PRODUCTIVE EMPLOYMENT IN DEVELOPING COUNTRIES' EXPORTING INDUSTRIES

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ERRATA

page 11, line 8: read instead of $\ln \frac{VA}{E} = \beta_1 + \beta_2$ GDP p/c

the relation $\ln \frac{VA}{E} = \beta_1 + \beta_2 \ln$ GDP p/c

page 12, line 14: read instead of $\ln \frac{VA}{E} = \beta_1 + \beta_2$ GDP p/c

the relation $\ln \frac{VA}{E} = \beta_1 + \beta_2 \ln$ GDP p/c

Foreword

This report is a background paper for a workshop, organized by the Council for Asian Manpower Studies (CAMS) and the section Development Economics of the Free University, to be held on 17-19 April in Bangkok.

Up to now, a number of CAMS studies have been devoted to the issue of employment and trade in some Asian countries. The Free University project is focussed on the impact of export-oriented expansion of manufacturing sectors on employment and income in a number of Asian as well as African and Latin American countries.

By co-operating in this new research project, it is expected that a more detailed assessment of the impact of outward-oriented manufacturing development on employment and income in developing countries can be made. Our ultimate purpose is to establish a policy-oriented research project from which policy guidelines could be inferred for agencies in both developing and developed countries.

In this background paper for the first joint meeting, outlines for a theoretical framework are presented. Our analysis departs from a differentiation between export promoting strategies and groups of exported products,and their impact on employment and (wage) income.

In this paper, a summary is presented of the research that has been undertaken at the Free University up to now, but results from previous CAMS studies have been used as well.

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I. Introduction

Employment creation is a crucial means for reducing poverty and the raising of living standards. This does not imply, however, that policies should aim at maximizing the level of employment. The pervading issue is not so much employment as such, but the creation of what is called productive employment. According to Pyatt and Thorbecke, maximization of employment as such may lead to "a regime of low wages" (1). Therefore, the income aspect of employment should be an integrated element in the analysis of employment problems and policies. A tension exists between the raising of employment and the raising of wages. This tension is a crucial element in all theories on employment creation in labour surplus economies and especially in theories that focus on such open economies. Employment and basic needs fulfilment for lower income groups have become a major issue in modern economic theory and in policy recommendations. With respect to the modern industrial sector, policies stimulating growth of relatively labour-intensive sectors have been carried through in a number of developing countries, while inward-oriented, anti-trade biased policies are (partly) abolished and replaced or supplemented by trade promotion policies.

Export promotion policies for non-traditional export products might be successful in increasing the demand for labour. At the same time, however, such open growth policies do influence the position of wages as these were more or less protected in the case of an inward-oriented development and are now open to international competition.

Export promotion policies for non-traditional export products have also an international dimension as they affect the level of employment and wages in developing and in developed countries. A structural increase in the share of developing countries in the world market for such products is a crucial component of what is called a new international economic order.

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(1) Pyatt and Thorbecke, 1976, p.16

However, up to now the growth of manufactured export production in developing countries has been frustrated by protective measures in developed countries. Now that unemployment is at a relatively high level and growth perspectives are unfavourable, the chances of a smooth process of industrial restructuring in these countries are diminishing.

There has been much concern for the negative employment effects of the penetration of developing countries on the markets of developed countries. Detailed studies of the above effects have been done by national and international agencies. In contrast, the positive employment effects of manufactured export production in developing countries have not been calculated systematically. In 1973 the ILO published a review of research on this subject in which it is stated "(...) that in spite of the importance of the subject, not a single study has been found that devoted itself to a thorough and systematic analysis of the direct and indirect effects of export expansion on employment in developing countries" (1). As recently as 1977 the World Bank stated that "the direct employment effects in developing countries have not been estimated, but the total would probably be in the order of 2 or 3 million workers, based on rule-of-thumb calculations" (2). This number is again mentioned in Keesing's study on developing countries' exports (3).

The employment impact of manufactured export production in developing countries is part of our research.

Sections II and III focus on the direct employment effects of manufactured export production. By means of international trade statistics and production statistics, employment, generated by manufactured export production, is calculated for a number of South-East Asian countries at one moment in time (1973). By regressing data on the productivity of labour on per capita income for a large number of developing countries, statistical patterns of the employment effects of manufactured exports from 11 major exporting

(1) Hsieh, 1973, p.2
(2) IBRD, 1977, p.152, footnote 1
(3) Keesing, 1979, p.56

sectors were found.

Sections IV, V and VI deal with the impact of trade on the structure of the economy. It is argued that three broad avenues of manufactured export expansion could be distinguished. It would appear useful to analyze future possibilities for South East Asian economies to stimulate manufactured exports within the framework of these three broad avenues, as has been demonstrated by Myint (1). The impact of exporting sectors on the rest of the economy is analyzed by means of input-output economics. As our study is basically concerned with employment and wages, we focus on direct employment effects, and indirect employment effects emanating from intermediate deliveries to exporting industries and those indirect effects that emanate from the spending of wages earned in exporting industries.

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(1) Myint, 1972.

II. Selection of Traded Products, Countries and Exporting Sectors

An inquiry into the effects of international restructuring and the growth of manufactured export production on employment in developing countries presupposes a procedure to select countries and products and a system to relate data from different data systems to each other consistently.

selection of products

First, we shall deal with the selection of products. There would be no reason to deal with the problem of defining manufactured products if the deviations between current concepts were only small. However, such deviations are substantial (1).

In 1965, the U.N. Statistical Office and the UNCTAD Secretariat jointly prepared a tentative list of primary commodities, semi-manufactures and manufactures (2). Semi-manufactured products have undergone considerable transformation; the value of these products must mainly be realized by the process of transformation and not by the sectors producing their raw materials. It should be stressed that some products from sections 0-4 of SITC-Rev. are included in this broad UNCTAD definition of manufactured products . These sections comprise products of farming, forestry, fishing, coal-mining and petroleum and related products. However, the criteria for dividing products into manufactures and other products, according to the manufactured value added component, are not entirely clear (3). The UNCTAD definition of 1965 did not obtain general acceptance.

In 1970, UNCTAD made a new distinction between kinds of products; from the 1965 definition, a number of products, roughly indicated as petroleum and related products and unworked non-ferrous metals (except aluminium) are excluded (4). The reason for isolating these products is that they "are not far removed from their primary stage".

In statistical publications and studies of international organizations, a range of short-cut definitions is used. All such definitions are limited

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(1) See Van Dijck, Verbruggen, 1978, pp.1-26.
(2) UNCTAD, 1965, p.4
(3) See Prakash, 1974
(4) UNCTAD, 1970, p.V

to SITC sections 5-8 only. The various definitions of manufactured exports in use by international agencies differ widely; even larger deviations can be found in such definitions used in specific studies by research institutions or individual researchers.

It is obvious that the validity of the results and conclusions of an inquiry into the industrial development dimension of manufactured exports depends on the range of manufactured products under investigation and that, therefore, that range must be in line with the object of investigation. As our research concerns several export-oriented industrialization strategies, among which the industrial processing of primary products, it is necessary not to limit the definition of manufactured exports to SITC sections 5-8 but to include manufactured primary products from SITC sections 0-4.

See for a more detailed description of the definition used in this study Annex I.

selection of countries

Based on the above definition, calculations were made of the value of manufactured exports of those 36 developing countries which exported manufactured products for a value of at least $100 million in 1975, for the period 1968-1975. The impact of manufactured exports on economic development in these 36 countries was analyzed by means of two indicators: (i) the ratio of manufactured exports to total exports, (ii) the ratio of manufactured exports to gross value of output in manufacturing.

For 15 developing countries both ratios reached relatively high levels or showed a pronounced increase during the period. These countries are: Costa Rica, Dominican Republic, Guatemala, El Salvador, Senegal, United Republic of Cameroon, Ivory Coast, Lebanon, Tunisia, Korea Republic, Thailand, Malaysia, Singapore, Hong Kong and Taiwan. The export performance of Taiwan could not be analyzed by means of U.N. data. For some other countries the data system is not yet complete. Our further research is mainly concentrated

on the above listed countries.

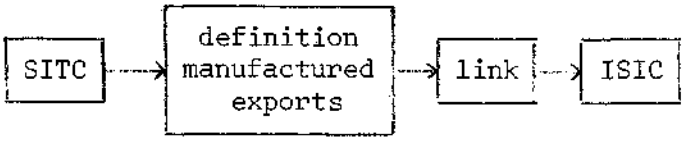
From the above-mentioned indicators, it follows that all countries in the CAMS project, except the Phillipines, show a relatively high level of outward-orientation or a drive to export-led growth in the period 1968-1975.

The case of the Phillipines is rather complicated, because of the classification of SITC 061 (sugar and honey) which is of major importance in Phillipines' exports. As follows from our definition, this item is not a manufactured product and in all available definitions of manufactured products it is not included (1). However, Prakash, reviewing a number of definitions in a study of statistical indicators of industrial development, argues that SITC items 061.1, 061.2, 061.5 and 061.9 should be included in the definition of manufactured products (2). Moreover, it could be argued that SITC 061 is linked to ISIC 311/2, which is a manufacturing sector in the UN classification of commodities by industrial origin.

More detailed research is necessary to allow for a more precise assessment of Phillipines' exports in terms of manufactured and non-manufactured products.

selection of exporting sectors

Up to now, we have dealt with the selection of exported products and of exporting countries. To facilitate international comparisons, data on manufactured exports in the Yearbook of International Trade Statistics (SITC) were transposed into data on manufacturing sectors in the Yearbook of Industrial Commodities by Industrial Origin. In this way we find manufacturing sectors that export part of their output. The procedure goes as follows:



The linking procedure is presented in detail in Annex II. This procedure is used for two purposes:

1. to find a consistent set of output employment ratios that facilitate international comparisons;
2. to compute the development of productivity per manufacturing sector.

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(1) See Van Dijck, Verbruggen, 1978, pp.1-26.
(2) V. Prakash, 1974, p.116

III. Employment and Productivity in Exporting Sectors

Direct employment effects of manufactured exports can be calculated directly from input-output tables. As input-output tables are not internationally standardized, differences in the classifications of sectors and subsectors seriously frustrate international comparisons of the impact of foreign demand for manufactured products on the demand for labour.

An alternative approach to calculate these direct employment effects goes by means of the linking procedure. This round-about procedure enables international comparisons as it links standardized internationally traded items (SITC) with 37 standardized manufacturing sectors (ISIC). However, the main frustrating element in this linking procedure is that in many cases data in international trade statistics are not detailed enough to allocate such traded items to producing sectors unarbitrarily. As follows from our data on Malaysia, Singapore and the Philippines, we were only able to allocate 92, 85 and 74 percent of total manufactured exports to producing sectors in these countries respectively (see Annex II).

Direct employment effects of such unallocated products were estimated by means of the average output-employment ratio in exporting manufacturing sectors. This may have caused an upward bias to the direct employment estimates.

A second frustrating element in this linking procedure emanates from difficulties to distinguish 're-exports' from 'normal' exports (as is the case in Singapore) which, again, causes an upward bias to the estimates and affects international comparability.

Third, international comparisons in the linking procedure are frustrated as only output-employment ratios can be used instead of more appropriate value added-employment ratios. Differences in output-value added ratios between countries do affect the international comparability of the findings.

Therefore, we used only value added-employment ratios in the productivity analysis that is presented in the following paragraph.

As is also the case in input-output economics, calculations of the employment impact of foreign demand for manufactured products might be frustrated because of price differences between domestic and international markets and because of differences in the level of productivity between firms producing for domestic and foreign markets.

It follows from the trade data in the Commodity Trade Statistics that the share of manufactured products in SITC 0-4 in total exported manufactured products is 44.5% in the Philippines, 25.0% in Malaysia and only 11.7% in Singapore (in 1973). As has been pointed out before, these items are not included in some other definitions of manufactured products such as the World Bank definition. Within these SITC sections, exports of food products and wood products are of great importance in the Philippines and in Malaysia. Food products are capital-intensively produced, while the wood processing sector is very labour-intensive in these countries and consequently greatly influences the employment effects of manufactured exports.

As a preliminary result of calculations with the linking procedure, we present the data in Annex II and some results below. Unfortunately, no production data were available to calculate the employment effects of manufactured exports in Thailand in 1973.

It is expected that by means of the linking procedure more accurate insight in the direct employment effects of manufactured export expansion in developing countries could be obtained that enables a more precise estimation of these effects than could be obtained by means of the aforementioned 'rule-of-thumb' calculations.

Manufactured Exports in the Philippines, Malaysia and Singapore (1973)

	Philippines	Malaysia	Singapore
$\frac{\text{manufactured exports}}{\text{total exports}}$	16.3 %	20.9 %	50.3 %
$\frac{\text{manufactured exported output}}{\text{total output in manufacturing}}$	6.4 %	18.7 %*	51.1 %
employment in manufactured export production	62772	82680	149692
$\frac{\text{employment in manufactured export production}}{\text{employment in manufacturing}}$	12.0 %	25.2 %*	75.0 %
$\frac{\text{output}}{\text{employment}}$ in manufactured exports	US $ 4733	US $ 7682	US $ 12117
$\frac{\text{output}}{\text{employment}}$ in manufacturing	US $ 8850	US $ 11216	US $ 17805

Sources: Data on output and the number of employees per exporting sector were taken from U.N. Yearbook of Industrial Statistics, 1976 Edition.
Data on exports were taken from U.N. Commodity Trade Statistics,1973.
The linking procedure is based on U.N. Classification of Commodities by Industrial Origin, New York, 1971.
Exchange rates were derived from I.M.F. International Financial Statistics, July 1979.

* Including Malaysia Peninsular, Sabah and Sarawak.
In the linking procedure, only data on Malaysia Peninsular were used.

productivity analysis

The employment effect per unit of exported manufactured products is reduced when labour productivity in industry increases. The productivity of labour in industry differs considerably between countries; generally, a high level of GDP per capita is associated with a high labour productivity in industry.

To emphasize prospects for employment creation in manufacturing in a growing economy, we estimated the following relation:

$$\ln \frac{VA}{E} = \beta_1 + \beta_2 \text{ GDP p/c}$$

where: VA = value added
E = number of employees

The variable GDP per capita is a proximation for the level of economic development of a country and value added per employee, labour productivity, varies with it. It should be stressed that no causal or explanatory relation is sought but only a statistical and stable one, in order to estimate future employment opportunities in exporting sectors (1).

This relation is estimated for those 11 manufacturing sectors that produced over 75% of the overall value of manufactured export products from developing countries in 1973 (2). Consequently, these sectors are of major importance for the development of manufactured export products in developing countries and the creation of productive employment in exporting industries. The cross-section estimates are based on data from a group of 36 developing countries that all exported manufactured products for a value over $\$100.10^6$ in 1975.

Here we present our findings. The diagrams represent the regression equations for each manufacturing sector; the plotted points represent the positions of three Asian countries in relation to the regression equation, namely Singapore (SI), Malaysia (MA) and the Philippines (PH).

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(1) See also Lydall, 1975.
(2) These computations are based on the linking procedure that has been described on page 7

ISIC number	Industry	β_1 (1)	β_2 (1)	R^2	n	Rank in VA/E at GDP p/c $100	Rank in VA/E at GDP p/c $2000
311/2	Food Products	4.17	0.66	0.51	21	5	4
321	Textiles	4.16	0.63	0.50	21	8	8
321.1	Spinning, Weaving	3.95	0.68	0.58	16	6	5
322	Wearing Apparel	3.28	0.69	0.53	19	11	11
323	Leather and Products	4.02	0.62	0.57	18	9	10
331	Wood Products	3.49	0.70	0.77	19	10	9
351+352	Chemicals	4.86	0.62	0.61	19	1	2
371	Iron and Steel	3.85	0.78	0.80	15	3	1
382	Machinery NEC	4.07	0.65	0.50	19	7	7
383	Electrical Machinery	5.24	0.50	0.47	20	2	6
384	Transport Equipment	4.17	0.70	0.51	20	4	3

Table 1. Estimated values of the parameters of $\ln \frac{VA}{E} = \beta_1 + \beta_2$ GDP p/c, 1973

Note 1: All estimated coefficients are significant at 1 per cent level.

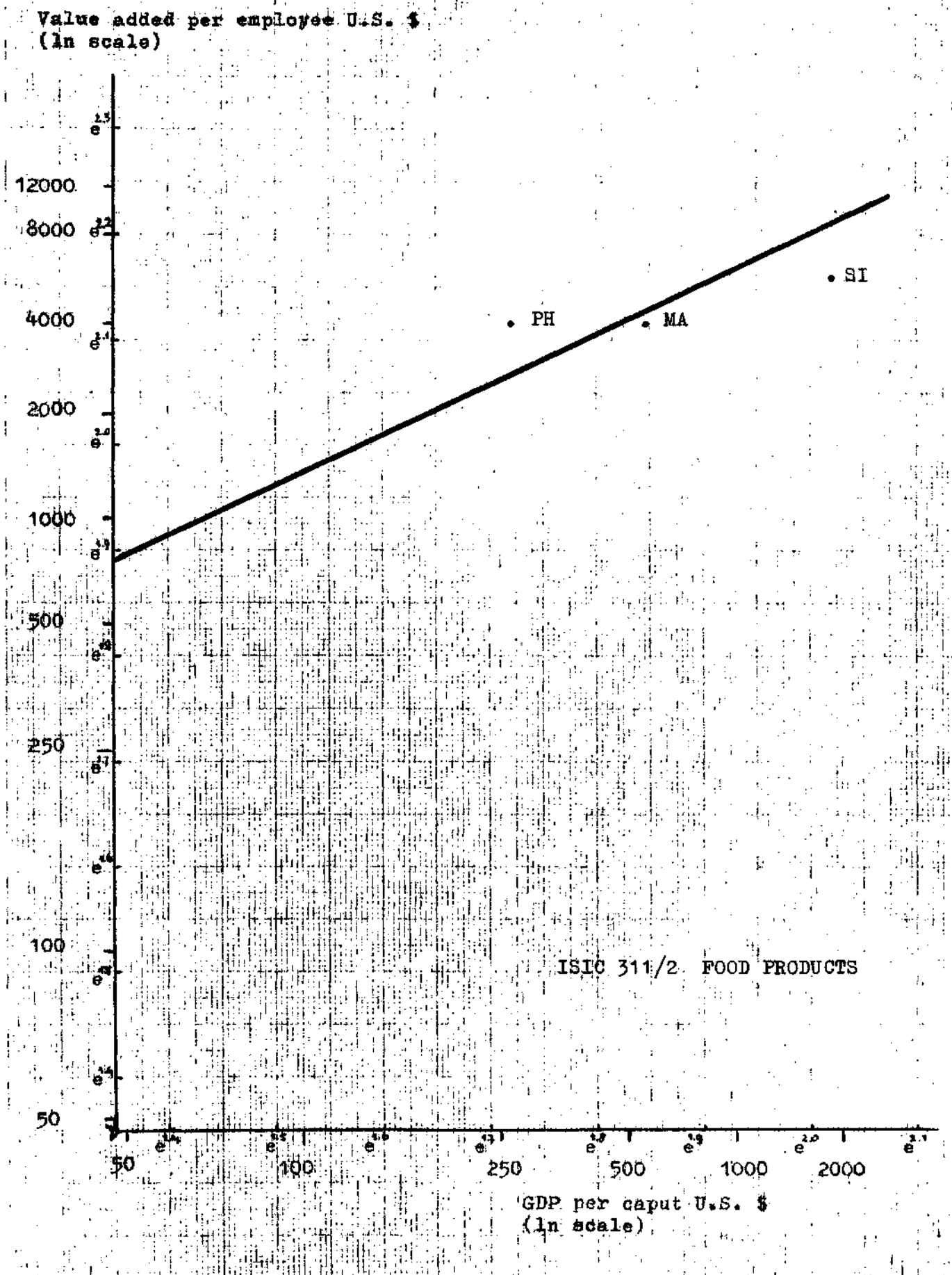
Sources: Data on value added and the number of employees per sector were taken from U.N. Yearbook of Industrial Statistics, 1976 Edition. Data on GDP per capita were taken from U.N. Yearbook of National Account Statistics, 1976 and unpublished IBRD data, dated 06.06.1978. Exchange rates to convert national currencies into U.S. dollars were derived from I.M.F. International Financial Statistics, July 1979.

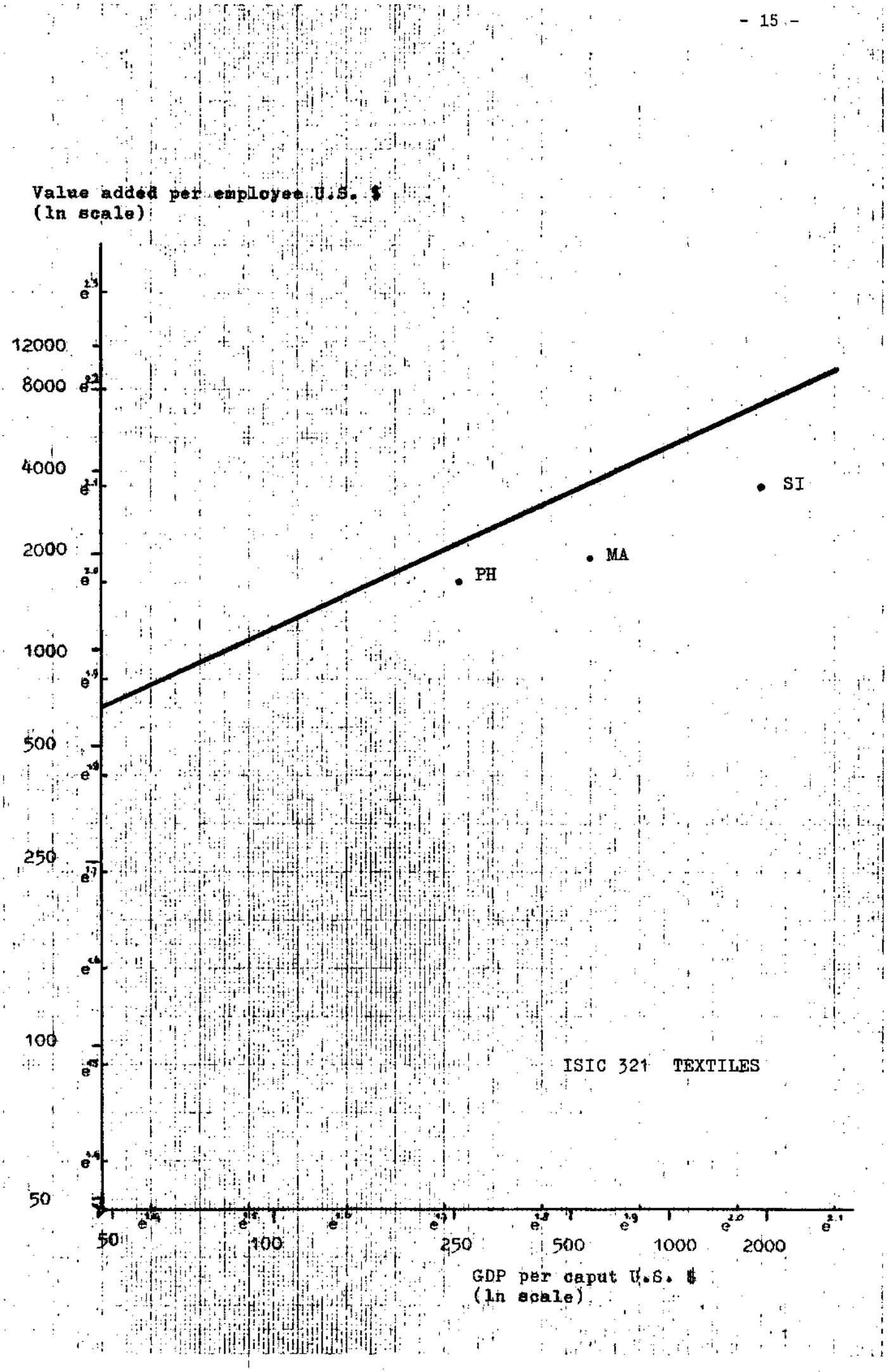
A significant positive constant term indicates at a higher labour productivity in a specific manufacturing sector compared with the average productivity in the whole economy. As can be learned from Table 1, all constant terms are positive. A significant constant term, combined with an elasticity of value added per employee per sector with respect to GDP per capita less than 1, points to a convergent development of high and low productivity sectors when GDP per capita increases. Lydall, who performed alike estimates, explains this phenomena by pointing to the shift of labour from low-productivity traditional sectors into high-productivity modern sectors (1). The ranking of sectors by value added per

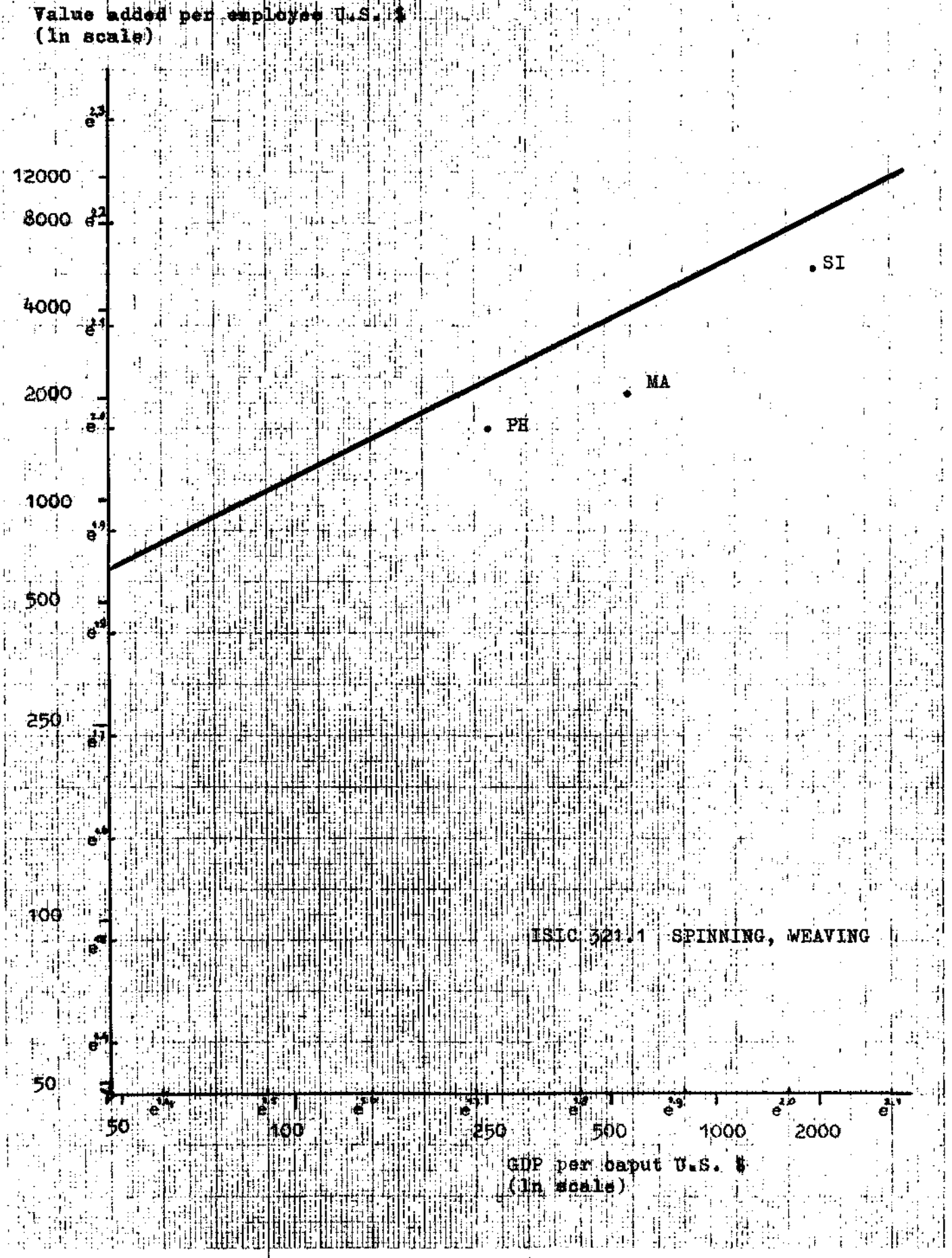
(1) Lydall, 1975, p.58.

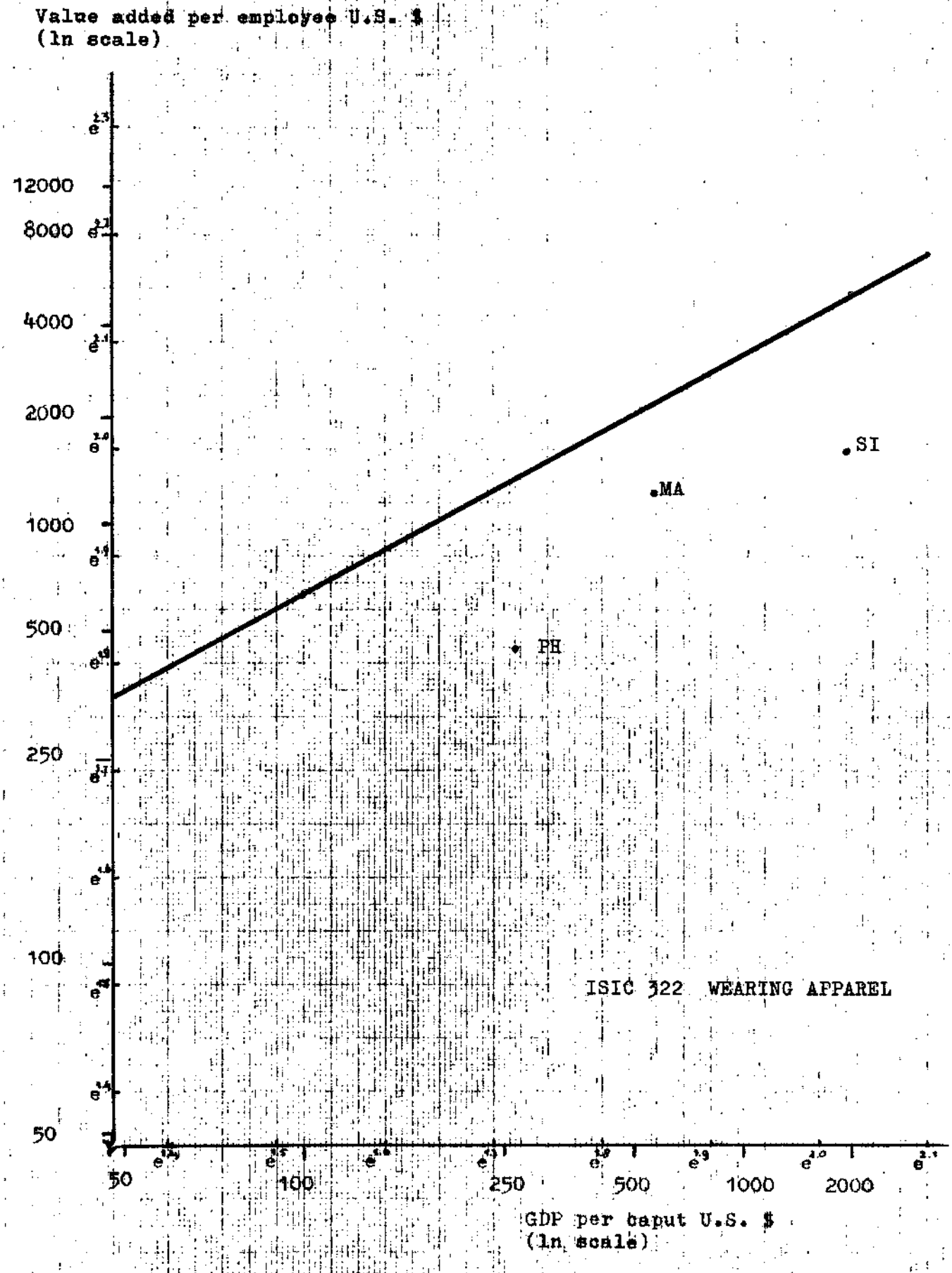
employee at $100 and $2000 GDP per capita levels produced a Spearman coefficient of rank correlation of .87. This means that the level of productivity in different manufacturing sectors vis à vis each other does not change much at increasing GDP per capita levels. If industries with lower value added per employee are classified as relatively labour-intensive, it follows that wearing apparel, leather and products, and wood products are consistently labour-intensive industries, followed by textiles (1). Iron and steel, and chemicals are clearly capital-intensive. It is important to note that electrical machinery is relatively capital-intensive at low GDP per capita levels, but becomes relatively more labour-intensive at higher GDP per capita levels; electrical machinery shows the highest constant term and the lowest elasticity. This may reflect a fairly standardized technology in the electrical machinery sector.

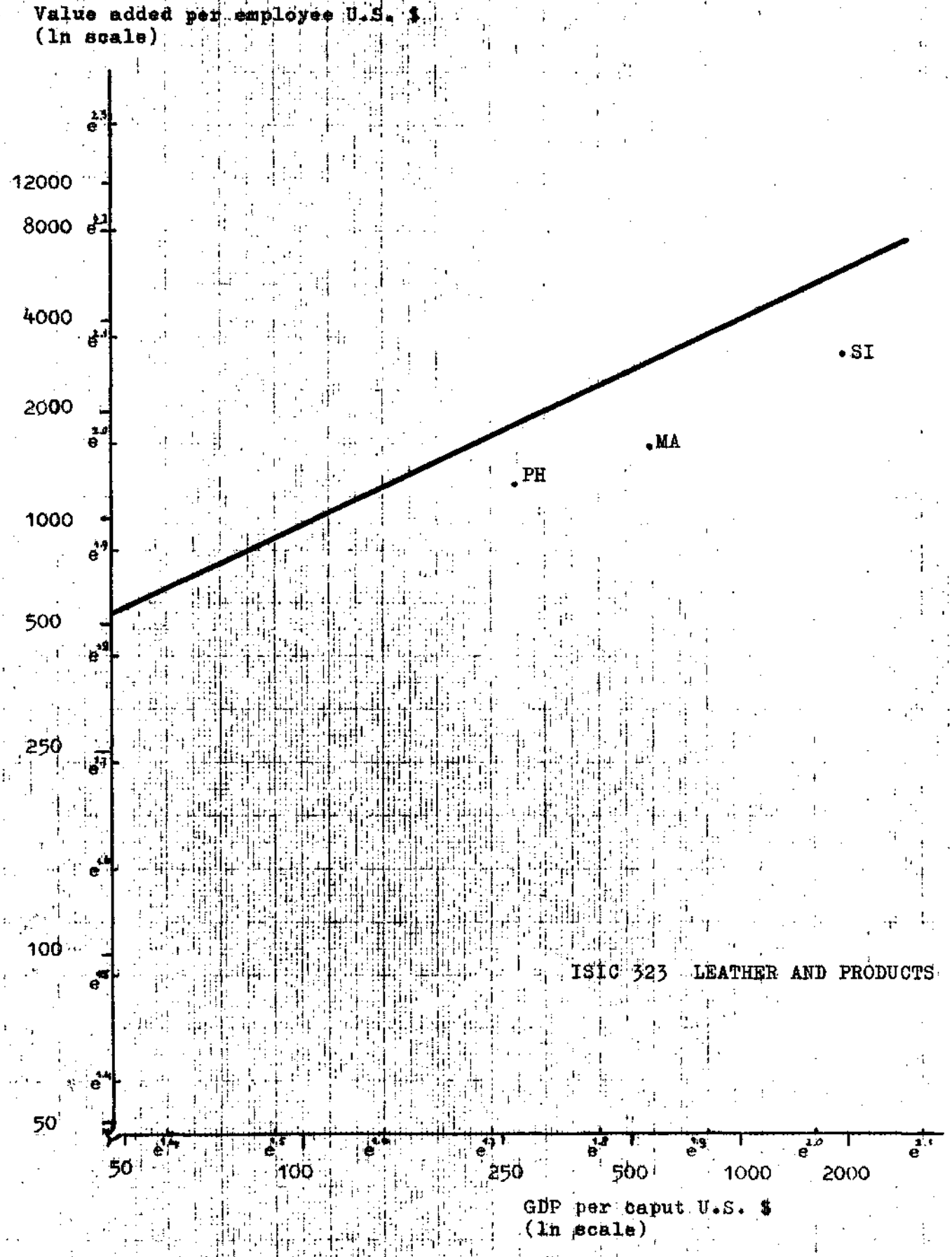
(1) We shall elaborate on this issue in Section V.

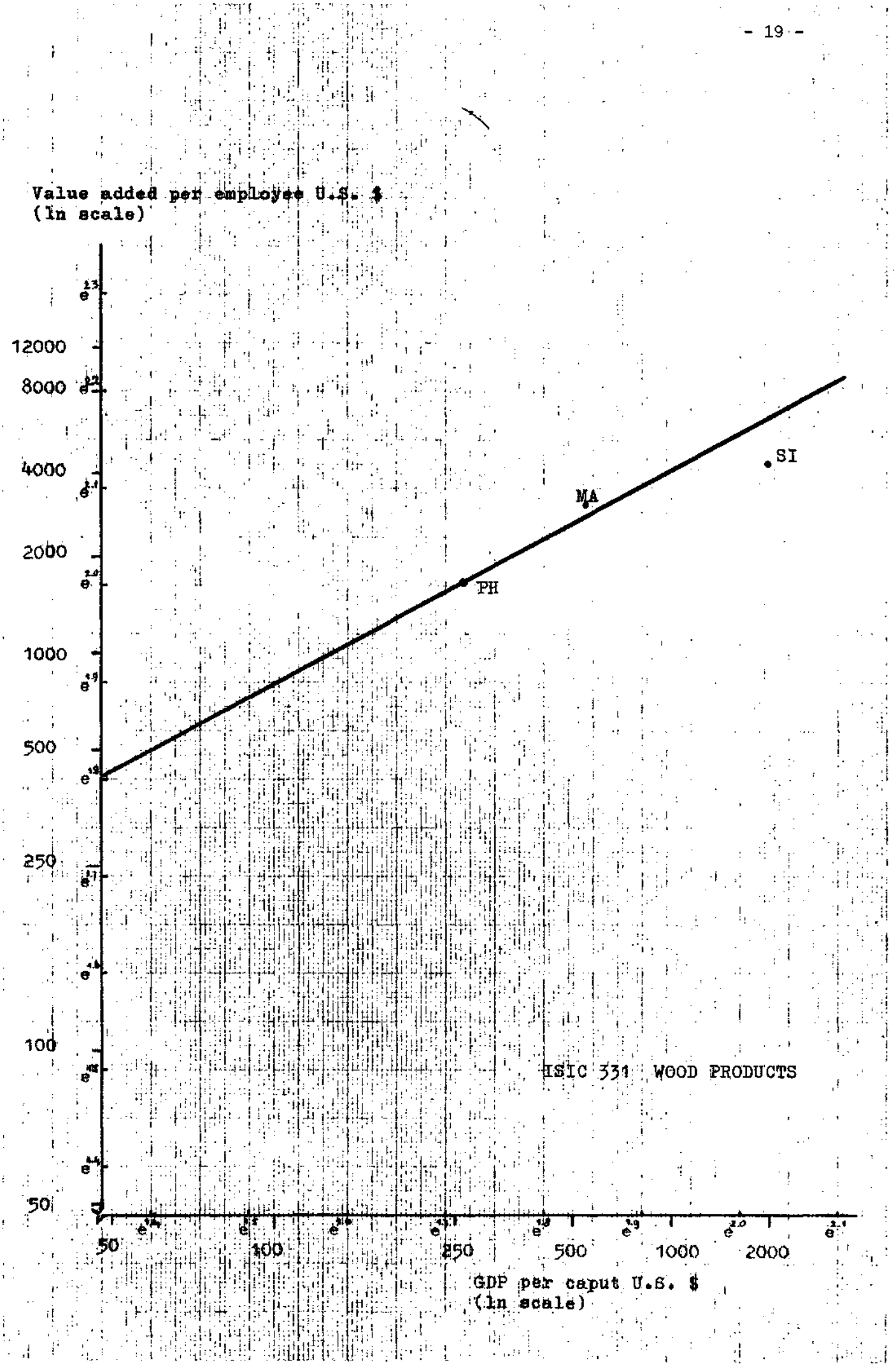

Value added per employee U.S. $
(ln scale)
12000
8000
4000
2000
1000
500
250
100
50
PH
MA
SI
ISIC 311/2 FOOD PRODUCTS
50
100
250
500
1000
2000
GDP per caput U.S. $
(ln scale)

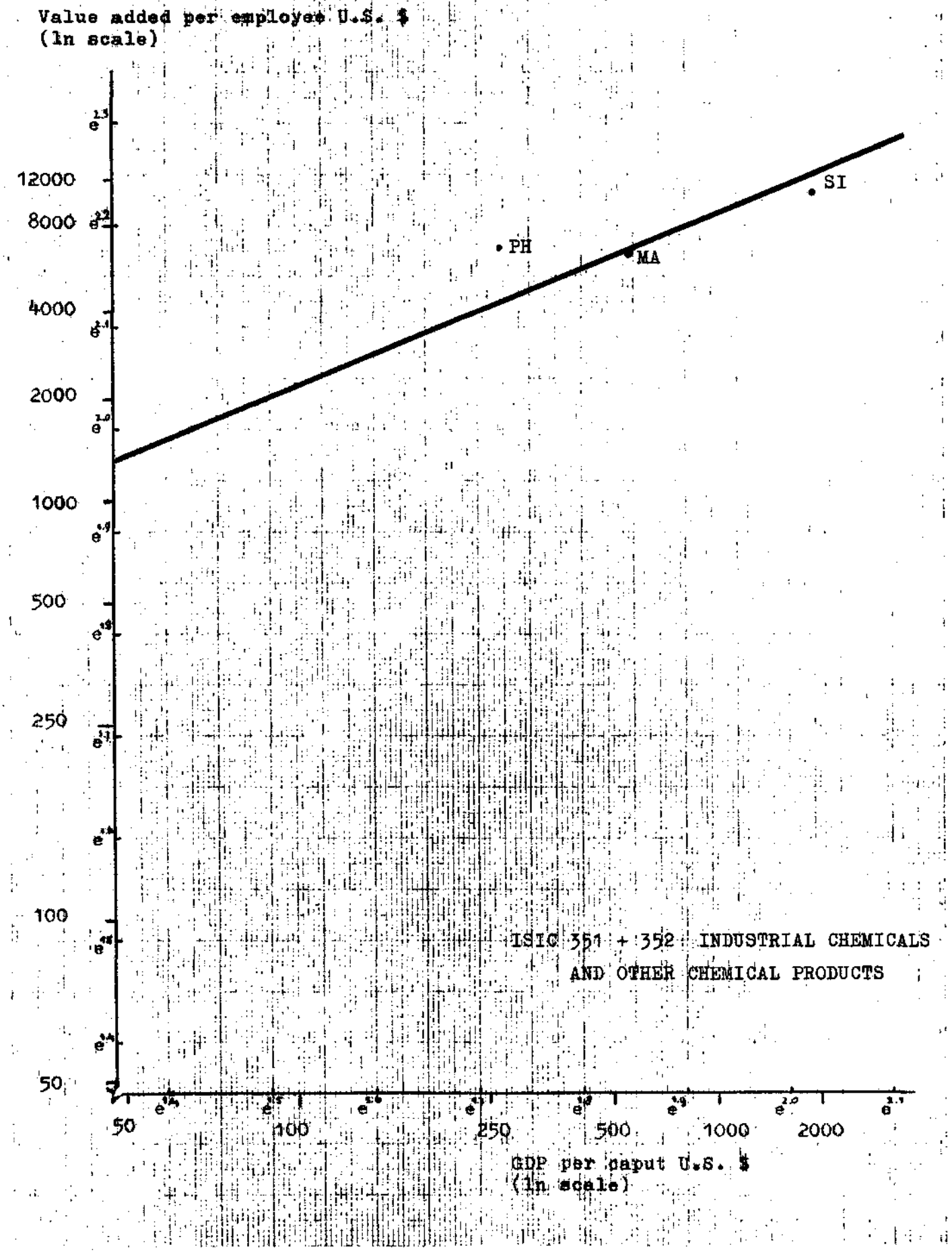

Value added per employee U.S. $
(ln scale)
12000
8000
4000
2000
1000
500
250
100
50
SI
MA
PH
ISIC 321 TEXTILES
50
100
250
500
1000
2000
GDP per caput U.S. $
(ln scale)

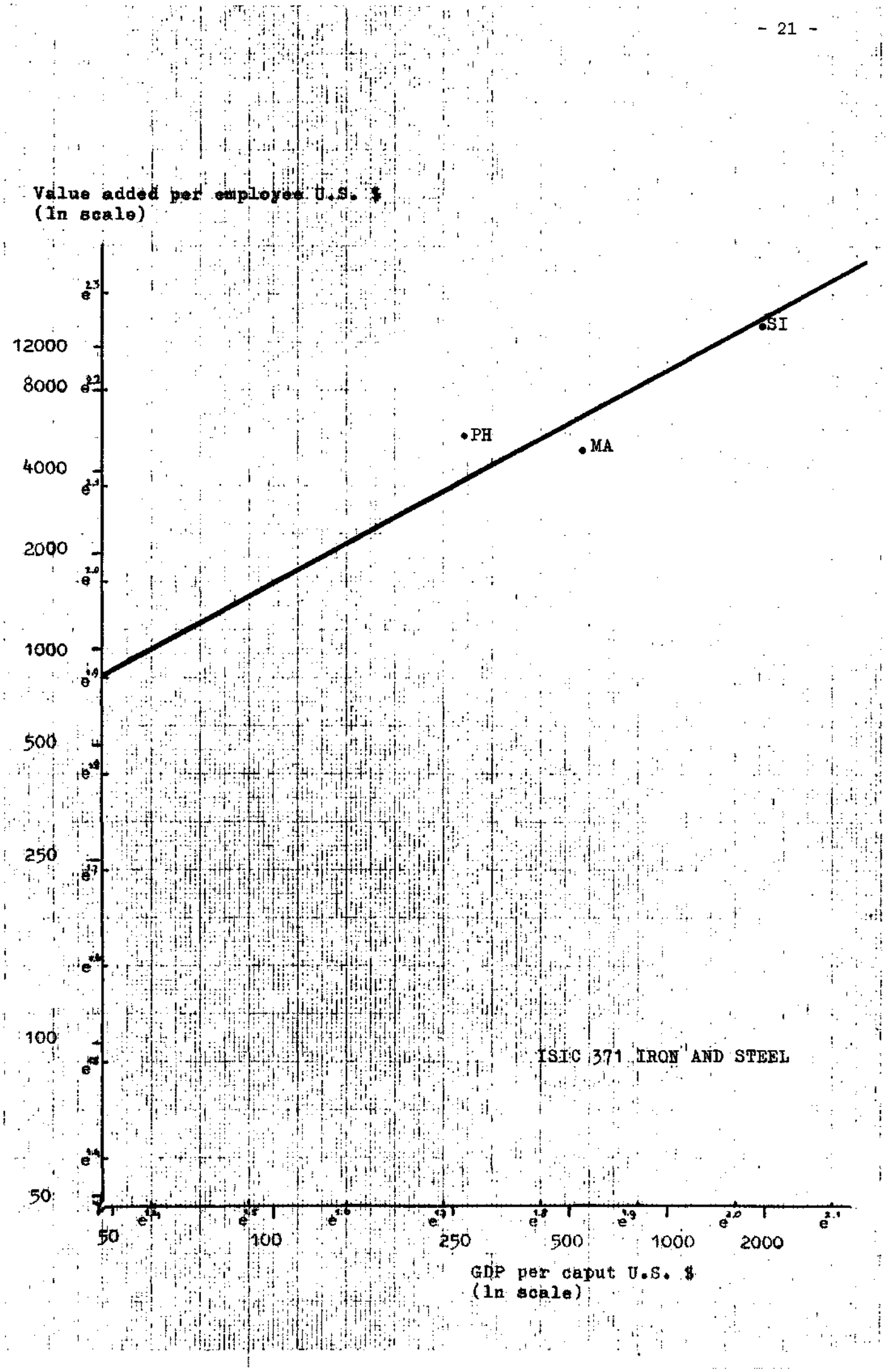

Value added per employee U.S. $
(ln scale)
12000
8000
4000
2000
1000
500
250
100
50
SI
MA
PH
ISIC 3211 SPINNING, WEAVING
50
100
250
500
1000
2000
GDP per caput U.S. $
(ln scale)

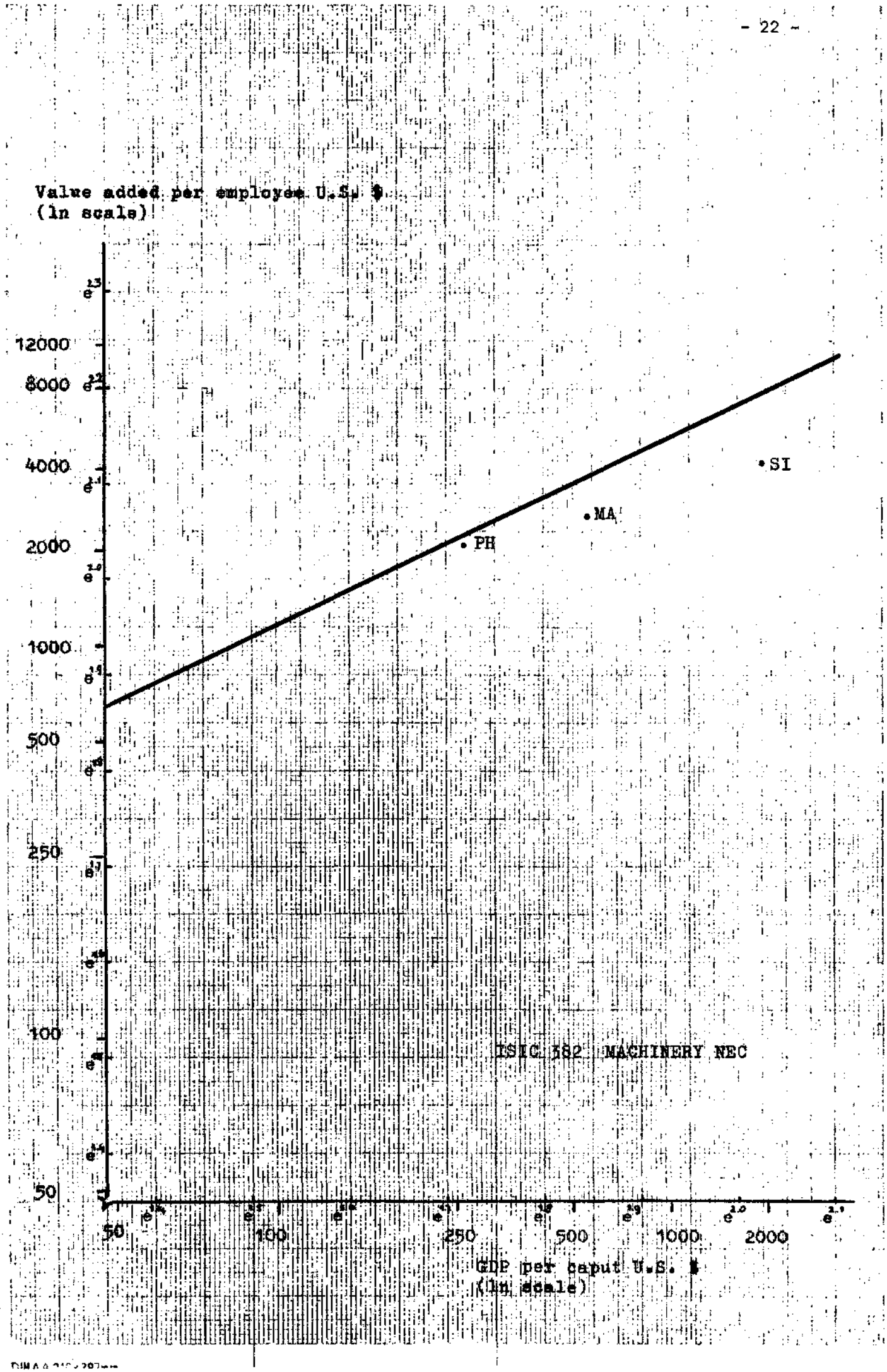

Value added per employee U.S. $
(ln scale)
12000
8000
4000
2000
1000
500
250
100
50
SI
MA
PH
ISIC 322 WEARING APPAREL
50
100
250
500
1000
2000
GDP per caput U.S. $
(ln scale)

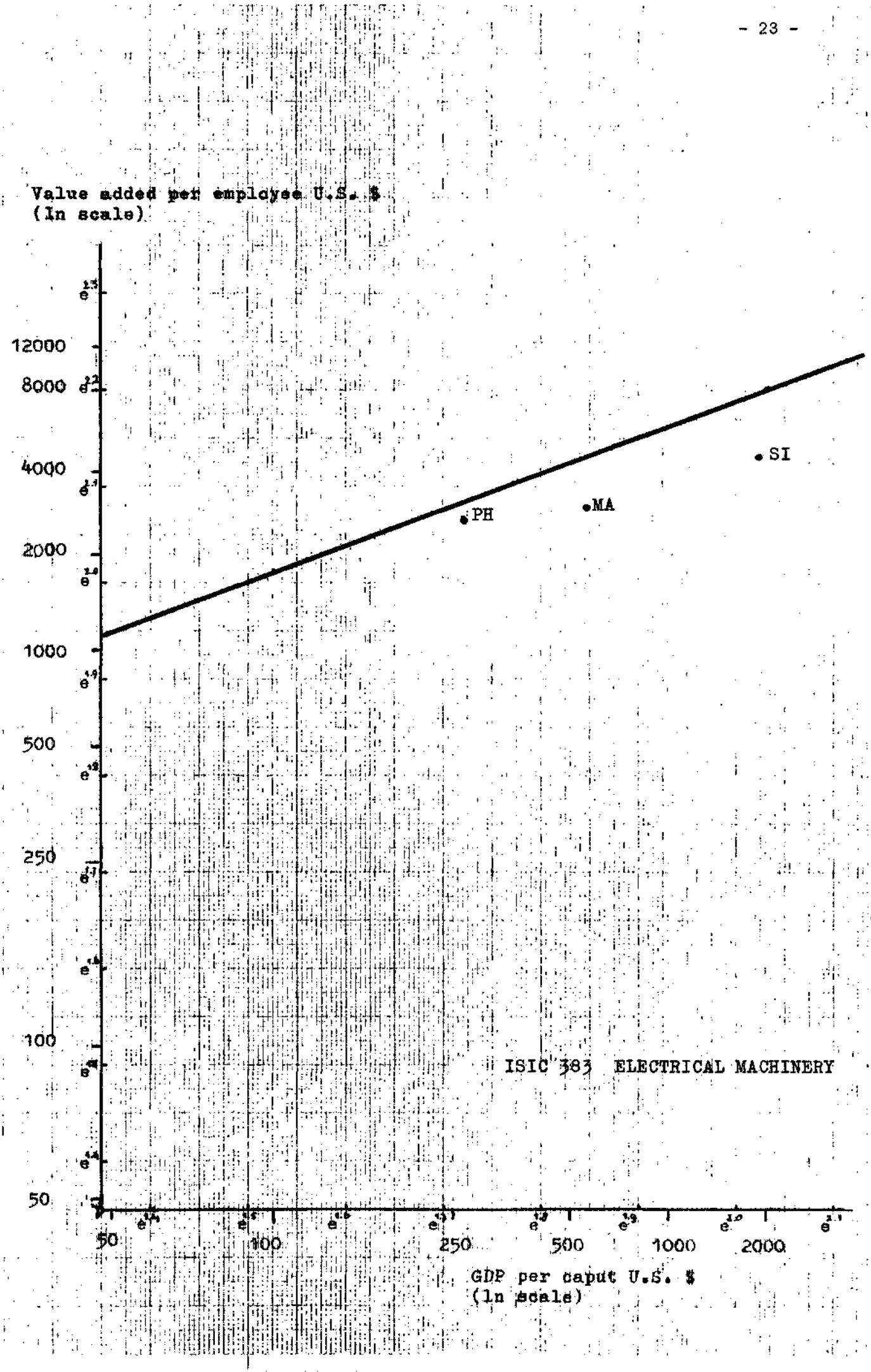

Value added per employee U.S. $
(ln scale)
12000
8000
4000
2000
1000
500
250
100
50
SI
MA
PH
ISIC 323 LEATHER AND PRODUCTS
50
100
250
500
1000
2000
GDP per caput U.S. $
(ln scale)

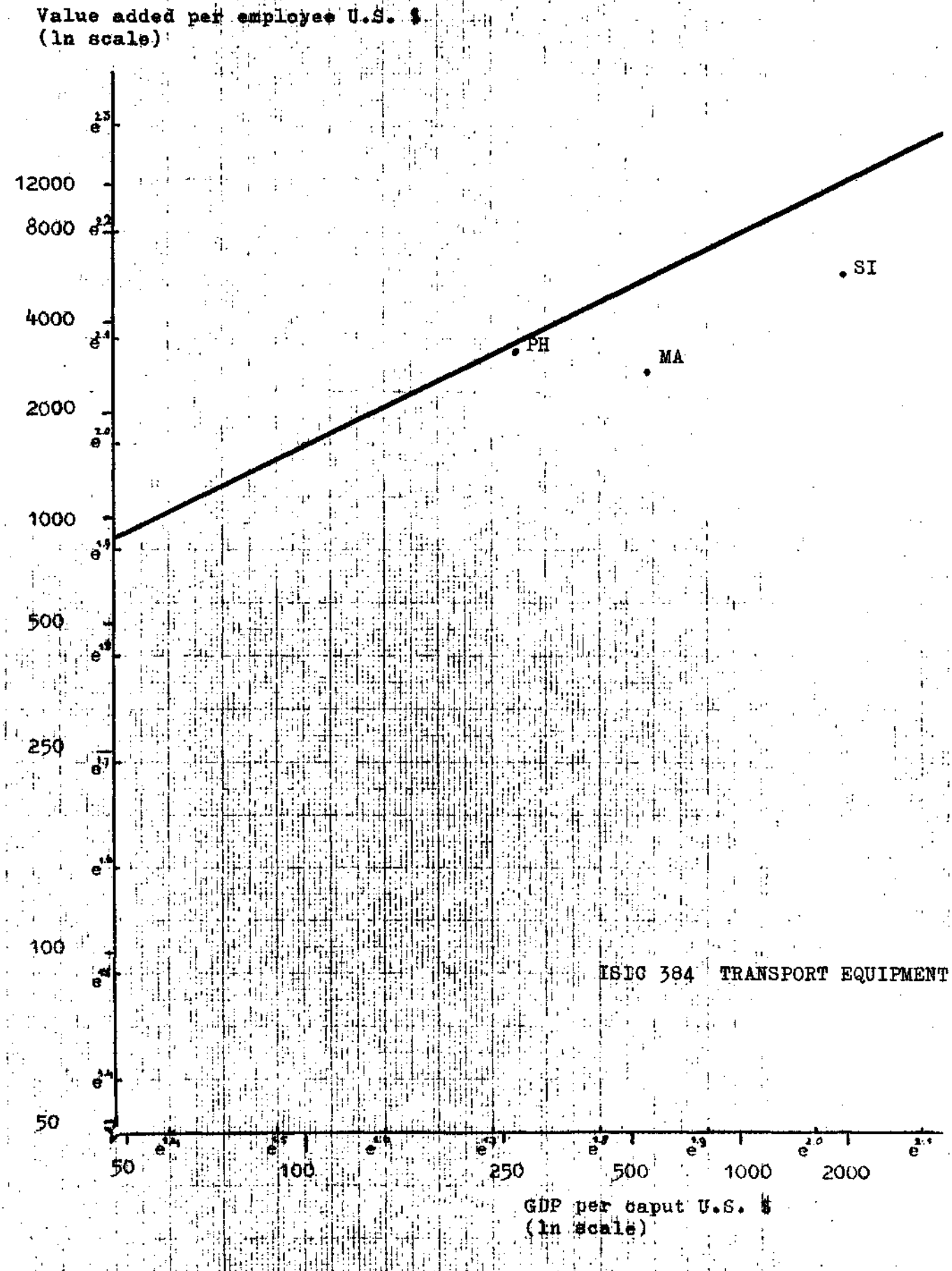

Value added per employee U.S. $
(ln scale)
12000
8000
4000
2000
1000
500
250
100
50
SI
MA
PH
ISIC 331 WOOD PRODUCTS
50
100
250
500
1000
2000
GDP per caput U.S. $
(ln scale)


Value added per employee U.S. $
(ln scale)
12000
8000
4000
2000
1000
500
250
100
50
SI
PH
MA
ISIC 351 + 352 INDUSTRIAL CHEMICALS
AND OTHER CHEMICAL PRODUCTS
50
100
250
500
1000
2000
GDP per caput U.S. $
(ln scale)


Value added per employee U.S. $
(ln scale)
12000
8000
4000
2000
1000
500
250
100
50
SI
PH
MA
ISIC 371 IRON AND STEEL
50
100
250
500
1000
2000
GDP per caput U.S. $
(ln scale)


Value added per employee U.S. $
(ln scale)
12000
8000
4000
2000
1000
500
250
100
50
SI
MA
PH
ISIC 382 MACHINERY NEC
50
100
250
500
1000
2000
GDP per caput U.S. $
(ln scale)


Value added per employee U.S. $
(ln scale)
12000
8000
4000
2000
1000
500
250
100
50
SI
MA
PH
ISIC 383 ELECTRICAL MACHINERY
50
100
250
500
1000
2000
GDP per caput U.S. $
(ln scale)


Value added per employee U.S. $
(ln scale)
12000
8000
4000
2000
1000
500
250
100
50
SI
PH
MA
ISIC 384 TRANSPORT EQUIPMENT
50
100
250
500
1000
2000
GDP per caput U.S. $
(ln scale)

IV. The Structural Impact of Trade

New branches in development theory have strongly stressed the working of structural tendencies in international economic relations as well as in domestic economic relations in developing countries. These structural tendencies are bypassed in traditional economic thinking. The well-known Prebisch-Singer thesis and the theories that depart from it strongly emphasize the international aspect of underdevelopment and the existence of duality on a world scale while theories of the (open) dual economy as well as Marxian theories focus on the internal aspects of duality.

The internal aspect of duality expresses itself in the existence of an enclave-like modern export sector with no or only negligible relations with the rest of the economy. Traditionally, the enclave economy produced primary products for foreign markets. In most cases, production was organized by foreign enterprises, using imported capital goods as well as foreign skilled labour. Spendings out of income in the modern sector generated a demand for manufactures that was satisfied partly by imports and partly - and to an increasing degree as time goes by - via import substituting industries. In such a development process, as has been analysed by Hirschman, the import substituting sector was linked with the export sector.

In the enclave primary export sector, some forward linkages can be induced and consequently some domestic processing of primary products can be undertaken before these are exported. This is the first way to induce manufactured export production.

Import substituting industrialization has been an important drive to industrial growth in most developing countries. The objections against this industrialization strategy, in particular with respect to efficiency and employment creation, are well known and need not be repeated here. Producers were protected against foreign competition and were themselves not able to compete on foreign markets. Nevertheless, a drive to export production has

taken place in an increasing number of developing countries.

Four cases can be distinguished:

1. regional trade within a protective trade system;
2. dumping practices;
3. specific export promotion measures;
4. a re-orientation of import substitution strategy to export promotion in order to diminish discrimination against exports.

In this second strategy products are initially exclusively sold on the domestic market and in a later phase production for domestic and foreign markets takes place, which is in line with the 'normal' pattern of development (1).

In a third strategy, an increase in manufactured exports can be realised by developing a non-traditional export enclave sector, in which (labour-intensive) products are produced with standardized or low technological production processes. The establishment of export-processing free zones could be interpreted as an extreme model of this line of manufactured export promotion.

This third way of manufactured export production differs from the other two strategies in that it is more footloose in the short run. In the first strategy, the processing of products from primary sectors is rooted because of the immobility of inputs. In the second strategy, firms, producing for domestic and foreign markets are tied to the domestic economy as long as market penetration from outside is hampered by import restricting policies. In the third strategy, firms, producing exclusively for foreign markets and using only a limited number of domestic inputs are footloose, especially in the case of assembly activities and labour value added processing.

It goes without saying that these three strategies are not mutually exclusive, and can well be combined within a national industrialization program.

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(1) See Linder, 1961

The expansion of manufacturing export sectors might have positive effects on overall growth, employment, income distribution and the balance-of-payments. However, the extent of such effects depends largely on the factor intensity of the sectors, the level of integration of the exporting industries with the rest of the economy, the share of wages in value added and the import content of output. As Benjamin Cohen puts it: "one might want to examine the contemporary spurt in manufactured exports in terms of its impact on the developing countries. Is it possible to have en enclave of manufactured exports?" (1). To facilitate the analysis of the interrelatedness of exporting sectors with the rest of the economy, input-output methods will be used.

input-output analysis

An input-output table describes the input and the output of interrelated economic sectors of an economic system by a set of linear equations over a stated period of time.

By definition:

$$(1) \quad X_i = \sum_{j=1}^{n} X_{ij} + Y_i$$

in which:

X_i = total output of sector i, i=1,2...n

X_{ij} = output of sector i, absorbed as an input in sector j, j=1,2...n

Y_i = final demand for goods from sector i, i=1,2...n.

One of the columns of final demand consists of exports.

If $a_{ij} = \frac{X_{ij}}{X_j}$ is denoted as the constant input coefficient and is substituted into (1), this set of equations for all i can be written in matrix notation:

$$(2) \quad X = AX + Y$$

It follows that:

$$(3) \quad X = (I - A)^{-1} Y$$

(1) Cohen, 1975, p.7

The matrix A is called the structural matrix, the matrix (I-A) is the so-called Leontief matrix. As only domestically supplied inputs are to be considered, the matrix (I-A) must be exclusive of intermediate imports.

In the traditional Hirschman, Chenery and Watanabe approach (1), the interrelatedness of sectors of production with the rest of the economy is analyzed via the backward linkage effect

$$(4)\quad L_j^B = \frac{\sum_{i=1}^{n} X_{ij}}{X_j} \quad \text{for sector } j,$$

and the forward linkage effect for sector i

$$(5)\quad L_i^F = \frac{\sum_{j=1}^{n} X_{ij}}{Z_i} \quad \text{in which } Z_i = \sum_{j=1}^{n} X_{ij} + Y_i$$

Yotopoulos and Nugent introduced the so-called total linkage effect for sector j (2):

$$(6)\quad L_j^T = \sum_{i=1}^{n} r_{ij} \quad \text{in which } r_{ij} = \text{element of the matrix } (I-A)^{-1}$$

In international as well as intertemporal comparisons, sectors can be ranked according to their impact on production in the domestic economy. If a stable pattern could be found with respect to the ranking of sectors in developing economies, more general observations on the structure of production and the impact of trade on production could be made. By confronting the pattern of export trade with the country-specific ranking, we can make a detailed assessment of the contribution of the newly arising manufacturing export sectors on the overall level of production.

Following Hirschman, Chenery and Watanabe, some preliminary remarks can be made with respect to some sectors in developing economies, based on their global scheme of linkage effects. Traditional primary products, being produced with relatively primitive techniques and aiming at direct consumption, have no or only a few linkage effects. Primary export produc-

(1)See Chenery and Watanabe, 1958; and Hirschman, 1970
(2)Yotopoulos and Nugent, 1973.

tion, being produced with relatively modern techniques and aiming at overseas processing and consumption, has no or only a few forward linkage effects domestically. Backward and forward linkages go abroad: "The grudge against what has become known as the 'enclave' type of development is due to this ability of primary products from mines, wells and plantations to slip out of a country without leaving much of a trace in the rest of the economy"(1).

Domestic processing of primary export products has become an important element in the export-led industrialization policy of some developing countries. Such activities score low with respect to forward linkages and high with respect to backward linkages. However, these linkages are often concentrated in primary production and it is highly unrealistic to think of such primary production as being 'induced' by its processing. Sometimes, however, this might indeed be the case.

The high level of backward linkages in final manufacturing production is what Hirschman called the high potential of the import enclave industries: import substituting industries, working their way back to intermediate manufacturing and thus inducing diversified manufacturing sectors in some developing countries.

Finally, intermediate manufacturing industries are mentioned, because of their high levels of forward and backward linkages,the central chain of the vertical structure of production: the absence of such industries with pincer cum feedback effects is a real leakage of development effects.

It should be noted that some of the manufacturing sectors that are relatively well integrated in developing countries are of major importance in manufacturing export strategies, such as apparel, leather and products, processed foods, lumber and wood products, textiles, and printing and publishing.

If major policy changes vis à vis the manufacturing sector do occur, as has been the case in a large number of developing countries at the end of the sixties and the beginning of the seventies, the effectiveness of such new policies is reflected in the changing structure of the economy and could

(1) Hirschman, 1970, p.110

only be analyzed by means of up-to-date input-output tables. The same holds for the impact of new technologies.

The process of restructuring an inward-oriented economy towards a more outward-oriented model with import liberalization and export promotion might lead to an increase of import coefficients and a decrease of the value of backward linkages in order to maximize productivity and international competitiveness. This is exactly what Riedel's argument against linkage oriented approaches is all about and where the grudge against domestic licensing systems for export sectors is rooted (1).

In general terms, we could distinguish the following effects of export-led growth on the relations between value added, domestic linkages and imported inputs in manufacturing export sectors.

(i) In some labour intensive exporting sectors, the wage component is relatively small compared with such sectors producing for domestic markets. This might be caused by the relatively high level of labour productivity in exporting sectors and a relatively low wage level when in a labour surplus economy wage levels do not reflect the level of productivity.

(ii) Production at world market prices instead of protected domestic prices might cause lower levels of profits and thus a smaller profit component in export production.

(iii) Because of fierce international competition and the role of footloose labour value added processing, there might be a relatively heavy reliance on imported inputs and a low level of intermediate inputs.

These relations might differ substantially within manufacturing sectors between firms producing for the domestic market and firms producing for foreign markets. Unfortunately, it seems virtually impossible to distinguish between such firms within an input-output framework.

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(1) Riedel, 1976, pp.320-321

V. The Impact of Trade on Employment

Up to now, the interrelatedness of economic activities is dealt with in input-output ratios. From an employment policy point of view, it is more meaningful to investigate employment generating effects connected with these inputs and outputs.

There holds:

$$(7) \quad W_1 = \sum_{j=1}^{n} W_{1j}$$

in which:

W_1 = total output of primary sector labour

W_{1j} = primary input of labour into sector j, j=1.2...n

If $l_j = \frac{W_{1j}}{X_j}$ is denoted as the direct fixed labour coefficient, the vector of these coefficients for all j is called L, we can write:

$$(8) \quad W_1 = L' X$$

Substitution of (3) into (8) gives:

$$(9) \quad W_1 = L'(I-A)^{-1} Y$$

method and scope

The following general observations are based on a survey of empirical studies on employment effects of manufactured exports from developing countries (1). The method used in these studies for quantifying these employment effects and the scope of the computations differ substantially. Some studies are limited to direct effects only. The proportionality method is the most common method to estimate direct employment effects. Sectorwise, the employment-output ratio is taken, either from input-output tables or census data, and multiplied by the share of total output exported per sector. Proportionality is assumed between the share of output exported and the share of total employment created in export production.

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(1) The following studies were used: Tyler, 1974; Tyler, 1976; Lydall, 1975; Lydall, 1975; Watanabe, 1972; Watanabe, 1974; Tzong-biau Lin and Victor Mok, 1978; Kuo-shu Liang and Ching-ing Hou Liang, 1975 and 1978; Norienga, 1973; Alban, 1973; Bautista, 1975; King, 1974.

As has been pointed out before, this proportionality in estimations of employment effects disregards two possible disparities which may lead to misleading outcomes, in casu the disparity between domestic prices and world market prices, and second, the disparity between production conditions and labour productivity in export industries and industries producing for the domestic market. The first disparity can be smoothed out if appropriate price indices are available to adjust price differences between exports and output sold on the domestic market (1). The second disparity encounters more problems, and in none of the studies, possible differences in production techniques and productivity were taken into account (2).

Because of the limitations of the proportionality method, the employment estimates are rough, and it is even impossible to say whether they tend to overestimate or underestimate the employment effect as opposite biases are at work. Moreover, the proportionality method is not appropriate to predict direct employment effects of export expansion (3).

Thus, if data are not available to differentiate between export industries and other industries, the reliability of employment estimates depends on the accuracy of the classification of industries and the weight of export industries in the distinguished sectors. Examination of the degree of export orientation of manufacturing sectors must precede the estimates.

The crudity of employment estimates applies in particular to the indirect effects arising from interindustry relations with primary sectors. All investigations, except Lydall's cross-country analysis, include these linkages and ascribe unqualifiedly the employment generated in primary sectors to manufactured export activities (4).

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(1) See for instance Norienga, 1973, and Alban, 1973.
(2) Only Watanabe partly comes up to objections to the proportionality method by assuming the same raw material consumption per worker in all sectors. See Watanabe, 1972.
(3) Both Bautista, 1975, and King, 1974, estimated incremental employment-output coefficients for Philippines' exporting sectors. See also Lydall, 1975, and the estimates on pp. 14-24 of this paper.
(4) See Lydall, 1975.

In input-output tables the primary sector is often treated poorly and is brought together in one to four widely defined primary sectors. Only with a high degree of inaccuracy, specific intersectoral deliveries between non-primary and primary sectors can be traced back. "In such cases it is extremely difficult to offer a precise notion of labour requirements, as there is neither a question of retirement in case of loss nor much scope of expansion of the farm in case of profit (...) this peculiarity of agriculture makes it truly difficult to project employment requirements" (1). The strict input-output proportionality which makes estimates of indirect employment effects in the primary sector so unsatisfactory, can be relaxed (2). If changes in final demand influence indirectly the total payment for the labour input in agriculture, we can assume that a change in total payment does not create employment but diminishes underemployment.

Let L_j be the wage-bill in agricultural sector j. This wage-bill can be written as the product of the average wage per hour in sector k (w_j), the average number of hours worked per labourer in sector j (h_j), and the number of workers (or man-years) employed in sector j (N_j). Thus $L_j = w_j.h_jN_j$, and $N_j = {}^{L}j/w.h_j$. In this manner N_j can be varied or held constant, without disturbing the fixed relation of ${}^{L}j/w_j$ with X_j. L_j is proportionally related to X_j, and w_j must be held constant to avoid the possibility of factor substitution. Now the number of hours worked can be varied according to alternative hypotheses. If it is assumed that an increase in manufactured exports only diminishes underemployment in agriculture through increased deliveries to manufacturing industries, this can be translated in an increase of h_j and a constant amount of N_j. This line of approach does not violate the assumption of input-output analysis, but involves, however, a great deal of guesswork, unless detailed knowledge about the employment situation in a specific primary sector is available and can be used to formulate a plausible hypothesis.

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(1) United Nations Economic Commission for Asia and the Far East, 1970, p.32. This study is devoted to sectoral output and employment projections for 1970-1980.
(2) J. Krishnamurty, 1975, pp.67-68.

When employment generating effects of manufactured export production are to be investigated, also two theoretical reasons can be forwarded to handle linkages to the primary sector differently. The first reason is fairly well elaborated in Lydall's study on trade and employment (1). In his line of thinking, an increase of manufactured exports from developing countries mainly takes place through a 'transfer' of production activities from a developed to a developing country. Import trade of raw materials and semi-manufactured products used up in 'transferred' production activities in developing countries will increase if these countries do not produce the required intermediate products. We are concerned here with the concept of footloose industries, 'which can be economically sited either close to or far away from their sources of raw materials' (2). If the developing country already produces the required intermediate product, the second theoretical reason becomes effective, namely the possibility of substitution. Formerly exported primary products are diverted into the domestic manufacturing sector to be transformed in (final) manufactured export products. In both cases, an increase of manufactured exports would have no extra linkage effects to the primary sector (3).

If employment linkage effects to the primary sectors are taken into account, the employment studies reveal that these effects constitute by far the greater part of the total indirect employment effects of manufactured exports. Linkage effects of manufactured exports within the manufacturing sector are, on the average, relatively of minor importance. These findings do not refer to the city-states of Hong Kong and Singapore, where no appreciable primary sector exists.

Thus, backward linkages should not be lumped together and treated all alike. Insight into the reliability of the employment estimates and into

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(1) H.F. Lydall, 1975
(2) R.B. Sutcliffe, 1971, p.115
(3) Bautista uses a second-best employment measure, namely the ratio of compensation of employees - instead of the number of jobs - to the value of output. See Bautista, 1975.

the structural effects on the interrelatedness of economic sectors is deepened if a distinction is made between various input supplying sectors.

multiplier effects

In Lydall's cross-country analysis and Watanabe's study on Korea, the scope of the effects of manufactured export expansion is extended to employment created by the spending of export revenues (1).

Watanabe limits the multiplier effect to a first round spending effect from wages earned in export industries. In the case of Korea, the initial spending of export wages creates about as much employment opportunities as do the linkage effects of manufactured exports.

The scope of Lydall's multiplier is much wider. It includes not only the spending effects from export revenues, but covers also an increase in employment opportunities which is permitted by relaxation of supply bottlenecks through additional imports. Lydall supposes that direct and indirect employment effects of manufactured exports should be multiplied by a factor somewhere between two and five to encompass the multiplier effects. Contrary to the Keynesian multiplier effect, which is an employment creating effect, his wider defined multiplier functions also as an employment facilitating effect as it relaxes restrictions on the expansion of effective demand (2).

Spending from wages induces demand for products from sectors of production and thus creates additional employment. Increased output in these sectors generates a new round of demand for intermediate inputs which again creates employment. In order to calculate the spending effect from wages on output, a row and column are added to the original structural matrix A, the row vector representing coefficients for labour income and the column vector representing coefficients for the spending on output from industrial sectors. These latter coefficients represent the average propensity to consume products from different sectors of production and are found by

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(1) Lydall, 1975; Watanabe, 1972.
(2) Watanabe, 1972, p.513.

dividing household demand for products from such sectors by total household income.

The procedure can be illustrated as follows. If A is the original structural matrix, the new extended matrix A is A*

$$\left[\begin{array}{ccc|c} a_{11} & \cdots & a_{1n} & a_{1,\,n+1} \\ \vdots & & \vdots & \vdots \\ a_{n1} & \cdots & a_{nn} & \\ \hline a_{n+1,1} & \cdots & & a_{n+1,n+1} \end{array}\right]$$

In the new inverted Leontief matrix $(I-A^*)^{-1}$ the elements of the (n+1)th row represent the wage income multipliers for all sectors of production. The employment effects from this income multiplier can be calculated via:

$$(10) \quad l_{n+1} \cdot r_{n+1,1} \cdot Y_1 + l_{n+1} \cdot r_{n+1,2} \cdot Y_2 + \cdots + l_{n+1} \cdot r_{n+1,\,n+1} \cdot Y_{n+1}$$

Now the overall employment effect of an expansion of foreign demand for a sector's output can be calculated. Stern has demonstrated that there exist substantial differences between the value of Type I multipliers - direct and indirect labour coefficients compared with direct labour coefficients - and the value of these Type II multipliers - overall labour coefficients compared with direct coefficients (1).

export patterns and employment

As has been pointed out before, three ways to increase manufactured exports can be distinguished (2).

(i) Industrial processing ofproducts from primary sectors.

(ii) Spill-over from import substitution to export-led growth.

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(1) Stern, 1977. See also Yotopoulos and Nugent, 1976, p.268.

(2) Helleiner distinguishes four broad avenues for the development of manufactured exports: a) local raw material processing, b) conversion of import-substituting industries to export, c) new labour-intensive final product exports, and d) labour-intensive processes and component specialisation within vertically integrated international industries. (Helleiner, 1973, pp.25-31). The last two forms are empirically hard to distinguish from each other and we therefore handle form c) and d) as one form.

(iii) Establishing of new export-oriented industries using standardized or low technological production processes.

Each form of manufactured exports can be distinguished from the other two by differences in factor intensities, the relative extent of direct and indirect employment effects and the impact on the structure of the economy.

We shall now examine the most important features of these three broad ways of manufactured export expansion without going into detail on all possible deviations. Output-employment or value added-employment ratios are used to calculate the factor intensity of products.

According to the reviewed studies the following product groups have, in each study in decreasing order, the highest direct labour content:

- clothing, footwear, made-up textiles, wood products (at $500 GDP per head; cross-country study, Lydall, 1975);
- wigs, stainless steel table ware, finished textile products, textile fabrics (Rep. of Korea, Watanabe, 1972);
- wooden products, furniture, clothing, textiles (Mexico, Watanabe, 1974);
- furniture, apparel and shoes, lumber and wood, printing and publishing (Brazil, Tyler, 1976);
- metal products, transport equipment, rubber and chemicals, wearing apparel and foorwear (Hong Kong, Tzong-biau Lin and Victor Mok, 1978);
- textiles, lumber, other wood products, other metal products, footwear, wooden furniture (Philippines, Bautista, 1975).

Thus, clothing, footwear, wood products, and related products always have high positions in the ranking of manufactured exports according to direct labour requirements, with the most labour absorbing products on top. In some cases, textiles and metal products have low ranks too, but in most cases these product groups, together with different types of electronical products, score somewhat higher. Notwithstanding mutual differences, these manufactured exports can generally be characterized as labour-intensive. The export of especially those products fits in with the avowed export-led industrialization

strategy and serves best the objective of maximum employment generation, at least with respect to direct employment generation. Korea Rep., Hong Kong and Taiwan heavily rely on the export of exactly those products. These countries are good examples of the above-mentioned third way to develop manufactured exports.

In contrast, manufactured exports of Brazil and Mexico are not dominated by labour-intensive products, but consist also of capital-intensive products of basic industries. The composition of manufactured exports is much more diversified. Growth of manufactured exports of Brazil, and of Mexico to a lesser degree (1), is attributable to a re-orientation in import substitution sectors. In inducing these industries to export, partly within a regional trade area within which Brazil mainly exports relatively capital-intensive products, these countries follow the second line of export-led growth.

The direct labour-content of various agro-based manufactured exports differs widely. For instance, the processing of food and beverages is often relatively capital-intensive, as is the case in Brazil and Mexico. And in the Philippines, processed sugar is the most capital-intensive export product but one. However, the processing of fruit, fish and meat preparations in the Philippines is labour-intensive. In this respect, the nature of the product plays an important role.

The three lines to develop manufactured exports become more distinct in analyzing their different impact on the economy in terms of backward linkage effects and indirect employment generation. Countries which specialize in the export of labour-intensive manufactures experience in general weak backward linkages to other sectors of the economy. Thus, exports of the third export strategy generate relatively little indirect employment. This is clearly illustrated by the ratio of indirect to direct labour requirements of Korea's most labour-intensive manufactured exports: textile

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(1) Mexican exports originating from the border-line zone, the 'Zona Fronteriza' belong to the third line.

fabrics (0.12), finished textile products (0.04), and stainless steel table ware (0.045). This ratio is also low in the case of less labour-intensive products, like electronic and electrical equipment (0.25) (1).

The same goes for Hong Kong's labour-intensive exports; metal products (0.07), rubber and chemical (0.03), transport equipment (0.25), wearing apparel and footwear (0.08) and also electrical products (0.11) (2).

In the Philippines, knitting and textile mill products, and other metal products show the lowest indirect to direct wage coefficient ratios, respectively 0.32 and 0.48 (3). Consequently, total manufactured exports from these countries have low overall ratios of indirect to direct employment effects, respectively 0.11 for Hong Kong, 0.28 for Korea Rep. and 0.46 for Taiwan (4). Total manufactured exports of the Philippines score higher, but as we have seen, the Philippines are not clearly industrializing along the third way of export-led growth.

Tyler's cross-country study of eight countries confirms these findings. Taiwan and Korea Rep. show the lowest ratio of total to direct employment generated by manufactured exports, followed by the Philippines (5). The relatively low level of backward linkages of labour-intensive products in the third strategy confirms the high dependence on imported inputs and the footloose character of these production processes.

It is of importance to emphasize that a number of industries which have large backward linkages in developed countries have very limited linkage effects if these industries operate under the regime of the third export strategy (6).

Manufactured products which are produced in a re-oriented import substitution sector have a considerable greater indirect employment impact. This can clearly be illustrated by the case of Brazil. As has already been indicated, Brazil's exports are not biased to labour-intensive products; the

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(1) Watanabe, 1972, pp.506-508.
(2) Tzong-biau Lin and Victor Mok, 1978.
(3) Bautista, 1975, pp.55-58.
(4) Kuo-shu Liang and Ching-ing Hou Liang, 197 , p. 67
(5) Tyler, 1974.
(6) Van Dijck and Verbruggen, 1980.

four most labour-intensive manufactured exports generate only 17 per cent of total direct employment attributable to manufactured exports (1). However, these exports generate substantially more indirect employment opportunities, compared with alike products of the third line of export promotion.

For purposes of comparison, we give the following ratios of indirect to direct labour requirements: furniture (1.3), apparel and shoes (2.3), lumber and wood (1.9) and printing and publishing (1.6). The average ratio for Brazilian manufactured exports amounts to 3.6 (2). And in Tyler's cross-country study Brazil's manufactured exports employ the highest amount of indirect labour. In general, the dependence on imported inputs is low.

Finally, manufactured exports which draw their inputs from primary sectors have, as might be expected, a high indirect labour content. Notwithstanding the often capital-intensive final stage of processing agro-based products, these exports generate a multiple of indirect employment, if we prescind from export substitution and underemployment. This is illustrated by the relatively high indirect to direct employment ratio for Korea's exported raw silk and peigne (2.48) (3).

For Brazil, the most notable example is manufactured exports of the food sector with an indirect employment content which is 6.8 times its direct employment content (4).

In the Philippines, the export of processed primary products, like sugar, grain mill products, plywood and veneers yield the highest indirect employment effects. Employment linkages of agro-based manufactured exports within the manufacturing sector are limited.

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(1) Tyler, 1976, Tables V-21, VI-1 and VI-2.
(2) ibidem.
(3) Watanabe, 1972.
(4) Tyler, 1976, Table

Summarizing, the three distinguished ways to develop manufactured exports differ widely with respect to factor intensity, employment generation and their influence on the structure of the economy. The third way may lead to an isolated enclave export sector, characterized by relatively high direct labour absorbtion, but with only a small indirect employment effect. If the second line is followed, the structure of manufactured exports is more balanced between labour-and capital-intensive products. The overall higher indirect employment generation - also of labour-intensive products - is characteristic. Manufactured exports in the first strategy are predominantly capital-intensive. From an employment point of view, the strength of this way of industrialization is its high value of backward linkages, except in the case of export substitution.

As the three ways by which manufactured export production can be realized have such distinctive economic influences, it is of major importance to structure future research along the lines of the typologies elaborated in the above.

VI. Wages and Employment in the Open Economy

Industrialization programs have the twin objective of raising real wages and increasing employment. In the model of the open dualistic economy these objectives are partly competitive as can be demonstrated in the Fei-Ranis model (1).

At a given demand curve for labour, the quantity of absorbed labour is smaller in a situation of limited supply of labour or increasing real wages than in a situation of unlimited supply of labour with wages at a subsistence level. At a higher wage level, the investable surplus decreases and consequently future demand for labour decreases. When higher wages induce substitution processes, future demand for labour decreases even more. Interventions in factor markets directed at the increase of the costs of capital and a lowering of the costs of labour have again become an important theme in development theorizing. This is connected with the relatively high real wage levels in the modern sector compared with wage levels in the rural and informal urban sectors. Labourers in the modern industrial sector 'typically belong to middle-income groups and are usually successful in pushing wage demands substantially cutting into the socially owned surplus' (2). This situation is sub-optimal in terms of the growth of output and employment.

Policy recommendations in manpower or employment-oriented studies focus on the divergence between real wages and the opportunity costs of labour. Shadow wage rates are estimated to calculate the loss of employment due to 'distortions' in factor markets (3). With respect to labour policies, one should distinguish between policies aiming indirectly at the reduction of the costs of labour via subsidies and tax reliefs and policies aiming at the lowering of real wages. Both have a positive effect on the investable

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(1) Fei and Ranis, 1971
(2) Ahluwalia, 1976, p.81
(3) Akrasanee, 1977. For a more general approach, see Donges, 1974.

surplus and on factor use in production, but the latter is more 'socially regressive'. One might question the effectiveness of policies directed at the increase of capital costs in the modern sector. This goes all the more for its influence on the use of technologies in foreign firms.

Part of the rationale of the intervention in factor markets is rooted in the neo-classical assumption of substitution possibilities in production processes. As is well known, estimates of substitution possibilities are rather problematic indeed and in most cases the value of the elasticity of substitution is overstated (1). According to Leontief the concept of substitution is rather meaningless in the case of narrowly defined industrial sectors (2).

As has been demonstrated by Girgis and others, a rise in labour productivity might be caused by a number of factors but, due to misspecification and aggregation in the estimations of the elasticity of substitution, is attributed to wage increases. On the other hand, some other effects of wage increases on employment opportunities are bypassed in such calculations, such as the holding off of foreign investments, the running away of industries and the deterioration of the international competitiveness of industries.

Tentatively, we shall focus on the tension between the growth of employment and of real wages in an open labour surplus economy through the aforementioned broad avenues by which manufactured exports can be induced.

With respect to manufacturing sectors,processing products of primary sectors with capital-intensive technologies, the scope for changes in technologies due to changes in factor remunerations is limited. The technology in use in such industries solely depends on the current state of technology. This goes most notably for large scale extractive industries (3).

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(1) Girgis, 1974, Gaude, 1975
(2) Leontief, 1977
(3) ILO, 1976, pp.4-5

Consequently, if these sectors are rooted in the domestic economy because of specific resource endowments, there exist possibilities for labour to increase its share in the value of production without the risk of labour being expelled or of the running away of production processes. In the total costs of production, wages are of relatively minor importance. But, as has been stated before, not all processing of primary products is capital-incentive.

At the other extreme, in the case of footloose labour-intensive industries, the scope for changes in production techniques seems also to be limited. Such production processes are fairly standardized and the export products produced in these processes might be called mature product cycle goods (1). The choice of techniques does not depend on the relative factor remunerations.

Through the transfer of (parts of) production processes form one country to another, factor remunerations are 'adapted' to production techniques. The transfer of production activities need not be a reaction to a rise in the costs of labour but might as well be induced by the occurrence of new and competitive suppliers of low wage labour in other countries. Countries do compete with low labour and a large number of socio-economic measures in order to reinforce their international comparative advantage and to attract foreign firms in export sectors (2). The rationale for countries to attract foreign firms is that these firms are able to abolish supply-oriented and demand-oriented barriers in production and trade which cannot be abolished by domestic firms. In fact, those barriers are often rooted in the monopolistic positions of multinational firms themselves. This goes in particular with respect to their availability of technology and their control of distribution channels. These firms are able to bring in a complementary set of factors of production and instruments to organize production and distribution (3). Multinational firms play an increasing role in the

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(1) Hirsch, 1974
(2) For an earlier study on this phenomenon, see Reynolds and Gregory, 1965. For a detailed study on international competition in the electronics industry, see Economic Research Centre University of Singapore, 1977
(3) Dunning, 1974

expansion of manufactured exports, especially in the most dynamic products (1).

In the literature on employment creation by means of the expansion of export production of domestic industries which formerly produced solely for the domestic market, the tension between employment creation and the level of wages is a crucial theme. Studies on the possibilities of substitution between factors of production indicate at large possibilities in the agricultural sector and the informal sector, and at minor possibilities in the modern manufacturing sector (2). According to available empirical evidence and in line with traditional economic reasoning, manufactured exports from developing countries are biased to relatively labour-intensive products. As long as such industries produce for domestic and foreign markets, and domestic market penetration by imports is hampered by protective policies, such industries are more or less rooted in the domestic market, and consequently the transfer of activities to foreign countries is excluded. When producing for foreign markets, these industries are exposed to international competition and wages are no longer protected. If substitution possibilities are limited and firms are operating at a maximum level of efficiency, the tension between wages and employment finds expression in the value of exports: in that case, wage increases cause price increases and consequently the volume of exported output decreases, depending on the price elasticity of demand. A loss of output thus creates a loss of employment opportunities.

Summarizing, the risk of a loss of employment opportunities due to a rise in real wages does not so much result from the possibilities of substitution between capital and labour, but results from a loss of output on the world market or the running away of industries.

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(1) Cohen, 1975, pp.9-10.
(2) See Girgis, 1974. For a critical survey of estimates of the elasticity of substitution: Gaude, 1975. See also Leontief, 1977; Eckaus, 1958.

Annex I

Definition of Manufactured Products (SITC)

Total section 0

012
013
032
046
047
048
052
053
055
062
071.3
072.2
072.3
073
091
099

Total section 1

111
112
122

Total section 2

231.2
231.3
231.4
243
244.02
251
266
267

Total section 4 [43(1)]

Total section 5 -/- 513,65

Total section 6 -/-

-/- 667
-/- 681
-/- 682.1
-/- 683.1
-/- 685.1
-/- 686.1
-/- 687.1
-/- 689

Total section 7

Total section 8

Total section 9 [51]

Annex II Estimations of Employment Effects of Manufactured Exports

Philippines, 1973

SITC code	export $ × 10^3	ISIC code	export Pesos × 10^3	output / employment	employment in export production
032	420	311	2840.4	82973	34
048	253	311	1711.0	82973	21
053	26032	311	176051.8	82973	2122
055	1240	311	8386.0	82973	101
062	784	311	5302.1	82973	64
071.3	1093	311	7391.8	82973	89
072.3	1729	311	11693.0	82973	141
099	1607	311	10868.0	82973	131
112	1246	313	8426.6	70621	119
122	748	314	5058.6	67534	75
243.3	35117	331	237492.8	26162	9078
251	3411	341	23068.3	88667	260
431.2	213	311	1440.5	82973	17
51	2055	351	13897.8	172564	81
541.7	201	352	1359.3	95268	14
55	826	352	5586.2	95268	59
571(-/-~.4)	052	352	351.7	95268	4
571.4	132	382	892.7	30550	29
581.9	1470	351	9941.4	172564	58
599.2	328	351	2218.2	172564	13
611	136	323	919.8	26667	34
631	80138	331	541965.3	26162	20716
632	21157	331	143082.7	26162	5469
641	8384	341	56700.2	88667	639
642.2	109	341	737.2	88667	8
642.9	588	341	3976.6	88667	45

Philippines, 1973

SITC code	export $ × 10^3	ISIC code	export Pesos × 10^3	output / employment	employment in export production
651	5556	3211	37574.7	31031	1211
652	7464	3211	50478.3	31031	1627
653	2952	3211	19964.1	31031	643
654	822	321	5559.1	31031	179
655(-/-~.7)	5914	321	39995.8	31031	1289
655.7	251	322	1697.5	9762	174
656	409	321	2766.0	31031	89
657	733	321	4957.2	31031	160
661	17442	369	117958.5	39235	3006
662	3964	369	26808.1	39235	683
663	226	369	1528.4	39235	39
664	1965	362	13289.1	49142	270
665	1548	362	10469.0	49142	213
666	104	361	703.3	25000	28
67	748	371	5058.6	128308	39
691	807	381	5457.7	54143	101
692	362	381	2448.2	54143	45
718	231	382	1562.2	30550	51
719.1	201	382	1359.3	30550	44
719.5	440	382	2975.7	30550	97
723.1	164	383	1109.1	47558	23
724.1	151	383	1021.2	47558	21
724.2	230	383	1555.5	47558	33
732.1	111	384	750.7	85362	9
732.6	373	384	2522.6	85362	30
812.2	314	361	2123.6	25000	85
841.1	3449	322	23325.2	9762	2389

Philippines, 1973

	SITC code	export $ x 10^3	ISIC code	export Pesos x 10^3	output / employment	employment in export production
	841.4	7573	321	51215.4	31031	1650
allocated total		253973		1717594.0		53649
total manufactured exports		297160		2009663.4		
unallocated manufactured exports		43187		292069.4		

average $\frac{\text{export output}}{\text{export employment}}$ = 32015

employment effect of unallocated manufactured exports 9123

total employment effect of allocated and unallocated manufactured exports 62772

average $\frac{\text{output}}{\text{employment}}$ in manufacturing = 59851

share of export in manufacturing output = 6,4%

share of employment in export to total employment in manufacturing = 12,0%

Malaysia, 1973

SITC code	export $ x 10^3	ISIC code	export Ringgits x 10^3	output / employment	employment in export production
012	506	311	1236.3	50778	24
013	175	311	427.6	50778	8
032	3194	311	7803.9	50778	154
046	385	311	940.7	50778	19
048	2676	311	6538.3	50778	129
053	18116	311	44262.8	50778	872
055	5188	311	12675.8	50778	250
062	327	311	799.0	50778	16
072.3	1381	311	3374.2	50778	66
073	370	311	904.0	50778	18
091	939	311	2294.3	50778	45
099	1387	311	3388.9	50778	67
112	3219	313	7865.0	39739	198
122	4918	314	12016.1	40093	300
243	237619	331	580574.5	20431	28416
431.2	1057	311	2582.6	50778	51
51	4937	3511	12062.6	37500	322
531	128	3511	312.7	37500	8
541.7	3890	3522	9504.4	15714	605
551	2010	352	4911.0	31965	154
553	1700	352	4153.6	31965	130
554	2398	352	5859.0	31965	183
561.1	223	351	544.9	64561	8
599.2	852	351	2081.7	64561	32
62	8675	355	21195.6	47256	449
63	112681	331	275313.5	20431	13475
641.3	511	3411	1248.5	25000	50
641.5	309	3411	755.0	25000	30

Malaysia, 1973

SITC code	export $ x 10^3	ISIC code	export Ringgits x 10^3	output / employment	employment in export production
642.1	2200	341	5375.2	16981	317
642.3	148	342	361.6	16940	21
651	3450	3211	8429.3	14366	587
652	15546	3211	37983.5	14366	2644
653	2088	3211	5101.6	14366	355
654	168	321	410.5	12959	32
655	546	321	1334.0	12959	103
656	1554	321	3796.9	12959	293
657	138	321	337.1	12959	26
661	2678	369	6543.2	19310	339
662	1762	369	4305	19310	223
663	276	369	674.3	19310	35
664	173	362	422.7	17450	24
665	690	362	219.9	17450	13
666	257	361	627.9	11000	57
67	2748	371	6714.2	36408	184
684.1	177	372	432.5	30882	14
691	3643	381	8900.9	20517	434
692	1951	381	4766.9	20517	232
711.2	297	381	725.7	20517	35
711.4	1062	384	2594.8	27273	95
711.5	1276	384	3117.7	27273	114
712.5	478	382	1167.9	15547	75
714	11989	3825	29292.7	6107	4797
715.1	142	382	346.9	15547	22
717	392	382	957.8	15547	62
718	5236	382	12793.1	15547	823
719.12	1242	382	3034.6	15547	195

Malaysia, 1973

SITC code	export $ x 10^3	ISIC code	export Ringgits x 10^3	output / employment	employment in export production
719.32	319	382	779.4	15547	50
719.5	698	382	1705.4	15547	110
719.6	729	382	1781.1	15547	115
719.7	152	382	371.4	15547	24
719.8	3859	382	9428.7	15547	606
722	1537	383	3755.4	16213	232
723.1	427	383	1043.3	16213	64
724	4535	383	11080.4	16213	683
729.1	887	383	2167.2	16213	134
729.2	441	383	1077.5	16213	66
729.3	1865	383	4556.8	16213	281
729.4	130	383	317.6	16213	20
729.5	356	385	869.8	13690	64
732.1	1419	384	3467.0	27273	127
732.3	909	384	2221.0	27273	81
732.5	191	384	466.7	27273	17
733	1025	384	2504.4	27273	92
734	7194	384	17577.1	27273	644
812.2	521	361	1273.0	11000	116
841.1	16512	322	40343.8	10319	3910
841.3	102	322	249.2	10319	24
841.4	3688	321	9010.9	12959	695
861.4	663	385	1620.0	13690	118
861.9	49811	385	121703.2	13690	8890
864	774	385	1891.1	13690	138
892.1	990	342	2418.9	16940	143
892.2	266	342	649.9	16940	38
892.9	749	342	1830.0	16940	108

Malaysia, 1973

	SITC code	export, $ x 10^3	ISIC code	export Ringgits x 10^3	output / employment	employment in export production
	895.2	652	390	1593.0	13873	115
	897.1	428	390	1045.7	13873	75
allocated total		583907		1426660.0		76010
total manufactured exports		635147		1551854.7		
unallocated manufactured exports		51240		125194.7		
average export output / export employment					18769	
employment effect of unallocated manufactured exports						6670
Total employment effect of allocated and unallocated manufactured exports						82680
average output / employment in manufacturing (Peninsular) =					27403	

Share of exports in manufacturing output = 18.7% *

Share of employment in export to total employment in manufacturing = 25.2% *

* including Peninsular, Sabah and Sarawak.

Singapore, 1973

SITC code	export $ x 10^3	ISIC code	export Sing. $ x 10^3	output / employment	employment in export production
012	250	311	610.9	79006	8
013	1554	311	3797.4	79006	48
032	4505	311	110008.4	79006	1392
046	12922	311	31576.2	79006	400
047	199	311	486.3	79006	6
048	4754	311	11616.9	79006	147
052	1157	311	2827.2	79006	36
053	21089	311	51533.1	79006	652
055	4942	311	12076.3	79006	153
062	1706	311	4168.8	79006	53
071.3	167	311	408.1	79006	5
072.2	1512	311	3694.7	79006	47
072.3	4000	311	9774.4	79006	124
073	1066	311	2604.9	79006	33
091	5701	311	13931.0	79006	176
099	2421	311	5916.0	79006	75
112	8451	313	20650.9	29889	691
122	4752	314	11612.0	110169	105
243	127107	331	310598.7	36096	8605
251	945	341	2309.2	25602	90
431.2	239	311	584.0	79006	7
51	22415	351	54773.3	71538	766
531	4110	3511	10043.2	71538	140
533.1	5327	3511	13017.1	71538	182
533.2	611	352	1493.0	53488	28
541.1	551	3522	1346.4	53488	25
541.3	16349	3522	39950.4	53488	747
541.4	226	3522	552.3	53488	10

Singapore, 1973

SITC code	export $ \times 10^3$	ISIC code	export Sing. $ \times 10^3$	output / employment	employment in export production
541.6	188	3522	459.4	53488	9
541.7	15598	3522	38115.3	53488	713
551	3949	352	9649.8	53488	180
553	2997	352	7323.5	53488	137
554	5661	352	13833.2	53488	259
561.1	6547	351	15998.2	71538	224
571(-/-~.4)	813	352	1986.6	53488	37
571.4	147	382	359.2	27119	13
581.9	126	351	307.9	71538	4
599.2	2146	351	5244.0	71538	73
611	998	323	2438.7	43077	57
621	1327	355	3242.7	160552	20
629	7420	355	18131.5	160552	113
631	91889	331	224540.0	36096	6221
632	3029	331	7401.7	36096	205
633	106	331	259.0	36096	7
641	10418	341	25457.4	25602	994
642.1	1174	341	2868.8	25602	112
642.2	441	341	1077.6	25602	42
642.3	1302	342	3181.6	22520	141
651	33822	3211	82647.4	34280	2411
652	45781	3211	111870.5	34280	3263
653	47911	3211	117075.3	34280	3415
654	1167	321	2851.7	22317	128
655	4748	321	11602.2	22317	520
656	7919	321	19350.9	22317	867
657	2050	321	5009.4	22317	224
661	2430	369	5937.9	47658	125

Singapore, 1973

SITC code	export $ x 10^3	ISIC code	export Sing.$ x 10^3	output / employment	employment in export production
662	1579	369	3858.4	47658	81
663	1014	369	2477.8	47658	52
664	2381	362	5818.2	25301	230
665	4210	362	10287.6	25301	407
666	962	361	2350.7	13333	176
67	37828	371	92436.5	77778	1188
684.1	282	372	689.1	63462	11
691	4057	381	9913.7	32271	307
692	8732	381	21337.5	32271	661
693.3	1395	381	3408.8	32271	106
695.1	159	381	388.5	32271	12
711.4	13491	384	32966.6	30260	1089
711.5	10448	384	25530.7	30260	844
712.5	262	382	640.2	27119	24
714	144562	3825	353251.7	27119	13026
715.1	2356	382	5757.1	27119	212
717	7310	382	17862.7	27119	659
718	41575	382	101592.7	27119	3746
719.12	1627	382	3975.7	27119	147
719.32	1067	382	2607.3	27119	96
719.5	5816	382	14212.0	27119	524
719.6	1803	382	4405.8	27119	162
719.7	6322	382	15448.4	27119	570
719.8	7302	382	17843.2	27119	658
722	32781	383	80103.7	28221	2838
723.1	2225	383	5437.0	28221	193
724	101087	383	247016.2	28221	8753
725.01	804	382	1964.7	27119	72

Singapore, 1973

SITC code	export $ × 10^3	ISIC code	export Sing. $ × 10^3	output / employment	employment in export production
725.02	212	382	518.0	27119	19
725.03	1461	383	3570.1	28221	127
725.04	448	383	1094.7	28221	39
726.2	760	383	1857.1	28221	66
729.1	13542	383	33091.2	28221	117
729.2	759	383	1854.7	28221	66
729.3	55052	383	134525.1	28221	4767
729.4	1975	383	4826.1	28221	171
729.6	1525	382	3726.5	27119	137
731	405	384	989.7	30260	33
732.1	26146	384	63890.4	30260	2111
732.2	428	384	1045.9	30260	35
732.3	2513	384	6140.8	30260	203
732.5	3670	384	8968.0	30260	296
733	1859	384	4542.7	30260	150
734	23631	384	57744.7	30260	1908
812.2	397	361	970.1	13333	73
812.3	643	381	1571.2	32271	49
841.1	84293	322	205978.4	14009	14703
841.4	43335	321	105893.4	22317	4745
861.1	807	385	1972.0	19723	100
861.2	1370	385	3347.7	19723	170
861.3	562	385	1373.3	19723	70
861.4	24604	385	60122.3	19723	3048
861.6	13073	385	31945.2	19723	1620
861.7	620	385	1515.0	19723	77
864	13004	385	31776.6	19723	1611
891.4	293	390	716.0	27675	26

Singapore, 1973

SITC code	export $ × 10^3	ISIC code	export Sing.$ × 10^3	output / employment	employment in export production
891.8	337	390	823.5	27675	30
892.1	15506	342	37890.5	22520	1683
892.2	1558	342	3807.1	22520	169
892.4	135	342	329.8	22520	15
894.1	104	384	254.1	30260	8
895.1	207	381	505.8	32271	16
895.2	1191	390	2910.3	27675	105
897.2	309	390	755.1	27675	27
allocated total	1341303		3277608.0		110699
total manufactured exports	1813768		4432123.5		
unallocated manufactured exports	472465		1154515.5		

average $\frac{\text{export output}}{\text{export employment}}$ = 29608

employment effect of unallocated manufactured exports = 38993

total employment effect of allocated and unallocated manufactured exports = 149692

average $\frac{\text{output}}{\text{employment}}$ in manufacturing = 43508

share of export in manufacturing output = 51.0 %

share of employment in export to total employmnet in manufacturing = 75.0 %

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