

Labour Content of Traded Manufactured Goods

SURRAIYA NISHAT*

The present paper is an extension of an earlier study on "Labour Content and Structure of Pakistan's Manufactured Exports". While in the former study a partial method (labour employed in home goods sectors only) was used to estimate the total labour requirements of exports, the present paper takes into account all the inter-industry linkage effects to calculate total labour requirements for manufactured exports as well as for manufactured imports.

The basic aim of this study is to seek the verification of the Heckscher-Ohlin (H-O) theorem with respect to Pakistan's trade of manufactured goods, *i.e.*, to test whether Pakistan's exports are relatively more labour intensive than her imports or not?

The paper has been divided into four sections. The first section describes the methodology and data, while the second summarizes and analyses the final results. An international comparison of labour intensity has been made in the third section, whereas the last section discusses the conclusions and policy implications.

METHODOLOGY AND DATA

The direct labour requirement is defined as the number of workers per rupees one million of value added:

$$l_j^d = L_j/V_j \dots\dots\dots (1)$$

*The author is a Research Economist at the Pakistan Institute of Development Economics (PIDE) Islamabad. She is grateful to the participants of the seminar, specially to Mr. Mazahir Hamdani, held at PIDE for their valuable suggestions on an earlier draft of this paper. The author wishes to acknowledge her indebtedness to Mr. Sohail J. Malik, Staff Economist, PIDE for helping her throughout the preparation of this paper. However, the author alone is responsible for any errors or omissions.

The vector of total labour requirements is derived by the simple Leontief input-output procedure:

$$l_j^t = l_j^d [I-A]^{-1} \dots\dots\dots (2)$$

Where I is the unit matrix and A the original input-output matrix. The columns of $(I-A)^{-1}$ show the total direct and indirect usage of commodity i by the sector j.

Having determined the vectors of total labour requirements, we move to the next step of applying them to the vectors of the composition of exports, total manufactured imports and competing imports.

$$L_E^T = l_j^t \text{ (or } l_j^{t*}) E_j \quad \text{(Exports) } \dots\dots\dots (3)$$

$$L_M^T = l_j^t \text{ (or } l_j^{t*}) M_j \quad \text{(Total manufactured imports) } \dots\dots\dots (4)$$

$$L_M^{T*} = l_j^t \text{ (or } l_j^{t*}) M_j^* \quad \text{(Competing imports) } \dots\dots\dots (5)$$

Where E_j , M_j and M_j^* are the vectors of unit composition of exports, total manufactured imports and competing imports; L_E^T , L_M^T and L_M^{T*} are the total employment generated by the increase of one million rupees in value added in either manufactured exports, total manufactured imports or competing imports. The vectors of direct labour requirements l_j^d are directly obtained from the Census of Manufacturing Industries. The vector of total labour requirement l_j^t was calculated for 1960-1961 and 1969-1970 with the use of the vectors l_j^d , for the respective years, and the input-output matrix of 1962-1963 [7] which was adjusted to 1969-1970 prices by M. Hamdani [4].

An important point to note is that the input-output matrix contained information on all the sectors of the economy and not only on industry, but the census of manufacturing industries data contains information only on the manufacturing sectors. This results in some underestimation of the total labour requirements of the respective sectors. To adjust this, consideration has been given to the agriculture sector and the home goods sectors.

Thus, for three agriculture commodities *viz.* rice, wheat and cotton, the direct labour requirements were obtained by multiplying the average man years required per acre in each crop [10] by the corresponding total cultivated acreage of these crops. These labour requirements were then divided by the value added for each of the crops taken for 1960-1961 from [16] and for 1969-1970 from [14] to obtain the labour/value added ratios. In case of all other agriculture, fishery and forestry, the labour requirements were obtained as an average of the three major crops.

For the non-traded home goods sector, labour requirements were derived by multiplying the proportion of the labour force employed in this sector with the estimates of the labour force obtained from the Planning Division. The value added in these sectors was obtained from the national income accounts.

The vector of total labour requirements is derived by the simple Leontief input-output procedure:

$$l_j^t = l_j^d [I-A]^{-1} \dots\dots\dots(2)$$

Where I is the unit matrix and A the original input-output matrix. The columns of $(I-A)^{-1}$ show the total direct and indirect usage of commodity i by the sector j.

Having determined the vectors of total labour requirements, we move to the next step of applying them to the vectors of the composition of exports, total manufactured imports and competing imports.

$$L_E^T = l_j \text{ (or } l_j^*)E_j \quad \text{(Exports) } \dots\dots\dots(3)$$

$$L_M^T = l_j \text{ (or } l_j^*)M_j \quad \text{(Total manufactured imports) } \dots\dots\dots(4)$$

$$L_M^{T*} = l_j \text{ (or } l_j^*)M_j^* \quad \text{(Competing imports) } \dots\dots\dots(5)$$

Where E_j , M_j and M_j^* are the vectors of unit composition of exports, total manufactured imports and competing imports; L_E^T , L_M^T and L_M^{T*} are the total employment generated by the increase of one million rupees in value added in either manufactured exports, total manufactured imports or competing imports. The vectors of direct labour requirements l_j^d are directly obtained from the Census of Manufacturing Industries. The vector of total labour requirement l_j^t was calculated for 1960-1961 and 1969-1970 with the use of the vectors l_j^d , for the respective years, and the input-output matrix of 1962-1963 [7] which was adjusted to 1969-1970 prices by M. Hamdani [4].

An important point to note is that the input-output matrix contained information on all the sectors of the economy and not only on industry, but the census of manufacturing industries data contains information only on the manufacturing sectors. This results in some underestimation of the total labour requirements of the respective sectors. To adjust this, consideration has been given to the agriculture sector and the home goods sectors.

Thus, for three agriculture commodities viz. rice, wheat and cotton, the direct labour requirements were obtained by multiplying the average man years required per acre in each crop [10] by the corresponding total cultivated acreage of these crops. These labour requirements were then divided by the value added for each of the crops taken for 1960-1961 from [16] and for 1969-1970 from [14] to obtain the labour/value added ratios. In case of all other agriculture, fishery and forestry, the labour requirements were obtained as an average of the three major crops.

For the non-traded home goods sector, labour requirements were derived by multiplying the proportion of the labour force employed in this sector with the estimates of the labour force obtained from the Planning Division. The value added in these sectors was obtained from the national income accounts.

One point must be clarified that initially, following the Leontief approach, only the natural resource-based imports (agriculture, fishery, forestry, and mining) have been treated as non-competitive imports, and all the manufactured imports have been classified as competitive imports, but the labour intensity computed provided an upward bias for imports. This bias has arisen out of a compulsion to use the labour coefficients obtained from the Census of Manufacturing Industries, where, for sectors like transport equipments, electrical and non-electrical machinery and basic metal industry, a misrepresentation of the actual labour requirements occurs because of a discrepancy in the classification of the component items of each category. Leontief was correct in assuming only natural resource-based imports as non-competitive, since for the United States of America capital scarcity is not the binding constraint. However, in countries like Pakistan, there are many items which cannot be produced due to capital scarcity and hence are imported non-competitively. So such imports should have been excluded while computing the labour intensity for competing imports. In order to overcome this upward bias in the labour intensity of imports, a percentage by value, of certain sectors of manufactured imports has been classified as non-competitive and excluded from the value of total manufactured imports. This classification has been done on a very arbitrary basis. The import sectors where such adjustment was undertaken, and their percentage of non-competitiveness are listed in the appendix.

RESULTS

In Table 1 the values of exports and imports for two years 1960-1961 and 1969-1970 are given. It is apparent, that, for both the years, a few industries account for nearly 85 percent of the total exports and 56 percent of total imports. The percentage share of various sectors in total exports and imports show that, cotton textiles, leather, footwear, food n.e.s. and miscellaneous manufactures, are the major exporting sectors, and industrial chemicals, fertilizers, petroleum and its products, basic metal and non-electrical machinery, the major importing sectors. One very striking feature is that the share of petroleum and petroleum products in total manufactured imports has dropped from 12 percent in 1960-1961 to 1 percent in 1969-1970 despite the increase in price of petroleum.

As is clear from Table 2, previously there was a heavy concentration on the import of refined petroleum and petroleum products whereas in recent years, the trend has changed; now a larger proportion of the petroleum import is based on crude and partly refined petroleum. (The final refining being done domestically, after the setting up of an oil refinery in Karachi).

On the exports side, the share of cotton textiles in the total manufactured exports has decreased from 60 percent to 50 percent and that of leather has increased from 4 percent to 11 percent. The decrease in cotton textiles exports could be attributable to the fact that domestic consumption of cotton yarn has risen over time.

Table 3 is based on direct and total labour requirements for manufacturing sectors. Column 1 of Table 3 gives the direct labour requirements per million Rs. of value added; column 2 the total labour requirements excluding the linkage effect of agriculture sector and column 3 the total labour requirements including the linkage effect of agriculture.

Table 1

Value of Exports and Imports for 1960-1961 and 1969-1970

(Value in Rs. '000')

	1960-1961				1969-1970			
	Export		Import		Export		Import	
	Value	Percentage share	Value	Percentage share	Value	Percentage share	Value	Percentage share
1. Sugar and confectionery	1761	0.93	1075	0.06	11169	1.10	1153	0.04
2. Edible Oils	1423	0.75	19059	1.15	2265	0.22	13896	0.50
3. Food n.e.s. and beverages	22857	12.13	24313	1.47	94454	9.30	35817	1.31
4. Tobacco	10	0.05	566	0.03	1686	0.17	1086	0.04
5. Cotton textiles	111945	59.40	8541	0.51	511664	50.38	526	0.02
6. Other textiles	136	0.71	6775	0.41	826	0.08	16065	0.58
7. Footwear and made-up text.	5757	3.05	13477	0.81	87569	8.62	1501	0.05
8. Wood, cork and furniture	169	0.09	18500	1.12	604	0.06	45993	1.68
9. Drugs and pharmaceuticals	1436	0.76	73623	4.46	15350	1.51	72445	2.65
10. Printing and publishing	613	0.32	5138	0.31	2312	0.22	10736	0.39
11. Paper and its products	241	0.13	15276	0.92	1087	0.10	30774	1.12
12. Rubber and its products	400	0.21	36696	2.22	4105	0.40	64250	2.35
13. Leather and its products	6756	3.58	2489	0.15	117147	11.53	1023	0.03
14. Industrial chemicals	808	0.43	124222	7.53	12012	1.18	244094	8.94
15. Fertilizers	—	—	27041	1.64	—	—	282272	10.33
16. Petroleum and its products	—	—	198416	12.02	39820	3.92	32085	1.17

Continued—

Table 1—Contd.

	1	2	3	4	5	6	7	8
17. Non-metallic mineral products	992	0.53	40129	2.43	20072	1.98	45444	1.66
18. Basic metal industries	1587	0.84	297825	18.04	203	0.02	365089	13.37
19. Fabricated metal industries	2781	1.48	62499	3.79	7324	0.72	115480	4.23
20. Non-electrical machinery	4772	2.53	278914	16.90	6546	0.64	709001	25.96
21. Electrical machinery	820	0.44	130123	7.88	4767	0.47	218850	8.01
22. Other transport equipments	1536	0.81	91763	5.56	1162	0.11	182950	6.70
23. Motor vehicles	4184	2.22	132361	8.02	530	0.05	157119	5.75
24. Miscellaneous	17494	9.28	41446	2.51	72864	7.17	82948	3.03
(A) Total manufactured goods	188486		1650324		1015538		2730600	
(B) Grand Total (including primary products)	525692		2124968		1513241		3364817	
(A) as percentage of (B)	35.85		77.66		67.11		81.15	

Source: Foreign Trade Statistics of Pakistan [13].

Note: Data for Imports was compiled by Seemin A. Khan.

Table 2
Value of Petroleum Imports

(Rs. in '000')

	1960-1961		1969-1970	
	Value	Percentage Share	Value	Percentage Share
Petroleum and Petroleum products	198416	99.97	32085	15.32
Petroleum crude and partly refined	53	0.03	177316	84.68
	198469	100.00	209401	100.00

Source: [13].

Table 4 gives the direct and total labour requirements for the non-manufacturing sectors.

A comparison of the direct labour intensity for the two years reveals that sectors which have a labour intensity less than the overall average for both the years are sugar, edible oils, food n.e.s., tobacco, drugs and pharmaceuticals, industrial chemicals, petroleum, non-metallic mineral products and electrical machinery. Industries with relatively higher labour intensity than the overall average are cotton textiles, wood cork and furniture, printing and publishing, basic metal industries and transport equipments. The higher labour intensity of the four sectors except transport equipment does not require any explanation. The high labour intensity in transport equipment could be due to the fact that the direct labour coefficient for this sector, given in the Census of Manufacturing Industries is not for the manufacturing of transport rather for the assembling and repair of transport equipments and the manufacturing of cycles and rickshaws.

A few sectors where the relative position of labour intensity has changed over the ten year period are: (a) Other textiles, fabricated metal industries and non-electrical machinery, which had less than the overall average labour intensity in 1960-1961, but became more labour intensive than the overall average in 1969-1970; and (b) footwear, paper, leather, rubber, fertilizer and miscellaneous manufacturing industries which had more than the average labour intensity in 1960-1961, but became less labour intensive than the average in 1969-1970.

The final results are presented in Table 5. As mentioned earlier, the relevant measure is employment per million rupees of value added. We have assumed that an increase of one million Rs. of exports which represents an increase in final output of one million rupees is equivalent to an increase in value added of the same amount. The results for the year 1960-1961, judged on any basis support the H-O theorem *i.e.*, Pakistan's exports are more labour

Table 3

Direct and Total Labour Requirements Per Million Rupees of Value Added in Manufacturing Sectors, 1960-1961 and 1969-1970
(in man years)

	Direct Labour Requirements		Total Labour Requirements excluding the linkage effect of agriculture		Total Labour Requirements including the agriculture linkage effect		Percentage change in Total Labour Requirements Δl_j^*
	l_j^d		l_j^t		l_j^*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	1960-1961	1969-1970	1960-1961	1969-1970	1960-1961	1969-1970	
1. Sugar and confectionery	172	40	266	119	447	252	-44
2. Edible oils	155	38	268	113	416	207	-50
3. Food n.e.s. and beverages	185	78	355	200	378	216	-43
4. Tobacco	41	27	147	140	255	220	-14
5. Cotton textiles	283	122	558	288	718	372	-48
6. Other textiles	185	137	440	327	462	340	-27
7. Footwear and made up text.	246	56	387	117	410	134	-67
8. Wood, cork and furniture	224	230	255	255	340	318	-7
9. Drug and pharmaceuticals	108	59	208	122	228	134	-41
10. Printing and Publishing	491	124	596	187	601	190	-68
11. Paper and its products	305	100	452	188	459	192	-58
12. Leather and its products	246	56	387	117	410	134	-67
13. Rubber and its products	226	62	398	187	445	221	-50

Continued—

Table 3—Contd.

	1	2	3	4	5	6	7
14. Industrial chemicals	68	56	100	98	107	102	— 5
15. Fertilizers	235	34	412	199	412	199	—52
16. Petroleum and its products	68	6	196	108	197	108	—45
17. Non-metallic mineral products	113	81	257	195	258	196	—24
18. Basic metal industries	124	118	424	380	425	380	—11
19. Fabricated metal industries	210	207	450	415	451	415	— 8
20. Non-electrical machinery	200	221	296	304	297	304	+ 2
21. Electrical machinery	174	100	364	264	366	265	—28
22. Other transport equipment	214	612	297	664	300	666	+55
23. Motor vehicles	492	151	796	340	805	348	—57
24. Miscellaneous industries	237	77	453	212	462	218	—53
Overall average:	211	102					

Sources: (a) Columns 1 and 2: [12]

(b) Columns 3,4,5, and 6: Based on column 1 and 2, of Tables 3 and 4 and matrix 'A' given in [4].

(c) Column 7: [Column 5—Column 6/Column 5] x 100.

Table 4

Direct and Total Labour Requirements Per Million Rupees of Value Added in Non-Manufacturing Sectors,
1960-1961 and 1969-1970

36

	(in man years)			
	Direct Labour Requirements l_j^d		Total Labour Requirements $l_j^{t,*}$	
	1960-1961	1969-1970	1960-1961	1969-1970
	(1)	(2)	(3)	(4)
(A) Agriculture				
1. Rice	240	231	382	250
2. Wheat	391	272	551	389
3. Cotton	454	230	610	335
4. All other agriculture, fishery, and forestry	215	160	336	253
(B) Home Goods Sector				
1. Construction	364	397	529	537
2. Electricity and gas	293	114	408	163
3. Transport	262	237	403	408
4. Trade (wholesale and retail)	323	281	356	302
5. Government	828	481	937	559
6. Services n.e.s.	828	481	852	497

Sources: Columns 1 and 2: (i) Data on direct labour employed in agriculture and home goods sectors are taken from [10 and 15] respectively.
(ii) Value Added data for all non-manufacturing sectors have been obtained from National Accounts [16] for the year 1960-1961 and [14] for the year 1969-1970.

Columns 3 and 4: Based on data given in columns 1 and 2 of Tables 3 and 4 and matrix 'A' given in [4].

intensive than her imports, based on the three criteria considered namely, by taking into account either the intermediate deliveries from agriculture, or the total manufactured imports or just the competing imports. It is apparent in Table 5 that without the inclusion of the agriculture linkage effect, 485 workers (in man years) are required per million rupees of exports, 402 for total manufactured imports and 344 workers for competing imports *i.e.*, exports are more labour intensive than total manufactured imports and competing imports by a ratio of 1.21 and 1.41 respectively. With the inclusion of the agriculture linkage effects the situation improves further. Now exports are more labour intensive than total manufactured and competing imports by a ratio of 1.41 and 1.61 respectively. This change in the result is due to the fact that exports are heavily weighted by cotton, leather, food *n.e.s.* and footwear which are expected to demand a substantial volume of inputs from the agriculture sector. To the extent that agriculture is more labour intensive than industry, the neglect of the linkage from agriculture sector could seriously underestimate the relative labour intensity of food, cotton, leather and footwear and as such the relative labour intensity of exports. Hence results obtained with the inclusion of agriculture linkages lend stronger support to the H-O theorem.

There was a sharp decline in labour intensity over the ten year period for the three sectors, exports, total manufactured imports and competing imports (see Table 6). The sharpest decline being in the exports sector, which suffered an overall 54 percent decline in labour intensity. This led to a paradox for 1969-1970, where exports are less labour intensive than imports. Taking various industries at a disaggregated level it is apparent from table 3 that a very high decline in labour intensity has occurred in those sectors which constitute a higher proportion of exports (food *n.e.s.*, cotton textiles, footwear and made up textiles, leather, and miscellaneous manufacturing industries where the decline has been 43 percent, 48 percent, 67 percent, 67 percent and 53 percent respectively). Where as labour intensity has not declined as much in those industries, which, constitute a major proportion of imports including industrial chemicals, basic metal, fabricated metal, and electrical machinery where the decline in labour intensity has been only 5 percent, 11 percent, 8 percent, and 28 percent respectively.

There are some cases where the labour intensity has actually increased. Table 3 shows a 2 percent increase for non-electrical machinery and 55 percent for other transport equipment. These movements in labour requirements have, on an aggregate, resulted in a downward bias of the labour intensity of exports and an upward bias for imports.

The paradoxical result obtained for 1969-1970 is at its worst when the linkage effects of agriculture are not incorporated; exports are less labour intensive than total manufactured imports by a ratio of 0.76. The situation improves slightly with the inclusion of agriculture linkages, and normalizes completely when only competing imports are considered, (exports become more labour intensive as compared to competing imports). The overall results thus obtained support the H-O theorem; Pakistan, being a labour abundant economy, exports relatively more labour intensive goods as compared to its competitive imports.

Table 5

*Total Labour Requirements Per Million Rupees of Manufactured Exports and Imports for Pakistan
1960-1961 and 1969-1970*

	Total Labour Re- quirements for Manufactured Exports L_E	Total Labour Re- quirements for Manufactured Imports		Ratio of Labour Intensity of Exports to Labour Intensity of Total Manufac- tured Imports L_E/LM	Ratio of Labour Intensity of Exports to Labour Intensity of Competing Imports L_E/LM^*
		Total Imports LM	Competing Imports LM*		
	(1)	(2)	(3)	(4)	(5)
1960-1961					
(a) Excluding the linkage effect of agriculture sector	485	402	344	1.21	1.41
(b) Including the linkage effect of agriculture sector	600	425	373	1.41	1.61
1969-1970					
(a) Excluding the linkage effect of agriculture sector	224	293	199	0.76	1.12
(b) Including the linkage effect of agriculture sector	278	297	204	0.94	1.36

Source: Based on data given in Tables 1, 3 and 4.

Table 6
Percentage Decline in Labour Intensity of Manufactured Exports and Import Replacements Over the Period 1960-1961 to 1969-1970
 (in percentages)

	Exports	Total imports	Competing imports
(a) Excluding the linkage effect of agriculture sector	54	27	42
(b) Including the linkage effect of agriculture sector	54	30	45

Source: Based on data given in Table 5.

International Comparison of the Labour Intensity for Exports and Imports

Most of the studies done on this subject are based on determining the intensity of capital alongwith labour, for exports as well as for imports, (see [2, 4, 5, 6, 8, 9], while some explore the employment creation of export expansion only [1, 3, 11, 17].

Table 7
Ratios of Labour Intensity of Exports to Labour Intensity for Imports

Country/year	L_E/L_M
(a) <i>India</i> (1953-1954) Total merchandize	1.46
(b) <i>South Korea</i> (1968) Total merchandize Manufactures only	0.84 1.21
(c) <i>Brazil</i> (1959) Total merchandize Manufactures only —— (1971) Manufactures only	2.00 0.88 1.36
(d) <i>Pakistan</i> (1960-1961) Total merchandize Manufactures only —— (1969-1970) Total merchandize Manufactures only	1.41 1.21 0.94 0.76
(e) <i>Japan</i> (1951) Total merchandize	0.67
(f) <i>U.S.</i> (1947) Total merchandize	1.07

Sources: (a) India [2] (b) South Korea [9] (c) Brazil [3]. (d) Pakistan Table 5, (e) Japan [6] (f) U.S. [8].

Note: Results for India, South Korea, Japan and U.S.A. are based on labour per value of output and for Brazil and Pakistan on labour per value added.

Table 7 shows the estimates for ratios of labour intensity of exports to imports obtained from the above mentioned studies for various countries.

For India [2], the labour intensity estimates were made for total merchandise (which includes primary goods trade also) and it was found that the labour intensity of exports was higher than that of imports by a ratio of 1.46. Therefore, the estimates were in agreement with the H-O theorem (Indian exports absorb relatively more labour *viz-a-viz* imports replacements of equal value).

In the case of South Korea, [5] the labour content of exports was initially less than that of imports by a factor of 0.48, which may be attributable to the labour intensive nature of Korean agriculture and to the large imports (relative to exports) of agricultural goods. When agriculture was excluded, and the labour content estimated for manufactured goods only, the results obtained lent strong support to the H-O theorem (the labour content of exports was greater by a factor of 1.21 than for imports).

Labour intensity estimates for Brazil [3] for 1959 show that Brazilian exports were less labour intensive than her imports when the agriculture effect is not taken into account. This is so because the exports of industrial goods in 1959 were not only small in value, but also heavily weighted by food. Since food products demanded a substantial volume of input from the agriculture sector, the neglect of linkages of agriculture resulted in an under-estimation of the relative labour intensity of exports. Thus, when the agricultural effects was incorporated, the exports became twice as much labour intensive as the imports which is in accordance with the H-O theorem. For the year 1971, despite the exclusion of the agriculture sector, Brazilian exports turned out to be more labour intensive than her imports, which could be due to the fact that the agro based sectors held a smaller share in exports for this year.

Japan is a developed economy so her exports are much less labour intensive than her imports (by a ratio of 0.6). The results for the United States formed the basis of the famous Leontief Paradox.

Table 8

*Factor Requirements per \$ 100 Million Exports and Imports
Replacements: Korea (1970)*

	Capital (Million \$ 1970)	Labour (1000 persons)
Exports	98.0	66.0
Competitive Imports	116.7	69.5
No -Competitive Imports	178.7	9.7
1974 U.S. Coefficients	178.6	9.7
1958 U.S. Coefficients	148.3	8.1
1965 Japanese Coefficients	143.0	34.9
1970 Japanese Coefficients	137.5	28.0

Source: Table 9.4 Hong Wontack [5].

Results for Korea are given in a separate table since Hong [5] has classified manufactured imports differently. The author divides the non-competitive imports into natural resource-based and non-natural resource-based. While he ignores the former, he incorporates the latter in his estimation of factor intensities. The findings of this study indicate that the increasing capital intensity of the Korean export bundle was due to significant capital labour substitution in the production process. The factor requirements of non-competitive non-natural resource-based imports were estimated by applying U.S. and Japanese sectoral factor requirements.

A noteworthy fact is that Korea's labour requirements of exports are slightly less than the competitive imports but much more than the non-competitive imports, based on either the U.S. or Japan's sectoral requirements.

Some of the findings of Hong's paper are very interesting. The remarkable fact that the amount of both capital and labour required per \$100 million worth of non-competitive imports decreases significantly when a more recent set of coefficients for capital and labour are applied for the U.S. and Japan. This indicates that significant technological progress occurred in both the United States and Japan which led to a consequent decrease in factor requirements per unit of output. Another noticeable fact is that while the capital requirements did not differ greatly between the United States and Japan, the latter required about four times more labour than the former per unit of output.

Limitations of the Present Study

Three limitations of the present study may be pointed out. Firstly, the study is limited to large scale manufacturing industries. Small scale industries have been ignored despite their important role in creating employment and their contribution (roughly 30 percent) to the total exports of manufactured goods. Neglect of this relatively more labour intensive sector results in an underestimation of the actual labour intensity of exports.

Secondly, due to the non-availability of input-output tables for recent years, we have been forced to use the 1962-1963 input-output table (adjusted for 1969-1970 prices) by assuming that technology had remained constant. It gives us an over estimation of the true labour intensity because the direct labour requirements have declined sharply over this period.

Thirdly as skill data is not available, it was not possible to compute the skill content of trade, which is supposedly a much better measure of factor intensity.

CONCLUSIONS

In the present study H-O theorem has been tested with respect to Pakistan's trade, along the lines of Leontief's analysis. The H-O theorem is fully supported for the year 1960-1961. For 1969-1970 the results partially substantiate "Leontief's Paradox" i.e. exports are less labour intensive as compared to total manufactured imports. The reason underlying this finding is that the major exporting sectors have experienced a great fall in their direct

labour requirements over the period 1960-1961 to 1969-1970. However, when non-competitive manufactured imports are excluded from the computation the results sufficiently supported the H-O theorem.

The question of relative intensities has important implications in the choice of trade policies, that take into account the labour market. If exports are more labour intensive than import substitutes, a policy of export promotion with imports held fixed would generate a larger excess demand for labour than a policy of import substitution with exports held fixed, although the effects of both policies in the balance of payments could be the same. If the supply of labour in Pakistan were perfectly elastic at the prevailing wage rate, the policy of export expansion would simply absorb more labour under the above hypothesis than the equivalent policy of import substitution. If the supply of labour were not perfectly elastic, in addition to the employment effect we would have a redistribution of income, more favourable to labour in the case of export expansion than in the case of import substitution. If however the economy was already at full employment, all the effects of these trade policies would fall on the distribution of income and there would be no net employment effect. In any case, the effect of trade strategies on labour absorption and distribution of income is a separate study altogether.

The results of this study provide valuable basic information not previously available to policy makers on the employment implications of trade strategies, which should be accepted only keeping in mind the limitations and reservations expressed earlier in this paper.

Appendix Table

Percentage of Non-competing Imports as of Total Manufactured Imports

Sectors	1960-1961	1969-1970
Wood, cork and furniture	100%	100%
Drugs and pharmaceuticals	50%	50%
Rubber and its products	100%	100%
Industrial chemicals	50%	50%
Fertilizers	100%	100%
Basic metal industries	100%	100%
Petroleum	100%	100%
Fabricated metal industries	50%	50%
Non-electrical machinery	100%	75%
Transport equipments	100%	100%
Miscellaneous manufacturing	40%	40%

REFERENCES

1. Bautista, Romeo M. "Employment effects of Export Expansion in Philippines". *The Malayan Economic Review*. Vol. XX, No. 1. April 1975.
2. Bharadwaj, Ranganath and Bhagwati Jagdesh. "Human Capital and the Pattern of Foreign Trade: The Indian Case". *The Indian Economic Review*. October 1967.
3. Carvalho, Jose L. and Hadded Claudio L.S. *Trade and Employment in Brazil*. Paper prepared for National Bureau of Economic Research. New York, 1976.
4. Hamdani, S.M. Mazahir H. *Structural Basis of Pakistan's Foreign Trade*. Unpublished. PIDE, Islamabad. 1977.
5. Hong, Wontack. *Factor Supply and Factor Intensity of Trade in Korea*. Korea Development Institute. Seoul Korea 1976.
6. Ichimura, S. and Tatemotu. "Factor Proportions and Foreign Trade: The Case of Japan". *Review of Economics and Statistics*. November, 1957.
7. Khan, A.R. and McEwan. *Regional Current Input-Output Tables for East and West Pakistan 1962-63*. (Mimeographed). Pakistan Institute of Development Economics, Islamabad. 1967.
8. Leontief, W. "Domestic Production and Foreign Trade: The American Capital Position Re-examined". *Proceedings of the American Philosophical Society*. September 1953.
9. Lim, Youngil. "Capital Labour and Skill Contents of Trade: South Korea". *Southern Economic Journal*. Volume 42, No. 3, January 1976.
10. Naqvi, A.A. and Gill M. Shafi. *Cost of Production of Major Crops, 1961-62 to 1963-64*. Publication No. 138. The Board of Economic Inquiry, West Pakistan, Lahore. 1966.
11. Nishat, S. "Labour Content and Structure of Pakistan. Manufactured Exports". *The Pakistan Development Review*. Vol. XVI, No. 4. Winter 1977.
12. Pakistan. Statistical Division. *Census of Manufacturing Industries, 1959-60 and 1969-70*.
13. ————. *Foreign Trade Statistics of Pakistan, 1960-61 and 1969-70*.
14. ————. *National Accounts 1969-70*.
15. Pakistan Central Statistical Office. *Labour Force Survey 1969-70*.
16. Taufiq, M. and A. Bergen. "Measurement of Structural Change in Pakistan's Economy: A Review of National Income Estimates, 1946-50 to 1963-64". *The Pakistan Development Review*. Vol. VI, No. 2, Summer 1966.
17. Tyler, William G. "Manufactured Exports and Employment Creation in Developing Countries: Some Empirical Evidence". *Economic Development and Cultural Change*. Vol. 2, January 1976.