Labour Content and Structure of Pakistan's Manufactured Exports

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The Heckscher-Ohlin (H-O) theorem occupies a central position in the discussion of the pattern of trade between countries. According to this theorem a country should specialize in the production and export of those commodities which require more of those factors with which the country is relatively well endowed, i.e., a labour-abundant country should export labour-intensive products and a capital-abundant economy should export capital-intensive goods.

Interest in seeking a verification of the H-O theory arose during the fifties and sixties. Leontief's [11] analysis for the U.S. economy, however showed that U.S. exports were labour-intensive and imports were capital-intensive. This paradoxical result led to a deeper study of the H-O theorem. As compared to the Heckscher-Ohlin assumption that factor intensities are non-reversible, Minhas [12] has shown that factor intensities are reversible in reality because CES production functions fitted to international data showed elasticities of substitution both significantly different from unity and zero. Another possible explanation of Leontief's paradox is provided by the 'human skill' model hypothesized by Keesing [8]. This model postulates that physical capital and not labour but labour skills or human capital are the decisive factors in determining the trade pattern of any country.

The implication of these propositions bear a special significance in view of the current concern for employment creation in developing countries. The pressing nature and the magnitude of the labour absorption problem for these countries have been well recognized. Industrial growth of the import-substituting variety has been highly capital intensive, providing little employment

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generation. To solve this employment problem, economists suggest export expansion in labour-intensive industries.

Exports play a major role in the process of economic development as they are the primary purveyors of foreign exchange resources. Also, in so far as export industries are, in general, intensive in a country's abundant resource, they tend to be labour intensive in a labour-abundant economy. In Pakistan, which has a civilian labour force of 20 million and an addition to it of approximately 600,000 workers yearly, it is specially important that export industries generate a high rate of employment growth, not only to minimize the use of scarce capital but also to contribute to a solution of one of the country's most intractible problems-unemployment.

A number of studies have examined Pakistan's choice between export promotion and import substitution, but there has been no attempt to determine the employment-generating effects of alternative trade strategies, particularly those emphasizing export expansion. The aim of the present paper is to analyse the employment generated by an additional million rupees worth of exports. No attempt is made in this paper either to compare the employment-generating effects of export expansion as an alternative to import substitution, or to determine all the various economic and social effects of promoting different types of exports. Our task is limited to determining which group of exports should be promoted with a view to increase employment generation.

STRUCTURE OF EXPORTS

We briefly describe the structure of Pakistan's exports with data on commodity composition and direction of export. In case of commodity composition the period covered is the 15 years from 1960-61 to 1974-75. All the exports figures are in terms of value at current prices and are divided into 5 major and 20 minor groups.

Table 1 shows how the composition of various commodities in total exports to the rest of the world[1] has changed over time. It will be seen that the share of agricultural products in total exports has declined while that of manufactured consumer goods has increased from one-third in 1960-61 to about half in 1974-75. This is a welcome indication of greater diversification in output and competitiveness in export markets. However, the share of consumer goods in manufactured exports has remained relatively constant. In Table 2, exports to developed, developing, and centrally planned economies[2] are shown for 1960-61 and 1969-70. For each country group, manufactured consumer goods have replaced primary goods as the major export.

[1]Countries other than former East Pakistan are defined as rest of the world.

[2]Grouping of the countries is based on arbitrary judgement rather than an explicitly defined criteria. The following countries U.S.A., France, United Kingdom, Sweden, Canada, Denmark, Norway, Australia, West Germany, Belgium, Italy, Netherlands, Austria, Switzerland, Japan, Finland, Newzealand, Spain and Portugal are classified as developed countries, while Bulgaria, China, Czechoslovakia, East Germany, Hungary, Poland, Romania, USSR and Yogoslavia, are defined as centrally planned. All other countries are classified as developing countries.

Table 1

*Structure of Exports to Rest of the World**

(Value Rs. 000)

	1960-61	61-62	62-63	63-64	64-65	65-66	66-67	67-68
Total Exports	525692	527809	972015	1035684	1111691	1156268	1262534	1536676
Agriculture	334575	375404	742865	634116	580011	599012	614956	745795
Mining	2631	7244	1490	6119	10981	9188	10326	7870
Total Manufactured Exports	188486	145161	227660	395449	520699	548068	637252	783011
(*a*) Consumer Goods	163609	105180	179442	314563	409035	401881	462677	613473
1. Food	26041	31286	47294	51404	57284	68293	83617	66776
2. Beverages	—	18	14	79	330	213	1988	2013
3. Tabacco	10	22	40	60	52	53	1030	869
4. Cotton Textile	111945	40867	87705	184093	268074	250087	273617	406132
5. Other Textiles	134	34	79	1180	2585	1002	1738	802
6. Foot Wear and made up Textiles	5757	6116	11818	29663	30895	27021	43618	65687
7. Wood, Cork and Furniture	169	157	34	289	364	343	154	411
8. Drugs and Pharmaceuticals	1436	909	2573	10630	11562	14061	15197	14967
9. Printing and Publishing	623	767	470	826	1186	2494	751	1611
10. Miscellaneous Industries	17494	25004	29415	36339	36703	38314	40967	54205
(*b*) Intermediate Goods	8205	16156	21025	51698	85423	109146	101642	139374

*Rest of the world does not include data of Exports to former East Pakistan, as it was valued at domestic prices.

Continued—

Table 1—*contd.*

11.	Paper and it's products	241	1916	975	503	213	554	711	270
12.	Leather and it's Products	6756	11528	15142	31797	47617	75882	75373	88763
13.	Rubber and it's Products	400	1399	1683	3009	2245	1752	1599	1766
14.	Industrial Chemicals	808	1313	3225	16389	35348	30958	23959	48580
(*c*)	Investment Goods	16672	23825	27193	29188	26241	37041	72933	30164
15.	Non-Metallic Minerals	992	5682	855	988	921	920	6776	10783
16.	Basic Metal Industries	1587	379	894	283	721	973	1214	185
17.	Fabricated Metal Industries	2781	1444	3332	8394	6733	6925	8434	6968
18.	Non-Electrical Machinery	4772	7677	12309	4097	8008	13644	26996	3269
19.	Electrical Machinery	820	1182	2613	4447	5760	6223	20194	8296
20.	Transport Equipment	5720	7461	7190	10979	4098	8256	9319	663

Tabie 1—contd.

	68-69	69-70	70-71	71-72	72-73	73-74	74-75
Total Exports	1580019	1513241	1948029	3310522	8409858	9323997	9648105
Agriculture	658543	473157	616049	1427603	2934207	3306550	4495483
Mining	7357	24546	19494	18327	48834	91769	121936
Total Manufactured Exports	914019	1015538	1302486	1864592	5426817	5925678	5030686
(*a*) Consumer Goods	696909	800763	1101720	1544102	4320202	4843789	4047337
1. Food	84530	106350	148245	263842	374366	377436	309047
2. Beverages	2363	1538	682	1242	424	3567	1184
3. Tabacco	246	1686	2480	3627	4050	6124	50945
4. Cotton Textile	433777	511664	668222	992740	3218116	3272802	2221373

Continued—

Table 1—*contd.*

5. Other Textile	365	826	188	395	4052	7652	2223
6. Foot Wear and made up Textiles	99973	87569	175099	144889	368101	680141	920248
7. Wood, Cork and Furniture	502	604	507	546	3264	4740	4791
8. Drugs and Pharmaceuticals	14559	15350	10398	11237	20102	32082	45158
9. Printing and Publishing	2107	2312	2666	2518	4143	7812	13395
10. Miscellaneous Industries	58487	72864	93233	123066	323584	451433	478973
(*b*) Intermediate Goods	183698	174171	161869	252393	833176	714062	570598
11. Paper and it's products	688	1087	855	2288	1953	2825	2106
12. Leather and it's Products	121072	117147	117741	191206	696661	516531	432693
13. Rubber and it's Products	2174	4105	3430	2383	3603	9240	10246
14. Industrial Chemicals	59764	51832	39843	56516	130959	185466	125553
(*c*) Investment Goods	33412	40604	48897	68097	273439	367827	412751
15. Non-Metallic Minerals	13023	20072	22647	45090	101923	195676	290475
16. Basic Metal Industries	228	203	355	606	526	16439	5084
17. Fabricated Metal Industries	6512	7324	8847	9606	25303	44146	55858
18. Non-Electrical Machinery	4439	6546	7270	7326	121636	17637	31685
19. Electrical Machinery	8465	4767	8195	4291	12243	79827	26078
20. Transport Equipment	745	1692	1583	1178	11808	14102	3571

Source: Foreign Trade Statistics of Pakistan, [14].

Table 2

Direction of Exports

(Value in Rs. 000)

Total Exports	1960—61				1969—70			
	Developed Economies	Developing Economies	Centrally Planned Economies	Former East Pakistan *	Developed Economies	Developing Economies	Centrally Planned Economies	Former East Pakistan
	(a)	(b)	(c)	(d)	(a)	(b)	(c)	(d)
Agriculture	180647	112923	41005	169237	187376	180675	105106	621087
Mining	263	—	—	7633	17185	3993	3367	3929
Manufactured Exports								
(a) *Consumer Goods*								
1. Food	7516	18412	113	46131	69811	35442	1094	114155
2. Beverages	—	—	—	—	42	1496	—	289
3. Tobacco	—	10	—	30954	1392	294	—	42182
4. Cotton Textiles	57822	54123	—	377088	134451	219501	157712	328768
5. Other Textiles	96	40	—	85	110	333	384	9540
6. Foot wear and Made-up textiles	517	5240	—	8936	27968	34658	24943	8008
7. Wood, Cork and Furniture	231	146	—	—	154	451	—	—
8. Drugs and Pharmaceuticals	879	557	—	30957	1290	14033	26	57363
9. Printing and Publishing	173	450	—	4050	1920	392	—	2649
10. Miscellaneous Industries	12278	5211	5	80489	47934	23572	1758	154918

*Value of Exports to Former East Pakistan are at Domestic Prices.

Continued—

Table 2—*contd.*

(*b*) *Intermediate Goods*								
11. Paper and its Products	8	234	—	3976	4	1083	—	39589
12. Leather and its Products	4990	1765	—	273	86463	4441	26243	1353
13. Rubber and its Products	104	299	—	4402	26	3998	81	22700
14. Industrial Chemicals	364	443	—	10405	19164	31272	1400	128336
(*c*) *Investment Goods*								
15. Non-metallic minerals	445	547	—	1820	79	19993	—	48873
16. Basic Metal Industries	1294	293	—	—	61	142	—	—
17. Fabricated Metal Industries	701	2080	—	4038	2338	4986	—	7113
18. Non-Electrical Machinery	2393	2368	11	—	443	6091	12	—
19. Electrical Machinery	582	239	—	13460	424	4346	—	64057
20. Transport Equipments	2207	3512	2	—	12	1680	—	—

Source: Foreign Trade Statistics of Pakistan, [14].

LABOUR CONTENT OF MANUFACTURED EXPORTS

Methodology

For Pakistan no work has been done to determine the factor-content of trade, though a few studies have investigated industrial factor intensity. Nurul Islam [16] followed H.B. Lary's [10] approach in ranking industries by total value added per employee. On the assumption that the higher the total value added per employee, the higher is capital intensity, Pakistan's comparative advantage should lie in those sectors where value added per employee is low. In an other study, A.R. Khan [4] ranked industries by their observed capital-labour ratios. The comparative advantage for Pakistan should be in those industries where capital-labour ratios are low.

In the present paper we follow A. Kruger's work [9] to estimate the labour content of exports. Our application of Kruger's methodology is similar to that of V. Corbo and P. Meller [1]. Derivations of the formulas for direct as well as total labour requirements are given below.

The direct industrial requirements of labour is based on the labour input required for Rs. one million worth of domestic value-added:

$$L^d j = Lj/Vj \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where Lj is average number of workers employed and Vj is domestic value-added (in millions of rupees) in the jth industry for a given year. Value-added is used in our estimates rather than gross output because the former is the more appropriate measure of the contribution of an industry to GNP. The higher the direct labour requirement for a given Rs. one million of value-added, the greater will be the labour intensity for that sector.

To arrive at the domestic value added content for the jth export industry, the percentage share of direct domestic value-added in ouput was multiplied by export value:

$$[(V/O)j \times Ej] \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

then the share[8] (i.e. weight) of each export industry in total exports was derived as:

$$W_j = (V/O \times E)j \; / \sum_{j=i}^{m} (V/O \times E)_j \quad \ldots\ldots\ldots\ldots (3)$$

Finally, the direct labour coefficients, L^d_j, were corrected for these weights. This procedure gives weighted average labour intensity for manufactured exports:

$$L \frac{D}{E} = \sum_{j=i}^{m} W_j \times L^d_j \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

[8]To calculate the share of each industry in overall export manufacturing j = 1, 2 . . ., 20. And the weight (or share) of individual export industry in the group which it belongs to is calculated by varying j = 1 . . . 10 for consumer goods, j=11, ... , 14 for intermediate goods and j = 15, ..., 20 for investment goods.

A better concept to measure labour intensity would be to incorporate indirect labour requirement as well. The purpose is to measure some of the backward linkage effects, that is the ouput, value-added, and employment which are generated due to increase demand from the exporting industry. We assume that tradeable goods used as inputs in the exporting industry would be produced anyhow, and sold for other purposes, but that the flow of services originating in the 'home goods industries' would be reduced if the demand from the export industries had been lower. As a measure of indirect labour requirement we have therefore taken into account the direct labour employed and value-added generated in home good sectors.

The value-added multiplier which measures direct plus indirect value added in home goods industries is defined as the ratio of total value-added per unit of output to direct value-added per unit of output and is given as:

$$S_j = \frac{V_j + \hat{V}_j}{O_j} \Big/ V_j / O_j \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

or

$$S_j = \frac{1 + \hat{V}_j}{V_j} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)'$$

where O_j is output, V_j is direct value-added, and $\hat{V}_j$ is indirect value-added, all for the jth sector. $\hat{V}_j$ is defined as:

$$\hat{V}_j = V'_H \; [I - A_{HH}]^{-1} A_{HT} \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

where V'_H = a row vector of direct domestic value-added per unit of gross output corresponding to h home goods sectors.

A_{HH} = a square matrix of direct intermediate input coefficients in the home goods sectors.

A_{HT} = a rectangular matrix of home goods coefficients for n input output sectors.

Similarly the employment multiplier of direct plus indirect home goods requirement per unit of value-added in jth sector, is defined as the ratio of total labour per unit of total value-added to direct labour per unit of direct value-added and is given as:

$$m_j = \frac{L^d_j + \hat{L}_j}{V_j + \hat{V}_j} \Big/ \frac{L^d_j}{V_j} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

where L^d_j is direct and $\hat{L}_j$ is indirect labour employed per unit of output, for the j^{th} sector. $\hat{L}_j$ is defined as:

$$\hat{L}_j = L'_H [I - A_{HH}]^{-1} A_{HT} \quad \ldots\ldots(8)$$

where L'_H = a row vector of labour per unit of gross output, corresponding to h home goods sectors.

To get the total value-added generated by an increase in domestic production we multiply s_j with the direct value-added content of exports:

$$(s \times V/O \times E)_j \quad \ldots\ldots(9)$$

New weights (see footnote 3) for individual export industries are derived as:

$$\hat{W}_j = (s \times V/O \times W)_j \Big/ \sum_{j=i}^{m} (s \times V/O \times E)_j \quad \ldots\ldots(10)$$

Similarly multiplication of the employment multiplier m_j, with the direct labour coefficient gives us the total labour coefficient for the jth industry:

$$L^t_j = m_j L^d_j \quad \ldots\ldots(11)$$

Finally the total labour coefficient, L^t_j is corrected by the new export weights $\hat{W}_j$ to obtain the weighted average labour intensity for overall manufactured exports:

$$L^T_E = \sum_{j=1}^{m} (\hat{W}_j L^t_j) \quad \ldots\ldots(12)$$

The coefficient is also calculated for three major groups of manufactured exports.

Labour Requirements

The manufacturing sector of Pakistan is classified into 20 sub-groups. The four[4] home goods sectors considered are: electricity and gas, transport and communication, trade (wholesale and retail) and insurance, banking and other services. To make the intertemporal comparison of labour intensity, two years, 1960-61 and 1969-70, were chosen as all the data required to calculate labour intensities are available only for these years. Figures for labour intensity have been calculated for 3 major groups of export industries, i.e., consumer goods, intermediate goods, and investment goods. However, within each of these groups there are very large differences in the labour coefficient of industries (see Table 3) and the average for the group, therefore, is not representative for industries within the group.

[4]The input-output matrix showed no deliveries of intermediate goods and services from the fifth home goods sector, construction, to the manufacturing sector.

Table 3

Direct and Indirect Labour Requirements Per Million Rs. of Value-Added
(Man years)

	1960—61 Labour Requirements			1969—70 Labour Requirements		
	Total	Direct	Indirect	Total	Direct	Indirect
	L^t_j	L^d_j	L^I_j	L^t_j	L^d_j	L^I_j
	1	2	3	4	5	6
(*a*) *Consumer Goods*						
1. Food	413	166	246	177	47	130
2. Beverages	—	—	—	138	61	77
3. Tobacco	93	41	52	79	27	52
4. Cotton Textiles	367	283	84	158	122	36
5. Other Textiles	246	185	61	182	137	45
6. Footwear	236	211	25	123	110	13
7. Wood & Furniture	216	213	3	233	230	3
8. Drugs and Pharmaceuticals	264	146	118	103	57	46
9. Printing and Publishing	606	491	115	153	124	29
10. Miscellaneous	562	237	325	183	77	106
(*b*) *Intermediate Goods*						
11. Paper and its Products	496	305	191	163	100	63
12. Leather and its Products	377	246	131	86	56	30
13. Rubber and its Products	498	226	272	136	62	74
14. Industrial Chemicals	277	106	171	103	44	59
(*c*) *Investment Goods*						
15. Non-Metallic minerals	192	112	80	139	81	58
16. Basic Metal	174	124	50	166	118	48
17. Metal Products	251	210	41	248	207	41
18. Mach. except Electrial	487	400	87	269	221	48
19. Electrical Machinery	324	174	150	186	100	86
20. Transport Equipment	258	240	18	274	255	19

Sources: Columns 2 *and* 5: The data for employment L_j and value added V_j were obtained from Census of Manufacturing Industries (CMI) for the years 1959-60 and of 1969-70 (13).
Columns 1 *and* 4: The number of workers in home goods sectors L_h is obtained from labour force survey for 1969-70 and for 1960-61 from Hussain's [3] study. As the value added in home goods sector V_h is not available from national accounts for West Pakistan for the year 1960-61, it was obtained from Taufiq and Bergen [15] and for the year 1969-70 directly from national accounts. The output 0_j and 0_h is taken from CMI [13] and national accounts respectively. For the input-output matrix (AHH and AHT) results of Mazahir Hamdani [2] have been used.
Columns 3 *and* 6: $Lt_j - Ld_j$

Table 4

Labour Intensities for Exports to the Rest of the World

(Man years)

	1960—61		1969—70				
	Labour intensity	Ranking	Labour intensity	Ranking	Percentage decline (Total)	Percentage decline due to change in labour coefficient	Percentage decline due to change in composition of exports
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
(A) *Direct Labour Requirement per Million Rs. of Value Added in Exports*							
All industries	267	—	103	—	61	56	5
(*a*) Consumer Goods	268	2	111	2	59	58	1
(*b*) Intermediate Goods	217	3	52	3	76	74	2
(*c*) Investment Goods	270	1	123	1	54	33	21
(B) *Total Labour Requirements per Million Rs. of Value Added in Exports*							
All industries	377	—	131	—	65	57	8
(*a*) Consumer Goods	377	1	137	2	64	60	4
(*b*) Intermediate Goods	371	3	96	3	74	74	Nil
(*c*) Investment Goods	375	2	192	1	49	36	13

Source: Results are based on the information given in Tables 1, 3 and 4.

Notes: Column e = $\triangle WL = (a—b) \times 100/a$

f = $(\triangle \bar{L})$ W taken from table 9

g = $(\triangle \bar{W})$ L = e-f

Table 5

Labour Intensities for Exports to the Developed Economies

(Man years)

	1960—61		1969—70	
	Labour Intensity	Ranking	Labour Intensity	Ranking
(A) *Direct Labour Requirements per Million Rs. of Value Added in Exports*				
All industries	274	—	89	—
(*a*) Consumer goods	274	2	99	2
(*b*) Intermediate goods	223	3	53	3
(*c*) Investment goods	287	1	177	1
(B) *Total Labour Requirements per Million Rs. of Value Added in Exports*:				
All industries	377	—	132	—
(*a*) Consumer goods	382	2	143	2
(*b*) Intermediate goods	360	3	90	3
(*c*) Investment goods	392	1	332	1

Source: Data in Table 2 and 3.

Table 6

Labour Intensities for Exports to Developing Economies

(Man years)

	1960—61		1969—70	
	Labour Intensity	Ranking	Labour Intensity	Ranking
(A) *Direct Labour Requirements per Million Rs. of Value Added in Exports*				
All industries	266	—	106	—
(*a*) Consumer Goods	266	2	112	2
(*b*) Intermediate Goods	207	3	48	3
(*c*) Investment Goods	283	1	119	1
(B) *Total Labour Requirements per Million Rs. of Value Added in Exports:*				
All industries	378	—	149	—
(*a*) Consumer Goods	377	2	150	2
(*b*) Intermediate Goods	371	3	107	3
(*c*) Investment Goods	380	1	185	1

Source: Data in Table 2 and 3.

Table 7

Labour Intensities for Exports to Centrally Planned Economies

(Man years)

	1960—61		1969—70	
	Labour Intensity	Ranking	Labour Intensity	Ranking
(A) *Direct Labour Requirements per Million Rs. of Value Added in Exports*				
All industries	—	—	115	
(*a*) Consumer Goods	—	—	120	2
(*b*) Intermediate Goods	—	—	55	3
(*c*) Investment Goods	—	—	221	1
(B) *Total Labour Requirements per Million Rs. of Value Added in Exports*				
All industries	—	—	150	—
(*a*) Consumer Goods	—	—	154	2
(*b*) Intermediate Goods	—	—	88	3
(*c*) Investment Goods	—	—	269	1

Source: Data in Table 2 and 3.

Table 8

Labour Intensities for Exports to Former East Pakistan

(Man years)

	1960—61		1969—70	
	Labour Intensity	Ranking	Labour Intensity	Ranking
(A) *Direct Labour Requirements per Million Rs. of Value Added in Exports*				
All industries	249	—	91	—
(*a*) Consumer Goods	257	1	101	1
(*b*) Intermediate Goods	162	3	54	3
(*c*) Investment Goods	174	2	96	2
(B) *Total Labour Requirements per Million Rs. of Value Added in Exports:*				
All industries	367	—	146	—
(*a*) Consumer Goods	374	1	150	2
(*b*) Intermediate Goods	343	2	116	3
(*c*) Investment Goods	306	3	172	1

Source: Data in Table 2 and 3.

Table 9

Decline in Labour Intensities due to Change in Labour Coefficient 1960-61 to 1969-70

(Man years)

	Labour intensity based on 1960-61 exports weights and 1960-61 labour co-efficients	Labour intensity based on 1960-61 exports weights and 1969-70 labour co-efficients	Percentage decline in labour intensity
	(a)	(b)	(c)
(A) *Direct Labour Requirements per Million Rs. of Value Added in Exports*			
All industries	267	118	56
(*a*) Consumer Goods	268	113	58
(*b*) Intermediate Goods	217	56	74
(*c*) Investment Goods	270	181	33
(B) *Total Labour Requirements per Million Rs. of Value Added in Exports*			
All industries	377	164	57
(*a*) Consumer Goods	377	151	60
(*b*) Intermediate Goods	371	98	74
(*c*) Investment Goods	375	241	36

Source: Data in Table 2 and 3.
Note : Column $c=(a-b) \times 100/a$

Table 3 shows the direct and indirect labour coefficient per Rs. one million of domestic value added for 20 industries. Tables 4 to 9 give the intertemporal and interindustry information on direct and total labour intensities, for the rest of the world, developed, developing, centrally planned economies, and the former East Pakistan. Part A of the Tables 4 to 9 is based on direct labour requirements and part B total labour requirements.

Table 4 part A shows that if additional manufactured goods containing Rs. one million in domestic value-added were exported to the rest of the world on average a potential employment of 267 was generated in 1960-61 and 103 in the year 1969-70. If this additional export was comprised of consumer goods, intermediate goods, or investment goods, respectively, the additional employment generated in these sectors would have been 268, 217, and 270 in 1960-61, and 111, 52, and 123 in 1969-70. Similarly, Part B shows that Rs. one million of additional value-added contained in exports to rest of the world on the average would have generated 377 jobs in overall manufacturing in 1960-61 and 131 in 1969-70; on the same basis for consumer goods, intermediate goods, and investment goods, the number of new jobs created would have been 377, 371, 375 for 1960-61, and 137, 96, and 192 for 1969-70 respectively.

Using the method described above, Tables 5 to 8 show how much direct or total employment would be generated if goods with value added of an additional Rs. one million worth of any of the three major groups were exported to developed, developing, centrally planned economies, or to the former East Pakistan.

Ranking of the Major Groups of Industries

The ranking of the three major industrial sectors with respect to their direct or total labour rquirements is similar for both years 1960-61 and 1969-70, and the ranking is unchanged even for different country groups. The composition of investment goods exports is most labour intensive and the composition of intermediate goods exports is the least labour intensive.

In case of exports to Bangladesh (East Pakistan) we get somewhat different results that is direct labour requirements for both years and total labour requirements for 1960-61 for consumer goods exports are labour intensive relative to investment goods exports. For 1969-70 total labour requirements are similar to the pattern observed in the case of exports to other regions.

Another case where the ranking differs from the general pattern is for exports to the rest of the world in the year 1960-61. Consumer goods exports in this case are slightly more labour intensive than investment goods exports, but the difference in total labour intensities is negligible, i.e., creation of 377 jobs in the case of consumer goods and 375 jobs in the case of investment goods.

Decline in Labour Intensity Over Time

As labour co-efficients were corrected for export weights, the total change in labour intensity could be decomposed into change due to (a) changing export structure, and (b) change in labour coefficient.

$$\Delta WL = (\Delta W)\ \bar{L} + (\Delta L)\ \bar{W}$$

where

ΔWL = total change in labour intensity,

$(\Delta W)\ \bar{L}$ = change in labour intensity due to change in export composition (i.e. export weights) keeping labour co-efficient constant, and

$(\Delta L)\ \bar{W}$ = change in labour intensity due to change in labour co-efficient keeping composition of export constant.

We have measured total change in labour intensity of exports only for the rest of the world. ΔWL is shown in column C of Table 4. $(\Delta L)\ \bar{W}$ was calculated by applying labour coefficient of 1969-70 with 1960-61 export weights (see Table 9), which gives us the percentage decline due to change in the labour coefficient shown in column f of Table 4. Once total change (ΔWL) and partial change in labour coefficients $(\Delta L)\ \bar{W}$ were determined independently

$(\triangle W)\ \bar{L}$ (change in export composition) was calculated as the residual (see Table 4, column g). Comparison of column f and g of Table 4 shows that the decline in labour intensity over time was mainly due to the fact that there has been a sharp decline in the labour coefficient itself; it is apparent from Table 3 that the labour coefficient for each industry has fallen over time. What are the implications of this result? One may say that there has been an increase in labour productivity independent of a change in degree of capital intensity or it has been caused by an increase in capital intensity. A third explanation is also possible: there has been a shift in the structure of exports within the three groups from more to less labour intensive industries. For example in 1960-61 cotton textiles comprised 83 percent of all consumer goods exports to the rest of the word, but in 1969-70 the share was reduced to 72 percent while the share of footwear, which has a lower labour intensity than cotton textiles, rose by 10 percent. Similarly in case of intermediate goods export, 67 percent of this group was leather products and 21 percent was industrial chemicals in 1960-61, in 1969-70, the leather products came down to 57 percent and the share of industrial chemical increased to 39 percent, which is less labour intensive than leather products.

Other studies give conflicting evidence as regards the major explanatory factors. Hussain's [3] findings are that capital/labour ratios have definitely increased over the period 1959-60 to 1967-68. However, a more recent study by A.R. Kemal [7] shows that the capital/labour ratio for manufacturing as a whole did not change appreciably between 1959-60 and 1969-70 while the capital/output and capital/value added ratios fell somewhat and the value added/labour ratio increased by 75 percent.

It would be futile to try to arrive at a precise explanation of the sharp fall in the labour requirements of Pakistan's manufactured exports, because the data on capital in particular are too uncertain. But the main explanation is certainly a genuine increase in output and value added per labourer, caused by a gain in experience in very young industries, helped by higher capacity utilization in many instances, and also some increase in capital intensity. As manufacturing industries which export a large part of the output to the rest of the world must be competitive, these tendencies are necessary and desirable. It is likely that the very sharp fall in labour requirements in manufactured exports during the sixties will prove to have been exceptionally rapid, but the results of this study give a warning against using present labour requirements as a measure of the employment potential of exports of different types of manufactured goods in the foreseable future. Allowance should be made for a continued fall in the direct and total labour requirements. This factor will, of course, probably also apply to import substitution industries. Our preliminary conclusion is that comparisons of the employment potential between industries is more important than the absolute figures obtained for labour requirements at any one point of time.

COMPARISON OF LABOUR REQUIREMENTS BETWEEN INDUSTRIES

Our results show that a major proportion of Pakistan's manufactured exports consist of consumer goods whose labour intensity appears to be relatively lower than that of investment goods. This is not an unusual phenomenon for Pakistan as earlier studies show parallel results. Islam [16] following

Lary's [10] approach found that the capital goods industry as a group in Pakistan has lower value-added per employee than the national average. Furthermore it has less than average non-wage value added per employee and in both cases it is significantly lower than the national average—while the consumer goods industries when taken separately for West Pakistan have value added per employee just below the average, showing a bias towards labour intensity. The intermediate goods in West Pakistan came out to be the least labour intensive, in Islam's study. While describing intertemporal variation in factor intensities, Islam does not mention whether labour intensities have increased or declined over time, he just discusses the changes in ranking of industries whereas our results have further indicated an overall decline in labour intensities over time.

Sectoral capital intensities obtained by A.R. Khan [4] also support our results. Khan measured capital intensities based on the ratio of observed physical capital to labour and concluded that the three industries with unusually high capital intensities are fertilizer, paper, and petroleum products. These industries belong to the intermediate goods sector; in our findings also, based on direct and total labour requirements, this sector came out to be the least labour intensive. The other industries which came next in capital intensity ordering are sugar, cigarettes and edible oils which belong to the consumer goods sector; in our study this sector appears to have the second lowest labour intensity.

Khan's study [4] shows that the least capital intensive sectors are leather and its products, metal products, and wood cork and furniture. The leather industry is a puzzle—its direct labour requirements also appear to be very low, and in our study this industry is mainly responsible for the low, labour requirements of the exports of intermediate goods (as 67 percent in 1960-61 and 57 percent in 1969-70 of intermediate goods export to the rest of the world was held by leather and its products alone). Kemal's study [7] also shows that the leather goods industry simultaneously has a low capital/labour and a very high value added/labour ratio.

Concerning the capital intensity of the investment goods sector, Khan [4, p. 231] concludes "It may be noted that capital intensity of capital supplying sector is not particularly high". This view supports our findings and the reason underlying this fact could be that our investment goods sector at present mainly consists of those industries (e.g., metal and metal products, and non-electrical machinery) which are quite highly labour intensive.

Khan has extensively argued that consumer goods industries in Pakistan were relatively more capital intensive than socially desirable, and that capital has been heavily underpriced (due to different government policies, e.g., overvaluation of the exchange rate, low interest rates, and other different incentives for import of capital) while the price of labour has been higher than its efficiency value. The reasons that consumer goods are relatively more capital intensive than socially desirable could be due to the fact that most of the industries belonging to this sector, e.g., sugar, cigarettes, edible oil, and other food manufacturing are the products of the era of import substitution, when

capital was underpriced. It created the incentives to build up greater capacity than can be used at any given time period to ensure against the difficulties of getting licences for expanding the capacity in future. G. Winston [17] and A.R. Kemal [6] have shown in their study that for the year 1965 only 33 percent [17] and for 1967-68 only 55 percent [6] of the industrial capacity was being utilized—hence underutilization of capital stock in large-scale manufacturing reduced the potential level of employment and increased the observed capital intensities in the underutilized sectors.

Our tentative conclusions are subject to a number of important qualifications pertaining to the statistical basis and the method of analysis of the study. Firstly, labour requirements for each of the 20 subgroups of manufacturing industries reflect the total production in each group, and are not adjusted for the structure of exports within each group. This implies that the labour requirements for exports from a given group can differ quite significantly from the labour requirements for the group as a whole. Thus the labour requirement ratio for the food industry group is strongly influenced by the sugar industry which in 1969-70 accounted for 64 percent of the capital assets, 54 percent of value added, and 45 percent of employment in the food industry group, and the direct labour requirement of which was 40 against 48 for the group as a whole, and 183 for the fish canning and sea foods industry, an important export industry. Thus even the data for the 20 individual subgroups of manufacturing industries do not give exact data for labour requirements for exports. Secondly, as pointed out previously, the three major industry groups are very heterogenous, and ratios for the groups as a whole are not representative for all industries within the groups. Thirdly, the labour/value added ratios in some industries do not appear to be influenced by capital intensity. Thus, if we base our estimates on the Census of Manufacturing Industries 1969-70 data, we find that the direct labour requirements in the leather industry is 56 against 87 for all manufacturing industries whereas the value of fixed assets per employed person was Rs. 6,075 in the leather industry against Rs. 11,600 for all industries. Still, employment costs in the leather industry represented only 11.4 percent of value added against 20.5 percent for all industries. Thus the assumption that low apparent labour intensity (measured by employment in relation to value added) reflects high capital intensity does not seem to apply in all cases.

Moreover, other factors have to be taken into consideration. The cotton textile industry is Pakistan's most important industry both in terms of value added and employment, and it is also the country's most important export industry amongst the manufacturing industries. Its strong position is due to its role as a processing industry of an important domestic raw material. There is no evidence which suggests that it is unduly capital intensive, at least not as regards spinning, and its structure has not been influenced by foreign investments. Similarly, several other important export industries (such as fish preparations and leather) are based on domestic raw materials.

On the other hand, investment goods industries are relatively weak in Pakistan and one reason is the heavy skill component in such industries. Because we do not include human capital in our analysis, we lose one important explanatory factor. The growth and establishment of certain capital-intensive investment goods industries (noteably cement and steel) may lead to increased

exports of investment goods, but this will most probably lead to a very significant fall in the labour requirements embodied in exports of investment goods from Pakistan.

Thus our results must be interpreted with utmost caution. For other reasons than capital/labour ratios, certain manufacturing industries have managed to succeed in and may be further expanding their exports. On the other hand, certain apparently labour-intensive industries will require heavy investment in human capital before they can enter the export markets successfully.

CONCLUSIONS

As mentioned in the introduction of the paper the task has been to determine the employment-generating effects of export expansion. In Pakistan, where the needs exceed the means to achieve, the appropriate choice of one instrument, export policy can help in meeting two ends, i.e., earning foreign exchange and generating employment. From time-series analysis of our export structure it is apparent that manufactured consumer goods constitute a major part of our export, and its share in total export has been increasing over time. Nevertheless, it has been shown in this paper that consumer goods are relatively less labour intensive than investment goods.

Based on two measures of direct and total labour requirements, an attempt was made to explore how much employment should be generated in consumer, intermediate and investment goods sectors if products worth an additional one million rupees in domestic value added from either of these sectors were exported to developed countries, developing countries, centrally planned economies, or former East Pakistan. For most of the cases it was found that investment goods are most labour intensive based on labour/value added ratios. Does this imply that Pakistan should concentrate more on the promotion of exports of investment goods? This would not necessarily be a correct choice of policies as the structure of exports shows that consumer goods have always been a major part of Pakistan's manufactured exports, showing that world demand for Pakistan's exports is concentrated in consumer goods and that Pakistan has some distinct advantages in manufacturing such goods. In fact, an apparently lower labour intensity for consumer goods against investment goods could be attributed to domestic factor market distortions and underutilization of industrial capacity as well as statistical artifacts, hence to obtain the potential labour intensity of this sector, we could inter alia increase capacity utilization by removing the deficiencies of demand through promoting exports.

Next an attempt was made to analyse the labour requirements based on the geographical direction of export to determine to which group of countries these exports should be diverted to get a high growth of total labour employed. It was found that if exports containing an additional one million rupees of domestic value added (irrespective of industrial group) were exported to developed, developing, or centrally planned economies, or to former East Pakistan, then total employment generated for 1969-70 would have been 132, 149, 150, and 146, (man years) respectively. It shows that exports promoted to centrally planned economies and developing countries appeared to be most favourable for employment creation, but the differences are so small that they may be

caused by unavoidable statistical errors. However as the data required to calculate labour intensities (i.e. direct labour coefficients and input-output matrix) are not available for the recent years, it is not possible to speculate about the existing situation with regard to the relationship between labour intensity and exports.

It is interesting to note that our results for determining the labour intensities for different sectors follow the similar pattern as obtained in the studies done earlier. Incidentally, the results of our analysis partially refute the Heckscher-Ohlin Theorem, i.e., our major export group is consumer goods which has on the average a relatively lower labour intensity than other commodity groups.

Appendix Table

Value-added and Employment Multipliers

		Value-added Multipliers	Employment Multipliers
(a)	*Consumer Goods:*		
		S_j	M_j
1.	Food	1.41249	2.4898
2.	Beverages	1.51064	2.2688
3.	Tobacco	1.23414	2.9127
4.	Cotton textiles	1.29504	1.2968
5.	Other textiles	1.43432	1.3303
6.	Footwear	1.08527	1.1198
7.	Wood and furniture	1.03029	1.0147
8.	Drugs and pharmaceuticals	1.23084	1.8088
9.	Printing and publishing	1.20315	1.2347
10.	Miscellaneous	1.86202	2.3725
(b)	*Intermediate Goods:*		
11.	Paper and its products	1.45187	1.6261
12.	Leather and its products	1.14839	1.5325
13.	Rubber and its products	1.46586	2.2017
14.	Industrial chemicals	1.38411	2.3329
(c)	*Investment Goods:*		
15.	Non metallic minerals	1.37182	1.7137
16.	Basic metals	1.41534	1.4039
17.	Metal products	2.03574	1.1973
18.	Machinery except electric	2.60642	1.2181
19.	Electrical machinery	1.75357	1.8644
20.	Transport equipment	1.25277	1.0761

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