

## Notes & Comments

# Employment Aspects of Industrial Growth in West Pakistan

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Employment has been one of the major explicit objectives of all development plans in Pakistan. The Third Five Year Plan estimated [3] that at least 255,000 additional employment opportunities would be created in West Pakistan in large-scale manufacturing sector. Although complete reliance on the data reported about employment in the C.M.I. is not recommended, the orders of magnitude can easily be seen. It appears from the statistics available that employment in this sector has increased by approximately 90,000-100,000 only during these eight years. The average annual rate of growth of employment between 1954-1959/60 was 16.8%, slightly higher than 15.6% annual rate of output growth but this rate declined to 3.1% between 1959/60 and 1967/68 while output at factor cost rose by about 11.4%. The output elasticity of demand for labour thus works out to be 0.27 for this period. Implicit in these growth rates is the fact that labour productivity was increasing at an average of 8% per year.

In view of such a wide gap between employment growth and output growth, it becomes important to inquire whether the objective of the Plan regarding labour absorption using the strategy of rapid industrial development of the kind pursued so far are realistic and attainable. Secondly, it is also interesting to explore as to what have been the major constraints in the way of industrial employment generation. This note focusses on one particular aspect of the employment problem in large-scale manufacturing industries in West Pakistan. Section I attempts to measure the degree of displacement of labour due to the adoption of more capital-intensive techniques. Section II discusses the causes of increased capital-intensity and tests the hypothesis that labour displacement has been due to increase in wage rates.

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## I

Table I presents the comparative data for West Pakistan employment by major sectors for various intervals of time. It can be seen that employment in manufacturing sector (including small scale industries) declined from 15.0% of total employment in 1955 to 14.3% in 1965. On the other hand, the contribution of manufacturing to GNP rose from 11.1% to 15% in the same period. These figures for employment do not isolate the share of large-scale manufacturing which, in our view, has declined more than what is implied in the aggregate data for the sector as a whole. An index of factor intensity used in this study is the capital-labour ratio and changes in these ratios which have taken place during this period have been computed. The aggregate capital-labour ratio for the whole large scale manufacturing sector was 4531 in 1959/60 and had risen to 9558 by 1967/68. However, taking the deflated figures of capital for these years we find that capital-labour ratios were 4531 and 6479 respectively for 1959/60 and 1967/68. The largest increase in industry capital-labour ratios appear to have taken place in electrical machinery, rubber, beverage, food manufacturing, chemical and chemical products, printing and publishing, while tobacco, paper and paper products, leather and leather products appear to have recorded relative declines. This raises the possibility that factor substitution between capital and labour was taking place during this period. Following Williamson and Sicat's technique [5], the labour displacement effects have been

Table I

*West Pakistan Employment in Major Sectors*

(thousand workers)

Sectors	1951	1955	1959	1961	1963/64	1965
Agriculture	7499	7092	7929	8970	9887	10210
Mining	11	19	4	30	15	20
Manufacturing	1111	1939	2021	2003	2209	2540
Construction	56	553	414	299	235	510
Public Utilities	43	25	35	30	57	30
Transport and Comm.	133	299	379	389	334	800
Trade	786	1070	1514	1032	1243	1570
Services	994	1802	1726	1973	2160	1640
Others	865	157	250	224	350	375
Total	11478	12950	14271	14950	16490	17685

Employment in Mfg.  
as % of total employment

	9.6	15	13.4	13.4	11.5	14.3
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Source: 1951 and 1961 figures from the Census of Pakistan: 1955, 1963/64 and 1965 figures from Manpower Surveys, Government of Pakistan.

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computed and are presented in Table II. These displacement effects have taken place due to a movement away from the 1959/60 factor combinations determined by 1959/60 factor prices, which are being used as basis of comparison. If the 1959/60 capital-labour ratio had prevailed in 1967/68, which it has not in large part due to policy induced factor price distortions, employment would have increased in proportion to increase in capital stock. However, due to a change in factor prices and subsequent substitution of capital for labour, total employment generated in 1967/68 is less than it would have been, had the capital-labour ratio remained the same as of 1959/60. Then the optimum level of 1968 employment ( $L^*_{168}$ ) can be compared with actual employment levels ( $L_{168}$ ). The difference between the two can be termed as the labour displacement effect for manufacturing as a whole. The labour displacement effect is about 44% of the present level of employment. In other words, if the 1959/60 capital-labour ratios were in operation about 175494 additional employment opportunities could have been generated by 1967/68. The largest displacement effects have occurred in rubber products, beverage industries, transport equipment, printing and publishing, basic metal industries and food manufacturing.

## II

What has been the cause of these increasing capital-labour ratios? One obvious possibility is the existence of relative price distortions in the economy. It is quite widely established empirically [2] that economic policies pursued during this period, such as accelerated depreciation allowances, tax rebates and tax holidays, have given rise to artificial incentives to promote capital-intensive industries, which explains, in part, the failure of employment to grow.

Besides factor price distortions, the second and equally important obstacle to employment growth was non-availability of appropriate technology to complement the resource endowment of LDC's. Modern capital-intensive production techniques originating in the advanced countries were imported liberally and at times under pressure from aid-giving agencies.

Third, the under-utilization of the existing capital stock in large scale manufacturing in West Pakistan reduced the potential level of employment even further. Gordon Winston [6] who investigated the phenomenon for the year 1965 reported that only 33% of existing capacity was being used (on the basis of 2-1/2 shift per day). If policies had been pursued to keep the relative prices of capital and labour equal to their true scarcity values, industrial employment would have probably been 70-95% higher than the levels of employment actually experienced, as the use of second shift would have been much more widespread [7].

Fourth and very relevant in the context of Pakistan are the effects of the prevailing distribution of income. It has been argued [4] that the distribution of income, by determining the structure of demand, in large part dictates the overall capital-output ratios in the economy and therefore for a given aggregate level of domestic output and the existing set of production technologies the

<sup>1</sup>The percentage change for each variable was computed as follows. The base year values (1959/60 and 1963/64) were averaged, the terminal year values were averaged (1967/68 and 1969/70) and the difference between these two average values, taken as a percentage of the base year was used in the regressions.



pattern of demand dictates the level of employment. Where, the rich display a consumption pattern heavily biased towards capital intensive goods, employment suffers and at the expense of the poor, not the rich. Exacerbating the maldistribution of personal income are the inequitable government policies that govern rural-urban distribution of income, for as much as production in the rural sector is characteristically more labour intensive than production in urban area and government pursuing policies for agricultural and industrial goods often redistribute income towards the urban sector, employment again suffers.

Finally, the influence of wages on employment growth and labour productivity seems to have drawn much attention as an explanatory variable. Lagging employment is attributed to rising wage levels which either reduce the substitution of capital for labour or cause management to make more efficient use of labour. The components of the employment lag written large scale manufacturing are analysed below with the rate of growth of labour productivity being taken as an indicator of employment lag....the higher the growth of productivity, the more sluggish is the growth of employment, the aggregate level of output being held constant. Using the Harris-Todaro model [1] the function relating productivity to wages and output can be written as

$$\log v = a + b \log w + c \log Q \dots \dots \dots (1)$$

where  $v$  is percentage change in labour productivity,  $w$  is percentage change in wages/labour  $Q$  and is percentage change in output (value added at factor costs). 'a', measures the rates of increase in labour productivity due to technological change, 'b' estimates the elasticity of substitution between labour and all other factors and 'c' measures the effects of output growth on labour productivity. The above function says that the rate of increase of labour productivity will depend on the rate of growth of wages and the rates of growth of output.

Time series data for the variables is not available but it was possible to calculate the annual average rates of growth for the variable for each of the 20 industries from the CMI for early and late 1960s. The average of 1959/60 and 1963/64 figures for all these variables was taken and subtracted from the average of 1967/68 and 1969/70 figures; the use of average of two census years eliminate business fluctuation and provides a better measure of long term trend than can be obtained from any pair of census observations. The output figures are estimates of value added at factor costs (excluding indirect taxes and subsidies) in current price; wages are the aggregate earnings per worker in each industry, also in current prices. As the only index available for deflation of prices was the wholesale price index for all manufactures and as this index will affect all industries uniformly, the regression coefficients of the cross section regressions are not affected by using undeflated data. Equation [1] was estimated for a cross section of 18 industries. Two observations were deleted because of negative values. The estimated relationship was

$$\begin{aligned} \log v &= 0.55 + 0.73 \log w + 0.24 \log Q \dots \dots (2) \\ &\quad (3.357) \quad (1.157) \\ R^2 &= .56 \quad F = 9.48 \quad d = 2.098 \end{aligned}$$

The output variable was tried in both log and unlogged form and was not significant in either. The important result is that the regression coefficients for



W/L i.e.w is significantly different from zero at the five per cent level and is less than unity. The elasticity of substitution of value added per labor (V/L) with respect to W/L is 0.73. Thus if output is held constant, then 1% relative change in wages (W/L) causes a 0.73 change in value added per worker (V/L). The implication of this regression is that significant substitution between capital and labour does exist. As a consequence, for any given level of output, an increase in wages leads to an increase in productivity and therefore a decline in employment. By the same token, for any given growth in output, the employment effect will be greater, the smaller is the increase in wages per worker.  $R^2$  indicates that about 56% of variation in labour productivity is explained by variations in wages and output levels.

### CONCLUSION

The consequence of rapid industrial growth on employment generation in West Pakistan has been very disappointing. Employment growth during the sixties lagged behind output by 8.1% on an aggregate basis. Distortions in relative factor prices seem to have been aggravated during this period. If the industries had followed the same labour-capital ratios of 1959/60 at least an additional 44% of the present level of employment would have been generated. Liberal provisions of imported capital goods and raw materials at official exchange rate and under foreign aid agreements, easy availability of institutional credit at low interest rates, tax exemptions and rebates on investment, increasing money wage rates seemed to have induced substitution of capital for labour in almost all the industries studied and biased choice of techniques in favour of relative capital intensive technologies. The influence of money wages on employment was quite effective and an increase in wages was found to be positively associated with considerable decline in employment corroborating similar evidence adduced for Latin America, Kenya, Jamaica and other developing countries. The existence of 'a shelf of labour-intensive or appropriate technologies', alternative modes of production with the same end-product quality and economic efficiency is hardly known with any amount of clarity or certainty at the present stage of our knowledge but there seems to be much flexibility in choosing the kind of product, considerable choice in the auxiliary or subsidiary services around the main production and processing unit and the proportion of time installed capacity is used. It is, therefore, pertinent to suggest that all such incentives which artificially result in making labour more expensive should be reconsidered and re-examined in the light of accumulated evidence on the tendency of substitution of capital for labour in a number of developing countries. It is quite possible that policies which make capital-intensive goods cheaper than the equilibrium prices may also be encouraging a consumption pattern biased toward capital-intensive goods. If this is true, reversal of these policies may also have some implications for income distribution patterns.



Table II  
Labour Displacement Effects

(Value in 000 rupees)

Industries	K 1959	L 1959	L — K 1959/60	K (At current prices) 1967/68	K (Deflated) 1967/68	L* <sub>168</sub>	L <sub>168</sub>	L* <sub>168</sub> -L <sub>168</sub>	$\frac{L^*_{168}-L_{168}}{L_{168}}$ %
Food Manufactures	95405	15080	0.1581	603165	424614.5	67112	35525	31587	89
Beverage Industries	2839	775	0.2730	23752	16720.8	4565	1325	3240	244.5
Tobacco Manufactures	21176	1380	0.0652	66750	46990.4	3062	8114	-5052	62.3
Manufactures of Textiles	344990	104343	0.3024	1182251	832278.0	251748	184713	67035	36.29
Manufactures of Footwear	6815	3845	0.5642	26318	18527.2	10456	7186	3270	45.5
Manufactures of Wood & Cork	—	—	—	3618	2546.2	—	—	—	—
Furniture & Fixtures	1316	494	0.3751	7419	5222.8	1961	1572	389	25.0
Paper & Paper Products	30391	2045	0.0673	48972	34475.2	2319	3847	-1528	-39.7
Printing & Publishing	12202	4935	0.4044	57404	40411.1	16341	7799	8542	109.5
Leather & Leather Prod.	9638	2401	0.2491	18212	12820.8	3194	4111	-917	-22.3
Manufacture of Rubber Prod.	1446	760	0.5256	36820	25920.4	13621	2555	11066	433.9
Chemical & Chemical Prod.	120517	8175	0.0678	682135	480207.6	32574	25388	7186	28.7
Products of Petroleum & Coal	—	—	—	172615	121517.1	—	—	—	—
Non Metallic Mineral Prod.	76081	8092	0.1064	265097	186622.3	19849	15091	4758	31.5
Basic Metal Industries	18874	8098	0.4291	64899	45687.4	19600	9955	9645	96.9
Manufactures of Metal Prod.	19310	10216	0.5291	75941	52052.7	27541	16268	11273	69.3
Machinery except Electrical	20552	8318	0.4047	66500	46814.6	18946	11845	7101	59.9
Electrical Machinery	19365	4489	0.2318	107152	75432.5	17486	17311	175	1.0
Manufactures of Transport Equipment	12172	5103	0.4192	143142	100768.7	42251	17384	24867	143.1
Misc. Manuf. Industries	105622	17156	0.1624	153949	10837.1	17602	24745	-7143	289.0
All Industries	918711	205705	0.2239	3806111	2580467.4	570228	394734	175494	44.0

Sources: K<sub>67-68</sub>, L<sub>168</sub> from C.M.I. 1967/68.  
L  
—Computed from C.M.I. 1959/60.  
K<sub>59-60</sub>

Table III  
*Capital, Labour, Wages & Value-Added in Large-Scale Manufacturing Industries (West Pakistan)*  
 (1959-60)

(Value in 000 rupees)

Industries	K	L	W	V	$\frac{K}{L}$	$\frac{VA}{L}$	$\frac{W}{V}$
All Industries	918711	205705	241857	693103	4584	3339	.35
Food Manufacturing	95405	15080	19661	64453	6327	4274	.31
Beverage Industries	2839	775	916	4513	3663	5823	.20
Tobacco Manufactures	21176	1380	2757	20652	15345	14965	.13
Manufacture of Textiles	344990	104343	110358	272767	3306	2614	.41
Manufacture of Footwear	6815	3845	8748	25233	1772	6563	.35
Manufacture of Wood & Cork	—	—	—	—	—	—	—
Furniture and Fixture	1316	494	464	959	2664	1941	.48
Paper and Paper Products	30391	2045	4064	18310	14861	8954	.22
Printing and Publishing	12202	4935	6879	10239	2473	2075	.67
Leather and Leather Products	9638	2401	2538	6781	4014	2824	.37
Manufacture of Rubber Products	1446	760	565	1681	1903	2212	.34
Chemical and Chemical Products	120517	8175	13262	53342	14742	6525	.25
Products of Petroleum and Coal	—	—	—	—	—	—	—
Non Metallic Mineral Products	76081	8092	10431	51074	9402	6312	.20
Basic Metal Industries	18874	8098	10029	29061	2331	3589	.35
Manufacture of Metal Products	19310	10216	11087	21605	1890	2115	.51
Machinery except Electrical	20552	8318	8424	21766	2471	2671	.39
Electrical Machinery	19365	4489	5941	14593	4314	3251	.41
Transport Equipment	12172	5103	5441	8690	2385	170	.63
Misc. Manufacturing Industries	105622	17156	17173	52488	6157	3060	.24

Source: C.M.I. 1959-60.



Table IV  
*Capital, Labour, Wages & Value-Added in Large-Scale Manufacturing Industries (West Pakistan)*

Industries	(1963-64)				(Value in 000 Rupees)			
	K	L	W	VA	$\frac{K}{L}$	$\frac{VA}{L}$	$\frac{W}{V}$	$\frac{W}{L}$
All Industries	2533348	330529	504442	2029509	7665	6140	.249	1526
Food Manufacturing	259322	23976	42830	271387	10816	11319	.16	1786
Beverage Industries	10174	1634	2474	18600	6226	11383	.133	1514
Tobacco Manufactures	80926	9084	17935	175568	8909	19327	.102	1974
Manufactures of Textiles	1028012	173604	225495	696145	5922	4010	.32	1299
Manufactures of Footwear	25358	6264	13917	37520	4048	5990	.37	2222
Manufactures of Wood and Cork	—	—	—	—	—	—	—	—
Furniture and Fixtures	3269	1568	2239	4712	2085	3005	.48	1428
Paper and Paper Products	37369	2881	6243	36008	12971	12498	.17	2167
Printing and Publishing	31372	6023	12204	32460	5209	5389	.38	2026
Leather and Leather Products	12183	3767	5382	33288	3234	8837	.16	1429
Manufactures of Rubber Products	6420	1522	3189	11337	4218	7449	.28	2095
Chemicals and Chemical Products	460229	17489	36057	239394	26302	13681	.15	2061
Products of Petroleum and Coal	—	—	—	—	—	—	—	—
Non Metallic Mineral Products	169980	10289	16506	73443	1652	7138	.23	1604
Basic Metal Industries	71765	13399	22881	72788	5356	5432	.31	1708
Manuf. of Metal Products	55684	13658	22250	48842	4077	3576	.46	1629
Machinery except Electrical	52350	11099	15475	37415	4717	3371	.41	1394
Electrical Machinery	77945	12574	23044	73839	6199	5872	.312	1833
Manufacture of Transport Equip.	55670	10407	27833	94153	5349	9047	.30	2675
Misc. Manufacture Industries	108288	15999	25467	118437	6768	7403	.215	1592

Source: C.M.I, 1963-64.



Table V  
*Capital, Labour, Wages & Value-Added in Large-Scale Manufacturing Industries (West Pakistan)*

Industries	K	L	W	VA	K — L	VA — L	(Value in 000 Rupees)	
							W — V	W — L
All Industries	3806111	398226	709426	3683449	9558	9250	.193	1782
Food Manufacturing	603165	35525	64466	471625	16979	13276	.137	1815
Beverage Industries	23752	1325	3282	39527	17926	29832	.083	2477
Tobacco Manufacturing	66750	8114	20583	318394	8227	39240	.065	2537
Manufactures of Textiles	1182251	184713	264241	1052219	6401	5697	.25	1431
Manufactures of Footwear	26318	7186	13216	41574	3662	5785	.32	1839
Manufactures of Wood and Cork	3618	1128	1597	4918	3208	4360	.33	1416
Furniture and Fixtures	7419	1572	3209	6999	4720	4452	.46	2041
Paper and Paper Products	48972	3847	11421	33538	12730	8718	.34	2969
Printing and Publishing	57404	7799	18847	59068	7360	7574	.32	2417
Manufactures of Leather	18212	4111	7327	40485	4430	9848	.18	1782
Manufactures of Rubber Products	36820	2555	6921	43785	14411	17137	.16	2709
Chemical and Chemical Products	682135	25388	69907	419098	26868	16508	.17	2754
Products of Petroleum and Coal	172615	2364	14180	238421	73018	100855	.060	5998
Non Metallic Mineral Products	265097	15091	26495	207664	17567	13761	.13	1756
Basic Metal Industries	64899	9955	22032	98997	6519	9945	.22	2213
Manufacture of Metal Products	73941	16268	29000	78390	4545	4819	.37	1783
Machinery except Electrical Mach.	66500	11845	19566	52560	5613	444	.37	1652
Electrical Machinery	107152	17311	39967	172170	6190	9946	.23	2309
Manufactures of Transport Equip.	143142	17384	38802	126590	8234	7282	.31	2232
Misc. Manufactures Industries	153949	24745	34367	186427	6221	7534	.18	1389

Source: C.M.I. 1967-68.



Table VI  
*Capital, Labour, Wages & Value-Added in Large-Scale Manufacturing Industries (West Pakistan)*

Industries	(1969-70)							(Value in 000 Rupees)		
	K	L	W	VA	$\frac{K}{L}$	$\frac{VA}{L}$	$\frac{\text{Wages}}{VA}$	$\frac{W}{L}$		
All Industries	4852949	318360	987020	481130	11600	11500	.21	2359		
Food Industries	681270	34103	91438	710755	19977	20841	.129	2681		
Beverage Industries	30848	1784	4020	28833	17292	16162	.139	2253		
Tobacco Manufacturing	67167	10655	26339	383314	6304	35975	.069	2472		
Manufacture of Textiles	1670884	197902	395721	1554115	8443	7853	.255	2000		
Manufactures of Footwear	25438	7434	20002	67549	3422	9086	.0296	2691		
Wood Cork and Allied	7816	943	1704	3981	8288	4222	.043	1807		
Furniture and Fixtures	8201	1688	5049	7443	4858	4409	.68	2991		
Paper and Paper Products	166309	6298	18851	62558	26407	9933	.0301	2993		
Printing and Publishing	62446	8844	24799	71180	7061	8048	.35	2804		
Leather Manufacturing	31243	5291	10777	94416	6075	17845	.11	2037		
Rubber Products	25495	2611	6555	41844	9765	16026	.157	2511		
Chemical and Chemical Products	647470	22340	82403	428723	28983	19191	.192	3689		
Products of Petroleum and Coal	157162	2340	16181	383836	67163	164033	.0422	6915		
Non Metallic Mineral Products	545474	16876	39714	207764	32323	12311	.191	2353		
Basic Metal Industries	125753	13765	34130	116131	9136	8437	.29	2480		
Metal Products	94224	17879	37692	86131	5270	4817	.44	2108		
Machinery except Electrical	72332	12786	24182	57645	5657	4508	.42	1891		
Electrical Machinery	140706	16197	48311	160401	8687	9903	.301	2983		
Transport Equipment	128798	17238	45794	67353	7472	3907	.68	2657		
Misc. Manufactures Industries	163013	21386	53358	277337	7622	12968	.192	2495		

Source: C.M.I. 1969-70.

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