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Structure of Large-scale Manufacturing Industries of Pakistan (1950–1988)*

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I. INTRODUCTION

Bain's (1951) paradigm provided a theoretical underpinning for a great deal of the empirical work on the structure-conduct-performance relationship in the past. The results of almost all the earlier studies lend support to the hypothesis. What it states is that the presence of various "barriers to entry" to an industry determines its level of concentration (structure). High levels of concentration in turn facilitate co-operative price behaviour (conduct). This collusive behaviour then leads to high profits (performance).

The purpose of the present paper is to examine the evolution of the structure of manufacturing industry by tracing the pattern of changes, over time (1970, 1978, 1984 and 1988) in some of the basic aspects of industrial structure like (a) distribution of firm size and type of ownership; (b) trends in aggregate concentration in manufacturing industry; (c) the levels of concentration in individual industries; and (d) the average size of establishment and plant size in Pakistan in relation to international standards of average plant size.

II. DISTRIBUTION OF FIRM-SIZE AND TYPE OF OWNERSHIP

Information about the distribution of firm size and type of ownership are important because the structure – conduct – and behaviour of different enterprises besides other factors, also depend on the size structure, and type of ownership.

Table 1 shows the size structure by comparing the distribution of size in the three size groups measured in terms of number of workers. The table also provides a comparison of the percentage share of the three size groups in manufacturing value-added.

*Owing to unavoidable circumstances, the discussant's comments on this paper have not been received.

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Table 1

Size Distribution of Manufacturing Establishments and Value-added (1959–88)

Size	Establishments Percent						Value-added Percent					
Employment	1959	1970	1975	1978	1984	1988	1959	1970	1975	1978	1984	1988
0–99	87.3	83.5	82.3	83.2	82.7	82.	25.4	15.6	13.0	13.3	12.9	13.0
100–999	10.3	14.2	14.5	14.2	14.7	16.	32.4	39.9	45.8	51.9	44.8	57.0
1000 and Above	3.3	2.3	3.2	2.5	2.6	2.	43.4	40.6	39.3	32.2	42.2	30.0
N	(22)	(86)	(108)	(94)	(100)	(85)						

N = Number of establishments in the largest size group.

At the beginning 87.28 percent of firms had 100 or fewer workers, this percentage declined to 83.5 percent in 1970 and remained almost the same in 1988. Whereas the percentage of firms with more than 100 but less than 1000 workers increased from 10.33 to 14.20 percent in 1970 and since then has increased only marginally. In contrast about 3 percent of the firms employ 1000 or more workers and this percentage has also changed only fractionally since 1970. This means that after 1970 the pattern of distribution of employment by the three size groups remained the same. Similarly, the comparison of percentage share of the three size groups in manufacturing value-added show that the share of the small-size group continued to decline from 25.40 percent to 13 percent between 1959–88, while that of the medium size group has persistently increased except for a slight decline in 1984. In contrast, the share of the largest size group has fluctuated and has not remained stable.

Table 4 summarises some evidence on the relative importance of the public and private sectors in Pakistan's manufacturing industry. It suggests that the role of the public sector in the manufacturing industries has increased substantially since the 1970s, for example public-sector investment increased from 12 percent in 1969-70 to 80 percent in 1977-78 and 54 percent in 1984. It is engaged mainly in basic industries like edible oil, petrochemicals fertiliser, pesticides, petroleum refining, non-metallic mineral products, cement, iron and steel, engines, motor vehicles and ship building etc. In contrast, private sector involvement in manufacturing industry which had reached its peak in 1960s, started declining in the 1970s and increased only marginally in the 1980s. For example, private sector investment which was at the level of 87 percent in 1969-70 declined to 45 percent in 1984.

From the above information we understand that there exist small/medium/large size enterprises privately or publicly owned. Such enterprises may record a different structure and therefore performance. For example, first, the size of an enterprise will influence its structure and technique of production. These will in turn determine to a large extent the cost per unit of output, prices, profitability, productivity and wages. Second, the type of ownership besides influencing the structure of an industry also determines its performance. The public-owned enterprises are mostly concentrated but pursue objectives, different from the private-owned enterprises.

III. AGGREGATE CONCENTRATION IN PAKISTAN'S MANUFACTURING INDUSTRY

We have already gained a bird's eye view about the importance of the three

size groups from Table 1. However, the percentage share of the largest size group in manufacturing value-added can also be interpreted in terms of overall concentration trends over a 29 year period 1959–88. In other words, these percentages enable us to gauge the importance of the largest size class enterprises in the manufacturing sector and the extent of market power–concentration exercised by them.

At the beginning, the largest size group comprised of 22 establishments in manufacturing industry and controlled about 43.4 percent of its output and employed 3.3 percent of the labour force. The biggest of these was textiles, followed by food. The share of output and employment held by the large enterprises, 100 in 1984 is 42.19 and 3.3 percent. In 1984 on top of the list of large enterprises are establishments belonging to iron and steel, textiles, chemicals and food industries. In 1988 the number of large enterprises declined to 85 along with its percentage share in value-added and employment to 30 and 2 percent respectively. From Table 1 it is clear that over the period 1970–88 the number of large establishments and their percentage shares in value-added have fluctuated somewhat. However the job opportunities provided by the large size group has slightly declined. These findings indicate there are opposite forces at work, which on balance maintained approximately the aggregate level of concentration in manufacturing industries at the same level at least till 1984 after which a declining trend is noticed mainly because of the decline in the number of establishments in the large size group.

A similar picture emerges when we summarise the data in Table 2 in terms of concentration ratios defined as the percentage share of the top few in value-added and employment. For 1970 of the 33 sectors 7 sectors carried over 80 percent of production in their respective areas of production and employed more than 60

Table 2

Frequency Distribution of the Large Size Firm's Concentration Ratio in Manufacturing

Concentration Ratio	Number of Industries						
	1970	%E	1978 (Employment)	%E	1984	%E	1988
< 40	10	76	12	76	13	65	11
40 – 60	10	10	8	11	8	14	11
60 – 80	6	6	9	6	7	14	01
80 >	7	3.5	6	2	9	5	10
N	33		35		37		33

percent of the labour force. This number declined to 6 in 1978 and increased to 9 in 1984 and 10 in 1988, mainly because of the opening of four separate sectors–petroleum refining, petroleum products, ship building and motor cycles by 1984, indicating that concentration has fluctuated between 1970 and 1988.

Individually these ratios show the same tendency, increase in the market power of some with decline or same market share in the case of others over time. Table 5 reports concentration in manufacturing enterprises in individual sectors, measured as the percentage share of the top few firms in value-added for 1970, 1978, 1984 and 1988. It suggests that tea, alkalies, petroleum refining, rubber, poultry, non-ferrous industries, ship building, motor cycles and photographic goods industries are ranked as the highly concentrated industries followed by tobacco, leather footwear, paper, tyres, fertiliser and iron and steel. Out of a total of thirty-seven sectors, nineteen sectors witnessed a decline in the concentration ratio; in 6 sectors market power on the average, was constant over the period 1970 to 1988, and in 12 sectors concentration increased over time.

It is of interest to enquire whether these concentrated industries are relatively more capital-intensive or employ more labour, have higher labour and capital productivity and their wage bill is greater than the small-size establishments in the same industries. Table 3 summarises the comparison of the capital/labour ratio, value-added per unit of labour and capital and wages per head, between the top few large-size and small-size establishments in selected industries. Out of 26 industrial sectors the largest size establishments of 8 sectors have capital-labour ratios lower than the small-size establishments. Whereas in the case of 10 sectors the large-size establishments had lower value-added per unit of capital and only 2 sectors recorded lower wages than in the small units. Similarly, in case of 6 sectors, the large-size establishments employed less than 40 percent of the workers in their respective industries. In the rest of the 20 sectors the top few firms employed more than 50 percent of employees in their respective industries.

Table 3

Summary Comparison of Selected Ratios of 26 Concentrated Industries (1984)

	K/L	V/L	V/K	W/L	E
	(Number of Industries)				
Lower than Small	8	8	10	2	6
Higher than Small	22	18	16	24	20
Total	26	26	26	26	26

Table 4

Large Scale Manufacturing Investment (LSM) 1963-64 to 1982-83
(Rs Million 1959-60 Prices)

	Investment in LMS				Percentages		
	Private (PRI)	Public (PUI)	Total (TI)	VA (LMS)	PRI VA	PUI VA	II VA
1963-64	864.4	29.5	893.9	2,233	38.7	1.32	40.0
1964-65	966.7	108.3	1075.0	2,523	38.3	4.29	42.6
1965-66	866.5	110.1	976.6	2,766	31.0	3.93	34.9
1966-67	714.2	89.8	804.0	2,982	24.0	3.0	27.0
1967-68	730.5	97.4	827.9	3,209	22.8	3.0	25.8
1968-69	646.0	59.6	705.6	3,548	18.2	1.67	19.9
1969-70	827.4	121.3	948.7	4,042	20.5	3.0	23.5
1970-71	779.4	43.7	823.1	4,090	19.1	1.06	20.1
1971-72	630.9	60.2	691.1	3,813	16.5	1.57	18.1
1972-73	426.9	61.5	488.4	4,265	10.0	1.44	11.5
1973-74	307.5	165.5	473.0	4,585	6.7	3.6	10.3
1974-75	287.3	306.4	593.7	4,509	6.4	6.79	13.2
1975-76	354.3	855.2	1,209.5	4,486	7.6	19.06	27.0
1976-77	381.2	1,120.9	1,502.1	4,385	8.7	25.6	34.3
1977-78	337.6	1,393.7	1,731.3	4,823	7.0	28.9	35.9
1978-79	357.5	1,352.0	1,707.5	5,006	7.1	27.0	23.1
1979-80	432.8	1,097.9	1,530.7	5,575	7.8	19.16	27.5
1980-81	515.8	753.8	1,269.1	6,188	8.3	12.18	20.5
1981-82	553.2	717.5	1,270.7	7,036	7.9	10.19	18.1
1982-83	582.3	684.0	1,266.3	7,646	7.6	8.94	16.6

Source : Estimated by I.B.R.D., Federal Bureau of Statistics, Statistics Division, Government of Pakistan as reported in I.B.R.D. (1984).

Table 5

Concentration Ratios in Pakistan Manufacturing Industries (1970, 1978, 1984, 1988)

	Concentration Ratio							
	1970		1978		1984		1988	
Sectors	CR VA	CR E	CR VA	CR E	CR VA	CR E	CR VA	CR E
Food	32	13	13	10	7	10	10	10
Tea	100	100	100	100	100	100	100	100
Beverages	54	50	24	35	13	24	24	29
Tobacco	54	27	48	25	61	59	60	59
Textile	13	14	10	13	8	19	10	23
Wearing Apparel	64	46	50	46	23	39	20	31
Leather Tanning	44	30	42	41	59	35	24	46
Leather Footwear	76	75	73	66	71	67	89	80
Ginning	3	8	2	9	1	8	1	8
Wood Products	41	48	42	39	39	46	36	24
Furniture	43	42	27	33	40	39	28	39
Paper	95	66	92	87	75	75	54	60
Printing and Publishing	35	22	49	45	49	47	38	43
Drugs	60	27	25	28	21	25	24	28
Chemicals	44	47	25	31	31	29	31	26
Alkalies	100	100	80	80	90	83	100	100
Fertilisers	100	100	66	65	66	63	57	70
Other Chemicals	10	17	11	15	28	23	50	19
Petroleum Refining	–	100	100	100	100	100	100	100

Continued –

Table 5 – (*Continued*)

Sectors	Concentration Ratio							
	1970		1978		1984		1988	
	CR VA	CR E	CR VA	CR E	CR VA	CR E	CR VA	CR E
Petroleum Products	–	–	70	67	64	63	–	–
Rubber	63	54	71	69	86	79	84	28
Tyres	80	73	83	56	66	61	88	68
Plastic	73	55	71	56	54	39	46	44
Pottery	95	87	98	85	82	86	90	81
Glass	75	51	52	39	49	44	46	44
Cement	58	55	48	49	54	30	–	–
Iron and Steel	51	34	30	52	61	55	77	78
Non-ferous Metal	93	81	68	69	88	84	84	80
Fabricated Metal	22	13	26	19	26	23	43	43
Machinery	21	12	51	47	37	46	42	45
Electric Machines	23	23	18	31	20	31	–	–
Transport	31	50	65	52	49	55	42	58
Ship Building	–	–	–	–	100	100	100	100
Motor Cycles	–	–	–	–	100	100	100	100
Science Equipment	39	42	31	43	42	50	53	35
Photographic Goods	86	83	86	82	100	100	–	–
Sports	51	50	69	57	29	40	5%	67

Source: Calculated from Census of Manufacturing Industries (1970–88), Federal Bureau of Statistics, Statistics Division, Government of Pakistan.

Thus the main conclusion drawn is that most concentrated industries are capital-intensive and were at the same time employing more than half of the workforce in their respective industries. However, it is noted that most of these large establishments although they were able to have higher productivity, were not able to utilise capital more efficiently.

IV. AVERAGE SIZE OF ESTABLISHMENT AND PLANT SIZE IN PAKISTAN IN RELATION TO INTERNATIONAL STANDARDS OF AVERAGE PLANT SIZE

Besides the above findings, it has been reported that concentration ratios are very high in Pakistan and may exceed in some cases by a significant margin the level of concentration found in developed countries. [Merhave (1969) and White (1974)]. However this does not imply that the size of plant or enterprise is the same in both developed and less developed countries. In practice the size of plant in less developed countries is smaller than in the advanced countries. [Banerji (1978)]. And even among the less developed countries the level of concentration will vary with the size of their domestic markets [Mueller and Hamm (1974)].

Tietal (1975) and Banerji (1978) in their studies show considerable similarity in the pattern of distribution of plant size by sector in different industries across a sample of developing and advanced countries (including Pakistan). In a similar exercise Table 6 shows the ranking of manufacturing industries according to two measures of size (i) average value-added per establishment (ii) average number of workers per establishment for a sample of 20 industries. And our own results are in line with those of Tietal, the rank ordering according to average value-added per firm shows petroleum on top followed by fertiliser, cement, tobacco, food, beverages, paper, drugs, iron and steel, transport and rubber. At the end of the list are leather, matches, soap, printing, furniture, etc. Ranking according to mean number of workers again shows petroleum on top followed by cement, fertiliser, tobacco, paper, textile, transport equipment, iron and steel, rubber, drugs, beverages and food. While at the bottom of the list are matches, printing, leather, soap and furniture.

Results reported by Tietal (1975) and Banerji (1978) and those reported in Table 6 indicate that the same kind of industries experience a concentrated structure i.e. forces working for an oligopolistic structure in a particular industry are similar in all countries both developed and less developed. These forces can be technical economies of scale but the leading producers, realising that entry is difficult, through their entry deterring practices will work for an oligopolistic

Table 6

Ranking of Selected Industries by Average Size of Firm

Industry	Average Size (VA/N) Rank	Average Size (E/N) Rank
Petroleum	1	1
Fertiliser	2	3
Cement	3	2
Tobacco	4	4
Food	5	12
Beverage	6	11
Paper	7	5
Pharmaceuticals	8	10
Iron and Steel	9	8
Transport	10	7
Rubber	11	9
Paints	12	13
Textiles	13	6
Leather	14	17
Plastic	15	16
Matches	16	14
Soap	17	19
Printing	18	15
Metal Products	19	18
Furniture	20	20

Source: Calculated from Census of Manufacturing Industries (1987-88), Federal Bureau of Statistics, Statistics Division, Government of Pakistan.

structure as well. However these results do not indicate that minimum efficient size is the same in all countries. Table 7 compares the minimum efficient size of a few sectors with international standards of minimum efficient size, and shows that plant sizes in Pakistan are much smaller relative to the International Standards of minimum efficient size. Such a comparison suggests that the existence of economies of scale may not necessarily mean economies with small markets will have a few large

Table 7

Pakistan and International Standards of Average Size of 5 Selected Industries

Industry	Average Size in Pakistan	Average Size International Standards
Cement	450,000 tpy	900,000 tpy
Cotton	12,500 spindles	--
Polyster Staple	40. tons/day	120 a
Polyster Filament	11 tons/day	80 b
Automotives	200,000	7 million d
(Cars and LCV)	300,000	
Vegetable Ghee	9,500–20,000	30,000 and above

Source: Pakistan Industrial Regulatory Policy Report Vol. II (Draft Confidential January 6, 1988).

[a]In case of individual countries it is 111 for Korea, 181 Taiwan, 97 Thailand, 115 Malaysia, 59 Philippines and Japan 159.

[b]Average size for Korea is 64, 132 for Taiwan, 20 for Thailand, 65 Philippines and 113 Japan.

[c]Total output of LCV was only 12, 392 units in 1984-85.

[d]It is estimated that in 1970 the World production of automotives of all types, was around 22 million, in Western Europe it was round about 10 million, USA alone produced 7 million and Japan over 3 million. These estimates are made by the Motor Industry of Great Britain 1971 (Society of Motor Manufactures and Traders Ltd.

firms. Many small well below optimum size plants may be operating in such economies due to several other considerations such as political and social.

Given a few facts about some of the aspects of industrial structure in Pakistan, it is of interest to identify the factors causing first increase and then keeping constant the market power of large enterprises in particular at least till 1984. Although the scope of this paper does not include the determinants of concentration, our general remarks are that market power originate with conscious policies, adopted by the then government, regarding the structure of industry, later, the changing market and political environments exercised their influence, on the structure of industry and concentration levels.

CONCLUSION

Although this paper is incomplete in many respects, still a fair picture emerges from the data contained in the various tables we may conclude that, first, monopoly in the sense of a single seller is virtually nonexistent but the structure of manufacturing industry is quite concentrated which suggests that part of the industrial structure is categorised as oligopolistic. Second opposite forces are at

work therefore industrial concentration has fluctuated over the period 1970–88. Individually not all industries experienced the same trend in their concentration. Third, ranking of industries according to average size of plant shows that the pattern of distribution in Pakistan is the same as in other countries. This suggests that similar forces are at work in creating an oligopolistic structure in different countries. However this does not imply that the plant size is the same in similar industries across countries. In Pakistan the minimum optimum size of plants are substantially below the international standards of minimum efficient size.

The limitations in this paper are, first, these concentration ratios obscure the changes in the rank order of the top enterprises over time. The observation of such changes would be an indication of dynamic competition. Second, the importance of the forces in determining the structure of industry cannot be gauged from the modest approach adopted here.

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