PAKISTAN ECONOMIC AND SOCIAL REVIEW

Volume XXXII Summer 1994 Number 1

ARTICLES

DEPARTMENT OF ECONOMICS
UNIVERSITY OF THE PUNJAB
LAHORE - PAKISTAN

Pakistan Economic and Social Review
Vol. XXXII (Summer 1994), No.1, pp.77-102.

PAKISTAN'S TEXTILE SECTOR: COMPETITIVE PRESSURES AND PATTERNS OF RELATIVE EFFICIENCY

by

Robert E. Looney*

Introduction

The textile industry in Pakistan is one of great significance for its contribution to employment and exports. The production of cotton textiles predominates, despite the existence of a large jute industry, and increasingly important carpet industry and synthetic textiles. Although the share of textiles in manufacturing value added fell from 32.4 percent in 1977 to around 15 percent in recent years, the industry still employs 28 percent of the total labor force and accounts for around 60 percent of the country's total exports (United Nations 1990, p. 53). Capital investment in the sector accounts for around 28 percent of total national investment (and 37 percent of foreign currency investment in 1991).

The purpose of this paper is to examine recent trends in the industry. What are the main patterns of growth, changes in the composition of output, and government policies to encourage production and export? In addition, given the relative efficiency of textiles it is of some interest to examine the structural differences between that sector and other lines of manufacturing. Are there any discernible differences between textiles and other main areas of manufacturing regarding factors associated with relative efficiency? Do these factors vary by ownership pattern, that is, public versus private? What are the links between efficiency, ownership and the degree of protection received by firms? Drawing on the analysis that follows, several policy implications are noted.

---

* Professor, Naval Postgraduate School
Monterey, California 93943 USA

Recent Developments

The textile industry in Pakistan had experienced rapid growth during the 50s and 60s, but it started encountering problems in the 1970s. The production and export stagnated and a large part of the industry became "sick." In addition, just when new investments were needed, the owners tended to let their capital stock run down. Conditions in the industry started to improve around 1979, with a number of positive changes taking place since that time (Haque 1992).

Growth of the Cotton Textile Industry

The growth record of Pakistan's textile industry, shows a reverse trend, especially in the weaving capacity of the mill sector in which the installed capacity of looms, kept shrinking from 24,000 in 1984 to 15,000 in 1992 (Memon 1993). The number of actual working looms was reported to be only 8,000 in 1992. Clearly the sector made an all-out shift toward cotton spinning and almost completely gave up efforts to develop and modernize the weaving sector. By the end of 1992, the spinning capacity had increased to 6.1 million spindles, from 4.3 million in 1988. As a result, during the 1988-92 period, consumption of cotton increased at an average rate of 14.6 percent per annum.

Corresponding to this expansion in equipment, the Textiles sector has also accelerated its contribution to overall Gross Domestic Product. In the period 1982-88 textiles accounted for only 2.15 percent of expanded GDP. By 1989-92 this had more than doubled to 4.67% (Table 1). Although detailed data on the country's manufacturing is only available for the period through 1988, the increased contribution over time of textiles to the overall rate of that sector's growth is apparent (Table 2). For the period as a whole-1 , textiles contributed 4.6 percent to the overall expansion in manufacturing. This increased to 15.3 and 19.6 percent for the 1982-87 and 1985-87 periods respectively.

The corresponding contributions of apparel and ginning are more erratic. For the period as a whole, apparel contributed 2.6 percent to the overall growth in manufacturing. However, this increased to 5.3 percent during the 1985-87 period. During the period from 1977 to 1987, ginning contributed 6.6 percent to the growth in manufacturing. This rate fell to 5.2 percent in the 1985-87 period. While the expansion in textiles is encouraging, it has not been regionally balanced in recent years. Nearly 73 percent of new investment has been flowing into the Punjab.

TABLE-1

Pakistan: Summary of Sectorial Contributions to GDP Growth, 1989-1992

Sectors	Average 82-88	1989	1990	1991	1992	Average 89-92
Agriculture	1.07	1.77	0.79	1.31	1.64	1.38
Wheat	0.06	0.44	-0.04	0.10	0.01	0.13
Rice	0.00	0.02	0.02	0.05	-0.11	-0.01
Cotton	0.35	-0.06	0.04	0.52	1.23	0.41
Sugar Cane	0.00	0.24	-0.01	0.04	-0.08	0.02
Livestock	0.41	0.44	0.46	0.38	0.45	0.44
Mining	0.04	0.01	0.05	0.06	0.02	0.04
Manufacturing	1.44	0.67	1.00	1.11	1.36	1.03
Large Scale	1.09	0.29	0.06	0.07	0.94	0.63
Food	0.15	0.03	0.04	0.03	0.02	0.08
Textiles	0.14	0.09	0.28	0.26	0.38	0.25
Fertilizer	0.09	0.02	0.03	-0.02	-0.04	-0.01
Petroleum	0.04	-0.03	0.03	0.09	0.00	0.02
Cement	0.02	0.00	0.01	0.01	0.01	0.01
Pig-Iron	0.05	-0.02	-0.01	0.03	0.01	0.00
Automobiles	0.05	0.03	0.04	0.00	0.03	0.02
Other Manuf	0.57	0.16	0.17	0.31	0.35	0.25
Small-Scale	0.36	0.38	0.40	0.41	0.42	0.40
Construction	0.22	0.01	0.13	0.24	0.25	0.18
Electricity	0.21	0.37	0.44	0.34	0.24	0.35
Transport	0.73	-0.41	0.61	0.52	0.66	0.35
Commerce	1.26	0.87	0.58	0.91	1.25	0.90
Finance	0.21	0.08	0.09	0.08	0.04	0.07
Public Admin.	0.40	0.57	0.02	0.24	0.13	0.28
Other Services	0.69	0.77	0.78	0.78	0.79	0.78
GDP	6.51	4.79	4.67	5.59	6.38	5.35
Textile Contribution %	2.15	1.88	6.00	4.65	5.96	4.67

Source: Computations based on data provided by the Federal Bureau of Statistics.

Note: Sectorial contribution to growth rate are computed by weighting the sectorial growth rates by the previous years sectorial share (in GDP).

TABLE-2

Pakistan: Contribution of Textilesto the Growth in Manufacturing Value Added, 1977-1988

Year	Growth in Manuf (%)	Textiles			
		Share (%)	Growth (%)	Contribution to Manuf	
				Absolute	%
1977	15.30	22.2	4.9	1.2	7.9
1978	11.50	19.8	-0.2	0.0	-0.3
1979	3.84	17.8	-6.9	-1.4	-36.5
1980	21.56	17.4	18.5	3.3	15.3
1981	3.36	15.9	-5.2	-0.9	-27.2
1982	10.11	15.9	10.0	1.6	15.7
1983	3.09	16.1	4.4	0.7	23.2
1984	9.55	14.2	-3.5	-0.6	-5.9
1985	9.66	15.9	22.7	3.3	33.5
1986	3.80	15.5	1.5	0.2	6.1
1987	17.02	16.1	21.1	3.3	19.3
1988	0.35	17.4	8.1	1.3	520.8
AV 77-87	9.9	17.0	6.1	1.0	4.6
AV 77-82	10.9	18.1	3.5	0.6	-4.2
AV 82-87	8.9	15.6	9.4	1.4	15.3
AV 85-87	10.2	15.8	15.1	2.2	19.6
VA 77-87	34.7	7.7	93.9	2.4	407.4
VA 77-82	40.0	8.9	77.6	2.5	418.6
VA 82-87	21.5	0.7	81.4	1.8	157.1
VA 85-87	29.4	0.5	79.1	1.7	125.3

Note: Computed from data in Government of Pakistan, Economic Survey (Islamabad: Finance Division, Economic Adviser's Wing) various issues. Sectorial contribution to the growth rate in manufacturing is computed by weighing the sectorial growth rates by the previous years sectorial share of GDP. AV = Average; VA = Variance.

The spinning sector operates in an environment of considerable uncertainty. Along with the law and order problems in the Sindh there are the usual concerns with fluctuation demand, erratic prices in export markets, quota restrictions on export at home, movements in raw cotton prices, cost push inflationary pressures, frequently changing tax policy of the government, adverse impact on production from power breakdowns, labor problems, etc. During the past three years, prices of cotton yarn increased 22 to 52 percent in the local market, creating concern for the producers of value added products in the manufacturing sectors.

The share of the coarse and medium varieties has been constant at about 82 percent in recent years. The share of blended has, however almost doubled while that of fine and super fine yarn varieties has fallen from 7.3 percent in 1987 to only 2.4 percent in 1992. On the other hand the production of fine blends of cloth, by the mill sector has declined, while that of coarse cloth has increased. Clearly without an improvement in the quality of yarn, production quality improvements in cloth production are unsustainable.

Some indication of the relative importance of the wearing apparel sector can be deduced from the country's export statistics. The textile product exports increased their share in total textile export from 55.5 percent in 1990 to 59.9 percent in 1992. Export earnings from the export of canvas knit wear, woven garments, towels and other made-ups increased from about US $1.1 billion to over US $1.6 billion during this period. Further, growth is limited however by increased competition in international markets and the low productivity of the domestic industry.

Pakistan's textile industry had to consolidate its leading position as an exporter of yarn along with catering to the domestic demand for low quality yarn for the domestic hosiery goods manufacturing industry and power looms, most of which have been geared to the production of gray cloth for export.

The industry's revival in recent years was largely caused by the sharp rise in the demand for yarn and other textile goods in Japan and other foreign markets. The boom was a response to the improvement in the quality of yarn, hence the expansion in new spinning units in recent years. It should be noted that the boom in cotton yarn also stems from the withdrawal of South Korea from export markets. That country has diverted its attention to the expansion and modernization of the cloth manufacturing sector.

Exports

While textiles have led Pakistan's recent export surge, the country has not established a real niche in export markets even at the lower end of the quality scale. Exports in 1992 amounted to US $6.9 billion. Pakistan has lost ground, particularly during the 1970s, to South Asian Countries. Korea's textile exports currently earn US $17 billion.

Both cotton yarn and cotton cloth may be considered as export oriented industries--since export shares are significantly higher than world production shares. As far as yarn is concerned, this represents an important structural weakness. The country is unable to domestically utilize a large share of its yarn for the production of higher value added textile products. Thus, the country loses out to its main competitors at the higher end of the world textile markets.

On the other hand there has been gradual improvement in the quality of raw cotton produced in the country. Pakistani short and medium staple cotton is of high quality. Unfortunately this grade of cotton cannot be used for the production of the count yarn and superior quality fabrics. Ginning quality is very poor, and foreign matter is often present in the ginned cotton. Clearly the modernization of the ginning sector should be a high investment priority.

Policy Incentives

To encourage exports of textiles, the Pakistani government has experimented with a variety of financial incentives and institutions. The most significant incentive involves the use of cash compensatory rebates. This incentive introduced in 1973 was intended to cover domestic taxes not included in the duty draw back. Because of abuses and losses in revenue to the government, these incentives were withdrawn in 1988. In retrospect it appears that the incentives (Haque 1992, p. 12).

1. Provided a substantial boost to textile exports. In the first year after introduction of rebates, yarn and fabric exports increased by 60% (and 20% in volume terms). In value terms, yarn and fabric exports increased by 46% while garments, and hosiery increased by about 35%.
2. Had a minimal impact on unit values, although this was a major aim.

3. Did not induce growth of value added products--the differentials between various product groups were not sufficiently large.
4. Allowed inefficient and sick mills to survive and
5. Over time, encouraged abuse.

Presently the following incentives are available to exporters (Haque 1992, p.12):

1. Export Finance Scheme
2. Rebates of customs and excise duties on the refund of sales tax
3. Income tax concessions on export earnings
4. Special licensing facilities for export industries.
5. Import facilities for modernization.
6. Programs to encourage locally manufactured machinery.

To encourage export of higher quality yarn, an import exemption has been allowed for the import of machinery designed for yarn of this make up under the new Trade Policy of 1992-93. Under the new procedures a 5 percent surcharge and a 6 percent license fee are charged. At the same time, the surcharge can be deferred for two years. The export duty on higher quality yarn has been drastically reduced. The intent of this incentive is to increase the production of these products. The hope is that increased production of this type of yard will also increase the production of higher valued added textile products for export. Shifts of this type are the only way to increase the value of textile exports to quota countries such as the USA and Western Europe.

Impediments

Pakistan enjoys domestic availability of cotton that greatly exceeds the domestic demand. However the textile industry is functioning in an international trade environment that is increasingly subject to protectionism. The export of textile products is restrained in the larger markets such as the U.S., EEC, Canada, Sweden and Finland within the framework of the Multifibre Agreement (MFA) and Bilateral agreements. In addition the industry suffers from:

1. A narrow production base.
2. Outdated industrial structure.

3. Low stage of technology.
4. Lack of attention to R&D.
5. Severely selective markets (that is, more than 64% of the yarn market is Japan).
6. Limited product range, and
7. Increasing quality consciousness in the importing countries.

Summing up, Pakistan enjoys domestic availability of cotton that greatly exceeds the domestic demand. However the cotton base industry is functioning in an international trade environment that is increasingly subject to protectionism. The export of textile products is restrained to the country's markets such as USA, EEC, Canada, Sweden and Finland within the framework of Multifibre Agreement and Bilateral agreements. In addition, the narrow production base, outdated industrial structure, low state of technology, and lack of attention to R and D severely selective markets (for example, more than 64% of the yarn market is Japan) limited product range; increasing quality consciousness in the importing countries constitute impediments in the way of expansion of exports.

Besides these difficulties the textile industry faces a number of problems in the area of design. There is no design institute in the country that can help the manufacturers design their products suitable for highly competitive international markets. Moreover Pakistan in spite of being a cotton and textile oriented economy does not have even a single university offering a curriculum focused on the industry.

To counter these problems Pakistan is in the process of developing a long-term textile strategy. The First National Textile Conference (Pakistan & Gulf Economist, 1989) held in April 1989 recommended:

1. Establishing a federal textile ministry.
2. Abandoning the old MFA negotiating strategy followed by Pakistan in the past (the major concern of which was achieving a marginal increase in quotas),
3. Developing target markets; and
4. Encouraging direct foreign investment especially in the quality product areas.

Pakistan will hopefully be able to strike a balance between a domestic, demand-oriented, mainly labor intensive industry producing cheap and durable products for low income groups and the need to rapidly expand the production of quality textiles and wearing apparel. To achieve the latter, rationalization incentives need to be implemented. Fashion and design centers need to be developed and possibilities for extensive collaboration with international firms (particularly those based in Southeast Asia) could be explored. Although raw cotton exports are a major source of foreign exchange, they are mainly destined to countries whose cotton textile exports compete with those of Pakistan (United Nations, 1990, p. 55).

Factors Relating to Efficiency

Another option open to the government is that of privatizing public sector textile firms. On the surface there would appear to be a number of cases where a shift from public to private ownership could be expected to increase efficiency output. The most notorious public firm is a joint project between the governments of Pakistan and Iran--the Pak-Iran Textile project in Balochistan (Ali 1992, pp. 38-39).

This plant is Pakistan's largest and most modern textile complex, with 100,000 spindles and 2,200 looms capable of producing 66.58 million yards of cotton and blended fabrics plus 5.38 million lbs. of marketable yarn. However the plant, has been out of production for the last nine years, with the government paying over Rs. 500 million in salaries to the idle workers (Ali, 1992). There are about 3,000 such workers getting money without any work at Pak-Iran Textile Miles, one at Baleli and another at Uthal. These mills with 50,000 spindles and 1100 looms each, equipped with ultra modern machinery for mercerizing, sanforizing, bleaching, dying, printing and other finishing facilities went into production in 1981. However, just two years later these mills were declared sick and 1983 because of bribery, corruption inefficiency, and mismanagement.

Since then, these Pak-Iran Textiles Mills with large defaulted loans from public sector banks are defunct. These mills became neither productive, despite the heavy investment by Pakistan and Iran, nor paid taxes and utility bills. These Mills also failed to provide employment, production or export of textile goods.

Clearly, Pak-Iran is an extreme example. However the country's privatization program is predicated on the assumption that public firms are on average less efficient than their private counterparts.

Is this assumption correct for the textile industry? Does the situation in textiles vary from that in other sectors and if so in what manner?

Clearly, ownership is only one factor entering into firm efficiency. A number of World Bank reports have noted correctly that perhaps a more important source of efficiency or inefficiency lies in the type of incentives provided by government. Based on a World Bank research project this section analyzes the incentive regimes in textiles. As a basis of comparison two other sub-sectors chemicals and engineering are also examined.

For purposes of this study the Domestic Resource Cost (DRC) concept is used to measure the efficiency of a particular manufacturing activity. A DRC coefficient more than one indicates inefficient production conditions. The efficiency profile with the three sub sectors (Table 3) is then contrasted with the economic incentives resulting from the trade regime, as measured by the Effective Rate of Protection (EPR).

On average the three industrial sub-sectors--textiles, chemical, and engineering are facing domestic resource costs that are close to international standards (Table 3) and thus not operating particularly inefficiency. However, the DRCs in the chemical and engineering sectors are just above unity. On the level of individual product classes the picture is very mixed. There are many items that are manufactured at domestic opportunity costs significantly above the cost of importing the respective products.

Similarly, current average effective protection levels seem moderate, but conceal vast differences among product groups. For example in the chemical sub-sector (average EPR = 20%) industrial chemicals, fertilizers and synthetic fibers are highly protected. In the engineering sector (average EPR = 12%) basic metals and mechanical products enjoy high effective protection, whereas electrical and electronic products are negatively protected. Among textile products (average EPR = 13%) it is weaving and finishing activities as well as woolen and jute products that are heavily protected, whereas protection levels for cotton spinning and made-ups are low.

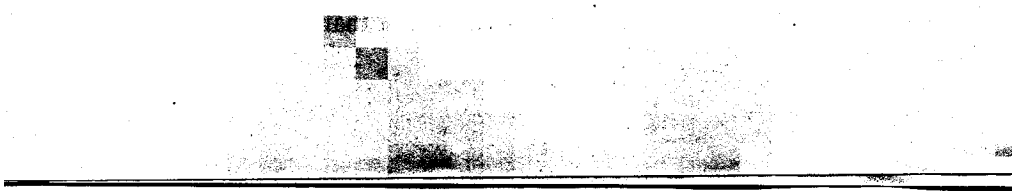

TABLE-3

Pakistan: Impact of Trade Reform on Effective Protection and Profitability

	Existing Rates		
	DRC	EPR	Private Return
Textiles			
Cotton Spinners	0.72	-5	20
Weaving and Finishing	1.22	45	16
Cotton Made-ups	0.87	9	18
Woolen Products	2.20	93	6
Jute Products	1.07	38	16
Subsector	0.92	13	17
Chemical			
Paper Products	0.86	-8	12
Basic Indust Chem	1.69	70	9
Fertilizers	1.08	23	14
MMF	1.30	29	9
Other Chemicals	0.76	10	27
Rubber & Plastics	1.03	19	13
Glass and Ceramics	1.03	6	11
Subsector	1.04	20	14
Engineering			
Basic Metals	1.33	2	7
Metal Products	1.10	19	12
Mechanical Machinery	1.25	58	19
Electrical Machinery	0.76	-13	14
Electronics	0.92	-31	2
Transport Equipment	1.07	-1	7
Subsector	1.07	12	11

Source: World Bank

Overall it appears that textile industry in Pakistan is the most efficient sub-sector (DRC= 0.92) within the manufacturing sector. Efficiency is however, far from uniform with DRC estimates at the product group level varying from 0.72 for cotton spinners to 2.20 for wool products.

In general, the industry is most efficient in the spinning of locally secured fiber (cotton) and the use of the same in makeup items (towels, canvas, knitwear and garments). It is relatively less efficient in the conversion of spun short staple and filament yarn into cloth (both finished and gray) and is least efficient in the conversion of imported fiber (wool) into both yarn and cloth. Internationally the textile industry is characterized by large scale integrated operations employing very sophisticated technology to produce an increasingly more demanding product. Both the weaving and finishing and the woolen industries in Pakistan are characterized by small scale, non-integrated units. Both industries employ very simple, relatively labor intensive technology. Their products are of questionable quality.

The industry as a whole operates within a largely neutral assistance regime (EPR= 13%), earning average private financial returns of 17% that are approximately equal to the estimated public economic return of 18%. This picture is however, highly misleading. Some 25% of domestic resources are employed in industries that are very efficient and negatively protected. These industries are all characterized by the use of manmade fiber and are unable to pass-on an average 24% distortion in input prices to their customers because of competition from a close substitute--pure cotton textiles--which is generally priced domestically at or near the world price. Such a situation is hardly conducive to the growth of the manmade fiber (MMF) section of the industry that is necessary if Pakistan is to develop a more balanced profile relative to international demand trends.

In contrast to textiles, the development of Pakistan's chemical industry is based on import substitution, and is largely restricted to the manufacture of common chemicals and a range of relatively simple products. The production of basic industrial chemicals and manmade fibers stand out as particularly inefficient and generate the lowest returns in the industry, even with the highest rates of protection.

Finally, Pakistan's engineering industry is characterized by a bi-modal industrial structure with either the production of simple shapes and components or the assembly of complex industrial products. It currently meets some 50% of demand for engineering products utilizing labor intensive techniques with low levels of productivity. The recent

export performance of the sub-sector is very poor with only surgical instruments achieving any significant penetration of export markets. Not surprisingly, the product group currently most exposed to competition--electrical machinery (DRC = 0.76) is the most efficient while the product group least exposed to competition is the least efficient--base metals (DRC 1.32). Within the electrical machinery industry, transformer and switch gear manufacturers sell the bulk of the output to the Water and power Development Authority (WAPDA) against international tenders; domestic appliance manufacturers compete against smuggled goods; and the fan industry is intensely competitive with 250 to 400 manufacturing enterprises.

Within this framework the next section attempts to assess the critical manner in which public and private firms differ. Specifically we are interested in determining if efficiency is one area where these firms systematically diverge.

Methodology

In Pakistan differences between public and private sector industrial firms take many forms: variations in capital labor ratios, size, efficiency of resource use, productivity of capital and the like. Unfortunately, there is little consensus on the most meaningful way to depict these differences. There is even less agreement on the best way to define these differences. Should size be defined in terms of the number of workers per firm? Or, instead, should it be defined as the value of fixed assets per establishment? Which measure best depicts efficiency: output per worker, value added per unit of capital? As it turns out, each measure provides a somewhat different picture.

One away to get around this problem is to compile an extensive data set of the most widely used industrial statistics and measures of manufacturing output, costs, and performance. Clearly, many of these measures will overlap and thus be redundant. Using factor analysis however the main dimensions of firm diversity can be identified.

More specifically the basic assumption of factor analysis is that a limited number or underlying dimensions (factors) can be used to explain complex phenomena. The resulting data reduction produces a limited number of independent, (correlated) composite measures. In the current example, measures such as employment, sales, value added, capital stock will produce a composite index or factor depicting the relative size of the sample firms. One advantage of indexes formed in this manner is that it avoids the problem of selecting one measure of size say fixed assets over just as logical alternatives. Through this type

of data reduction a clearer picture of firm differences can emerge (Fane and Hill, 1987).

Operationally the computations of factors and factor scores for each industry were performed using a principle components procedure (BMDP, 1990). The data consisted of the industrial statistics provided in the annual Census of Manufacturing Industries (Federal Bureau of Statistics, 1989, 1991) for 1985-86 and 1986-87. The raw data by industry consists of:

1. Number of Reporting Establishments;
2. Value of fixed assets at the end of the year;
3. Changes in stocks;
4. Average daily persons engaged;
5. Average daily Employment including contract labor--number;
6. Average daily Employment including contract labor--cost;
7. Industrial cost during the year;
8. Value of production during the year; and
9. Value added during the year.

For use in comparing firms across industries, several of these variables were transformed. In total, thirteen variables were created: (a) value added per cost of labor, (b) value added per unit of capital, (c) value added per industrial costs, (d) value added per worker, (e) value added per firms, (f) labor costs per firm, (g) workers per firm, (h) capital per firm, (i) industrial costs per worker, (j) industrial costs per firm, (k) industrial costs per unit of capital, (l) capital per labor costs, and (m) capital per worker.

Each of these variables is identified by region: (a) Total Country, (b) Punjab, (c) Sindh, (d) NWFP and (e) Balochistan, and by ownership pattern: (a) individual ownership, (b) partnership, (c) private limited company, (d) public limited company, (e) cooperative society, (f) federal ownership, (g) corporation by act of National and/or Provisional assembly, (h) provincial government establishment, (i) and local body government establishment. Individual ownership, partnership and private limited company were aggregated to obtain total private firms. The remaining firms were classified as public sector entities.

Identifying the main dimensions of the industrial data set is a first and a necessary step in assessing the manner in which private and public enterprises vary in resource usage, productivity and so on. The factor analysis and means of the resulting factor scores by ownership pattern provide some initial insights as to the manner in which private

and publicly held firms differ. Ultimately however a more rigorous test is needed to determine which of these factors are statistically significant in distinguishing public from private sector firms. Discriminant analysis and logistic regression analysis provide this tool.

If our hypothesis that each set of firms--domestic and foreign--has distinctive and unique structural and performance characteristics that set them apart, the logistic analysis should classify each firm in its appropriate ownership category with a high degree of probability (SPSS, 1992).

Results

The analysis of the textile sub-sector over the 1976-87 period produced a number of interesting patterns (Tables 7-8):

1. The dominant trend in characterizing textile plants was size (Factor 1), followed by the various measures of value added (Factor 2), capital intensity (Factor 3) and finally industrial costs (Factor 4).

2. In terms of the main differences between private and public firms: (a) as measured by the composite value added factor score, private firms are somewhat more efficient than their public counterparts, (b) private firms are smaller, (c) use less capital per worker, and have relatively lower industrial costs per unit of capital/worker.

Although one might argue from these mean factor scores that private firms are more efficient than their public sector counterparts, a more rigorous statistical analysis needs to be performed before any definite conclusions can be drawn. To this end, logistic analysis examined the potential roles of the main data dimensions in differentiating public from private firms. These dimensions included: size (Factor 1), value added per factor input (Factor 2), capital intensity (Factor 3), and industrial costs (Factor 4). That is, with a high degree of statistical confidence, are larger, more capital intensive and lower cost firms more likely to be private or public entities?

Again several interesting patterns emerged:

1. Using a fairly broad definition of efficient firms (those firms with a Factor 2 score greater than -0.5 were coded with as 1.0 and those with those with Factor 2 scores less than -0.5 coded as 2.0), only size was statistically significant in differentiating

public from private firms. Knowing simply the size of a firm one could have classified a firm as private with a 95 percent chance of being correct. The corresponding value was slightly less than 73 percent for a public firm.

2. This same general pattern emerged as the definition of efficiency narrowed (Factor 1 scores > 0). However for very efficient firms (those with Factor 1 scores more than 1.0, Efficiency became statistically significant (along with size in distinguishing public from private firms). The negative sign on the efficiency term indicates that of the efficient firms in the country, private firms are more efficient than their public counterparts, and that this relative efficiency is a critical element in distinguishing public from private firms.

3. Based on the high cutoff for efficient/inefficient, more than 96 percent of private firms would have been classified correctly on the basis of their size and efficiently rating. For Public firms the corresponding percentage was 74.5 percent.

These results suggest that in a competitive industry such as textiles, public and private firms are both forced to utilize resources efficiently. If one simply divides efficient firms approximately in half (Factor 2 scores greater or less than 0), there is no indication that private firms are more efficient than their public counterparts. On the other hand, if one demands a higher level of value added per factor input to be classified as efficient (Factor 2 scores greater than 1.0) then private firms tend to be somewhat more efficient than their public counterparts--efficiency is a critical element (along with size) in distinguishing private from public firms.

TABLE-4

Pakistan: Structural Characteristics, The Textile Industry

Variable	Factor-1	Factor-2	Factor-3	Factor-4
	Size	Value Added	Capital	Industrial Costs
Labor Costs/Firm	0.953*	-0.165	0.023	-0.194
VA/Firm	0.950*	0.135	0.063	-0.189
Indust Costs/Firm	0.943*	0.059	0.047	0.215
Workers/Firm	0.924*	-0.183	-0.023	-0.190
Capital/Firm	0.862*	-0.138	0.307	-0.178
VA/Labor Costs	-0.053	0.932*	0.079	0.070
VA/Worker	-0.033	0.920*	0.153	0.062
VA/Capital	-0.162	0.675*	-0.522*	-0.002
Capital/Worker	0.092	0.107	0.939*	-0.004
Capital/Labor Costs	0.066	0.023	0.932*	-0.057
Indust Costs/Worker	-0.157	0.310	0.042	0.875*
Indust Costs/Capital	-0.144	0.170	-0.384	0.808*
VA/Indust Costs	0.095	0.363	-0.151	-0.770*
Eigen Value	4.991	2.449	2.150	1.883

Profiles of Ownership

Efficiency Measure: Factor 1 > 0.5

Owner	**Efficiency**	**Factor 1**	**Factor 3**	**Factor 4**
Private	1.182	-0.509	-0.030	-0.031
Public	1.085	1.043	0.061	0.063
Total	1 150	0.000	0.000	0.000

Notes: Principal component factor analysis, oblique rotation. See SPSS (1992) for a description of the methods used. * = loading greater than 0.50.

TABLE-5

Pakistan: Factors Affecting the Likelihood of Ownership--Public versus Private, The Textile Sector

Efficiency Measure: Factor 1 > -0.5
-2 Log Likelihood = 106.79--Goodness of Fit = 212.56

Variable	Coefficient	Std Error	Significance
Efficiency	-0.852	0.647	0.1880
Factor-1	3.267	0.563	0.0000***
Factor-3	0.021	0.259	0.9342
Factor-4	0.317	0.244	0.1950
Constant	0.796	1.151	0.4892

Prediction--Overall Correct = 87.78%

	Private	Public	Percent Correct
Private	115	6	95.04
Public	16	43	72.88

Efficiency Measure: Factor 1 > 0
-2 Log Likelihood = 107.86--Goodness of Fit = 187.74

Variable	Coefficient	Std Error	Significance
Efficiency	-0.417	0.519	0.4221
Factor-1	3.331	0.588	0.0000***
Factor-3	0.014	0.262	0.9582
Factor-4	0.208	0.223	0.3509
Constant	-0.085	0.790	0.9140

Prediction--Overall Correct = 87.78%

	Private	Public	Percent Correct
Private	115	6	95.04
Public	16	43	72.88

Efficiency Measure: Factor 1 > 1.0
-2 Log Likelihood = 102.55--Goodness of Fit = 329.57

Variable	Coefficient	Std Error	Significance
Efficiency	-1.770	0.811	0.0292**
Factor-2	3.702	0.672	0.0000***
Factor-3	0.007	0.284	0.9801
Factor-4	0.140	0.232	0.5456
Constant	1.501	1.040	0.1451

Prediction--Overall Correct = 89.44%

	Private	Public	Percent Correct
Private	117	4	96.69
Public	15	44	74.58

Notes: Logistic Regression Analysis. Notes: Principal component factor analysis, oblique rotation. See SPSS (1992) for a description of the methods used. ** = significant at the 95% level; *** = significant at the 99% level.

As a basis of comparison a similar analysis was undertaken on the chemical industry. As noted above, this industry is, on average, somewhat less competitive then textiles. The results of this analysis provide an interesting contrast (Tables 6-7):

1. Capital intensity (Factor 1) is the dominant trend (Table 6) in the chemical industry, followed by size, efficiently (Factor 3) and finally industrial costs per unit of inputs.

2. Public and private firms differ in that public firms tend to be more efficient, have relatively greater capital intensity and size and incur greater industrial costs per unit input.

3. In terms of the critical elements differentiating public from private firms the logistic analysis (Table 7) suggests that all for factors are statistically significant in this regard. This pattern holds across a wide definition of efficiently. The model is quite accurate in classifying public and private firms, with an average probability a firm being classified correctly on the basis of its efficiency and factor scores nearly 95% The positive sign on the efficiency term suggests that public firms are more efficient than their private sector counterparts.

For a final comparison, the least competitive sub-sector, engineering was selected. Because of the great diversity of the major sub-sectors in this industry, we focused on one main area of specialization, basic metals. Firms producing basic metals were selected because this appears to be one of the least competitive areas of the economy, thus providing a good contrast to the competitive environment characterizing textiles and chemicals.

Again, several interesting patterns emerged from the factor and logistic analysis (Tables 8 and 9):

1. Size (Factor 1) is the most important factor (Table 8) characterizing these firms. This was followed by efficiently (Factor 2), industrial costs per factor input (Factor 3) and finally capital intensity (Factor 4).

2. Based on the mean factor scores on the four main dimensions, it appears that public firms are, on average, considerably more efficient than their private counterparts. In addition they are larger, have lower industrial costs per factor input and greater capital intensity.

3. While public firms appear more efficient based on simple factor scores, logistic analysis (Table 9) found little evidence that efficiency differences were an important element in distinguishing firms by ownership type. For these firms relative size and industrial costs appear to be the critical factors in distinguishing private form public firms.

4. It should be noted that while the logistic model correctly classified public and private firms with a high degree of accuracy (over 95 percent), the statistical significance of the size and industrial cost firms was only marginal.

The basic metals case suggests that for industries with low levels of competitive pressures, there is no particular mechanism that forces either public or private firms to be relative efficient. This finding is quite consistent with the extensive literature on X-Efficiency originally developed by Libenstein (1966) and applied to developing countries by Bergsman (1974).

TABLE-6

Pakistan: Structural Characteristics, The Chemical Industry

Variable	Factor 1	Factor 2	Factor 3	Factor 4
	Capital	Size	Value Added	Industrial Costs
Capital/Worker	0.919*	0.087	0.309	0.181
Capital/Labor Costs	0.912*	0.436	0.208	-0.042
Capital/Firm	0.848*	0.374	0.202	0.037
VA/Capital	-0.637*	0.304	0.576	0.238
Workers/Firm	-0.008	0.970*	0.037	0.015
Labor Costs/Firm	0.175	0.955*	0.105	0.032
VA/Firm	0.133	0.859*	0.377	0.044
VA/Labor Costs	0.152	0.141	0.939*	-0.051
VA/Worker	0.357	0.117	0.845*	0.078
VA/Indust Costs	0.132	0.203	0.571*	0.516
Indust Costs/Capital	-0.262	0.003	0.052	0.882*
Indust Costs/Worker	0.547*	0.013	-0.005	0.795*
Indust Costs/Firm	0.540*	0.319	-0.032	0.726*
Eigen Value	5.043	2.772	2.219	1.550

Profiles of Ownership

Efficiency Measure: Factor 3 > 0

Owner	**Efficiency**	**Factor 1**	**Factor 3**	**Factor 4**
Private	1.272	-0.252	-0.358	-0.029
Public	1.577	0.443	0.631	0.050
Total	1.383	0.000	0.000	0.000

Notes: Principal component factor analysis, oblique rotation. See, SPSS (1992) for a description of the methods used. * = loading greater than 0.50.

TABLE-7

Pakistan: Factors Affecting the Likelihood of Ownership--Public versus Private, The Chemical Industry

Efficiency Measure: Factor 3 > 1.0
-2 Log Likelihood = 59.63--Goodness of Fit = 214.99

Variable	Coefficient	Std Error	Significance
Efficiency	6.449	1.557	0.0000***
Factor 1	7.507	2.229	0.0008***
Factor 2	11.816	2.230	0.0000***
Factor 4	5.820	2.031	0.0042***
Constant	-3.766	1.437	0.0088

Prediction--Overall Correct = 94.90%

	Private	**Public**	**Percent Correct**
Private	121	4	96.80
Public	6	65	91.55

Efficiency Measure: Factor 3 > 0.5
-2 Log Likelihood = 52.155--Goodness of Fit = 115.75

Variable	Coefficient	Std Error	Significance
Efficiency	5.942	1.330	0.0000***
Factor 1	10.392	2.781	0.0002***
Factor 2	12.376	2.507	0.0078***
Factor 4	7.512	2.335	0.0013***
Constant	-3.329	1.183	0.0049***

Prediction--Overall Correct = 94.39%

	Private	**Public**	**Percent Correct**
Private	121	4	96.80
Public	7	64	90.14

Efficiency Measure: Factor 3 > 0
-2 Log Likelihood = 72.01--Goodness of Fit = 659.98

Variable	Coefficient	Std Error	Significance
Efficiency	3.433	0.869	0.0001***
Factor 1	7.562	1.995	0.0002***
Factor 2	10.888	2.061	0.0000***
Factor 4	5.289	1.551	0.0006***
Constant	-1.754	1.141	0.1243*

Prediction--Overall Correct = 94.39%

	Private	**Public**	**Percent Correct**
Private	123	2	98.40
Public	9	62	87.32

Notes: Logistic Regression Analysis. See SPSS (1992) for a description of the methods used. ** = significant at the 95% level; *** = significant at the 99% level.

TABLE-8

Pakistan: Structural Characteristics, The Basic Metals Industry

Variable	Factor 1	Factor 2	Factor 3	Factor 4
	Size	Value Added	Industrial Costs	Capital
Labor Costs/Firm	0.960*	-0.047	-0.194	-0.134
Capital/Firm	0.934*	-0.024	-0.123	0.206
Indust Costs/Firm	0.930*	-0.037	-0.151	0.021
Workers/Firm	0.917*	-0.022	-0.291	0.150
Capital/Worker	0.900*	-0.034	-0.109*	0.348
VA/Firm	0.835*	0.108	-0.284	0.341
VA/Worker	0.072	0.927*	0.212	0.080
VA/Capital	-0.219	0.915*	0.214	-0.153
VA/Labor Costs	-0.015	0.716*	0.112	0.651*
VA/Indust Costs	0.342	0.618*	-0.559*	0.280
Indust Costs/Worker	-0.208	0.239	0.886*	-0.006
Indust Costs/Capital	-0.408	0.333	0.725*	-0.171
Capital/Labor Costs	0.327	0.000	-0.187	0.913*
Eigen Value	6.695	3.090	1.284	0.931

Profiles of Ownership

Efficiency Measure: Factor 2 > -0.5

Owner	**Efficiency**	**Factor 1**	**Factor 3**	**Factor 4**
Private	1.531	-0.411	0.236	-0.011
Public	1.929	0.940	-0.539	0.027
Total	1.652	0.000	0.000	0.000

Notes: Principal component factor analysis, oblique rotation. See SPSS (1992) for a description of the methods used. * = loading greater than 0.50.

TABLE-9

Pakistan: Factors Affecting the Likelihood of Ownership--Public versus Private, The Basic Metals Industry

Efficiency Measure: Factor 3 > 0.5

-2 Log Likelihood = 9.90--Goodness of Fit = 40.13

Variable	Coefficient	Std Error	Wald	Significance
Efficiency	-3.116	4.153	0.56	0.4532
Factor 1	14.067	7.236	3.78	0.0519*
Factor 2	-3.254	1.768	3.38	0.0658*
Factor 4	0.835	2.439	0.12	0.7321
Constant	6.300	6.390	0.97	0.3242

Prediction--Overall Correct = 97.83%

	Private	Public	Percent Correct
Private	32	0	100.00
Public	1	13	92.86

Efficiency Measure: Factor 3 > 0

-2 Log Likelihood = 10.07--Goodness of Fit = 21.79

Variable	Coefficient	Std Error	Wald	Significance
Efficiency	2.029	2.437	0.69	0.4051
Factor 1	15.315	7.824	3.83	0.0503*
Factor 2	-3.017	1.453	4.31	0.0379**
Factor 4	2.519	3.419	0.55	0.4604
Constant	-0.069	2.878	0.00	0.9810

Prediction--Overall Correct = 95.65%

	Private	Public	Percent Correct
Private	31	1	96.88
Public	1	13	92.86

Efficiency Measure: Factor 3 > -0.05

-2 Log Likelihood = 9.104--Goodness of Fit = 14.062

Variable	Coefficient	Std Error	Wald	Significance
Efficiency	12.172	81.681	0.02	0.8815
Factor 1	14.218	7.472	3.62	0.0570*
Factor 2	-4.079	2.741	2.21	0.1368
Factor 4	5.801	6.493	0.80	0.3709
Constant	-20.690	163.213	0.02	0.8991

Prediction--Overall Correct = 95.65%

	Private	Public	Percent Correct
Private	31	1	96.88
Public	1	13	92.86

Notes: Logistic Regression Analysis. See See SPSS (1992) for a description of the methods used. ** = significant at the 95% level; *** = significant at the 99% level.

Conclusions

The remarkable progress shown by the spinning sector is the result of government support policies, availability of sufficient finance, good quality cotton at low prices, low labor cost and availability of technical and managerial personnel (Memon, 1992, p. 14). Above all, the highly developed management skill in all phases of production together with a favorable international market have been responsible for the development of a strong spinning sector. This will serve as the main source of strength to the downstream industries like weaving, knitting, finishing garments and specialized textiles. The experience gained during the last forty-five years in manufacturing and marketing of cotton yarn should help the industry gain a stronger position in the international market.

Today the textile industry continues to be the largest industry in Pakistan, and still commands the strongest comparative advantages in resource utilization. It is also the largest foreign exchange earner. Presently Pakistan has a share of 28.9 percent in export in the world trade of cotton yarn, but only 6.5 percent in fabrics and 1 percent in garments.

The industry is one of the most efficient in Pakistan, but even here there is room for improvement. The analysis above suggests that private firms may be considerably more efficient that their public counterparts. Privatization of the remaining public firms in the industry would most likely lead to even greater improvements in efficiency and competitive strength in external markets.

In this regard, it is noteworthy that Pakistani industries subject to less competitive pressures, private firms do not appear to be any more efficient than their public counterparts. If anything, they may be less efficient. Clearly, for these industries, a joint policy of reducing tariffs and other barriers to competition would be a necessary element for the privatization of public enterprises to result in marked improvements in overall sector efficiently.

Notes:

1. Because of the abnormally low rate of growth in manufacturing in 1988, averages are for the period through 1977.

REFERENCES

Ali, S. Azam (1992) "Pak-Iran Textile Project," Pakistan and Gulf Economist, volume XI, No. 21, pp. 38-39.

Bergsman, Joel (1974) "Commercial Policy, Allocative and X-Efficiency" Quarterly Journal of Economics Vol. LXXXVIII, No. 3, pp. 409-433.

BMDP Statistical Software (1990), BMDP Statistical Software Manual: 1990 Version, Volume 1 Berkeley: University of California Press, pp. 311-337.

Federal Bureau of Statistics (1989), Census of Manufacturing Industries 1985-86 Karachi, Government of Pakistan

Federal Bureau of Statistics (1991), Census of Manufacturing Industries 1986-87 Karachi, Government of Pakistan

Frane, James W. and Mary Ann Hill (1987), "Annotated Computer Output for Factor Analysis: A Supplement to the Write-up for Computer Program BMDP4M" Technical Report #8. Los Angeles: BMDP Statistical Software.

Haque, Inaamul (1992) "Profile, Growth and Trends of Pakistan's Textile Exports in the Past Decade," Pakistan and Gulf Economist , volume XI, No. 9, pp. 9-17.

Leibenstein, Harvey (1966), "Allocative Efficiency vs. X-Efficiency" American Economic Review, vol. LVI, pp. 392-415.

Memon, Noor Ahmed (1993), "A Whisker of Pride: Forty-Five Years of Textile Industry Experience Have Given us a Competitive Edge" Pakistan & Gulf Economist Vol. XII, No. 15, pp. 12-14.

Pakistan and Gulf Economist (1989) "Textile Industry: Special Report", Pakistan and Gulf Economist (April 15-21), pp. 26-42,

SPSS8 (1992). "Logistic Regression Analysis" (1992) in SPSS/PC+ Advanced Statistics. Chicago: SPSS International, pp. 1-34.

United Nations Industrial Development Organization (1990), Pakistan: Towards Industrial Liberalization and Revitalization Oxford: Basil Blackwell.