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PRIVATIZATION OF PUBLIC SECTOR ENTERPRISES IN PAKISTAN: PROSPECTS FOR REDUCING REGIONAL IMBALANCES*

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This paper tests the somewhat counterintuitive hypothesis that public firms are more efficient than their private sector counterparts. A factor analysis (9 industrial groups/34 industries) indicated that for all Pakistani provinces, public enterprises contributed relatively more value added which supports the findings of Naqvi and Kamal. The paper also concludes that a policy to reduce Pakistan's regional income disparities by privatizing public enterprises would likely be ineffective.

1. Introduction

For many developing countries, the 1980s saw widespread attempts by policy makers to curtail the state's economic role. A common policy was large scale privatization of public enterprises. This divestiture was an attempt to reverse policies of the 1960s and 1970s when policy makers had emphasized direct state intervention to try and correct perceived failures in private markets (van de Walle, 1989). The arguments for privatization are well known in terms of its impact on economic efficiency and national output since private firms are assumed to be more efficient than public enterprises (Goodman, 1985; Hanke, 1987; Butler, 1985). Not so much is known about the success rate of privatization attempts across a broad spectrum of developing countries. The inability to measure success (or failure) of privatization is often due to the lack of reliable and meaningful data.

There have been several studies looking at the private/public issue in Pakistan. While the papers are discussed in more detail in the following section, it is fair to say that the picture as to success or failure of privatization is "mixed." For example, some economists like Sarmad (1984) and Mehdi (1991) support the intuitive logic that public enterprises are less profitable than private sector enterprises. Other economists such as Kay and Thomson, (1986) find that the gains from privatization are more tempered. An important recent study by Naqvi and Kamal (1991) find that public enterprises in Pakistan are more efficient than their privately-owned counterparts.

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This paper tests the somewhat counterintuitive hypothesis that public firms are more efficient than their private sector counterparts. Hopefully the results of this analysis will a) shed additional light on the conclusion of Naqvi and Kemal's study on public sector efficiency, b) suggest some reasons for the disparity in efficiency between the two sectors, and c) determine whether privatization could serve as an effective way of correcting regional imbalances in Pakistan - an approach not yet examined in the literature. As no useful statistics are published on technical efficiency - either at the firm or industry level - the authors use a large number of Census measures to calculate various dimensions of firm diversity. The major factors which distinguish private from public firms in Pakistan are examined to determine whether or not private enterprises are more efficient in terms of generating more value added than their public sector counterparts.

2. Review of the Literature

As noted, the papers by Sarmad (1984) and Mehdi (1991) support the proposition that private sector enterprises are more profitable than their public sector counterparts. One major drawback of these studies is that profitability ratios are used which, in the authors' opinion, have serious drawbacks. For example, profits are not adjusted for the wider social and economic objectives of public enterprises. Rees (1986) and Hemming and Mansoor (1988) joined Kay and Thompson (1986) in suggesting that the efficiency gains from privatization will be modest and, for the most part, limited to reductions in productive and regulatory inefficiencies. Naqvi and Kemal (1991) examine the case for privatization of public enterprises in Pakistan by comparing the efficiency levels in enterprises producing similar goods. Naqvi and Kemal showed that allocative and productive efficiency is based more on management quality than ownership, and that while a few public enterprises experienced losses, most of them were profitable. The profitability was not a function of industry protection but was due largely to high capacity utilization. The authors showed that the effective rate of protection was lower for public enterprises and that they face competition from both imports and the private sector. While the present authors consider this to be an important study, Naqvi and Kemal generally used company financial data (with associated inter-firm problems such accounting practice compatibility) to arrive at their conclusions. A major purpose of this paper is to confirm the findings by Naqvi and Kemal by using a different (macroeconomic) approach and different data set.

Other studies have failed to look at regional manufacturing in conjunction with private or public ownership. However several studies have produced some valuable insights into the regional pattern of industrialization. Chaudhary (1990) found that a regional disparity in output existed and that the pattern of inequality declined until 1979-80 but has since increased. The same trend is expected through the Seventh Plan although investment may shift from the Sindh to other regions depending on local unrest in the province. In terms of per capita output, Chaudhary noticed an increasing disparity among provinces. Chaudhary's findings are important since appropriate government policy measures could apparently be employed to stem the increasing regional disparity and develop backward areas.

Arshad (1989) focused on the regional dimension of industrialization and ranked each province by eight different indicators of industrialization over time -- 1970/71, 1976/77 (to

examine the effect of secession), and 1985/6 (the last year of available data).[1] Arshad's study suggested that Sindh was Pakistan's most industrialized region with Punjab in second place. Importantly, Arshad found no tangible change in the regional pattern of industrialization over time except for a slight improvement in employment and factory concentration in Baluchistan. He concluded that enforcement of industrial programs between 1970/71 and 1984/85 have been largely ineffective in reducing regional disparities in industrialization.

An alternative policy available to the Pakistan government is the privatization of public sector enterprises. As inefficient public operations are transferred to private ownership, higher retained earnings would presumably be generated and followed by a more rapid rate of investment growth. This paper also examines this policy option in detail by examining how private and public firms differ by region.

3. Methodology

In Pakistan, differences between public and private sector industrial firms can take many forms such as differences in capital/labor ratios, size, efficiency of resource use, productivity of capital, and the like. However there is little consensus on the most meaningful way to define these differences and even less agreement on the best way to define the differences. For example, should "size" be measured as number of workers per firm or as the value of fixed assets per establishment? Since each measure provides a different picture and in order to identify and assess the difference between private and public firms in Pakistan, a set of widely used industrial statistics and measures of output, costs, and performance from the most recent annual Census of Manufacturing Industries (1985/6, 1986/7) were collected for nine industrial groups and further subdivided into 34 different industries.[2] The raw data consisted of the following measures:

1. Number of reporting establishments
2. Value of fixed assets year end
3. Change in stocks
4. Average number of daily employment
5. Average number of daily employment including contract labor
6. Average cost of daily employment including contract labor
7. Annual industrial cost
8. Annual production
9. Annual value added

To enable comparisons across industries, several of the variables were transformed to create thirteen variables as follows:

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[1]Value added per worker by sector, share of provincial manufacturing output, large scale employment per population, large scale manufacturing and number of factories per square kilometer, percent of employment in large scale manufacturing, and capital employed per worker.

[2]See Appendix.

1-5: value added - per cost of labor, per unit of capital, per industrial cost, per worker, and per firm
6-9: labor costs, workers, capital, and industrial costs per firm
10-11: industrial costs and capital per worker
12: industrial costs per unit of capital
13: capital per labor costs

Each variable is identified by province and by ownership pattern - private (individual, partnership, and private limited company) or public (public limited company, cooperative society, federal/provincial/local government ownership).

Since no doubt many of the transformed variables overlap, a factor analysis was used to identify the main dimensions of firm diversity. This data reduction into several "factors" provides a limited number of independent (uncorrelated) composite measures. For example, measures such as employment, sales, value added and capital stock are replaced by a composite factor and factor score (index) which depicts the relative size of sample firms. While the factor analysis provided some initial insights as to how public and private firms differ, a discriminant analysis was conducted to determine which factors were statistically important in distinguishing public from private sector firms.

4. Results of Factor and Discriminant Analysis

The factor analysis generated four main factors: value added, size, capital intensity and industrial costs. The value added factor combines (into one factor) all measures which use the value added variable.[3] Eigen values for each of the four factors are reported by province in Table 1, Part A.[4] For all provinces except Baluchistan, the variability among industries is best explained by the value added factor, followed by the size factor. For Baluchistan, the size factor best explained variability followed by industrial costs.

Since the paper's primary interest is to assess income changes which might result from privatization, the authors further examined the value added factor since this seemed to be the best indicator of likely income changes. Value added factor scores were calculated for all firms. Table 1, Part B reports the results by ownership and by province where the value added factor score was greater than one - a measure of efficiency. In every case public firms exhibited a higher value added factor score - with the greatest percentage difference (27 percent) in the Punjab and the North West Frontier Province (NWFP).

To further identify differences between public and private manufacturing firms, size, capital intensity and industrial cost factor scores were calculated (Table 2). After controlling for whether the firm is a heavy or light industry and for the average skill level required in the industry, a striking pattern emerges: in addition to generating relatively more income, the public firms in the Punjab, the Sindh and Baluchistan are also larger, more capital intensive,

[3]Correlations of each factor with the remaining factors is not reported but is available, together with a complete set of subsequent results, from the authors.

[4]Only factors with Eigen values > 1 are reported.

Table 1
Eigen Values, Relative Efficiency, Factor Entry Order and Probability of Correct Grouping

	PUNJAB	SINDH	NWFP	BALUCHISTAN
A: Eigen Values				
Factors:				
Value Added	5.06	4.47	5.37	2.42
Size	2.90	3.07	2.98	5.21
Capital Intensity	1.71	1.23	1.87	1.52
Industrial Costs	1.71	2.21	1.63	3.07
B: Efficient Firms [Value Added Factor Score > 1]				
Private Firms	1.09	1.23	1.09	1.38
Public Firms	1.39	1.40	1.39	1.67
Average	1.20	1.30	1.22	1.50
C: Order of Entry in Discriminant Analysis				
Factors/Variable:				
Value Added	2	5	5	4
Size	1	2	1	1
Capital Intensity	5	4	2	4
Industrial Costs	-	-	3	2
Heavy/Light Industry	4	3	4	5
Skills	3	1	-	3
D: Probability of Correct Grouping				
Probability	86.98	79.97	94.5	92.86

and greater users of industrial materials. There is little difference in whether the public enterprise is in a light or heavy industry although the average skill level of the work force employed in the public sector is considerably higher than the counterpart firms in the private sector. The same overall pattern holds for the NWFP except that the industrial costs factor (industrial costs per worker and per firm, and capital per worker) are higher for private firms.

These results - that public firms generate more income, employ higher skilled workers, and generally have lower industrial costs - support Naqvi and Kemal. Apparently the quality of management, competition from imports and the private sector, lower effective rates of protection, high rates of capacity utilization in public enterprises (posited by Naqvi and Kemal), and other factors such as higher job security and prestige in public enterprises or the employment of higher skilled workers and lower industrial costs (as indicated in the factor analysis) all contribute to the superior efficiency of the public firm.

The factor analysis implies that public and private firms have unique structural and performance characteristics which set them apart. If this is correct, a discriminant analysis

Table 2
Average Factor Scores, Control Variable Values, Private and Public Firms, by Province

	Factors			Heavy/Light Industry	Average Skill Level
	Size	Capital Intensity	Industrial Costs		
PUNJAB					
Private	-0.46	-0.13	0.03	1.57	13.49
Public	0.80	0.22	.05	1.55	22.50
Mean	0	0	0	1.56	16.77
SINDH					
Private	-0.32	-0.12	-0.13	1.53	19.74
Public	0.47	0.18	0.20	1.60	28.10
Mean	0	0	0	1.56	23.13
NWFP					
Private	-0.64	-0.21	0.13	1.31	13.07
Public	0.86	0.28	-0.17	1.22	17.51
Mean	0	0	0	1.27	14.96
BALUCHISTAN					
Private	-0.54	-0.25	-0.30	1.38	20.10
Public	0.73	0.34	0.40	1.33	26.24
Mean	0	0	0	1.36	22.73

Note: Mean of Heavy/Light Industry and Skill Levels does not equal zero since they are control variables and not factor scores.

should support this finding and classify firms into their appropriate ownership category with a high degree of probability. Operationally, the procedure includes (in a step-wise manner) the scores of each of the main factors (or control variables) so that the factor which provides the highest differentiating power is selected first. The procedure continues until it is impossible for an additional variable to make a statistically significant improvement (based on the F statistic) in the group delineation.[5] The order of entry for the factors and control variables are shown in Table 1, Part C. The results indicate that size is the most important discriminating variable in all provinces except Sindh.

Discriminant analysis allows us to predict the correct grouping (public or private) given the values of the various structural descriptors. The probability of correct grouping appears as Table 1, Part D and range from 94.5 percent for the NWFP to approximately 80 percent for the Sindh.

[5]Light industry = 1.0 (food, textiles, wood products, and paper products). Heavy industry = 2.0 (chemical, non-metallic mineral products, basic metal industries, and metal/products/machinery industries. Skills were proxied by the employment cost per worker.

5. Logistic Regression

On the one hand the initial analysis shows remarkable consistency - the efficiency of public over private firms across the provinces - but on the other hand indicates some diversity - such as the relative importance of each factor in the discriminant analysis. To further test the strength of these results, several equations were estimated using logistic regression to (a) measure the relative strength of each factor or control variable and to (b) estimate the prediction probability of correct grouping.[6] Ownership is the dependent variable and assumes a value of 1 for private firms and 2 for public firms. While several set of equations were estimated (for sets of firms with value added factor scores > 0.5, > 0, and > -0.25, respectively), only the results for one set of firms (value added factor score > 0) are reported since the results were consistent across the three sets. The results appear as Table 3.[7] For the Punjab, differentials in value added between public and private firms were an important element in characterizing the two ownership patterns. Since the estimated coefficient is positive, public firms were ceteris paribus contributed more to income than their private counterparts. Size and capital intensity were also statistically significant in profiling ownership. For the Sindh and the NWFP, value added was not statistically significant. In these provinces, size, capital intensity, industrial costs, and the type of industry (heavy or light) were important in distinguishing ownership. In Sindh and NWFP, production by public firms was concentrated in the lighter industries as evidenced by the negative coefficient. The average skills level was only important in the Sindh. Based on a limited number of variables, this model predicted correct ownership at least 92% of the time.

6. Conclusions

A major purpose of this study was to confirm the findings of Naqvi and Kemal on the relatively higher efficiency of public over private enterprises in Pakistan by using a different methodology and different data set. Public and private firms were examined to see how they differ across the provinces of Pakistan. The major focus has been on the relative ability of each to contribute to regional value added. Since no published statistics for Pakistan exist which indicate technical efficiency at the firm or industry level, a proxy measure - a value added factor - was developed by factor analysis together with other indicators of manufacturing activity. Several striking patterns of ownership emerged which have important implications should the government of Pakistan embark on a program of privatization. Importantly, the findings of Naqvi and Kemal are confirmed since the results indicate that public firms are more efficient in the sense of generating more value added than their private sector counterparts. This conclusion holds across all provinces. In addition, value added differentials (especially in the Punjab) are a critical factor in distinguishing ownership. Since public firms contribute more value added, privatization per se would most likely contribute little in increased output or to improvements in industrial productivity. If Arshad's

[6]For a good description of this procedure, see Pindyck and Rubinfeld (1976).

[7]There were insufficient observations to estimate the model for Baluchistan.

Table 3
Logistic Regression Results by Province, Coefficient and Standard Errors*

Independent Variable	Regression Coefficients (Standard Errors)		
	PUNJAB	SINDH	NWFP
Value Added	1.92 (0.43)***	0.34 (0.38)	0.10 (1.13)
Size	8.15 (1.07)***	12.34 (1.23)***	5.53 (1.12)***
Capital Intensity	1.14 (0.19)***	2.89 (0.67)***	1.93 (0.43)***
Industrial Costs	0.21 (0.12)*	3.35 (0.29)***	-2.65 (1.12)**
Heavy/Light Industry	0.18 (0.39)	-1.17 (0.36)***	-1.64 (0.99)*
Skills	0.02 (0.04)	0.05 (0.02)**	0.17 (0.12)
Prediction of Correct Grouping	92.36%	92.27%	95.14%

* Note: values in parentheses are standard errors. *, **, and ***, represent statistical significance at the 90%, 95% and 99% level, respectively.

view is accepted that the Sindh is the most industrialized region, privatization in the Punjab would do little to restore regional balance.

For somewhat different reasons, the same conclusion holds true in Sindh province. Value added differences are not such a critical factor and while privatization would shift workers of higher skills into the private sector, it is not clear whether these skill differentials would represent real productivity differences. For the more backward regions of the NWFP and Baluchistan province, privatization appears to offer little prospect for speeding up industrialization since value added differences are not that significant in differentiating public from private firms. Perhaps privatization in these provinces would make more skilled workers available to the private sector. Yet it is not clear - given possible subsequent out-migration - whether private firms could retain
these workers.

This paper confirms the relative efficiency of public sector enterprises in Pakistan. In addition, the policy of privatization of public enterprises has been examined to estimate whether such a policy could reduce regional income disparities in Pakistan. The findings suggest that privatization of public enterprises is unlikely to be an effective means to reach this goal.

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