The Contribution of Pakistan's Large Scale Manufacturing Industries Towards Gross National Product at World Prices

by

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Over the period 1949/50 to 1970/71, Pakistan's large-scale manufacturing sector grew at a compound rate of more than 15 per cent. Its share of GNP increased during this period from 1.5 per cent to 9.4 per cent. Various factors contributed to this growth, not the least of which were the various incentives provided to the manufacturing sector via tariffs, restrictive import licensing, tax holidays and an overvalued official exchange rate.

Recently, several studies, and most notably an OECD study by Little, Scitovsky and Scott [10] (hereafter referred to as LSS) questioned the meaning of the growth rates and sectoral shares of manufacturing sector when the goods produced in these sectors are valued at prices distorted by various subsidy and trade restricting policies. They concluded that a better measure of the manufacturing sector's contribution could be obtained by valuing a country's gross national product not at domestic prices but at world prices—i.e. the prices that would obtain in the country were there no trade tax or quotas. Table I

TABLE I

Value Added in Manufacturing Industries at Domestic and World Prices in Some of the Developing Countries

Country	Year	Share at domestic prices	Share at world prices	2 ÷ 1
		1	2	3
Argentina	1958	31.3	22.5	.718
Brazil	1966	27.9	21.3	.763
Mexico	1960	19.0	17.2	.905
Philippines	1965	19.0	15.2	.800
Taiwan	1965	18.7	16.0	.855
Pakistan	1963-64	7.0	0.4	.057

Source: [10, p. 75]

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summarizes the LSS estimates of the proportional shares of the industrial sectors for six developing countries at two sets of value: column 1 show the share at domestic prices while column 2 shows the share at world prices.

In all countries, protection inflates the importance of the manufacturing sector. But in Pakistan's case it would appear that almost all of manufacturing value added can be attributed to protection. For no country in the sample is the spread between the two measures of the industrial sector's contribution so great.

If Pakistan's manufacturing sector is so heavily dependent on protection as LSS allege, then clearly the policies of industrial promotion ought to be reviewed very carefully. The purpose of this paper is to re-examine the factual basis for the conclusions reached by LSS for Pakistan. Two important reasons for such a re-examination exist. First, rates of protection frequently change over time due to changing tariff rates, licensing procedures, international prices and domestic patterns of competition. Thus, the difference between the domestic value and the "international" value of the manufacturing sector may vary over time. Second, the Lewis-Guisinger study [9], on which LSS based their calculations, was carried out on a fairly high level of aggregation. As measures of protection can be quite sensitive to the level of aggregation, it would be useful to check the Lewis-Guisinger estimates of effective protection using more disaggregated data.

The paper is divided into three parts. Part I deals with methodology, coverage and data problems. Part II presents results and Part III discusses some policy conclusions that follow from the results of this study.

(I)

Methodology

Value added measures the payments made to the primary factors of production in a particular industry and is defined as the difference between the value of output and the cost of intermediate inputs of the processing industy, i.e.

$$VA_j = P'_j X_j$$

Where VA_j : Value added in jth activity;

P_j : Price vector for jth activity;

X_j : Product vector for jth activity, where first k elements refer to output and the remaining n-k elements refer to inputs. Outputs take a positive sign, and inputs a negative sign.

When vector P is substituted by vector P_d (domestic prices), value added at domestic prices in activity j, denoted by VAD_j, is obtained. Similarly, substitution of vector P_w (world prices) for P gives value added at world prices in activity j, denoted by VAW_j.

The methodology adopted in this study for the calculation of VAW_j is equivalent to that used by Lewis and Guisinger. Using aggregated data, they

assumed that only one product is produced in a sector (or that there is a certain product which is representative of the sector), although that particular sector may be producing more than one product. In this study, instead of assuming a representative price for the industry's output, we consider the full range of products produced by the industry. Similarly inputs are valued on a more disaggregated basis. Except for this use of disaggregated data, the methodology used in the study is equivalent to that of Lewis-Guisinger.

The methodology for calculating the share of manufacturing at world prices in GNP is due to LSS [10, especially Pp. 410 to 418]. For Pakistan, LSS took the VAW's reported by Lewis and Guisinger and corrected these for the implicit overvaluation of the exchange rate. "Implicit" used in this context implies that while a country's balance of payments may be in equilibrium as the result of a system of trade restrictions and subsidies, the elimination of that system would create a deficit in the balance of payments, requiring a devaluation of the official exchange rate to bring the balance of payments back into equilibrium. The percentage devaluation that would be required is a measure of the implicit level of overvaluation of the present exchange rate. How this implicit rate of overvaluation is calculated is discussed in a later section of the paper.

To calculate the VAW for each industry, the inputs and outputs are classified into tradables and non-tradables and the tradables are then further classified into importables and exportables. The tradable goods are then valued at world prices, using c.i.f. prices for importables and f.o.b. prices for exportables. The VAW is then the difference between the value of the output at world prices and the value of the purchased inputs (not including labour, land and capital) at world prices. There are two problems in calculating VAW, however. The first is that the c.i.f. and f.o.b. prices are not always available and the second is that a world-price value must be assigned to the inputs, such as electricity and inland transportation, that are not traded on world markets.

Valuation of Traded Goods

For homogenous tradable products, such as fertilizers, sugar and cement, the competitive international prices are readily available. In the case of heterogeneous products, however, direct price comparisons are difficult because of lack of product indentification. In these cases, where per unit prices are not available, one has to resort to indirect methods.

Importables

Protection, whether provided through tariffs or quantitative restrictions, leads to an increase in the domestic price of each importable by a certain percentage, and let this percentage increase in price-referred to here as the markup be denoted by m_{ij}

Then,

$$P_{ij}^{d} = (1+m_{ij})\, P_{ij}^{w}$$

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$$\text{and } P_{ij}^{w} = P_{ij}^{d} \frac{1}{1+m_{ij}}$$

where

P_{ij}^{d} = domestic price of ith product in jth activity

P_{ij}^{w} = world price of ith product in jth activity

Mark-ups (m_{ij}) for importables are determined after taking into consideration the following.:[1]

(*a*) Tariffs
(*b*) Quantitative restrictions
(*c*) Imports under bonus
(*d*) Imports under cash-cum-bonus

The rate of tariff duty would have been an appropriate mark-up if protection were provided only through tariffs. In the case of Pakistan, however, the use of tariff duties as measure of mark-up is very misleading, firstly, because, tariffs understate protection when quotas are the binding constraint, and secondly because tariffs overstate protection where they are redundant. The latter is very important for industries,whose production has increased to such an extent that they are able to export. For the purpose of computing VAW, products with redundant tariffs are treated as exportables. When tariffs or quotas are the binding constraint, the results of the studies by Matilal Pal [14] and Alamgir [2] are drawn upon.

The mark-ups for products imported under bonus are obtained by adding the bonus premium to the price paid for imports. For the commodities imported under cash-cum-bonus 50 per cent of the bonus premium is added to the price for the calculation of the mark-up. If there is any customs duty on the import of these products, then import duty is added as well.

Sugarcane is neither an exportable, nor an importable. Thus the price of sugarcane is evaluated in a different way compared to other products. Social cost of production plus (net profitability on alternate crops per acre/ sugarcane production per acre) is taken to be the social cost to the manufacturing sector. Net social profitability estimates are taken from M. Afzal's study on Green Revolution [1].

Exportables

As far as exportables are concerned, the main subsidy has been the export bonus premium. Mark-ups for those products are obtained in the following way: Suppose a certain product is given 40 per cent bonus and the

[1]We have used value of output excluding indirect taxes, and as such, no adjustment is needed for excise and sales taxes.

bonus rate is 180 in the market, then the mark-up is $(100+.4(180))/100=\frac{172}{100}$

Since other subsidies are not taken into account in the calculation of mark-ups there is an upward bias in the value of exportables.

Valuation of Non-Traded Goods

Non-traded goods have no world prices, and thus a value must be assigned to them on the basis of certain assumptions. We have used two sets of assumption:—

(*i*) non-tradables are valued at their market prices;
(*ii*) price of non-tradables differ in the same proportion, as the prices of tradables differ.

In the literature on effective protection two definitions of value added at world prices are provided viz. the Corden definition and the Balasssa definition. Corden assumes that besides primary factors of production, non-tradable inputs are protected as well, and thus in calculation of VAW, deducts only tradable inputs. Balassa deducts both tradable and non-tradable inputs from value of the output.

Thus:

$$VAWC_j = P_{wj}^{n} X_j^N$$
$$VAWB_j = VAWC_j - N_j$$

where

$VAWC_j$ = value added at world prices in jth activity according to Corden definition

$VAWB_j$ = value added at world prices in jth activity according to Balassa definition

P_{wj}^N = vector of world prices in jth activity for traded products.

X_j^N = vector of traded products in jth activity

N_j = cost incurred on non-tradable inputs in jth activity

Contribution of large scale manufacturing sector is obtained by summing over all of j activities, i.e.

$$VAW_M = \sum_j VAW_j$$

Since our purpose is to measure the contribution of certain activity and manufacturing sector as a whole, the Balassa definition has been adopted in this study.

To adjust for the implicit overvaluation of the exchange rate, two correction factors[2] depending on the alternate assumptions regarding non-

[2]For a detailed discussion see LSS.

tradable inputs are calculated. Thus the corrected value added is obtained as follows:

$$VAW_j = \phi\ (VAWC_j - N_j)$$

where

$$\phi = \frac{VAD_A + VAD_M}{VAW_A + VAW_M}$$

VAW_j = corrected value added when non-traded inputs are not deflated

VAD_A, VAD_M = VAD in agriculture and manufacturing sectors respectively

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$$VAWI_j = \phi'\ (VAWC_j - N_j/\ \phi') = \phi'\ VAWC_j - N_j$$

where

$$\phi' = \frac{VAD_A + VAD_M + N}{VAW_A + VAW_M + N}$$

$VAWI_j$ = L.S.S. ideal method i.e. corrected value added when non-traded inputs are deflated in activity j.

In order to estimate ϕ and ϕ' we have assumed that sixty per cent of value added in agriculture to be tradable. This assumption is based on the Tims-Stern Input-Output Table. To calculate VAW_A, the ratio of the implicit exchange rate for agriculture to the official exchange rate was used to deflate tradable part of the VAD_A. The non-traded value added in agriculture is combined with the value added in other non-traded activities and is shown in the formula as N.

Data Problems and Coverage

Fairly disaggregated Census of Manufacturing Industries data for the year 1968-69 on products, by-products and input structures have been obtained from Bureau of Statistics, Punjab, for twenty three industries. Two important industries viz. cigarettes and petroleum could not be included in the study because of the non-availability of data. Inputs are divided into two categories: inputs purchased from the domestic market and inputs directly imported.

The study covers about 65 per cent of the value added in the manufacturing sector of Punjab. Since a major portion of Pakistan's industry is located in Karachi, and cost of imported inputs whould be higher in Punjab because of transportation costs, the data for Punjab may not be fully representative of West Pakistan. However, as the government protective economic policies were more or less the same for the whole of Pakistan, the analysis based on the data for the region of Punjab is fairly representative, as there is no *prima facie* reason to believe that cost structure of industry in Karachi is markedly different.

Comparable per unit prices for exportables have been taken from the Foreign Trade Statistics of Pakistan [12]. The per unit c.i.f. price for sugar

used in this study is the simple average of six years i.e. 1965-70[3], and has been obtained from F.A.O. Trade Yearbook [17]. Per unit prices of fertilisers have been derived from table 23 in an O.E.C.D. study on Agriculture and Related Industries [7]. Tariff rates and import licensing data have been taken from the Import and Export Journal [4]. Basic rates of bonus subsidy provided for exports are taken from Imports and Export Manual [11] and have been updated in the light of subsequent changes obtained from Pakistan Economic Survey [13]. Since sugarcane is not tradable, the determination of its alternate cost poses serious problems. In this study, the price sugarcane implicit in M. Afzal's study on the Green Revolution [1] is used.

As regards the quality of the data, the Census of Manufacturing Industries data have the same limitations as the other data in Pakistan and other developing countries have. To avoid taxes, there is tendency among industrialists to understate production and overstate inputs, resulting in lower value added. In a system of protection that provides more incentive to the production of finished goods than to intermediate goods such misreporting lowers VAW to a greater extent than VAD. However, since we are interested in the quotient, VAW/VAD, this discrepancy may be reduced to some extent.

II

Table II presents value added at world prices, at domestic prices, calculated on the basis of both Corden and Balassa definitions. Value added adjusted for the implied rate of overvaluation is also shown in the table. To provide the reader with an idea of the magnitude of resources involved in different industries, the value of fixed assets and employment costs in each industry is also shown.

This study supports the conclusions reached by Lewis and Guisinger, Soligo and Stern [16] that a substantial part of domestic value added is contributed by protection. This can be confirmed from Tabe III. Value added is negative in the sugar[4] industry, which again conforms to the results of [9], [16] and Raquibuzzaman [15]. Negative value added at world prices is not very unusual amongst the developing countries e.g., in India leather goods, bicycles and non-ferrous metals and in the Philippines, refrigerators, air-conditioners and television sets show negative value-added [10,p. 186]. In all of these countries, negative value added resulted mainly because of distortions introduced by a differential tariff structure.

The finding of negative value added by Soligo and Stern [16] stirred considerable debate over the validity of negative value added as a meaningful concept. Some economists, such as Basevi [3] and Leith [8], termed results involving negative value added absurd, while Ellsworth [5] states that "a negative value added implies a degree of inefficiency that is almost unbelievable". However, Guisinger [6] has stated that "negative value added is neither an 'absurd' concept, nor does its occasional appearance in empirical studies need

[3]A simple average of sugar prices has been used because, the price of sugar show very wide fluctuations.

[4]This refers to 1968-69. The change in the exchange rate in May 1972 and the rise in world sugar prices would obviously change the picture.

to be explained by additional assumptions about extreme inefficiency in production". Negative value added at world prices may occur when protection permits domestic production of a product, which would not be possible in a free trade equilibrium. For example, if we reduce the price of sugarcane sufficiently, substantial positive value added would appear. However, at that reduced price sugarcane would not be grown in Pakistan.

Except for edible oils and for silk and artsilk, this study generally supports the findings of Lewis and Guisinger. For these two industries the results of this study differ significantly from those of Lewis and Guisinger. In contrast to the negative value added in edible oils shown by Lewis and Guisinger, this study comes up with substantial positive value added. Similarly for silk and artsilk, the present study comes up with substantial positive value added compared to a negligible VAW in [9]. One reason for the difference in the results in the former industry may be the use of disaggregated data. Lewis and Guisinger used a 116 per cent mark-up taking edible oils to be representative of the sector, whereas vegetable ghee forms about 70 per cent of the value added in the sector. Vegetable ghee is a fairly homogeneous product and as such its per unit f.o.b. value, calculated on the basis of export data, is fairly representative of its world price. F.o.b. value for both the years, 1967-68 and 1968-69, is higher than the domestic price excluding taxes. Though the ratio of the domestic price to the f.o.b. price may have changed on the period between the Lewis-Guisinger study (1963-64) and present study, it is quite possible that the differences can be attributed to the aggregation used by Lewis-Guisinger. The main cause for differences in the results for silk and artsilk industry is that the industry is now an exportables, and the mark-up comes out to be 172.4/100 as against the 350/100 used in [9].

The ratio of total value added at domestic prices with total value added at world prices yields a constant which measures the percentage deviation of VAWI from VAD_M. Using this constant the contribution of large scale manufacturing towards GNP, both measured at world prices, comes to 3.67 per cent and 3.5 per cent respectively for $\phi = 1.43$ and $\phi' = 1.15$, compared to 12 per cent at domestic prices. This shows that VAW is about 29 per cent of VAD, and thus protection has contributed to domestic value added to the extent of 71 per cent.

The use of more recent and more disaggregated data in estimating the protection levels for each industry has produced estimates of protection which are, overall, significantly lower than for Lewis-Guisinger. Thus, the LSS calculations for Pakistan's industrial sector may have understated that sector's contribution to GNP. Also, it should be pointed out that not all of the remaining difference between value added at domestic prices and value added at world prices can be attributed to production inefficiency. Some of the difference may be due to the absence of competitive domestic markets, although another study would be necessary to establish to what extent monopolistic practices could account for the observed differences.

If the 1968/69 estimates of protection are used instead of the Lewis-Guisinger estimates, the share of manufacturing at world prices in Table I would rise from .057 to .292 on the assumption that the industrial cost data for the Punjab are representative of Pakistan as whole.

CONCLUSION

Even with the upward revisions in the LSS results that are indicated on the basis of this study, the difference between the shares of the manufacturing sector measured at the two sets of prices is still greater than any other country in the LSS sample. Quite possibly, even more disaggregated and more recent data would cause the gap to be closed even further.

But if a gap still remains what can be said? Unfortunately not much, because so little is still known about the role of protection in industrial growth. Less protection in the past might have reduced inefficiency in the sense emphasized by LSS but the overall growth of the economy, at world prices or at domestic prices, might have been retarded because of the absence of a dynamic manufacturing sector. "Excessive" industrial growth might have been necessary to absorb the urban unemployed. Until more is known about the overall contribution of the industrial sector to the economy, it will remain difficult to distill any strong implications for trade policy from calculation such as those provided by LSS. Our re-examination has emphasized the need in such studies to use the most disaggregated data possible and to estimate protection at several points in time.

TABLE II

Value Added at Domestic and World Prices for the Year 1968-69 (000 Rs.)

S.No.	Name of the Industry	Value added at current domestic prices	Value Added At World Prices				LSS ideal method	Value of Fixed assest	Total employment cost
			Corden		Balassa				
			Gross	Net	Gross	Net			
I.	**Consumer Goods Industries**								
1.	Sugar and Refineries	150,223	—13,623	—27,956	—33,553	—47,880	—55,073	225,433	18,075
2.	Edible Oils and Fats	41,654	74,468	71,051	65,758	62,341	72,997	45,451	9,217
3.	Cotton Textiles	318,565	128,214	97,067	92,677	61,532	62,092	355,050	101,439
4.	Woolen Textiles	43,214	22,195	17,550	17,288	12,463	15,276	36,428	6,968
5.	Silk and Artsilk Textiles	10,631	4,445	3,160	1,922	637	2,060	15,414	5,678
6.	Footwear Except Rubber	3,017	1,548	1,157	153	— 238	—64	4,247	1,953
7.	Rubber Footwear	30,970	20,614	19,694	17,193	16,273	19,227	19,201	3,350
8.	Utensils	6,566	1,597	1,231	975	609	794	5,644	2,891
9.	Fans	15,326	8,191	7,429	5,321	4,559	5,673	10,560	4,499
10.	Cycle & Cycle Rickshaws	41,108	20,978	17,233	16,800	13,055	15,640	16,268	7,374
II.	**Intermediate Goods Industries**								
11.	Tanning	30,970	20,614	19,694	17,193	16,273	19,227	9,201	3,350
12.	Fertilizers	44,393	48,032	40,845	21,447	14,447	20,573	148,151	9,184
13.	Manufacturing of Acids and Alkalies etc.	42,681	23,322	22,063	17,199	16,940	20,249	53,989	4,727
14.	Iron & Steel basic forms	80,683	40,545	35,832	24,808	20,895	25,476	39,652	15,327
III.	**Capital Goods and Related Industries**								
15.	Cement	41,612	43,029	32,443	17,005	6,419	11,285	114,151	8,298
16.	Agricultural Machinery	16,216	11,931	11,255	8,505	7,799	9,483	9,505	2,386
17.	Textile Machinery	5,857	3,531	2,937	2,657	1,073	1,514	6,064	2,351
18.	Food Processing Machinery	2,957	1,615	1,461	1,202	1,048	1,268	1,598	8,859
19.	Metal Working Machinery	1,145	606	458	316	168	237	2,223	837
20.	Heating and Plumbing Equipment	6,370	2,357	2,195	1,681	1,339	1,668	5,324	2,478
21.	Engines and Turbines	15,272	9,006	7,738	6,681	5,313	6,4741	9,681	5,475
22.	Motor Generators and Transformers	16,593	6,704	5,339	2,503	638	1,439	12,597	4,934
23.	Pumps and compressors	9,475	4,502	3,758	2,390	2,643	3,207	6,451	2,625

TABLE III
Rates of Protection 1968-69

Sr. No.	Name of Industry	Nominal Protection rate %	Effective Protection rates $U = 1 - \frac{WAD}{VAD}$		Effective Protection Rates after Adjustment for Over-valuation of Exchange Rate (LSS. Ideal)
			Corden	Balassa	
I. Consumer Goods Industries					
1.	Sugar	241	119	132	137
2.	Edible Oils	33	—70	—50	—75
3.	Cotton Textiles	63	70	81	76
4.	Woolen Textiles	66	59	71	58
5.	Silk and Artsilks	72	70	86	82
6.	Footwear except Rubber	73	62	108	102
7.	Rubber Footwear	84	37	48	38
8.	Utensils	44	71	91	88
9.	Fans	94	53	70	63
10.	Cycles and Cycle Rickshaws	72	59	68	62
II. Intermediate Goods Industries					
11.	Tanning	67	36	48	38
12.	Fertilizers	33	8	68	54
13.	Manufacturing of Acids and Alkalies	87	48	60	53
14.	Iron and Steel Basic forms	66	56	74	69
III. Capital Goods Industries					
15.	Cement	85	22	85	73
16.	Agricultural Machinery	42	31	52	42
17.	Textile Machinery	72	50	82	74
18.	Food Processing Machinery	72	51	65	57
19.	Metal Working Machinery	73	60	85	79
20.	Heating and Plumbing Equipment	75	66	79	74
21.	Engines and Turbines	58	49	65	56
22.	Motor Generators	79	68	96	63
23.	Pumps and Compressors	72	60	72	67

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