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MEASURING PROTECTION IN A DEVELOPING COUNTRY:

THE CASE OF PAKISTAN

Stephen R. Lewis, Jr.
Stephen E. Guisinger

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INTRODUCTION

In the recent literature on international trade and economic development, the subject of protection to domestic manufacturing industry, the encouragement of 'import substitution', the possible gains from restricting trade through the use of tariffs, and the welfare losses from inappropriate trade restrictions have all played an important part. One of the most interesting recent contributions is the notion of protection to value added, or implicit, or effective protection, as opposed to the more usual procedure of examining the level of tariffs on goods to determine the level and structure of protection. As yet there have been few empirical studies of the levels of implicit protection, particularly in the developing countries.1/

Comments by: Richard Bird, Hollis Chenery, Paul Clark, Morton Grossman, and John Sheahan; other colleagues at Williams and Harvard; and other participants in a Colloquium on Industrialization and Trade Policy, held in Williamstown in November, 1966; were all helpful to us in revising an earlier draft of this paper. We remain accountable for the final result.

1/ Studies have been made for Argentina /2/, Pakistan /18/, /28/ and the Philippines /26/.

The purpose of the present study is to examine various measures of the level and structure of protection, both in principle and empirically in the case of Pakistan. In addition to the tariff structure, we introduce other domestic indirect taxes, which may either augment or offset the protective effects of the tariff system. Second, we explicitly introduce the problem of non-traded inputs into the production process, and have examined the sensitivity of the measured level of implicit protection to the level of non-traded goods in the input structure of an industry. Third, and closely related to the second modification, we have made some allowance for the fact that (i) the currency of many countries is overvalued at the official exchange rate and that (ii) a substantial part of the tariff level in such countries is really just a substitute for official devaluation of the currency. Fourth, we have made use of a substantial body of material on direct price comparisons for various goods in Pakistan and in international trade, and have made adjustment for the fact that (i) some tariffs are redundant and overstate the level of protection implied by the tariff structure, and (ii) quantitative restrictions, not tariffs, are the effective determinants of domestic prices of some goods, so that tariffs understate the level of protection afforded to the industry. Finally, we have asked the question: at what price of foreign exchange would the industry be fully competitive? The details of the empirical results may be of more interest to those actively involved in the affairs of Pakistan. The sensitivity of the measures of protection to adjustments that are of importance in many countries makes the results of somewhat wider interest.

II THE LEVEL OF PROTECTION AS DERIVED FROM THE TAX AND TARIFF SYSTEM

Recent literature on tariff structure /1/, /3/. /8/, /11/, /12/ has stressed the need to go beyond the nominal level of protection when dealing with the incentives provided to a domestic activity. Emphasis has been placed not on the percent by which total costs and factor payments could exceed the "free trade" costs, but on the extent to which the payments to primary factors within the industry could exceed payments if there were no tariffs. The principal method for making this calculation has been to adjust the tariff on the product for (i) the tariffs on its intermediate inputs and (ii) the share of value added in gross output of the industry. The rate thus arrived at has been termed the <u>implicit</u> or the <u>effective</u> rate of protection.

A modified form of Johnson's formula for the effective tariff, or the effective rate of protection, T_i, is given by:

$$T_i = \frac{t_i - \sum_j a_{ji} t_j}{v_i} \qquad (1)$$

where t_i and t_j are the nominal tariffs on industries i and j, the a_{ji}'s are the input coefficients from industry j into i, and v_i is the value added coefficient for the industry. Holding the other variables constant, T_i is higher (1) the higher nominal protection to output, (2) the lower the nominal protection on inputs, and (3) the smaller the value added proportion. The difference

between nominal and effective protection can be seen by examining an industry where, before any tariff is imposed, the value added proportion is only .10.[1/] A ten percent tariff on output, with no tariff imposed on the inputs, would raise the domestic price ten percent, allowing value added in the industry to rise by 100 percent.[2/] The effective rate of protection to the industry is, then, not 10 percent but 100 percent. Note that the effective tariff is the same as the nominal tariff on output whenever $t_i = t_j$ for all a_{ji}, regardless of the value of v_i. Small differences between t_i and the average t_j are greatly magnified the smaller is v_i, as indicated in the example.

One problem with the method has been to arrive at appropriate weighting procedures for the tariffs on inputs. In some empirical studies, and in Johnson's theoretical contribution, the country's own input-output structure has been used, and that is the procedure followed here.

If:

X_i	=	domestic value of output at market prices (i.e. including domestic indirect taxes)
W_i	=	value added at domestic price
X_{ji}	=	value of input from the ith into the jth industry
T_{Di}	=	indirect taxes on output

1/ Some food processing industries would fall in that category.

2/ Note it is assumed that the a_{ji}'s do not change in the industry and that the entire increase in price goes to value added. We will question the realism of this assumption in connection with our results for Pakistan.

Domestic value added at domestic prices is given by

$$W_i = X_i - \Sigma X_{ji} - T_{Di} \qquad (2)$$

If t_i and t_j are nominal tariffs on industry i and on the inputs from industry j to industry i, respectively, and if these tariffs reflect the difference between world and domestic prices, then we can compute "value added at world prices" by deflating domestic flows by the appropriate tariff to calculate flows at "world prices". If $\hat{W}_i$ is value added "at world prices," it is written:

$$\hat{W}_i = \frac{X_i}{1+t_i} - \sum_j X_{ji} \frac{1}{1+t_j} \qquad (3)$$

Since the notion of effective protection is the extent by which actual value added can exceed value added "at world prices," it is written:

$$T_i = \frac{W_i - \hat{W}_i}{\hat{W}_i} \qquad (4)$$

This expression is used by Johnson /11/, Balassa /2/ and Basevi /3/. In some cases, the deflated value of output is very close to the deflated value of inputs, so values of T_i are exceedingly large. Should the value of inputs exceed the deflated value of output (implying "negative value added" at world prices), T_i becomes negative. Since a number of industries exhibited this characteristic in the first study done in Pakistan, Soligo and Stern /28/ changed the arrangement slightly and used U_i, where

$$U_i = \frac{W_i - \hat{W}_i}{W_i} \qquad (5)$$

and U_i is interpreted as the percentage of total value added that is "due to" protection. There are a number of industries for which T_i is not well-behaved, so we have used U_i to express the level of implicit protection whenever U_i is positive. The rankings of the industries do not change, but comparability of industries with different rates of protection is greatly facilitated.

"Negative value added" may be a rather strange notion. Basevi /3/ argued that such results were absurd, and dropped any industry giving such results from consideration. Ellsworth /9/, in commenting on the initial Pakistan study by Soligo and Stern /28, states four times in less than two pages that such results "are absurd." His basic argument is: ".... logically all such results /giving negative value added/ are absurd." The notion is not so absurd as Basevi and Ellsworth believe, however, particularly in a country with a greatly distorted price structure. It simply states that the value of the inputs used by the industry exceeds the value of output of the industry, when both are valued at world prices. This result does not have to imply the physical destruction of the inputs during the production process, though such might be the case. Economic "destruction" of inputs was found in at least one study of multiple exchange rates for different export products for Pakistan /19/, and tariffs are only a form of multiple exchange rates. If the domestic price structure is sufficiently distorted, processes of

production could easily be privately profitable, and not technically very inefficient, and yet they might still consume a higher value of inputs than the value of outputs when both are measured at world prices or trade opportunity costs. A question we should deal with initially, then, is the general pattern of the relative price structure in Pakistan, and how this has both influenced, and been influenced by, economic growth and policy in Pakistan.

III INDUSTRIAL GROWTH AND ECONOMIC POLICY IN PAKISTAN[1/]

In terms of measured per capita income, Pakistan is one of the poorest countries in the world, with a level around $75 per capita. At the time of independence in 1947, Pakistan was a raw material and food producing area for the rest of the Indian subcontinent, and had virtually no manufacturing capacity. Trade with the rest of India was restricted after Partition, and Pakistan failed to devalue with Britain and India in 1949. Sterling reserves from World War II and the Korean War boom kept the full impact of these two related decisions from being felt until 1952, but at that time a severe balance of payments crisis developed, and a rigid system of quantitative import restrictions was adopted. The terms of trade were shifted sharply against the

[1/] The summary in this section draws heavily on Falcon and Lewis /10/, Lewis /15/, and Lewis and Hussain /16/.

domestic agricultural sector, and the manufacturing sector was heavily protected, not only by the tariff structure but primarily by the system of quantitative restrictions. The industrial policy was one of manufacturing domestically almost anything that physically could be produced there. The policy of banning imports once domestic producers stated that they could supply the entire domestic market was a dominant part of the protective system.

As a result of the low manufacturing base and the very substantial level of protection provided to domestic manufacturing, the growth of large scale manufacturing industry in Pakistan proceeded at a rate of ten to fifteen percent per year throughout the 1950's, and was fifteen percent per year in the first half of the 1960's. Agriculture grew less rapidly than population through the 1950's, and between 1949/50 and 1959/60 the share of agriculture in GNP fell from 59.9 percent to 53.2 percent of GNP, while manufacturing rose from 5.9 percent to 9.3 percent. During the 1960's, the agricultural growth rate accelerated considerably, but the manufacturing growth rate also increased somewhat, and by 1964/65 agriculture's share of GNP had fallen to 49.9 percent and manufacturing industry produced 11.5 percent. Accompanying the rapid shift in industrial structure, which was largely a response to the trade-restricting policies of the early 1950's, was a movement of relative prices back toward a pattern

more consistent with the trade alternatives that Pakistan faced. Most characteristic was a movement of the terms of trade back in favor of the domestic agricultural sector, though the restrictive policies on manufacturing imports and the maintenance of an overvalued currency taxed agriculture quite heavily even in the mid-1960's.[1/]

Accompanying the movements in the structure of production there were also substantial movements in product use. The share of gross domestic saving in GNP was probably around five percent in 1950, and it had increased to over ten percent by the mid-1960's. The rise in the share of investment in GNP was even more rapid, rising from about five percent in 1950 to seventeen or eighteen percent in the mid-1960's. The resource gap was financed largely by inflows of foreign assistance, which began in sizable amounts in the late 1950's, and accelerated sharply in the early 1960's. It was undoubtedly no accident that the rise in the saving rate accompanied the increasing share of the large-scale manufacturing sector in GNP, although direct evidence on this point is still somewhat sketchy.

There were substantial changes in the composition of imports and exports as the productive structure changed. Imports of manufactured consumer goods fell both absolutely and as a proportion of total imports,

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1/ Data on structure of GNP are from Khan and Bergen /13/. Relative price structure data are from Lewis /15/ and Lewis and Hussain /16/.

with the change in major mass consumption goods (cotton cloth, soap, matches, etc.) leading the decline. Machinery and equipment took over as the principal categories of manufactured imports, and other metal manufactures also rose in relative importance. On the export side, the share of raw jute and raw cotton fell from over 85 percent before 1955 to slightly over half during the Second Plan period, while new manufacturing exports and a few new primary exports rose substantially. Overall export earnings have been rising steadily since 1957/58, due in large measure to the adoption of the "Export Bonus Scheme," which provided a more realistic exchange rate for exporters of non-traditional products.

Domestic production in most manufacturing industries rose more rapidly than imports over the period after 1950, and import substitution (in the sense of providing a larger percentage of total supply from domestic production) was a major source of growth in most industries. By the mid-1960's, however, most of the scope for this sort of import substitution was exhausted in consumer goods, and the largest potential remained in the intermediate and the producer goods industries. This pattern was in part due to the structure of incentives provided by import licensing and tariff decisions, but was also related to the fact that more consumer goods industries had domestic raw-material bases then did many intermediate and producer goods industries.

The incentives given to domestic production of manufactured goods were of several varieties, and are only described briefly here.[1/] The Rupee was substantially overvalued for the entire Post-Partition period, at the official exchange rate. A comprehensive set of administrative import controls was adopted in 1953 to prevent reserves from becoming exhausted and to govern the composition of imports. Tariffs were fairly high by international standards, but the scarcity of foreign exchange and of import competing goods forced the domestic market prices of imports well above the price expected from c.i.f. prices and duties. In 1954/55 an average tariff was around 62 percent for manufactures, but the domestic wholesale prices probably exceeded c.i.f. prices at the official exchange rate by almost 200 percent.[2/] In addition to this high rate of nominal protection due to scarcity of imports, established industrialists began in 1955 to receive licenses to import materials directly, so that they only had to pay tariffs, not full scarcity prices for imported components, spare parts, or semi-processed goods. Finally, because most agricultural goods either were exported or competed with exports, the overvaluation of the currency

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1/ See Radhu /27/, Thomas /32/, and Lewis /15/ for a more complete discussion.

2/ The average is unweighted within 27 manufacturing industries but weighted by purchases in the agricultural sector among the 27. The same weights are applied to the implicit total scarcity markup. Estimat are made in Lewis /15/.

(combined with export taxes on raw jute and cotton) kept domestic prices of agricultural raw materials and wage goods well below their opportunity cost to the economy. Under the circumstances, virtually anyone who entered manufacturing made a profit at it. As mentioned above, about the time that domestic manufacturing started to fully supply the protected domestic market in some industries, the Export Bonus Scheme introduced a substantial but partial devaluation (raising the price of foreign exchange as much as 60 percent) for new exports, primarily manufactures. As a result, costs did not have to fall to the unrealistically low level implied by the official exchange rate in order for exports to become competitive abroad. In some cases the subsidy to exports was larger than the tariff protection to imports of the same industrial origin.

Over the decade 1954/55 to 1964/65 a number of important factors affecting the value of foreign exchange were modified. Costs fell in domestic industries, substantially more foreign exchange became available from expanded export earnings and foreign loans, the Rupee was officially devalued in 1955, and was partially devalued in 1959 through the Export Bonus Scheme, and tariff rates were progressively raised to attempt to make the costs of imports to importers reflect the opportunity cost of foreign exchange to the economy. The introduction of the Bonus Scheme and the use of tariffs were devices to devalue the

currency without officially doing so. The official exchange rate had more meaning in representing the value of foreign exchange in 1964/65 than it did from 1953 to 1955, but it was still not a very good indicator. It is against a background of heavy non-tariff protection, a multiple exchange rate system, and the overwhelming importance of quantitative restrictions, not tariffs, in setting domestic prices, that the results of any analysis of the protective structure must be understood.

IV MEASURING THE LEVEL OF PROTECTION IN PAKISTAN

There are two distinct parts of the empirical study of protection in Pakistan. In the first we have only considered tariff and indirect tax systems, while in the second we have made allowance for the fact that (i) some tariffs are redundant and therefore overstate price differentials and welfare losses, and (ii) in many industries quantitative restrictions are the dominant factor in setting the difference between domestic and international prices, and tariffs understate the level of protection afforded in such cases. In both cases we have made comparisons between the nominal and the effective rate of protection, and in both cases we have made an adjustment for the fact that the currency was overvalued and that a substantial portion of tariff rates were really just a compensation for the fact that the official exchange rate had not changed. In addition, we discuss

some characteristics of the sensitivity of the measured rate of implicit or effective protection to errors in the input-output table, and to the importance of non-traded inputs.

1. The Levels of Protection due to Tariffs and Taxes

It was possible to make estimates of protection by the tariff and tax structure for forty-six manufacturing industries varying from the two-digit to the four-digit level of industrial classification. The principal determinant of the level of disaggregation was the structure of the 1963/64 input output table /21/, which is the most detailed and most widely used table for Pakistan. Estimates of nominal tariff (t_i), nominal protection ($t_i - t_{di}$) and implicit protection were given in Lewis and Radhu /18/,[1/] and are summarized first.[2/] The additional

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1/ The first study of implicit protection, by Soligo and Stern /28/, /29/ also treated the same forty-six industries, with slightly different methods of calculation and averaging. Comparisons of the Lewis/Radhu results and the results of this paper with those of Soligo and Stern are shown in an Appendix.

2/ As explained in Lewis and Radhu, /18/ the original Soligo/Stern calculations /28/ deflated output at factor cost by tariffs, which is incorrect. Either output at market price should be deflated by the tariff (including sales taxes or imports) or output at factor cost should be deflated by tariffs less indirect taxes on domestic output. In a subsequent note /29/ Soligo and Stern reported calculations based on deflating outputs at market price by tariffs.

calculations reported here represent (i) alternative methods of dealing with non-traded inputs (principally the inputs from "all other Services" in the Pakistan table) and (ii) adjusting the levels of implicit protection for the overvaluation of the domestic currency. The details of our methods for calculating these new measures of effective protection are contained in the Appendix. The various rates of protection are given in Table 1. Simple averages of rates within each group of industries have been used.

The level of nominal protection ($t_i - t_{di}$) represents the difference between the rate of tariff plus the rate of sales tax on imports (here called the nominal tariff) (t_i), and the percentage rate of tax on domestic output (t_{di}) which includes excise and sales taxes.[1/]

The effect of domestic indirect taxes (t_{di}) is to offset the level of protection and to lower the entire scale of protective rates. Nominal protection exceeds 100 percent for nine industries even after accounting for domestic indirect taxes. Despite the drawbacks of simple averages of tariff rates, they are broadly indicative here. Nominal tariffs are generally higher on consumer goods industries, as are domestic indirect taxes. Nominal protection is also higher on consumer

[1/] One cannot just drop sales taxes from the calculation, since (i) some goods are only subject to sales taxes if they are imported and (ii) some goods are subject to a higher rate of sales tax when imported than when produced domestically. Excises are levied only on domestic production.

TABLE I. RATES OF NOMINAL AND EFFECTIVE PROTECTION TO MANUFACTURING INDUSTRIES, 1963/64

Consumption Goods		Nominal Tariff (t_i)	Nominal Protection ($t_i - t_{di}$)	Effective Protection
1.	Canning	112	105	265
2.	Bakery Products	107	92	89
3.	Sugar	62	55	109
4.	Edible Oils	47	45	100
5.	Tea	14	-2	-60
6.	Salt	100	38	40
7.	Beverages	107	81	90
8.	Cigarettes	275	207	106
9.	Cotton Textiles	159	127	147
10.	Wool Textiles	164	139	144
11.	Silk + Art Silk Tex.	200	174	121
12.	Knitting	170	155	94
13.	Footwear	91	76	76
14.	Wearing Apparel	230	223	161
15.	Wood Products (non-metallic furn.)	96	81	269
16.	Printing + Publishing	0	0	-13
17.	Leather Products	100	92	80
18.	Soaps, etc.	73	35	1
19.	Matches	95	33	38
20.	Optical Good	49	34	67
21.	Plastic Goods	107	94	81
22.	Sports Goods	72	72	67
23.	Pens + Pencils	61	46	39
24.	Metal Furniture	130	115	268
25.	Electric Appliances	104	82	75
26.	Motor Vehicles	93	78	292
27.	Cycles	92	92	182
	Simple Average	107	88	108
Intermediate Goods				
28.	Jute textiles	70	51	92
29.	Dyeing + Finishing	130	115	90
30.	Thread + Thread Ball	92	84	62
31.	Saw Milling	61	61	157

(continued)

32.	Tanning	61	61	160
33.	Rubber Products	41	25	39
34.	Fertilizer	0	0	28
35.	Paints + Varnishes	49	23	27
36.	Chemicals	33	24	-10
37.	Petroleum Products	57	-23	-55
38.	Paper Products	77	62	83
	Simple Average	61	44	61
	Investment + Related Goods			
39.	Non-Metallic Min. Prods.	69	49	46
40.	Cement	69	38	33
41.	Basic Metals	17	9	3
42.	Metal Products	66	59	247
43.	Non-Electrical Mach.	12.5	12.5	14
44.	Sewing Machines	85	85	120
45.	Electric Mach. + Equip.	22	22	20
46.	Other Transport Equip.	20	20	26
	Simple Average	45	37	64
	Average of All Industries	86	68	89
	Median Level	73	61	80

Source: Lewis and Radhu /18/, based on original data on indirect tax structure in Radhu /27/.

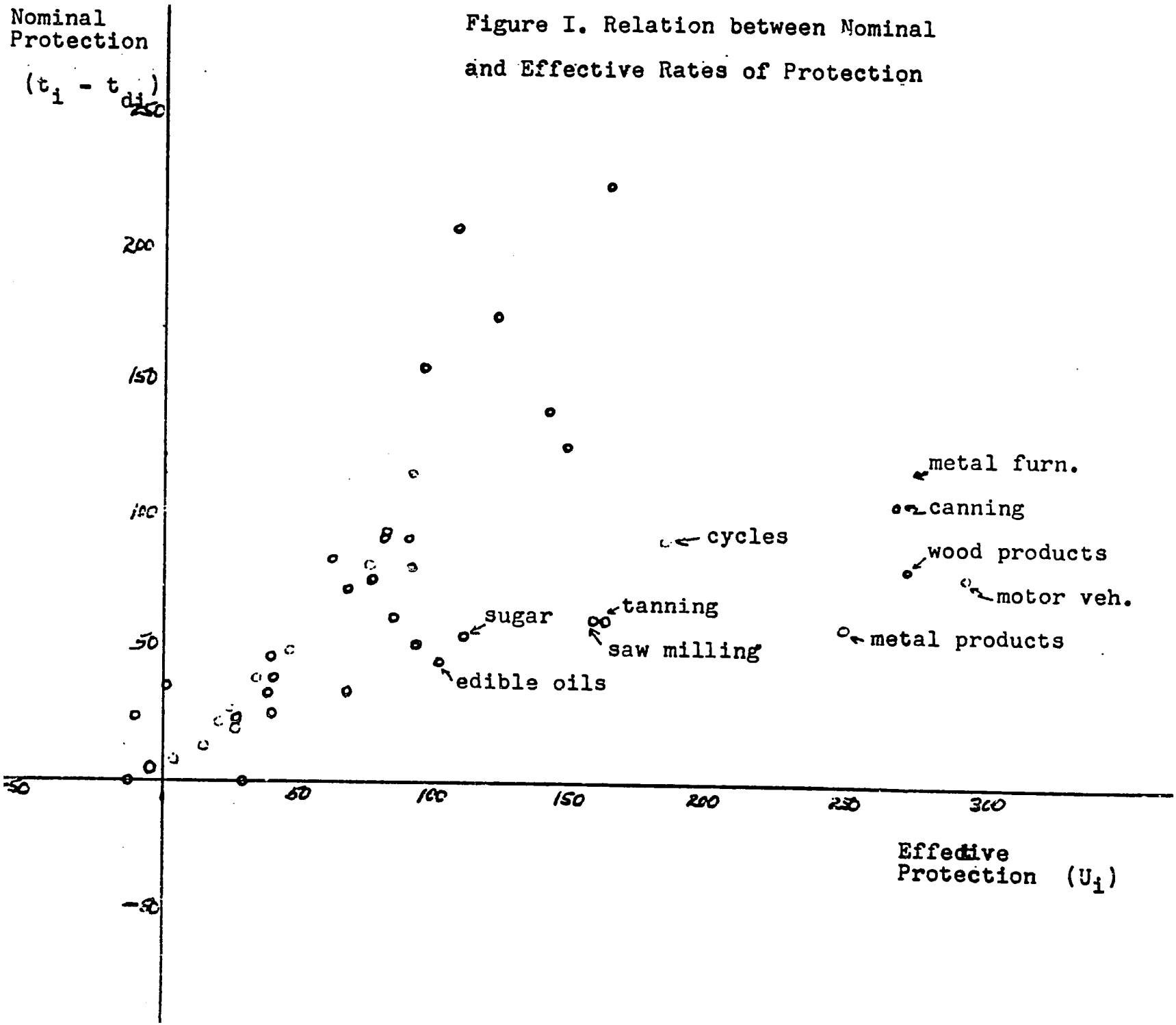
Note: Items 24-27 were included in investment and related goods by Soligo and Stern /28/, but we have treated such consumer durables as consumer goods.

goods than on other types of industries, with both the average and the median protection to consumer industries around eighty-five percent. The average and median nominal protection for intermediate and investment and related goods industries combined is around forty percent.

The theory of effective protection suggests that some industries with low nominal protection may have much higher levels of effective protection, due to either a low proportion of value added, or severe cascading of tariffs on traded inputs (i.e., much lower tariffs on inputs than on output), or a large share of non-traded goods in output (which accentuates the effective protection given the nominal level of protection). The dispersion of the effective rates relative to the nominal rates in Pakistan is shown in Figure 1. A few industries have much higher effective than nominal rates of protection, and the scatter of rates is much wider for effective than for nominal protection. Sugar, edible oils, wood products, saw milling and tanning are industries with low value added proportions that led to much higher effective than nominal rates. High proportions of non-traded (or non-deflated) goods were an important factor in greatly raising the level of effective protection in canning, metal furniture and metal products, and contributed to high rates in some other industries. Cascading of tariffs on traded inputs is discussed below.

The average levels of effective protection are considerably higher than the levels of nominal protection, though this is in part due

Figure I. Relation between Nominal and Effective Rates of Protection



to the extreme values above 100 percent for the former. The median level of effective protection among the 46 industries is slightly lower than the average level but it is definitely higher than the median level of nominal protection. The median and average levels of effective protection for each of the sub-groups of industries are also above the rates of nominal protection. There are some industries in which the effective rate of protection is lower than the nominal rates however.

The rankings of the industries by degree of protection do not change significantly when effective rates rather than nominal protection is used. In general, the industries that are highly protected under the nominal measure are also highly protected where effective protection is used. The rank correlation coefficient between nominal protection and the Lewis/Radhu measure of effective rates is .78.

Tariff Cascading

One theme of the extant literature on implicit protection emphasizes the general cascading of tariff structures, where the tariffs on inputs are less than the tariff on output of the same industry, or where tariffs are higher on more highly processed goods. No tariff on cotton,

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1/ It should be remembered, however, that nominal rates of protection express the percent by which domestic price could exceed foreign price and still be competition, while the measure of effective dates used here expresses the percent of value added "due to" protection.

low tariffs on yarn, higher tariffs on cloth, and very high tariffs on clothing are typical examples of such cascading. Table II gives, for the forty-six industries, the average level of nominal protection ($t_i - t_{di}$) and the average nominal tariff ($\bar{t}_i$) on the inputs into that industry.[1/] In twenty-one of the forty-six industries the average nominal tariff on inputs is greater than the nominal protection to output of the industry. In ten of those 21 industries (edible oils, tea, salt, soaps, matches, rubber products, paints and varnishes, petroleum products, cement, and some of the electrical equipment industry) there are substantial excise taxes on local production that have tended to offset the protective effects of the tariff system. In Pakistan, then, there is no cascading of the tariff structure in almost half of the industries covered, but rather there is the reverse.

In many industries, however, cascading of tariffs and taxes is very important. Wide divergencies between nominal protection and the tariff on inputs are found in canning, cotton textiles (accentuated by the export taxes on raw cotton), wool textiles, silk and art silk textiles, plastic goods, jute textiles (export taxes on raw jute aid in this) tanning, metal furniture, sewing machines, electrical appliances,

[1/] Note that $t_i - t_{di}$ is an unweighted average; $\bar{t}_i$ is unweighted within each i, but weighted by input shares among interindustry deliveries to each industry i. $t_i - t_{di}$ and $\bar{t}_i$, therefore, are not absolutely comparable in concept. t_i and $\bar{t}_i$ include sales taxes on imports as well as tariffs.

TABLE 2- COMPARISON OF NOMINAL

PROTECTION TO IA N INDUSTRY WITH THE NOMINAL TARIFF ON ITS

INPUTS, PAKISTAN, 1963/64

Consumption Goods	$t_i - t_{di}$	$\bar{t}_i$	
1. Canning	105	53	+
2. Bakery Products	92	103	-
3. Sugar	55	31	+
4. Edible Oils	45	62	-
5. Tea	-2	37	-
6. Salt	38	80	-
7. Non. Alc. Beverages	81	68	+
8. Cigarettes	207	193	+
9. Cotton Textiles	127	18	+
10. Wool Textiles	139	15	+
11. Silk + Art Silk Textiles	174	58	+
12. Knitting	155	136	+
13. Footwear	76	64	+
14. Wearing Apparel	223	146	+
15. Wood Products	81		
16. Printing + Publishing	0	69	-
17. Leather Products	92	100	-
18. Soaps, Cosmetics	35	57	-
19. Matches	33	47	-
20. Optical Goods	34	-12	+
21. Plastic Goods	94	40	+
22. Sports Goods	72	35	+
23. Pens and Pencils	46	50	-
24. Metal Furniture	115	20	+
25. Electrical Appliances	82	34	+
26. Motor Vehicles	78	52	+
27. Cycles	92	31	+

Intermediate Goods	$t_i - t_{di}$	$\bar{t}_i$	
28. Jute Textiles	51	11	+
29. Dyeing and Finishing	115	129	-
30. Thread + Thread Ball	84	132	-
31. Saw Milling	61	32	+
32. Tanning	61	33	+
33. Rubber Products	25	35	-
34. Fertilizer	0	47	-
35. Paints + Varnishes	23	33	-
36. Chemicals	24	49	-
37. Petroleum Products	-23	32	-
38. Paper Products	62	50	+
Investment and Related Goods			
39. Non-Metallic Min. Prod.	49	42	+
40. Cement	38	58	-
41. Basic Metals	9	21	-
42. Metal Products	59	22	+
43. Non-Electric. Mach.	12.5	19	-
44. Sewing Machines	85	20	+
45. Electric Mach. + Equip.	22	31	-
46. Other Transport Equip.	20	47	-

and cycles. The cascading appears in many cases where effective protection by the tariff and tax system was greater than 100 percent, implying that value added at world prices could be negative.[1/]

Cascading of tariffs was more important in (i) consumer goods industries not subject to excise taxes, including consumer durables industries such as metal furniture, sewing machines, and cycles, and (ii) industries processing raw materials that are also exported (cotton, woolen, and jute textiles, and leather tanning). There was generally less cascading (i) where the industry was subject to excise taxation and (ii) where it produced an intermediate or investment related good . Within the category of investment and related goods, cascading of tariffs only seems important in those industries in which a part of the output of the industry was consumer durables and was, therefore, subjected to higher tariffs and consequently higher rates of protection than non-consumer goods.[2/]

1/ The measure used is that given in Table III, Column 2, which took account of the overstatement of inputs from all other services. The industries are cotton and woolen textiles, tanning, metal furniture, sewing machines, and cycles.

2/ Use of "therefore" in this sentence does not imply that such goods ought to have higher tariffs, but it is rather a statement about the manner in which the Government of Pakistan (and many other governments) went about determining tariff levels.

2. The Special Problem of Non-Traded Inputs

A major problem area in measuring and interpreting affective protection is the treatment of non-traded and unallocated inputs. There is a more formal discussion in the Appendix on Method, but some general considerations should be mentioned here. First of all, presence of non-traded inputs increases the level of protection to value added, since while other intermediate flows are deflated to arrive at their value at world price, non-traded inputs generally are not deflated. This practice is equivalent to having inputs with no tariff, which "cascades" the tariff rates. Second, non-traded inputs, together with value added, are measures of an economy's direct domestic contribution to val ue of the product produced, and these two magnitudes play a crucial role in determining the sensitivity of an industry's level of protection to adjustment's for currency overvaluation.[1/] Third, it is not clear from a theoretical point of view that non-traded goods should be treated simply as inputs with no tariffs. Corden /8/ suggests they should be included with value added. Related to this is the fourth point, that of the appropriate kind of deflation procedure for unspecified inputs.

[1/] Or, alternatively value added proportions and the share of non-traded inputs are important in determining changes in relative profitabilities should a country's currency be devalued.

If we separate out S_i as the inputs of non-traded goods or services into industry i, we could re-write the expression for value added at domestic prices as:

$$W_i = X_i - S_i - \sum_i X_{ii} \tag{6}$$

Likewise, value added at world prices could be written:

$$\hat{W}_i = \frac{X_i}{1 + t_i} - S_i - \Sigma X_{ii} \frac{1}{1 + t_i} \tag{7}$$

It can be seen easily, however, that the greater the share of non-traded goods, the smaller will be "value added at world prices," since non-traded goods are, by definition, not deflated. Since we really have no firm basis for predicting what will happen to the prices of non-traded goods under a system of protection (until further assumptions are specified) we cannot say whether we should make no further adjustment for non-traded goods prices.[1/] One can also see the logic of Corden's position that non-traded inputs (S_i) should be included in value added (W_i) and the implicit rate of protection to the two combined should be calculated: higher returns permitted by tariffs on output would be shared by primary factors and by producers of those inputs not subject to international price competition, i.e. non-traded goods.

[1/] We could make a downward adjustment in the price of non-traded items such as transportation, or electricity, to account for the removal of tariffs (adjustment to world prices) of the traded inputs into such industries.

In Pakistan the problems of non-traded goods appear in magnified form for two reasons. The input-output table is made up at market prices, including both trade and transport mark-ups and direct taxes. The latter can be easily accounted for, but the former are lumped into the deliveries to the producing sector from "all other services." Since one wishes to compare the value of domestic output with c.i.f. or f.o.b. values of comparable products, the domestic trade and transport margins should be removed from the inputs and from the value of output. In addition, we suspect that the Pakistan table uses the "all other services" inputs as the residual item for unallocatable inputs.[1/] This deficiency must be accounted for in order to get a more accurate idea of both the level and the rankings of the rates of effective protection in manufacturing industry.

Four different methods were tried to adjust for the unusual nature of the "all other services" inputs, three of which are treated in the Appendix. In the method reported in Table 3, we deducted two-thirds of the value of the input from all other services from both the input row and from the value of output of the industry, and recomputed the effective protection with the "new" industry structure.

1/ The Census of Manufacturing Industries has numerous defects, which undoubtedly affect the accuracy of the input-output table. Some discussion of the problems is contained in Papanek /24/, Lewis and Soligo /17/, and Stern / /.

The two-thirds proportion was adopted on the basis of the importance of wholesale and retail trade and transportation in the entire service sector in Pakistan's National Accounts /20/. The other three alternatives simply tried other methods of testing the sensitivity of measured levels of protection to other treatment of unallocated and non-traded inputs. The adjustment seems warrented because in the Japanese input-output structure for 1954 as given in Chenery, Shishido, and Watanabe /7/, the value of inputs from non-traded goods varied from five to fifteen percent of gross output, while in Pakistan it often went over thirty-five percent.

When the value of "all other services" inputs is reduced by two-thirds, the average level of protection drops from 89 percent to 58 percent, while the median level falls from 80 percent to 58 percent. The average level of protection on each subgroup of industries also falls substantially. The drop is particularly large in those industries with particularly large deliveries from "all other services" in the original table, which made the effective rates of protection considerably higher than the nominal rates. Notable drops occur in edible oils, dying and finishing, thread and threadball making, saw milling, tanning, paper products, metal furniture, metal products, and sewing machines. The extremely high values of protection under the original methods are reduced when the peculiar nature of "all other

TABLE 3. SENSITIVITY OF EFFECTIVE RATES OF PROTECTION TO A CHANGE IN INPUT-OUTPUT STRUCTURE

Consumption Goods		Effective Protection Rates (1) Input-Output Relations Unadjusted	(2) Service Inputs Adjusted for Overestimation
1.	Canning	265	179
2.	Bakery Products	89	59
3.	Sugar	109	80
4.	Edible Oils	100	18
5.	Tea	-60	-59
6.	Salt	40	31
7.	Beverages	90	63
8.	Cigarettes	106	81
9.	Cotton Textiles	147	122
10.	Wool Textiles	144	123
11.	Silk + Art Silk Tex.	121	99
12.	Knitting	94	75
13.	Footwear	76	58
14.	Wearing Apparel	161	116
15.	Wood Products (Non-Metallic Furn)	269	170
16.	Printing + Publishing	-13	-22
17.	Leather Products	80	58
18.	Soaps, etc.	1	1
19.	Matches	38	27
20.	Optical Goods	67	62
21.	Plastic Goods	81	71
22.	Sports Goods	67	58
23.	Pens + Pencils	39	34
24.	Metal Furniture	268	139
25.	Electrical Appliances	75	66
26.	Motor Vehicles	292	155
27.	Cycles	182	106
	Simple Average	108	73

(continued)

Intermediate Goods			
28.	Jute Textiles	92	76
29.	Dyeing + Finishing	90	49
30.	Thread + Thread Ball	62	30
31.	Saw Milling	157	81
32.	Tanning	160	105
33.	Rubber Products	39	22
34.	Fertilizer	28	12
35.	Paints + Varnishes	27	17
36.	Chemicals	-10	11
37.	Petroleum Products	-55	-49
38.	Paper Products	83	58
	Simple Average	61	37
Investment + Related Goods			
39.	Non-Metallic Min. Prods.	46	39
40.	Cement	33	27
41.	Basic Metals	3	-1
42.	Metal Products	247	76
43.	Non-Electrical Mach.	14	9
44.	Sewing Machines	120	93
45.	Electric Mach. + Equip.	20	15
46.	Other Transport Equip.	26	8
Simple Average		64	33
	Average of all industries	89	58
	Median Level	80	58

Source: Column (1) from Table 1, Column 2 calculated by subtracting 2/3 of the value of "all other service" inputs into each industry from both the value of the delivery from all other services and the value of output of the industry.

services" accounted for. There are no rates in excess of 200 in the adjusted measure, while formerly there were five, and the number of industries with rates in excess of 100 drops from sixteen to nine. While there are some changes in relative levels of protection, the rank correlation between the two measures is still .88. Similar results come from the other methods of adjusting the inputs from "all other services," though other methods generally result in even lower levels of effective protection. Since (i) non-traded inputs in Pakistan were unusually large in comparison to other countries, and (ii) even in the absence of such corroborative evidence there was good reason to believe the interindustry deliveries of non-traded goods were overestimated, we have used the adjusted industry structure as the basis for our further estimates of the effective rate of protection. In addition, we consider the rates of effective tariff and tax protection shown in column 2 of Table 3 to be the most appropriate measure of the effective protection that would have been provided if the tax and tariff structure alone had determined relative prices, and if the currency were not overvalued at the official exchange rate.

3. Adjustments for Currency Overvaluation

Measures of protection are usually designed to show how domestic prices of goods, or payments to domestic factors of production,

differ from those that would have prevailed under some alternative set of circumstances regarding trade restrictions. In a country that has been m aintaining an overvalued currency for some non-economic reason, tariffs are often employed to make prices of imports reflect the scarcity value of foreign exchange to the economy. They are a partial substitute for a devaluation. In Pakistan, the official exchange rate was eroded as an effective price of foreign exchange both by tariffs and sales taxes, on the import side, and by the Export Bonus Scheme, on the export side. We should try to correct measured levels of protection, therefore, since a failure to do so greatly overstates the level of protection the industry is receiving relative to what it might receive under "free trade" or some approximation thereof.[1/] Certainly if tariffs and quotas were removed or even lowered, the official rate of exchange could not be maintained. A truly appropriate price of foreign exchange in Pakistan connor be accurately arrived at, but

1/ Note that we are not trying to correct the level of protection for the fact that the very presence of tariffs would change the equilibrium price of foreign exchange, as was Corden /8/ in his own adjustment for overvaluation. Ours is a more naive approach, but is related to his.

recent empirical studies suggest that the price would have to be raised by at least 50 percent in order to come close to an appropriate exchange rate, if one simultaneously lowered tariffs by a considerable amount.[1/]

Methods of estimating implicit or effective protection are terribly partial in nature, and this applies a fortiori to our adjustment for overvaluation. We have essentially asked the question: At the more appropriate exchange rate, what rate of tariff or subsidy would be required to keep domestic prices as they are now? The question is not designed to show the direction in which comparative advantage would move if the exchange rate were changed. It merely gives a standard comparison other than the official exchange rate for measuring the degree of protection afforded to various industries. A good with a 50 percent level of nominal protection at the present official rate really has zero nominal protection at the more appropriate exchange rate; a good with a nominal rate of 70 percent at the official rate has a nominal rate of 13 percent at the appropriate

1/ Suggestive, if not fully conclusive, evidence on the value of foreign exchange can be found in Pal /22/,/23/ and Lewis /15/. The Export Bonus Scheme gives a price of foreign exchange thirty percent above the official price for cotton and jute textiles and forty-five percent above for virtually all other "non-traditional" exports. The domestic price of imports was on the average, about twice their landed cost in 1963/64. Allowing for some supply response if the exchange rate were changed, fifty percent is probably a reasonable estimate for the extent of underdevaluation of foreign exchange.

exchange rate, etc.[1/]

The derivation of a formula to correct the effective rate of protection for currency overvaluation is given in the Appendix. The basic idea is that we can adjust each tariff deflator ($\frac{1}{1+t_i}$) or ($\frac{1}{1+t_i}$) by (1 + q), where q is the percent by which foreign exchange is raised. Value added "at world prices" then becomes:

$$\bar{W}_i = \frac{X_i}{1+t_i} (1+q) - S_i - (1+q) \Sigma X_{ji} \frac{1}{1+t_j} \qquad (8)$$

Just as the inputs of non-traded goods were not deflated by tariffs, so they do not get re-inflated by the currency adjustment. The effective rate of protection at the more appropriate price of foreign exchange (U^*) is related to the effective rate of protection calculated at the official exchange rate by the expression:

$$U^* = (1+q)\ U - q\ (1 + \frac{S}{\bar{W}}) \qquad (9)$$

Thus, the sensitivity of the measure of effective protection to a change in the price of foreign exchange is related to the importance of non-traded inputs, such that the more important the deliveries of non-traded goods the greater will be the amount by which U exceeds U^*.

1/ The correction factor also suggests, or implies, that the domestic price that prevailed, or the degree of relative protection, was a conscious and rational choice by the government, which is probably a misrepresentation of reality .

The levels of effective tariff and tax protection were recomputed for a price of foreign exchange fifty percent higher than the official exchange rate, and the results are shown in Table IV.[1/] The most interesting features of the measure at a different exchange rate are (i) a substantial increase in the number of industries with negative protection (up from four to seventeen) (ii) a substantial fall in the average level (from 58 to 25 percent) and the median level (from 58 to 24) of effective protection; (iii) an increase in the extremely high rates of effective protection;[2/] and (iv) some change in rankings after the adjustment for overvaluation.[3/]

1/ We also adjusted the Soligo-Stern measure of effective protection for a 50 percent increase in the price of foreign exchange under the assumption that relative prices did not change domestically. The results are shown in the Appendix, but are very similar to those reported here.

2/ Due to the nature of the overvaluation adjustment, industries that have very high levels of protection at the existing exchange rate get higher rates of protection at a higher price of foreign exchange.

3/ Rank correlation between the adjusted and unadjusted values of .87. Corden /8/ suggests that a fifty percent rise in the price of foreign exchange should be accounted for by subtracting 50 percentage points from each industry's rate of effective protection. This is primarily because he treats non-traded goods differently. Our decreases in effective rates are greater than the percentage increase in the price of foreign exchange, and our industries do have some change in rankings, which would not happen with Corden's measure.

TABLE 4. RATES OF EFFECTIVE PROTECTION UNDER DIFFERENT ASSUMPTIONS ABOUT THE PRICE OF FOREIGN EXCHANGE

Consumption Goods	Rate of Effective Protection When $1.00 = Rs. 4.76	When $1.00 = Rs. 7.14
1. Canning	179	175
2. Bakery Products	59	20
3. Sugar	80	50
4. Edible Oils	18	-48
5. Tea	-59	-76
6. Salt	31	-11
7. Beverages	63	29
8. Cigarettes	81	63
9. Cotton Textiles	122	118
10. Wool Textiles	123	124
11. Silk + Art Silk Tex.	99	89
12. Knitting	75	54
13. Footwear	58	26
14. Wearing Apparel	116	107
15. Wood Products (Non-Metallic Furn)	170	149
16. Printing + Publishing	-22	-51
17. Leather Products	58	24
18. Soaps, etc.	1	2
19. Matches	27	-17
20. Optical Goods	62	36
21. Plastic Goods	71	50
22. Sports Goods	58	32
23. Pens + Pencils	34	-4
24. Metal Furniture	139	99
25. Electrical Appliances	66	43
26. Motor Vehicles	155	103
27. Cycles	106	69
Simple Average	73	46
Intermediate Goods		
28. Jute Textiles	76	48
29. Dyeing + Finishing	49	4
30. Thread + Thread Ball	30	-19

(Continued)

31.	Saw Milling	81	26
32.	Tanning	105	70
33.	Rubber Products	22	-29
34.	Fertilizer	12	-42
35.	Paints + Varnishes	17	-28
36.	Chemicals	11	-35
37.	Petroleum Products	-49	-68
38.	Paper Products	58	20
	Simple Average	37	-5
	Investment + Related Goods		
39.	Non-Metallic Min. Prods.	3[illegible]	3
40.	Cement	2[illegible]	-15
41.	Basic Metals	-[illegible]	-39
42.	Metal Products	7[illegible]	38
43.	Non-Electrical Mach.	[illegible]	-[illegible]
44.	Sewing Machines	9[illegible]	76
45.	Electric Mach. + Equip	1[illegible]	-26
46.	Other Transport Equip.	[illegible]	-40
	Simple Average	33	-4
	Average of all industries	58	25
	Median Level	58	24

Source: Column (1) from Table 3; Column (2) computed according to method shown in expression (9) in the text.

We find that after allowance is made for currency overvaluation, the average industry in Pakistan could have had one quarter of its value added attributable to tariff protection, rather than 85 percent as implied by the original study by Soligo and Stern. Of some additional interest is that those industries that produce principal intermediate and capital goods[1/] had negative effective rates of tariff and tax protection after adjustment for currency overvaluation, which supports the argument /25/, /28/, /27/, /14/ that such industries were being discriminated against by the tariff system.

4. Summary of Measured Levels of Tariff and Tax Protection

The levels of tariff protection, both nominal and effective, are quite high by standards of international comparison. Even in a notable "high tariff" economy like Argentina, Balassa /2/ found little evidence of effective rates as high as the unadjusted rates in Pakistan. The range of effective protection to various industries is also exceedingly wide. The measure of protective levels adjusted for currency overvaluation found seventeen of forty-six industries with negative rates of

1/ Rubber products, fertilizer, paints and varnishes, chemicals, base metals, non-electrical machinery, electrical machinery and equipment, and other transport equipment.

effective protection and six industries with protection so high it implied value added was negative "at world prices". Thus, even though the nominal rates and some of the effective rates overstate the amount of protection they are giving, since they are really in part a substitute for devaluation, the rates of protection are exceedingly high. Likewise, even though unadjusted measures of protection by Soligo and Stern /28/ or Lewis and Radhu /18/ overstate the levels for many industries due to the nature of the input-output table, the fact remains that even when the measures are adjusted for both statistical defects of the table and for currency overvaluation many industries received extraordinary amounts of protection from the tariff and tax system.

Apart from the overall average or median levels of protection afforded by the tariff and tax systems, several other interesting features of effective rate of protection appear. First, while there are some changes in ranking of industries when effective instead of nominal rates are used, by and large those that are highly protected by nominal tariffs are highly protected by effective tariffs, and those that are low on one are also low on the other. Second, and related to the former, a consequence of moving from nominal to effective rates of protection is to widen the spread of protective rates considerably, Primarily by raising the rates applying to highly protected industries

but also by lowering the rates on industries with very low nominal protection that use output of protected industries. Third, the level of effective protection is quite sensitive to the proportion of non-traded inputs, which in the Pakistan input-output table played a particularly important role. Thus, the decision about the treatment of non-traded and unallocated inputs is very important in determining the general level of protection and especially the level for those industries that have a high proportion of non-traded and unallocated inputs. Fourth, an adjustment for the overvaluation of the currency is easy to make, and the importance of non-traded goods comes out in such an adjustment. Again, overall rankings do not change significantly though there are some shifts. On e effect of adjusting for currency overvaluation was to even further widen the dispersion of effective rates of protection among different industries.

Finally, it should be emphasized that we have dealt here with only the tariff and tax system, and that it is inappropriate to move from the levels of protection given here (which represent, in effect, the extent to which factor payments could have exceeded those possible under a hypothetical situation of "free trade") to any judgment about welfare losses of the system. At best, welfare implications should not be drawn until one investigates the extent to which actual differences between world and domestic prices are reflected by tariffs and tax rates.

V A MAJOR MODIFICATION: REDUNDANT TARIFFS AND QUANTITATIVE RESTRICTIONS

The entire analysis in Section IV was carried out on the assumption that tariffs and other indirect taxes are representative measures of the extent to which prices domestically diverge from "international" prices. This assumption is incorrect for two important reasons. First, in the presence of effective quantitative import restrictions, the determinant of differences between world and domestic prices will not be the tariff. Price differentials will be greater than those implied by tariffs. In addition, as emphasized by Pal /22/ and Lewis /15/ quantitative restrictions may offset tariffs in determining relative differentials between world and domestic prices, and have done so in fact in Pakistan. Second, in some important industries in Pakistan, tariffs and quantitative restrictions are no longer the effective determinants of price differentials, since supply of these goods has expanded to the extent where exports of the goods are profitable. Similar arguments may be made about the pricing of inputs, with one important exception. In Pakistan, a great many firms receive licenses to import raw materials directly; they pay only the price inclusive of duty and not the domestic scarcity prices for such goods

Therefore, only domestic flows of import-competing production should be deflated by the full price differential between world and domestic prices.[1/]

If we let m_i be the mark-up of domestic price of good i above duty-paid import price, the expression:

$$(1 + t_i)\ (1 + m_i) \tag{10}$$

represents the domestic wholesale price of i expressed as a percentage of world prices. A tariff that is redundant can then be expressed by allowing m_i to be negative. Value added "at world prices" can be expressed as $\bar{W}_i$, where

$$\bar{W}_i = \frac{X_i}{(1 + t_i)(1 + m_i)} - S_i - \sum_i \frac{X_{ii}}{(1 + t_i)(1 + m_i)} \tag{11}$$

and the effective rate of protection is simply calculated using $\bar{W}_i$ instead of W

The principal sources of price comparisons are from Pal /23/ and Lewis /15/, though we have added some items to the list. Unfortunately,

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1/ Naturally, the producers who do not receive import privileges are at a severe disadvantage relative to those who do, often paying sixty percent more than their more fortunate competitors for comparable inputs purchased from commercial importers. The input-output table, however, is made up with the aid of industry structure based on the more favored industries.

due to problems of defining the commodities properly and other information difficulties, it was not possible to cover all manufacturing activities.[1/] We were able to obtain sufficient information to make estimates of effective rates of protection for 32 manufacturing industries that produced over seventy percent of value added in large-scale manufacturing in 1963/64. The results of the analysis using direct price comparisons instead of tariffs are given in Table V, along with data on tariff protection for the same industries.

When actual price differentials instead of tariffs are used to measure protection, several changes occur in the level and structure of protection. First, the unweighted average level of effective protection rises considerably, relative to the level provided by tariffs (from 45 to 96). This average effective rate of protection rises even after allowance for the overvaluation of the domestic currency from 14 percent, for tariffs only, to 76 percent for all price distortions. The

1/ For example, while the domestic wholesale prices of various brands of cigarettes were readily available, we were unable to get any comparable international prices because (i) there were no imports or exports of cigarettes and (ii) quality differences made direct comparisons impossible without considerable detailed knowledge of the industry.

median levels of effective protection also rise [1/] when actual price differentials are used. Second, there is a very substantial change in the implied pattern of protection or subsidy. Some of the industries (e.g. cotton textiles, matches, footwear, leather tanning, and sewing machines) have expanded to the point where the industry structure is fairly competitive, and, in most cases, there are substantial exports from those industries. As a result, their tariffs are redundant, i.e. they do not utilize the extent of protection that is provided by the tariffs. The movement in the opposite direction is much more striking. Many industries, most notably sugar, and edible oils, among consumer goods, rubber products, fertilizer, and chemicals among intermediate goods, and virtually all of the metal working and machinery industries show substantial increases in the level of both nominal and effective protection when direct price comparisons are introduced. The extent of discrimination against the domestic production of the intermediate and capital goods industries mentioned in Section IV [2/] is markedly reduced when it is recognized that tariffs

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1/ From 34 to 78 percent when the exchange rate is unadjusted, and from 2 to 50 percent when overvaluation is accounted for.

2/ Rubber products, fertilizers, paints and varnishes, chemicals, cement, basic metals, non-electric machinery, and electrical machinery and equipment.

are not the principal determinant of protection to domestic industries. The relative position of those latter industries changes radically as one shifts from tariff protection to a more complete measure of protection. The rank correlation between nominal tariff and nominal price differentials for the thirty-two industries was only .35, while the rank correlation between effective protection under the two measures was only .36, when some allowance was made for overvaluation of the currency. Tariff structures are not a good basis from which to draw welfare or incentive implications.

Both the relative and absolute levels of protection to domestic manufacturing are greatly altered when we use direct price comparisons instead of tariff and tax rates. We should, therefore, specify something about the confidence we have in the price data, and the limitations that should be placed on interpreting the results. First, we believe the price data are sufficiently accurate to indicate the right orders of magnitude of the extent to which the domestic price structure differs from the structure of "international" prices. The prices are average prices of major commodities within industries, and as such they are not perfect representatives for all commodities within any one industry. (The same limitation applies to the use of tariff rates, of course.) Second, there are quality differentials between imported goods, whose prices were used for those industries where imports were the dominant

part of total supply, and domestically produced goods. Thus, the domestic substitute would sell at a discount relative to the import, and so the price differential we used would tend to overstate the differential for a good of similar quality.[1/] What the price comparison may give is a maximum rate of nominal protection, not the actual rate to a particular good. A third, and related, point is that we would not want to move from the analysis here to precise conclusions about specific industries. We know too little about any given industry, though we have re-examined the results carefully for some important industries.

We have sufficient confidence in the results to say that they do indicate several things. (i) A very wide range of distortions to investment incentives now exist in Pakistan, even if allowance is made for currency overvaluation. (ii) Quantitative controls on competing imports, and cost reductions in older industries make tariff rates inappropriate indicators of how incentives to domestic resource allocation are induced, or pushed, away from the pattern that would emerge in the absence of trade restrictions. (iii) Even after allowing for redundant tariffs and for

1/ Even here, however, there is some offset: Many goods (chemicals, iron and steel items, etc.) entered under tied-aid agreements, so that their c.i.f. prices were higher than the c.i.f. prices of non-aided imports. Since we used the mark-up of domestic above c.i.f. prices as our measure of the price differential, we tend to <u>understate</u> the nominal protection against low-cost international supplies.

TABLE V. LEVELS OF EFFECTIVE PROTECTION FROM ALL SOURCES COMPARED WITH LEVELS OF TARIFF PROTECTION ONLY 1963/64

		Nominal Tariff	% By Which Domestic Price Exceeds "World" Price	Effective Tariff Protection when $1.= Rs.4.76	Effective Tariff Protection When $1.= Rs.7.14	Effective Protection From all Sources when $1.= Rs.4.76	Effective Protection From all Sources when $1.= Rs.7.14
Consumption Goods							
1.	Sugar	62	327	80	50	235	283
2.	Edible Oils	47	106	18	-48	489	614
3.	Tea	14	39	-59	-76	-10	-53
4.	Cotton Textiles	159	56	122	118	88	67
5.	Silk + Art Silk Tex.	200	350	99	89	119	119
6.	Footwear	91	66	58	26	46	8
7.	Wearing Apparel	230	275	116	107	127	124
8.	Printing + Publishing	0	28	-22	-51	18	-27
9.	Soaps	73	94	1	2	64	46
10.	Matches	95	62	27	-17	10	-32
11.	Plastic Goods	107	236	71	42	87	74
12.	Sports Goods	72	60	58	32	48	17
13.	Pens + Pencils	61	155	34	-4	71	50
14.	Electrical Appliances	104	308	66	43	103	100
15.	Motor Vehicles	93	249	155	103	257	257
	SIMPLE AVERAGE	94	157	55	28	117	110
Intermediate Goods							
16.	Jute Textiles	70	46	76	48	105	91
17.	Thread + Thread Ball	92	73	30	-19	62	25
18.	Saw Milling	61	73	81	26	92	42
19.	Tanning	61	56	105	70	85	41
20.	Rubber Products	41	153	22	-29	122	110
21.	Fertilizer	0	15	12	-42	117	85
22.	Paints + Varnishes	49	102	17	-28	72	44
23.	Chemicals	33	81	11	-35	75	43
24.	Petroleum Products	57	107	-49	-68	-7	-45
25.	Paper Products	77	94	58	20	79	48
	SIMPLE AVERAGE	54	80	36	-5	80	49

(Continued)

TABLE V (continued)

Investment + Related Goods

26.	Non-Metallic Mineral Prod.	69	154	39	3	77	57
27.	Cement	69	75	27	-15	39	1
28.	Basic Metals	17	66	-1	-39	84	63
29.	Metal Products	66	95	76	38	113	83
30.	Non-Electric. Mach.	12.5	89	9	-32	78	55
31.	Sewing Machinery	85	60	93	76	58	23
32.	Elec. Mach. + Equip.	22	60	15	-26	47	13
	SIMPLE AVERAGE	47	86	37	1	71	42
	SIMPLE AVERAGE FOR ALL INDUSTRIES	72	118	5	14	96	75
	MEDIAN LEVEL	66	81	4	2	78	50

some currency overvaluation we found that the distortion of incentives, or the level of subsidy, to some of the older and larger industries was exceedingly high. For cotton textiles, two-thirds of the value added could be attributed to the subsidies inherent in the multiple exchange rate system for exports. For jute textiles the results were even more startling: value added "at world prices" was negative in the manufacturing industry with the largest volume of exports. Even if our price data were incorrect by a significant amount, one could not avoid the conclusion that the implicit multiple exchange rate system that favors domestic processing of jute is an inefficient operation as it now exists.[1/] Either domestic processors are reaping substantial rents or there are too many resources being devoted to this activity, or, more likely, some of each is true.

Two other questions relating to a welfare interpretation of our results should be mentioned. First, what happens to our average protection levels if we change from unweighted to weighted averages? Weighting by domestic value added, we find that the average rates are not substantially changed:

1/ The subsidized exchange rate for jute textiles is approximately Rs. 6.05, while the raw jute exchange rate was approximately Rs. 3.75. The latter is obtained by comparing f.o.b. Chittagong prices with wholesale prices in Narayengang, (adjusted for internal freight charges) of similar quality jute.

	Unweighted	Weighted
Consumption goods	117%	130%
Intermediate goods	85	78
Investment and Related goods	71	78
TOTAL	96	105

The percent of protection "due to" value added rises slightly for all industries together, and for those producing principally consumer and investment and related goods, but falls for intermediate goods industries. The same is true after allowance for foreign exchange undervaluation of 50 percent. The figures still suggest that something over three-fourths, if not all, of value added in domestic manufacturing in Pakistan was "due to" protection. Second, suppose we re-consider Corden's suggestion that producers of non-tradable goods and services also benefit from protection. Even if we include non-tradable goods in the protected part of output, we obtain high average rates of protection, though certainly not so high as before:

	Unweighted	Weighted
Consumption goods	73%	93%
Intermediate goods	53	51
Investment and related goods	52	60
TOTAL	62	75

Still three-fourths of both value added in the protected industries and deliveries from industries producing non-tradable inputs would be "due to" protection, or to price-distorting trade restrictions.

In summary, the use of actual differences between world and domestic prices, instead of tax and tariff rates, changed the rates of effective protection in these ways: (i) the average and median levels of protection rose substantially when actual price differentials were used, since fewer industries had redundant tariffs (though they were important in terms of value added) than had tariffs understate protection due to quantitative import restrictions; (ii) the rate of protection to many industries with low tariff protection (particularly some intermediate and capital goods industries) rose considerably, eliminating much of the discrimination against domestic production in such industries that is implied by the tariff structure alone; (iii) the rankings of industries by level of protection changed considerably when actual price differentials instead of tariffs were used. In terms of chosing a measure of protection that indicates the directions in which resources are pulled away from the "free trade" allocation, we have more confidence in the levels of protection as indicated by the price differential calculations than we have in the protection implicit in the tax and tariff system alone.

VI AT WHAT EXCHANGE RATE ARE INDUSTRIES COMPETITIVE?

An alternative way of looking at the sensitivity of protection rates to the price of foreign exchange would be to ask: given "world" prices of output and tradable inputs, and given the input structure of the industry from the input-output table, at what exchange rate would the industry be receiving zero protection? If we regroup the terms of expression (8) in the following way,

$$\hat{W}_i = (1 + q) \left(\frac{X_i}{1 + t_i} - \sum_i \frac{X_{ii}}{1 + t_i} \right) - S_i , \qquad (12)$$

we can see that wherever the deflated value of tradable inputs exceeds the deflated value of output, there is no exchange rate that would make value added positive at world prices. Using expression (9) above we can solve for q and find that , for the effective rate of protection to be zero, the price of foreign exchange would have to be raised by:

$$q = \frac{U_i}{1 + \frac{S_i}{W_i} - U_i} \qquad (13)$$

This approach relates more closely to some of the literature on investment criteria, cost of foreign exchange earned or saved, etc., though it does not require the wealth of information used by Bruno /4/,

which is probably the most thorough approach to the problem the input structure as observed is appropriate, and if we could assume the industry was in equilibrium in the sense of having moved out to the lowest cost point on its cost function, then calculating the exchange rate necessary to make U_i zero would give us a better way of looking at the distortions inherent in the trade-restricting system.[2/] In addition, at least a part of the literature on economic planning argues that one of the most important adjustments to be made in present prices as a guide to investment is that foreign exchange is likely to increase in value as the demand for importables grows more rapidly than earnings of foreign exchange /5/, /6/. For this reason, a higher price of foreign exchange should be used in planning future projects. If we calculate the exchange rate necessary to eliminate protection to each industry, we could ask the question: is it likely that the price of foreign exchange will be

1/ Bruno allows, for example, an eight percent rate of return on capital as a domestic cost, and disposes of profit payments above this as a rent, or a transfer payment. In our adjustment, rents are included in actual domestic value added, thus overstating domestic "cost", and, therefore, overstating the exchange rate at which domestic producers would be competitive.

2/ It is necessary to make some assumption about an industry having moved to a low-cost point of production in order to allow for infant industries that may not have "grown up" yet. Presumably one is willing to tolerate some short-run inefficiency on the assumption that costs will fall in the longrun.

raised to this height? If the answer is no, then protection of the domestic industry is likely to be uneconomic. In intuitive terms, it would mean that the domestic costs ($S_i + W_i$) of saving foreign exchange $\left(\frac{X_i}{1+t_i} - \sum_i \frac{X_{ii}}{1+t_i}\right)$ are too high to be justified at a reasonable value for foreign exchange.

We have calculated the price of foreign exchange that would be necessary to make the rate of protection to value added equal to zero, and these calculations are given in Table VI. The necessary price of foreign exchange is given both where the tariff and tax system, alone, and where the direct price comparisons were used to value inputs and output.

Using the direct price comparisons, only eleven of the thirty-two industries would have zero protection at a price of exchange <u>twice</u> the present level. An exceedingly high price of foreign exchange would be necessary to eliminate the protection to silk and artificial silk textiles and motor vehicles. The price of foreign exchange would have to more than triple before jute and cotton textiles become fully competitive. What is also disturbing, however, is that there is no price of foreign exchange at which sugar refining and edible oil processing would be un-protected.[1/] These latter results should not be dismissed

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[1/] This means that the value of tradable inputs exceeds the value of output at "world prices," or $\left(\frac{X_i}{(1+t_i)} - \sum_i \frac{X_{ii}}{(1+t_i)}\right) < o.$

TABLE VI. EXCHANGE RATES NECESSARY FOR THE RATE OF EFFECTIVE PROTECTION ON VALUE ADDED TO BE ZERO

		Exchange Rate Needed: If Tariffs Determine Relative Prices	Exchange Rate Needed: When Direct Price Comparisons are used
Consumption Goods			
1.	Sugar	11.04	*
2.	Edible Oils	5.14	*
3.	Tea	3.67	4.52
4.	Cotton Textiles	92.72	15.09
5.	Silk + Art Silk Tex.	27.75	1137.64
6.	Footwear	9.00	7.62
7.	Wearing Apparel	36.46	99.20
8.	Printing + Publishing	4.05	5.52
9.	Soaps	4.81	13.23
10.	Matches	6.09	5.19
11.	Plastic Goods	12.85	20.80
12.	Sports Goods	9.95	8.38
13.	Pens + Pencils	6.90	13.66
14.	Electrical Appliances	11.66	63.12
15.	Motor Vehicles	11.90	7692.16
Intermediate Goods			
16.	Jute Textiles	11.09	17.85
17.	Thread + Thread Ball	6.09	8.71
18.	Saw Milling	8.23	9.14
19.	Tanning	12.00	9.33
20.	Rubber Products	5.62	29.27
21.	Fertilizer	5.09	13.47
22.	Paints + Varnishes	5.47	10.90
23.	Chemicals	5.14	10.23
24.	Petroleum Products	3.52	4.52
25.	Paper Products	8.38	11.57
Investment + Related Goods			
26.	Non-Metallic Mineral Prod.	7.28	15.09
27.	Cement	6.19	7.19
28.	Basic Metals	4.71	14.38
29.	Metal Products	9.52	18.18
30.	Non-Electric Mach.	5.14	12.85
31.	Sewing Machinery	15.04	8.66
32.	Elec. Mach. + Equip.	5.47	8.04

Rates expressed as the Rupee price of $1.00.

* for sugar, edible oils, and jute textiles indicate that for the data at hand, the value of tradable inputs exceeded the value of output at world prices so that no exchange rate would equalize value added at world prices and value added domestically. See text for discussion.

out of hand, though there may be good reason to suspect them in their extreme form.

Even before making the calculations of effective protection, most observers would have singled out these six industries (cotton, jute, silk and artificial silk, sugar, edible oils, and motor vehicles) and added, perhaps, one or two more, as likely sources of inefficient resource allocation. Sugar, edible oils, silk and artificial silk textiles, and motor vehicles all have high income elasticity of demand, and demand for them has increased rapidly with rising income inequalities and rapid urbanization. Domestic producers benefited greatly from the banning, or near banning, of competing imports through most of Pakistan's history. These four all have relatively low value added proportions. Together with jute and cotton textiles these industries depend heavily on importable or exportable intermediate goods, whose prices were kept relatively low by (i) direct industrial import licensing to producers and (ii) export taxes on jute and cotton. Sugar cane and oil seed prices were relatively higher than cotton and jute prices domestically, but most of the benefits of protection were going to those industrialists who were fortunate enough to receive a sanction to import machinery and build a processing plant, not to agricultural producers. Talking with Pakistani economists and businessmen, one finds that first preferences for industrial investment licenses are still likely to be in textiles (cotton, jute, or

artificial silk) or in sugar, and the motor vehicle assembly business was well known to be a rich prize for those receiving an investment sanction. In sum, subjecting the data to systematic analysis told one what most economists and businessmen had been talking about for some time. On the other hand, however, the results point out the danger of taking the systematic calculation uncritically, even when direct price comparisons are used. For example, the two industries, (sugar and edible oils) that show unprofitability in the extreme, both use raw materials and produce an output subject to exceedingly wide fluctuations in price over time and, due to market imperfections, in different places at a given time. We have tried to use appropriate prices for comparison of both inputs and output, but we quite likely erred to some extent. It would be unwise, however, to draw the conclusions that these results are completely wrong, and that nothing could be said about the policy being pursued. In addition, it is not likely that these industries would disappear (though they would probably not expand!) if policies were changed and domestic prices were pulled back in line with world prices. Input coefficients are not rigid, and there would be changes in the input mix in some cases, and elimination of rents in other cases, so that changes in relative prices would change input and factor uses, and the industries would probably survive. While the absolute inefficiency shown here may not be correct, there is definitely inefficiency of an extreme economic (if not technical) variety in these industries, due to the substantial differentials maintained on input and output prices through trade policy.

VII SUMMARY AND CONCLUSION

This study has concentrated exclusively on manufacturing industries, since such industries have the most detailed coverage in existing input-output studies of Pakistan. A brief word should be said about agriculture before summarizing the results relating to manufacturing. Most observers had concurred for some time that Pakistan's agriculture was severely discriminated against by government policies of all sorts. One study that formed the basis for the present paper /15/ suggested some orders of magnitude for this price discrimination. The agricultural sector in 1963/64 paid approximately Rs. 8.08 when it purchased one dollar's worth of manufactured goods, while it received about Rs. 5.15 for its sales of one dollar's worth of agricultural products. This price differential is equivalent to paying 57 percent more, or receiving 36 percent less, when trading domestically, than agriculture could have paid or received if it could have traded in a free international market. The losses were much greater a decade earlier. With any reasonable set of input weights, the agricultural sector has been suffering "negative" protection, or discrimination against its output. This fact is the principal counterpoint to the exceedingly high levels of nominal and effective protection found in most manufacturing industries, even after an adjustment has been made for the overvaluation of the Rupee.

Since agricultural products are the principal wage goods to industrial labor, the low prices of agricultural goods relative to manufactures undoubtedly kept pressure off wages and added to the profitability of domestic manufacturing activity generally. If this factor were taken account of, the measured degree of "protection" afforded investors in most lines of manufacturing in Pakistan would be even larger than it already is.

The principal conclusions of this study deal with (i) the relation between nominal and effective rates of protection, (ii) the sensitivity of measures of protection to shares of non-traded goods, (iii) adjustments to measured protection for currency overvaluation, and most important of all, (iv) including the effects of import quotas, multiple exchange rates, and other non-tax aspects of protection, as well as the possibility of redundant tariffs.

(i) in general we found that nominal protection was a good guide to the relative degree of protection given to various industries. Due to non-traded goods, lower protection to inputs, and low value added ratios, however, nominal protection quite often understated the amount of protection given to a high-tariff industry. On the other hand, industries with very low nominal protection often had even lower effective protection due to high protection to inputs. Thus, the spread among effective rates of protection was much wider than with nominal rates.

(ii) The measured levels of effective protection are quite sensitive to the treatment of non-traded inputs, particularly in Pakistan, where such inputs were unusually large. Adjusting the levels of non-traded inputs, and the manner in which the remaining flows of such inputs were treated, caused a substantial fall in the measured level of tariff protection for almost every industry, and dropped the average level from almost 90 to 50 or less (depending on the nature of the adjustment).

(iii) It is relatively easy, even when there are non-traded inputs, to make some adjustment for the degree of overvaluation of the currency, at least to have some basis other than the official exchange rate for comparison. Adjustments for currency overvaluation changed the relative positions of some industries, but for the most part rankings were unchanged. Assuming a price of foreign exchange 50 percent higher than the official price reduced the share of value added "due to" tariff protection to twenty to twenty-five percent, though there were still a number of industries with much greater protection.

(iv) The most important adjustment made in this study was to take account of import quotas, redundant tariffs, multiple exchange rates, and other factors which kept tariffs from being the sole or even the principal determinant of the difference between domestic and world prices. Introducing direct price comparisons for inputs and for output

increased markedly the average levels of protection afforded by the tax, exchange rates, and control system taken together, though the levels of protection on some very important industries, such as cotton textiles, fell. After adjusting for price comparisons and allowing for overvaluation of the domestic currency, the weighted average of industries still had over two-thirds of value added "due to" protection of various sorts. Some industries were well above this, a number with levels of protection implying that value added in the industry was negative "at world prices" More important, perhaps, is that the ranking of industries changes when direct price comparisons are used, due largely to the substantial rise in the level of protection from quota restrictions on imports of "low tariff" industries, particularly intermediate and capital goods industries.

(v) Using a variant of the measure of effective protection, one can array industries by the price of foreign exchange at which the industry would be receiving zero protection. The results give a more systematic way of analysing the relative efficiencies of various industries with regard to their exchange-earning or exchange-saving capacity, as well as in terms of general resource use. One finds that the kind of judgment that would be made by an economist using only the implicit exchange rate for output and for principal inputs is borne out (and perhaps exaggerated) by the use of the effective protection notion.

One finally arrives at a more precise method of stating what had been suspected all along, and what had been shown with some empirical precision in the calculations of implicit exchange rates for commodities /15/: the trade restricting policies of the Government of Pakistan have led to a set of prices domestically that diverge widely from the prices that exist in international trade. As a consequence, resource allocation even in major industries such as textiles and food products, is badly out of line with what it should be. The fact that other countries have distortions is no real answer to this objection. Pakistan has moved in the past decade away from many trade distorting policies, but a great deal remains to be done in order to get domestic users of tradable goods to face prices that more fully reflect the opportunity cost of such goods to the economy in order to minimize the wastes of industrial investment decisions.

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MEASURING PROTECTION IN A DEVELOPING COUNTRY:

Appendix on Method

by

Stephen R. Lewis, Jr.
Stephen E. Guisinger

A-I. FORMULAE AND METHODS OF ESTIMATING EFFECTIVE PROTECTION

1. First recall the general approach to measuring effective protection, to which we have made some minor additions. Let:

X_i = domestic value of ourput at market prices (i.e. including domestic indirect taxes)

W_i = Value added at domestic prices

S_i = value of non-traded inputs (electricity, water, gas, and all other services)

X_{ji} = value of input from the jth domestic industry to the ith industry

M_i = value of imported inputs at c.i.f. prices

T_{mi} = value of taxes on imported inputs

T_{Di} = value of indirect taxes on output of industry i

$\hat{W}_i$ = value added "at world prices," i.e. when output and inputs are adjusted to c.i.f. prices at the official exchange rate, by deflating each flow by the appropriate rate of nominal tariff.

t_i, t_j = the nominal tariff (including sales taxes on imports) on industry i or j. Under the above definitions, actual value added in industry i is given by:

$$(1.1) \qquad W_i = X_i - (T_{Di} + M_i + T_{mi} + S_i + \sum_j X_{ji}),$$

while value added "at world prices," is given by:

$$(1.2) \qquad \hat{W}_i = X_i \frac{1}{1+t_i} - (M_i + S_i + \sum_j X_{ji} \frac{1}{1+t_j})$$

If effective protection to industries is defined as the percent by which actual value added could exceed value added "at world prices," then

$$(1.3) \qquad T_i = \frac{W_i - \hat{W}_i}{\hat{W}_i}$$

Since for some industries "value added at world prices" may be either very small or even negative, it is more convenient for purposes of tariff comparisons to use a rearranged version of effective protection, following Soligo and Stern /28/, defined as U_i, as the percent of actual value added that is "due to" protection:

$$(1.4) \qquad U_i = \frac{W_i - \hat{W}_i}{W_i}$$

2. One major modification we have made in the usual procedure is to substitute direct price comparisons for tariff rates, in order to take account more systematically of (i) quantitative restrictions which provide more nominal protection than tariffs imply, and (ii) redundant tariffs that overstate the nominal protection . Taking first the case

of quantitative restrictions, let:

m_i = the mark-up of domestic price above the duty-paid import price

$(1 + t_i)\ (1 + m_i)$ = domestic wholesale price of i expressed as a percentage of world prices. (Note that a redundant tariff appears in this notation as a negative m_i.)

The new "value added at world prices," $\bar{W}_i$, is expressed as

$$(2.1) \qquad \bar{W}_i = \frac{X_i}{(1+t_i)(1+m_i)} - \left(M_i + S_i + \Sigma X_{ji} \frac{1}{(1+t_j)(1+m_j)}\right),$$

and the rate of effective protection (which is reported in the text) is expressed as:

$$(2.2) \qquad U^*_i = \frac{W_i - \bar{W}_i}{W_i}$$

3. Another major adjustment, which was of particular importance in the Pakistan study, involved the treatment of the service sector. In the Pakistan input-output table, inputs from "all other services" account for one-third of purchased inputs, on the average. This proportion is exceedingly high, and is probably due to two factors: (i) inclusion of substantial wholesale and retail trade mark-ups on the output of the industry in the deliveries from all other services [1/], and

[1/] Since c.i.f. or f.o.b. prices are used to represent "world" prices, the correct comparison would be with ex-factory prices, not including trade and transport margins.

(ii) unreported material inputs, since the "all other services" input was used as a residual item in the allocation of input costs. Some aspects of input-output tables available for Pakistan are reviewed by Stern /31/, who was a principal contributor to the 1963/64 input-output table for Pakistan.

There are several adjustments that can be made in the input-output table and in the method of treating "all other services" inputs in order to correct for the anomolies of the Pakistan table. One adjustment consisted of removing an amount equal to estimated deliveries from wholesale and retail trade and transportation from both the value of imputs of all other services and from the value of gross output.[1/] The new effective rate of protection U^2_i is then systematically related to the old (U_i).

Let:

b = the percentage reduction in inputs from the service sector (assumed to be equal for all industries).

$\hat{W}^2_i$ = value added "at world prices" after the adjustment has been made

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1/ We did not take the further step of reducing the value of intermediate deliveries from the same industry, since the adjustment became much less important quantitatively in that next round. The two-thirds proportion was chosen as an approximation of the importance of trade and transportation in "all other services," as given by the National Accounts /20/.

S_i^1 = delivery from all other services to sector i.

S_i^2 = delivery from electricity, gas, etc. to sector i.

$S_i = S_i^1 + S_i^2$

then:

$$(3.1) \qquad \hat{W}_i^2 = (X_i - b\,S_i^1)\,\frac{1}{1+t_i} - (M_i + (1-b)\,S_i^1 + S_i^2 + \sum_i \frac{X_{ji}}{1+t_i})$$

$$(3.2) \qquad \hat{W}_i + S_i^1 = \hat{W}_i^2 + (1-b)\,S_i^1 + \frac{b\,S_i^1}{1+t_i}$$

$$(3.3) \qquad \frac{\hat{W}_i}{W_i} = \frac{\hat{W}_i^2}{W_i} + \frac{bS_i^1}{W_i}\left(\frac{1}{1+t_i} - 1\right)$$

$$(3.4) \qquad U_i^2 = U_i + b\,\frac{S_i^1}{W_i}\left(\frac{1}{1+t_i} - 1\right)$$

Since $\frac{1}{1+t_i}$ is generally less than one, the last term is usually negative, and U_i^2 will be less than U_i. U_i^2 is the measure reported in the text, and shown in column 2 of Table A-1. The original, unadjusted measure by Lewis and Radhu is given in the first column.

4. A second adjustment that can be made in the "all other services" inputs relates to the fact that they contain a certain amount of unrecorded material inputs. One procedure for adjusting effective protection for this

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fact could be to deflate the percentage (c) of all other services inputs (S_i^1) that is thought to be such unrecorded inputs, by the average tariff on other inputs into the industry. Let:

c = share of S_i^1 that is unrecorded material inputs (assumed constant for all industries here);

$$r_i = \frac{1}{1+\bar{t}_i} = \frac{\Sigma X_{ji} \frac{1}{1+t_j}}{\Sigma X_{ji}}$$, or the inverse of the average tariff on inputs into the industry i;

$\overset{o}{W}_i$ = value added at world prices after the adjustment.

Then:

$$(4.1) \qquad X_i \frac{1}{1+t_i} = \hat{W}_i + S_i^1 + S_i^2 + M_i + \Sigma X_{ji} \frac{1}{1+t_j}$$

$$(4.2) \qquad X_i \frac{1}{1+t_i} = \overset{o}{W}_i + r_i c S_i^1 + (1-c) S_i^1 + S_i^2 + M_i + \Sigma X_{ji} \frac{1}{1+t_j}$$

$$(4.3) \qquad \overset{o}{W}_i = \hat{W}_i + cS_i^1 (1 + r_i)$$

$$(4.4) \qquad \frac{\overset{o}{W}_i}{W_i} = \frac{\hat{W}_i}{W_i} + \frac{S_i^1}{W_i} .c.(1-r_i)$$

$$(4.5) \qquad U_i^3 = U_i - \frac{S_i^1}{W_i} (1-r_i) c$$

r_i is generally less than one, and $0<c<1$, so the last term is generally negative and U_i^3, is generally less than U_i. U_i^3 is the measure given in column 3 of table A-i, when $c = 1.0$.

5. Corden /8/ suggests that non-traded inputs should be treated in the same way as value added, arguing that returns to domestic factors in the protected industry as well as other domestic industries serving the protected industry will rise with protection.

If we define:

a = the share of S_i that represents non-traded inputs into industry i;

$W_i + a S_i$ = domestic value added, (adjusted);

$\hat{W}_i + a S_i$ = value added at world prices, (adjusted).

Then:

$$U_i^4 = \frac{W_i + a S_i - (\hat{W}_i + a S_i)}{W_i + a S_i} \tag{5.1}$$

$$U_i^4 (W_i + a S_i) = W_i - \hat{W}_i$$

$$U_i^4 \left(1 + \frac{aS_i}{W_i}\right) = \frac{W_i - \hat{W}_i}{W_i} = U_i$$

$$U_i^4 = U_i \frac{1}{1 + \frac{aS_i}{W_i}}$$

The larger is a, and the larger is $\frac{S_i}{W_i}$, the greater will be the downward adjustment in the measured level of effective protection.

Empirically, this adjustment was made in two different ways. First, we started with U_i^2 (i.e. after 2/3 of the value of inputs from all other services had been removed from both the inputs into each industry and the value of gross output of the industry) and put all of the remaining 1/3

of all other service inputs into value added. The result is called U and is given in column 4 of table A-1. Second, and a more general approach, we (i) divided the original all other service inputs into equal parts, a, b, and c, (ii) removed one-third (b) the value of inputs and the value of output, treated one-third (a) as a part of value added, and (iii) deflated one-third (c) by the average tariff on other material inputs, on the assumption that they were really unrecorded material inputs. The result is called U^5, and is reported in column 5 of table A-1.

6. In addition to the adjustments for (i) deficiencies in the measured input-output relationships, (ii) the proper treatment of "true" non-traded inputs, and (iii) the effect of non-tax policies, such as quantitative restrictions, we have included an adjustment for the fact that the official exchange rate greatly undervalues foreign exchange. Tariffs and the export bonus scheme were used by the government to adjust for this fact without changing the official exchange rate. Some basis other than the official exchange rate is needed, therefore, as a standard of comparison for rates of protection. The method adopted basically asks two questions: (1) what levels of nominal tariffs and subsidies would be required at the higher price of foreign exchange to keep domestic prices the same; and (2) using these new taxes and subsidies, what is the

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measured rate of effective protection to the industry?[1/]

Let:

q = the percent by which the price of foreign exchange should be raised

W'_i = value added at world prices after raising the price of foreign exchange

(6.1) $$X_i d_i = \hat{W}_i + S_i + M_i + \Sigma X_{ji} d_j$$

(6.2) $$X_i d_i (1+q) = W'_i + S_i + M_i (1+q) + (1+q) \Sigma X_{ji} d_j$$

Since:

(6.3) $$W'_i + S_i = (X_i d_i - \Sigma X_{ji} d_j) (1+q), + M_i \cdot (1+q)$$

and

(6.4) $$\hat{W}_i + S_i = X_i d_i - \Sigma X_{ji} d_j , + M_i$$

then

(6.5) $$W'_i = \hat{W}_i (1+q) + (q) S_i$$

The new level of effective protection can be expressed as:

(6.6) $$U_i^6 = 1 - \frac{\hat{W}_i (1+q)}{W_i} - (q) \frac{S_i}{W_i} ,$$

(6.7) $$U_i^6 = (1+q) U_i - q \left(1 + \frac{S_i}{W_i}\right)$$

Because of non-traded inputs, S_i rankings of industries may change with

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1/Our treatment differs from that of Corden /8/, in that he wants to adjust for the fact that the exchange rate would change after tariffs were imposed, while we are asking a much more naive question: Keeping relative prices the same, what would happen if we re-evaluate the efficiency of the industry at a different exchange rate?

the adjustment for currency overvaluation, which could not happen in Corden's scheme because of the different assumption about such non-traded inputs.

A-II - EFFECTS OF ADJUSTING "ALL OTHER SERVICE" INPUTS IN PAKISTAN

1. Table A-I gives the estimates of effective tariff protection in Pakistan under alternative treatment of inputs from "all other services' We discussed in the text the adjustment of removing a lump sum (for trade and transport margins) from both deliveries from all other services and the value of output. The average rates of protection drop from 89 to 58 percent, while the median falls from 80 to 58. The number of industries with rates in excess of 100 falls from sixteen to nine. There are some changes in rankings, but the rank correlation between the two measures is .88.

2. When the inputs from "all other services" are treated as unallocated material inputs (which is true to varying degrees) the results (U^4) are even more dramatic. The average level of effective protection falls from 89 to 43 percent, while the median level drops from 80 to 41 percent and the number of rates in excess of 100 percent falls from sixteen to seven. In addition, the number of industries with negative effective rates of protection rise from four to ten (as one might suppose from the evidence on "reverse cascading" presented in the text).

TABLE A-I - EFFECTIVE RATES OF TARIFF PROTECTION IN PAKISTAN CALCULATED WITH ALTERNATIVE TREATMENT OF INPUTS FROM "ALL OTHER SERVICE" INDUSTRIES

	Consumption goods	U^1	U^2	U^3	U^4	U^5
1.	Canning	265	179	36	97	103
2.	Bakery Products	89	59	41	45	44
3.	Sugar	109	80	80	57	60
4.	Edible Oils	100	18	-35	8	3
5.	Tea	-60	-59	-72	-43	-33
6.	Salt	40	31	-65	26	21
7.	Beverages	90	63	53	48	47
8.	Cigarettes	106	81	69	68	67
9.	Cotton Textiles	147	122	136	95	101
10.	Wool Textiles	144	123	71	101	108
11.	Silk + Art Silk Tex.	121	99	101	83	86
12.	Knitting	94	75	66	64	63
13.	Footwear	76	58	51	47	47
14.	Wearing Apparel	161	116	103	87	89
15.	Wood Products (Non-Metallic Furn.)	269	170	91	80	86
16.	Printing + Publishing	-13	-22	-32	-18	-15
17.	Leather Products	80	58	30	46	45
18.	Soaps, etc.	1	1	1	1	1
19.	Matches	38	27	17	22	17
20.	Optical Goods	67	62	72	55	57
21.	Plastic Goods	81	71	71	63	65
22.	Sports Goods	67	58	59	52	54
23.	Pens + Pencils	39	34	30	31	31
24.	Metal Furniture	268	139	208	63	83
25.	Electric Appliances	75	66	67	59	60
26.	Motor Vehicles	292	155	131	60	64
27.	Cycles	182	106	84	59	69
	SIMPLE AVERAGE	108	73	54	50	53
	Intermediate Goods					
28.	Jute Textiles	92	76	84	57	60
29.	Dyeing + Finishing	90	49	18	35	34
30.	Thread + Thread Ball	62	30	1	22	16

(Continued)

31.	Saw Milling	157	81	84	42	49
32.	Tanning	160	105	106	60	66
33.	Rubber Products	39	22	7	15	12
34.	Fertilizer	28	12	-21	6	8
35.	Paints + Varnishes	27	17	7	13	-9
36.	Chemicals	-10	11	-5	8	7
37.	Petroleum Products	-55	-49	-60	-40	-35
38.	Paper Products	83	58	49	43	36
	SIMPLE AVERAGE	61	37	25	24	24
	Investment + Related Goods					
39.	Non -Metallic Min. Prod.	46	39	36	35	34
40.	Cement	33	27	19	23	22
41.	Basic Metals	3	-1	-8	-1	-3
42.	Metal Products	247	76	86	50	142
43.	Non-Electrical Mach.	14	9	13	7	6
44.	Sewing Machines	120	93	106	72	79
45.	Electric Mach. + Equip.	20	15	10	13	12
46.	Other Transport Equip.	26	8	-21	5	0
	SIMPLE AVERAGE	64	33	30	26	37
	AVERAGE OF ALL INDUSTRIES	89	58	43	40	43
	MEDIAN LEVEL	80	58	41	45	45

There is a substantial drop in the level of effective protection in all three sub-groups of industries. Again, these are some major changes in realtive degrees of protection, but the rank correlation between the unadjusted rates (U^1) and the rates adjusted for unallocated inputs (U^4) is still .84. [1/]

3. Treating a part of non-traded inputs to value added was done to explore the importance of Corden's suggestion for the Pakistan data. The interpretation of rates of effective protection to value added in the industry and to non-traded goods used therein is obviously different from the interpretation of protection to primary factor payments in the industry, and the rates given here are for purposes of comparison and completeness only. The relevant comparisons are among the four adjusted levels of protection: (i) removing 2/3 of "all other services" U^2, (ii) deflating "all other services" inputs by the average tariff on traded inputs, U^3, (iii) treating the 1/3 of "all other services" inputs plus public utilities as a part of value added, U^4, and (iv) removing 1/3 of all other services, combining 1/3 with value added, and deflating the remaining third by the average tariff on traded inputs, U^5. On the average, and for most industries, any of the latter three methods of treating non-traded goods give somewhat lower levels of effective protection (40 to 43) than the first (58).

1/ The rank correlation of nominal protection ($t_i - t_{di}$) with either of the adjusted measures of effective protection is .7.

The median levels are also lower, 41 to 45 for the latter three and 58 for U^1. There are fewer extreme rates when non-traded goods are treated as a part of value added, as one would suspect. The rankings are practically invariant, with rank correlations of between .90 and .96 among the four measures.

4. It is worth emphasizing again that the adjusted methods of calculating the effective rate of protection do not change the ranking of the industries very much. Rank correlations between the nominal level of protection and the adjusted measure of effective levels are around .7, while the rank correlation of each new measure with either the Lewis/Radhu or the Soligo /Stern measure is between .7 and .8, all of which are highly significant. In terms of levels of effective protection, however, adjustment of the "all other services" inputs makes a very substantial difference, particularly in reducing the number of industries that appear to have outrageously high levels of effective protection. Any one of the adjusted measures gives a more realistic picture of the effective rates of tariff and tax protection in Pakistan than unadjusted measure.

A-III- COMPARISON WITH SOLIGO AND STERN'S RESULTS

The pioneer study of effective protection in Pakistan, which provoked great discussion and controversy when it appeared in 1965 was

done by Ronald Soligo and Joseph J. Stern. Their initial method /28/ contained a minor error in method (deflating output at factor cost by nominal tariffs, instead of by tariffs less domestic indirect taxes), but they later /29/ published, a corrected set of estimates which did not differ greatly from those first published. The corrected results of the Soligo / Stern study are compared, in Table A-II, with the results of the Lewis and Radhu study /18/, as well as with our results from section IV of the present study. There were a few large differences between Lewis/Radhu and Soligo/Stern, all in industries where indirect taxes and subsidies were important, which were treated differently in the two studies. Overall, the results were quite similar, in both rankings of industries and overall levels of protection. We also adjusted the Soligo-Stern measure for the undervaluation of foreign exchange by the official exchange rate, which produces a substantial response in rates of protection. The average rate dropped from 101 to 47 percent, while median protection fell from 85 to 20 percent, and the average rates on all sub-groups of industries fall as well. The number of industries with rates over 100 fell from eighteen to twelve, and the number with negative rates rises from four to seventeen.

TABLE A-II- COMPARISON OF EFFECTIVE

RATES OF PROTECTION FROM THREE SOURCES

Consumption Goods		Lewis/ Radhu Estimate	Soligo/ Stern when $1.- Rs.4.76	Estimate when $1.- Rs.7.12	when $1= Rs.4.76	when $1= Rs 7.12
1.	Canning	265	311	291	179	175
2.	Bakery Products	89	120	83	59	20
3.	Sugar	109	87	20	80	50
4.	Edible Oils	100	155	-17	18	-48
5.	Tea	-60	-35	-71	-59	-76
6.	Salt	40	-15	-49	31	-11
7.	Beverages	90	-6	-51	63	29
8.	Cigarettes	106	118	99	81	63
9.	Cotton Textiles	147	135	116	122	118
10.	Wool Textiles	144	142	135	123	124
11.	Silk + Art Silk Tex.	121	139	132	99	89
12.	Knitting	94	130	120	75	54
13.	Footwear	96	94	59	58	26
14.	Wearing Apparel	161	216	225	116	107
15.	Wood Products (Non-Metallic Furn.)	269	318	261	170	149
16.	Printing + Publishing	-13	-15	-53	-22	-51
17.	Leather Products	80	85	45	58	24
18.	Soaps, etc.	1	11	17	1	2
19.	Matches	38	59	7	27	-17
20.	Optical Goods	67	24	-25	62	36
21.	Plastic Goods	81	75	46	71	50
22.	Sports Goods	67	48	5	58	32
23.	Pens + Pencils	39	33	-11	34	-4
24.	Metal Furniture	268	253	150	139	99
25.	Electric Appliances	75	59	23	66	43
26.	Motor Vehicles	292	394	206	155	103
27.	Cycles	182	161	72	106	69
	SIMPLE AVERAGE	108	115	68	73	46

(Continued)

	Intermediate Goods					
28.	Jute Textiles	92	145	127	76	48
29.	Dyeing + Fini shing	90	138	99	49	4
30.	Thread + Thread Ball	62	145	115	30	-19
31.	Saw Milling	157	152	41	81	26
32.	Tanning	160	211	157	105	70
33.	Rubber Products	39	59	-18	22	-29
34.	Fertilizer	28	123	-33	12	-42
35.	Paints + Varnishes	27	12	-42	17	-28
36.	Chemicals	-10	51	-19	11	-35
37.	Petroleum Products	-55	92	29	-49	-68
38.	Paper Products	83	78	16	58	20
	SIMPLE AVERAGE	61	110	43	37	-5
	Investment + Related Goods					
39.	Non-Metallic Min. Prods.	46	29	-19	39	3
40.	Cement	33	29	-20	27	-15
41.	Basic Metals	3	56	-1	-1	-39
42.	Metal Products	247	93	11	76	38
43.	Non-Electrical Mach.	14	11	-39	9	-32
44.	Sewing Machines	120	78	24	93	76
45.	Electric Mach. + Equip.	20	11	-35	15	-26
46.	Other Transport Equip.	26	34	-45	8	-40
	SIMPLE AVERAGE	64	43	-16	33	-4
	AVERAGE OF ALL INDUSTRIES	89	101	47	58	25
	MEDIAN LEVEL	80	85	20	58	24

Source: Estimates by Lewis and Radhu from /18/. Estimates by Soligo and Stern (when $1.00 = Rs.4.76) from /29/. Estimates by Soligo and Stern when $1.00 = Rs.7.12 calculated according to expression 6.7 in the Appendix. $\bar{U}^2$ estimates are from Table of the text of this paper .

A-IV SOURCES OF DATA

The input-output structure for 1963/64 is taken from the Tims-Stern table which appeared in a mimeographed publication of Pakistan's Planning Commission /21/. It separates all flows by domestic and imported origin. The table is made up at user prices, so nominally includes trade and transportation margins as well as indirect taxes in the value of the flows.

Tariff and indirect tax data are taken from Radhu /27/ as up dated in Lewis and Radhu /18/. The average tariff and tax rates are simple averages within industries.

Price comparisons, or implicit exchange rates, are obviously the most important ingredient in our calculations. They were obtained from several sources and by several methods. For many manufacturing industries, particularly in the intermediate and capital goods producing industries, total domestic supply is dominated by imports. Price comparisons for imported goods were made for a large number of products by Pal /22/, /23/ in two separate surveys. Domestic price data were gathered from wholesalers, from market reports, and from purchasers of goods, in order to double-check the results. The price for each item was an average of several reported prices. The c.i.f. price of identical commodities were obtained from customs records, and a mark-up above

c.i.f. price plus duties and fees was computed. At this latter stage, several specific grades or sizes of an item were averaged to get a mark-up for a broader type of good (e.g. steel bars and rods). Since Pal reported the duty and the mark-up for each good, it was easy to convert to a price differential for those goods.

An assumption became necessary: that the price of domestically produced goods was determined by the price of imports, and that, therefore, the price differentials for imported goods represented the nominal rate of protection the domestic industry was receiving. This assumption was made for those lindustries in which imports were the dominant part of total supply.

This procedure has one serious drawback: domestic goods are often of lower quality than imports, and so sell at a discount relative to those goods. In such a case, we may have overstated the protection, but for many industries (motor vehicles, basic metals, chemicals, metal products) this is not likely to be the case.

A second method of arriving at price differentials was used where industries exported in sufficient volume to make the following assumption: the exchange rate at which the industry exported was a good representation of the ratio of the wholesale price net of indirect taxes and the f.o.b. price of exports. The underlying rationale is that producers

equilibriate marginal revenue in the domestic and the foreign market, and that marginal revenue is equal to price. Fortunately, most of the exporting industries have fairly large numbers of firms domestically to make this a reasonable assumption.

The third method of getting price differentials was by direct price comparisons of domestic and some form of world or international price. Such comparisons were made for agricultural goods and reported in Lewis/ 15/, and we made some further price comparisons for a few manufactured goods not covered by the first two methods above (e.g. refined sugar, hydrogenated vegetable oils, and paper products).

For most industries we had only a few representative goods, price differentials for which were averaged to arrive at a price differential for the industry. Larger numbers of individual goods were available for chemicals, basic metals, and metal products, while fewer were available for electrical and non-electrical machinery, paper products, and refined petroleum products. We believe the price differentials are fairly representative for the industries, and they are certainly much more representative of price differentials than are the tariff rates.