THE PROTECTION STRUCTURE, RESOURCE FLOWS AND THE CAPITAL-LABOR RATIO IN PHILIPPINE MANUFACTURING: A SHORT EMPIRICAL NOTE

by

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The trade and industrial policies adopted by the Philippines can be characterized as inward looking protecting heavily final consumer products and generally penalyzing exports. In the 70s, there has been a conscious effort, particularly through Board of Investment (BOI) incentives, to promote exports. However, these export incentives have not been enough to counter the adverse effects of the protection structure (See Norma Tan, 1979). In 1981, the Tariff Reform Program (TRP), which aims to bring down tariffs to a more uniform level, was launched together with some degree of import liberalization. However, in the advent of the economic crisis starting at the second half of 1983, the liberalization program became inoperative.

The system of protection adopted by any country is perhaps the most pervasive among all government policies. It is, thus, very important to know what are possibly the effects of the tariff structure on employment. Trade theory suggests that trade restriction (e.g. tariffs & QRS) benefits the scarce factor of production and adversely affects the abundant factor.

In the case of the most LDCs, including the Philippines, the abundant factor is labor. Thus, a priori, we expect that the tariff structure adopted by the Philippines harms employment. This short paper offers some empirical evidence to support this conclusion.

First of all, let us use the concept of effective protection rate (EPR) to indicate the overall incentive the sector receives from the tariff and tax system. Specifically, this could be represented by

$$EPR_j = \frac{1 - \Sigma a_{ij}}{\frac{1}{1+T_j} - \Sigma \frac{a_{ij}}{1+T_i}} - 1$$

$$= \frac{\text{Protected domestic value-added}}{\text{Free trade value-added}} - 1$$

where a_{ij} is the value of input i per peso of output j in domestic prices, i.e., inclusive of tariffs and taxes, and T_i and T_j are the implicit tariff on input i and output j respectively.

It is usually logically assumed that resources would flow from sectors with low EPR to those with high EPRs. This paper offers empirical evidence to support this.

Using the input-output (I-O) Transaction Table, Norma Tan computed the EPR by I-O sector for 1974. Using her implicit tariffs for 1969 and the 1969 I-O Table, the EPR for 1969 by sector was readily computed. We then look at the manufacturing sector specifically and compare the EPR and 1+T for 1969 and 1974 by sector. Results are presented in Tables 1 and 2.

Examining individual sectors, implicit tariffs did not seem to change significantly from 1969 to 1974 except for a few cases. Using two weighting systems (1) domestic supply (W_3) and (2) average exports and imports (W_4) as weights -- the average implicit tariff is calculated (two other weighting systems were used. However, the two presented here seem the more relevant for averaging implicit tariffs.) Using domestic supply as weights, the average implicit tariff for manufacturing rose only slightly from 32.7 percent in 1969 to 36.2 percent in 1974, while using exports and imports as weights the average implicit tariff even went down from 31.4 percent in 1969 to 26.2 percent in 1974. There is inherently a downward bias in using exports and imports as weights since low tariffs would normally be associated with higher imports and high tariffs with low imports. For the opposite reason, using domestic supply as weights creates an upward bias in the estimates.

Table 1. Weighted Average Implicit Tariffs in Manufacturing, 1969 & 1974

Industry/Sector	I + T			
	Using Average Domestic Supply as weights (W_3)		Using Average exports and imports as weights (W_4)	
	1969	1974	1969	1974
Sugar	.960	.940	.960	.940
Food except Sugar	1.194	1.219	1.288	1.217
Beverages	3.110	2.692	3.110	2.996
Knitting	2.190	1.290	2.190	1.290
Weaving	1.550	1.590	1.550	1.590
Textiles	1.543	1.530	1.541	1.538
Footwear except rubber		1.250		1.250
Wearing apparels	1.529	1.062	1.124	1.084
Plywood & Veneer	1.000	.980	1.000	.980
Furnitures & Fixtures	1.000	1.010	1.000	1.010
Wood Products	1.163	.996	1.046	1.002
Paper & Paper Products	1.653	1.819	1.582	1.685
Printing & Publishing		1.290		1.290
Leather Products	2.272	1.565	2.381	1.303
Rubber shoes	2.170	2.170	2.170	2.170
Rubber products	1.676	1.860	1.556	1.527
Other Chemical products	1.460	1.501	1.464	1.430
Industrial Chemicals	1.164	1.220	1.147	1.137
Petroleum Refineries &	1.308		1.299	
Product of Petroleum & Coal		1.611		1.613
Glass Products	1.510	1.580	1.510	1.580
Pottery & China	1.740	1.580	1.740	1.580
Other nonmetals	1.231	1.102	1.577	1.112
Iron & Steel	1.320	1.360	1.320	1.360
non-Ferrous	1.260	1.150	1.260	1.150
Fabricated metals	1.541	1.510	1.520	1.502
Machinery except electrical	1.238	1.219	1.236	1.216
Electrical machinery	1.270	1.327	1.270	1.327
Communication Equipment	1.270	1.390	1.270	1.390
Electrical Appliances	1.644	1.933	1.594	1.849
Transport Equipment	1.530	1.845	1.502	1.740
Plastic Products	1.760	1.960	1.760	1.960
Professional & Scientific	1.489	1.094	1.376	1.034
All Manufacturing	1.327	1.362	1.314	1.262

Source

Thus, it seems very reasonable to conclude that the average implicit tariff for manufacturing did not change significantly.

Looking at Table 2, however, although the tariff structure remained basically the same, the weighted average EPR increased substantially from 1969 to 1974 using either weighting system, i.e., (1) free trade value-added (W_2) or (2) domestic production (W_1). What these results unambiguously indicate is that resources do flow from industries with low EPRs to industries with high EPRs since the high EPR in 1974 was clearly due to higher weights (whether value-added or value of production) of industries with high EPRs in 1974 relative to 1969.

The next important question is how the relative use of capital and labor are affected in the shift of resources from low EPRs to high EPRs. Using Richard Hooley's estimate of capital (net fixed assets) and labor by industry, the average capital-labor ratio (K/L) is estimated. Results are presented in Table 3. Again, two weighting systems are used --- free trade value-added and domestic production.

Table 2. Weighted Average Effective Protection Rate (EPR) in Manufacturing, 1969 & 1974

INDUSTRY/SECTOR	1 + EPR			
	Using Average Free Trade Value-added as weights (W_2)		Using Average Domestic Production as Weights (W_1)	
	1969	1974	1969	1974
Sugar	.950	.880	.950	.880
Food except sugar	1.115	2.063	1.273	3.183
Beverages	2.840	2.844	2.840	2.844
Knitting	4.890	.960	4.890	.960
Weaving	1.600	1.780	1.600	1.780
Textiles	1.443	1.612	1.676	1.549
Footwear except rubber		1.180		1.180
Weaving apparels	.851	.679	1.192	.722
Plywoods & Veneer	.920	1.050	.920	1.050
Furniture & Fixtures	.940	1.000	.940	1.000
Wood Products	1.007	1.086	1.064	1.082
Paper & Paper Prodcuts	1.752	2.327	1.809	2.464
Printing & Publishing		1.190		1.190
Leather Products	3.282	1.956	3.252	1.770
Rubber shoes	2.650	5.540	2.650	5.540
Rubber Products	1.791	3.724	1.882	4.006
Other Chemical products	1.430	1.818	1.668	2.043
Industrial chemicals	1.089	1.069	1.049	1.019
Petroleum Refineries	.888		.905	
Petroleum and Coal		1.209		1.209
Glass Products	1.550	1.450	1.550	1.450
Pottery & China	1.650	1.310	1.650	1.310
Other nonmetals	1.004	.731	1.112	.812
Iron & Steel	1.310	1.270	1.310	1.27[illegible]
Non-Ferrous	1.160	1.000	1.160	1.000
Fabricated Metals	1.655	1.688	1.724	1.653
Machinery except Electrical	1.170	1.114	1.173	1.108
Electrical machinery	1.210	1.229	1.210	1.229
Communication Equipment	1.120	1.310	1.120	1.310
Electrical appliances	1.755	2.218	1.822	2.211
Transport Equipment	1.323	2.072	1.335	2.077
Plastic Products	1.950	2.940	1.950	2.940
Professional & Scientific	1.304	1.271	1.435	1.340
All Manufacturing	1.127	1.582	1.291	1.968

Sources of basic data: Same as Table 1.

Table 3. Average Capital/Labor Ratio in Manufacturing, 1969 & 1974

Industry/Sector	(₱000/worker) 1969	1974
Sugar	34.872	44.732
Food except sugar	28.208	28.118
Beverages	23.169	25.590
Knitting		
Weaving		
Textiles	22.877	11.185
Footwear except rubber		
Wearing apparels	13.660	5.327
Plywood & Veneer		
Furniture & Fixtures	3.785	4.540
Wood Products	10.467	13.360
Paper & Paper Products	37.184	58.424
Printing & Publishing		
Leather Products	9.143	12.056
Rubber Shoes		
Rubber Products	26.630	20.524
Other Chemical Products	24.701	25.689
Industrial Chemicals	81.15	64.697
Petroleum refineries & products of petroleum & coal	586.091	874.769
Glass products	23.802	31.858
Pottery & China		
Other nonmetals		
Iron & Steel	93.509	69.493
non-ferrous	11.706	19.966
Fabricated metals	14.332	20.348
Machinery except Electrical	22.056	12.842
Electrical Machinery	16.055	12.789
Communication equipment		
Electrical Appliances		
Transport Equipment	24.664	28.200
Plastic Products	12.650	10.957
Professional & Scientific		
All Manufacturing		
Mean using average value added as weights (W_2)	46.48373	76.23664
Mean using domestic product as weights (W_1)	66.04689	128.45070

Source: 1) Richard Hooley, "Productivity Change in Philippine Manufacturing: Retrospect and Future Prospects." PIDS paper. 1984.

2) 1969 and 1974 I-O Tables, NCSO.

Looking at individual sectors, it is interesting to note that the K/L ratio declined significantly in sectors such as food excluding sugar refining, textiles, wearing apparel, and machinery except electrical while the ratio rose in sugar refining, paper and paper products, and products of petroleum and coal. For all manufacturing, the average K/L ratio, using either weighting system, almost doubled from 1969 to 1974.

The rise in the K/L ratio could have been caused by other factors but results indicate clearly that the tariff structure induced resource flows from low protection industries to high protection industries entailing an increased capital intensity, or equivalently a lower labor use, in the process. Furthermore, the tariff structure is such that capital goods can be imported with very low duties (in certain cases importation is allowed duty free), below the degree of undervaluation of foreign exchange defended by the tariff structure (Tan 1979) so that capital is artificially cheapened. Moreover, in the last decade of persistent current account deficits with domestic inflation higher than the world's minimal foreign exchange adjustment resulted even in a real appreciation of the peso.

In sum, the exchange rate and trade policies have induced a capital bias in the system which could explain in a large part this rise in the K/L ratio which accompanied the resource flows from industries with low protection to industries with high protection.

These findings shed some light as to why the manufacturing sector failed to grow as a generator of employment in the last decade.

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