EFFECTIVE PROTECTION OF THE CHEMICAL INDUSTRY

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1. Introduction

Among the measures the Philippine government has adopted, in the name of industrial restructuring and development over the last few years, perhaps none has a potentially pervasive effect on industry as the ongoing tariff reform. Embodied mainly in two orders issued by President Ferdinand E. Marcos, namely Executive Order No. 609 dated August 1, 1980, and Executive Order No. 632-A dated November 28, 1980, the decision to embark on the reform program came from the recognition of the need to improve some features of the country's incentive system emanating mainly from the system of tariff protection. Likewise, the review was sparked by the realization of increasing pressure in the domestic market of competition from imported goods, and of the need to improve the competitive position of Philippine exports in world markets.

Previous studies of the Philippines' structure of protection have argued that the biases created by the protection system have hampered industrialization and growth by penalizing new exports and the more basic stages of industrial production, in addition to agriculture and other primary activities (Tan, 1979). Industrial growth has been increasingly hampered by unchecked high production costs built up under a basically inward-looking industrialization strategy. To eliminate or minimize the cost penalties of such a strategy, the lowering of tariff rates has been deemed to carry a more immediate impact than exhausting other ways of bringing down production costs without tariff changes.

Since industries in all sectors of the economy are ultimately

competing for limited resources, encouraging any individual industry or sector by way of tariff protection reduces the resources available for the development of other industries and sectors. Particularly important in this regard is the finding that the high-cost industries are also the more highly protected ones. Apparently, the system of protection has favoured certain industries while penalizing others, serving at the same time to misallocate resources from the more efficient sectors to the less efficient ones by artificially raising the profitability rates of the latter. These findings have led to a re-examination of the system of protection, including the system of tariffs, and its use in the overall scheme of industrial policies

Thus, the tariff reform program involves a total restructuring of tariffs, largely comprising a reduction of rates but also indicating increases for the rest. However, the thrust has decidedly been to scale down "excessive" protection to industries, and thus ultimately raise real income by fostering increased efficiency in resource use.

As with any policy changes, the effects of changes in tariff rates on Philippine industry must be monitored to determine whether indeed, desired results are being achieved; specifically, inter-industry or inter-sectoral implications of the tariff reform must be taken into account. This study aims to analyze the transformation in the structure of protection accorded the different sectors of a major local industry — the chemical industry — to determine whether, in this industry at least, the tariff reform program might succeed in correcting such biases as may have existed prior to the reforms.

2. The Philippine Chemical Industry

The development of the chemical industry in any country may well serve as a commercial yardstick of her overall industrial development. For indeed, without it, aside from steel and metal products, little economic activity can proceed. It must grow fast enough to meet the requirements imposed upon it by the other sectors of the economy. Its importance becomes even more pronounced when one considers the role of chemicals in raising the quantity and quality of production in an economy dominated by agricultural activities, where the impact of fertilizers, pesticides, herbicides, and antibiotics is only too well known.

The chemical industry is not a homogenous entity. Rather, it is a group of divergent sectors serving widespread industries. Its strategic role is mainly due to its numerous products which serve as major inputs into a wide range of industries encompassing the manufacture

of consumer, intermediate and capital goods. Besides these forward linkages, there is strong evidence of equally significant backward linkage effects from its sectors. Undoubtedly, developments in the chemical industry significantly affect the growth of Philippine industry.

Actually, the major markets of the chemical industry are those sub-sectors within the complex industry itself. In effect, the chemical industry "is its own best customer." Important markets outside the industry include the construction, food processing, textile, and pulp and paper industries.

Despite its years of existence in the Philippines, the chemical industry still is in its infant stage of development. It was a product of the import-substitution policy of the government in the 1950s and until now, it still retains its import-substituting nature as exports are very minimal.

The industry accounted for an average share of almost 14 per cent of total manufacturing value-added during the period 1973 to 1977. Among all major manufacturing industries, the chemical industry has the largest percentage share to total manufacturing value-added, surpassed only by the food manufacturing sector. For the period 1972 to 1977, the gross value-added of the industry posted an annual average real growth rate of 10 per cent, a figure higher than the 7 per cent overall growth rate of the manufacturing sector. In short, the chemical industry has been growing at a faster pace than the average manufacturing sector.

The index of physical volume of production of the chemical industry reflected an increase of 0.4 per cent from 1973 to 1978 (Table 1). The production volume of the whole industry peaked in 1974 when it substantially expanded due to increased demand for certain chemical products. However, the oil hike in 1974 directly affected the industry, causing a slump in production in succeeding years. Recovery was made in 1978 and 1979, with a slowdown in 1980 due to another round of oil price increases in 1979.

The chemical industry is highly dependent on imported petroleum-based raw materials for its inputs. In fact, imports easily account for greater than 80 per cent of total raw materials used.

Exports of various chemicals and chemical products have been very minimal as compared to total imports of these products. Within

Table 1 — Index of Physical Volume of Production
For the Chemical Industry,
1973 to 1979
(1972 = 100)

Year	Index	Percentage Change
1973	103.87	3.87
1974	138.37	33.21
1975	94.03	(32.04)
1976	112.70	19.86
1977	101.07	(10.32)
1978	104.27	3.17
1979*	106.63	2.26
Average Growth Rate		2.86

*1979 figures are projected using the average growth rate.
Source: Central Bank of the Philippines Statistical Bulletin, 1981 Philippine Chemicals Directory.

the period 1976 to 1979, per cent of exports to imports registered the lowest in 1976 at 7.96 per cent (Table 2), and was highest in 1979 at 22.18 per cent. Annual growth rate of total exports was pegged at 82.35 per cent with total value of exports at its peak in 1979 at $142.1 million.

On the other hand, total value of imported chemicals and chemical products increased from $334.4 million in 1976 to $640.5 million in 1979. On the average, the annual growth rate of imports was 24.24 per cent. Chemical imports accounted for some 12 per cent annually of total imports of the economy.

Generally, the domestic chemical industry may be divided into two broad groups; the manufacture of industrial chemicals and the manufacture of other chemical products. Industrial chemicals encompass mainly basic chemicals which may be utilized for further processing, e.g., basic industrial chemicals, synthetic resins and plastics, fertilizers and pesticides. Other chemical products, on the other hand, are usually processed products which can be disposed of in final form, e.g., paints, varnishes and lacquers, drugs and pharmaceuticals, and soap.

It is largely the supportive role of the chemical industry that

Table 2 — Total Exports and Imports of
Chemicals and Chemical Products
1976 to 1979
(In FOB Value, US$1000)

Year	Export	Import	Per Cent of Export to Import
1976	26,603	334,381	7.96
1977	49,688	410,802	12.10
1978	58,675	496,926	11.81
1979	142,094	640,539	22.18

Source: NCSO, 1981 Philippine Chemicals Directory.

lends importance to a study on the degree of protection it enjoys. Specifically, protection of the industry sectors involved in the more basic production activities should not be too high as to penalize other sectors or industries to which they cater, a possibility to be discussed subsequently in greater detail.

3. Analytical Framework

Effective protection seeks to show the effects of the structure of nominal tariffs on the production pattern through the effects on value-added rather than on the product price of the protected industry. Effective protection rate (EPR) is defined as the percentage excess of domestic value-added per unit of output over free trade value-added per unit of output as a result of tariff protection, and is expressed in terms of the nominal protection on the product as well as on the inputs to production.

The rationale behind the measure is simple. Although tariffs on the product itself provide protection to the industry by allowing domestic prices to rise above import prices, tariffs on material inputs reduce the extent of protection by raising the cost of material inputs and can be regarded as a tax on the processing of such inputs. Thus, from the viewpoint of providing incentives to industry, the joint effects of policy instruments are relevant: tariffs on inputs may penalize certain industries while favoring others, and partly or wholly offset the apparent protection of some economic activities. Alter-

natively, tariffs on the output raise the effective protection, whereas tariffs on the inputs reduce it. Seen in this light, the EPR concept assumes special importance in developing countries, like the Philippines, where tariffs are invariably high and differences between tariffs on inputs and outputs are often substantial.

Having been defined, the effective rate of protection of an industry E_j may be expressed in general terms as follows:

$$(1) \qquad E_j = \frac{V_j' - V_j}{V_j}$$

where:

V_j : world market value-added per unit of j
V_j' : domestic market value-added per unit of j

If product price is taken to be unity, the above can be further expressed in free trade values as:

$$V_j = 1 - \overset{\Sigma}{i} a_{ij}$$

$$V_j' = (1 + T_j) - \overset{\Sigma}{i} a_{ij} (1 + T_i)$$

where:

a_{ij} : value of material input i used per unit of output j, and is always less than unity = input coefficient of industry j for input i

T_j and T_i : proportions by which domestic market prices of output and input respectively, exceed world market prices due to tariffs.

Thus:

$$(2) \qquad E_j = \frac{V_j' - V_j}{V_j} = \frac{(1 + T_j) - \overset{\Sigma}{i} a_{ij}(1 + T_i) - (1 - \overset{\Sigma}{i} a_{ij})}{1 - \overset{\Sigma}{i} a_{ij}}$$

$$= \frac{T_j - \overset{\Sigma}{i} a_{ij} T_i}{1 - \overset{\Sigma}{i} a_{ij}} = \frac{T_j - \bar{T}_j \overset{\Sigma}{i} a_{ij}}{1 - \overset{\Sigma}{i} a_{ij}}$$

where $\bar{T}_j = \dfrac{\overset{\Sigma}{i} a_{ij} T_i}{\overset{\Sigma}{i} a_{ij}}$ = the weighted average tariff rate on inputs of commodities into the jth product.

Effective protection rates often differ from nominal rates. A common characteristic of tariff structures of different countries is the escalation of nominal rates with the degree of processing, i.e., nominal rates tend to be low or even zero for raw materials and to rise to prohibitive levels with each successive processing stage, implying that, except for the raw material which has no tradable product as an input, the effective rate is usually higher than the nominal rate.

Several other implications can be inferred from the above EPR formulation. A maximum EPR is obtainable for a commodity if all its inputs enter into the production process duty-free. Further, equation (2) shows that the EPR will be higher than, equal to, or lower than the rate of tariff on the product, depending on whether this tariff exceeds, equals, or falls short of the average rate of tariff on material inputs.

This study applies the EPR framework in the analysis of the changes in the structure of protection due to tariffs in the seven sectors comprising the chemical industry in the Philippines, over the period 1980-1985, during which time the tariff reform is to take full effect. Estimation is based on the 121 x 121 sector input-output tables prepared by the National Census and Statistics Office (NCSO) for 1974 as adjusted for 1980 prices.

The study uses the techniques of the Leontief input-output system with its accompanying simplifying assumptions: first, of constant costs of production; second, of zero elasticity of subsitution among inputs, or fixed factor input proportions; and third, of zero general equilibrium repercussions of tariffs, i.e., they do not affect factor prices, choice of technology, productivity levels, product and input substitutions, final demand, and other related variables(Tan, 1979).

The empirical application of the EPR concept has been constrained by the unavailability of free-trade coefficients. Alternatively, estimates can be obtained from domestic values of input coefficients. The approach infers free trade coefficients from the domestic input coefficients by assuming that protected prices deflated by tariff rates give free trade prices. Thus equation (1) can be rewritten in terms of domestic (protected) values as:

$$E'_j = \frac{V'_j - V_j}{V_j} = \frac{(1 - \sum_i a'_{ij}) - (\frac{1}{1+T_j} - \sum_i a'_{ij} \frac{1}{1+T_i})}{(\frac{1}{1+T_j} - \sum_i a'_{ij} \frac{1}{1+T_i})}$$

$$(3) \qquad = \frac{1 - \sum_i a'_{ij}}{(\frac{1}{1+T_j} - \sum_i a'_{ij} \frac{1}{1+T_i})} - 1$$

where :

E'_j : EPR estimated in terms of protected coefficients

a'_{ij} : protected input coefficient

V'_j : $(1 - \sum_i a'_{ij})$ = protected or domestic value-added per unit of j

V_j : $(\frac{1}{1+T_j} - \sum_i a'_{ij} \frac{1}{1+T_i})$ = unprotected or free trade value-added

obtained by deflating the value of output and the values of material inputs per unit of output each by the relevant T.

The next section discusses the assumptions and procedures adopted on the other important aspects of EPR estimation, including certain qualifications of the EPR results obtained.

Information in the input-output accounts is available only on the relative proportions of material inputs and value-added under protection, which might have been affected by the imposition of

tariffs. As mentioned earlier, such tariffs may induce substitution among material inputs because of relative price changes, in which case the assumption of constant input coefficients will involve an error, irrespective of whether effective rates are calculated from domestic or from world market values (Balassa and Associates, 1971).

To calculate EPR, it was necessary first of all to establish a correspondence between the industry classification scheme employed in the input-output tables and the trade classification scheme used in the 1978 and 1982 Tariff Codes. The averaging of tariffs for each input-output sector was primarily complicated by the absence of exact correspondence between commodity and industry classifications. The study employs a conversion scheme devised by the Tariff Commission's Commodity Specialist for 157 industry sectors, adjusted to the necessary 121-sector disaggregation. This further brings to light possible aggregation biases due to the lack of disaggregation of input-output sectors in the chemical industry. However, it is believed that the level of disaggregation chosen still permits the inference of meaningful conclusions.

Given the nominal tariffs for the individual products belonging to an industry, a problem encountered was that of finding a meaningful average tariff rate for each sector of the relevant input-output table. One possible procedure involved the weighing of tariffs by the country's imports (Balassa and Associates, 1971). However, the resulting average would then be subject to a downward bias since low tariffs associated with high levels of imports are given large weights, while high tariffs that restrict imports have small weights. The use of unweighted (simple) averages, assigning equal weights to all products within a particular industry, was deemed to be a less biased procedure in this regard.

Ideally, export taxes should have been represented in the computations as negative tariffs since they, in effect, reduce the protection provided the domestic processing activity. However, considering the suspension in 1980 of export taxes on most exportable commodities, it was unnecessary for the study to include the effects of such taxes on EPR. Besides, there is no way of knowing at present how export taxes are to change between 1980 and 1985. It was therefore considered more appropriate to ignore effects of export taxes altogether, for consistency.

Tariff rates of exportable commodities were then simply considered equal to zero or non-effective, where exportables were identified as those commodities which were exported in values exceeding

one million dollars for the year 1979. In such cases, there is reason to believe that the domestic prices of the products concerned are lower than or equal to their respective world prices; hence, the protective effects of tariffs can be considered redundant.

To adjust input coefficients (expressed in value terms) for price changes between 1974 and 1980, the appropriate Home Consumption Wholesale Price Index and Wholesale Price Index of Domestic Products for the National Capital Region, both published by the Central Bank, were used for output and input sectors, respectively.

Out of 121 producing industries in the 1974 input-output tables, 29 were considered nontraded. Unlike other material inputs, non-tradeable inputs, due to their service nature, were simply treated as part of value-added.

Due to time constraints, this study focuses solely on the effects of tariff changes on the structure of protection and makes no attempt to incorporate other such instruments or policies that may affect protection of the sectors under study.

4. Presentation and Analysis of Results

An assessment of the effectiveness of the Tariff Reform in liberalizing protection in the chemical industry can be much aided by referring to the protection structure in 1974. Table 3 presents Tan's computation of effective protection rates for the chemical industry in 1974. The industry effective protection average was 68.38 per cent. Considering a 44 per cent all-manufacturing average EPR and an even lower agriculture and primary industry EPR of 9 per cent, the chemical industry average of 68.38 per cent was indeed substantial.

An examination of the estimates for the sectors comprising the industry shows that it was largely the paints, varnishes, and related compounds and soap and other washing and cleansing compounds sectors which accounted for the high average EPR for the industry. There being no substantial and comprehensive tariff changes between 1974 and 1980, it is only logical that if the ongoing Tariff Reform Program aims to even out protection across industries, the change in the protection afforded the chemical industry, especially the soap and paint sectors should be of a downward nature. Accordingly, one may look into average protection before and after the reform to see if the desired direction of change is achieved.

Table 3 — Effective Protection
Within the Chemical Industry, 1974
(In Per Cent)

Basic Industrial Chemicals	7
Fertilizer and Lime	41
Paints, Varnishes, and Related Compounds	221
Plastic Materials	56
Medicinal and Pharmaceutical Preparations	9
Cosmetics and Toilet Preparations	*
Soap and Other Washing and Cleansing Compounds	175
Insecticides, Germicides, and Agricultural Chemicals	17
Other Chemical Products	35
Average for chemical industry	68
Average for all manufacturing	44
Average for agriculture and primary industry	9

*EPR cannot be calculated for the sector because its derived international value-added is negative.

Source: Norma A. Tan, "The Structure of Protection and Resource Flows in the Philippines" (Unpublished Ph.D. dissertation, University of the Philippines, 1979).

Table 4 presents the nominal and effective protection rates for the chemical industry, both before the tariff reform (1980) and after the full effects of the reform were considered (1985). Looking initially at the industry averages, one notes that both nominal and effective protection indeed fall as a result of the reform. The decline in effective rates is more dramatic though — a 12.24 percentage point decline as against an 8.84 percentage point fall in nominal rates. One may venture that the objective of the tariff reform is being realized within the chemical industry. But this conclusion cannot be definitive yet; a closer look into each sector is necessary.

Table 4 — Nominal and Effective Protection
Within the Chemical Industry, 1980 and 1985
(In Per Cent)

I-O Code	Sector	Nominal		Effective	
		1980	1985	1980	1985
57	Basic Industrial Chemicals	15.0	13.35	13.74	12.62
60	Fertilizer and Lime	18.0	17.5	18.98	21.35
61	Paints, Varnishes, and Related Compounds	33.33	22.67	39.79	26.29
62	Plastic Materials	32.5	19.73	44.30	23.17
63	Medicinal and Pharmaceutical Preparations	7.5	7.5	2.51	4.11
64	Soap and Other Washing and Cleansing Compounds	65.0	37.5	90.91	48.06
65	Other Chemical Products	32.97	24.19	41.27	30.24
	Industry Average	29.19	20.35	35.93	23.69

Table 5 presents the absolute differences in rates obtainable under the reform. Nominal rates fall uniformly for the different sectors, except the medicinal and pharmaceutical preparations sector, for which the rate stays at 7.5 per cent. The biggest reduction occurs in the soap sector — a decrease of 27.5 per cent from a pre-reform rate of 65 per cent to a post-reform rate of 37.5 per cent. The smallest reduction is by 0.5 per cent, for the fertilizer and lime sector. Presumably, the nominal protection accorded this sector was deemed reasonable enough so that no big cut, similar to that made in the soap sector, is repeated here.

The direction of change for the effective rates is not uniform. Effective protection for the medicinal and fertilizer sectors increases while the other sectors experience varying degrees of decline. However, the increases for the two sectors are relatively small compared with the reductions for the five other sectors. Furthermore, in relation to the earlier finding that the soap and paints sectors were the most highly protected in 1974, calculations show that these sectors are indeed among those which experience the greatest reductions in effective protection under the reform. For instance, the absolute decline in EPR for the soap sector is 42.85 per cent. Against such a reduction, the 2.37 and 1.6 per cent increases for the fertilizer and medicinal sectors, respectively, cannot but appear small.

Table 5 — Percentage Point Differences
In Nominal and Effective Protection
For the Chemical Industry
From 1980 to 1985

I-0 Sector	Difference in Nominal Rates From 1980 to 1985	Difference in Effective Rates From 1980 to 1985
Basic Industrial Chemicals	(1.65)	(1.12)
Fertilizer and Lime	(0.50)	2.37
Paints, Varnishes, and Related Compounds	(10.66)	(13.50)
Plastic Materials	(12.77)	(21.13)
Medicinal and Pharmaceutical Preparations	No Change	1.6
Soap and Other Washing and Cleansing Compounds	(27.50)	(42.85)
Other Chemical Products	(8.78)	(11.03)
Industry Average	(8.84)	(12.24)

Significantly, the rate changes for the different sectors vary. While some sectors experience very minimal effective rate changes, others have their effective protection cut almost in half. Implicit in this differential change is the belief that different sectors require

different degrees of protection. Likewise, it must be noted that for certain sectors, though substantial reductions are effected, effective protection remains very high. This is true for the soap sector for which effective protection after the reform is still at 48.06 per cent. Although this rate is much lower than the pre-reform 90.91 per cent effective rate, it has room for further liberalization, which can be done in gradual phases, similar to the ongoing tariff reform.

One of the objectives of rationalizing the tariff structure has been to equalize nominal and effective rates across industry sectors. Assuming that protection is required for operation and survival, large variations among rates suggest large costs incurred from allowing levels of efficiency to vary from one sector to another. Thus it is of interest to determine the relative dispersion of rates within the industry, particularly to take note of any changes attributable to the tariff reform.

While both nominal and effective rates appear to differ substantially even among sectors within the chemical industry, the effective rates are considerably more dispersed than the nominal rates for both pre- and post-reform periods. Table 6 provides the coefficients of variation: 74.62 per cent for the effective rates as compared with 59.64 per cent for the nominal rates in 1980, and 54.24 per cent for the effective rates as compared with 43.05 per cent for the nominal rates in 1985. Already, these measures call attention to the opportunities for increasing efficiency in resource use through the increased equalization of protection.

Table 6 — Coefficients of Variation
For Chemical Industry Sector Protection Rates,
1980 and 1985

	1980	1985	Percentage Point Decline
	(In per cent)		
Nominal Rates	59.64	43.05	16.59
Effective Rates	74.62	54.24	20.38

However, it is more important to see whether indeed, the tariff reform has succeeded in reducing the relative dispersion of rates within the industry. While the coefficient of variation for nominal rates shows a decline of 16.59 percentage points, that for effective

rates declines by 20.38 percentage points from 74.62 per cent in 1980 to 54.24 per cent in 1985 — an indication that the reform has succeeded in reducing the dispersion of rates at least within the industry.

The nominal rates of protection derived from tariffs yield simple averages of 29.19 per cent and 20.35 per cent for 1980 and 1985 respectively (Table 4). Except for the medicinal sector, nominal rates for the industry exhibit the cascading nature of most tariff structures, meaning low rates on raw materials, higher rates on semimanufactures, and the highest rates on finished products, which, as previously confirmed by Tan's (1979) findings, prevailed on an economy-wide scale in 1974.

Thus, nominal rates range from 15 per cent for basic industrial chemicals to 65 per cent for soap and other washing and cleansing compounds in 1980 and from 13.35 per cent to 37.5 per cent for each of the two sectors respectively, in 1985. According to both the pre-reform and post-reform rates, intermediate products such as fertilizers and plastic materials enjoy less protection than the finished products of paints, varnishes and related compounds, and soap and other cleansing compounds.

Effective protection, too, hardly deviates from the pattern observed by Tan (1979a, p. 148) in 1974, whose study noted that consumption goods received very high effective protection while basic and intermediate goods received substantially lower protection. With the exception of the medicinal sector, effective protection rates ranged from 13.74 per cent for basic industrial chemicals to a high 90.91 per cent for soap and other cleansing compounds in 1980 and from 12.62 per cent to 48.06 per cent for each of the two sectors respectively, in 1985. Again, the intermediate goods consisting of fertilizers and plastics enjoy less protection than the consumption items of soap and other cleansing compounds. A slight exception is observable in this respect, however. Prior to the reform, plastic materials enjoyed greater protection than paints, varnishes and related compounds, which involve a less basic processing activity than the former. However, the reform seemed to correct this "inconsistency" so that post-reform rates on EPR for paints and varnishes were higher than that for plastic materials. In this small respect perhaps, the reform can be said to reinforce the cascading nature of the tariff structure in the chemical industry. However, in the sense of reduced dispersion among rates, as discussed earlier, such cascading nature is

effected by the reform despite substantial reductions in the differences between protection rates afforded the different sectors of the industry. In short, the cascading nature of both nominal and effective rates is preserved hand-in-hand with the attempt to approach the "equalization" of rates across sectors.

The basic rationale for adopting a cascading structure of tariffs has to do with the linkages among industries in an economy. Thus, protection of raw materials, particularly those that enter as inputs into several industries, should be kept low so as not to penalize user-industries. However, this is not to cloud the importance also of considering the industry's own needs for protection and the significance of its role in the national economy.

High protection observable for consumer items, on the other hand, may be seen to be a remnant of the import-substituting policies adopted by the Philippine government in the 1950s, which started off with the protection of consumer goods.

Thus effective protection is observed to be fairly low for basic industrial chemicals and to proceed at higher rates as one goes down the production process, approaching the finishing stages of the manufacture of paint, soap and other presumably more finished chemical products. An exception noted was that of medicinal and pharmaceutical preparations, which may be classified with consumer items; yet, computations for the sector yielded very low effective rates of 2.51 per cent in 1980 and 4.11 per cent in 1985. Perhaps this is due to the nature of the industry. The domestic manufacture of medicinal items and pharmaceuticals is still mainly a mixing and compounding activity requiring little protection—hence the low EPRs.

One other aspect that can be looked into is whether EPR is greater than or less than nominal tariff rates in the chemical industry. Industry averages, as shown in Table 4, indicate that, both before and after the tariff reform, EPR is higher than the nominal rate. The difference is that pre-reform EPR exceeds the nominal rate by 6.74 per cent while post-reform EPR exceeds the nominal rate by a smaller 3.34 per cent.

To understand why EPR differs from the nominal rate, one needs to look into the weighted tariff on inputs into the industry. If weighted tariff on inputs is higher than the nominal tariff on the industry, EPR turns out to be less than the nominal rate. If weighted tariff on inputs is lower than the nominal rate, effective protection is higher than the nominal rate. Referring to equation (2),

E_j can be equal to T_j only if $T_j = \overline{T}_j$ or if the tariff on the product is equal to the weighted average tariff on inputs.

Whereas industry EPR is consistently greater than nominal protection for both 1980 and 1985, a look at each sector reveals differently. For both 1980 and 1985, EPRs of the basic industrial chemicals and medicinal sectors are lower than the nominal rates. For the remaining five other sectors, effective protection is greater than nominal protection.

Table 7 presents the weighted average of tariff rates on industry inputs and the nominal tariff rates on industry output. For the sectors with effective protection less than nominal protection, it is found that nominal tariffs on outputs are not enough to cover average tariffs on inputs. This is especially so for the medicinal sector for which the 7.5 per cent protection is wholly inadequate to compensate for the 21.54 per cent and 15.78 per cent average input tariffs for 1980 and 1985, respectively. Thus, for the basic industrial chemicals and medicinal sectors, actual protection is lower than would be indicated by the nominal rates. Turning to the paints, fertilizer, plastic materials, soap and other chemical products sectors, it is found that the nominal tariff rates are greater than the average input tariffs, thereby yielding greater effective protection than nominal protection. Apparently, tariffs on outputs are high enough to absorb even moderately high tariffs on intermediate inputs.

5. Conclusion

The ongoing tariff reform program involves a total restructuring of tariffs with the objective of scaling down "excessive" protection to industries. As with any policy changes, the possible effects of changes in tariff rates on Philippine industry must be monitored and compared against policy objectives.

The present study has focused on the transformation in the structure of protection accorded the different sectors of the chemical industry, taking into light their supportive role in Philippine industry. Apparently, the tariff reform program, upon full implementation, effects the greatest reductions in nominal and effective rates in those sectors where protection was originally the highest. Further, it succeeds in reducing the dispersion of rates across industry sectors towards the greater "equalization" of protection afforded different

Table 7 — Weighted Average of Tariff Rates
On Chemical Industry Inputs
(In Per Cent)

I-O Sector	Weighted Average Of Tariff Rates On Inputs		Nominal Tariff Rate For Sector Output	
	1980	1985	1980	1985
Basic Industrial Chemicals	18.65	15.28	15	13.35
Fertilizer and Lime	17.27	14.08	18	17.5
Paints, Varnishes, and Related Compounds	25.73	17.83	33.33	22.67
Plastic Materials	18.50	15.02	32.5	19.73
Medicinal and Pharmaceutical Preparations	21.54	15.78	7.5	7.5
Soap and Other Washing and Cleansing Compounds	30.23	19.80	65	37.5
Other Chemical Products	19.30	12.43	32.97	24.19

processing activities. This is achieved while maintaining the general cascading nature characteristic of the tariff structure so as to minimize the penalties imposed by a protected output sector on its user-industries. Nominal rates were then compared with effective rates for specific sectors, and their differences explained by the magnitudes of tariffs of inputs into the protected sector.

In short, viewing tariffs as protective instruments, the reform program succeeds in rationalizing the structure of protection in the chemical industry. However, there is still room to reduce further the protection of sectors involved in the more final stages of production. This can be done, perhaps through another gradual restructuring of tariffs by phases, after the Philippine industry has been given enough time to adjust to the impact of the ongoing tariff reform.

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