III METHODOLOGY AND REVIEW OF EARLIER STUDIES

For systematically describing, measuring and analysing the influence of protective and other incentive policies on domestic industries, effective protection and effective subsidy indicators are commonly used. The methodology of measuring effective protection and effective subsidy has been discussed in great detail in Pursell-Roger (1985) Manual for Incentive and Comparative Advantage Studies.[1] Therefore, to save space, it is only briefly discussed here.

Effective Protection

Nominal protection is concerned with the impact of trade related incentives to domestic producers (tariffs, quotas, etc.) on the prices of products. Nominal protection measures show to what extent product prices are raised or lowered by such incentives. Let PD_i denote the domestic market (protected) price of commodity i and let PW_i be the world price of the product, then the nominal protection coefficient for the commodity (NPC_i) may be defined as :

$$NPC_i = PD_i / PW_i \tag{3.1}$$

In this definition, the world price or the border price is generally the cif import price or the fob export price. If the country does not actually import or export the commodity, the border price is estimated, considering possible external sources of supply, price quotations of such exporters, and port-to-port transportation costs.[2] Studies attempting greater sophistication in the estimation of NPC also take into account the location of domestic producers and inland transportation costs.

Consider the case of a homogeneous good which is both produced and sold domestically, and imported under competitive conditions. It is assumed further that consumers are indifferent between the locally produced and imported versions of the good. Imports are subject to an ad valorem tariff on cif value, and this is the only relevant government incentive. The country concerned is small in relation to the global trade in the good and can import as much as it wants at a given world price.

In this case, the nominal rate of protection is equal to the rate of tariff. This equality will, however, not hold in general. Thus, if there are quantitative restrictions on imports of the commodity, the domestic price may exceed the world price by a margin greater than the tariff rate. Similarly, if the tariff rate is so high that the good is not imported at all, then the gap between the domestic price and the world price may be lower than the tariff rate. In this situation, the tariff is partially redundant. Such redundancy in tariff may occur because competition among domestic producers keeps the price low, or there is administrative price control.

Information about the structure of nominal protection across products is useful for analysing the impact of incentives on prices and hence on the pattern of consumption. But, to study the impact of incentives on production activity (or the value adding process of production), one requires the inter-industrial structure of effective protection rates which take into account protection to output and to intermediate inputs of the activities.

The efective rate of protection (ERP) to an activity is defined as the difference between value added in that activity at domestic (protected) prices (VAd) and value added at world or border (freely traded) prices (VAw) expressed as a proportion of value added at world prices, i.e.,

$$ERP = \frac{VA_d - VA_w}{VA_w} \qquad (3.2)$$

It shows to what extent the income of the primary factors engaged in the activity goes up as a result of protection.

The concept of ERP can be expressed in another way. If both the final product and the material inputs used in the production could be bought or sold in world markets at given prices, then with a given exchange rate there would be certain processing margin into which a producer in a particular country will have to fit his processin costs (cost of labour, land and capital including an acceptable profit margin). Tariffs and other measures, through their effects on prices, widen or narrow this processing margin. Effective protection is then simply the difference between the observed processing margin, and what that margin would be in the absence of tariffs and other interventions.

Let P_d be the domestic price of a commodity and I_d be the value of intermediate inputs in domestic prices needed to produce one unit of the commodity. Then, the value added at domestic prices by producing one unit of the commodity is

$$VA_d = P_d - I_d \qquad (3.3)$$

which is also the observed processing margin. Let P_w be the world price of the product and NPCothe nominal protection coefficient for output, then the following relationship holds

$$P_w = P_d \;/\; NPC_o \qquad (3.4)$$

Similarly, let I_w be the value of intermediate inputs at world prices. Then, the <u>average</u> nominal protection coefficient for intermediate inputs NPC^I, may be derived as

$$NPC^I = I_d \;/\; I_w \qquad (3.5)$$

or

$$I_w = I_d \;/ NPC^I \qquad (3.5a)$$

Using these notation, the value added at world prices may be wntten as

$$VA_w = P_w - I_w \qquad (3.6)$$

$$= (P_d \,/\, NPC_o) - (I_d \,/\, NPC^I) \qquad (3.6a)$$

which is clearly the processing margin in the absence of tariffs and other interventions. The effective protection coefficient (EPC) and the effective rate of protection (ERP) may be defined as

$$EPC = \frac{VA_d}{VA_w} \quad (3.7)$$

$$\frac{P_d - I_d}{(P_d/NPC_o) - (I_d/NPC^1)} \quad (3.7a)$$

$$ERP = EPC - 1 \quad (3.8)$$

The measurement of ERP gets complicated once it is recognised that some intermediate inputs (e.g., power) may not be tradeable. Various conventions have been developed to deal with non-tradeable intermediate inputs in the framework of effective protection.

The simple Balassa method assumes that the supply of non- tradeable intermediate inputs is infinitely elastic and that the protective structure has no effect on their prices. Under this approach non-tradeable intermediate inputs are treated in the same way as tradeable inputs with zero nominal protection, i.e., the non-tradeable intermediate inputs are deducted from the gross output along with tradeable inputs to get value added.

The simple Corden method assumes that the supply of non- tradeable intermediate inputs is less than infinitely elastic and that the protective structure affects their prices in much the same way as it affects the income of primary factor. Under this approach, non-tradeable intermediate inputs are lumped in with value added aggregate. Measured in this manner, effective protection to an activity includes protection to the primary factors used in the activity and protection to industries producing non-tradeable intermediate inputs used in the activity.

In the more sophisticated Corden approach, non-tradeable intermediate inputs are broken down into their value added and tradeable goods components. The value added component of the non-tradeable intermediate inputs is added to the value added in the original tradeable good activity. The tradeable input component is treated along with other tradeable inputs.

The more sophisticated Balassa approach maintains the assumption of non-tradeable intermediate inputs being supplied at constant cost, but allows for protection induced changes in the prices of tradeable inputs used in the production of non- tradeable goods.

While the choice of themethod significantly affects absolute values of ERPs, the ranking of industries may not be affected very much. The simple Corden and Balassa methods are easy and quick to compute, but obviously some information is lost. The sophisticated Corden method is probably conceptually most correct, but it clubs protection to processing activity with associated non-tradeable intermediate input activities, and requires much more data than the simple Corden and Balassa methods.

Effective Subsidy

ERP shows how tariff and other such interventions affect the prices of output and intermediate inputs and thereby influence the attractiveness of production activities. It should be recognised that concessional credit, tax preference and subsidy on intermediate inputs would also influence the attractiveness of production activities. To take into account the influence of such measures on the attractiveness of a production activity, effective subsidy indicators are used. Let VAddenote value added at domestic prices, VAw value added at world/border prices and S the net value of subsidies, then the effective subsidy coefficient (ESC) may be defined as

$$ESC = \frac{VAd + S}{VAwr} \qquad (3.9)$$

and the effective rate of subsidy (ERS) as

$$ERS = ESC - 1 \qquad (3.10)$$

It should be noted that while tariff, quota etc. affect the processing margin of a commodity, the subsidies mentioned above affect the processing costs without affecting the processing margin into which these costs must fit. Another point to be noted is that in the computation of the subsidies some norms have to be used. Thus, to compute credit subsidy one has to compare the rate of interest on debt capital actually paid by a firm and the average or normal rate of interest. Similarly, actual tax rate on profits has to be compared with the normal tax rate, and actual power tariff with the average power tariff or the cost of power generation. Evidently, the value of et subsidy, S in eq. 3.9, can be negative, which would indicate that the incentive for production created by tariff and other such interventions is partly offset by government policies relating to credit, taxation and public sector pricing.[3]

Earlier Studies on Effective Protection for Indian Aluminium Industry

There have been two earlier studies on effective protection for Indian aluminium industry. These are the studies of Panchamukhi (1978) and Gupta (1987). In both the studies, ERP has been estimated for production of primary aluminium from bauxite (including the stage of alumina production). Panchamukhi has presented ERP estimates for two units and the industry (aggregation of the two units) for the period 1959 to 1970. ERP estimates for a third unit has been presented for 1969 and 1970. Gupta has presented ERP estimates for 1967 and 1977. He has covered all the four primary aluminium production firms in the country - one in the public sector and three in the private sector. For the firm which has plants in different locations, plant-wise ERP estimates have been presented. Gupta has estimated ERP using both the simple Balassa method and the simple Corden method (discussed above).

In Table 3.1, ERP estimates for the aggregate aluminium industry made by Panchamukhi (1978) and Gupta (1987) are presented. These estimates bring out that the Indian aluminium industry enjoyed a high level of protection in the early 1960s. The estimates indicate that there was a downward trend in the level of effective protection to aluminium industry after 1963. ERP estimates for 1970 and 1977 are found to be negative from which it appears that the industry was disprotected in those and probably most other years of the 1970s.

Firm-level estimates of ERP made by the two authors are presented in Table 3.2. The estimates reveal considerable inter- firm variation in the level of effective protection (also, year to year variations in ERP are quite sharp). The observed variations in ERP across firms, are attributed by the authors to the inter-firm differences in regard to scale of production, capacity utilisation, technology, sources of input supply, managerial efficiency, etc.

One limitation of the two studies is that these consider only effective protection to primary aluminium production activity. Since primary aluminium producers, themselves, fabricate a large part of their metal production, for a proper understanding of the incentive structure of aluminium industry, it is important to estimate also effective protection to fabricated products.

Table 3.1

ERP Estimates for Aggregate Aluminium Industry

(per cent)

Year	Panchamukhi	Gupta	
		Estimate 1	Estimate 2
1959	71.7		
1960	132.4		
1963	232.1		
1966	44.9		
1967	21.6	5.9	4.0
1969	9.7		
1970 -	–19.4		
1977		–46.7	–19.2

Source : Panchamukhi (1978) and Gupta (1987).

Table 3.2

Firm-Level ERP Estimates for Aluminium Industry

(per cent)

Year	Firm 1	Firm 2	Firm 3	Firm 4
1969	16.8	1.1	–304.9	
1970 -	2.3	–25.8	–52.4	
1977 -	6.1	–40.8	–19.9	1.1

Source : Panchamukhi (1978) and Gupta (1987).

NOTES

1. For theoretical discussion on effective protection, see Corden (1971, 1985) and Tower (1984).

2. Alternatively, one estimates the fob export price for the commodity in question considering the prices at which major importing countries are buying and the transportation costs.

3. An alternative approach to the analysis of effective incentives for domestic production involves a comparison between a situation in which tariffs, quantitative restrictions on imports, domestic taxes, subsidies, etc. are all present with another situation in which all these are absent. Comparing value added in the two situations, a measure of "total protection" may be obtained. This will be different from the effective protection and effective subsidy coefficients discussed above. It should be possible to decompose the "total protection" measure into parts that can be attributed to trade restrictions, subsidies, etc. Though what is needed to compute the effective protection and effective subsidy coefficients.