V ESTIMATES OF EFFECTIVE PROTECTION AND EFFECTIVE SUBSIDY RATES

Estimates of effective protection and effective subsidy rates for the Indian aluminium industry are presented in this chapter. Effective rates of protection to the production of primary aluminium metal have been estimated for four primary producers HINDALCO, INDAL, MALCO and BALCO[1] for the years[2] 1980, 1983 and 1986 to 1988. Effective subsidy rates have been estimated for three aluminium firms for 1986 and 1987. To get a better insight into the structure of incentives, effective protection rates have been estimated also for the two processes, alumina refining and aluminium smelting, separately, and for the production of semi-fabricated products (extrusions, rolled products, and foils). These estimates have been made at the aggregate industry level and relate to 1986 and 1987.

Data Sources

For estimating effective protection and effective subsidy rates, basic data (input requirements, cost structure, input prices, etc.) have been drawn from Radhakrishna and Kalra (1987), Thangaraju and Kothari (1986), NCAER (1983) and the Report of the Working Group on Aluminium, Manasium, Titanium, Vanadium and Gallium for the Eighth Five Year Plan (Ministry of Steel and Mines, May 1989). Domestic and international prices of major inputs in aluminium production have been provided in Radhakrishna and Kalra (1987) for the period 1979 to 1983/1984. To get such prices for recent years and for inputs for which prices are not available in the study of Radhakrishna and Kalra, various other sources have been utilised. Domestic prices of inputs have been worked out from cost data of aluminium producers obtained from the sources mentioned above. Wherever found necessary, price quotations reported in the official series Revised Index Numbers of Wholesale Prices in India (hereafter abbreviated as RINWPI) have been used. To get border prices of inputs, unit values of imports (or exports, in certain cases) have been used. Unit values have been computed from Monthly Statistics of Foreign Trade of India and Indian Petroleum Statistics. Also, unit values computed from Yearbook of International Trade Statistics (UN) and price quotations in international markets have been used for this purpose.

Border price of aluminium ingot is obtained on the basis of annual average price (spot) quotations in the London Metal Exchange (LME), which is reported in Minerals and Metals Review. Domestic prices of aluminium ingot are the retention and controlled pool prices (depending on the production unit for which the estimate is made) are announced by the government from time to time. These have been compiled from various sources.

For semi-fabricated products, domestic prices have been taken from price quotations reported in RINWPI. Since domestic prices of semi-fabricated products are taken from RINWPI, these are inclusive of excise duty. To maintain consistency, purchasers' price of aluminium ingot (CG) has been taken as the domestic price of aluminium in the computation of ERP for semi-fabricated products. Border prices have been obtained on the basis of unit values of exports computed from data on quantity and value of exports of aluminium products published in Minerals and Metals Review.

Price of Aluminium Ingot

As noted earlier, border price of aluminium ingot is obtained on the basis of annual average[3] price (spot) quotations in the London Metal Exchange. To obtain the cif import price in India, it is necessary to add to the quoted LME price, transportation costs and allied expenses. From some information on transportation of aluminium metal available in the study of Brown et.al. (1983), it seems that, in 1980, the cost of transporting one tonne of aluminium ingot from European countries to India was about U.S.$100. This figure has been used to compute landed price of aluminium ingot in India from the data on price of aluminium ingot prevailing in London market.

It has been noted in Chapter 4 above, that the international price of aluminium in 1988 was much higher than what one would expect on the basis of the past trend. In particular, the price prevailing in June 1988 was exceptionally high. Since such abnormal price variations may distort the estimates of effective rate of protection, the international price of aluminium for 1988 has been computed after excluding price quotations for the month of June.

It has been noted earlier that only a small part of the global trade in aluminium takes place through the London Metal Exchange. Thus, to judge the correctness of the border prices computed from LME price quotations, these need be compared with unit values of imports of aluminium ingot in India. A comparison of the computed border prices with unit values of imports is presented below :

Year	Border price based on LME price quotations (Rs./MT)	Unit value of imports (Rs./MT)	% difference
1980	14515	14864	2.4
1981	13084	14108	7.8
1982	10883	11396	4.7
1983	15512	14309	-7.8
1984	15306	15770	3.0
1985	14274	14261	-0.1
1986	15789	15620	-1.1
1987	21517	21310	-1.0
1988	35440	30031	-15.3
April '88 to March '89	–	34300*	-3.2

* estimated from available month-wise import data.

It is seen that for six out of the nine years, the difference between the two sets of prices is less than five per cent. For 1981 and 1983, unit values differ from the computed border prices by 7.8 per cent, which is again not large. But, for 1988, the unit value is found to be much lower (by 15.3%) than the computed border price. This seems to be attributable largely to the fact that a sizeable part of the imports of aluminium in India during 1988 occurred in the first three months when the international price level was relatively low compared to the average price level during the year. Also, unit import values may deviate from current international market prices due to time lags in delivery. When the unit value for the period April 1988 to March 1989 is compared with the computed border price for 1988, the difference is found to be quite small.

The system of pricing and distribution control on primary aluminium producers which existed in India from 1978 to 1988 has been described in Chapter IV. In view of such controls on pricing and distribution, the "domestic" price of aluminium ingot to be used in the estimation of effective protection rates depends on the production unit for which such estimate is made. For the individual primary producers, the relevant price is the average retention price of CG and EC grade aluminium ingot.[4] This price varies significantly from one primary producer to another. On the other hand, if the analysis is carried out at the aggregate industry level, the relevant price is the average controlled pool price (net of excise duty) of CG and EC grade. In both cases, annual averages have been taken of the retention prices/controlled pool prices prevailing in different months of a year.

Price of Bauxite

Since bulk of the world trade in bauxite takes place among the six major multinational companies and their affiliates, and of the remaining, most is under long-term contracts, it is very difficult to estimate the 'free-trade' reference price for Indian bauxite. One set of figures that are available is the U.S. cif import price of Jamaican bauxite, which is shown below :

Year	U.S. cif import price of Jamaican bauxite ($/tonne)
1980	41.2
1981	40.0
1982	36.0
1983	34.7
1984	33.0
1985	30.0
1986	28.0
1987	26.0

It is seen that in 1980 and 1981, the price of bauxite was about forty dollars per tonne. It has been steadily declining since then and came down to 26 dollars per tonne in 1987.

The prices of bauxite given above are quite high in relation to the fob export price of Indian (non-calcined) bauxite, which is shown below :

Year	Fob export price of Indian bauxite(non-calcined)	
	(Rs./Tonne)	($/Tonne)
1980-81	118	14.9
1981-82	123	13.7
1982-83	137	14.2
1983-84	135	13.1
1984-85	152	12.8
1985-86	175	14.3
1986-87	187	14.6

It is seen that the fob export price (unit value) of Indian bauxite expressed in U.S.$ remained by and large in the range of $13 to $15 per tonne during the years 1980-81 to 1986-87.

It should be pointed out here that before April 1985, when the export policy was liberalised, there were government restrictions on the exports of bauxite from India. Therefore, the unit export values may not correctly represent the border prices of Indian metallurgical grade bauxite. It seems, however, that the unit values of bauxite exports from India shown above would be much closer to the border prices than the fob export prices of Jamaican bauxite reported in Radhakrishna and Kalra (1987) or the cif U.S. import prices of Jamaican bauxite presented above. Accordingly, the unit value of exports of bauxite from India has been taken as the border price for 1980 and 1983. Since, for recent years data on export of bauxite from India are not available, the border price has been taken as $14.6 per tonne, which is the unit value realised in 1986-87.

The primary aluminium producers in India get their supply of bauxite (from their captive mines) at varying prices. This variation in the price of bauxite is due largely to differences in mining costs and in the distance over which the bauxite mined has to be transported. To apply a uniform price of bauxite for all aluminium producing firms does not methodologically seem correct inter-firm differences in the cost of procuring bauxite enters into the fixation of retention prices. Accordingly, while estimating the effective protection rate to an individual producer, the unit cost of procuring bauxite for the producers has been used as the 'domestic' price. When the analysis is carried out at the aggregate industry level, a weighted average of the firm specific bauxite prices has been taken.

Nominal Protection to Aluminium

Nominal rates of protection to aluminium (primary metal) production have been computed by taking the ratio of administered price[5] (average of CG and EC grade ingot) to the landed price[6] of imported aluminium (based on LME price quotations plus transportation cost). Such computations have been done for the four primary producers and the aggregate industry, for the period 1979 to 1988. The results are presented in Table 5.1.

Table 5.1 reveals that the nominal rate of protection to aluminium production varied considerably from year to year in the period 1979 to 1988. The nominal rate of protection was significantly negative in three years 1979, 1980 and 1988, while it was significantly positive in four year 1982, 1984, 1985 and 1986. Also, there were marked differences in the nominal rate of protection among the four primary producers. Inter-firm differences in nominal protection is clearly attributable to the system of retention prices for firms. Inter-temporal variations are in normal protection traceable mainly from year to year fluctuations in the international price of aluminium ingot and the domestic administered prices not being sufficiently linked to the international price.

Table 5.2 shows for a number of years the rate of customs duty on imports of aluminium ingot. It is seen from the table that from August 1976 to March 1985, the rate of customs duty was raised steadily from 20 to 40 per cent ad valorem. In this period, it seems, the rate of customs duty bore little relation to the relative price of aluminium in international market vis-a-vis the price in India. But, from April 1985, frequent changes (sometimes twice or thrice in a year) were made in the rate of customs duty in response to changes in the international price of aluminium vis-a-vis the domestic price (administered). It is seen, however, that in the period from 1977 to 1987, the rate of customs duty was maintained at 20% or higher level, though in several years during this period, the domestic price for aluminium producers was lower than the world price, i.e. the nominal rate of protection was negative. It is only in 1988, that the import of aluminium ingot was put under Open General Licence and the rate of customs duty was brought down to a substantially low level.

Effective Protection to aluminium

Estimates of effective rate of protection (ERP) to aluminium (primary metal) are presented in Table 5.3. Estimates are presented in the table for the four primary producers, for the years 1980, 1983 and 1986 to 1988. Estimates of ERP are presented also for the industry as a whole, which have been obtained by taking a weighted average of firm-level estimates, the weights being the relative production levels (in relevant years) of the firms. For making these estimates, the simple Cordon method has been used. Bauxite, caustic soda, C.P. coke, cryolite, aluminium flouride, pitch, lime, fuel oil and coal[7] are taken as tradeable inputs. Other tradeable inputs, such as soda ash, flurspar and carbon black, are combined into one miscellaneous group, for which the nominal protection coefficient is assumed to be unity.[8]

It is seen from Table 5.3 that ERP was negative for all the four firms in 1980, 1983 and 1988. ERP was negative for two firms in 1986 and three firms in 1987, out of the four. ERP for the aggregate industry was close to zero in 1986 and negative in the other four years. In 1988, ERP for the aggregate industry was - 44.5% and in 1980 it was -50.8%.

A negative ERP indicates disprotection of the industrial activity, i.e., the non-tradeable factors engaged in the activity receive less reward than what they would have received in the absence of tariffs and other such restrictions on trade, and government controls on prices of output and tradeable inputs. For Firm 4, ERP is found to be -59.9% for 1980. This figure may be interpreted as indicating that in 1980, non-tradeable inputs (including primary inputs, labour and capital) engaged in aluminium production in Firm 4 earned an income of about 60% less than what they would have earned if aluminium ingot and the various tradeable inputs could be traded freely without any customs duty and there was no government control on the price of aluminium ingot.[9]

Earlier studies on effective protection to aluminium production in India, reviewed in Chapter 3 above, have found that ERP was positive in the 1960s. The estimates show a clear downward trend in ERP after 1963, indicating that the extent of protection to aluminium has been going down. Estimates of ERP for 1970 made by Panchamukhi (1978) and for 1977 made by Gupta (1987) indicate that the industry was disprotected in those years and probably most other years of the 1970s. From the estimates presented in this study it seems that ERP was negative for most years of the 1980s. Considering the present estimates along with the estimates of Panchamukhi and Gupta, it would therefore appear that the production of aluminium metal in India has remained disprotected for quite a long time conninciding by and large with the period during which the industry was under government control.

As in the case of nominal protection, the effective protection rate is found to vary substantially among the four firms. Disprotection is more pronounced for Firms 1 and 4, compared to Firms 2 and 3. This inter-firm variation in ERP is attributable to the system of firm specific retention prices, though there are differences also in the average rate of nominal protection to tradeable inputs.[10]

In Table 5.4 a comparison is presented between nominal and effective protection rates to aluminium for the aggregate industry. The table also shows the nominal rate of protection to tradeable inputs (as a group). It is interesting to note that while the average rate of nominal protection to tradeable inputs was only 2.2 per cent in 1980, it was more than 50 per cent in the other four years. In 1986 and 1987, the nominal rate of protection to aluminium was positive. But, the average rate of nominal protection to tradeable inputs was far higher, the net result of which was a near zero or negative effective rate of protection. Comparing nominal and effective protection rates to aluminium, it is found that the latter is lower than the former in all the five years by 10 percentage points or more.

At this stage, it would be useful to take a look at ERP estimates for other manufacturing industries, and find out where the aluminium industry stands relative to other manufacturing industries in terms of the extent of protection.

In a recent study carried out by the World Bank (India, An Industrialising Economy in Transition, 1989), effective rates of protection have been estimated for 66 major industries covering almost the entire manufacturing sector. The actual ERP estimates have not been presented in the study, but the industries have been classified into high, moderate and low categories according to the level of effective protection. The ranges are taken as follows: high, above 70 per cent; moderate, 30 to 70 per cent; and low, less than 30 per cent (including negative). The study finds that effective protection was high in 21 industries, moderate in 5 industries and low in 30 industries. Using the middle values of the protection ranges - 100 per cent for high, 50 per cent for moderate and 15 per cent for low - weighted average rates of effective protection have been computed. These turn out to be 40 per cent using value added at world prices as weights and 46 per cent using value added at domestic prices as weights.

In studies undertaken by ICICI, BICP and CEI, effective rates of protection have been estimated for some Indian industries for recent years.[11] These estimates are shown in Table 5.5.

For most industries for which ERP estimates are presented in the table, the estimated ERP is found to be positive. In some cases, the estimated ERP is very high, over 300 per cent. ERP estimates are found to be negative in four industries in the ICICI study and for some auto ancillary items in the BICP study. For sheet glass, the estimated ERP is -96.8 per cent, which is remarkable since it implies that value added at domestic prices is only about 3 per cent of the value added at world prices. Considering the ERP estimates presented in the table along with the findings of the World Bank study mentioned above, it seems that in a majority of Indian industries there was significant positive effective protection, and aluminium belongs to that minority group which was disprotected.

Effective Subsidy

As pointed out in Chapter 3 above, effective subsidy coefficient (ESC) is a more comprehensive measure of incentives to a production activity than effective protection coefficient (EPC), since ESC takes into account taxes and subsidies on non-tradeable inputs, besides the effect of trade restrictions and other government interventions on prices of output and tradeable inputs. Ideally, in the computation of ESC, one should consider all taxes and subsidies, along with norms for each. But, in empirical studies, inadequate availability of data often forces the researchers to confine attention to only important items. Recognising the significance of ESC, its estimation has been attempted for the aluminium firms. For making the estimates, only the subsidy on power is included. It may be mentioned, however, that power constitutes about 40 per cent of the total cost of production of aluminium ingot and about 60 per cent of the cost of non-tradeable inputs, and a subsidy on power has therefore an important bearing on incentives to the production activity. For firms which draw power from their own captive plants, subsidy arises from underpricing of inferior grades of coal (used in power generation) which is attributable to the coal pricing policy of the government. For firms which draw power from the State Electricity Boards (SEBs), subsidy arises from (1) SEB charging a lower rate for power to the aluminium unit than its cost of generation[12], and (2) SEB's cost of generation being lower than what it would have been otherwise as a result of the coal pricing policy of the government and the supply of concessional credit by the government/financial institutions.

ESC has been estimated for Firms 1, 2 and 3 for the year 1986 and 1987. It has not been possible to make such estimates for Firm 4 due to certain gaps in the available data. Before presenting the ESC estimates, some details about the estimation of subsidy on power is given below.

That poorer grades of non-coking coal, mainly used in the power sector, are severely underpriced, is recognised widely.[13] This has been held mainly responsible for the massive losses incurred by Coal India Ltd. in recent years. The cost of production of coal per tonne was Rs.219 in 1986-87 and Rs.225 in 1987-88. The average realisation per tonne of coal was about Rs.192 in those two years. This involved a loss of Rs.27 per tonne in 1986-87 and Rs.33 per tonne in 1987-88, which may be treated as average subsidies per tonne of coal in those two years. There was, in addition, an element of cross subsidisation among different grades of coal.

One approach to the estimation of cross subsidy is to compare the administered prices of different grades of coal with gross calorific values of those grades. From such a comparison, it appears that inferior grades of non-coking coal were cross-subsidised to the extent of about Rs.28 per tonne. Thus, the total subsidy on coal used for power generation comes to about Rs.55 per tonne for 1986 and Rs.61 per tonne for 1987 (as against the supply price of about Rs.120 per tonne).[14]

For an aluminium firm which draws power from its own captive plant, the amount of subsidy per tonne of aluminium is computed considering (1) the consumption of power per tonne of aluminium, (2) the consumption of coal per unit of power generated, and (3) subsidy per tonne of coal used in power generation. For a firm that draws power from SEBs, the computation of subsidy is more complex. Additional information[15] needed is : (1) the rate at which the aluminium unit gets power, (2) the costs of generation of the SEB, (3) share of hydel in SEB's total power generation, (4) ratio of imports (from central sector and inter-State sources) to net generation of the SEB, (5) coal consumption per unit of power generated in coal-based plants, and (6) interest cost and net fixed capital employed. Capital cost subsidy is computed as the difference between actual interest payment and the imputed cost at 12 per cent return on net fixed assets.

From the computations made, the amount of subsidy on account of power per tonne of aluminium produced is found to range from Rs.838 to Rs.7958. The estimated ESCs are shown in Table 5.6. To facilitate comparison, this table also shows the EPCs.

It is seen from the table that ESC estimates exceed the EPC estimates for all the three firms. But, it is only in the case of Firm 3 that the estimated ESC is substantially higher than the estimated EPC. Indeed, it is interesting to note that while EPC estimate for Firm 3 for 1987 is less than unity (indicating disprotection), the estimated ESC is well above unity.

Comparing weighted averages, it is found that estimated ESC is higher than estimated EPC by 10.4 per cent for 1986 and 10.6 per cent for 1987. From this, it appears that the estimates of ERP to aluminium industry presented in Table 5.4 above overstates somewhat the extent of disprotection to the industry.

Processwise ERP Estimates

In the analysis presented so far, aluminium production has been treated as one production activity. It would be interesting and useful to divide the production process of aluminium into two parts - alumina refining and aluminium smelting - and study effective protection to these two processes separately. This analysis has been carried out at the aggregate industry level for the years 1986 and 1987.

Table 5.7 gives the ERP estimates for alumina refining and aluminium smelting. The table brings out clearly the sharp difference that existed between the two processes in terms of effective rate of protection. ERP estimates for alumina refining are 108.2 per cent for 1986 and 109.6 per cent for 1987. But, ERP estimates for aluminium smelting are significantly negative at -15.3 per cent for 1986 and -22.8 per cent for 1987. This clearly shows that the incentive structure created by trade restrictions and administered price policies of the government favoured production of alumina from bauxite, but not production of aluminium from alumina.

Effective Production to Semi-fabricated Products

A substantial part of aluminium produced by the four primary producers are used in their semi-fabrication units for producing (1) properzi rods, (2) rolled products (flats, sheets, circles, coils, foils, etc.), and (3) extruded products (rods, tubes, etc.). Prior to March 1989, when the industry was deregulated, there was government control on the price of properzi rods (based on EC grade metal), but there was no control on prices charged for rolled and extruded products. It is believed that primary producers over-priced the rolled and extruded products to make up for inadequate profits earned or losses incurred on the production of aluminium metal. Thus, for a proper assessment of the incentive structure of aluminium industry, it is important to examine effective rates of protection to rolled and extruded products.

Domestic price quotations for (1) extrusions, (2) rolled products other than foils, and (3) foils have been taken from RINWPI.[16] Border prices for these aluminium products have been obtained from export trade data given in Minerals and Metals Review. Unit export values of the relevant categories of semi-fabricated aluminium products are taken as the border prices. Since there are many types of rolled and extruded products and there is also significant variation in quality, it has not been possible to match adequately the unit export values (as border prices) with the product categories for which domestic prices are available. This is a deficiency of the ERP estimates for semi-fabricated products presented here. There is, therefore, need for caution in drawing inferences from the results.

Table 5.8 shows the estimated effective rates of protection to (i) extrusions, (ii) rolled products other than foils, and (iii) foils. The estimates relate to 1986 and 1987. It is seen from the table that estimates of ERP to rolled products and foils are quite high, especially for 1987. ERP to Foils for 1987 is found to be over three hundred per cent, which may be interpreted as showing that the processing margin in foils (including any abnormal profits earned) in 1987 was over eight times what the processing margin would have been in the absence of trade restrictions and government controls on pricing and distribution of aluminium.

Compared to ERP estimates for rolled products and foils, ERP estimates for extruded products are much lower; but these are positive. It may be mentioned in this connection that while primary producers dominate the market for rolled products, there are many secondary producers in the market for extruded products. In 1983, 85 per cent of the licensed capacity of rolled products was with the primary producers. For extrusions, the relevant ratio was 50 per cent. The existence of a large number of secondary producers for extrusion but not for rolled products is attributable, among other reasons, to lower investment requirement of extrusion plants and the minimum efficient scale for extrusions (500 tpa) being much smaller than that for rolled products (20,000 tpa). This has naturally led to greater competition among firms producing aluminium extrusions, which is probably one of the reasons for the relatively low ERP for extruded products (compared to rolled products).

Summing up

ERP estimates for aluminium firms presented in this chapter indicate that there was disprotection to aluminium production in most years of the 1980s. Estimates of ESC which take into account subsidy on power indicate that the extent of disprotection is overstated somewhat by the ERP estimates. When the production process of aluminium is broken into two processes, alumina refining and aluminium smelting, and ERP is estimated for them separately it is found that the production of alumina from bauxite is sufficiently protected, and it is the production of aluminium from alumina which has a negative effective rate of protection. A substantial part of the metal produced by aluminium firms are used by themselves for manufacturing semi- fabricated products. Estimates of ERP to semi-fabricated products are found to be positive. The estimates are quite high for rolled products and foils.

Table 5.1

Nominal Rate of Protection to Aluminium Production
1979 to 1988

(Per cent)

Year	HINDALCO	INDAL	MALCO	BALCO	Industry
1979	-38.4	-44.7	- 31.7	-13.2	-32.7
1980	-40.1	-44.8	-30.9	-13.4	-28.2
1981	-7.1	-13.1	-1.9	18.3	-2.2
1982	32.0	33.1	42.2	65.9	41.1
1983	-7.4	-6.6	-0.3	16.4	-1.0
1984	7.8	10.6	36.9	37.7	17.2
1985	18.8	22.5	54.5	52.6	29.9
1986	9.5	15.5	40.3	44.0	23.7
1987	-2.0	-5.3	12.0	21.2	7.8
1988	-35.8	-32.4	-29.4	-19.1	-27.5

Table 5.2

Customs Duty on Aluminium Ingot

Year/Date	Rate of Customs Duty (Basic + Auxiliary)
August 1976 to April 1980	(20% on EC grade
	(25% on others
1980-81	25%
1981-82	30%
1982-83	35%
1983-84	40%
1984-85	45%
April 1985	25%
December 198.	50%
June 1986	20%
February 1987	35%
May 1987	20% [made specific at Rs.3700 per MT]
December 1987	Rs.2000 per MT + 5% aux. (=13% a.v.)
February 1988	Rs.1000 per MT + 5% aux. (=8.4% a.v.)
November 1988	Rs.500 per MT + 5% aux. (=6.3% a.v.)

Table 5.3

Estimates of Effective Rate of Protection to Aluminiur (Primary Metal)

(Per cent)

	1980	1983	1986	1987	1988
Firm 1	-52.7	-30.5	-16.5	-20.7	-51.0
Firm 2	-24.9	-6.9	21.4	3.1	-34.3
Firm 3	-47.0	-30.6	12.2	-10.9	-47.8
Firm 4	-59.9	-36.7	-12.6	-26.5	-47.4
Industry*	-50.8	-25.9	-0.9	-12.4	-44.5

* Weighted average based on production levels.

Table 5.4

Comparison of Nominal and Effective Rates of Protection to Aluminium for Aggregate Industry

(Per cent)

Year	Nominal Production			Effective protection
	Output (1)	Output (2)	Tradeable inputs	
1980	-28.2	-37.0	2.2	-50.8
1983	-1.0	-0.7	56.0	-25.9
1986	23.7	24.2	96.2	-0.9
1987	7.8	6.5	76.6	-12.4
1988	-27.5	29.2	53.6	-44.5

Note : Nominal protection rates shown under the head output (1) are based on pool prices, and those under the head output (2) are obtained by taking a weighted average of nominal protection rates of the four firms. Nominal protection rates for inputs and effective protection rates are similarly obtained as weighted averages of firm level estimates.

Table 5.5

Estimates of Effective Rate of Protection for Some Manufactured Products

(Per cent)

Product	ERP
ICICI Study	
Wire rope	103.1
Dyes	469.2
Ferro alloys	480.9
Switch gears	10.5
Auto ancillaries	-15.6
Hand tools	53.5
Textiles machinery	101.4
Machine tools	8.5
Cables	-11.5
Sheet glass	-96.8
Commercial vehicles	8.3
Ceramics	35.4
Castings and forgings	324.3
Steel tubes and pipes	-20.2
Textiles	65.4
BICP Study	
Machine tools*	48 to 425
Electrical equipment*	0 to 32
Mining equipment*	30 to 380
Auto Ancillary*	-47 to 17
CEI Study	
Fertilizer equipment*	20 to 77

* There are several items in these categories. Therefore, the range of ERP estimates is shown.

Source : See text.

Table 5.6

Effective Protection and Effective Subsidy Coefficient for Aluminium Firms, 1986 and 1987

	EPC	ESC
1986		
Firm 1	0.835	0.910
Firm 2	1.214	1.287
Firm 3	1.122	1.801
Weighted average	1.009	1.113
1987		
Firm 1	0.793	0.850
Firm 2	1.031	1.168
Firm 3	0.891	1.362
Weighted average	0.895	1.001

Table 5.7

Estimates of Effective Rate of Protection to Alumina Refining and Aluminium Smelting, 1986 & 1987

(Per cent)

Process	ERP	
	1986	1987
Alumina refining	102.1	109.6
Aluminium smelting	-15.3	-22.8

Table 5.8

Estimates of Effective Rates of Protection to Semi-Fabricated Products, 1986 and 1987

(Per cent)

Product	ERP	
	1986	1987
Extrusions	8.3	66.0
Rolled products, other than foils	95.7	210.7
Foils	142.6	323.9

NOTES

1. NALCO which has come on stream very recently is excluded from the analysis.

2. The choice of years for study is largely dictated by the availability of data.

3. An average has been taken of the average prices prevailing in different months in a year.

4. An average of CG and EC grade is taken because the primary producers were under obligation to produce 50 per cent of their metal production as EC grade ingot and wire rods.

5. For firms, the retention prices are used, and for the industry, the pool price is used.

6. It does not include customs duty.

7. Border price of coal is obtained on the basis of landed cost of Australian coal in India after making adjustments for differences in gross caloric value (GCV).

8. Since the cost of items included in this group forms a small part of the total cost of tradeable inputs, a different assumption about NPC of this group will not have any appreciable effect on the ERP estimates.

9. Such an inference would be right for a firm which is engaged in the production of aluminium ingot only. But, for a multiproduct firm, the actual incomes of labour, capital and other non- tradeable inputs need not be low, as a result of disprotection, if there is significant protection to some other activities for the firm (say, production of

semi-fabricated products) and the gains in income from such protection is shared with inputs which are engaged in activities that are disprotected. It is also important to recognise that this interpretation of ERP estimates has implicit in it the "small country" assumption, i.e., India's foreign trade in aluminium and in inpujts used in aluminium production does not affect the international prices of those items.

10. Further, there are inter-firm differences in input consumption rates and the price at which bauxite is procured.

11. The estimates of ICICI (Industrial Credit and Investment Corporation of India) have been taken from their study, Export Performance of ICICI Financed Companies, 1978-79 to 1980-81, 1985. The estimates of CEI (Confederation of Engineering Industry) are taken from their study, Capital Goods Under Project Imports, 1986. The estimates of BICP (Bureau of Industrial Costs and Prices) have been taken from their publication, Strategies for Cost Reduction : Some Lessions from B.I.C.P. Studies, Studies on the Structure of the Industrial Economy, No.7, Ministry of Industry, June 1988.

12. Supply of power to aluminium smelters provides certain advantages to SEBs in maintaining a high plant load factor and thereby reducing cost of generation per unit of power. Thus, the entire difference between the cost of generation of power in a SEB and the price charged to an aluminium unit cannot be considered as a subsidy. The correction needed to separate the subsidy element is, however, very difficult to make and it has not been attempted for this reason.

13. See, for example, The Energy Scene , Advisory Board on Energy, Government of India, December 1987, p. 145.

14. One may argue that the amount of subsidy is over-estimated, since a part of the cost of production of coal by CIL may be traced to inefficiencies, which should not be considered as a subsidy to the coal-using sectors. While this, no doubt, causes an upward bias, there

is also a downward bias caused by not taking into account the premium that should be put on coal since a non- renewable resource of the country is being depleted.

15. Most of this information has been obtained from Annual Reports of the State Electricity Boards.

16. For rolled products, a simple verage of prices of sheets, coils and circles is taken. For extrusions, a simple average of prices of rods and tubes is taken. The data source on domestic wholesale prices gives three price quotations for foils. Among these three, the price quotation for 0.10 mm. Toggar Foils in reels hard packed is used for the present analysis.