IV REGULATION, PRICE TRENDS AND PROFITABILITY

The Indian aluminium industry has been under government regulation since 1970.[1] There was regulation on pricing, and also on distribution of aluminium. After being under government regulation for about 18 years, the industry was deregulated recently, in March 1989. Though it would have been quite interesting to make a comparative study of price, cost, profitability, and effective protection and subsidy rates for the Indian aluminium industry before and after the deregulation, it has not been possible to do so due to non-availability of the data required for such analysis for the period after March 1989. Thus the period covered for the empirical analysis presented in this and the next Chapter is upto the end of 1988 and the post- deregulation experience of the Indian aluminium industry is taken up separately in Chapter VII.

Prior to 1975, the government exercised informal control over the distribution of aluminium. From 1975, the distribution was brought under the purview of the Aluminium Control Order. By notifications issued in July 1975, each producer was required to produce 50 per cent of his metal production as EC (electrical conductor) grade in the shape of ingots and wire-rods, for supply to units against allotments made by the Aluminium Controller. In imposing this control, the objective of the government was to ensure adequate availability of EC grade metal for the manufacture of cables and conductors needed for rural electrification programme. However, in later years (mid-1980s), this control on distribution caused serious problems for aluminium producers, since the State Electricity Boards slowed down investment in transmission and distribution (due to financial difficulties and for other reasons), and in consequence the off-take of EC grade metal fell far short of the stipulated 50 per cent production level. The share of EC grade metal in total apparent consumption was 61 per

cent in 1976-77. This ratio came down to about 42 per cent in 1983-84, and further to about 35 per cent in 1987-88.

The system of pricing which has been prevalent since October 1978 (till February 1989) is as follows. There was a retention price for each producer based on cost of production plus a post standard tax return on shareholders' funds. The rate of return was linked to the level of capacity utilisation. It ranged from 7% at 55% capacity utilisation to 12% at 90% capacity utilisation. There was a controlled pool price (basic price), which was a weighted average of retention prices of the producers, the weights being the production tonnages. A producer whose retention price was lower than the sale price had to pay the difference between the sale price and retention price for each tonne of metal sold into an account called the Aluminium Regulation Account. [2] A producer whose retention price was higher than the sale price drew from the said account the difference between the sale price and retention price for each tonne of metal sold. Controlled pool prices were fixed by the government for CG ingot [3], EC grade ingot and EC grade wire-rods. Prices of semi-fabricated products (sheets, plates, etc.) were not controlled by the government. From October 1979, the government brought imported aluminium under the ambit of price control and introduced a formula for calculation of 'aluminium price equalization amount' to form a part of the Aluminium Regulation Account.

Costs and Retention Prices

Radhakrishna and Kalra (1987) have analysed increases in cost of production and retention prices for aluminium producers for the period 1978 to 1983. Their analysis brings out that the increases in retention prices granted by the government has not always kept pace with increases in cost. Table 4.1 shows cost of production and retention prices for the aluminium producers for different years from 1978 to 1983. It was seen from the table that in the late 1970s and early 1980s the cost of production of aluminium in BALCO was much higher than that in INDAL, HINDALCO and MALCO. In 1978 and 1979, the retention prices covered

the cost of production for INDAL, HINDALCO and MALCO. In the next few years, the cost of production rose sharply. The retention prices were revised on July 1980, March 1981, and December 1981. However, there was no revision during 1982 and 1983. It is seen from the table that in 1982 and 1983, the cost of production was higher than the retention price in all the four firms.

Subsequently, retention prices were revised in May 1984, December 1985, March 1987, January 1988, and November 1988. Making a comparison between costs of production and retention prices for 1987 and 1988 (up to June), it is found that in 1987 cost was higher than retention price for one firm and in 1988 this was so for three firms out of four.[4]

Between 1978 and 1988, there were large increases in cost of production of aluminium in HINDALCO, INDAL and MALCO. The cost figures for 1988 were nearly three times those for 1978. These increases in cost of production are attributable to increases in the prices of inputs. One major source of cost escalation was the hike in the power rates. Power cost constitutes about 40 per cent of the total cost of producing aluminium. The average (weighted) power rate for HINDALCO, INDAL and MALCO was 14 paise per KWH in 1979.[5] It increased to 50 paise per KWH in 1988. This alone would raise the cost of production by six/seven thousand rupees per tonne of aluminium, i.e., nearly half of the actual increase in the cost of production between 1979 and 1988.

Administered Prices and Excise Duty

The administered prices of CG and EC grade aluminium ingot prevailing on different dates since October 1978 are shown in Table 4.2. The figures in parentheses are the basic prices (producers' average prices), while the figures without parentheses are prices inclusive of excise duty (purchasers' prices).

It is seen from the table that the administered price of CG aluminium ingot was raised from a little over Rs.12 thousand per tonne in October 1978 to about Rs.35 thousand per tonne in November 1988. The ad-

ministered price of EC grade ingot was fixed at a slightly higher level than that for CG grade - the difference ranging from Rs.100 to Rs.400 per tonne.

Between October 1978 and November 1988, the administered price of aluminium ingot (average of CG and EC grade) increased at the linear rate of about 18 per cent per annum. The rate of increase in the basic price was much higher at about 24 per cent per annum. Comparing administered prices on different dates, it is found that the increase in price was quite slow between March 1981 and March 1986. The rate of increase was only 3.8 per cent per annum.

In Table 4.3, the rates of excise duty on CG aluminium ingot, semi-fabricated products and circles (0.56 to 2.00 mm.) are presented. It is seen from the table that in December 1981 and again in December 1985 the excise duty on CG ingot (also on EC grade ingot) was reduced substantially. In March 1981, the administered price of CG ingot was Rs.18492 per tonne, which was made up of basic price of Rs.12842 per tonne and excise duty of Rs.5650 per tonne. The basic price was raised to Rs.19435 per tonne in December 1985 (i.e., an increase at the rate of about 11 per cent per annum). The excise duty was reduced to Rs.2322 per tonne. As a result there was only a small increase in the administered price of CG ingot between March 1981 and December 1985. The rate of increase was at 3.7 per cent per annum.

Another point to be noted is that before December 1981 the rates of excise duty on ingot and semi-fabricated products were equal. While the excise duty rates were reduced for both ingots and semi-fabricated products in December 1981 and again in December 1985, the reduction in excise duty on semi-fabricated products was not as much as that on ingots. There arose, as a result, a marked difference between the excise duty rates for ingots and semi-fabricated products. This gap has been reduced somewhat from November 1988 by raising the rate of excise duty on aluminium ingot from 11 to 18 per cent. It should be pointed out here that due to the Proforma Credit Scheme (and the MODVAT Scheme

introduced recently), the reduction of excise duty on aluminium ingot provided little cost advantage to the producers of semi-fabricated product (sheets, plates, etc.) and the down- stream units based on the semi-fabricated products.

Price Trends

Table 4.4 gives prices of aluminium ingot in London market and in India for different years from 1960 to 1988. These prices are annual averages. For the London market, the price series for the period 1960 to 1983 have been taken from Radhakrishna and Kalra (1987, Vol. 2, Appendix 2.7). To extend this series up to 1988, price quotations of London Metal Exchange have been taken from various issues of Minerals and Metals Review. For expressing the prices in US dollar and Indian rupee, the exchange rates have been taken from International Financial Statistics.

It is difficult to form a comparable time series for price of aluminium ingot in India. Taking data from Annual Survey of Industries (Census Sector), average purchase price of aluminium ingot has been computed for years 1961 through 1966, and 1968 through 1970. These are shown in the table. For 1977 and 1978, price quotations for CG and EC grade ingot are available in Revised Index Number of Wholesale Prices in India. These quotations have been used to compute domestic price of aluminium ingot (average of CG and EC grade) for 1977 and 1978. For subsequent years, the administered price of aluminium ingot (average of CG and EC grade) has been used to construct the price series. Considering the administered prices prevailing in different months of a year, the annual averages have been computed.

Figure 4.1 depicts movements in the price of aluminium ingot in London market (expressed in U.S. dollar) over the period 1960 to 1988. Along with actual prices, trend values estimated by fitting an exponential trend, are shown.

From Table 4.4 and Figure 4.1, it is seen that during the period 1960 to 1973 there was not much increase in the price of aluminium ingot in London market (expressed in US dollar). The price of aluminium ingot per tonne was $513 in 1960. It increased to $669 in 1973. This involves an annual growth rate of 2.06 per cent per annum. The slow growth in aluminium price in world market in the 1960s and early 1970s is mainly attributable to the fact that there was a balance between capacity and demand in this period. Also, the world market was oligopolistic, being dominated by six major aluminium companies. These companies followed a policy of keeping aluminium price low and raising it only in line with production cost, so as to discourage new entry into the industry.

Profits derived from aluminium operations began to decline sharply after 1973 as a result of oil price hike, increase in the prices of other forms of energy input and increase in taxes on bauxite. As new and partly government- backed aluminium projects went on stream in developing countries, the share of the six majors in the world aluminium smelter capacity declined substantially; and along with this went down their control over the market price. The six majors therefore decided to raise aluminium prices. Between 1973 and 1978, the aluminium price increased by 56 per cent, i.e., at the annual rate of 9.3 per cent.

After 1978, there have been sharp fluctuations in aluminium prices from year to year, reflecting primarily short- term excess demand and excess supply situations. Between 1978 and 1986, the aluminium price in London market grew at the rate of 1.2 per cent per annum. In 1987 the aluminium price increased by 35.4 per cent. In 1988, there was another sharp increase in aluminium price by 63 per cent, bringing the price level to $2542 per tonne. The explanation for the sharp rise in aluminium price in 1988 lies primarily in the closure of a substantial part of the world aluminium smelting capacity (due to rising energy costs and continuing slump in the world aluminium market) in the 1980s, and the supply-shortage developing subsequently.[6]

Figure 4.1 brings out clearly that the aluminium price prevailing in London market during 1988 was exceptionally high in relation to the past trend. An examination of month-wise price quotations during 1988, presented in Table 4.5, reveals that a peak in aluminium price occurred in June 1988 when the price reached $3594 per tonne.[7] Since June 1988, the international price of aluminium has been falling. In December 1988, the price was $2378 per tonne, which was lower than the price prevailing in June 1988 by about $1200 per tonne.[8]

Turning back to Table 4.4, the last column gives the ratio of the price of aluminium ingot in India to that in London market. It is seen that in the first half of the 1960s, the price ratio was significantly above one, i.e., the price in India was more than the international price. Between 1965 and 1970, the rate of increase in the aluminium price in London market (expressed in rupees) was much higher than that in India (partly a result of the devaluation of the Indian Rupee in 1966). Consequently, the price ratio fell from 1.44 in 1965 to 1.02 in 1970. However, between 1970 and 1977, there was a steep rise in aluminium prices in India, and the price ratio increased to 1.38 in 1977. In the post-1977 period, the price ratio has been about 1.3 or above for most years. It is only in 1988 that the price of aluminium ingot in India was lower than the international price.

Next, trends in aluminium prices in the 1980s are analysed using month-wise data. Figure 4.2 depicts the behaviour of the price of aluminium ingot in London market (Pound per tonne) from January 1980 to December 1988. Fitting a linear trend line to the data, a significant upward trend in the international aluminium price is found. The trend values are shown in the figure along with the actual prices. It is seen clearly that the price prevailing in June 1988 was exceptionally high in relation to the trend.

Figure 4.3 depicts the behaviour of prices of aluminium ingot in India. In the figure, the administered price of CG ingot and the price at which aluminium ingot were being traded in Bombay market are both shown. Average monthly price quotations for aluminium in the Bombay market

have been taken from various issues of Minerals and Metals Review. Such data being available only from February 1981, the earlier period is not included in the figure.

It is seen from Figure 4.3 that during 1981 and 1982, the market price of aluminium was less than or almost equal the administered price. In the subsequent period, the market price always exceeded the administered price, generally by a substantial margin. Looking at the figure, it seems the administered price fixed by the government did have an important influence on the price prevailing in the market. To study this relationship econometrically, a regression equation has been estimated using data for the period February 1981 to December 1988. The price prevailing in Bombay market (pB) has been regressed on administered price of CG ingot (pA) and the price prevailing in London market, expressed in Rupees (pL). To eliminate the trend effect on these variables, a time trend variable (T) has been included in the regression equation. The estimated regression equation is shown below (t-values in parentheses) :

$$pB = 3592.7 + 0.5853\ pA + 0.2838\ pL + 50.3\ T$$

$$(5.613) \quad (8.458) \quad (4.186)$$

$$n = 95 \quad R^2 = 0.938 \quad F = 459.6 \quad DW = 0.53$$

The coefficients of pA and pL are both positive (as one would expect) and statistically significant at one per cent level. It may be inferred therefore that the administered price fixed by the government and the price prevailing in London market were two important determinants of the price of aluminium ingot in Bombay market.

Profitability

It has been pointed out above that the Indian aluminium industry was under government control since 1970 (till February 1989). Formal control on distribution of aluminium was imposed from 1975; and the prices of both CG and Ec grade aluminium were controlled by the government from 1978. There was a system of retention prices fixed for

each producer to cover the cost plus a post standard tax return on shareholders' funds. It would be interesting to find out how profitability of aluminium companies was affected by these controls.

Although retention prices for aluminium ingot were supposed to give the producers a rate of return ranging from 7 per cent at 55 per cent capacity utilisation to 12 per cent at 90 per cent capacity utilisation, the revisions made to the retention prices over time did not keep pace with increasing costs, and in consequence the primary producers often found the retention prices unremunerative. This had two effects :[9]

(1) Increased use of ingots by the primary producers for their own consumption (in the semi-fabrication department) and arising consequently a shortage of CG ingot for downstream industries.

(2) A disproportionate increase in the prices of semi-fabricated products by the primary producers to make up for unremunerative returns on the sale of ingots (and EC grade wire rod) at controlled prices, thereby distorting the link between the price of ingot and semi-fabricated products.

Table 4.6 shows profitability of HINDALCO, INDAL and MALCO for different years between 1965 and 1987. To measure profitability, the ratio of net profit to net worth has been taken. BALCO has not been included in the table since it has been incurring losses year after year since its inception. At the bottom of the table, the average profitability rates during 1965-69 (when the industry was not under government control) and 1978-87 (when both pricing and distribution of aluminium were controlled) are presented.

It is seen from the table that during 1965-69, the profitability rate of HINDALCO exceeded 20% in three years out of five and was a little over 13% in the two remaining years. The average rate of profitability of HINDALCO for the five year 1965-69 was 18.3 per cent, which was quite high. In this period, the profitability performance of INDAL was also good. The rate of profitability of INDAL was about 14% or higher in four

years out of five. The average rate of profitability of INDAL for 1965-69 was 13.9%.

The rate of profitability of MALCO was very low at 2.8% in 1965, which was the first year of production of the company. The rate of profitability rose steadily in the following years and reached 16.4% in 1969 and 19.7% in 1970. The average rate of profitability of MALCO for the five year period 1965-69 was 9.8%; and if 1965 is excluded it was 11.3%.

HINDALCO and MALCO suffered a major set back in their profitability performance in the post-1970 period. The average profitability rate during 1978-87 was 4.9 per cent for HINDALCO and -13.6 per cent for MALCO. However, INDAL did not experience any such marked fall in the profitability rate. Thus, the average profitability rate for INDAL was 11.8 per cent during 1970-77 and 8.9 per cent during 1978-87.[10]

The superior performance of INDAL (despite the fact that its utilisation rate of smelter capacity has in recent years come down drastically due to power shortage) is probably attributable to its production structure. Production statistics of HINDALCO, INDAL and MALCO are presented in Tables 4.7 through 4.10. It is clearly seen from these tables that in relation to the production of primary metal and EC grade wire rod (Properzi rod) the production of semi-fabricated products (which are more profitable to produce) is relatively much higher in INDAL.

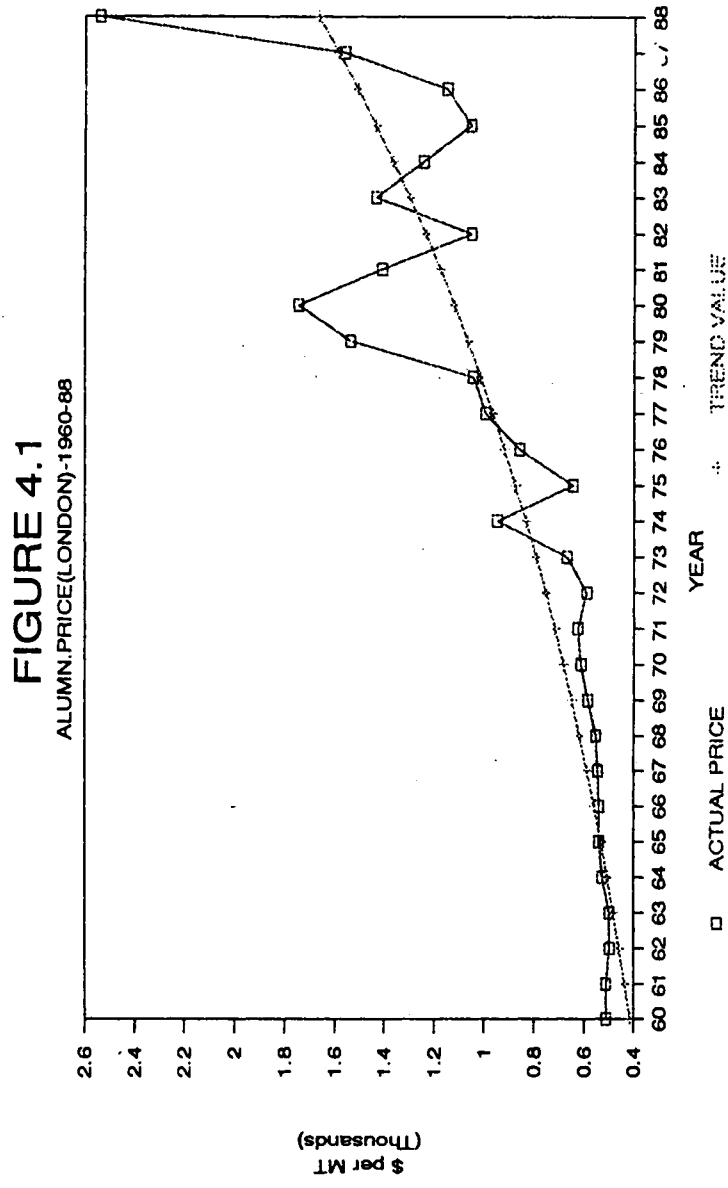
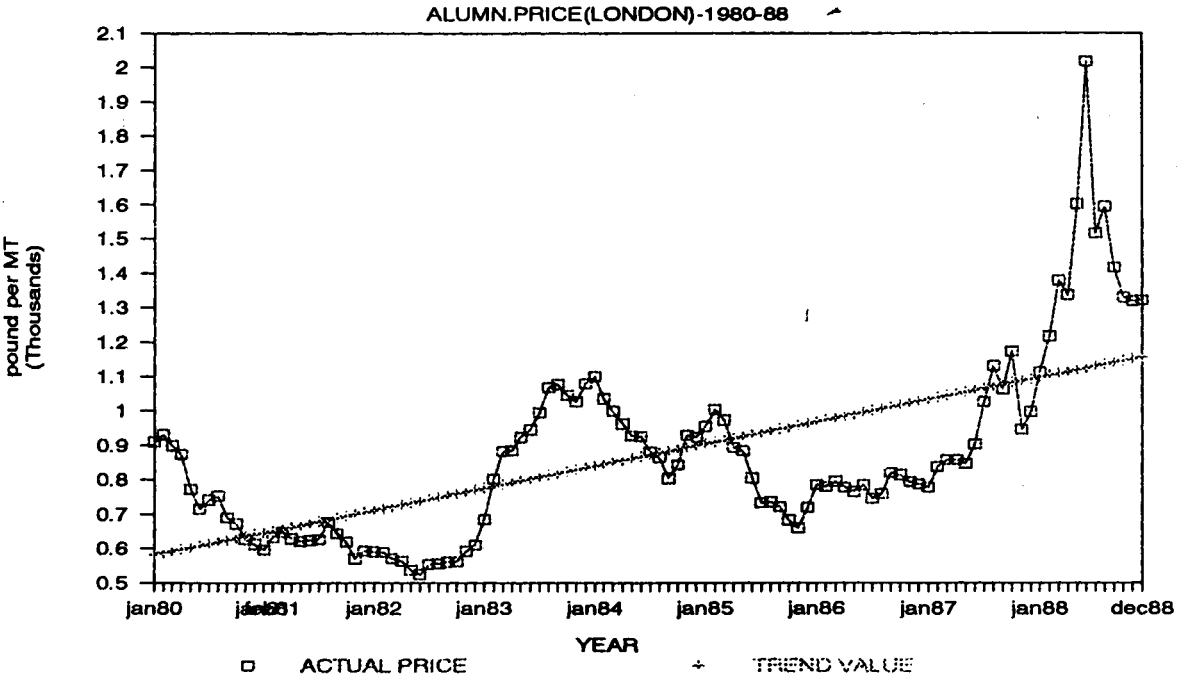


FIGURE 4.1
ALUMN.PRICE(LONDON)-1960-88
$ per MT
(Thousands)
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86
YEAR
ACTUAL PRICE
TREND VALUE

FIGURE 4.2


ALUMN.PRICE(LONDON)-1980-88
pound per MT
(Thousands)
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
jan80
jan82
jan83
jan84
jan85
jan86
jan87
jan88
dec88
YEAR
ACTUAL PRICE
TREND VALUE

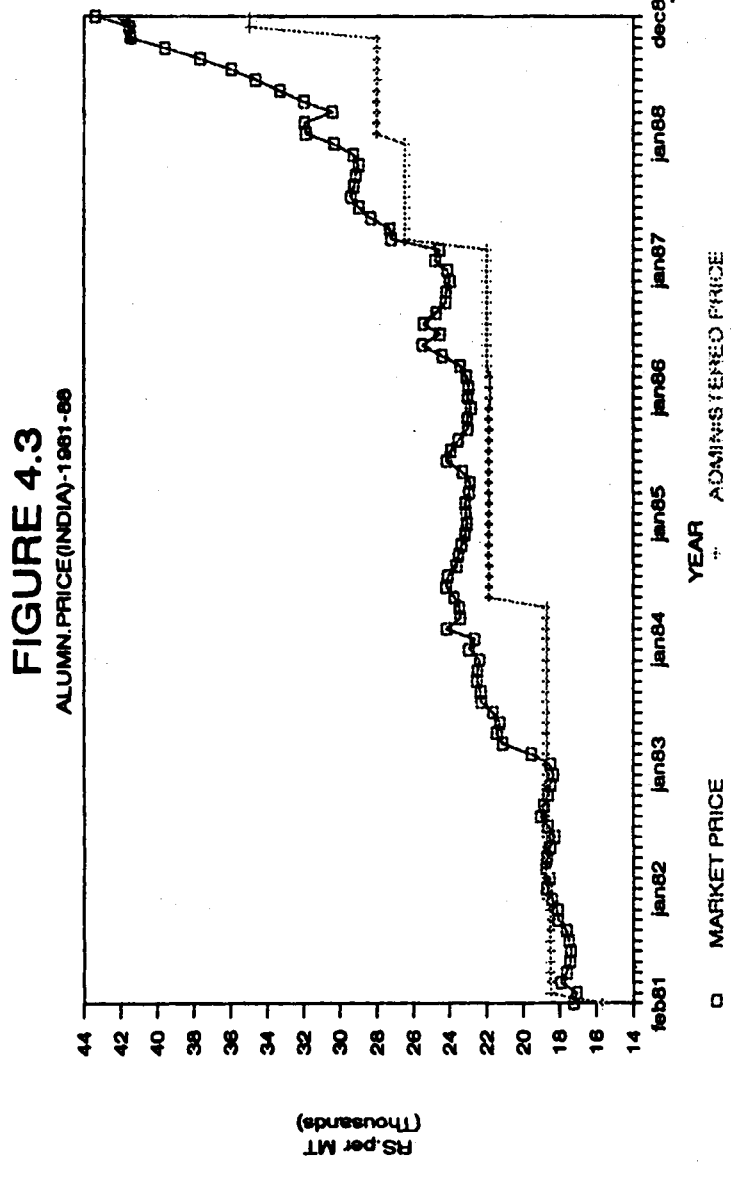


FIGURE 4.3
ALUMN.PRICE(INDIA)-1981-88
RS.per MT
(Thousands)
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
feb81
jan82
jan83
jan84
jan85
jan86
jan87
jan88
dec88
YEAR
MARKET PRICE
ADMINISTERED PRICE

Table 4.1
Costs of Production and Retention Prices

(Rs. per tonne)

Year/Firm		Total Cost of Production	Retention Price at the end of the year	Surplus(+) Deficit(–)
1978	INDAL	6264	7355	+
	HINDALCO	7297	8038	+
	MALCO	8543	8770	+
	BALCO	14511	11208	–
1979	INDAL	6622	7355	+
	HINDALCO	8523	8691	+
	MALCO	9547	10029	+
	BALCO	21223	12570	–
1980	INDAL	11172	8681	–
	HINDALCO	10974	8691	–
	MALCO	11778	10029	–
	BALCO	23310	12570	–
1981	INDAL	13204	14485	+
	HINDALCO	13383	12365	–
	MALCO	14791	15472	+
	BALCO	30164	18051	–
1982	INDAL	14873	14485	–
	HINDALCO	14214	12365	–
	MALCO	17365	15472	–
	BALCO	32417	18051	–
1983	INDAL	16463	14485	–
	HINDALCO	15908	12365	–
	MALCO	25126	15472	–
	BALCO	N.A	18051	–

Source : Based on Tables 6.9 through 6.14 of Radhakrishna and Kalra (1987).

Table 4.2

Administered Prices of Aluminium Ingot

(Rs. per tonne)

Date	CG	EC
October 1978	12258	12400
	(8632)	(8732)
October 1979	13718	14089
	(9661)	(9922)
July 1980	15723	16349
	(10995)	(11433)
March 1981	18492	18636
	(12842)	(12942)
December 1981	18679	18805
	(15311)	(15411)
May 1984	21847	21965
	(18405)	(18505)
December 1985	21767	21991
	(19435)	(19635)
March 1986	21961	22188
	(19435)	(19635)
March 1987	26449	27152
	(23828)	(24028)
January 1988	27982	28712
	(25209)	(25409)
November 1988	34986	35222
	(29649)	(29849)

Source : Compiled from various issues of Minerals and Metals Review.

Note : Figures in parentheses are basic prices and figures without parentheses are puchasers' prices (basic + excise duty).

Table 4.3
Ad Valorem Rates of Excise Duty on Aluminium

(Per cent)

	CG ingot	Semi-fabricated products	Circles (0.56 to 2.00 mm)*
Pre December 1981	44.0	44.0	30.8
December 1981	22.0	28.6	16.5
May 1984	18.7	28.6	16.5
December 1985	12.0	24.0	12.0
March 1986	13.0	25.0	13.0
March 1987	11.0	25.0	11.0
January 1988	11.0	25.0	11.0
November 1988	18.0	25.0	18.0

* Exempted category.

Table 4.4

Prices of Aluminium Ingot : 1960 to 1988

Year	Price in London Market ($/MT)	Price in London Market (Rs/MT)	Price in India* (Rs/MT)	Price Ratio
1960	513	2443		
1961	513	2443	3268	1.34
1962	498	2371	3376	1.42
1963	499	2376	3506	1.48
1964	526	2505	3511	1.40
1965	540	2571	3692	1.44
1966	540	3434	3990	1.16
1967	544	4080		
1968	553	4148	4390	1.06
1969	587	4403	4651	1.06
1970	614	4605	4694	1.02
1971	626	4696		
1972	590	4480		
1973	669	5179		
1974	948	7681		
1975	646	5411		
1976	859	7697		
1977	995	8695	12026	1.38
1978	1045	8562	12767	1.49
1979	1538	12498	12723	1.02
1980	1746	13729	14970	1.09
1981	1411	12218	18158	1.49
1982	1051	9937	18742	1.89
1983	1436	14502	18742	1.29
1984	1247	14170	20852	1.47
1985	1054	13037	21904	1.68
1986	1152	14528	22042	1.52
1987	1560	20221	26013	1.29
1988	2542	35385	29473	0.83

Source : See text.

* Prices for different periods are not exactly comparable.

Table 4.5

Price of Aluminium Ingot in London Market during 1988

Month	Pound/MT	Dollar/MT	Rs./MT
January	1113	2007	26278
February	1217	2138	27942
March	1379	2524	32806
April	1337	2508	33077
May	1601	2995	39865
June	2017	3594	49558
(13th June)	2350	4187	57740
July	1516	2585	36429
August	1594	2706	38543
September	1417	2386	34603
October	1330	2308	33942
November	1319	2385	35705
December	1321	2378	36301

Source : Various issues of Minerals and Metals Review.

Table 4.6

Profitability Performance of HINDALCO, INDAL and MALCO, 1965 to 1987

(Per cent)

Year	Profitability Rate (ratio of net profits to net worth)		
	HINDALCO	INDAL	MALCO
1965	21.5	20.0	2.8
1966	22.2	13.9	6.4
1967	13.1	14.4	9.1
1968	13.4	8.0	12.3
1969	21.9	15.3	16.4
1970	2.1	16.8	19.7
1971	11.5	19.0	10.0
1972	6.1	12.7	9.1
1973 -	1.6	7.4	1.1
1974 -	20.4	10.7	9.0
1975 -	1.3	10.6	4.1
1976	15.5	11.1	10.7
1977	6.8	9.2	-41.6
1978	4.1	19.1	11.6
1979	4.3	11.9	6.7
1980	0.9	6.0	5.4
1981	2.8	9.3	-24.5
1982	1.8	7.6	-26.0
1983	2.9	-10.6	-180.8
1984	9.0	13.6	-41.6
1985	3.5	16.3	-4.3
1986	5.2	10.5	-29.1*
1987	10.8	5.1	N.A.
Average** for 1965-69	18.3	13.9	9.8
Average** for 1978-87	4.9	8.9	-13.6

* For 18 months, January 86 to June 87.

** Based on average net profit and average net worth for the relevant period.

Table 4.7

Production Structure of HINDALCO

(Tonne)

	1986	1987	1988
Aluminium Ingot	123425	122508	157826
Rolled Products	26498	28524	31702
Extruded Products	9064	9902	12969
Conductor Re-draw	29492	31588	38111
Commercial Rods	951	1220	2880

* for 15 months ending March 1989.

Table 4.8

Production Statistics of HINDALCO, 1978-88

('000 tonnes)

	Primary Metal	Rolled and Extruded Products
1978	66	27
1979	78	30
1980	74	32
1981	77	31
1982	91	30
1983	94	30
1984	122	33
1985	124	34
1986	123	36
1987	122	38
1988*	158	45

* for 15 months ending March 1989.

Table 4.9

Production Statistics of INDAL

('000 tonnes)

	1978	1982	1985	1986	1987	1988*
Aluminium Ingot	82.3	70.2	37.4	28.5	31.6	57.3
Rolled Products	28.6	32.4	38.1	40.3	42.5	54.9
Extruded Products	5.1	4.2	5.6	4.6	6.2	9.1
Properzi Rods	9.9	10.0	4.9	1.6	–	2.7
Foil	2.5	2.4	3.5	3.5	4.0	6.0
Alumina	18.8	49.6	113.3	147.3	124.9	15.9

* for 15th months ending March 1989.

Table 4.10

Production Statistics of MALCO

(Tonnes)

	1978	1981	1983	1985	1986-87*
Primary Metal	23117	14891	4989	10742	14665
Properzi Rod	10500	6875	754	4720	6433
Extruded Products	-	555	810	1681	2901
Rolled Products	-	-	25	10	191

* For 18 months.

NOTES

1. Under Aluminium (Control) Order of 1970.

2. Irrespective of whether the produced primary aluminium is sold directly or used in the firm's own plant for producing semi-fabricated products, the payment had to be made to the Aluminium Regulation Account.

3. Prior to 1978, a dual price system was followed. The government used to fix only the price of EC grade metal (and require firms to produce 50% of their output as EC grade). The price of CG ingot was not controlled; it was fixed by the companies.

4. This analysis is based on cost data provided in the Report of the Working Group on Aluminium, Magnesium, Titanium, Vanadium and Gallium for the Eighth Five Year Plan, Ministry of Steel and Mines, May 1989.

5. During the period 1968-72, aluminium producers got power, on an average, at the rate of 4 paise per KWH. HINDALCO received bulk of its power supply from U.P. State Electricity Board at the rate of 2 paise per KWH. The cost of power generation in HINDALCO's own captive power plant was 4.5 paise per KWH. The State Electricity Boards were charging about 13 paise per KWH from bulk consumers (which was probably subsidised) in that period. See Gupta (1987), pp. 112-3.

6. See Kalra (1988).

7. On 13 June 1988, the spot price of aluminium ingot in London market reached the all-time high figure of $4187 per tonne.

8. The downward trend in international price of aluminium ingot has continued in 1989.

9. Shah (1986), p. 29.

10. The profitability performance of HINDALCO and INDAL improved significantly in 1988. For the 15-month period ending March 1989, the ratio of net profits to net worth was 17 per cent for HINDALCO and 25.6 per cent for INDAL. However, the performance of MALCO has been poor.