CHAPTER VI

PRICING SYSTEM IN
IRON AND STEEL INDUSTRY OF INDIA
(A CASE STUDY)

After macro-analysis of the pricing system in public enterprises in the preceding chapter, the present chapter is devoted to an analytical case study of the price behaviour of a basic metal, i.e., steel. The steel industry is a basic industry. The entire civilisation of England is based on iron and steel industry. The strategic significance of steel prices in the context of economic growth has been recognised in unambiguous terms. One important study attempted in the Indian context states, "Steel is one of the important sinews of industry. Stability of steel prices ensures stability of manufactures in particular and wholesale prices generally."\(^1\) More ambitiously, the price of steel has been related to the price-cost behaviour of industrial economy in general.

In the Indian context, even though the cost-price

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relationship of steel is approached indirectly through returns analysis, attempts at estimation of actual unit cost of steel are found to be rare; particularly during recent years with the only exception of the efforts of the Committee on Cost of Production of Steel (1966). The present study estimates the works cost of saleable steel in India and decomposes it into its component parts during 1956 and 1973-74.

In the course of the analysis, attention is primarily focussed on the cost of production per unit of output incurred by the marginal manufacturer to examine as to whether the prices fixed by the Government are consistent with the cost of production to permit self-financing of the industry and to generate resources for general capital formation. To examine in depth the impact of pricing steel categories, the cost components are divided into two general categories, viz., 'Works Cost' and 'Overheads'. This classificatory scheme has been evolved on the basis of the one used by the Indian Tariff Commission. The research scholar has made independent estimates of the important raw-materials and labour components on an average basis since the cost data on the individual components of Works Cost were not presented

1. Govt. of India, Committee on Cost of Production of Steel, Ibid.
in the Tariff Commission's 1956 Report. And adequacy of the estimates of Overheads has also been investigated by the research scholar because they were rather arbitrarily determined by the Commission.

**COST OF RAW MATERIALS**

The raw-material component of works cost is influenced by the physical considerations and the money prices of these materials at the point of consumption. The average delivered prices of raw materials in 1956 were calculated from the data presented in the Census of Manufactures.¹

By dividing the quantity of each major material consumed by the industry during 1956 into the value of each material consumed, the following delivered prices were obtained:²

- Coking coal - Rs. 24.80
- Iron Ore - Rs. 14.75
- Limestone - Rs. 15.86
- Scrap - Rs. 229.76

(Scrap was the most expensive material purchased by the mills followed by coking coal, limestone and iron ore).

The cost of raw materials per unit of output is a function of both the prices and respective quantities of these materials consumed per unit of output. The estimates of the raw material costs per ton of saleable steel

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² Figures are related to materials purchased whether during the year or earlier and consumed.

were obtained by multiplying the factor prices by the input coefficients. The results of these computations are summarised in Table 6.1.

**TABLE 6.1 - RAW MATERIAL COST PER TON OF SALEABLE STEEL - 1956**

<table>
<thead>
<tr>
<th>Item</th>
<th>Raw material cost per ton of saleable steel</th>
<th>As % of the Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power and Fuel (Coking Coal):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivered cost</td>
<td>Rs.25.00</td>
<td></td>
</tr>
<tr>
<td>Coefficient</td>
<td>2.199</td>
<td></td>
</tr>
<tr>
<td>Cost per quantity of saleable Steel</td>
<td>Rs.55.00</td>
<td>37%</td>
</tr>
<tr>
<td><strong>Iron Ore:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivered cost</td>
<td>Rs.15.00</td>
<td></td>
</tr>
<tr>
<td>Co-efficient</td>
<td>2.413</td>
<td></td>
</tr>
<tr>
<td>Cost per quantity of saleable Steel</td>
<td>Rs.36.00</td>
<td>24%</td>
</tr>
<tr>
<td><strong>Limestone:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivered cost</td>
<td>Rs.16.00</td>
<td></td>
</tr>
<tr>
<td>Co-efficient</td>
<td>0.732</td>
<td></td>
</tr>
<tr>
<td>Cost per quantity of saleable Steel</td>
<td>Rs.12.00</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Purchased Scrap:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivered cost</td>
<td>Rs.230.00</td>
<td></td>
</tr>
<tr>
<td>Co-efficient</td>
<td>0.199</td>
<td></td>
</tr>
<tr>
<td>Cost per quantity of saleable Steel</td>
<td>Rs.46.00</td>
<td>31%</td>
</tr>
<tr>
<td><strong>TOTAL RAW MATERIAL COST</strong></td>
<td>Rs.149.00</td>
<td>100%</td>
</tr>
</tbody>
</table>

**SOURCE:** Co-efficients have been computed by the research scholar from the data presented in the Central Statistical Office, Eleventh Census of Manufactures, 1956, pp. 373-78.

**NOTE:** The total input of materials was divided by the quantity of hot-rolled steel products, including castings and semi-finished steel for sale.
On the basis of these data, the cost of raw materials was estimated to be Rs. 149 per ton. As of the individual elements of raw material cost, power and fuel accounted for 37 per cent, scrap 31 per cent, iron ore 24 per cent and limestone 8 per cent.

LABOUR COST: Labour cost per unit of saleable steel was computed by combining data on hourly payroll cost and man-hours worked per ton of saleable steel produced. To find the hourly payroll cost, the fringe benefits received by the production workers were added to the annual wage payments. In this endeavour, an arbitrary distribution was made of the total benefits paid to productive workers and others, as shown in the Indian Census of Manufactures (Eleventh). The annual payroll cost was divided by the number of man-hours worked. The results of these calculations are summarised in the Table 6.2.

**TABLE 6.2 - UNIT LABOUR COST**

<table>
<thead>
<tr>
<th>Items</th>
<th>Unit labour cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>Rs. 77</td>
</tr>
<tr>
<td>Finished Steel</td>
<td>Rs. 110</td>
</tr>
</tbody>
</table>

SOURCE: Computed by the research scholar from the data presented in the Central Statistical Office, Census of Manufactures (Eleventh).
OTHER WORKS COST

The remaining components of works cost as defined by the Tariff Commission were lumped by the companies into a category labelled 'Other Works Cost.' The major elements in this category were housing, medicine and food supplied to workers. Power and fuel oil, stores and spare parts, excise tax on steel ingots. In the present study, a number of these items were included with either the raw material or labour costs. Power and fuel oil costs, which accounted for approximately 34 per cent of IISCO's other works costs in 1955-56, were treated as components of the power and fuel costs under raw materials. In addition, the housing, medicine and food supplied to workers were previously included under labour costs.

The largest component of other works costs not previously discussed was the excise duty on steel ingots. The duty amounted to Rs. 4 per long ton of steel ingots produced in 1956 and comprised over 20 per cent of IISCO's other costs in that year. In order to ascertain the incidence of this tax per ton of saleable steel, the appropriate saleable steel - crude steel conversion rates were applied to IISCO's saleable steel product mix in 1956. On the basis of these calculations it was estimated that the excise tax per metric ton of saleable steel amounted to approximately Rs. 5.00.
Since adequate data on the other components in this category were lacking, no additional calculations were attempted. The remaining items, however, were relatively minor and no great loss of accuracy resulted from their omission.

WORKS COST PER TON OF SALEABLE STEEL - 1956

By combining the raw material, labour and excise tax costs computed previously, a crude approximation of the works costs per ton of saleable steel could be obtained. The average works costs estimated are presented in the Table 6.3. Using the actual input costs

<table>
<thead>
<tr>
<th>Items</th>
<th>Works Cost per Ton of Saleable Steel</th>
<th>As % of the Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Materials:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power &amp; Fuel</td>
<td>Rs. 55</td>
<td>21%</td>
</tr>
<tr>
<td>Iron Ore</td>
<td>Rs. 36</td>
<td>14%</td>
</tr>
<tr>
<td>Limestone flux</td>
<td>Rs. 12</td>
<td>4%</td>
</tr>
<tr>
<td>Purchased Scrap</td>
<td>Rs. 146</td>
<td>17%</td>
</tr>
<tr>
<td><strong>TOTAL RAW MATERIALS</strong></td>
<td><strong>Rs. 149</strong></td>
<td><strong>56%</strong></td>
</tr>
<tr>
<td>Labour</td>
<td>Rs. 110</td>
<td>42%</td>
</tr>
<tr>
<td>Excise</td>
<td>Rs. 5</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Total Works Cost</strong></td>
<td><strong>Rs. 264</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

SOURCE: See Tables 6.1, 6.2 and the subject-matter in the foregoing paragraphs.
for 1956, the actual average works cost per ton of saleable steel was estimated to be Rs. 264. This figure was remarkably close to the works cost estimate prepared by the Indian Tariff Commission at that time. Working with detailed cost data supplied by IISCO, the Cost Accountants of the Commission concluded that IISCO's average works cost per ton of saleable steel between 1955-56 and 1956-57 amounted to Rs. 266. Thus the estimate derived in the present study is a reasonable approximation of the actual works cost during 1956.

**OVERHEADS** Remaining components of the steel retention price were classified as 'Overheads' by the Tariff Commission. The major items contained in this category were depreciation and return on fixed capital, interest on working capital, and some minor non-capital items such as selling and administrative expenses. Compared to its assessment of works cost, however, the Tariff Commission's estimates of overheads could be considered rather arbitrary, since these were obtained, for the most part, by applying fixed formulae to the asset and cost structure of the highest cost producer, IISCO. As a result, in this section each of the overhead components of the steel price must be assessed in order

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to determine whether the formulae adopted by the Commission provided an accurate reflection of the costs involved. The non-capital items will be investigated first, followed by an assessment of the charges provided for working and fixed capital.

**NON-CAPITAL OVERHEADS PER TON OF SALEABLE STEEL**

The noncapital items arbitrarily included within the overheads category by the Tariff Commission were selling expenses, margin for contingencies, and head office expenses; selling expenses were allowed by the Tariff Commission at Rs.2 per ton of saleable steel, a figure accepted by the firm as being representative of the actual costs incurred. As regards the margin for contingencies, Rs.5 per ton was included in its retention price "so as to cover any possible increases in the prices of materials, etc., during the later part of the year." Finally, although head office (administrative) expenses were not explicitly expressed on a per ton basis by the Commission, it was possible to compute this figure. The head office expense per year of IISCO was estimated to be Rs.2,311,000 which was then divided by IISCO's actual output of saleable steel in 1955-56 and in 1956-57 yielded a per ton cost of approximately Rs.5. The sum of these non-capital components of overhead amounted to Rs.12 per ton of saleable steel in 1956.
The Tariff Commission also allowed interest on the working capital of the producers as an explicit cost item which was to be included in the steel price. The need for such capital on the part of the steel producers is large because substantial quantities of steel are always in process or in inventory. Indeed it has been estimated that five months' production remained in process or in the form of semi-finished or finished steel. Moreover, large stocks of raw materials, stores, and spares have to be maintained for an efficient operation of the plant.

The method used by the Commission for establishing the appropriate interest cost per ton of saleable steel was somewhat arbitrary. Due to the difficulties associated with determining the exact amount of working capital required, the Commission assumed that the working capital requirements of the producers were equivalent to six months' works cost. Interest on this estimate of working capital was then allowed at 4.5 per cent, a figure which was traditionally 1 per cent above the official bank rate.¹

It was necessary to examine whether the true costs associated with working capital were accurately reflected by this procedure. The base, six months' works costs, was considered by the firms to yield a close approximation of their working capital requirements. The interest rate allowed, however, while sufficient in terms of the actual short-term rates existing in the country at that time, did not reflect the true market value of short-term capital in India.

Two estimates of the interest cost on working capital per ton of saleable steel were thus calculated, one based on the actual interest rate used by the Commission, the other based on the estimated true rate. Both rates were applied to the six months' works cost of IISCO in 1956, which was calculated to be Rs.131 per ton of saleable steel. At 4.5 per cent, the actual interest cost on working capital per ton of saleable steel amounted to Rs.6. The true interest cost per ton, on the other hand, was estimated to be Rs.10, if the 7.5 per cent interest rate was used. The Tariff Commission's estimate of the interest cost on working capital per ton of saleable steel was thus Rs.4/- less on this basis.

1. This figure was obtained by dividing the works cost per ton of Rs.264 calculated in the study by me. See Table 6.3.
DEPRECIATION AND RETURN ON FIXED CAPITAL

The largest and most arbitrary components of overhead were those associated with fixed capital. The amount of depreciation and return allowed by the Tariff Commission per ton of saleable steel was generally determined by the application of a rate formula to the fixed capital base of the highest cost producers.

Thus before analysing the rate formulae and consequent amounts allowed per ton of saleable steel, the rate base itself must be briefly discussed.

The fixed capital base on which the return and depreciation were calculated was termed "gross block", a concept devised expressly by the Tariff Commission for the purpose of price fixing. Gross block could be defined loosely as a firm's undepreciated, original capital investment in fixed assets. The composition of the gross block was either arbitrary, since the decision as to which capital assets were to be included within the block was the result of long negotiations between the Tariff Commission and the producers. For example, although many ancillary facilities such as town buildings and raw material leases had been specifically treated as an integral part of the gross block since 1947, company-owned collieries were not
included until 1956. For purpose of price fixing, the firms desired the largest block possible, since the return and depreciation allowed by the Commission were based on a fixed percentage of this block.

In 1956, the fixed capital base employed by the Tariff Commission was the IISCO's gross block per ton of saleable steel output. Although the exact figure was not presented in the Tariff Commission's 1956 Report, a crude estimate was obtained by dividing IISCO's saleable steel output into its gross block for both 1955-56 and 1956-57 and then taking the average of the two years. On the basis of the data presented in the Table 6.4, it was

TABLE 6.4 - ESTIMATE OF IISCO'S GROSS BLOCK PER TON OF SALEABLE STEEL

<table>
<thead>
<tr>
<th>Item</th>
<th>1955-56</th>
<th>1956-57</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rs.</td>
<td>Rs.</td>
<td>Rs.</td>
</tr>
<tr>
<td>Gross Block</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saleable Steel (Metric tons)</td>
<td>460,159.00</td>
<td>450,812.00</td>
<td></td>
</tr>
<tr>
<td>Gross block per ton of saleable steel</td>
<td>465.90</td>
<td>507.00</td>
<td>485.00</td>
</tr>
</tbody>
</table>

SOURCES: Gross block and saleable steel figures obtained from IISCO, Annual Report, 1955-56, 1956-57, p.27

estimated that IISCO's gross block per ton of saleable steel in 1956 amounted to Rs.465.
The gross block per ton figure obtained for IISCO reflected the original cost of the company's fixed assets, however, not their replacement cost. Indeed, the capital cost per ton of a new plant would have been substantially higher. Although there has been a long debate in the public over the relative merits of the original versus reproduction cost as the appropriate rate base, the weight of opinion today inclines towards original cost. Moreover, in view of the static nature of the analysis of the present chapter, it was felt that original cost was the most appropriate base on which to compute depreciation and return. With this background, the depreciation and return components of retention price can now be discussed.

DEPRECIATION COST PER TON OF SALEABLE STEEL

It was the policy of the Tariff Commission to include an allowance in the steel price for the depreciation of the producer's fixed capital. The depreciation charge was in the nature of an operating expense because it "reflected the systematic and gradual transfer of capital costs into a series of charges to current operations during the estimated useful lives of the fixed assets. In this way, an attempt was made to apportion the costs of the assets among the years during which they performed their services instead of charging them in lumps either in the year of acquisition or of
retirement. There were, of course, many methods of allocating these charges and the final procedure adopted was, in the final analysis, rather arbitrary.

The initial policy of the Tariff Commission in 1949 was to allow 'normal' depreciation on the gross block. According to the Income Tax Act, normal depreciation was to be calculated by applying a rate of 10 per cent to the "written down value" of these assets. In order to enable the industry to carry out all the replacements and improvements which were considered essential for maintaining plant facilities and to stabilize production, however, a special depreciation in excess of normal depreciation was allowed in 1951. The Tariff Commission stipulated that this extra depreciation, amounting to Rs.5,000,000 per year for TISCO and Rs.51,98,000 for IISCO, should not be treated as profits for the purpose of determining the profit-sharing bonus or the managing agency commission and that the companies should actually set apart the total amount in a special plant and rehabilitation fund. Moreover, from 1953 onward, depreciation was also allowed at 6-1/4 per cent on fresh additions to gross block over and above the normal and special depreciation referred to above. Finally, in 1955, the government allowed the producers,

1. Tariff Commission, 1962 Report, p.22. The subsequent discussion is derived from this source.
a "development rebate" or tax-credit amounting to 25 per cent of the new capital investment in plant and equipment. Thus the firms, in effect, could depreciate 25 per cent of their new capital additions. All of these additional depreciation allowances were designed to enable the firms to obtain a portion of their capital requirements for replacement and expansion from internal sources.

To ascertain the most appropriate amount of depreciation to be included in the steel price as an operating expense, it was decided in the present study to exclude the development rebate and special depreciation. Both of these allowances were over and above the original cost of the capital assets and, in line with the procedure adopted with respect to gross block, were considered to belong more appropriately under profits. Additional support for this treatment of depreciation could be derived from the fact that TISCO included these items as components of its profits.¹

For the purposes of the present study, a crude estimate of the depreciation per ton of saleable steel was obtained by dividing IISCO's normal depreciation allowance for each of the years 1955-56 and 1956-57 as presented in the Tariff Commission's 1956 Report by its production of saleable steel in those years and then computing their average. On the basis of the data

¹ TISCO, Annual Report, 1962-63, p.26
presented in the Table 6.5, it was estimated that the
depreciation cost per ton of saleable steel in 1956 amounted

TABLE 6.5 - ESTIMATE OF DEPRECIATION COST PER TON OF
SALEABLE STEEL - 1956

<table>
<thead>
<tr>
<th>Items</th>
<th>1955-56</th>
<th>1956-57</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RS.</td>
<td>RS.</td>
<td>RS.</td>
</tr>
<tr>
<td>Normal Depreciation</td>
<td>10,714,712</td>
<td>12,033,167</td>
<td></td>
</tr>
<tr>
<td>Saleable Steel (Metric tons)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>460,159</td>
<td>450,812</td>
<td></td>
</tr>
<tr>
<td>Depreciation per ton of saleable steel</td>
<td>24.88</td>
<td>26.56</td>
<td>25.72</td>
</tr>
</tbody>
</table>


to Rs.24.88.

The depreciation charge estimated in this computation
appeared to be closely related to the technical or engi­
neering lives of the producer's fixed capital assets. The
majority of the assets in a steel plant possess a useful
life of from twelve to twenty-five years with twenty years
considered as average.\footnote{Tariff Commission, 1962 Report, p.30.} On a straight line basis, a uni­
form depreciation rate of 5 per cent on gross block would
constitute a reasonable allocation to costs. For India,
the depreciation allowance of Rs.24.88 per ton on a gross
capital block of Rs. 465 per ton represented a depreciation rate on gross block of 5.1 per cent. On the basis of useful life, the estimate derived here yields a reasonable approximation of depreciation.

RATE OF RETURN

The largest and most arbitrary component of overheads was the return or profit allowed the producers. The return represented the excess in operating revenues over and above current operating deductions, including allowances for depreciation and interest and working capital. In India, however, the Tariff Commission did not allow the managing agency commission, profit-sharing bonus, or corporate profits taxes as separate items of cost, and the producers had to meet these items from the return.

The producers of iron and steel had long maintained that the return allowed on their gross block was too low and unfair. If it could be demonstrated that the return allowed was too low by some objective standard, then the retention price of steel established by the Commission was not fair. In this section, it is thus necessary to examine whether the claims of the producers with respect to rate of return were valid in 1956.

1. See Tables 6.4 and 6.5
The standard practice followed by the Tariff Commission, as judged by the majority of its reports, was to allow a return of 8 per cent by way of profits on the gross block of the highest cost producer. In the 1956 price inquiry, however, the Commission felt that a higher return than 8 per cent was required so that the producers could "obtain a reasonable proportion of their capital requirements from internal sources." The actual rate of return allowed the highest cost producer, IISCO, was not explicitly stated in the Tariff Commission's 1956 Report and thus had to be computed indirectly.

**TABLE 6.6 - ESTIMATION OF RETURN PER TON OF SALEABLE STEEL FOR IISCO - 1956**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average price of steel (Including miscellaneous recoveries)</td>
<td>Rs. 396</td>
</tr>
<tr>
<td>LESS:</td>
<td></td>
</tr>
<tr>
<td>Works cost</td>
<td>Rs. 264.00</td>
</tr>
<tr>
<td>Selling costs</td>
<td>2.00</td>
</tr>
<tr>
<td>Head Office Costs</td>
<td>5.00</td>
</tr>
<tr>
<td>Margin for contingencies</td>
<td>5.00</td>
</tr>
<tr>
<td>Depreciation</td>
<td>25.72</td>
</tr>
<tr>
<td>Interest on Working Capital</td>
<td>5.90</td>
</tr>
<tr>
<td><strong>Return per tonne of steel</strong></td>
<td>88.38</td>
</tr>
<tr>
<td><strong>Gross Block per ton</strong></td>
<td>Rs. 486.00</td>
</tr>
<tr>
<td><strong>Rate of Return</strong></td>
<td>18.18%</td>
</tr>
</tbody>
</table>

**SOURCE:** See Tables 6.3, 6.4 and 6.5.

1. The concept profit is used in its accounting sense rather than its pure economic sense.

An approximation of the return allowed IISCO was obtained by subtracting the actual operating costs previously calculated in this study from the weighted average retention price per ton of saleable steel ultimately established by the Tariff Commission in 1956.\(^1\) The data on which this calculation was based are summarised in Table 6.7. Depreciation, actual interest on working capital, 

<table>
<thead>
<tr>
<th>TABLE 6.7 - ESTIMATE OF ADJUSTED RETURN PER TON OF SALEABLE STEEL FOR IISCO - 1956.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average Price of Steel</strong></td>
</tr>
<tr>
<td><strong>LESS:</strong></td>
</tr>
<tr>
<td>Works Cost</td>
</tr>
<tr>
<td>Selling Costs</td>
</tr>
<tr>
<td>Head Office Cost</td>
</tr>
<tr>
<td>Margin for contingencies</td>
</tr>
<tr>
<td>Depreciation</td>
</tr>
<tr>
<td>Interest on Working Capital</td>
</tr>
<tr>
<td>Managing Agency Commission</td>
</tr>
<tr>
<td><strong>Total Operating Costs</strong></td>
</tr>
<tr>
<td><strong>Return per ton of saleable steel</strong></td>
</tr>
<tr>
<td><strong>Rate of Return</strong></td>
</tr>
<tr>
<td><strong>Gross block per ton of saleable steel</strong></td>
</tr>
</tbody>
</table>

**SOURCE:** See Table 6.6 and also the text.

selling and administrative costs, and margin for contin-

1. To the price of saleable steel, however, was added an allowance for miscellaneous recoveries resulting from the sale of by-products, surplus coke, and surplus pig iron as provided for IISCO, I
gencies were included as components of the operating costs along with the actual works cost. On the basis of these data, it was estimated that the return per ton of saleable steel amounted to Rs. 88.38.

Given this figure, the rate of return on gross block could be easily calculated. The previously obtained estimate of IISCO GROSS BLOCK PER TON of saleable steel, which the Tariff Commission had considered the appropriate rate base, was divided into the above return per ton. On the basis of this computation, the crude rate of return was estimated to be 18.2 per cent for the highest cost producer, IISCO, in 1956. (See Table 6.6 for calculations.)

One could argue that the rate of return figure was too high due to the use of actual costs in the calculation and the failure to include the managing agency commission as a cost component. Thus an alternative computation of the rate of return was constructed in which these factors were taken into consideration.

The data from which the return was computed are reproduced in Table 6.7. The adjusted works cost figure as well as the previously derived estimate of the true interest on working capital were utilised in calculating the operating costs. Moreover, an estimate of the managing agency commission per ton of saleable steel was
also included, since this factor could be considered an operating cost rather than a component of return. Although no such statistics existed, an approximation was obtained by dividing IISCO's actual managing agency commission by its saleable steel output in both 1955-56 and 1956-57, and it was estimated that the managing agency commission amounted to Rs. 7.23 per ton of saleable steel in 1956.

If these adjusted costs were utilised in the calculation, the rate of return on gross block in steel industry would have amounted to 16.7 per cent (Table 6.7). Thus, the rate of return declined by only 1.5 per cent approximately after all the adjustments in operating costs had been made.

In order to check the validity of these indirect estimates of the rate of return, a direct calculation was attempted, utilising the data contained in the annual reports of IISCO for 1955-56 and 1956-57. A number of adjustments had to be made in IISCO's reported profits figure to make it consistent with the concept of return used in the previous estimates. For example, the allocations to general reserves and works and iron ore extensions reserve in the Profit & Loss Account were deducted by IISCO's cost accountants before obtaining the reported profits figure. Since in normal accounting practices, these items are treated as components of profits, these two
items had to be added to IISCO's reported profits figures in the present study. Moreover, appropriations to the Plant and Rehabilitation Fund, development rebate reserve and extension special reserve, all reserve funds out of which new investment was to be financed, were also added to the reported profits figure. This corresponded with the treatment accorded these items in the previous determination of the rate of return. Finally, the provision for income taxation was added to the reported profits in order to obtain a figure inclusive of the corporate profits tax. The relevant data from which IISCO's return for the years 1955-56 and 1956-57 was calculated are summarised in Table 6.8.

**TABLE 6.8 - ESTIMATE OF RATE OF RETURN FOR IISCO**

<table>
<thead>
<tr>
<th>Item</th>
<th>1955-56</th>
<th>1956-57</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported Profits</td>
<td>25,008,383</td>
<td>22,088,201</td>
</tr>
<tr>
<td>Plant &amp; Rehabilitation Fund</td>
<td>5,947,620</td>
<td>4,508,196</td>
</tr>
<tr>
<td>Development Rebate Reserve</td>
<td>699,720</td>
<td>949,620</td>
</tr>
<tr>
<td>Extension Special Reserve</td>
<td>2,946,658</td>
<td>2,369,052</td>
</tr>
<tr>
<td>Taxation Provision</td>
<td>27,988,800</td>
<td>31,887,240</td>
</tr>
<tr>
<td><strong>TOTAL ESTIMATED PROFIT</strong></td>
<td><strong>62,591,181</strong></td>
<td><strong>61,802,309</strong></td>
</tr>
<tr>
<td>Gross Block</td>
<td>214,200,000</td>
<td>228,500,000</td>
</tr>
<tr>
<td>Rate of Return</td>
<td>30.1%</td>
<td>26.1%</td>
</tr>
</tbody>
</table>

**SOURCE:** IISCO, Annual Report, 1955-56, 1956-57, pp.18-19

1. In 1956, the corporate profits tax amounted to 45 per cent on gross profits (See Taxation in India, p.332.)
On the basis of these figures a direct estimate of IISCO's rate of return on gross block could be obtained. By dividing the computed return for the two years by IISCO's corresponding gross blocks for these years and then averaging the two resulting rates, it was estimated that IISCO's rate of return on gross block for this period amounted to 26.1 per cent. There are grounds for discounting this figure somewhat in view of the peculiar manner in which IISCO presented the data in its Final Accounts. Nevertheless, the results of the direct computation of return did indicate that the previous indirect estimates of the rate of return on gross block were not unduly low.

Assuming for the moment that 18.7 per cent represented a reasonable approximation of the actual rate of return on gross block in the iron and steel industry for 1956, it was essential to determine whether this rate was adequate or fair. For the purpose of the present study, three criteria of adequacy were used: (1) the marginal rate of return on capital, (2) the rate of return earned by the steel industries in other countries, and (3) the rate of return considered as a minimum by persons associated with the industry.

According to economic theory, the rate of return allowed the industry should have been at least as high as the marginal rate of return on general capital. This
figure represented the opportunity cost of capital to the economy and thus the minimum return that had to be earned by any viable industry. Although estimates of the marginal rate of return on general capital varied, the estimates of most analysis ranged from 10 to 15 per cent. The rate of return earned by the iron and steel industry, however, exceeded 15 per cent, and thus by this criterion the industry's rate of return must be considered adequate.

The second criterion of adequacy adopted was the rate of return earned in the iron and steel industries of the developed nations. If the rate of return earned by the Indian iron and steel industry was found substantially below rates of return obtained in other countries, then grounds would exist for considering the profit rate too low. Thus estimates of the return on gross block in the steel industries of the United States and the United Kingdom were calculated to serve as a standard comparison. As Table 6.9 demonstrates, the rate of return earned by

<table>
<thead>
<tr>
<th>Country</th>
<th>1956</th>
<th>1957</th>
<th>1958</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.A.</td>
<td>17.9%</td>
<td>16.0</td>
<td>9.0</td>
</tr>
<tr>
<td>U.K.</td>
<td>20.8</td>
<td>18</td>
<td>17.7</td>
</tr>
</tbody>
</table>

SOURCE: Computed from Welfred Malenbaum, Comparative Costs And Economic Development, pp.396-397.

these two countries did not differ markedly from the rate of return of our steel industry. Indeed, the actual rate of return on gross block here in 1956 was slightly above that earned in the United States and only 2 per cent below that earned in the United Kingdom. Despite the limitations in the data and in the calculation procedures used, it must be concluded that the rate of return here was not low even by world standards.

As a final criterion, the long-run rate of return on gross block that persons associated with the steel industry considered to be the minimum essential for the economic production of steel in India was adopted. M.D.J. Brisby maintained that a return on gross block of 12 per cent was required by the Indian Iron and Steel Industry. The 18.7 per cent rate of return earned by our iron and steel industry in 1956 clearly satisfied this criterion.

On the basis of all the three criteria proposed in this study, the rate of return on gross block was found to be adequate in 1956. The average retention price, the sum of works cost and overheads was sufficient to cover all operating costs as well as to provide an adequate or more than adequate rate of return to the industry.

---

With the expansion of the industry's capacity after 1956, a new structure of costs emerged as new firms entered the industry and old firms expanded their existing capacities. To evaluate properly whether the prices of the steel industry were fixed at a level yielding a fair return on capital, the unit costs of this industry were examined.

The following method of analysis was adopted. The works cost and capital costs incurred by the major iron and steel producers were first examined in detail for the fiscal year 1961-62, the year the industry's initial expansion programmes were completed. In that year, the Tariff Commission published a detailed analysis of the estimated saleable steel cost both at the 1961-62 levels and at the levels of production assumed to be optimum. Armed with these data, the rate of return on capital earned by the highest cost producer could then be calculated and compared with the opportunity cost of this capital. However, since the Tariff Commission provided only estimated cost data for these firms and since the optimum levels of production were not actually attained or exceeded by these firms until the 1964-65 fiscal year, it was necessary to undertake a second analysis in which the rate of return
of the marginal producer would be calculated in 1964-65.
To assess the adequacy of the present pricing policy which is marked by partial decontrol of steel prices, the rate return of public steel enterprises has been computed.

As a first step in the analysis, estimates of the unit cost of production incurred by the major mills in 1961 must be examined. This investigation will not only illustrate what happened to costs as a result of the expansion in the industry's capacity, but will also reveal which of the mills appeared to be the highest cost producer.

Crude estimates of the works cost incurred by the major producer in 1961 are shown in Table 6.10. These figures were prepared by the cost accountants of the Tariff Commission on the basis of a detailed examination of the books of both the public and private producers. Although the Commission did express some reservations about the methods of accounting and costing used by the public sector mills, it felt that the data on the whole were quite reliable.

Focussing first on the change in works costs between 1956 and 1961, it was clear that the works costs of the major private producers increased with the expansion in industry's capacity. The average works cost of IISCO,


<table>
<thead>
<tr>
<th>Items</th>
<th>DURGAPUR</th>
<th>ROURKELA</th>
<th>BHILAI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TISCO</td>
<td>IISCO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>aProbableOptimum</td>
<td>aProbable</td>
<td>aProbable</td>
</tr>
<tr>
<td></td>
<td>level</td>
<td>level</td>
<td>level</td>
</tr>
<tr>
<td></td>
<td>of capacity</td>
<td>of capacity</td>
<td>of capacity</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Works Cost Per ton of saleable steel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>355</td>
<td>358</td>
<td>358</td>
</tr>
<tr>
<td></td>
<td>368</td>
<td>428</td>
<td>428</td>
</tr>
<tr>
<td></td>
<td></td>
<td>353</td>
<td>353</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>370</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>378</td>
</tr>
<tr>
<td>Weighted av. cost per ton of saleable steel at TISCO assuming product mixes of the plant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>355</td>
<td>370</td>
<td>305</td>
</tr>
<tr>
<td></td>
<td>337</td>
<td>430</td>
<td>442</td>
</tr>
<tr>
<td></td>
<td>1.00</td>
<td>.969</td>
<td>1.177</td>
</tr>
<tr>
<td></td>
<td>1.092</td>
<td>.994</td>
<td>.798</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.054</td>
<td>1.07</td>
</tr>
</tbody>
</table>

**SOURCE:** Tariff Commission, 1962 Report, pp. 64-65, Weighted average cost figures have been estimated from the production data of these firms for 1961-62 presented in the above source, pp. 51-8

**NOTE:** a = Probable level refers to capacity which the Commission estimated the various firms would attain in 1961-62, b = The term, Optimum Level, refers to 90 per cent of capacity.
for example, was Rs. 358 per ton of saleable steel in 1961
compared to Rs. 264 per ton in 1956, an increase of approxi-
mately 37 per cent. Although a detailed break-down of the
works cost components was not provided in the Tariff
Commission's 1962 Report, a brief picture of the nature of
this cost increase can be gained from other sources.

One of the more obvious causes of the higher
works cost was the increase in the excise tax on steel ingots.
In 1957, the government raised the excise tax on this product
from Rs. 4 to Rs. 40 per ton. The change in the tax was
affected solely to increase the revenue.

The changes in the remaining components of the works
cost, on the other hand, were more directly related to the
increase in the industry's capacity. Table 6.11 is an index

**TABLE 6.11 - INDEX OF IISCO'S WORKS COST COMPONENTS - 1961
(1956-57 = 100)**

<table>
<thead>
<tr>
<th>Component</th>
<th>Index Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour cost per ton of saleable</td>
<td>93.6</td>
</tr>
<tr>
<td>steel*</td>
<td></td>
</tr>
<tr>
<td>Raw-material pit head cost per</td>
<td>135.2</td>
</tr>
<tr>
<td>ton of saleable steel</td>
<td></td>
</tr>
<tr>
<td>Raw-material transport cost per</td>
<td>162.8</td>
</tr>
<tr>
<td>ton of saleable steel</td>
<td></td>
</tr>
</tbody>
</table>

**SOURCE:** The index is computed from the Chairman's Statement

**NOTE:** * Labour cost includes "Fringe benefits" also.
of the major works cost components computed from the Chairman's statement dealing with the year ended March, 1961.

According to these data, labour costs per ton of saleable steel actually declined by over 6 per cent during this period despite the increase in total works cost. As noted in the previous section of this chapter, the private mills had accumulated an excessive amount of workers on their rolls during the late forties and early fifties. However, by not being substantial numbers of additional workers as their plants were expanded, and through the retrenchment of their labour forces, the private mills were able to reduce the sizes of their work forces during the Second Five Year Plan. Thus despite a constant increase in the wage costs per labourer, the mills were able to decrease their labour costs per ton of steel with the increase in their capacities.

The raw-material pit-head costs per ton of saleable steel, on the other hand, increased by approximately 35 per cent between 1956 and 1961. One of the causes of this rise was the increase in the pit-head prices of the major steel making raw materials. Between 1955 and 1961, for example, IISCO's pit-coal prices increased 56 per cent, its pit-head iron ore prices increased 41 per cent.
and its pit-head limestone price increased 3½ per cent.

The major cause of this increase was the deterioration in the quality of the materials used by the industry. To some extent, the effects of the poorer quality of raw materials were offset by the improved technology of raw material preparation and coke and pig iron production at plants. But despite these improved techniques, the raw material input coefficients for the two private mills were higher, except for iron ore in 1961 than in 1956 (Table 6.12).

<table>
<thead>
<tr>
<th>Year</th>
<th>Iron Ore</th>
<th>Coke</th>
<th>Limestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>1956</td>
<td>1.61</td>
<td>0.883</td>
<td>0.357</td>
</tr>
<tr>
<td>1961</td>
<td>1.59</td>
<td>0.932</td>
<td>0.391</td>
</tr>
</tbody>
</table>


The cost of transporting these raw materials to the mills, however, increased at an even faster rate than the pit-head costs of the materials. During this period the Railway Board awarded the rail-road generous rate increase, partially to compensate for its delay in raising these rates. Thus, between 1956 and 1961, the increase in the
works cost of the existing plants was primarily traceable to the higher railroad rates, the deterioration in the quality of the steel making raw materials, the higher raw material-pit-head prices and the increase in the excise duty on steel ingots.

Although the works cost of the private plants had increased with the expansion in the industry's capacity, their works costs in 1961 were still lower than those of the new public sector plants. This factor is shown clearly by comparing the probable 1961-62 works costs of these plants presented in the Table 6.10. If the TISCO was to produce the same combination of products as did the public steel plants in 1961, TISCO's average works cost per ton of saleable steel would have been approximately the same as Rourkela's or Bhilai's probable average works costs per ton.

One reason for the higher works costs incurred by the public sector steel mills was that these units had not yet normalised their operations. As Table 6.13 demonstrates, the public sector plants in 1961-62 were still producing saleable steel at levels substantially below their rated capacities. Since a portion of the works costs were in the nature of either fixed or semi-fixed charges, the works cost per ton of output should decline as the mills operate
TABLE 6.13 - PRODUCTION OF SALEABLE STEEL AS A PERCENTAGE OF RATED CAPACITY

<table>
<thead>
<tr>
<th>Plant</th>
<th>Actual rated capacity (millions of metric tons)</th>
<th>Production as per cent of capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1961-62</td>
</tr>
<tr>
<td>TISCO</td>
<td>1.52</td>
<td>87</td>
</tr>
<tr>
<td>IISCO</td>
<td>0.81</td>
<td>91</td>
</tr>
<tr>
<td>Bhilai</td>
<td>0.77</td>
<td>71</td>
</tr>
<tr>
<td>Durgapur</td>
<td>0.82</td>
<td>44</td>
</tr>
<tr>
<td>Rourkela</td>
<td>0.72</td>
<td>26</td>
</tr>
</tbody>
</table>


closer to their rated capacities. Fortunately, the Tariff Commission also prepared estimates of the works costs of the three public sector mills on the assumption that their optimum level of production at 90 per cent of capacity had been achieved. These estimates of the works costs at what the Commission considered to be an optimum level of production are shown in Table 6.10.

According to these data, however, the works costs of both Durgapur and Bhilai continued to remain above the costs of the private sector plants even if these plants of the public sector operated at their optimum levels of production. For example, if Bhilai and Durgapur produced at 90 per cent of their rated capacities, their average
works cost per ton of output would have been 11 and 9 per cents higher respectively than the average works costs of TISCO's mill producing the same combination of products. Indeed, the Bhilai mill, even if it had operated at 90 per cent capacity, would possess the highest average works cost per ton of saleable steel at that time - Rs. 378. The Durgapur mill closely followed with an average works cost of Rs. 368 per ton, a works cost still Rs. 31 per ton above that of TISCO. The cause of higher works cost at Bhilai and Durgapur extended beyond their failure to operate at the optimum levels of production.

Although the new public sector steel plants were able to instal the most modern and efficient methods of production, this advantage was reduced by a number of offsetting factors. The public sector mills, for example, were not as favourably located with respect to their supplies of raw materials as were the private sector mills. As Table 6.14 demonstrates, the ton-mile requirements of iron ore and coal to produce one ton of pig iron at the public sector mills substantially exceeded those at the private sector mills.

Moreover, the new mills had difficulties in obtaining the needed number of experienced personnel to operate their plants. Although these mills were able to draw upon TISCO and IISCO for some of their skilled labour requirements,

1. See Table 6.10.
there were not clearly enough experienced personnel to fill the industry's needs after 1956. Thus the new mills had to employ a large number of fresh college graduates in positions normally filled by seasoned workmen.

TABLE 6.14 - TON-MILES OF COAL AND IRON ORE PER TON OF PIG IRON - 1961

<table>
<thead>
<tr>
<th>Plant</th>
<th>Ton-Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>TISCO</td>
<td>248</td>
</tr>
<tr>
<td>IISCO</td>
<td>322</td>
</tr>
<tr>
<td>Durgapur</td>
<td>456</td>
</tr>
<tr>
<td>Rourkela</td>
<td>462</td>
</tr>
<tr>
<td>Bhilai</td>
<td>731</td>
</tr>
</tbody>
</table>

SOURCE: Johnson, The Steel Industry of India, pp. 245-82.

In addition to fill a part of this skilled labour gap, these mills were forced to import many high cost technicians from abroad to assist in the operation of their plants. In the last week of 1963, for example, there were 333 foreign personnel in maintenance or production positions within the three public sector mills.¹ The works cost differential between the public and private

sector firms in 1961 was largely traceable to the shortage of skilled and experienced workers at the public sector plants and to the less favourable location of their plants with respect to raw material sources.

**CAPITAL COSTS PER TON OF SALEABLE STEEL - 1961:**

The capital costs of the new mills also exceeded those of the old established plants in 1961. This fact is clearly shown in Table 6.15, in which the capital costs

**TABLE 6.15 - CAPITAL COSTS PER TON OF SALEABLE STEEL CAPACITY.**

<table>
<thead>
<tr>
<th>Plant</th>
<th>Tariff Commission's 1961-62 Estimates</th>
<th>Actual capacity cost per ton</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>After completion</td>
<td>After completion</td>
</tr>
<tr>
<td>II Plan's</td>
<td>III Plan's</td>
<td>II Plan's</td>
</tr>
<tr>
<td>Tariff Commission's 1961-62 Estimates</td>
<td>Actual capacity cost per ton</td>
<td></td>
</tr>
<tr>
<td>TISCO</td>
<td>Rs. 1558</td>
<td>Rs. 1558</td>
</tr>
<tr>
<td>IIISCO</td>
<td>1115</td>
<td>1115</td>
</tr>
<tr>
<td>Durgapur</td>
<td>2143</td>
<td>1852</td>
</tr>
<tr>
<td>Rourkela</td>
<td>3261</td>
<td>2566</td>
</tr>
<tr>
<td>Bhilai</td>
<td>2250</td>
<td>1563</td>
</tr>
</tbody>
</table>


or gross blocks, of the public and private sector mills are expressed per ton of their respective saleable steel capacities.

The inflation in plant and equipment costs was primarily responsible for the capital cost differential between the public and private sector mills. As mentioned previously, between the late forties and late fifties, the cost of plant and equipment increased over 60 per cent.\(^1\) Since a substantial portion of TISCO's and IISCO's gross block represented plant and equipment purchased before 1956, their gross blocks per ton of capacity were thus below those of the newer public sector mills.\(^2\)

The Tariff Commission expected that public sector mills' capital costs per ton of capacity, however, would decline after their planned expansion programmes were completed. The cost of expanding an established mill would have been much less than the initial cost of erecting the new public sector mills due to the existence of excess capacity in certain indivisible plant and ancillary units.

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1. See the text of this chapter. Some of the increase in cost, however, reflected improvements in the plant and equipment.

For example, the cost of expanding IISCO's mill during the fifties amounted to Rs.934 per ton of saleable steel capacity, while the cost of erecting Bhilai's first stage of capacity, which occurred at approximately the same time, amounted to Rs.2,127 per ton.\(^1\) Bhilai's capital cost per ton of capacity, however, was estimated to decline to Rs.1,477.98 per ton after the mill's capacity had been expanded from 1 million to 2.5 million ingot tons. Yet, even at that point, it was estimated that its costs per ton of capacity would still exceed those of the private sector mills.

Among the public sector plants, the Tariff Commission estimated that Rourkela's capital costs per ton of saleable steel would exceed Bhilai's. This results, however, because the Rourkela mill was to specialise in the production of flat products, which are more costly to produce. Bhilai's capital cost advantage over Rourkela, however, was more than offset by the higher works costs Bhilai possessed and by the lower prices Bhilai's products commanded.\(^2\) On the basis of this brief analysis, it appeared that from the perspective of the Tariff Commission in 1961-62 the marginal producer was the new public sector plant at Bhilai. The plant possessed not only the highest

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1. IISCO's cost per ton figure was calculated from data presented in the Planning Commission, Programmes of Industrial Development, 1956-61, pp.2-6.
2. See Table 6.16
estimated works cost but also the second highest capital costs per ton of capacity. Thus the Bhilai plant was the marginal firm used in the subsequent analysis.

RATE OF RETURN ESTIMATE, 1961-62:

Given data on the estimated unit costs of the marginal steel producer in 1961, it was possible to evaluate whether the prices determined by the Government were consistent with the fair return on capital.

The cost data from which these rates were computed are summarised in the Table 6.16. The Tariff Commission

<table>
<thead>
<tr>
<th>Items</th>
<th>Initial capacity (1 million ingot tons)</th>
<th>Expanded capacity (2.5 million ingot tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average c.i.f. import price</td>
<td>Rs. 648</td>
<td>Rs. 648</td>
</tr>
<tr>
<td>Cost of production Rs.378</td>
<td>Rs.378</td>
<td>Rs.378</td>
</tr>
<tr>
<td>Interest on working capital</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Other expenses</td>
<td>06</td>
<td>06</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recoveries</td>
<td>-02</td>
<td>-02</td>
</tr>
<tr>
<td>Depreciation</td>
<td>113</td>
<td>511</td>
</tr>
<tr>
<td></td>
<td></td>
<td>78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>476</td>
</tr>
<tr>
<td>Return</td>
<td>137</td>
<td>172</td>
</tr>
<tr>
<td>Capital cost per ton of saleable steel</td>
<td>2250</td>
<td>1563</td>
</tr>
<tr>
<td>Rate of Return on capital</td>
<td>6%</td>
<td>11%</td>
</tr>
</tbody>
</table>

estimates of Bhilai's works costs when this mill was operating at its optimum level of production were assumed to provide a reasonable first estimate of the works cost of the marginal firm both at the initial level of capacity and after the completion of its Third Plan expansion programme. As for the overhead cost components, interest on working capital was allowed at 7-1/2 per cent of Bhilai's works cost for six months. Finally, the depreciation was allowed at 5 per cent of Bhilai's capital block at both its initial and expanded levels of capacity.

The price used to compute the rates of return earned by the Bhilai mill at both levels of capacity was the average landed price of imported steel in 1961-62. This price was obtained by weighting the prices of the individual categories of steel imported in that year by the product-mix of the Bhilai Steel mill. In that year, however, the prices of steel in world markets had been depressed as many nations had temporarily found themselves with a surplus steel capacity. Thus this price, if anything, understated the long-run import price and, hence, the rate of return earned by the Bhilai mill.

On the basis of these estimates (Table 6.16), Tariff Commission data, gave a rate of return on its capital 6

per cent at its initial level of capacity and a return 11 per cent after it had completed its subsequent expansion programme. The opportunity cost of the capital, on the other hand, was estimated to be no lower than 10 per cent. Although the rate of return earned by Bhilai on its capital marginally exceed the lower estimate of 'opportunity cost' of this capital once the plant's capacity had been expanded, the rate of return was not significantly higher than this required rate. Thus, on the basis of these computations, it could not be definitely asserted that the highest cost producer of iron and steel possessed a comparative advantage in this line of production.

RATE OF RETURN ESTIMATE, 1964-65:

Although the Tariff Commission's cost estimates were felt to be quite reliable, it must be pointed out that these estimates were made in 1961, several years before the public sector plants actually reached their optimum levels of production. Thus it was considered important to calculate the actual rates of return earned by these firms in a normal post-expansion year.

For the purpose of the analysis, the 1964-65 fiscal year would appear to be most suitable. By that time, all
TABLE 6.17 - ESTIMATES OF RATES OF RETURN ON CAPITAL EARNED BY BHILAI PLANT BASED ON 1964-65.

<table>
<thead>
<tr>
<th>Items</th>
<th>Initial capacity (1 million ingot tons)</th>
<th>Expanded capacity (2.5 million ingot tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average c.i.f. price</td>
<td>Rs.655</td>
<td>Rs.655</td>
</tr>
<tr>
<td>Cost of Production (excluding returns)</td>
<td>Rs.429</td>
<td>Rs.429</td>
</tr>
<tr>
<td>Total Works Cost Composed of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated works</td>
<td>Rs.378</td>
<td>Rs.378</td>
</tr>
<tr>
<td>Adjusted increases in ingot cost</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Adjusted for increases in steel excise tax</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Interest on working capital</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Other expenses</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Misc. Recoveries</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>Depreciation</td>
<td>110</td>
<td>92</td>
</tr>
<tr>
<td>TOTAL COST OF PRODUCTION</td>
<td>559</td>
<td>541</td>
</tr>
<tr>
<td>Return</td>
<td>96</td>
<td>114</td>
</tr>
<tr>
<td>Capital cost per ton of saleable steel</td>
<td>2204</td>
<td>1847</td>
</tr>
<tr>
<td>Rate of Return</td>
<td>4.3%</td>
<td>6%</td>
</tr>
</tbody>
</table>

SOURCES: a - Table 6.18; b - Table 6.10; c - Table 6.16; d - At the initial level 5% of Bhilai's actual capital cost per ton of 1964-65 saleable steel output, at the expanded level 5% of Bhilai's actual capital costs per ton of its expanded capacity.

e - At the initial level, actual capital cost (Rs.2020.5 million) per ton of Bhilai's 1964-65 saleable steel output (9,16,000 tons), at the expanded level of capacity (see table 6.16).
of the public sector plants had normalised their operations, and all were producing saleable steel at rates that equalled or exceeded their optimum levels of production. Moreover, the operations of these mills had not yet been affected by the recession that was to hit the engineering industry in the latter part of 1965.

In order to ascertain the rate of return earned by the Bhilai mill in 1964-65, it was necessary to obtain data on its costs and prices in that year. Fortunately, in 1965 a select committee was appointed by the government to examine the reasons for the rising cost of steel in India. Its report provided actual cost data that could be used in this analysis. The cost data used to compute the 1964-65 rate of return are summarised in Table 6.17.

The works costs were estimated to be higher than those that had been estimated by the Tariff Commission in 1961-62, a difference traceable to higher level of steel ingot costs and a higher steel excise duty. Bhilai's steel ingot costs, exclusive of the excise duty, for example, were Rs. 25 per ton higher than had been estimated previously by the Tariff Commission's estimates of Bhilai's saleable steel works costs. As in the earlier period, this increase was due primarily to the continued increases in raw material costs.
The excise duty in 1964-65 was also higher than the Tariff Commission envisaged in 1961-62. In 1961-62, the duty was levied on the steel ingot and amounted to Rs.47.40 per ton of Bilai's saleable steel output. In 1964-65, however, the duty was increased and levied at various rates on the finished products rather than on the steel ingots. On the basis of Bilai's 1964-65 product-mix, Bilai's duty now amounted to Rs.77 per ton of saleable steel, an increase of Rs.30 over the earlier period.

As in the previous analysis, however, it was assumed that the works costs estimated for Bilai's initial level of capacity would also hold at its expanded level of capacity. In addition, for the overhead components of costs, interest on working capital was once again allowed at 7-1/2 per cent on Bilai's works costs for six months. Moreover, the other minor components were assumed to be unchanged from the previous analysis. Finally, depreciation was allowed at 5 per cent on the actual capital costs of Bilai's initial plant per ton of its actual saleable steel output in 1964-65 at 5 per cent of the actual capital costs of Bilai's expanded plant per ton of its expanded capacity. From an examination of Table 6.16, it is apparent that Bilai's actual capital costs per ton of capacity were substantially higher than had been originally envisaged by the Tariff Commission. Bilai's capital cost per ton of its actual saleable steel output in 1964-65 was lower than the Tariff Commission had estimated, however, because
Bhilai was operating at 118 per cent of its saleable steel capacity in that year.

The price used to compute the rates of return for Bhilai was the average landed price of imported steel in 1964-65, a price derived by weighting the individual import prices by Bhilai's 1964-65 product-mix. As Table 6.18 demonstrates, although the prices of steel generally were higher in 1964-65 than in 1961-62, the

TABLE 6.18 - PRICES OF IMPORTED STEEL DURING 1961-65

<table>
<thead>
<tr>
<th>Items</th>
<th>Import Price</th>
<th>Bhilai's Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-finished steel</td>
<td>Rs. 562</td>
<td>583</td>
</tr>
<tr>
<td>Structural</td>
<td>691</td>
<td>704</td>
</tr>
<tr>
<td>Rails</td>
<td>617</td>
<td>604</td>
</tr>
<tr>
<td>Bars and Rods</td>
<td>699</td>
<td>760</td>
</tr>
</tbody>
</table>

SOURCES: (a) Johnson, The Steel Industry of India, p.98.  
(d) Based on Bhilai's product-mix of "Optimum Capacity" assumed in 1961-62.  
(e) Based on Bhilai's actual product-mix in 1964-65.

average price of the type of steel produced at Bhilai increased only 1 per cent.
Armed with these data, a more accurate estimate of the rate of return earned by the marginal steel firm in a normal post-expansion year could then be calculated. The results of these calculations are summarised in Table 6.16. On the basis of 1961–65 cost and price data, Bhilai was earning a revised rate of return 4.3 per cent at its initial output level and a return of 6 per cent after it had completed its Third Plan expansion scheme. Both rates of return were lower than those obtained when using the Tariff Commission's 1961–62 estimate. Moreover, since both of those rates of return on capital were lower than the "opportunity cost" of capital, it could not be asserted that the marginal producer of iron and steel received a fair price.

RATE OF RETURN ESTIMATES, 1973-74:

Although the steel prices have been decontrolled partially since May, 1967, the basic structure evolved by the 1962 Tariff Commission still endures. For the purpose of analysis, the 1973–74 fiscal year seemed to be the most suitable year because, by that time, the major part of the expansion programme was complete. The installed capacity of the public sector plants had reached the 5.9 million tons of salable steel mark. All these plants were producing steel at optimum level of output.
All the units of Hindustan Steel Limited earned a profit of Rs. 4.71 crores on their operations after the lapse of about 10 years since 1964-65. An examination of the Financial Accounts of these units revealed steep-rise in the cost of production which is largely traceable to increases in the price of raw-materials, higher wages, higher freights and hike in the excise duty. The cost of production was higher by Rs. 971 than had been in 1964-65. Interest on working capital was higher because the public sector plants had required more working capital to finance their inventories which amounted to nine months' cost of production in 1973-74. As a result, the interest charges were higher by Rs. 34 per ton of salable steel. Though the figures for excise duty could not be computed separately from the data presented in the financial statements of the public steel mills, it was, however, assessed that the Government raised them substantially with the purpose of raising more funds through this device. Expansion in production has, indeed, led to reduction in capital cost per ton of salable steel from Rs. 2,202 in 1964-65 to Rs. 2,072 in 1973-74.

The price used to compute the return is the average price per ton of the salable steel produced in 1973-74. The data so collected facilitated the estimation of return earned by the public sector steel units. The
results of these calculations are summarised in Table 6.20.

### TABLE 6.20 - ESTIMATE OF RATE OF RETURN ON CAPITAL EARNED BY HINDUSTAN STEEL LIMITED IN 1973-74.

<table>
<thead>
<tr>
<th>Items</th>
<th>Expanded capacity (5.9 million tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Price</td>
<td>Rs.1623</td>
</tr>
<tr>
<td>Cost of production (excluding returns):</td>
<td>Rs.1400</td>
</tr>
<tr>
<td>Depreciation</td>
<td>185</td>
</tr>
<tr>
<td>Interest on Working capital</td>
<td>69</td>
</tr>
<tr>
<td>Miscellaneous expenses</td>
<td>7</td>
</tr>
<tr>
<td>Miscellaneous recoveries</td>
<td>-48</td>
</tr>
<tr>
<td>TOTAL COST OF PRODUCTION</td>
<td>1613</td>
</tr>
<tr>
<td>Return</td>
<td>10</td>
</tr>
<tr>
<td>Capital cost per ton of saleable steel</td>
<td>2072</td>
</tr>
<tr>
<td>Rate of return</td>
<td>.005%</td>
</tr>
</tbody>
</table>

**SOURCE:** Hindustan Steel Limited, Annual Report, 1973-74.

On the basis of the costs and price data in 1973-74, Hindustan Steel Ltd. earned a meagre amount of Rs.10 per ton of saleable steel in 1973-74, yielding the rate of return .005 per cent. This rate is far below the rate of return 6 per cent that had obtained in 1964-65. Had the Government given a forward-looking price structure, the public sector steel firms would have presented a different picture.
TRENDS IN COSTS & STEEL PRICES

The price control is marked by two-tier price system. The prices paid for steel by consumers are not the same as the prices received by the producers. Rather, until 1973-74, the integrated steel producers received a separate set of prices known as retention prices, which were substantially below the controlled sales prices. In 1956, for example, the average retention price was 53 per cent lower than the average sales price, 11 per cent in 1964-65 and 4.8 per cent in 1973-74, as demonstrated by Table 6.21.

TABLE 6.21 - AVERAGE RETENTION AND SALES PRICES FOR STEEL PRODUCTS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Retention Prices</td>
<td>Rs.253.42</td>
<td>Rs.648</td>
<td>Rs.655</td>
<td>Rs.1623</td>
</tr>
<tr>
<td>Wholesale Prices</td>
<td>388.76</td>
<td>651</td>
<td>729</td>
<td>1702</td>
</tr>
<tr>
<td>Percent excess of wholesale prices over retention prices</td>
<td>53%</td>
<td>0.46%</td>
<td>11%</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

SOURCES: a - See Tables 6.7, 6.16 and 6.17.  
       b = C.S.O., Index Number of Wholesale Prices in India for various years.

NOTE: Differential rate of growth in wholesale prices have been computed from the above sources by the scholar.
The difference between the sales and retention prices, until 1964, accrued to Iron and Steel Equalisation Fund established by the Government. The fund was used primarily to subsidize the importation of the higher priced foreign steel, so that domestic and imported steel could be sold to consumers at one uniform price. Thus the higher cost steel imports were financed essentially by a direct tax on the private producers, equivalent to the difference between the sales and the retention prices.

From the current fiscal year, 1979-80, however, the Government has decided to levy surcharges on steel products to establish "Steel Development Fund". These increases in the price will generate additional resources which after providing for cost escalation would be utilised for the approved development outlays on this sector. I am of the opinion that these price increases will generate inflation in the economy. On the basis of current prices and the anticipated production in 1979-80, the internal resources of the public sector steel industry available for utilisation towards the plan outlay could at best be around Rs.30 crores. This modest amount would probably be eroded by cost escalation.

As already stated in this study, the retention prices were established by the Government on the basis of the
recommendations made by the Tariff Commission. These recommendations were based on detailed cost enquiries conducted periodically by the Commission. The first inquiry was undertaken in 1948 and was followed by a series of other investigations as either the Government or the producers asked for price adjustments.

The retention prices established during the fifties were conciliatory to the industry as demonstrated by Table 6.22. In 1956, the Commission had abandoned its previous method of calculating the retention prices.

| TABLE 6.22 - AVERAGE PRICE AND RETURN PER TON OF SALEABLE STEEL AVAILABLE TO MARGINAL PRODUCER, 1956-74. |
|---------------------------------------------------|---|---|---|---|
| Items                                             | 1956-57<sup>a</sup> | 1961-62<sup>b</sup> | 1964-65<sup>c</sup> | 1973-74<sup>d</sup> |
| Average price                                     | Rs. 396               | Rs. 645              | Rs. 655              | Rs. 1623              |
| Total Cost of production                          | 314.85                | 476                  | 541                  | 1613                  |
| Return per ton of saleable steel                  | 81.15                 | 172                  | 114                  | 10                    |
| Gross block per ton of saleable steel             | 486.00                | 1563                 | 1847                 | 2072                  |
| Rate of Return                                    | 16.7%                 | 11%                  | 5%                   | 0.005%                |
| Rate of increase in average price                 | -                     | 64%                  | 0.002%               | 148%                  |
| Rate of increase in cost of production            | -                     | 51%                  | 14%                  | 198%                  |

SOURCES: a = Table 6.7; b = Table 6.16; c = Table 6.17; d = Table 6.20.
No predetermined rate of return was established and prices were now explicitly set at a level which enabled both the producers to obtain a portion of their capital requirements from internal sources. Both TISCO and IISCO received common retention prices of Rs. 396 in 1956 which were based on the estimate of the internal resource requirements of the highest cost producer, IISCO. It was only with the implementation of the 1956 price policy that retention prices were established at a sufficiently high level to encourage the existing firms to expand. The return on capital per ton of saleable steel in IISCO, the marginal producer, was 16.7 per cent.

Pricing policy was reviewed by the Tariff Commission for the last time in 1962 and their "report on the ex-works retention prices for steel from April 1, 1960, to March 31, 1962", still endures. In 1961, the government sought to introduce the principle of standard cost instead of historical cost as the basis of price fixation; but the Tariff Commission made their recommendations in 1962 on the basis of a hypothetical block of Rs.1800. Subsequent revisions have been also made on the same basis. The Government rejected the Commission's proposal, partly because the Commission had allowed depreciation and return on capital assuming production at 90 per cent of capacity, a production rate achieved by IISCO. In the belief that the companies
should be penalised for failing to reach 100 per cent of their capacities, the government reduced the estimate of their capital per ton of output to Rs. 1,176 upon which return and depreciation were computed. The Government's unwillingness to allow the increase in the retention price contemplated by the Tariff Commission discouraged greater production of tested steel by the steel plants. Although the plants received additions to their prices, known as price extras, to compensate them for the greater costs of producing tested steel products. In fact, these extras were not remunerative during the early '60s. The marginal producer's cost of production, Bhilai's, increased by 14 per cent as compared to 0.002 per cent in its product's prices in 1964-65. As a result, the rate of return declined steeply from 11 per cent in 1961-62 to 6 per cent in 1964-65. The major reason was that the Government adhered to traditional absolute price differentials within any one category of steel.

Against the assumed capital block of Rs. 1,176 per ton, the actual block of H.S.L., at the million ton stage, was about Rs. 2072 in 1973-74. Even for private steel mills, the capital block of Rs. 1,176 had been unrealistic. Even if the block of Rs. 1,800 is taken to demonstrate the cumulative effect on return earned by the public sector mills, prices should be raised by 13 per cent which is
equivalent to the difference of Rs.600 that lies between the capital block per ton of H.S.L. Rs.1800 and Rs.1200 (or Rs.1,176). In other words, steel prices would have to be raised by about Rs.80 per ton, i.e., 13 per cent of Rs.600, the difference between Rs.1,800 and Rs.1,200 (or Rs.1,176) to enable the marginal producer, H.S.L., earn a fair return on its block capital per ton of saleable steel. As a result of denial of this capital per ton of saleable steel for computation of depreciation allowances and retention prices, H.S.L. obtained a meagre return 0.005 per cent on the gross block per ton in 1973-74 (Table 6.22). The cumulative loss of revenue to H.S.L. amounted to Rs.196 crores until the end of 1975-76, owing to unrealistic pricing policy of the Government.

As about two-thirds of steel produced by H.S.L. is purchased by the Government departments and public undertakings, H.S.L. has been forced to bear losses. Another aspect of this cost-plus formula is that it does not contain any incentive for cost reduction. In fact, it encourages cost inflation which consists in the provision of depreciation, tax rebates for development and retained profits or reserves which are deployed for expansion of capital base. Higher becomes the capital base, higher up are the prices adjusted to allow the

guaranteed return on this enlarged capital base. The 'cost plus formula' is not an economic principle of pricing which leads to accelerated costs. The sticky prices and rigid cost pattern during slack period reduce the level of output and push the unit cost of production. The effect of this policy is also to make the production of less costly and substandard alternatives, such as untested steel, more remunerative to the steel plants. For this reason, the Government's policy encouraged the substitution of untested for tested steel after 1961-62.

Perhaps the most serious defect of steel price control was the distortion of both retention and selling prices relative to the prices of other commodities and the cost of producing steel in India, as revealed by Table 6.23.

**TABLE 6.23 - INDEX NUMBERS OF WHOLESALE PRICES OF ALL COMMODITIES, STEEL PRICES AND COST OF STEEL PRODUCTION**

<table>
<thead>
<tr>
<th>Items</th>
<th>1961-62</th>
<th>1964-65</th>
<th>1969-70</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Commodities</td>
<td>100</td>
<td>122</td>
<td>172</td>
</tr>
<tr>
<td>Cost of Steel Production</td>
<td>100</td>
<td>165</td>
<td>190</td>
</tr>
<tr>
<td>Average Prices of All Steel Products</td>
<td>100</td>
<td>107</td>
<td>151</td>
</tr>
</tbody>
</table>

**SOURCES:**
- a and d = C.S.O, Index Number of Wholesale prices in India (for various years).
- b and c = Table 6.22.
Most strikingly, the rate of growth of steel prices was lowest when compared to all commodities and cost of production of steel in our country. Against the annual rate of growth of prices of 8 per cent in the case of all commodities, 10 per cent in the case of cost of steel production in the country, the recorded rate of growth of retention prices of steel is barely 5.5 per cent per annum during the period under consideration. In the context of spiralling cost of production and low retention prices of steel, the lower rate of growth of return, as demonstrated by Table 6.22, has definite implications on the quality of products rolled and economic efficiency of the undertakings.

Although operating costs were as a rule fully covered by retention prices, overheads were not, as analysed in this study. Not only were the rates used in computing overheads inadequate, so were estimates of total investment, or capital block, to which they were applied. In its last enquiry the Tariff Commission used a standard block of Rs.1,800 per annual ton, assuming production of 90 per cent of capacity. This was reduced to Rs.1,176 per ton by the Government, as observed earlier in this analysis. Both estimates were derived from the actual purchase costs of TISCO's plant and equipment, which were mostly installed before or immediately after World War II, and were in no
way related to replacement costs.

These measures of capital block were particularly untenable as bases for the computation of return to the public sector steel plants. At the end of their initial stages of construction, the public sector steel plants' had an average capital block of Rs.2024 per ton of saleable steel, assuming production at rated capacity. The same reached Rs.2072 per ton of salable steel after the completion of third stage. The public sector mills had difficulty meeting operating costs from their retention prices and had to borrow from the banks to cover their deficits. Even if their operating costs had been reduced, it would have been impossible for them to earn an adequate return on their investment so long as they received prices based on the out-of-date capital costs of the private sector plants, as revealed by Table 6.20. It is, therefore, recommended that the 'marginal cost principle of pricing' products be adopted in place of the cost-plus formula.