6. ADJUSTMENT OF DEPRECIATION FOR INFLATION

1. Details of Estimation

In Chapter 4 (methodology), we have already discussed the methods that we adopt to adjust depreciation; they need not be repeated here. With the availability of data restricted to ten years, the method used yields adjusted depreciation figures for only the last year under observation, that is, 1979. As mentioned in the chapter referred to above, we carry out the adjustment calculations for five types of fixed assets, the major being 'basic plant and machinery' which in our classification are denoted as type 3 assets. The others include buildings and other construction (type 1), other plant and machinery (type 2), motor vehicles (type 4) and furniture and fixtures (type 5). For roads, buildings and other construction (type 1 assets) having definitely longer lives than other types of assets, a different kind of adjustment procedure is adopted, as already explained.

These adjustments are done for the twenty groups of companies separately, exactly as in the case of inventory adjustment. These groups are listed at the beginning of the preceding chapter.

For all the twenty groups, the adjusted depreciation figures are arrived at using four sets of price indices, alternatively—the consumer price index, the wholesale price index for all commodities, the implicit GNP deflator and the specific price indices. In the last case, the price indices used for the five groups of fixed assets were: a cost of construction index (in Delhi, assuming that elsewhere the trend would be more or less the same) for roads, buildings and other construction; wholesale price index for manufactured products to adjust depreciation on other plant and machinery; a simple average of the wholesale price indices for electrical and non-electrical machinery to adjust depreciation on basic plant and machinery; the wholesale price index for transport equipment to adjust depreciation on motor vehicles, and the wholesale price index for manufactured pro-

ducts to adjust depreciation on furniture and fixtures.

Since our sample consists of only manufacturing companies, plant and machinery constitute the bulk of the fixed assets. Naturally, the depreciation—adjusted or unadjusted—on this category of assets dominates total depreciation.

The calculation of adjusted depreciation for the first category of assets is based on the assumption made earlier that they were on an average, 25 years old in 1979. That was reasonable for the sample as a whole (group 1), and for the non-government companies selected. For all the industry groups and size-groups also this may be a reasonable approximation. However, for groups 7, 8 and 9, this was not so by definition and hence we assume them to be on an average 30, 15 and 5 years old, respectively. For the government companies also, this assumption was modified as they turned out to be 20 years old on an average.

As in the case of inventory adjustments, the blowing-up of our estimates is undertaken with respect to the government companies and the three age-groups of non-government companies. The blown-up figures for these four groups together yield the estimate for the population of manufacturing companies.

2. Results

Tables 6.1 through 6.20 report the result of our calculations. Each table refers to one group of companies, classified as earlier. The figures refer to the year 1979, the last year under observation. This is so because the method of adjustment employed requires data for previous nine years to adjust the depreciation in the tenth year.

It should be noted that due to the approximations made in the estimation method[1] the bias of these estimated values would be downwards, *i.e.*, these estimates are conservative. Also, the backlog problem—a controversial issue in the inflation accounting methods—is ignored here, and no provision for backlog

[1]Due to insufficient details we had to treat all the estimated purchases (acquisitions) of assets (and also depreciation on them), which had negative values, as zero, as both are impossible events. Obviously, such an estimation would have been unnecessary if we had the actual figures.

Table 6.1

Adjusted Depreciation for all Companies

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	61939.40	71584.78	2047747.25	44428.00	35163.23
Using consumer price index	62974.31	70227.76	1920318.63	39818.26	33826.22
Using wholesale price index	69212.32	71400.95	1990241.43	41184.37	35125.25
Using implicit GNP deflator	57102.17	63339.81	1898077.61	39540.61	33403.06
Unadjusted	25060.00	77181.87	1320282.00	25614.81	23467.61

Table 6.2

Adjusted Depreciation for Government Companies

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	12303.85	63355.51	1634313.99	32706.80	24720.09
Using consumer price index	12275.73	62093.96	1535362.71	29294.33	23740.53
Using wholesale price index	13159.81	63119.15	1588426.54	30274.77	24621.93
Using implicit GNP deflator	11621.84	60465.98	1516220.44	29116.68	23390.78
Unadjusted	6214.37	66167.94	1074698.50	19482.30	17469.50

Table 6.3

Adjusted Depreciation for Non-Government Companies

(Rs '000)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	41073.15	6988.03	413804.48	6717.40	10220.29
Using consumer price index	41529.56	6693.50	385163.17	6266.40	9865.15
Using wholesale price index	45506.30	6880.93	402027.18	6368.59	10269.14
Using implicit GNP deflator	37922.63	6526.46	382122.63	6146.92	9783.63
Unadjusted	13845.70	11013.90	245582.50	6132.50	5998.10

Table 6.4

Adjusted Depreciation for Companies with Share Capital of Rs 50 lakh—Rs 1 crore

(Rs '000)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	10978.81	1182.19	77416.06	956.94	2008.57
Using consumer price index	11175.83	1125.93	72270.88	851.84	1942.74
Using wholesale price index	12257.46	1160.63	74968.57	882.65	2020.62
Using implicit GNP deflator	10143.54	1094.34	71533.31	843.95	1915.21
Unadjusted	4528.20	1089.00	39824.81	550.80	1190.60

Table 6.5

Adjusted Depreciation for Companies with Share Capital of Rs 1 crore—Rs 5 crore

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	19712.83	2962.86	170528.73	4687.37	5227.35
Using consumer price index	19916.49	2859.86	159242.01	4413.77	5040.09
Using wholesale price index	21821.80	2925.41	165599.46	4468.12	5255.95
Using implicit GNP deflator	18200.13	2801.45	157391.76	4347.77	5007.42
Unadjusted	9339.90	5466.20	103100.00	4359.20	3050.50

Table 6.6

Adjusted Depreciation for Companies with Share Capital of above Rs 5 crore

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	10784.73	8525.49	158390.53	2104.94	2926.63
Using consumer price index	10774.00	8184.99	146683.94	1865.68	2827.29
Using wholesale price index	11746.85	8532.08	154480.08	1935.51	2933.61
Using implicit GNP deflator	9915.61	8111.83	146434.82	1851.66	2805.84
Unadjusted	4977.60	4458.70	102657.91	1222.50	1757.00

Table 6.7

Adjusted Depreciation for Companies Incorporated before 1960

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	39021.53	6625.27	242380.87	4464.07	6346.32
Using consumer price index	30607.98	6336.98	226206.50	4169.98	6180.91
Using wholesale price index	31930.06	6520.44	234418.25	4231.87	6392.45
Using implicit GNP deflator	26354.78	6173.47	224820.97	4097.84	6084.28
Unadjusted	12832.61	8625.80	129641.37	3496.70	3372.40

Table 6.8

Adjusted Depreciation for Companies Incorporated between 1960 and 1970

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	7468.38	266.10	155289.91	3724.44	2457.01
Using consumer price index	6805.51	257.58	144583.04	3330.96	2369.67
Using wholesale price index	7339.01	263.00	152651.14	3465.92	2461.95
Using implicit GNP deflator	6788.10	252.75	143110.99	3296.26	2354.24
Unadjusted	4466.90	1329.40	106903.09	2355.30	1694.60

Table 6.9

Adjusted Depreciation for Companies Incorporated after 1970

(Rs '000)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	2153.43	1256.86	11876.49	409.47	1225.74
Using consumer price index	2058.79	1204.36	11043.02	366.93	1177.53
Using wholesale price index	2161.97	1239.64	11509.97	379.36	1215.56
Using implicit GNP deflator	1977.72	1192.30	10809.35	363.25	1159.30
Unadjusted	1546.20	1058.70	9038.20	280.50	931.10

Table 6.10

Adjusted Depreciation for Companies under Industry Group 1

(Rs '000)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	319.24	0.00	416.33	83.70	111.17
Using consumer price index	324.32	0.00	399.09	73.67	105.77
Using wholesale price index	355.67	0.00	405.35	76.43	110.90
Using implicit GNP deflator	293.00	0.00	391.77	72.45	104.39
Unadjusted	125.20	0.00	234.50	36.00	64.20

Table 6.11

Adjusted Depreciation for Companies under Industry Group 2

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	155.80	449.10	483.37	5.62	29.25
Using consumer price index	159.89	421.79	447.02	5.10	27.71
Using wholesale price index	175.88	439.06	466.76	5.30	28.96
Using implicit GNP deflator	143.82	406.34	441.81	4.93	27.01
Unadjusted	72.30	473.80	288.70	7.50	24.10

Table 6.12

Adjusted Depreciation for Companies under Industry Group 3

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	1836.43	450.67	10926.01	155.80	44.81
Using consumer price index	1895.53	438.45	10127.94	143.56	43.49
Using wholesale price index	2107.52	446.53	10512.80	146.26	44.33
Using implicit GNP deflator	1685.23	428.28	10065.70	140.00	42.74
Unadjusted	586.00	271.40	6102.80	159.70	50.90

Table 6.13

Adjusted Depreciation for Companies under Industry Group 4

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	4397.79	1767.67	91399.28	891.28	—692.23
Using consumer price index	4429.24	1715.29	84967.58	791.07	—665.69
Using wholesale price index	4848.68	1748.63	88049.94	824.36	—695.28
Using implicit GNP deflator	4081.39	1685.59	84938.21	784.51	—664.13
Unadjusted	3462.50	2668.60	52488.00	474.80	—449.20

Table 6.14

Adjusted Depreciation for Companies under Industry Group 5

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	12895.33	8906.44	170546.77	2185.32	4984.08
Using consumer price index	12704.50	8549.02	158902.84	2073.02	4816.08
Using wholesale price index	13767.12	8896.04	167403.37	2093.05	4981.38
Using implicit GNP deflator	11766.45	8454.80	157181.68	2053.45	4770.01
Unadjusted	6409.90	4868.40	114622.94	2385.50	3119.60

Table 6.15

Adjusted Depreciation for Companies under Industry Group 6

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	4084.81	1184.49	27184.91	2103.72	490.17
Using consumer price index	4208.61	1150.45	25377.00	1905.40	476.70
Using wholesale price index	4658.43	1200.59	26427.00	1981.29	497.17
Using implicit GNP deflator	3786.49	1138.48	25099.45	1879.43	471.51
Unadjusted	1450.60	714.40	15036.80	1381.50	317.00

Table 6.16

Adjusted Depreciation for Companies under Industry Group 7

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	1282.74	78.03	11463.50	60.27	483.45
Using consumer price index	1224.24	75.09	10643.57	53.13	467.93
Using wholesale price index	1314.61	78.30	11085.76	55.24	488.17
Using implicit GNP deflator	1161.25	75.58	10528.37	52.73	465.35
Unadjusted	725.90	55.20	6610.30	32.80	268.60

Table 6.17

Adjusted Depreciation for Companies under Industry Group 8

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	3528.70	—199.68	25214.68	476.40	561.94
Using consumer price index	3683.61	—199.68	23857.47	424.70	537.42
Using wholesale price index	4032.42	—199.68	24532.52	440.77	553.02
Using implicit GNP deflator	3358.19	—199.68	23526.70	421.22	523.52
Unadjusted	1523.80	—264.90	13866.10	213.80	788.70

Table 6.18

Adjusted Depreciation for Companies under Industry Group 9

(*Rs '000*)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	3518.32	1175.30	21007.92	369.63	714.41
Using consumer price index	3654.83	1135.06	19392.59	334.05	691.36
Using wholesale price index	4073.71	1187.12	20193.56	345.77	719.36
Using implicit GNP deflator	3273.46	1151.26	19306.68	331.01	686.21
Unadjusted	1102.80	584.20	9783.80	184.60	331.70

Table 6.19

Adjusted Depreciation for Companies under Industry Group 10

(Rs '000)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	983.52	3009.10	19611.75	436.25	734.83
Using consumer price index	954.54	2911.47	18280.29	376.02	708.14
Using wholesale price index	999.25	3010.95	18988.22	393.33	738.01
Using implicit GNP deflator	928.24	2879.53	17980.44	373.38	700.10
Unadjusted	944.90	1611.50	12395.60	244.30	451.90

Table 6.20

Adjusted Depreciation for Companies under Industry Group 11

(Rs '000)

	Type 1 assets	*Type 2 assets*	*Type 3 assets*	*Type 4 assets*	*Type 5 assets*
Using specific index	7504.13	21.21	18928.15	2129.20	2044.17
Using consumer price index	7805.69	20.38	18102.92	1941.23	1980.41
Using wholesale price index	8629.59	20.87	18582.57	1990.55	2065.39
Using implicit GNP deflator	6986.69	19.93	17783.48	1912.26	1952.26
Unadjusted	2441.80	31.30	14153.20	1012.00	1030.60

depreciation is made. The estimates would be higher if one wanted to include them too.

Even these conservative estimates turn out to be substantially higher than the depreciation calculated on the basis of historical costs. The use of specific price indices yields the highest estimates, generally speaking, implying that the specific price indices relevant to fixed assets in manufacturing companies have risen faster than any general price index.

A peculiar feature of the calculations done, as is depicted in the tables, is the fall in depreciation on some categories of assets after adjustment, even when prices have shown a rising tendency. In the case of assets of type 2, this feature can be observed in many of the tables. The reason can only be the unsatisfactory handling of disposals by us due to the lack of sufficient data on those disposed assets. A reassuring fact is that this problem has not arisen in the case of the most important category of assets—basic plant and machinery. As a result, aggregate adjusted depreciation does not show this peculiarity when seen against aggregate unadjusted depreciation. All the same, it is a limitation of our study, which can be easily removed if sufficient data on annual disposals and accumulated depreciation thereon are available. In any case, as we have already remarked, this shortcoming only understates the inflation adjustment figure. If one concludes from these calculations that inflation accounting would raise allowable depreciation substantially, the removal of the shortcoming would only strengthen that conclusion.

3. Relative Impact of Depreciation Adjustment

To facilitate inter-group comparisons of the impact of inflation accounting on depreciation provision, Table 6.21 was prepared using the figures in Tables 6.1 through 6.20.

Taking the first row of Table 6.21, the minimum underestimation of depreciation in real terms caused by inflation turns out to be a little higher than 42 per cent and the maximum about 54 per cent. This implies that the manufacturing companies, on an average, are allowed to charge as depreciation only two-thirds of what they would have with inflation adjustment.

Rows 2 and 3 show the impact on government and non-

government companies respectively. It is evident that so far as depreciation is concerned, private companies are hit harder than government companies by inflation. It may be recalled that fictitious inventory gains were found to be higher for government companies than non-government companies.

Similarly, a look at rows 4 through 6, which relate to the three size-groups, reveals that the impact of inflation has been the highest on the first size-group (with share capital of Rs 50 lakh to Rs 1 crore) and the lowest on the third size-group (with share capital of Rs 5 crore and above). Apparently, the larger the size, the less is the impact of inflation.

Table 6.21

Impact of Inflation Accounting on Depreciation in 1979 —20 Groups

	Adjusted total/Unadjusted total (Per cent)			
Group	*Specific*	*Using CPI*	*Using WPI*	*Using IGNPD*
1.	153.63	144.55	149.98	142.12
2.	149.27	140.43	145.23	138.58
3.	166.26	159.08	166.70	156.60
4.	196.13	185.17	193.48	181.27
5.	162.09	152.79	159.65	149.82
6.	158.80	148.02	156.10	146.97
7.	189.18	173.14	179.46	169.36
8.	144.93	134.77	142.34	133.45
9.	131.63	123.31	128.41	120.59
10. (1)	202.31	196.31	206.21	187.35
11. (2)	129.63	122.52	128.80	118.18
12. (3)	187.06	176.40	184.88	172.39
13. (4)	166.71	155.58	161.61	154.87
14. (5)	151.83	142.34	150.02	140.20
15. (6)	185.44	175.23	183.94	171.30
16. (7)	173.77	162.02	169.28	159.67
17. (8)	183.43	175.50	182.04	171.32
18. (9)	223.45	210.29	221.23	206.46
19. (10)	158.33	148.45	154.20	146.10
20. (11)	164.05	159.89	167.60	153.40

Note: The numbers within parentheses refer to industry groups.

As for the three age-groups, it seems that the older the company, the larger is the gain due to inflation accounting. This is what intuition would also suggest, since there probably would be some cumulative effect of inflation over the years.

Among the industry groups, the highest impact of inflation appears to be on industry group 8 (Electrical Machinery, Apparatus, and Appliances), irrespective of the price index used. The least affected group is industry group 2 (Fuel, Power, Light and Lubricants), again with any of the four indices. There is enough variation in the impact of inflation on various industry groups to support the contention that inflation affects different companies in different degrees.

One feature that needs mention is that so far as COSA is concerned, inflation accounting using consumer price index would not have affected profits much, whereas the use of any of the other three indices would have done so to a substantial extent. In the case of depreciation the use of any of the indices would mean a substantial change in the calculated profits. We postpone the discussion of the relative importance of these two adjustments to the next chapter.

As in the case of COSA, the blowing up of the depreciation adjustments are to be undertaken using the estimates for groups 2, 7, 8 and 9 separately and then adding the blown-up figures of these groups together. In the case of COSA, specific price indices could not be used for its calculation for these groups as the inventory of the companies included in these groups consisted of heterogeneous items. This is not so in the case of fixed assets and therefore the blown up adjustment figure for the population using specific price indices can also be arrived at.

The additional depreciation that the government companies would have got, using specific, consumer, and general wholesale price indices and the implicit GNP deflator are, respectively, Rs 2222554 thousand, Rs 1823979 thousand, Rs 2040520 thousand, and Rs 1740343 thousand. For the non-government companies as a whole the corresponding figures would have been Rs 3590914 (2820201+687313+83400) thousand, Rs 2906266 (2312980+531840+61446) thousand, Rs 3235549 (2512994+647657+74898) thousand, and Rs 2759327 (2193440 +511593+54294) thousand, respectively. Comparing these

with the respective COSA estimates, we see that these are far higher and would have reduced taxable profits to a far greater extent than COSA, with the use of either the consumer price index or the implicit GNP deflator, but the situation is the other way round using the general wholesale price index.