CHAPTER - III

AN ANALYSIS OF LABOUR INPUT.

Having discussed output, we now turn to one of the two inputs viz. labour. In this chapter, we propose to measure variations in labour input and labour productivity i.e. output per unit of labour (O/L) vis-a-vis variations in real wages. We have refrained from analysing the data in great detail since such discussion is more meaningful when the other input - capital is also taken into account. This has been done in the sixth chapter. It is a well known fact that a rise in O/L is generally accompanied by a rise in K/L (capital intensity). Thus a discussion of labour productivity is incomplete without a discussion of capital intensity. Therefore, observations made in this chapter are tentative, very broad and partial in character. Though our main concern is to measure labour input yet here and there we could not resist the temptation to discuss briefly about related problems.

3.2 For reasons discussed in para 2.13, labour employed in the three manufacturing units (CLW, DLW and ICF) is excluded from the study. Roy Choudhury also did a similar thing.[1]

3.3 The Railways classify the staff into two broad categories -- open line and construction. The staff employed

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1. Uma Datta Roy Choudhury, 'A Possible Production Function for Indian Railway System', Indian Economic Review, Vol.4, (New Series), No.2, 1971.

in the construction works, account for about 1% of the total staff vide Appendix Table 3-A-1. The expenses incurred on their wage bill are more in the nature of capital cost. Besides, the construction activities though essential, are not immediately related to the production of transport services and therefore we have excluded them.[2] Since the data at various levels are with respect to both open line and construction combined, we have used an overall ratio to isolate the figures for our study.

3.4 The Railways divide their staff on administrative grounds into four heads viz. Classes I and II, Class III and Class IV. The break-down of Classes I and II separately is not available. Classes I and II staff belong to gazetted cadre, while the latter two fall under non-gazetted.

3.5 We shall now attempt to precisely measure labour units. Generally, 'manhours' is deemed as the best measure. However, one can substitute the number of staff employed as a measure[3], provided the working hours remain constant and variations, in mandays lost (due to strikes, sickness, etc.) and overtime work, are not wide. Studies dealing with labour productivity,

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2. In a similar way Munby excluded the staff employed in the workshops producing investment goods. See D.L.Munby, 'Productivity of British Railways', Bulletin of the Oxford University Institute of Economics and Statistics, Vol.24, No.1, Feb. 1962.

3. See Harold Barger, the Transportation Industries 1889-1948, NBER, New York, 1961, p.99; Uma Datta Roy Choudhury, op.cit. and R.K.Saggar, 'Efficiency of Indian Railways 1960-70', Economic and Political Weekly, Vol.7, No.41, Oct. 7, 1972.

generally adjust labour input to take account of changes in mandays lost, overtime, hours of work etc.[4] However, in the present analysis, we have not adjusted labour, since working hours have not changed and fluctuations in mandays lost and overtime are not wide. Details of mandays lost and overtime are given in the appendix Tables 3-A-2 and 3-A-3. The mandays lost varied between 3 to 5% while changes in over-time work amounted to 1 to 2%. Even if we had adjusted labour, there would not have been much difference between the adjusted and unadjusted labour, since the bias introduced by the two variables (mandays lost and overtime work) are in the opposite direction and partly neutralise.

Aggregation:

3.6 For a meaningful analysis, the labour input should not be a mere summation of all categories of employees. The work performed by a skilled person like an engineer is substantially different from the work of an unskilled person. Therefore, different categories of workers should be given proper weights.

3.7 In any community primitive or advanced, labour is used to produce goods. The concept of 'necessary quantum of labour' is generally discussed in the context of marginal product of labour. However, the question arises whether the productivity of each category of labour in the same organisation

4. For details see B.M.Deakin and T.Seward, Productivity in Transport, Cambridge University Press, London, 1969, p.25.

Table 3.1

TRENDS IN GROWTH OF STAFF AND PROPORTIONS OF DIFFERENT CLASSES OF STAFF

Years	Classes I & II	Class III	Class IV	Total	INDICES OF			
	(THOUSAND)				Col.1	Col.2	Col.3	Col.4
	1	2	3	4	5	6	7	8
1951-52	2.19 (0.2)	325 (35.7)	584 (64.1)	911 (100)	100.0	100.0	100.0	100.0
-53	2.39 (0.2)	327 (35.8)	585 (64.0)	914 (100)	109.1	100.6	100.2	100.3
-54	2.47 (0.3)	337 (35.5)	610 (64.2)	950 (100)	113.6	103.7	104.4	104.3
-55	2.50 (0.3)	349 (35.9)	621 (63.8)	973 (100)	113.6	107.4	106.5	106.9
-56	2.87 (0.3)	368 (36.4)	641 (63.3)	1012 (100)	130.0	113.2	109.8	111.1
-57	3.37 (0.3)	390 (37.5)	647 (62.2)	1040 (100)	152.7	120.0	110.8	114.2
-58	3.68 (0.4)	419 (38.4)	668 (61.2)	1091 (100)	167.3	128.9	114.4	119.6
-59	3.78 (0.3)	442 (39.3)	679 (60.4)	1125 (100)	164.1	136.0	116.3	123.5
-60	3.88 (0.3)	446 (39.6)	677 (60.1)	1127 (100)	175.9	137.2	115.9	120.7
-61	3.84 (0.3)	450 (39.9)	675 (59.8)	1129 (100)	174.1	138.5	115.3	123.9
-62	4.10 (0.4)	461 (40.2)	681 (59.4)	1146 (100)	186.4	141.8	116.4	125.7
-63	4.41 (0.4)	472 (40.1)	700 (59.5)	1176 (100)	200.5	145.2	119.9	129.1
-64	4.82 (0.4)	496 (40.3)	731 (59.3)	1232 (100)	219.1	152.6	125.0	135.1
-65	5.03 (0.4)	515 (40.3)	755 (59.3)	1273 (100)	227.7	157.8	129.3	139.7
-66	5.49 (0.5)	526 (40.8)	772 (59.2)	1303 (100)	249.5	161.5	132.2	143.0
-67	6.32 (0.6)	532 (40.3)	781 (59.2)	1319 (100)	286.9	163.8	133.7	144.9
-68	6.49 (0.5)	533 (40.4)	779 (59.1)	1319 (100)	295.0	164.0	133.4	144.8
-69	6.57 (0.5)	537 (41.0)	766 (58.5)	1310 (100)	298.6	165.2	131.2	143.8
-70	6.78 (0.6)	546 (41.5)	762 (57.9)	1315 (100)	308.2	168.0	130.5	144.2
-71	7.05 (0.5)	557 (41.9)	765 (57.6)	1329 (100)	320.5	171.4	131.7	145.9
-72	7.25 (0.5)	566 (42.0)	775 (57.5)	1348 (100)	329.5	174.2	132.7	147.9

Sources: Supplements.

Notes: Figures in parentheses represent percentages.

is related to the respective wages. Since the output cannot be divided and assigned to each category of labour, individual productivity of each type of labour is impossible to evaluate in empirical research. At best it can only be said that the employer has correctly used his judgement to make the wages reflect broadly productivities. On the above assumption, labour units as inputs can be calculated by giving weights to different types of labour taking their base year wages[5] as weights.[6]

3.8 Whatever may be the market imperfections, to some extent wages are an index of the productivity. It is true, wages do not accurately represent the productivities of different employees, but still it is some kind of a rough measure.[7] We shall first examine changes in the pattern of employment and later discuss about the growth of imputed labour.

Pattern of Employment:

3.9 An analysis of the employment pattern in the Indian Railways reveals interesting results. This is presented in Table 3.1. The bulk of the labour force consists of Class IV employees who account for 58 to 64% of the total staff. During the period, the proportion of Class IV employees had been almost

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5. For details of items included in wages, see para 2.21.

6. Z.Griliches, 'Production Functions in Manufacturing: Some Preliminary Results, in Conference in Income and Wealth, Production Relations, Columbia University Press, 1967.

7. In a similar way Deakin and Seward standardised labour input using remunerations paid to different categories of labour as weights, see B.M.Deakin and T.Seward, op.cit., pp. 23-24.

continuously decreasing. However, in absolute numbers, there had been a rise in their employment except a small drop in the last two years of Second Five Year Plan and during 1967-70. Class III employees rank second in total employment and account for 36 to 42%. Contrary to the trends noticed in the proportion of Class IV employees, the proportionof Class III staff had been almost continuously rising. In absolute terms also, their growth was continuous. Classes I and II staff account for 0.2 to 0.5% but their employment has more than trebled. Thus it is interesting to note that classes I and II staff, occupying a negligible share in total employment, had witnessed a growth of 230%. On the other hand, Classes III and IV labour, who account for more than 99% of total labour force, have grown by 74% and 33% respectively. The phenomenal increase in the Classes I and II staff is due to reorganisation of Zones[8] and changes in the organisation pattern of staff. The increase in the proportion of Class III staff is due to the fact that the bulk of the administrative staff and operating staff fall under Class III. The decreasing proportion of Class IV employees is due to technical improvements introduced since the Second Five year Plan and changes brought about through redesignation of the staff. Certain Class IV employees were redesignated as Class III employees like First Fireman, Marker, Material Chaser, Store Issuer. Here we are making only aggregate preliminary observations. The pattern of employment can also be viewed functionally instead of administratively.

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8. See para 1.12.

Table 3.2

FUNCTIONAL CLASSIFICATION OF STAFF

(0005)

Years	Trans-port.	Engi-neering	Mecha-nical Engi-neering.	Signal & Tele-communi-cation.	Total	Index Numbers of				
						Col.1	Col.2	Col.3	Col. 4	Col.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1951-52	210	236	265	NA	911	100.0	100.0	100.0	--	100.0
-53	(23)	(26)	(29)		(100)					
-53	219	232	270	NA	914	104.3	98.3	101.9	--	100.
-54	221	238	280	NA	950	105.2	100.9	105.7	--	104.
-55	219	240	292	NA	973	104.3	101.7	110.3	--	106.
-56	221	244	317	NA	1012	105.2	104.1	119.6	--	111.
	(22)	(24)	(31)		(100)					
-57	230	228	528	18.6	1040	109.5	96.6	123.8	100.0	114.
-58	237	233	541	22.6	1091.	112.8	98.7	128.7	121.5	119.
-59	194	232	351	25.7	1125	92.4	101.3	132.4	138.1	123.
-60	198	236	349	27.0	1127	94.3	100.0	131.7	145.2	123.
-61	196	235	349	27.8	1129	93.6	99.6	131.7	149.5	125.
	(17)	(21)	(31)	(2)	(100)					
-62	174	239	387	29.8	1146	82.9	101.3	146.1	160.3	125.
-63	178	248	388	32.8	1176	84.8	105.1	146.4	176.4	129.
-64	180	262	404	37.9	1176	85.7	111.0	152.5	203.7	135.
-65	187	275	409	40.6	1273	89.1	116.5	154.4	218.3	139.
-66	193	280	412	41.8	1304	91.9	118.7	155.5	224.8	143.
	(15)	(21)	(32)	(3)	(100)					
-67	188	287	418	43.1	1319	89.5	121.6	157.8	231.7	144.
-68	189	282	417	43.0	1319	90.0	119.5	157.3	231.2	144.
-69	185	279	412	43.8	1310	88.1	118.2	155.5	238.2	143.
-70	184	278	413	45.1	1315	87.6	117.8	155.9	242.5	144.
-71	185	282	415	4688	1329	58.1	119.5	156.3	251.6	145.
-72	186	287	417	47.6	1348	88.6	121.6	157.4	256.6	148.
	(13.8)	(21.3)	(31.0)		(100)					

Source: Supplements.

Notes : (1) Totals of Cols. 1, 2, 3 and 4 do not add up to Col.5 and only a sizable portion of the total staff is taken into account.

(2) Figures in parentheses represent percentages.

(3) N.A. = Not Available.

Table 3.3

IMPUTED LABOUR

(000s)

Years	Staff As per the Railway Statistics	Imputed Staff	INDICES OF	
			Col.1	Col.2
	1	2	3	4
1951-52	911	1274	100.0	100.0
-53	914	1281	100.3	100.6
-54	950	1328	104.2	104.3
-55	973	1364	106.8	107.1
-56	1012	1437	111.1	112.0
-57	1040	1485	114.1	116.6
-58	1091	1569	119.9	123.2
-59	1125	1626	123.5	127.8
-60	1127	1635	123.7	128.3
-61	1129	1641	123.9	128.8
-62	1146	1673	125.7	131.3
-63	1176	1778	129.1	134.9
-64	1232	1804	135.2	141.6
-65	1273	1865	139.7	146.4
-66	1303	1913	143.0	150.2
-67	1319	1947	144.7	152.8
-68	1319	1949	144.7	153.0
-69	1310	1946	143.8	152.8
-70	1315	1963	144.3	154.1
-71	1329	1992	145.9	156.4
-72	1348	2023	148.0	158.8

Source: Supplements

Notes: (1) Computational details of imputed staff are given in Appendix, Table 3-A-4.

(2) Data pertain to employment as on 31st March of each year.

Functional Classification:

3.10 Table 3.2 presents functional classification of staff. It is evident from the table that there has been a perceptible decrease in the staff employed in the transport department both absolutely and relatively. In 1951-52, the proportion of the transport staff was about 23% which has fallen to 14% in 1971-72. In absolute terms, their employment decreased from 2.1 lakh to 1.9 lakh during the span of two decades. Bigger and heavier trains require less operative staff per ton of weight hauled. Due to the introduction of more powerful locomotives which can haul heavier loads, there has been a continuous reduction in the employment ratio of transport staff (see para 6.26).

3.11 The increase in the staff of engineering department is relatively small. Their employment has increased by about 22% during 1951-72 but their proportion has come down from about 26 to 21%. The proportion of staff employed in mechanical engineering department remained almost stable. There has been a substantial increase in the employment of signal and tele-communication staff. These are the effects of technical change that took place in Indian Railways.

Imputed Labour:

3.12 We shall now discuss the growth of imputed labour. Table 3.3 gives imputed labour calculated on the basis of base year (1951) weights. The imputed labour increased from about 1.3 million to over 2 million. It had increased by about 60% during the period or has grown at annual compound rate of 2.4%

Table 3.4

MONEY and REAL WAGES -- CATEGORY-WISE

Year	Money Wages (Rupees per Employee p.a.)			Real Wages (Rupees per Employee p.a.)			Wage Bill (Rupees Lakh)			
	Classes I & II	Class III	Class IV	Classes I & II	Class III	Class IV	Classes I & II	Class III	Class IV	Total
	1	2	3	4	5	6	7	8	9	10
1951-52	12831	1916	943	12831	1916	943	281	6226	5504	12011
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
-53	12510	1984	972	12510	1984	972	299	6488	5687	12474
-54	12389	2066	999	12158	2027	980	306	6962	6092	13360
-55	12400	2110	1002	13020	2216	1053	310	7365	6223	13898
-56	11310	2099	1026	11928	2274	1112	316	7725	6575	14616
	(88.8)	(109.6)	(108.7)	(93.0)	(118.7)	(118.0)	(113)	(124)	(120)	(141)
-57	10504	2141	1030	10208	2081	1000	354	8349	6667	15370
-58	10642	2244	1073	10067	2084	996	399	9402	7164	16965
-59	11296	2269	1095	9952	2017	965	427	10116	7434	17979
-60	11289	2345	1110	9551	1984	939	438	10459	7515	18412
-61	11718	2541	1195	9831	2132	1003	450	11436	8063	19949
	(91.4)	(132.6)	(126.8)	(76.6)	(111.3)	(106.4)	(160)	(184)	(147)	(166)
-62	11752	2617	1214	9609	2143	1076	481	12063	8266	20810
-63	11678	2779	1275	9276	2207	1013	515	13116	8925	22556
-64	12325	2796	1299	8979	2125	986	570	13879	9493	23942
-65	12107	3010	1387	8018	1993	919	609	15439	10475	26521
-66	12560	3619	1500	7723	2042	923	689	17427	11576	29692
	(97.3)	(173.3)	(159.1)	(47.8)	(106.6)	(97.8)	(246)	(280)	(210)	(247)
-67	13006	3600	1613	7080	1960	878	822	19150	12598	32570
-68	13402	3687	1758	6583	1898	958	875	20720	13700	35295
-69	13836	4147	1902	6786	2034	933	909	22271	14572	37752
-70	13997	4384	2038	6772	2121	986	949	23935	15528	40412
-71	14312	4728	2210	6586	2176	1017	1009	26332	16906	44247
-72	15062	5042	2336	6724	2251	1043	1092	28539	18104	47735
	(117.4)	(263.2)	(247.7)	(52.4)	(117.5)	(110.6)	(389)	(458)	(329)	(398)

Source: Supplements

Notes: (1) Cols.4, 5 and 6 are calculated by deflating Cols.1, 2 and 3 respectively by All India Consumer Price Index Numbers.

(2) Figures in parentheses represent indices of growth.

On the other hand, the labour calculated by counting the heads had increased by about 50%. There does not appear to be such a great difference between unadjusted and adjusted labour units.

Real and Money Wages:

3.13 Table 3.4 gives category-wise growth and proportions of real and money wages. The increase in money wages of Classes I and II is meagre (17%). Actually upto 1966, there was a fall in money wages due to larger recruitment of new staff and retirement of senior staff. On the other hand, there was a substantial increase in the money wages of Classes III and IV staff (about 150%). From the employees' point of view what is important is not a mere rise in money wages but real wages.[9] The real wages of Classes I and II staff continuously decreased. In 1972, their real wages were just one-half of the level of 1951. This is partially explained by the greater inflow of younger officers. In the case of Classes III and IV, there was an improvement in their real wages to the extent of about 18% and 11% respectively.

3.14 The proportion of wage bill of Classes I and II in the total wage bill of all categories remained almost constant (2.3%) but their wage bill nearly has risen by three times. On the other hand, the proportion of wage bill of Class III staff continuously increased (from 52% to 60%) while that of Class IV

9. Real wages are calculated by deflating the money wages by the All India Consumer Price Index with 1951-52 as the base.

Table 3.5

LABOUR PRODUCTIVITY and its GROWTH

Years	Imputed Labour (000s)	Output (Billion Tonne KMs)	O/L (3= 1 ÷ 2) (Thousand Tonne KMs)	O/L* (Thousand Tonne KMs)	Indices of Col.3	Indices of Col.4
	1	2	3	4	5	6
1951-52	1274	111.8	87.76	122.7	100.0	100.0
-53	1261	113.3	88.45	123.9	100.8	101.0
-54	1328	115.0	86.60	121.1	98.7	98.7
-55	1364	122.3	96.99	125.7	110.5	102.5
-56	1427	135.3	94.81	133.7	108.0	109.0
-57	1485	144.1	97.01	138.6	110.6	113.0
-58	1569	156.7	99.87	143.8	113.8	117.0
-59	1628	165.7	101.8	147.5	116.0	120.1
-60	1685	178.8	106.3	154.2	121.1	125.7
-61	1641	184.8	112.6	163.7	128.3	133.4
-62	1673	193.4	115.0	167.9	131.0	136.8
-63	1718	202.5	117.8	172.0	134.2	140.2
-64	1804	214.5	118.9	174.1	135.5	141.9
-65	1965	217.3	115.5	170.2	132.8	139.1
-66	1915	230.9	120.7	177.2	137.5	144.4
-67	1947	236.6	121.5	179.4	138.5	146.2
-68	1949	240.8	123.6	182.6	140.8	148.8
-69	1946	252.4	129.7	192.7	147.8	157.1
-70	1963	257.2	131.0	195.6	149.5	159.4
-71	1992	259.2	130.1	195.0	148.5	158.9
-72	2023	269.1	133.0	199.6	151.6	162.7

Source: Supplements.

Notes: (1) Col.2 refers to GVA as measured by composite unit method vide para 2.36

(2) *Col.4 is calculated by dividing Col.2 by staff employed as per Railway statistics.

decreased (46% to 40%).

3.15 From the above analysis it is clear that though the wage bill of Classes I and II has risen by nearly 3 times, their real wages (per employee) actually fell by 48%. Relatively, Classes III and IV staff gained.

Having claculated the trends in the employment pattern, growth of imputed labour and category-wise real and money wages, we now discuss labour productivity.

Labour Productivity[1]

3.16 Labour and capital are the two principal factors of production. O/L and O/K (labour and capital productivities) are known as partial productivities.[10] A study of labour productivity over a period of time, reveals the changing contribution of labour in increasing the output. The numerator (output) in the ratio is measured in terms of tonne KMs as discussed in para 2.36 above. The denominator (Labour) is the imputed labour. Table 3.5 gives labour productivity.

3.17 The table reveals that the increase in productivity is not continuous. Col.5 reveals that labour productivity fell by about 2 points in 1953-54, -56, -65 and 71. On the whole, labour productivity increased by about 52% or at a compound annual

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10. We have refrained from reviewing the well-known controversy over partial and total productivities. For a detailed discussion, see J.W. Kendrick, Productivity trends in the United States, NBER, New York, 1961 and M. Isaq Nadira, 'Some Approaches to the Theory and Measurement of Total Factor Productivity', Journal of Economic Literature - American Economic Association, Vol. 8, No.4, 1970.
The method of total productivity is generally used to measure technical change. But we have used Solow's method (see chapter 6) to evaluate technical change and therefore there was no need to measure total productivity.

Table 3.6

WAGES AND PRODUCTIVITY

Years	Money Wage (W_m)	Real Wage (W_r)	Real Wage Cost (W_c)	O/L (000 Tonne KMs)	Indices of: Col.1 (W_m)	Col.2 (W_r)	Col.3 (W_c)	Col.4 (O/L)
	(Rupees per employee p.a.)							
	1	2	3	4	5	6	7	8
1951-52	943	943	943	87.76	100.0	100.0	100.0	100.0
-53	974	974	932	88.45	103.3	103.3	98.8	100.8
-54	1006	987	964	86.60	106.7	104.7	102.2	98.7
-55	1019	1070	987	96.99	108.1	113.5	104.7	110.5
-56	1024	1109	980	94.81	108.6	117.6	103.9	108.0
-57	1035	1006	973	97.01	109.8	106.7	103.2	110.6
-58	1081	1004	1011	99.87	114.6	105.5	107.2	113.8
-59	1104	973	1029	101.80	117.1	103.2	109.1	116.0
-60	1126	953	1027	106.3	119.4	101.1	108.9	121.1
-61	1216	1020	1082	112.6	129.0	108.2	114.7	128.3
-62	1244	1019	1060	115.0	131.9	108.1	112.4	131.0
-63	1313	1050	1063	117.8	139.2	111.4	112.7	134.2
-64	1327	1008	1020	118.3	140.7	106.9	108.2	135.5
-65	1422	942	1068	116.5	150.8	100.0	113.2	132.8
-66	1552	955	1124	120.7	164.6	101.3	119.2	137.5
-67	1673	911	1191	121.5	177.4	96.6	126.3	138.5
-68	1811	884	1246	123.6	192.1	93.7	132.1	140.8
-69	1940	951	1274	129.7	205.7	101.1	135.1	147.8
-70	2059	996	1339	131.0	218.4	105.6	142.0	149.3
-71	2221	1022	1389	130.1	235.5	108.4	147.3	149.8
-72	2360	1054	1435	133.0	250.3	111.9	152.2	151.6

Source: Supplements.

Notes: (1) Col.2 is calculated by deflating Col.1 with All India Consumer Price Index

(2) Col.3 is computed by deflating Col.1 with composite index of fare and freight charge (output price index) of the [illegible] (vide Appendix Table [illegible])

(3) [illegible]

growth rate of 2.3%. When we compare the productivity of labour as reported by the Railway Statistics with that of imputed labour, the variance is only marginal. We now correlate the reward of labour i.e. wages - with productivity.

Real Wages and Productivity:

3.18 For a meaningful analysis of staff performance, the real wages have to be correlated with productivity. The concept of real wage has two meanings -- real wage as a cost to entrepreneur is different from real wage as reward to the recipient. Hence, from entrepreneur's point of view, wage is a cost. The effect of this item of cost is always with reference to the price of output. Hence, money wage has to be deflated by output price to represent the true picture.[11]

However, the human aspect could not be ignored. Hence, we have also deflated the money wages by the cost of living index of working class and compared the trends in the two types of real wages.

3.19 In Table 3.6, we present both types of real wages along with O/L. The table shows that though money wage rate had continuously risen and witnessed an increase of one and one half times, the variation in real wage rate was erratic and mainly downwards. It was only in the First Five Year Plan period

11. In aggregate analysis, the two concepts of real wage and real wage cost merge together, since the cost of living index represents price of output. For details see A.Nagaraj, 'Wages in Certain Industries in India', Asian Economic Review, Vol.7, No.3, May, 1965 and W.E.G.Salter, Productivity and Technical Change, Cambridge University Press, Cambridge, 1969, p.160. Salter calls the real wage cost as product wages.

and last four years, there had been a continuous rise in the real wage rate. Even then, the 1971-72 wage rate is below the 1954-55 level. This is due to fall in food prices during the end of 1st 5 year plan. On an average, the increase in real wage rate was about 12% as against 150% in the case of money wages. The rise in real wages was not due to rise in productivity alone. Though productivity increased by about 52%, the rise in real wages was only about 12%. Thus, increase in real wages, on the whole, was less than increase in productivity. Hence the wage earners are slightly better-off in 1972 when compared with 1951.

3.20 A comparison of the indices of money wages (W_m) and real wage cost (W_c) reveals important facts. If W_c index is equal to W_m index, it suggests that the enterprise has borne the entire burden and no shift was witnessed. If W_c is less than W_m, it clearly points towards a shift of the burden. When W_c reaches an index of 100, it is a clear case of complete shift. If W_c is less than 100, it indicates a shift much more than what is warranted by rising wages. It is pertinent to add that strictly we have to take into account interindustry purchase burdens also - see para 6.5.

3.21 Table 3.6 shows that by 1972 W_m index has risen to 250 while W_c index is only 152. On the above logic, since 152 lies between 250 (no shift case) and 100 (complete shift case), a partial shift has occurred. This can be roughly measured. The ratio between the indices of W_m and W_c gives such a measure. When it is unity (250 ÷ 250), there is zero shift. When it is 2.5 (250 ÷ 100), it is a case of complete shift. In the present analysis

Table 3.7

SHIFT OF THE BURDEN OF MONEY WAGES

Period	Shift of rises in money wages.	% Shift	O/L ÷ Wc	% Burden	Positive effect of Technical change.
	(1)	(2)	(3)	(4)	(5)
1951-56	1.05	3	1.05	97	102
1956-61	1.10	7	1.10	93	102
1961-66	1.40	27	1.20	73	88
1966-72	1.60	43	1.00	60	60

Source: Table 3.6

Notes:
1. Col.1 = $W_m \div W_c$
2. Col.2 = (Col.(1) - 1) ÷ 1.5 i.e. (2.5 - 1.
3. Col.4 = 100 - Col.2.
4. Col.5 = Col.3 x col.4.
5. .. W_c = Real Wage cost.
6. O/L = Labour Productivity.

this shift ratio is 1.64 (250/152). Thus the shift roughly works out to 43%(1.64 - 1)/(2.5 - 1).

3.22 Generally in markets where the elasticity of demand for the output is less than unity and small, the enterprise is likely to shift rises in W_m to the consumer so that the incidence on the enterprise is less. However, in public enterprises like the Railways, the rise in prices of output is likely to be restrained due to public accountability. That is one of the reasons why the shift is partial (43%).

3.23 Let us now view the partial shift in the context of labour productivity and examine the palliating effect of productivity on wage burdens. This can be done by scrutinising W_c and O/L indices. In the aggregate both are running almost parallel to each other though individual corresponding pairs of values are at variance. When O/L indices are divided by W_c indices, we get a measure to find out to what extent technical change (increase in O/L) has been availed of to mitigate the burden. If the ratio is unity, it indicates that technical change just managed to fully mitigate the effects of burden. If it is less than unity, it suggests that technical change could not ward off the money wage burden. If it is greater than unity, it means that technical change has more than compensated the wage rise.

3.24 We shall break the time span into four distinct periods. Table 3.7 presents a combined picture of shifts in burden and the moderating effect of technical change.

1951-56: During this period the Railways marginally shifted the small money wage burden to the consumer. The rise in productivity was able to take care of the wage burden. The burden was 97%, against 102 percent positive effect of technical change.

1956-61: A similar trend like the previous period was witnessed. The shift to the consumer (7%) was very slight. The wage burden was 93% and technical change was able to more than compensate the burden.

1961-66: The Railways had to bear 73% of the wage burden but technical change more than made good the burden.

1966-72: The shift of burden to the consumer was higher and therefore the burden on the Railways was only 60%, the lowest during all the four periods. Technical change was able to just compensate the burden.

3.25 In the aggregate, rise in W_m was relatively small in the first 3 periods. The Railways had to bear the burden for more than 90% during the first 2 periods. However, during these 3 periods, technical change has more than made good the rise in money wage burden. The fourth period is very interesting. In this period W_m index rose very steeply but on account of shifts the wage burden was smaller. Technical change was just able to completely mitigate the rising W_m. For a quick analysis cols.(7) and (8) of table 3.6 gives the effectiveness of technical change in mitigating wage burdens It is seen that throughout the 21 years, col.(8) indices are higher than col.(7) indices except in 1954 and 1972. This suggests that technical change was able to more than compensate the wage burdens during all the years except two.

3.26 It is well to remember that the above analysis of burdens, shifts and technical change gives a partial picture. The

value added output contains shares of labour and capital. Therefore, capital cost is another burden that we have to take into account. This can be done by examining the nature of technical change which has been studied in the sixth chapter. We might just hint that if there is neutral technical change, the above analysis need not be amended. If it is capital-saving technical change, the positive effect of productivity gets a little more blown up. If it is capital-using, the effect of productivity is a little less than what it is.

Conclusions:

3.27 One of the methods to evaluate staff performance is to compute O/L ratios. The productivity of imputed labour has increased by about 52% during the twenty one year period. The chief work force in the Railways is Classes III and IV, and within them, the latter occupies first rank. These two classes together account for more than 99% of total staff. The proportion of Class IV decreased whereas Class III increased. Highest growth of employment is witnessed in the case of Classes I and II staff. The growth of labour was about 60% whereas output increased by 140%.

3.28 Though money wages increased by 150%, the real wages increased by a small margin 12%. The rise in real wages is less than the rise in labour productivity. Money wages seemed to have moved in tune with cost of living rather than productivity. But what is more important to the enterprise is not real wages

but real wage cost. Though the money wage burdens have been different during different periods of time, yet higher productivity in all the cases either was able to just compensate or more than compensate, the effects of money wage burdens. The effect of burden of capital cost can be fully comprehended when the nature of technical change is determined.

A P P E N D I X

(Chapter-III)

Appendix Table 3-A-1

OPEN LINE AND CONSTRUCTION STAFF

(000s)

Year	Open Line		Construction		Total (3 = 1 + 2)	
	1		2		3	
1950-51	912	(99.5)	5.19	(0.5)	917	(100)
-52	914	(99.6)	3.45	(0.4)	917	(100)
-53	951	(99.9)	2.10	(0.1)	953	(100)
-54	975	(99.7)	2.73	(0.3)	978	(100)
-55	1012	(99.6)	4.18	(0.4)	1016	(100)
-56	1041	(99.4)	6.18	(0.6)	1047	(100)
-57	1090	(99.2)	8.27	(0.8)	1099	(100)
-58	1124	(99.0)	10.7	(1.0)	1135	(100)
-59	1128	(99.0)	11.3	(1.0)	1139	(100)
-60	1128	(99.0	11.5	(1.0)	1140	(100)
-61	1144	(98.8)	13.4	(1.2)	1158	(100)
-62	1176	(98.7)	16.0	(1.3)	1192	(100)
-63	1230	(98.5)	18.8	(1.5)	1249	(100)
-64	1273	(98.2)	22.6	(1.8)	1296	(100)
-65	1302	(98.1)	24.4	(1.9)	1327	(100)
-66	1318	(98.5)	20.1	(1.5)	1338	(100)
-67	1318	(98.7)	17.5	(1.3)	1335	(100)
-68	1309	(98.8)	15.6	(1.2)	1325	(100)
-69	1315	(99.0)	14.2	(1.0)	1329	(100)
-70	1330	(99.0)	13.7	(1.0)	1344	(100)
-71	1347	(99.1)	12.4	(0.9)	1359	(100)

Source: Supplements.

Note: Figures in parentheses denote percentages.

Appendix Table 3-A-2
PROPORTION OF MANDAYS-LOST

(000s)

Years	Number of Mandays Lost	Equivalent of Mandays Lost--Number of workers	Total staff Employed	Col.2 as % to Col.3
	1	2	3	4
1951-52	7431	28.1	912	3.1
-53	7206	27.3	914	3.0
-54	7848	29.7	951	3.1
-55	8486	32.1	975	3.2
-56	9458	35.9	1012	3.6
-57	10025	38.0	1041	3.7
-58	11122	42.1	1090	3.9
-59	12219	46.3	1124	4.1
-60	12392	46.9	1128	4.2
-61	12990	49.2	1129	4.4
-62	12483	47.5	1144	4.2
-63	12204	46.2	1176	3.9
-64	13089	49.6	1230	4.0
-65	13404	50.8	1273	4.0
-66	13433	50.9	1302	3.9
-67	14485	54.9	1318	4.2
-68	16619	63.0	1319	4.8
-69	15905	60.3	1309	4.6
-70	15618	59.3	1316	4.5
-71	15816	59.9	1330	4.5
-72	15519	58.9	1347	4.4

Source: Supplements.

Appendix Table 3-A-3
PROPORTION OF OVERTIME WORK

(000s)

Years	Staff Employed		Overtime Work Equivalent of Imputed Staff		Col.3 as % to Col.1	Col.4 as % to Col.2
	Class III	Class IV	Class III	Class IV		
	1	2	3	4	5	6
19[illegible]52	325	584	5.3	5.5	1.6	0.9
-53	327	585	5.4	5.6	1.7	1.0
-54	337	610	5.8	6.0	1.7	1.0
-55	349	621	6.2	6.2	1.8	1.0
-56	368	641	6.5	6.5	1.8	1.0
-57	390	647	7.0	6.6	1.9	1.0
-58	419	668	7.9	7.1	1.9	1.1
-59	442	679	8.5	7.4	1.9	1.1
-60	446	677	8.8	7.4	2.0	1.1
-61	459	675	6.6	4.7	1.5	0.7
-62	461	681	8.2	8.5	1.8	1.0
-63	472	700	9.7	8.1	2.1	1.2
-64	496	731	10.9	8.8	2.2	1.2
-65	513	755	10.2	8.1	2.0	1.1
-66	525	772	9.1	7.4	1.7	1.0
-67	532	791	8.7	6.7	1.8	0.9
-68	533	779	9.6	7.8	1.9	1.0
-69	537	766	10.4	8.4	1.9	1.1
-70	546	762	11.0	7.8	2.0	1.0
-71	557	765	11.3	7.4	2.0	1.0
-72	562	775	12.8	9.1	2.3	1.2

Source: Supplements.

Note: Overtime Work payment is not admissible to the Classes I and II staff.

Appendix Table 3-A-4
IMPUTED LABOUR

Year	Staff Employed as per the Railway's Statistics (000)			Imputed Staff (000)			
	Classes I & II	Class III	Class IV	Classes I & II	Class III	Class IV	Total (7=4+5+6)
	1	2	3	4	5	6	7
[illegible]	2.19	325	584	29.8	660	584	1274
[illegible]	2.89	327	585	32.4	664	585	1281
[illegible]	3.47	337	610	33.6	684	610	1328
[illegible]	2.50	349	621	34.0	709	621	1364
[illegible]	2.87	363	641	39.1	747	641	1427
[illegible]	3.37	390	647	45.9	792	647	1485
[illegible]	3.66	419	668	50.1	851	668	1569
[illegible]	3.78	442	679	51.5	897	679	1628
[illegible]	3.85	446	677	52.8	905	677	1635
[illegible]	3.84	450	675	52.3	914	675	1641
[illegible]	4.10	461	681	55.8	932	685	1673
[illegible]	4.41	472	700	60.0	958	700	1718
[illegible]	4.82	496	731	65.6	1007	731	1804
[illegible]	5.03	513	755	68.5	1041	755	1865
[illegible]	5.49	525	772	74.7	1066	772	1913
[illegible]	6.02	532	791	86.0	1080	781	1947
[illegible]	6.39	533	779	88.3	1082	779	1949
[illegible]	6.57	537	766	89.5	1090	766	1946
[illegible]	6.73	546	762	92.5	1108	762	1963
[illegible]	7.05	557	765	96.0	1131	765	1992
[illegible]	7.25	566	775	98.7	1149	775	2023

Source: Supplements

Notes: Cols.4, 5 and 6 are computed by multiplying Cols.1, 2 and 3 with the weights which are calculated on the basis of ratio of money wages of different classes of staff in 1951-52.