Productivity Led Wage Disparity in the Indian Industry

Hina Sidhu

Labour productivity and wage rates have recorded varying rates of growth in different sub-sectors of the Indian industry during different phases of time. Over a period of time the share of wages in labour productivity has declined due to relatively higher growth in labour productivity. The rise in labour productivity coupled with the competitive product and labour markets has led to the rise in wage disparities among the workers within and across the sub-sectors. The study revealed that the wages are closely linked to the labour productivity in the industrial sector in India.

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Wage Productivity Linkages

Wages are closely linked to labour productivity. Rise in productivity acts as the deciding factor for the expansion of capacity and the adoption of improved technology. The implementation of advanced technology necessitates recruitment of skilled workers and impart of training to the existing workers. However, experienced and skilled workers are available at relatively higher wages in competitive labour markets. The studies by Dickens and Katz (1986), Krueger and Summers (1986), Holzer, et. al. (1988), Katz and Summers (1988), Katz and Murphy (1991), Krueger (1991), Krugman (1994), Lowe (1995), Murphy, et. al. (1998), Krueger (1999), Jean and Nicolettiacts (2002) and Virén (2005) have been widely referred by the researchers while examining the wage structure in industries. This study empirically examines the impact of productivity as well as technology on the determination of wages in different sub-sectors of the Indian industry.

Data Source & Sectoral Classification

Data for the study were sourced from the Annual Surveys of Industries (ASI).

ASI statistics classify the factories into six sub-sectors, viz. (1) Un-incorporated enterprises, (2) Corporate Sector (3) Co-operative Societies, (4) Khadi and Village Industries, (5) Handloom Industries and (6) Others (including N.R.) activities. The Un-incorporated Sector comprised three sub-sectors viz. (i) Individual Proprietorship units (ii) Joint Family (HUF) establishments and (iii) Partnership firms while the Corporate Sector comprised four sub-sectors viz. (i) Public Limited Companies, (ii) Private Limited Companies, (iii) Government Department Enterprises and (iv) Public Corporations. Since Khadi and Village industries, Handloom industries and Others (including N.R) activities constitute very small proportion of the total ASI sample population, the data pertaining to these three sub-sectors were clubbed together and analyzed under the label KVHO in this study.

The design of data collection for the ASI classifies the industries into two categories viz. (i) the census sector units and (ii) the sample sector units. Over a period of time the definition of the census sector has been revised several times in order to alter its coverage. For example, prior to 1987-88 the census sector covered all the units employing 50 or more workers operating with power and 100 or more workers operating without power. As per the 1987-88 definitions, the census sector covered all the units employing 100 or more workers irrespective of being operated with or without power. In 1998-99, the census sector was redefined to include all the units, which employed 200 or more workers and also those units, which contributed significantly to the gross output even if they employed less than 200 workers. In addition to the public sector undertakings (PSUs), the 1998-99 definition of the census sector also included all the factories located in the 12 industrially backward states and Union Territories (UTs) viz., Goa, Himachal Pradesh, Jammu and Kashmir, Manipur, Meghalaya, Nagaland, Tripura, Andaman and Nicobar Islands, Chandigarh, Dadra and Nagar Haveli, Daman and Diu and Pondicherry. In 2004-05 the definition of the census sector was again revised to cover all the factories employing 100 or more workers in the industrially progressive states and UTs and all the factories that were located in the five industrially backward states and UTs. It is important to note that the revision in the definition of the census sector in 2004-05 brought the public sector undertakings into the general scheme in order to cover only those units, which were employing 100 or more workers. Thus, registered factories, which remained outside the purview of ASI census sector, formed the population for ASI sample sector. For selection of sample units, some specific method has been applied to determine the sample size for individual states and UTs. It has been claimed that the revision of the definition of census sector, and identification of sample size for ASI, has been done meticulously in order to obtain the precise estimates up to state level (ASI 2002-03). The same is expected to hold true for the sectoral level estimates.

Since there is considerable diversity in the characteristics of different sub-sectors, the sectoral study is expected to provide a true picture of wage productivity relationship in the Indian industry.

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Frequent revisions in the sample design coupled with year-to-year fluctuations in coverage of industries from different activities in different states and UTs have caused considerable constraints in the analysis of ASI statistics. In spite of the limitations, ASI is the only reliable source of time series data for Indian industry. Table 1 shows the sub-sectorwise coverage of industries in the ASI factory sector during some selected years. It is apparent from the table that the total number of factories as well as the representation of each sub-sector in the ASI sample population has been fluctuating. Table 1 also reveals that the representation of Individual Proprietorship and Private Limited Companies has increased while that of KVHO has declined over a period of time.

Table 1: Sub-sector wise Coverage of Factories in the ASI (%)

Sl. No.	Sector	1981-82	1985-86	1991-92	1995-96	2001-02	2005-06
1	Individual Proprietorship	18.88	17.55	19.14	20.15	24.75	27.75
2	Joint Family HUF	0.00	0.00	6.68	4.67	2.41	2.04
3	Partnership	47.20	53.95	40.16	37.44	35.38	33.02
4	Unincorporated Enterprises (1+2+3)	66.08	71.50	65.97	62.26	62.54	62.81
5	Public Limited Company Corrected	7.19	7.82	10.65	10.66	10.77	9.01
6	Private Limited Company	9.72	14.81	17.01	18.82	23.52	25.64
7	Govt. Dept. Enterprises	0.00	0.00	2.35	2.31	0.33	0.13
8	Public Corporation	1.77	2.10	1.69	3.87	0.53	0.29
9	Corporate Sector (5+6+7+8)	18.68	24.73	31.70	35.66	35.15	35.08
10	Co-operative Societies	1.90	1.95	1.99	1.65	1.59	1.46
11	KVHO *	13.34	1.83	0.34	0.43	0.72	0.65
	ASI Total	100.00	100.00	100.00	100.00	100.00	100.00
	ASI Total (Number)	105037	101016	112286	134571	128550	140161

*Khadi & Village, Handloom and Others (incl. NR)

ASI data considered for the present study pertained to (i) number of factories covered in ASI, (ii) number of workers and employees, (iii) payment of wages, salaries, provident fund, bonus, etc. (iv) value of fixed capital and (v) net value added. ASI data are available at current prices. For comparative analysis the time series financial data available at current prices were converted into constant prices though the application of appropriate price indices. As different price indices were considered for different purposes, the appropriate price index used for specific purpose would be mentioned at the appropriate place. It may be noted that all the financial data were measured at 1993-94 prices. It is also important to mention that due to significant rise and fall in the number factories covered in ASI during different years, the time series data pertaining to various parameters fluctuated significantly. Therefore, the time series data were first transformed into the averages of factories in order to generate a reliable set of data for the analysis. Thus analysis of factory averages would provide realistic estimates for the study.

Wage Disparities

ASI data on employment and payment of wages and salaries was considered to examine wage disparities among the workers and non-workers categories of employees within and across the sub-sectors. The term 'worker' means permanent as well as contract workers. The term non-worker in this study would refer to group of personnel who were employed as managers, supervisors and office or field staff. All India consumer price index (CPI) for industrial workers was used to deflate wages and salaries data. CPI translated the year-to-year wages and salaries data at current prices in to constant prices.

Time series analysis revealed that the Public Limited Companies were the high paymasters prior to the announcement of economic reforms.

Average monthly payments of wages and salaries, their growth rates and coefficients of variations within and across the sub-sectors were calculated to examine the wage disparities. Time series analysis revealed that Public Limited Companies were high paymasters prior to the announcement of economic reforms. Initial years of economic reforms from 1992-93 to 1997-98 may be considered as the phase of restructuring as the industry adopted various measures to insulate from increasing global competition. The wage structure also underwent considerable changes in different sub-sectors during this period. During the 1991-98 period wages were relatively high in Government Department Enterprises. Since 1998-99 Public Corporations have emerged as the high paymasters. Table 2a and Table 2b show the average monthly payments (exclusive of non-wage benefits like bonus, provident fund, etc.), to workers and non-workers during some selected years. It is important to mention that wherever con

venient, either the term 'wage' or 'payment' would be used at different places of data analysis.

Table 2a and Table 2b reveal considerable inter-sectoral wage differentials in the Indian industry. In 1981-82 average wage was highest in Public Limited companies and lowest in Individual Proprietor units. Individual Proprietor units paid only 23 percent of the average wage received by workers in Public Limited Companies while non-workers including paid family members in Individual Proprietorship units received only 40 percent of the salaries paid by Public Limited Companies. Similarly in 2005-06, average wage was the highest in Public Corporations and lowest in Individual Proprietorship units. In 2005-06 Individual Proprietor units paid only a little over 16 percent of the average wage paid by Public Corporations while non-workers including paid family members in Individual Proprietorship units received only a little over 18 percent of the salaries paid by Public Corporations. Likewise calculations for other sub-sectors also revealed the widening of wage disparities over a period of time.

Table 2 (a): Average Monthly Wage and Salary at Current Prices (Rs.)

Sector	1981-82		1991-92		2001-02		2005-06	
	Worker	Non-Worker	Worker	Non-Worker	Worker	Non-Worker	Worker	Non-Worker
Individual Proprietorship	197	638	728	1480	1897	2926	2138	4710
Joint Family HUF	NA	NA	845	1429	1945	3431	2400	5918
Partnership	262	520	845	1503	2143	4110	2646	7013
Public Limited Company	851	1597	2476	4422	5510	14090	6228	21270
Private Limited Company	497	1032	1263	2550	3092	8582	3927	15195
Govt. Dept. Enterprises	NA	NA	2422	3594	5957	11113	8102	16902
Public Corporation	689	1109	2083	4782	10126	17614	13150	25652
Co-operative Societies	340	470	1838	2986	4431	8080	4833	11663
KVHO *	798	1266	1587	2917	3372	9956	3050	8890
Coef. of Variation (%)	51	44	44	44	62	56	69	56
ASI Total	600	1188	1806	3196	4058	10251	4398	15331

*Khadi & Village, Handloom and Others (incl. NR)

Table 2 (b): Average Monthly Wage and Salary at 1993-94 Prices (Rs.)

Sector	1981-82		1991-92		2001-02		2005-06	
	Worker	Non-Worker	Worker	Non-Worker	Worker	Non-Worker	Worker	Non-Worker
Individual Proprietorship	547	1775	858	1743	1057	1631	1018	2242
Joint Family HUF	NA	NA	995	1683	1084	1912	1142	2817
Partnership	728	1447	995	1770	1194	2290	1259	3338
Public Limited Company	2367	4441	2917	5209	3070	7851	2964	10125
Private Limited Company	1382	2868	1488	3004	1723	4782	1869	7233
Govt. Dept. Enterprises	NA	NA	2854	4234	3319	6192	3857	8046
Public Corporation	1914	3082	2454	5634	5642	9815	6260	12211
Co-operative Societies	945	1306	2165	3518	2469	4502	2301	5552
KVHO *	2220	3521	1870	3436	1879	5548	1452	4232
Coef. of Variation (%)	51	44	44	44	62	56	69	56
ASI Total	1667	3303	2128	3765	2261	5712	2094	7298

*Khadi & Village, Handloom and Others (incl. NR)

Table 3 shows the disparities in payment within each sub-sector during different years. In 2005-06 the salary to wage ratio was 3.9 in Private Limited Companies, which was followed by 3.4 in Public Limited Companies, 2.9 in KVHO establishments, 2.7 in Partnership firms, 2.5 in Joint Family HUF, 2.4 in Cooperative Societies, 2.2 in Government Department Enterprises and 1.9 in Public Corporations. On the whole average salary of non-workers was nearly four times more than the average wages of workers during 2005-06. It is apparent from Table-3 that the wage disparities have widened in almost all the sub-sectors.

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Table 3: Sub-sector wise Ratio of Average Salary to Average Wage

Year	1981-82	1985-86	1991-92	1995-96	2001-02	2005-06
Individual Proprietorship	3.25	2.01	2.03	2.44	1.54	2.20
Joint Family HUF	NA	NA	1.69	2.08	1.76	2.47
Partnership	1.99	1.82	1.78	2.11	1.92	2.65
Public Limited Company	1.88	1.82	1.79	1.85	2.56	3.42
Private Limited Company	2.08	2.01	2.02	2.20	2.78	3.87
Govt. Dept. Enterprises	NA	NA	1.48	1.49	1.87	2.09
Public Corporation	1.61	1.74	2.30	1.55	1.74	1.95
Co-operative Societies	1.38	1.73	1.63	1.59	1.82	2.41
KVHO *	1.59	1.57	1.84	2.54	2.95	2.92
ASI Total	1.98	1.98	1.77	1.94	2.53	3.49

*Khadi & Village, Handloom and Others (incl. NR)

Coefficients of variation were calculated to examine the wages differentials across different sub-sectors. Table 4 shows that over the period of 25 years from 1981-82 to 2005-06, coefficient of variation in the wages of workers fluctuated in the range of 43 percent to 73 percent. Similarly coefficient of variation in the salaries of non-workers ranged from 32 percent to 58 percent. High values of the coefficient of variation are an indicator of substantial wage and salary differentials across the sub-sectors.

Table 4: Coefficient of Variation in Wages and Salaries across the Sectors (%)

Year	Wage	Salary
1981-82	51	44
1982-83	49	39
1983-84	47	32
1984-85	47	48
1985-86	47	44
1986-87	49	43
1987-88	49	43
1988-89	43	36
1989-90	46	44
1990-91	48	45
1991-92	44	44
1992-93	47	37
1993-94	44	58
1994-95	50	44
1995-96	46	32
1996-97	55	41
1997-98	52	48
1998-99	51	44
1999-2K	56	51
2000-01	58	47
2001-02	62	56
2002-03	66	54
2003-04	73	57
2004-05	69	54
2005-06	69	56

To understand whether the disparities have widened or declined over the period, growth rates analysis is the appropriate measure. An inference from Table 3 is that the growth rates for different phases would show substantial disparities. It is also expected that the growth in the salaries of non-workers would be relatively higher than the growth in wages of workers because changes in technology are biased towards skilled professionals. Studies by Dickens and Katz (1986), Krueger (1991), Krugman (1994), Murphy et. al. (1998) and Virén (2005) have established that implementation of skill biased technologies have widened the wage disparities among workers due to increase in demand for professional and technical skills.

To estimate the growth in real wages, data pertaining to wage payments were deflated by Consumer Price Index of industrial workers. Least-squares method was used to calculate the growth rates in real wages and salaries. To estimate the least-squares growth rate, a linear regression trend line was fitted to the logarithmic values of the variable in the relevant period. The regression equation to estimate the growth rate is given below:

$$\text{Ln } W_t = a + r\,t$$

where

W_t is the average wage rate during the relevant year,

t represents time or the relevant year,

a is the intercept or constant,

r is the growth rate, and

Ln is the natural log.

Table 5 shows that wages and salaries increased at different rates in different sub-sectors during different phases of time. Positive growth indicates rise of real wages and vice versa. During 1981-91 real wages of workers recorded the highest growth in Co-operative Societies. But during 1991-01 to 2001-06, growth in real wages was relatively high in Public Corporations. On the other hand, real wages had fallen in KVHO units during 1981-91, 1991-01 and 2001-06. Public Limited Companies recorded a decline in real wages during 1991-01and 2001-06. Real wages had declined during 2001-06 in Co-operative Societies and Individual Proprietorship units. Similarly in the case of non-workers, relatively high growth in salaries was recorded in Co-operative Societies during the 1981-91period, Government Department Enterprises during 1991-01 and Private Limited Companies during the 2001-06 periods. On the other hand real wages of non-workers had declined in Individual Proprietorship units during 1981-91and in KVHO establishments during 2001-06.

Table 5: Intra-sector Growth of Wage Payments (% per annum)

Sector	1981-91		1991-01		2001-06		1981-06	
	Worker	Non-Worker	Worker	Non-Worker	Worker	Non-Worker	Worker	Non-Worker
Individual Proprietorship	6.18	-7.69	1.81	3.44	-0.39	6.62	2.42	0.06
Joint Family HUF	NA	NA	1.12	0.45	0.25	6.87	NA	NA
Partnership	3.68	1.84	1.07	2.71	1.43	8.65	1.92	2.85
Public Limited Company	3.09	2.31	-0.26	2.62	-0.89	6.15	0.47	2.81
Private Limited Company	2.34	1.21	0.24	3.14	2.26	9.29	0.24	2.67
Govt. Dept. Enterprises	NA	NA	2.93	6.74	2.46	7.52	NA	NA
Public Corporation	6.32	6.51	5.90	5.59	2.57	4.45	4.54	5.04
Co-operative Societies	7.97	8.54	0.17	1.85	-1.39	5.20	2.50	3.57
KVHO *	-0.38	1.26	-0.84	0.51	-6.25	-4.75	-2.16	1.46
ASI Total	3.69	2.94	-0.35	2.78	-1.74	5.59	0.61	2.58

*Khadi & Village, Handloom and Others (incl. NR)

With the implementation of economic reforms, Government of India enacted some changes in labour laws to facilitate the industry reduce surplus labour through the 'voluntary retirement scheme'. This helped the industry to restructure and insulate from global competitors. However, the process of restructuring emphasized on professional management and labour efficiency. As a result demand for skilled workers and professional managers increased which led to the widening of wage disparities within and across the sub-sectors. Relative variations in the growth of wages vis-à-vis salaries measure the shift in the wage

disparities. Lower growth of wages compared to the growth of salaries is an indicator of the increase in wage disparities and vice-versa. The wage disparities, estimated for different periods of time in different sub-sectors are presented in Table 6. During 1981-91, wage disparities had declined in Individual Proprietorship units, Partnership firms, Private Limited Companies and Public Limited Companies. During 1991-01, only two sub-sectors viz., Joint Family HUF and Public Corporations recoded some fall in wage disparities, while in the remaining sub-sectors, wage disparities had widened. During 2001-06 wage disparities had widened in every sub-sector. For the overall industry, wage disparities, after a fall of 0.76 percent per annum during 1981-91, increased at 3.13 percent per annum during 1991-01 and 7.33 percent per annum during 2001-06.

During 2001-06 wage disparities had widened in every sub-sector.

Table 6: Sub-sector wise Growth of Wage Disparities (% per annum)

Sector	Shift in Wage Disparity			
	1981-91	1991-01	2001-06	1981-06
Individual Proprietorship	-13.87	1.63	7.00	-2.36
Joint Family HUF	NA	-0.67	6.62	NA
Partnership	-1.83	1.64	7.22	0.93
Public Limited Company	-0.78	2.88	7.04	2.35
Private Limited Company	-1.13	2.90	7.03	2.42
Govt. Dept. Enterprises	NA	3.80	5.06	NA
Public Corporation	0.19	-0.32	1.88	0.50
Co-operative Societies	0.57	1.68	6.60	1.07
KVHO *	1.64	1.35	1.51	3.62
ASI Total	-0.76	3.13	7.33	1.97

*Khadi & Village, Handloom and Others (incl. NR)

Share of Wages in Productivity

With the assumption that the employer has the ability to make optimal use of labour and capital, an attempt is made in this section to examine the linkage between payment of wages and labour productivity. In the context of wage payments, it is important to mention that the fringe benefits received by workers in the factory sector vary from one unit to another due to variations in payment policies influenced by the labour productivity. Therefore, while analyzing the wage and productivity relationship, it is important to take into account fringe benefits also. As per the definitions used for data collection in ASI, the term 'emoluments' comprises wages and salaries together with fringe benefits and other non-cash payments like provident fund, etc. Data on the nominal emoluments and nominal net value added were converted to real values with the Wholesale Price Index of Manufactured Products. The wages and productivity relationship explains the distribution of income between labour and capital. For example, if wages rise at the same pace as productivity, the share of labour in net value added would remain unchanged. Net value added is the surplus of earnings, which is available for distribution between

the factors of production i.e. labour and capital. The following equations establish the linkage between wages and labour productivity:

Average Wage = Total Emoluments / Total Number of Employees … (1)

Labour Productivity = Net Value Added / Total Number of Employees … (2)

Since the denominator in both the equations is the same i.e. total number of employees, the division of equation (1) by equation (2) would generate the share of wages in labour productivity. That is

Share of wages = Total Emoluments / Net Value Added

= Average Wage / Labour Productivity … (3)

Equation (3) implies that

Ä Share of Wage = Ä Average Wage – Ä Labour Productivity … (4)

Equation (4) shows that a change in the share of wages is measured by the difference in the rate of growth of wages and labour productivity. For example, if average wage rises by 8 per cent and labour productivity increases by 5 per cent, then the share of wages will increase by 3 per cent. On the other hand if average wage rises by 5 per cent and labour productivity increases by 8 per cent, then the share of wages will decrease by 3 per cent. Thus, the share of wages will remain unchanged so long the rise in wages and growth in labour productivity remain unaffected. The above association clearly shows that rise in productivity provides some cushion for increase in wages without causing any deviation in the share of capital in productivity.

Growth in net value added is influenced by the internal as well as external factors. Therefore, during the year of low performance, net value added would decline causing an increase in the share of wages in productivity. This is also an indicator of the weakening of the financial strength of industry. If wages continue to increase faster than rise in labour productivity for unreasonable span of years, then the management would have to take necessary measures to enhance labour productivity in order to check the depletion of liquid capital or financial reserves. On the other hand, if rise in wages is relatively lower than the growth in labour productivity, then the employer's margins would swell. As per the general practice, some proportion of the increased margins would be transferred to reserve funds while the remaining surplus would be allocated for investments in production and marketing related activities.

Table 7 shows that during 1981-91 rise in

real wages was relatively high in Cooperative Societies while labour productivity recorded relatively high growth in Individual Proprietorship units. As per equation-4 this means that share of wages in labour productivity was the highest in Cooperative Societies and the lowest in Individual Proprietorship units. In Cooperative Societies, a 9.3 percent per annum rise in real wages and 7.5 percent per annum growth in labour productivity led to about 1.8 percent per annum increase in share of wages in labour productivity during 1981-91. On the other hand, in the case of Individual Proprietorship units, the 4.3 percent per annum rise in real wages was lower than the 9.6 percent per annum increase in labour productivity due to which the share of wages in labour productivity declined by 5.3 percent per annum. Likewise, the share of wages in labour productivity declined by 2.6 percent per annum in Private Limited Companies, 2.2 percent per annum in Public Limited Companies, 1.4 percent per annum in Partnership firms, 0.4 percent per annum in KVHO establishments and 0.04 percent per annum in Public Corporations.

During 1991-01 annual growth in the share of wages in labour productivity was 2.3 percent in Individual Proprietorship units, 1.8 percent in Private Limited Companies, 0.6 percent in Joint Family HUF units and 0.02 percent in Partnership firms. On the other hand the share of wages in labour productivity declined by 4.9 percent per annum in Government Department Enterprise, 3.1 percent per annum in Cooperative Societies, 2.0 percent per annum in Public Corporations, nearly 2.0 percent per annum in KVHO establishments and 1.5 percent per annum in Public Limited Companies.

During 2001-06 share of wages in labour productivity increased in only two sub-sectors viz. KVHO and Individual Proprietorship units. In KVHO establishments share of wages had increased by 4.8 percent per annum while in Individual Proprietorship units the increase was 0.2 percent per annum. In the remaining subsectors share of wages recorded a decline; 35.3 percent per annum in Public Corporations, followed by 10.8 percent per annum in Public Limited Companies, 7.6 percent per annum in Private Limited Companies, 5.7 percent per annum in Cooperative Societies, 2.1 percent per annum in Partnership firms, 2.0 percent per annum in Government Department Enterprises and 1.8 percent per annum in Joint Family HUF units.

For the whole of industrial sector share of wages in labour productivity recorded a decline of 1.44 percent per annum during 1981-91, 1.37 percent per annum during 1991-01 and 10.55 percent per annum during 2001-06.

For the whole of industrial sector share of wages in labour productivity recorded a decline of 1.44 percent per annum during 1981-91, 1.37 percent per annum during 1991-01 and 10.55 percent per annum during 2001-06. A decline in the share of wages in labour productivity strengthens the confidence of investors

in the working of industries because when industry moves on the trajectory of growth, labour productivity increases faster than the rise in wages. A decline in the share of wages also means an increased share of capital in value added which could be allocated for further investments in expansion of capacities, up-gradation of technologies, improvement of product qualities, strengthening of marketing activities and expansion of markets.

Table 7: Growth in the Share of Wages in Labour Productivity (% per annum)

Sector	1981-91	1991-01	2001-06
A. Growth of Wages			
Individual Proprietorship	4.29	2.86	-2.56
Joint Family HUF	NA	1.47	-1.30
Partnership	4.39	2.10	-0.02
Public Limited Company	4.24	1.59	-1.46
Private Limited Company	3.23	1.72	1.60
Govt. Dept. Enterprises	NA	4.52	0.65
Public Corporation	7.77	5.76	-0.08
Co-operative Societies	9.30	1.62	-2.60
KVHO *	1.42	-0.81	-9.63
ASI Total	4.83	1.29	-2.57
B. Growth of Labour Productivity			
Individual Proprietorship	9.62	0.56	-2.80
Joint Family HUF	NA	0.85	0.54
Partnership	5.78	2.08	2.07
Public Limited Company	6.44	3.11	9.29
Private Limited Company	5.79	-0.07	9.22
Govt. Dept. Enterprises	NA	9.37	2.67
Public Corporation	7.81	7.76	35.18
Co-operative Societies	7.51	4.72	3.05
KVHO *	1.79	1.18	-14.46
ASI Total	6.27	2.66	7.97
C. Growth in the Share of Wages in Labour Productivity			
Individual Proprietorship	-5.32	2.30	0.24
Joint Family HUF	NA	0.63	-1.84
Partnership	-1.39	0.02	-2.10
Public Limited Company	-2.20	-1.51	-10.76
Private Limited Company	-2.55	1.79	-7.62
Govt. Dept. Enterprises	NA	-4.85	-2.02
Public Corporation	-0.04	-2.00	-35.27
Co-operative Societies	1.79	-3.10	-5.66
KVHO *	-0.37	-1.99	4.83
ASI Total	-1.44	-1.37	-10.55

*Khadi & Village, Handloom and Others (incl. NR)

Wage Productivity Relationship

It is important to mention that in the estimation of wage productivity relationship, the use of two different deflators - one for measuring real wages and the other for measuring productivity - would provide a misleading picture. This necessitates the use of only one deflator for Emoluments and Value Added. Therefore, the Wholesale Price Index (WPI) of Manufactured Products was used to convert the nominal 'Emoluments' and nominal 'Net Value Added' into real values before examining the wage productivity relationship. In the context of selecting a common deflator, it may be noted that any consistent deflator would show similar trends in the wages, productivity and their relationship.

In India, it is generally believed that the wage rates are not determined by the market conditions due to stringent labour laws and government policies biased towards the welfare of the workers. Statutory fixation of the minimum wages for unskilled workers, periodical revision of 'Dearness Allowance' linked to rise in the 'Cost of Living Index', and the revision of pay scales and other benefits of govern

ment employees based on the Pay Commission recommendations, also have considerable impact on wages in private and corporate sectors. The aforesaid situations do not support any linkage between the wages and productivity. Studies by Lowe (1995), Verlinden (1997), Carruth et. al. (1999) and Felipe (2005) have established that industrial wages are determined by the productivity of labour. In the previous section, the growth rate analysis also revealed some consistency in growth of wages and labour productivity. Since the growth rate analysis revealed substantial variations in wages as well as labour productivity across different sub-sectors during different time periods, it is important to examine their linear relationship through the regression analysis.

The ability to pay hypothesis states that labour productivity is an important determinant of wage rates.

The ability to pay hypothesis states that labour productivity is an important determinant of wage rates. Assuming competitive market conditions, the theory of productivity states that average wage would be equal to the marginal product of labour. Cobb-Douglas production function equates the marginal product of labour to the average product of labour. Thus the linear relationship between wages and labour productivity can be examined through the following regression equation:

$$\text{Ln } W_i = a + b \text{ Ln } P_{Li}$$

where

W_i is average wage paid in sub-sector i,

P_{Li} is labour productivity in sub-sector i,

a is constant or intercept of the regression line,

b is the elasticity of wage with respect to labour productivity,

Ln is the natural log.

Regression results for the wage productivity relationships are presented in Table 8. The F-test statistic was significant at 5 percent for every sub-sector, which strengthens the explanatory power of the regression equations for the respective sub-sectors. Value of R^2 was 0.38 for KVHO units, which means that only 38 percent of the variations of wages around its mean were explained by labour productivity. Another sub-sector for which the regression revealed weaker relationship between the wage and labour productivity is the Joint Family HUF establishments. For the remaining sub-sectors, values of R^2 varied in the range of 0.65 to 0.83. This indicates that labour productivity has significant influence on the determination of wage rates. R^2 was 0.79 for the aggregated industry in India. Statistical significance of regression equations and significantly high values of R^2 for most of the sub-sectors, states that labour productivity is an important determinant of wage rates in the Indian industry.

Labour productivity is an important determinant of wage rates in the Indian industry.

Table 8: Regression Results for Wage-Productivity Relationship (1981-06)

Sector	Constant	Coefficient b	t - Statistic	R^2	d.f.	F
Individual Proprietorship	-1.5451	0.4297	6.5250***	0.65	24	42.57
Joint Family HUF #	-1.4892	0.3691	3.2620***	0.40	17	10.64
Partnership	-1.2834	0.6679	10.5420***	0.83	24	111.13
Public Limited Company	-0.9014	0.3398	9.1750***	0.79	24	84.18
Private Limited Company	-1.1903	0.4628	7.3392***	0.70	24	53.86
Govt. Dept. Enterprises #	-0.7189	0.3635	6.3014***	0.71	17	39.71
Public Corporation	-0.8214	0.4908	10.4260***	0.83	24	108.70
Co-operative Societies	-0.8500	0.6722	7.2474***	0.70	24	52.52
KVHO @	-1.0334	0.3544	3.7704***	0.38	24	14.22
ASI Total	-1.0726	0.3887	9.2023***	0.79	24	84.68

ASI data Available since 1988-89 *** significant at 1%
@ Khadi & Village, Handloom and Others (incl. NR)

In the regression equation, b is the coefficient of labour productivity, which represents the elasticity of wages with respect to labour productivity. The value of coefficient b was positive and statistically significant in the regression equation of every sub-sector. This means that an increase in labour productivity leads to the rise in wages in every sub-sector of the Industry. However, the extent of rise in wages due to the increase in labour productivity would vary from one sub-sector to another depending on the value of the coefficient, b. The value of coefficient b ranged from 0.33 to 0.67. For the aggregated industry, the value of b was 0.39 which means that one percent increase in labour productivity would lead to about 0.39 percent increase in wage rates in the industrial sector in India. Thus the regression results support the hypothesis that labour productivity has strong influence on the determination of wages in the Indian industry.

one percent increase in labour productivity would lead to about 0.39 percent increase in wage rates in the industrial sector in India.

Impact of Technology on Wages

Technology plays an important role in the rise of labour productivity. Dickens and Katz (1986), Krugman, (1994), Murphy et. al. (1998), and Jean and Nicoletti (2002) conducted exhaustive studies to examine the role of technology in the determination of wages. In the context of Indian industry, some important studies, which examined the relationship between technology and wage rates were by Papola (1972), Dholakia (1976), Verma and Subbayamma (1985), Bhatnagar (1988), Singh (1991), Sidhu (1997), and Bhandari and Heshmati (2006). To examine the importance of technology in the determination of wages, capital-labour ratio was used as the proxy

for technology. Investment of capital for installation of advanced technology or up-gradation of existing machinery leads to rise in capital-labour ratio. Highly skilled workers and competent supervisors are required to operate modern and complex machineries. This necessitates the impart of training to the already employed workers and recruitment of skilled workers and supervisors. However, experienced and skilled labour is available at relatively higher wages in the competent labour markets. Therefore, capital intensity and wage rates are expected to have linear relationship. The impact of technology on wage in different sub-sectors of the industry was examined through the following regression equation:

$$\text{Ln } W_i = a + b \text{ Ln } K_i/L_i$$

where

W_i is average wage paid in sub-sector i,

K_i/L_i is capital-labour ratio in sub-sector i,

a is constant or intercept of the regression line,

b is the elasticity of wage with respect to capital intensity, and

Ln is the natural log.

Table 9 shows that the values of F-test were significant at 5 percent for all the sub-sectors except KVHO. This indicates that the regression equation explains the linear relationship between wages and technology in all the sub-sectors except the units in KVHO sub-sector. Relatively high value of R^2 for Partnership firms (0.89) implies that technology was an important determinant of wage rates in this sector. On the other hand negligible value of R^2 (0.001) for KVHO sector indicates the absence of wages and technology linkage. For the whole of industry, value of R^2 was 0.74 which means that around 74 percent of the variations of wages around its mean were explained by the technology.

Table 9 : Regression Results for Wage-Technology Relationship (1981-06)

Sector	Constant	Coefficient b	t - Statistic	R^2	d.f.	F
Individual Proprietorship	12.2091	6.4123	7.9631***	0.734	24	63.41
Joint Family HUF #	9.4367	5.2769	2.3551**	0.257	17	5.55
Partnership	12.2641	6.8233	13.9076***	0.894	24	193.42
Public Limited Company	9.4365	10.3523	8.9986***	0.779	24	80.98
Private Limited Company	13.0927	9.2892	6.1443***	0.621	24	37.75
Govt. Dept. Enterprises #	6.1901	6.0033	4.6084***	0.570	17	21.24
Public Corporation	4.0266	3.5475	12.7551***	0.876	24	162.69
Co-operative Societies	5.1682	3.8942	7.5110***	0.710	24	56.41
KVHO @	0.4245	0.2052	0.1789	0.001	24	0.03
ASI Total	10.5829	8.7010	8.0580***	0.738	24	64.93

*** significant at 1% ** significant at 5%
# ASI data available since 1988-89
@ Khadi & Village, Handloom and Others (incl. NR)

The value of coefficient b ranged from 3.55 to 10.35 for different sub-sectors other than KVHO. For KVHO sub-sector the value of coefficient b was very low (0.21) and statistically insignificant. It appears that technology has strong influence on the determination of wages in Public Limited Companies as well as Private Limited Companies. On the other hand the technology did not influence wage rates in KVHO units. In the remaining sub-sectors, influence of technology on the wage rates is either medium or low. For the aggregated industries value of coefficient b was 8.7 which means that an increase of one percent in capital-labour ratio would lead to about 9 percent rise in wage rates in the industrial sector in India.

It appears that technology has strong influence on the determination of wages in Public Limited Companies as well as Private Limited Companies.

An important observation from Tables 8 and 9 is that wage rates are influenced by both labour productivity as well as technology. But, it is difficult to say whether labour productivity or technology has more influence on the determination of wage rates. However, considering the sequence of relationships, it may be concluded that the adoption of improved technology enhances labour productivity, which leads to rise in wage rates.

Conclusion

Wage structure in Indian industry has undergone considerable changes over the years. The process of economic reforms and globalisation of the Indian economy have led to restructuring of the industrial sector in India. Presently the domestic industries in India are competing with the multinationals in the labour as well as product markets. The process of modernization coupled with the induction of skilled workers and professional managers in the system has led to rise in labour productivity as well as wage rates. Considerable variations in labour productivity have led to the widening of wage disparities within and across the sub-sectors over the period of time. The study concludes that wages in the industrial sector in India are determined by the labour productivity.

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