FACTORY EARNINGS IN DEVELOPING AND INDUSTRIALIZED COUNTRIES

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I. INTRODUCTION

THIS STUDY uses the three volumes of *Profiles of Manufacturing Establishments* compiled by UNIDO [11] [12] [13] to analyze the variation in earnings between factories in five countries, namely, France, India, Israel, Japan, and Middle Europe.[1] The data represent "snapshots," centered on the mid-1960s, of individual establishments drawn from forty-eight different industries. The *Profiles* give, inter alia, information on the skill composition of the labor force, hours of work, extent of shift-working, capital intensity, labor productivity, factory size, and the sex mix of the labor force. All these variables are thought likely to influence the level of factory earnings. The specification of the model is outlined in Section II while the empirical results, for each of the five countries, are presented in Section III.

The model is only partially successful as explanatory variables which we believe to be important are insignificant. However, important variables had to be omitted from the explanation because of a lack of data. Thus great care is needed when interpreting the results in Section IV. Interest centers on differences between the industrialized and developing countries. The results are considered under three headings, namely, the functioning of the labor market, the rate of return to further education or training, and the influence of labor productivity on earnings. The most important conclusions which emerge relate to India. It is shown that Indian managers receive an extremely high financial reward relative to all other workers. However, other evidence suggests that the labor market in India may not be working. A high degree of skill among non-managers is not associated with a higher level of wages and years of further education beyond the school-leaving age does not lead to a higher income. There are extreme disparities in income per worker between Indian factories and it is argued that this is a result of a positive relationship between earnings and labor productivity. In particular, high

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[1] Middle Europe is a non-communist country and a careful consideration of the *Profiles* also indicates that it is not a member of the European Economic Community. Other fragmented evidence suggests that it refers to Austria and the figures relating to school-leaving age and years of training to acquire a given skill are taken for this country.

capital intensity and associated high levels of labor productivity appears to be having a distorting influence on the Indian labor market.

II. DETERMINATION OF ANNUAL EARNINGS

Wage equations have frequently been used to explain the inter-industry variation in average earnings. Thus research reported by Sawyer [9], Hood and Rees [2], Pencavel [8], and Mulvey [7] considered the earnings level of male workers in different parts of U.K. manufacturing while Weiss [16], Masters [6], and Haworth and Rasmussen [1] were similar studies using American data. Wabe and Leech [15] were critical of these studies and they suggested an alternative model which is used in this paper.

The basic premise is that the skill mix of workers is the critical determinant of average earnings. The *Profiles* give a subdivision of total factory employment so that the proportion of managers M, skilled S, semi-skilled SS, and unskilled US are identified.[2] In a perfectly competitive situation, and given uniform hours of work and other working conditions, then the observed value of average yearly earnings AYE_j will depend on the skill mix of workers in the factory and the yearly value of the equilibrium of market wage rate α for each skill level. That is, $\alpha_1 M_j + \alpha_2 S_j + \alpha_3 SS_j + \alpha_4 US_j$ is a weighted average of the four equilibrium wage rates in factory j.

Such a situation is clearly an over simplification as there are many factors which will distort the competitive position and/or be leading to differences between wage rates and earnings. Each of the additional factors is assumed to add a proportionate premium, or discount, to the skill weighted equilibrium wage so that the fitted equation is of the form,

$$AYE_j = (\alpha_1 M_j + \alpha_2 S_j + \alpha_3 SS_j + \alpha_4 US_j) \prod_i (1 + \beta_i X_{ij}) , \qquad (1)$$

where X_{ij} is the value of the ith variable in the jth factory.

Six additional factors can be identified in the *Profiles*. These are:

(1) Overtime and/or Weeks Worked per Annum: Hours worked per annum per worker H_j vary widely between factories in the same country and, via the overtime premium β_1, this will affect the level of average yearly earnings. Unfortunately, it is difficult to acquire information on normal hours in the five countries and overtime hours have been computed in relation to the factory with the lowest number of hours worked. Thus, X_1 has been defined as (H_j − minimum hours)/minimum hours. In all five countries, workers in the factory with the minimum number of hours were working for some 1,600 hours per annum. It is expected that β_1 will be greater than unity, indicating that hours worked in excess of the minimum command some level of premium payment.

(2) Shift-Working: It is the norm, at least in western industrial economies, for shift-working to command a premium β_2 to compensate for the disruption and inconvenience imposed by such work. Hence it is expected that the average

[2] Note that the four proportions sum to unity. All variables are defined in UNIDO [11].

level of factory earnings will be dependent on the existence, and importance, of shift-working and X_2 is defined as man-hours on the second and third shifts/total man-hours. If $\beta_2 = 0.20$, that is shift workers get 20 per cent more than those employed on the main shift, and $X_{2j} = 0.50$ then the impact of shift-work is to increase factory average earnings by 10 per cent.

(3) Non-wage Value Added per Worker: It is expected that earnings are positively related to the productivity of labor. Such a relationship may be consistent with a competitive labor market in that it may be measuring "effort" or the "intensity" of work. However, it is more likely that this variable represents a distortion in the competitive process and indicates that workers in a highly profitable factory can negotiate higher wages than those in a less profitable factory. It is postulated that the proportionate deviation in annual earnings from the equilibrium level is a constant fraction β_3 of the proportionate deviation in non-wage value added per worker P_j from its average value in all factories $\bar{P}$. That is to say X_3 is defined as $(P_j - \bar{P})/\bar{P}$ and β_3 is expected to be positive.

(4) Capital Intensity of Production: This is measured as the current replacement cost of machinery and equipment per production worker employed on the main shift K_j. Such a variable is obviously related to non-wage value added and this aspect is discussed in Section IV below. Nevertheless, it is of interest to ascertain whether workers are in a stronger bargaining position as capital intensity increases, for any given level of non-wage value added. Capital per worker is introduced in the same way as non-wage value added so that X_4 is defined as $(K_j - \bar{K})/\bar{K}$. It is expected that β_4 will be positive.

(5) Factory Size: Many researchers have established that total employment E_j is positively related to earnings. Wabe and Leech [15, p. 302] argued that this is likely to be a "catchall" variable reflecting a variety of factors many of which are related to trade union power. Again it is postulated that the proportionate deviation of annual earnings from equilibrium is a constant fraction β_5 of the proportionate deviation in factory size from its average value so that X_5 is defined as $(E_j - \bar{E})/\bar{E}$.

(6) Importance of Females: If female workers receive lower wages than males with the same level of skill then the factory average wage will quite clearly depend on the sex mix of the labor force. Variable X_6 is taken as the proportion of females in the labor force. It is expected that β_6 will be negative, this coefficient indicating the extent to which female wages are below those for male workers.

An alternative version of equation (1) has also been estimated. The four proportions for workers with different skill levels have been consolidated into one variable, namely, the average years of further education or training beyond the school-leaving age AY_j. Information on school-leaving age and the years of further training to acquire a given level of skill were obtained from UNESCO [10]. School-leaving age was eleven in India, fourteen in Israel, fifteen in Japan and Middle Europe, and sixteen in France. Some assumptions had to be made,

TABLE I

AVERAGE ANNUAL INCOME IN U.S. DOLLARS, EMPLOYMENT CATEGORIES AS PERCENTAGE OF TOTAL EMPLOYED, AND DISTRIBUTION OF EARNINGS

	France	India	Israel	Japan	Middle Europe
Direct income ($)	2,454	599	2,430	1,495	2,507
Direct plus indirect income ($)	2,478	677	2,633	1,749	3,084
Managers	4.2	3.7	3.3	3.7	25.2
Skilled	39.3	36.7	7.7	65.9	26.0
Semi-skilled	29.6	20.4	11.9	23.4	38.7
Unskilled	26.9	39.2	77.1	7.0	10.1
Females	28.0	3.8	21.0	19.0	n.a.
10% with highest pay / 10% with lowest pay	3.8	4.7	4.0	3.1	2.5

the most important being that unskilled workers received no education or training beyond school-leaving age. Thus the alternative equation is

$$AYE_j=(\gamma_1+\gamma_2 AY_j)\prod_i(1+\beta_1 X_{ij})\,. \qquad (2)$$

Note that if all workers in a factory were unskilled then AY_j would equal zero. Hence γ_1 can be interpreted as the estimate of the yearly wage for a person leaving the education system at the school-leaving age and receiving no further training. Equally, γ_2 is the earnings increment which accrues to one year of education or training beyond school-leaving age.

Adding an error term to equations (1) and (2) gives equations which require the use of nonlinear estimation techniques.[3]

III. EMPIRICAL RESULTS

The empirical work proceeded with two alternative measures of the dependent variable. The first is the annual level of direct income, that is the total wage and salary bill divided by the total number employed. The second is the annual value of direct plus indirect income, where the latter is defined as other expenditure on employees. The average values of these two variables in the different countries are given in Table I. Indirect income was most important in Middle Europe, where it increased direct income by approximately one quarter, and appears to have been comparatively unimportant in Israel.

Table I also gives the average values for the skill proportion and the percentage of females in the labor force. There are some important differences between countries which suggest that the interpretation of the definitions for the skill levels may have varied. In Israel over three-quarters of the labor force were classified as unskilled while in Middle Europe only 10 per cent of the workers were in this

[3] For further discussion see Wabe and Leech [15, pp. 312–13]. Equations were estimated using a sub-routine of the TSP program developed by Bronwyn H. Hall at the Harvard Institute of Economic Research.

category. Management employees accounted for approximately 4 per cent of total employment in France, India, Israel, and Japan. However, in Middle Europe one-quarter of the factory labor force were, on average, classified as managers. Employment was not subdivided by sex in Middle Europe and female employment was comparatively unimportant in India.

Finally, Table I presents evidence on the distribution of earnings between factories. Ranking the Indian factories by the value of earnings per worker, then the 10 per cent of the total employed (in all Indian factories in the *Profiles*) who have the highest earnings had an average income of 5,600 rupees per annum. In contrast the 10 per cent of the total number employed who were in factories with the lowest earnings had an average income of only 1,184 rupees per annum. Thus workers in the highest paid Indian factories had earnings which were 4.7 times larger than in the factories with the lowest pay. The corresponding values for this ratio in other countries are given in Table I. The spread of earnings was greatest in India and lowest in Middle Europe.

France

The empirical results for France are based on thirty-six observations and are presented in Table II. Equation 1 shows that the four skill variables explain 25 per cent of the variation in direct income and there is a hierarchy of wage rates which, as expected, is highest for managers and lowest for unskilled workers. The addition of the six explanatory variables doubles the value of R^2. However, only two additional variables, plant size and the proportion of females, are significantly different from zero. The coefficient on factory size indicates that when total employment is double the average level then direct income is, ceteris paribus, some 10 per cent lower. This result is the opposite to that postulated and is in direct contradiction to that established by Jenny [5] who found a significant positive relationship between plant size and earnings using a random sample of French workers in 1962. A possible explanation for this significant negative coefficient is that it may be a reflection of discrimination and the fact that lower wages are paid to non-French workers. In particular, the larger the factory the greater the likelihood of it employing Algerian and other immigrant labor. The coefficient on the proportion of females is numerically large and indicates that female earnings, ceteris paribus, are some 37 per cent lower than for males.

Equation 3 has, as expected, a highly significant constant term indicating a basic wage to a French school leaver of nine thousand francs per annum. Further training makes a significant addition to earnings, each year increasing annual earnings by twenty-five hundred francs. Equation 4 is consistent with equation 2; the same additional variables are significant and the impact of plant size and proportion of females is similar. Adding indirect income, see equations 5 to 8, makes little difference to the results.

India

The Indian equations, derived from eighty-nine observations, are probably the least satisfactory of all the results. When skilled and semi-skilled were separately

TABLE II

FACTORS DETERMINING AVERAGE INCOME IN FRANCE

	Direct Income				Direct Plus Indirect Income			
	1	2	3	4	5	6	7	8
Managers	52.687	55.489			58.940	55.490		
	(14.565)	(22.632)			(15.370)	(22.869)		
Skilled	12.955	17.327			13.944	16.712		
	(2.426)	(4.080)			(2.561)	(4.028)		
Semi-skilled	10.200	12.928			12.439	14.668		
	(2.524)	(3.402)			(2.663)	(3.628)		
Unskilled	8.469	11.452			9.305	10.792		
	(2.282)	(3.549)			(2.408)	(3.455)		
Overtime		−0.279		−0.234		−0.102		−0.038
		(0.174)		(0.183)		(0.212)		(0.223)
Shift-work		−0.062		−0.126		−0.025		−0.099
		(0.343)		(0.334)		(0.345)		(0.330)
Non-wage		0.040		0.048		0.003		0.019
value added		(0.058)		(0.054)		(0.047)		(0.046)
Fixed capital		0.014		−0.004		0.028		0.001
		(0.046)		(0.034)		(0.047)		(0.032)
Size		−0.100		−0.117		−0.090		−0.108
		(0.044)		(0.040)		(0.045)		(0.041)
Females		−0.373		−0.421		−0.312		−0.369
		(0.170)		(0.156)		(0.177)		(0.162)
Years further			2.477	3.098			2.614	3.019
training			(1.081)	(1.365)			(1.155)	(1.347)
Constant			8.984	11.446			10.405	11.686
			(1.825)	(3.088)			(1.950)	(3.129)
R^2	0.250	0.496	0.134	0.451	0.266	0.468	0.131	0.422

Note: Measured in thousand francs per year. Number in parentheses is estimated standard error.

identified then the coefficient on the former tended to be low (0.8) and insignificant, while the coefficient on the latter was large (4.0) and significant. The equations in Table III thus show the effect of combining these two proportions. Equation 1 indicates that the skill composition of the labor force explains less than 5 per cent of the variation in direct income. Managers have a high wage rate which is five times greater than that for the other two groups. Adding the further six explanatory variables leaves the coefficients on the three skill proportions little changed and substantially increases the overall level of explanation. Fixed capital, plant size, and the proportion of females are not significant. However, female employment in Indian manufacturing is low, the average value in this sample being 3.8 per cent (see Table I). Shift-work and non-wage value added both have positive coefficients, as expected, and are significantly greater than zero at the 5 per cent probability level. Finally, the coefficient on overtime hours is significantly negative. This implies that a factory working a high amount of overtime will have lower earnings per worker than a similar factory working

TABLE III

FACTORS DETERMINING AVERAGE INCOME IN INDIA

	Direct Income				Direct Plus Indirect Income			
	1	2	3	4	5	6	7	8
Managers	10.345	11.930			11.812	12.598		
	(4.063)	(3.810)			(5.011)	(4.515)		
Skilled and	2.126	1.946			2.585	2.590		
semi-skilled	(0.432)	(0.477)			(0.533)	(0.580)		
Unskilled	2.002	1.886			2.325	2.557		
	(0.445)	(0.435)			(0.548)	(0.565)		
Overtime		−0.471		−0.366		−0.479		−0.410
		(0.216)		(0.262)		(0.213)		(0.242)
Shift-work		0.753		0.633		0.522		0.445
		(0.352)		(0.348)		(0.319)		(0.314)
Non-wage		0.163		0.180		0.174		0.187
value added		(0.044)		(0.049)		(0.044)		(0.047)
Fixed capital		−0.003		−0.001		0.011		0.016
		(0.016)		(0.019)		(0.017)		(0.019)
Size		0.019		0.008		0.040		0.027
		(0.028)		(0.029)		(0.029)		(0.029)
Female		0.900		0.489		0.155		−0.086
		(0.741)		(0.676)		(0.674)		(0.625)
Years further			−0.028	0.071			0.024	0.110
training			(0.135)	(0.116)			(0.166)	(0.143)
Constant			2.508	2.182			2.834	2.750
			(0.342)	(0.418)			(0.421)	(0.507)
R^2	0.047	0.375	0.000	0.306	0.042	0.427	0.000	0.390

Note: Measured in thousand rupees per year. Number in parentheses is estimated standard error.

at, or near, the minimum number of hours. This is clearly a perplexing aspect of the Indian results.

Equations 3 and 4 are of interest because they show that factory earnings in India do not rise as the years of further training increases. In fact, India is the only country in the study where this basic dimension of the labor market does not have a significant influence on earnings. This same conclusion holds when direct and indirect income is considered as the dependent variable. The impact of the additional explanatory variables in equation 4 is broadly in line with that established in equation 2. Perhaps the only difference worthy of comment is to note that the overtime coefficient in equation 4 is not significant.

Adding indirect income, see equations 5 and 6, increases all three skill coefficients but leaves their relative magnitude unchanged. The only change of any consequence in equations 6 and 8, as compared with 2 and 4, is that the shift-work variable is no longer significant.

Israel

The results for Israel, see Table IV, are derived from forty-eight observations. The coefficients on the skill categories were not "well behaved." Thus when

TABLE IV

FACTORS DETERMINING AVERAGE INCOME IN ISRAEL

	Direct Income				Direct Plus Indirect Income			
	1	2	3	4	5	6	7	8
Managers and skilled	18.245	20.882			17.846	22.430		
	(3.112)	(4.103)			(3.548)	(5.096)		
Semi-skilled	6.140	4.413			9.229	7.830		
	(2.310)	(2.769)			(2.633)	(3.260)		
Unskilled	6.374	9.805			6.686	9.919		
	(0.507)	(1.130)			(0.579)	(1.277)		
Overtime		−0.367		−0.268		−0.487		−0.440
		(0.372)		(0.409)		(0.388)		(0.401)
Shift-work		−0.753		−0.662		−0.720		−0.672
		(0.250)		(0.279)		(0.279)		(0.290)
Non-wage value added		0.120		0.053		0.094		0.059
		(0.071)		(0.066)		(0.075)		(0.069)
Fixed capital		0.008		0.013		0.017		0.019
		(0.037)		(0.040)		(0.043)		(0.044)
Size		0.006		0.022		−0.038		−0.024
		(0.055)		(0.057)		(0.061)		(0.060)
Females		−0.429		−0.429		−0.291		−0.286
		(0.188)		(0.199)		(0.219)		(0.223)
Years further training			2.253	1.588			2.501	2.169
			(0.660)	(0.850)			(0.741)	(1.028)
Constant			6.050	8.661			6.522	9.190
			(0.519)	(1.087)			(0.583)	(1.217)
R^2	0.238	0.468	0.202	0.389	0.212	0.413	0.198	0.380

Note: Measured in thousand Israeli pound per year. Number in parentheses is estimated standard error.

four skill levels were identified, the coefficient for managers was not significant and only half that observed for skilled workers. Both these types of manpower were unimportant for Israel (see Table I), and Table IV presents the results when the two categories have been aggregated. However, this does not eliminate the difficulties. In equation 1 the coefficients on semi-skilled and unskilled are almost equal while equation 2 generates a wage rate for unskilled which is more than twice that for semi-skilled workers. Shift-work and the proportion of females both have negative and highly significant coefficients in equation 2. The coefficient on the former variable is unexpected, and indicates that workers on a second or third shift receive significantly lower earnings than those employed on the main shift. Non-wage value added is almost a significant variable in equation 2 while overtime, fixed capital, and plant size are not significant.

Equation 3 shows that income is positively related to years of training, each year of further training increasing direct earnings by 2.25 (thousand Israeli pound) from a basic annual wage of 6.05 at school-leaving age. These coefficients change when the six further variables are added to the explanation, although the coefficient on years of further training remains significantly positive at the 5 per cent probability level.

TABLE V

FACTORS DETERMINING AVERAGE INCOME IN JAPAN

	Direct Income				Direct Plus Indirect Income			
	1	2	3	4	5	6	7	8
Managers	0.947	1.296			1.818	2.684		
	(0.390)	(0.341)			(0.481)	(0.539)		
Skilled	0.462	0.525			0.510	0.618		
	(0.044)	(0.055)			(0.054)	(0.075)		
Semi- and	0.365	0.395			0.431	0.464		
unskilled	(0.077)	(0.063)			(0.095)	(0.089)		
Overtime		−0.058		−0.054		−0.160		−0.147
		(0.151)		(0.150)		(0.161)		(0.168)
Shift-work		0.128		0.169		0.148		0.265
		(0.256)		(0.255)		(0.280)		(0.302)
Non-wage		−0.021		−0.020		−0.014		−0.015
value added		(0.027)		(0.027)		(0.029)		(0.032)
Fixed capital		0.018		0.017		0.002		0.002
		(0.015)		(0.015)		(0.014)		(0.015)
Size		0.094		0.090		0.106		0.091
		(0.034)		(0.032)		(0.040)		(0.040)
Females		−0.410		−0.418		−0.458		−0.474
		(0.105)		(0.102)		(0.117)		(0.118)
Years further			0.098	0.141			0.173	0.275
training			(0.060)	(0.047)			(0.075)	(0.075)
Constant			0.278	0.264			0.232	0.163
			(0.111)	(0.085)			(0.140)	(0.129)
R^2	0.051	0.661	0.051	0.658	0.138	0.615	0.096	0.567

Note: Measured in million yen per year. Number in parentheses is estimated standard error.

Indirect income is not important in Israel as it only increases direct income by some 8 per cent (see Table I). Perhaps the major difference between the two sets of results is that the proportion of females is no longer a significant variable when explaining the variation in direct plus indirect income.

Japan

The Japanese results are based on data from fifty-two factories and are given in Table V. Very few workers in Japan were classified as unskilled, on average they comprised only 7 per cent of total employment (see Table I), and this category has been combined with semi-skilled. A three-fold subdivision of employment only accounts for 5 per cent of the variation in direct income. The additional variables make a considerable difference to the overall level of explanation. However, all of this increase is caused by two factors, namely, plant size and the proportion of females. The results in equation 2 for Japan are broadly in line with those obtained for France. It is interesting to note that years of further training is not significant in equation 3 but does become significant when included with other variables in equation 4.

Equations 5 and 6 reveal that most of the benefit from indirect income in

TABLE VI

FACTORS DETERMINING AVERAGE INCOME IN MIDDLE EUROPE

	Direct Income				Direct Plus Indirect Income			
	1	2	3	4	5	6	7	8
Managers	3.543	3.656			4.107	4.313		
	(0.593)	(0.537)			(0.689)	(0.616)		
Skilled	2.785	2.258			3.222	2.589		
	(0.458)	(0.379)			(0.532)	(0.442)		
Semi-skilled	1.708	1.510			2.233	1.851		
	(0.237)	(0.329)			(0.276)	(0.376)		
Unskilled	1.382	1.226			1.892	1.621		
	(0.535)	(0.487)			(0.621)	(0.556)		
Overtime		0.189		0.201		0.173		0.187
		(0.280)		(0.275)		(0.263)		(0.261)
Shift-work		0.330		0.301		0.512		0.462
		(0.441)		(0.409)		(0.437)		(0.404)
Non-wage value added		0.199		0.195		0.152		0.145
		(0.058)		(0.056)		(0.052)		(0.049)
Fixed capital		−0.043		−0.040		−0.023		−0.016
		(0.045)		(0.044)		(0.044)		(0.044)
Size		0.024		0.023		0.025		0.023
		(0.018)		(0.017)		(0.017)		(0.016)
Years further training			0.408	0.404			0.403	0.441
			(0.124)	(0.118)			(0.144)	(0.135)
Constant			1.305	1.146			1.835	1.483
			(0.306)	(0.375)			(0.355)	(0.432)
R^2	0.170	0.480	0.164	0.478	0.127	0.458	0.125	0.453

Note: Measured in thousand U.S. dollars per year. Number in parentheses is estimated standard error.

Japan accrues to managers, this additional income results in a doubling of their wages. Direct plus indirect income increases with the level of training (see equations 7 and 8). However, the constant term in equation 8 is not significant.

Middle Europe

The empirical results for Middle Europe are based on fifty-seven observations and are presented in Table VI. The four-fold skill breakdown explains 17 per cent of the variation in direct income and a hierarchy of wage rates is observed (see equation 1). However, the excess of pay received by managers in Middle Europe, relative to the other occupations, is much smaller than in France, India, Israel, and Japan. This is almost certainly a consequence of the managerial category in Middle Europe covering a wider range of workers than in the other countries (see Table I). Adding five explanatory variables (see equation 2), increases the R^2 to 0.48 although only non-wage value added is significant. The same pattern of results is repeated in the other three sets of equations. Comparing equations 5 and 6 with 1 and 2 shows that the benefits from indirect income accrue to all categories of worker.

IV. INTERPRETATION OF THE RESULTS

The basic model adopted to explain the inter-factory variation in earnings is only partially successful and care is needed when interpreting the results. Two interrelated points are relevant when discussing the results.

(a) Variables which we believe to be important emerge as insignificant. This is most critical for hours of work, this coefficient never being significantly positive. The number of hours worked varies widely in all countries. The results suggest that if two factories have annual hours of 1,600 and 2,400, and are apparently identical in all other respects, then they will tend to have a similar level of earnings per worker. This is a most perplexing result which may indicate that the occupational categories, within a country, are not homogeneous. Skilled workers may vary in quality, the better ones working in factories with low hours and the less competent employed in firms with long hours. Thus apparently similar annual earnings may be disguising the fact that the labor market is working efficiently and rewarding the best skilled workers with a considerably higher level of hourly pay than that obtained by low quality skilled workers. It is also worrying that the shift-work coefficient is significantly greater than zero only in the Indian results. The incidence of shift-work will vary between the four levels of skill but lack of data meant that this could not be allowed for. It may also be the case that the labor quality, for any given level of skill, is lower for shift workers.

(b) Variables which are likely to be important have had to be omitted from the explanation. The list of such variables is long and will include the region in which the factory is located, the extent of union membership, the use of incentive payments systems, employment change (growth or decline) in the factory, market structure and associated market power of the company and the age mix of the factory labor force. No information on any of these variables was collected in the *Profiles*.

In spite of the above problems it seems possible to draw some conclusions, even if only tentative, from the empirical analysis. These can be discussed under three broad headings and the most interesting findings, as well as the potentially most important, relate to India. However, the conclusions could well be of more general relevance, in that they may be indicative of the situation in other developing countries.

1. *Functioning of the labor market*

In India we do not observe a hierarchy of wage rates for workers with different levels of skill. In particular, the skilled and semi-skilled workers received no premium over unskilled workers. These three groups all received an annual wage of 1.9 (thousand rupees) compared to the high value of 11.9 for managers (see Table III, equation 2). Managers in Indian factories appear to have been in receipt of especially high wages and to have been deriving considerable benefit from industrialization. For the rest of the Indian labor force we have evidence

that the labor market is not working, that is, a higher degree of skill is not associated with a higher level of wages. However, it is important to stress that regional differences in labor market conditions, and hence wage rates, are important in such a large country, see Verma [14, Table 2]. Jackson [3, p. 188] reports that a system of cost of living allowances, which varies between states, accounts for about one-third of total earnings. The absence of information on factory location is a major omission which could be distorting the Indian results.

Jackson [4] quotes figures to show that skill differentials exist in India within a company, or a specific industry in a given location. These differentials were narrowing during the 1950s and early 1960s. Our results show that, "on average," there is no premium or differential attaching to skilled work in Indian manufacturing. The conflict could arise from a mis-specification of the model as there may be a series of labor markets for different industries (see Wabe and Leech [15, p. 307]). The average quality of labor and the attributes associated with a given skill level are likely to vary between different parts of manufacturing. However, the Indian factories in the *Profiles* are drawn from twenty-three industries and it is not possible to allow for this sort of complication.

2. *Return to further education or training*

In all countries except India there was a high rate of return to training or education undertaken after the school-leaving age; each year of such training increasing the income of a school-leaver by an average of one-third. In India the coefficient on years of further education was not significant. This result links with the previous point regarding the functioning of the Indian labor market.

3. *Influence of labor productivity on earnings*

Non-wage value added per worker was a significant determinant of average earnings in India and Middle Europe, while capital intensity was never a significant variable. However, an explanation of average earnings in these two countries which included capital per worker and excluded non-wage value added always resulted in a significant coefficient for the capital variable (these results are not reported). This finding may be of considerable importance, as it seems to suggest that it is ability to pay which is exploited by workers rather than capital intensity. High non-wage value added per worker will normally be observed in capital-intensive firms. However, if such firms experience production problems or other difficulties, which result in relatively low non-wage value added, then they cannot as easily pay above average wages.

The spread of values for non-wage value added per worker in India was extremely wide. If the factories are ranked by the size of this variable and we consider the 10 per cent of all workers with the highest levels of non-wage value added per worker, then their average for this variable was 15.06 (thousand rupees). The corresponding average for the 10 per cent of workers with the lowest non-wage value added was 0.45, giving a ratio of 33.5 between the highest and lowest. The same ratio was approximately 8.0 in France and Middle Europe. Non-wage value added of 15.06 was some four times greater than the average value of this variable in India. The results thus indicate that these workers received earnings

which were some 64 per cent (4 multiplied by 0.16 the coefficient on non-wage value added) higher than in a factory with the average level of non-wage value added, keeping all other factors constant. This is a massive differential, giving high financial rewards to those workers who are lucky enough to obtain employment in enterprises with high labor productivity. Such factories tend to be capital-intensive, extremely so by Indian standards, and hence it looks as if such firms are having a distorting, and possibly highly undesirable, impact on the labor market. For example, it means that unskilled workers in high productivity factories can earn more than skilled manpower in factories with average or low productivity.

It is this relationship between labor productivity and earnings which is likely to have the most important policy implications. Evidence for India seems to suggest that it is the variation in labor productivity between factories which is leading to a huge disparity in earnings between factories and an associated distortion in the labor market. Furthermore, this observation would indicate that a developing country should take account of the labor market impact when choosing the appropriate level of capital intensity for industrial investment projects.

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