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# Technical Report

DETERMINANTS OF INTER-  
INDUSTRY WAGE STRUCTURE  
- IN INDIA

by

Bakul H. Dholakia

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DETERMINANTS OF INTER-INDUSTRY WAGE STRUCTURE  
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ABSTRACT

This paper deals with an analysis of the main factors explaining the inter-industry wage differentials in manufacturing sector of the Indian economy. It examines the basic theoretical framework which can provide a satisfactory explanation of the inter-industry wage structure. Taking the cross-section data on the two-digit level manufacturing industries for two years 1960 and 1964, the regression technique is applied to test alternative models based on the 'expected ability to pay' and the 'technology' hypotheses. The major finding of the study is that the skill-mix and productivity are the two main determinants of inter-industry wage structure in India. The policy implication of this finding is that if a more rational wage structure is to be evolved in the organised manufacturing sector in India, it can be done most effectively by following the policy of modernization and rationalisation of the existing low productivity industries while envisaging rapid development of the industrial sector during the course of the next decade.

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Bakul H. Dholakia\*

Several studies<sup>1</sup> have been made by now to examine various factors affecting the inter-industry wage differentials in the organised manufacturing sector in India. A variety of factors such as average productivity of labour, capital intensity, profitability, relative importance of wage costs, average size of firms in the industry, proportion of contract labour in total employment, degree of unionisation have been considered in different studies, and with the help of the standard statistical techniques of multiple regression and correlation it has been shown that some of them are significantly related with wage variation while others are not. The basic theoretical frame for explaining the inter-industry wage structure adopted by most of these studies seem to be the one provided by David G. Brown,<sup>2</sup> who advanced the basic hypothesis that "wage level differences among manufacturing industries result primarily from industry-by-industry differences in the employers' estimates of their future abilities to pay wages."<sup>3</sup> However, an interesting study made recently by T.S.Papola<sup>4</sup> tries to make the basic theoretical frame more comprehensive and compact by advancing what is called a "technology hypothesis" on the ground that the technological levels of different industries vary considerably and "technological advance requires not only a larger component of skill in the work force, but it also leads to greater degree of skill-differentiation and specificity of jobs in industries."<sup>5</sup> Thus, Papola argues that during the course of industrialisation, the whole labour market would become a conglomeration of a number of 'non-competing' groups of workers largely specific to individual industries and this, in turn, gives rise to inter-industry wage differentials. He, therefore, expects the inter-industry differentials in skill-mix to provide a major explanation of the inter-industry wage differentials. While Papola's study appears to be the first to stress the need for incorporating the skill-mix in the analysis of major factors explaining wage variation in Indian industries, it is rather surprising to find capital intensity being used in his study as a proxy for the skill composition of the

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\*The author is grateful to his colleague Professor T.S.Papola for some useful discussions and also to his brother Ravindra Dholakia for providing valuable assistance.

working force.<sup>6</sup> Since capital intensity is a separate variable by itself which influences the wage structure, quite independently of the skill-mix, and since the effect of skill-mix as such, being treated as independent variable, needs to be isolated from that of other factors, it is obvious that the former cannot be used as a proxy for the latter.

Thus, it appears that a study examining the importance of skill-mix as such in the explanation of inter-industry wage structure in India and integrating it in the basic theoretical frame developed to explain the wage structure has not been made so far. Moreover, in most of the studies made so far, some of the crucial variables like capital-intensity or profitability have not been properly specified and the way in which they are measured seems to be far from satisfactory. For instance, capital intensity has been generally measured as the ratio of the reported value of total fixed capital to the number of workers in each industry. Now, as it has already been pointed out in recent study made by S.R. Hashim and M.M. Dadi<sup>7</sup> that the reported figures, which indicate the depreciated book value of fixed assets accumulated over a long period of time, do not give true estimates of the existing real stock of fixed capital, and to that extent the studies using the reported figures without proper adjustments may yield results having doubtful validity. Hence, an attempt is made in this paper to introduce the skill composition of working force as an independent variable in the analysis of wage structure in Indian manufacturing and thereby integrate the 'technology hypothesis' with the 'expected ability to pay hypothesis' developed earlier by David Brown; and also make certain improvements in the specification of some of the major variables generally used in the analysis of wage structure.

## II.

### The Hypothesis and Specification of the Variables

The basic hypothesis, which the present study attempts to postulate and test, is that the inter-industry wage differentials in Indian manufacturing sector result primarily from (a) the differences in the technological levels of different industries as reflected in the requirements of skilled working force and capital intensity; and (b) the differences in the industries' capacity to pay as reflected in the differences in average productivity, profitability and average size of the firms in each industry. Thus, the following functional relationship is postulated:

$$W = F(S, K, P, R, F),$$

Where,

W = average wage rate in a given industry,

S = proportion of skilled workers in the total working force in the industry,

K = capital intensity as indicated by the value of fixed capital stock per worker employed in the industry,

P = average productivity of labour in the industry,

R = average rate of surplus originating in the industry as indicated by the ratio of non-wage income to total capital stock,

F = average size of firms in the industry as indicated by the average number of workers employed per factory.

By employing the usual single equation multiple regression technique, the above functional relationship (assumed to be linear) is estimated from the data on industries at the two-digit level of aggregation provided by the Annual Survey of Industries (Census Sector),<sup>8</sup> supplemented by the data on skill-mix derived from the work of Pitambar Pant and M. Vasudevan.<sup>9</sup> The exercise is conducted for two different years, 1960 and 1964 in order to eliminate any systematic bias from the results arising out of some special factors operating in a particular year. The actual method followed for the measurement of each of the six variables specified above is indicated below:

i) Wage Rate (W): W is derived as total wages paid to workers divided by total man-hours worked in each industry group as reported in the ASI. The term 'worker' includes contract labour and excludes employees reported as 'other than workers'. Since the salaries and other benefits accruing to the latter category are likely to be in the form of a "mixed income" (consisting of pure labour income plus also an element of rental or entrepreneurial income), their inclusion in W would distort the true picture of inter-industry wage differentials. The variable W, thus, measures the average wage

per man-hour worked, which may be regarded as a better indicator of the pure differentials in inter-industry wage rates as compared to the average annual earnings of labour inasmuch as it takes care of the differences in the latter arising out of the differences in man-days or man-hours worked during the year.

ii) Skill-mix (S): Since ASI does not provide any data on the skill composition of working force, the data for measuring S, defined as the proportion of skilled workers in total working force, have been obtained from a study by Pant and Vasudevan on the occupational pattern in Indian manufacturing<sup>10</sup> which gives fairly detailed information on the occupational classification of workers in different industries in the organised manufacturing sector for the year 1956. Two assumptions are implicit in above procedure. Firstly, it is assumed here that broadly speaking, the occupational classification reflects the underlying skill composition of the working force. And secondly, it is assumed that the relative skill composition of working force in the two-digit level industries estimated for the year 1956 reflects the relative skill-mix for the years 1960 and 1964 also. While the first assumption is decidedly a plausible one to make, it may be pointed out that the second one is also a fairly reasonable assumption inasmuch as the relative positions of different industries with respect to the skill composition of the category of 'workers' are not likely to alter significantly during the course of a relatively small period of about four to eight years or so.<sup>11</sup>

iii) Capital Intensity (K): K is derived as a ratio of the gross (undepreciated) value of fixed assets at current prices to the total number of workers employed in each industry. The data on gross stock of fixed assets valued at current prices for the years 1960 and 1964 are obtained directly from the study made by Hashim and Dadi.<sup>12</sup> It may be noted that this procedure is based on the assumption that the fixed capital assets do not decrease in their efficiency to contribute to production over a period of time. While the assumption implicit in the use of net or depreciated assets, viz., that capital stock decreases in efficiency in exact relation to the depreciation charge, is obviously a highly unrealistic assumption, it may be argued that the use of gross or undepreciated assets is also based on an extreme assumption of constant efficiency throughout the service life of fixed assets.<sup>13</sup> However, when a preference is to be made between the two measures of capital stock, most economists usually exercise their choice in favour of the gross stock on the ground that a correct index of capital services would lie much closer to a gross stock index as compared to a net stock index.<sup>14</sup>



iv) Productivity (P) : P is simply derived as the ratio of gross value added at current prices to the total man-hours worked in each industry. P, therefore, measures value of gross product per man-hour to ensure the consistency of the productivity measure with the two variables, W and K, specified above.

v) Rate of Surplus (R) : R is derived as the ratio of gross value added at current prices less wages paid to workers to the value of total gross capital stock at current prices.

vi) Average Size of Firms (F): F is derived as the total number of workers employed divided by the total number of reporting firms in each industry.

The series for each variable so derived for the years 1960 and 1964 for the twenty-two-digit level industries<sup>15</sup> have been presented in Appendix Table I.

It may be noted here before passing on to the analysis of the results that the first two explanatory variables specified above, viz., S and K, are assumed to serve as indicators of the differences in the technological levels of different industries; while the last three explanatory variables, viz., P, R and F, are essentially the variables representing the demand side of the problem of wage determination. On a priori grounds already discussed at length in the studies made by Brown<sup>16</sup> and Papola<sup>17</sup> we expect each of the five explanatory variables described above to have a positive relationship with the industry wage rate.

### III

#### The Regression Analysis

As a first step in the multiple regression analysis of the inter-industry wage structure, we may now examine the inter-relationships between different variables as brought out by the Coefficient of Correlation Matrix presented in Table I. The main conclusions which can be derived from the figures given in this table are:

1. The simple correlation between the dependent variable W and four of the five explanatory variables, viz., S, K, P and F, turns out to be positive and statistically

Table I  
Coefficient of Correlation Matrix

|                              |      | S       | K       | P       | R       | F       |
|------------------------------|------|---------|---------|---------|---------|---------|
| 1. Skill-Mix (3)             |      |         |         |         |         |         |
| 2. Capital-Intensity (K)     | 1960 | 0.3873  |         |         |         |         |
|                              | 1964 | 0.3855  |         |         |         |         |
| 3. Productivity (P)          | 1960 | 0.4368  | 0.9058* |         |         |         |
|                              | 1964 | 0.4140  | 0.9151* |         |         |         |
| 4. Rate of Surplus (R)       | 1960 | 0.0368  | -0.1848 | 0.1609  |         |         |
|                              | 1964 | -0.1155 | -0.4664 | -0.1880 |         |         |
| 5. Average Size of Firms (F) | 1960 | 0.4223  | 0.4102  | 0.3682  | 0.0349  |         |
|                              | 1964 | 0.4649  | 0.3393  | 0.2685  | -0.2840 |         |
| 6. Wage Rate (W)             | 1960 | 0.7106* | 0.7490* | 0.8263* | 0.2503  | 0.5769* |
|                              | 1964 | 0.7276* | 0.6146* | 0.7335* | -0.1139 | 0.5623* |

\*Significant at 1% level of significance.

Source: Appendix Table I.

significant at 1% level of significance for both the years under consideration. However, there does not seem to be any significant correlation between W and R, the coefficient for both the years being insignificant even at 10% level of significance.

2. Each of the four variables found significant, viz., S, K, P and F, can individually explain 50.5%, 56.1%, 68.3% and 33.3% respectively of the variation in W for the year 1960, the corresponding figures for the year 1964 being 52.9%, 37.8%, 53.8% and 28.3% respectively. Thus, taking into account the results for both the years and particularly for the year 1964, it appears that none of the independent variables taken separately possesses a very high explanatory power. This obviously implies that a fairly satisfactory explanation of the inter-industry wage structure can be provided only by a set of factors and not by any single factor alone.
3. So far as the inter-relations among the explanatory variables are concerned, there does not appear to be any significant correlation among the five explanatory variables considered here, with, of course, the solitary exception of the pair, K and P. As it can be seen from the table, of the ten different pairs of the five explanatory variables that be formed, as many as nine show coefficients of correlation which are all statistically insignificant at 1% level. Moreover, the similarity in the pattern of correlation among the explanatory variables observed between the two years 1960 and 1964 is also quite reassuring. It is particularly interesting to note that the new variable which we have introduced here, viz. the skill-mix as measured directly by the series of S, is not significantly correlated with any of the remaining explanatory variables including K. This implies that the use of capital intensity or any such variable as a proxy for the skill-mix, as it has been made for instance in Papola's study,<sup>18</sup> would be totally misleading.
4. The correlation between K and P is, however, highly significant. In fact, the coefficient of correlation between K and P, which turns out to be more than 0.9 for both the years, not only takes the highest value among all the figures given in Table I, but also exceeds

significantly the corresponding values of the coefficient of correlation between K & W and P & W especially for the year 1964. It should be noted, however, that there is nothing particularly surprising about a high correlation between K and P, because on simple economic logic of the production function, it is clear that one of the main factors on which the productivity of labour depends is the capital intensity of the production process. But then it is equally clear that if we look upon this phenomenon from the angle of multiple regression analysis of wage structure, the inclusion of both K and P as explanatory variables would introduce the serious problem of multi-collinearity in our analysis. This implies that, while from a purely theoretical point of view capital intensity and productivity may be regarded as two different factors influencing the inter-industry wage structure, in practice their separate influences cannot be isolated on account of a very high degree of collinearity between the two variables. From the practical point of view, the only alternative with which we are therefore left is to make a choice between the two variables K and P for the purpose of regression analysis; and in view of the very high correlation between the two, an obvious practical interpretation of such a choice would be that the inclusion of either of the two would capture a substantial part of the 'pure' influence of the other also.

Now, the choice can be made on the basis of an analysis of all possible alternative regression models, the results of which are presented in Appendix Table II for the year 1960. If we consider those models which involve both K and P as explanatory variables, we can easily see that out of eight such alternatives (indicated by the regression numbers 1,2,3,6,7,12 and 21), as many as seven show that K is statistically insignificant while in at least half of them P is found to be significant at 5% level. Furthermore, if we consider the model with only K and P as the two explanatory variables (i.e., regression no.21), we find that P is statistically significant while K is not. This observation coupled with the fact that P taken separately can explain a relatively much greater part of the variation in W as compared to K (as indicated by regression nos. 28 & 29) would imply that from a purely econometric point of view, P may be preferred to K. One may, from a broader

view point also, tend to make a choice in favour of P inasmuch as P, being a wider concept, would presumably cover the influence not only of K itself but also of a variety of other factors not covered by K.

In addition to this, it is interesting to note that the results given in Appendix Table II enable us to conduct a general sensitivity analysis of  $R^2$  and with  $R^2$  with respect to each of the explanatory variables considered here. Thus, it may be observed for instance that in most of the possible combinations of explanatory variables K, P, R & F, the addition of S leads to a considerable improvement in the overall explanatory power of the model,  $R^2$  showing an increase of at least about twelve percentage points. Similarly, R and F seem to be relatively less effective in terms of their capacity to improve the explanatory power of any given combination of explanatory variables.

In view of all this, we have considered the detailed results of five alternative models in Table II. Model I postulates  $W$  as a linear function of all the five explanatory variables considered here, while Model II drops K and postulates  $W$  as a linear function of S, P, R & F. Models III and IV examine separately the 'expected ability to pay' hypothesis and the 'technology' hypothesis respectively, while Model V examines the combined influence of the two major explanatory variables, P and S, representing the 'expected ability to pay' and the 'technology' hypotheses respectively.

It can be seen from Table II that all the five variables taken together explain as much as 90.4% of the variation in inter-industry wage rates in the year 1960 and 83.2% in the year 1964. However, only S and R turn out to be significant in the year 1960 while S, P and F are found to be significant in the year 1964. So far as the variable K is concerned, while it turns out to be insignificant in the year 1960, it becomes significant in the year 1964 at 10% level of significance but with a negative sign. The coefficient of variable R, though insignificant, also shows a negative sign in the year 1964. It may be noted here that our finding relating to the negative sign of K and R in the year 1964 is in broad agreement with the findings of Pramod Verma<sup>16</sup> based on a detailed analysis of 209 industries for the same year, i.e., 1964. However, the major difference between the findings of our study and Pramod Verma's study is that while the latter shows not only the negative signs for K & R but actually finds both the variables statistically significant at 1% level, our study shows that both the variables are insignificant not only at 1% level but also at even

Table II

Results of the Multiple Regression Analysis of the Inter-Industry Wage Structure in India, 1960 and 1964

| Year/Model        | Constant Term         | Regression Coefficients of |                       |                     |                      |                      |        |        | R <sup>2</sup> | F | R | F | R <sup>2</sup> | F | R <sup>2</sup> | F | R <sup>2</sup> |
|-------------------|-----------------------|----------------------------|-----------------------|---------------------|----------------------|----------------------|--------|--------|----------------|---|---|---|----------------|---|----------------|---|----------------|
|                   |                       | S                          | K                     | P                   | F                    | R                    | F      | R      |                |   |   |   |                |   |                |   |                |
| 1                 | 2                     | 3                          | 4                     | 5                   | 6                    | 7                    | 8      | 9      |                |   |   |   |                |   |                |   |                |
| <u>Year 1960:</u> |                       |                            |                       |                     |                      |                      |        |        |                |   |   |   |                |   |                |   |                |
| Model I           | 13.3387**<br>(2.0253) | 0.5052*<br>(4.0717)        | 0.0370<br>(1.5569)    | 0.0024<br>(0.0996)  | 0.6581**<br>(2.3110) | 0.0205<br>(1.5442)   | 0.9041 | 0.8629 |                |   |   |   |                |   |                |   |                |
| Model II          | 15.6492*<br>(3.0679)  | 0.4662*<br>(3.6220)        | -                     | 0.0407*<br>(5.5960) | 0.2774<br>(1.5609)   | 0.0277**<br>(2.0905) | 0.8852 | 0.3470 |                |   |   |   |                |   |                |   |                |
| Model III         | 30.5162*<br>(4.4957)  | -                          | -                     | 0.0495*<br>(5.4477) | 0.2574<br>(1.0933)   | 0.0426**<br>(2.5570) | 0.7849 | 0.7311 |                |   |   |   |                |   |                |   |                |
| Model IV          | 29.2141*<br>(4.8609)  | 0.6217*<br>(3.9135)        | 0.0368*<br>(4.4099)   | -                   | -                    | -                    | 0.7691 | 0.7283 |                |   |   |   |                |   |                |   |                |
| Model V           | 28.0120*<br>(5.5279)  | 0.5431*<br>(3.9330)        | -                     | 0.0459*<br>(5.8030) | -                    | -                    | 0.8339 | 0.8046 |                |   |   |   |                |   |                |   |                |
| <u>Year 1964:</u> |                       |                            |                       |                     |                      |                      |        |        |                |   |   |   |                |   |                |   |                |
| Model I           | 24.1306**<br>(2.2016) | 0.5504*<br>(3.0686)        | -0.0435**<br>(1.7785) | 0.1216*<br>(3.0728) | -0.3532<br>(0.7189)  | 0.0493**<br>(1.9334) | 0.8318 | 0.7598 |                |   |   |   |                |   |                |   |                |
| Model II          | 19.9535<br>(1.7125)   | 0.5698*<br>(2.9753)        | -                     | 0.0552*<br>(3.9611) | 0.2808<br>(0.7766)   | 0.0445<br>(1.6414)   | 0.7938 | 0.7251 |                |   |   |   |                |   |                |   |                |
| Model III         | 28.7252**<br>(2.1262) | -                          | -                     | 0.0694*<br>(4.3478) | 0.3505<br>(0.7955)   | 0.0773**<br>(2.5534) | 0.6722 | 0.5902 |                |   |   |   |                |   |                |   |                |
| Model IV          | 37.6614*<br>(4.7984)  | 0.7824*<br>(3.7622)        | 0.0235**<br>(2.5619)  | -                   | -                    | -                    | 0.6604 | 0.6005 |                |   |   |   |                |   |                |   |                |
| Model V           | 30.7725*<br>(4.5684)  | 0.6946*<br>(3.8781)        | -                     | 0.0556*<br>(3.9548) | -                    | -                    | 0.7549 | 0.7116 |                |   |   |   |                |   |                |   |                |

\*Significant at 1% level of significance

\*\* Significant at 10% level of significance

(Figures in parenthesis indicate the computed t-values)

Source: Appendix Table I.

5% level of significance. Apart from the difference in the sample size, one probable reason for the difference in the results of the two studies could be that there exists a considerable difference between the two studies in regard to the specification and measurement of the variables K and R.

The explanation of the negative signs of K & R and the low t-value of K obviously lies, as already discussed above, in the high degree of multi-collinearity between K and P. In fact, a comparison of the coefficients of K and R and the t-value of K as observed in Model I on the one hand and Models II, III and IV on the other hand clearly reveals the extent to which a high degree of multi-collinearity between K & P can distort the results of the regression analysis of wage structure. We would, therefore, prefer Model II to Model I, the choice being made on the grounds already examined earlier. It is evident from the results obtained for Model II that S and P are the two main variables found to be statistically significant and it is quite satisfying to note that both of them are significant at 1% level for both the years under consideration. In fact, as indicated by the results of Model V, the combination of variables S & P taken separately can, by itself, explain as much as 83.4% of the variation in W in the year 1960, the corresponding figure for the year 1964 being 75.5%.

Finally, it can be seen from the results of Models III and IV, especially for the year 1964, that neither the 'expected ability to pay' hypothesis nor the 'technology' hypothesis can by itself command a high explanatory power. Thus, while both can separately provide statistically significant explanation of the inter-industry wage structure in India, it is in fact their combination which alone is found to have a very high degree of explanatory power as it is evident from the results of Models II and V as against those of Models III and IV.

#### IV

#### Conclusions and Policy Implications

The main conclusions which can be drawn from the present study are:

1. For a satisfactory explanation of the inter-industry wage structure in India, it is necessary to adopt a theoretical framework which integrates the 'expected ability to pay hypothesis' with the 'technology' hypothesis.

2. Skill-Mix and Productivity are the two major determinants of inter-industry wage structure in India.
3. Since skill-mix is not significantly correlated with any other variable such as capital intensity, it has to be measured directly and no other variable can be used as a proxy for it.
4. Productivity and capital intensity cannot be simultaneously used as explanatory variables in the regression analysis of inter-industry wage structure because they are statistically interdependent to a highly significant extent.

The policy implications following from these conclusions are quite obvious. Inasmuch as the policy of rapid industrialisation is likely to lead to an increase in the extent of technological dualism in our industrial sector, there is every possibility of a significant widening of the inter-industry wage structure in India with the passage of time, unless definite steps are taken to check this tendency. A more rational wage structure in Indian industries can, therefore, be evolved only by following the policy of modernization and rationalisation of the low productivity industries while envisaging rapid industrial development during the years to come.



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2. David G. Brown: "Expected Ability to Pay and Inter-Industry Wage Structure in Manufacturing", Industrial and Labour Relations Review, Vol.XVI, No.1, October 1962.
3. Ibid, page 45.
4. T.S. Papola: "Inter-Industry Wage Structure: Technology Hypothesis," Anvesak, Vol.XI, No.1, June 1972.
5. Ibid, page 52.
6. The Reason given by Papola for using capital-intensity as a proxy for the skill-mix is two-fold. Firstly, direct data on the skill composition of work-force in Indian manufacturing for the years 1960 and 1964 are not available; and secondly, capital intensity is likely to be positively related with the skill component of the work-force. The assumption of a significant positive correlation between capital intensity and the skill-mix is tested by using some information available in Occupational Wage Surveys conducted by the Labour Bureau, Government of India, during 1958-59. However, the test is confined to a sample of only 13 industries covering only 8 of the 20 two-digit industry groups covered by the ASI. While the coefficient of correlation between capital intensity and the skill-mix for the sample of 13 industries turns out to be +.756, it may be noted that the correlation gets substantially depressed if you increase the sample size. It is interesting to note in this connection that some of the earlier studies also tried to use another variable, viz., ratio of contract labour to total workers, as a proxy for the skill-mix, which again for obvious reasons cannot be regarded as a satisfactory indicator of the skill composition of workers as such. See Papola, Op. cit. pp.54-5, and 63. See also Johri and Agarwal, Op. cit. p.394.

7. S.R. Hashim and M.M. Dadi: Capital-Output Relations in Indian Manufacturing (1946-64), the M.S. University of Baroda, Baroda, 1973.
8. Annual Survey of Industries, 1960, Census Sector, and Annual Survey of Industries, 1964, Census Sector, issued by Central Statistical Organisation, Government of India.
9. Pitambar Pant and N. Vasudevan: Occupational Pattern in Manufacturing Industries, Planning Commission, New Delhi, 1959.
10. Ibid.
11. It may be mentioned here that a United Nations' publication, Profiles of Manufacturing Establishments (UNIDO, Volumes 1 & 2, 1967, 1968) gives some data on the skill-mix in about 10 of the two-digit industry groups covered by the present study for the period around 1964-65. The coefficient of correlation between the figures for these ten industry-groups relating to the year 1964 as reported in this publication and the corresponding figures for 1956 used in this study turns out to be as high as .9. This may be taken as some evidence in support of the contention that the relative skill-mix among workers in Indian Industries has not undergone significant changes, during the period 1956-64.
12. S.R. Hashim and M.M. Dadi: Op. cit., p.45 & p.49.
13. For a brief discussion of the gross-net controversy in the field of measurement of capital, see Bakul H. Dholakia: The Sources of Economic Growth in India, Good Companians, Baroda, 1974, Ch.5.
14. Ibid., pp.138-40.
15. For the details regarding the description of the two-digit level industries covered by the ASI, see The Annual Survey of Industries, 1960 (Census Sector), Vol.1.
16. David G. Brown, Op. cit.
17. T.S. Papola, Op. cit.
18. T.S. Papola, Op. cit.
19. Pramod C. Verma, Op. cit.

Supplementary Tables I  
The Wage Rate And the Explanatory Variables, 1960 and 1964

| Two-digit<br>industry<br>group | 1960               |               |                    |                          |            | 1964               |               |                    |                       |            | S*<br>(in per<br>cent) |
|--------------------------------|--------------------|---------------|--------------------|--------------------------|------------|--------------------|---------------|--------------------|-----------------------|------------|------------------------|
|                                | W<br>(in<br>paise) | K<br>(in Rs.) | P<br>(in<br>paise) | R<br>(in<br>per<br>cent) | F<br>(No.) | W<br>(in<br>paise) | K<br>(in Rs.) | P<br>(in<br>paise) | R<br>(in per<br>cent) | F<br>(No.) |                        |
| 1                              | 2                  | 3             | 4                  | 5                        | 6          | 7                  | 8             | 9                  | 10                    | 11         | 12                     |
| 20                             | 34.75              | 105.93        | 167.68             | 16.85                    | 165        | 42.59              | 139.39        | 176.66             | 15.43                 | 149        | 20.56                  |
| 21                             | 43.71              | 185.13        | 239.90             | 21.03                    | 99         | 58.49              | 217.59        | 412.32             | 30.65                 | 114        | 31.90                  |
| 22                             | 45.66              | 13.64         | 123.02             | 34.38                    | 278        | 56.91              | 21.43         | 214.04             | 39.18                 | 259        | 30.50                  |
| 23                             | 59.73              | 63.61         | 118.15             | 15.59                    | 491        | 69.98              | 88.15         | 144.35             | 15.63                 | 458        | 48.44                  |
| 24                             | 48.17              | 34.57         | 90.74              | 16.95                    | 134        | 59.60              | 28.29         | 129.81             | 24.66                 | 157        | 31.57                  |
| 25                             | 35.81              | 54.30         | 103.15             | 20.57                    | 95         | 41.03              | 65.07         | 114.69             | 17.82                 | 89         | 11.94                  |
| 26                             | 62.37              | 28.61         | 119.87             | 23.02                    | 217        | 68.20              | 53.08         | 168.61             | 24.80                 | 131        | 24.86                  |
| 27                             | 51.51              | 272.61        | 205.36             | 12.56                    | 527        | 64.78              | 383.82        | 289.41             | 12.77                 | 344        | 29.38                  |
| 28                             | 67.63              | 73.85         | 181.93             | 25.03                    | 177        | 82.79              | 91.18         | 204.80             | 23.26                 | 186        | 66.26                  |
| 29                             | 45.92              | 42.82         | 107.93             | 15.33                    | 150        | 52.52              | 65.48         | 140.73             | 15.55                 | 110        | 31.91                  |
| 30                             | 81.33              | 67.55         | 379.56             | 54.19                    | 419        | 104.52             | 134.51        | 360.21             | 28.16                 | 325        | 32.53                  |
| 31                             | 60.90              | 317.57        | 332.82             | 17.91                    | 248        | 88.56              | 465.00        | 533.20             | 18.38                 | 180        | 26.61                  |
| 32                             | 121.43             | 1276.40       | 1334.36            | 23.21                    | 457        | 122.63             | 1533.21       | 979.27             | 12.99                 | 315        | 66.18                  |
| 33                             | 41.93              | 131.94        | 139.40             | 14.60                    | 213        | 53.06              | 169.56        | 173.67             | 14.14                 | 182        | 21.84                  |
| 34                             | 75.74              | 617.72        | 238.86             | 5.89                     | 422        | 85.47              | 720.67        | 375.31             | 8.84                  | 360        | 44.56                  |
| 35                             | 60.89              | 76.47         | 178.59             | 22.60                    | 168        | 72.95              | 100.61        | 237.46             | 23.76                 | 137        | 48.38                  |
| 36                             | 61.50              | 52.83         | 153.10             | 21.19                    | 240        | 87.06              | 124.54        | 264.32             | 20.57                 | 199        | 54.93                  |
| 37                             | 65.85              | 90.64         | 233.57             | 25.11                    | 304        | 87.07              | 159.69        | 321.26             | 20.48                 | 256        | 50.84                  |
| 38                             | 68.85              | 66.51         | 160.30             | 19.44                    | 513        | 92.61              | 107.21        | 233.54             | 19.05                 | 366        | 55.02                  |
| 39                             | 54.74              | 60.40         | 140.68             | 22.13                    | 155        | 65.63              | 88.13         | 205.22             | 25.16                 | 129        | 29.20                  |
| Average                        | 59.43              | 182.42        | 237.45             | 21.38                    | 274        | 72.82              | 237.93        | 283.94             | 20.56                 | 222        | 37.80                  |
| Std. Dev.                      | 19.34              | 293.01        | 268.97             | 9.66                     | 145        | 20.90              | 349.03        | 195.94             | 7.13                  | 106        | 15.39                  |

\* The data on skill-mix (S) relate to the year 1956.  
For the specification of the variables and the sources of data, see the text (Section II).

Appendix Table II

Results of Alternative Regression Models with Wage Rate  
as the Dependent Variable, 1960

| Regression<br>No. | Explanatory<br>Variables | Variables<br>Significant<br>at 5% level<br>of signi-<br>ficance | R <sup>2</sup> | R <sup>2</sup> |
|-------------------|--------------------------|---|----------------|----------------|
| 1                 | S, K, P, R, F            | S, R  | 0.9041         | 0.8629         |
| 2                 | S, K, P, R               | S, K, R   | 0.8877         | 0.8503         |
| 3                 | S, K, P, F               | S, P  | 0.3574         | 0.3233         |
| 4                 | S, K, R, F               | S, K, R   | 0.9040         | 0.8720         |
| 5                 | S, P, R, F               | S, P  | 0.8852         | 0.8470         |
| 6                 | K, P, R, F               | P   | 0.7904         | 0.7206         |
| 7                 | S, K, P                  | S, P  | 0.8340         | 0.7925         |
| 8                 | S, K, R                  | S, K, R   | 0.8871         | 0.8589         |
| 9                 | S, K, F                  | S, K  | 0.7950         | 0.7437         |
| 10                | S, P, R                  | S, P  | 0.8518         | 0.8148         |
| 11                | S, P, F                  | S, P  | 0.8666         | 0.8332         |
| 12                | K, P, R                  | -   | 0.7212         | 0.6515         |
| 13                | K, P, F                  | P, F  | 0.7720         | 0.7150         |
| 14                | K, R, F                  | K, R  | 0.7794         | 0.7242         |
| 15                | P, R, F                  | P, F  | 0.7349         | 0.7311         |
| 16                | S, R, F                  | S   | 0.6457         | 0.5571         |
| 17                | S, K                     | S, K  | 0.7691         | 0.7283         |
| 18                | S, P                     | S, P  | 0.8339         | 0.8046         |
| 19                | S, R                     | S   | 0.5553         | 0.4768         |
| 20                | S, F                     | S   | 0.5982         | 0.5273         |
| 21                | K, P                     | P   | 0.6828         | 0.6268         |
| 22                | K, R                     | K, R  | 0.7175         | 0.6677         |
| 23                | K, F                     | K   | 0.6435         | 0.5864         |
| 24                | P, R                     | P   | 0.6970         | 0.6435         |
| 25                | P, F                     | P, F  | 0.7688         | 0.7280         |
| 26                | R, F                     | F   | 0.3358         | 0.2775         |
| 27                | S                        | S   | 0.5050         | 0.4775         |
| 28                | K                        | K   | 0.5610         | 0.5366         |
| 29                | P                        | P   | 0.6828         | 0.6652         |
| 30                | R                        | -   | 0.0627         | 0.0106         |
| 31                | F                        | F   | 0.3328         | 0.2957         |

Source: Appendix Table I.