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EMPIRICAL TEST OF THE MARGINAL
PRODUCTIVITY THEORY OF WAGES—
THE CASE OF INDIAN INDUSTRIES*

by

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No. - -----

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ABSTRACT (within 250 words),

See the Separate Sheet attached

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B. H. Dholakia
Signature of the author

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EMPIRICAL TEST OF THE MARGINAL PRODUCTIVITY THEORY
OF WAGES — THE CASE OF INDIAN INDUSTRIES*

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Marginal productivity doctrine, while it has been under constant
criticism, has all along continued to dominate economic thought
centering around the theory of factor prices in general and the theory
of wages in particular, and has also elicited several efforts at its
empirical verification.[1] It is surprising, however, to find that
so far as the case of the Indian economy is concerned, very little
work has been done in the direction of empirically testing the validity
of the marginal productivity theory with reference to a specific
factor price, say, the wage rate. An attempt is therefore made in
this paper to test empirically the validity of the marginal productivity
hypothesis of wage determination in the case of the Indian economy
by using the data on the organised manufacturing sector and by follow-
ing, with some important modifications and extensions, the broad
methodology laid down by Paul Douglas and Charles Cobb in their
celebrated work on theory of wages and production.[2]

II

Basically, the marginal productivity theory of wages states
that under the conditions of perfect competition, labour will be hired
upto the point where the value of its marginal product equals its wage.

[1] For an excellent sketch of the evolution of the marginal productivity
doctrine, its limitations and the attempts at its empirical testing,
see Paul Davidson: _Theories of Aggregate Income Distribution,_ (Rutgers
University Press, New Brunswick, New Jercy, 1960); Chs.IV & VI; see
also, M.H.Dobb: "_Theories of Wages_", in V.B.Singh (Ed.):_Industrial
Labour in India,_ (Bombay, 1963).

[2] Charles W. Cobb and Paul H. Douglas: "A Theory of Production," _American
Economic Review,_ Proceedings, Vol.18, 1928. See also, Paul H. Douglas:
The Theory of Wages (MacMillan & Co., New York, 1934); and his famous
Presidential Address to the American Economic Association, "Are There
Laws of Production," _American Economic Review,_ Vol.38, 1948.

For the purpose of empirical testing, however, we can postulate a linear functional relationship between the wage rate (W) and the value of marginal product (MP_L), and write it as:

$$W = a + b.MP_L.$$

Now, obviously the hypothesis of the marginal productivity theory in its strict and rigid form, namely that wages are equal to the value of marginal product, would imply that in the above relationship, we must have $a = 0$ and $b = 1$. Similarly, a somewhat less rigid hypothesis of positive proportionality between W and MP_L would imply that $a = 0$ and $b > 0$. While in its most liberal interpretation, we may have the hypothesis of positive correlation between W and MP_L which would imply simply that $b > 0$, though it must be made clear that while $b > 0$ is a necessary condition for the marginal productivity theory to hold, it is certainly not the sufficient condition; and to that extent the last hypothesis even if found to be acceptable does not imply that the marginal productivity theory as such is operating in the determination of wage rate.

The traditional marginal productivity theory is based on two premises, viz., perfect competition in the product market implying the equality between price of the product and the marginal revenue accruing to the producers; and perfect competition in the labour market implying a horizontal supply curve of labour or the equality between the average wage and the marginal wage paid by the units hiring labour. These two premises coupled with the assumption of profit maximizing behaviour on the part of the producers, which in itself implies a tendency on the part of producers to equate the marginal wage (MW) with the marginal product (MP_L) of labour, gives rise to the proposition that W equals MP_L. It is obvious therefore that if the hypotheses that $a = 0$ and $b = 1$ in the above equation have to be rejected after a suitable empirical test of the same, then it would imply that one or more of the following factors might account for the statistically significant divergence between W and MP_L:

   i) lack of competition in the product market implying price $>$ MR;

   ii) lack of competition in the labour market implying an upward sloping supply curve of labour or $W < MW$; and

   iii) lack of the tendency on the part of producers to maximize profits implying a divergence between MW and MP_L.

Now we can argue that if the estimated coefficient b is found to be positive and statistically significant, i.e., if W is significantly correlated with MP_L, it would imply broadly speaking that there does exist a basic tendency on the part of producers to maximize profits inasmuch as W is significantly influenced by MP_L. And in fact we may conclusively say that the divergence between W and MP_L is caused primarily by imperfections either in the product market or in the labour market or both. However, since imperfections in both the markets, given the basic assumption of profit maximizing behaviour, show the same tendency, so far as their influence on W is concerned, namely, to push the wage rate below the value of marginal product of labour, we cannot hope to be able to isolate the separate influence of imperfections in the two different markets, unless of course we have in advance the knowledge about the elasticity of demand for the relevant product on the prevailing price range. But if we can make some kind of a rough guess about the elasticity of demand for the product, we can get at least some broad dimensional idea about the extent of the observed divergence between W and MP_L that can be attributed to the imperfections in labour market, i.e., to the presumably upward sloping supply curve of labour. It must be noted, however, that this type of theoretical framework of explaining the divergence between W and MP_L, if it is observed and found to be statistically significant, can only explain why MP_L exceeds W; it cannot explain any significant divergence of the nature $W > MP_L$, unless, of course, factors like strong and effective unionism or the socio-cultural-economic factors of the kind examined in detail by Lewis[3] are brought in. And finally, if W is not found to be significantly correlated with MP_L at all, then even the basic assumption of profit maximizing behaviour gives way and this actually means that almost any thing under the sun might be offered as a possible explanation of why W differs from MP_L.

In what follows, we have made an initial and purely experimental attempt to test the hypothesis of marginal productivity theory of wages within the broad framework discussed above by applying the standard regression technique to the time series as well as cross-section data on the organised manufacturing sector in India, which are presumably a more comprehensive and reliable set of data as compared to the data available for the rest of the Indian economy. While the time series analysis covers the period 1946-64 and relates to the 28 comparable industries covered by the Census of Indian Manufactures (1946-58)

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[3] See W. Arthur Lewis: "Economic Development with Unlimited Supplies of Labour", in Agarwal and Singh (Ed.): The Economics of Underdevelopment (Oxford University Press, 1964).

and the <u>Annual Survey of Industries</u> (1959-64), the cross-section analysis deals with nineteen two-digit level industries covered by the <u>ASI</u> and relates to two different years, 1960 and 1964.

<center>III</center>

Since MP_L is defined as the partial derivative of the production function with respect to labour, the first step in our analysis would involve the estimation of suitable production functions based on time series data and also on cross-section data. The specific form of production function which we have selected for this purpose is of course the celebrated Cobb-Douglas form which can be represented as : $Y = A. K^m. L^{1-m}$, where Y, K and L represent the output, the quantity of real stock of capital, and the quantity of labour employed respectively, and A & m are given constants. The properties, or the assumptions as we might put it, of this functional form are well-known. Thus, it is homogeneous of degree one in L & K; the exponents of L & K indicate the constant elasticities of output with respect to L & K respectively; and, perhaps most importantly, the elasticity of substitution between L & K is equal to unity for all combinations of L & K. For the purposes of estimation, the function can be reduced to its intensive form by dividing through by L. Thus, we have,

$$y = A. k^m, \text{ where } y = Y/L \text{ and } k = K/L.$$

For the purpose of time series analysis, we may modify the above functional form to incorporate the effect of neutral disembodies technical progress by introducing the time factor. Thus, we may re-write the above function as:

$$y = A. k^m. e^{rt}, \text{ where r is the rate of neutral technical}$$
progress and t represents the pure time factor.

<u>Time Series Production Functions:</u>

By using the data on gross capital stock per person employed and gross value added per person employed, both at 1950 prices, relating to 28 manufacturing industries covering the period 1946-64, obtained directly from a recent study by M.M.Dadi[4] we have estimated the time series production function by regressing log y on log k and t. The estimated relationship is:

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[4]M.M.Dadi: <u>Income Share of Factory Labour in India.</u> (Shri Ram Centre, New Delhi, 1973); Ch.V.

$$\log \hat{A} = -0.4609, \quad \hat{m} = 0.4111 ., \quad \hat{r} = 0.0285$$
$$(0.4482) \qquad (0.1831) \qquad\qquad (0.0046)$$

$$R^2 = 0.9146, \quad \bar{R}^2 = 0.8985$$

(Figures in brackets indicate the standard errors of the estimated coefficients.)

Thus, the estimated production function turns out to be:

$$\hat{Y} = 0.6307 \; L^{0.5889}. \; K^{0.4111}. \; e^{0.0285t} \tag{1}$$

Cross-section Production Functions:

By using the data on gross value added per worker and gross capital stock per work (both at current prices) relating to the 19 major two-digit level industry groups derived from the ASI and a recent study by Hashim and Dadi[5], we have estimated the 'cross-section' production functions for two different years, 1960 and 1964, by regressing log y on log k. The estimated relationships are:

i) Year 1960:

$$\log \hat{A} = -0.2116 \qquad \hat{m} = 0.6399$$
$$(0.2951) \qquad\qquad (0.1074)$$
$$R^2 = 0.6761 \qquad \bar{R}^2 = 0.6380$$

Hence, the estimated production function is:

$$\hat{Y} = 0.8093 \; L^{0.3601} \; K^{0.6399} \tag{2}$$

ii) Year 1964:

$$\log \hat{A} = -0.1215 \qquad \hat{m} = 0.6167$$
$$(0.2055) \qquad\qquad (0.0656)$$
$$R^2 = 0.8388 \qquad \bar{R}^2 = 0.8198$$

Hence, the estimated production function is:

$$\hat{Y} = 0.8856 \; L^{0.3833}. \; K^{0.6167} \tag{3}$$

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[5] S.R.Hashim and MM.Dadi: <u>Capital Output Relations in Indian Manufacturing (1946-64)</u>, (M.S.University of Baroda, 1973); Ch.IV.

IV

By partially differentiating each of the three estimated production functions presented above with respect to labour (L), we can derive the marginal product of labour as:

i) <u>Time-series data:</u>

$$\widehat{MP}_{L(t)} = 0.5889 \times 0.6307 \; L_t^{0.5889-1} \cdot K_t^{0.4111} \cdot e^{0.0285t}$$

$$\therefore \quad \widehat{MP}_{L(t)} = 0.5889 \, \hat{y}_t \qquad\qquad (4)$$

where $\hat{y}_t$ is the <u>estimated</u> output per person employed at time t and $\widehat{MP}_{L(t)}$ is the corresponding estimated value of marginal product of labour (at time t). Since both y_t and therefore $\widehat{MP}_{L(t)}$ are valued at constant 1950 prices of manufactured articles, we have converted the latter time series to the corresponding series at current prices by applying the wholesale price index numbers manufactured articles for the period 1946–64 (with 1950 as the base year). The time series of value of marginal product of labour at current prices, so derived for the period 1946–64, is presented in <u>Appendix Table I</u> along with the time series of the observed wage rate (per person employed) actually paid in the industries covered by equation (1).

ii) <u>Cross-section data:</u>

(a) <u>Year 1960:</u>

$$\widehat{MP}_{L(i)} = 0.3601 \times 0.8093 \; L_i^{0.3601-1} \cdot K_i^{0.6399}$$

$$\therefore \quad \widehat{MP}_{l(i)} = 0.3601 \, \hat{y}_i \qquad\qquad (5)$$

(b) <u>Year 1964:</u>

$$\widehat{MP}_{L(i)} = 0.3833 \times 0.8856 \; L_i^{0.3833-1} \cdot K_i^{0.6167}$$

$$\therefore \quad \widehat{MP}_{L(i)} = 0.3833 \, \hat{y}_i \qquad\qquad (6)$$

where $\hat{y}_i$ is the <u>estimated</u> value of output per worker at current prices in the industry i, and $MP_{L(i)}$ is the corresponding estimated value of the marginal product of labour at current prices in industry i.

The series of MP_L , so derived, are presented in Appendix Table I along with the corresponding series of observed wage rates (actually paid) in different industries for the years 1960 and 1964.

V

Having derived the required series of MP_L and W, we can now estimate the relationship $W = a + b.MP_L$ by regressing W on MP_L. The results of this exercise are given in Table I below:

Table I

Results of the Regression of W on MP_L

The Sample	No. of obser- vations	Estimate of a	Estimate of b	R^2
1) 28 comparable industries over the period 1946-64	19	183* (45)	0.7572* (0.0256)	0.9809
2) 19 Two-digit industries in the year 1960	19	829** (413)	0.3070* (0.0558)	0.6404
3) 19 Two-digit industries in the year 1964	19	1093* (168)	0.2457* (0.0553)	0.5372

*Statistically significant at 1% level of significance
**Statistically significant at 10% level of significance

(Figures in parenthesis indicate the standard errors of the estimated regression coefficients.)

It can be readily seen from this table that both a and b are statistically significant and b is significantly less than unity (at 1% level) in all the three regressions. However, we can notice a significant difference between the results of the regression based on time series data and the regressions based on cross-section

data. The former shows a very high explanatory power, a much lower value of the constant term a and a fairly high value of the co-efficient b as against the relatively low explanatory power, very high values of a and quite low values of b indicated by the latter. This clearly implies that there is a much better correspondence between W and MP_L at an aggregate level of the industrial sector consisting of a group of 28 industries when we consider the vertical movement of the sector as a whole over a period of time, than at a somewhat disaggregated level of two-digit industries when we consider the horizontal movement across the industries at a given point of time. Nonetheless it must be noted that the test procedure outlined in section II above would lead us to reject the marginal productivity hypothesis in all the three cases examined in Table I above. However, in view of the significant differences observed between the results of the time series and the cross-section analysis, we may consider a few alternative test criteria before arriving at any definite conclusion.

Now, before we consider any other alternative criterion, it would be interesting to apply the one suggested by Paul Douglas[6] and subsequently used in some of the more recent studies on the subject.[7] The test criterion suggested by Douglas essentially consists in comparing the observed average share of labour in total product with the estimated elasticity of output with respect to labour (based on the estimated production function), and testing whether the difference between the two is statistically significant or not. If the difference between the two turns out to be statistically insignificant, then it is concluded that "the results conform to what normally would be expected to occur under the competitive (marginal) productivity theory",[8] or that "labour on an average therefore is getting what its marginal productivity would warrant for".[9] It is quite interesting

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[6] Paul Douglas: The Theory of Wages, op. cit.

[7] See, for instance, M.M.Dadi, Op. cit.

[8] Paul Douglas: "Are There Laws of Production?", op. cit., p.38.

[9] M.M.Dadi, op. cit., p. 67.
The rationale behind this test criterion is of course derived from the well known neo-classical theorem which states that under the conditions of constant returns to scale, if factors of production are paid according to their respective marginal products, then the elasticity of output with respect to a given factor would be exactly equal to the relative share of that factor in total product.

to find that in each of the three cases considered above, the
difference between the observed wage shares and the estimated
elasticities of output with respect to labour turns out to be
statistically insignificant at one or even ten per cent level of
significance;[10] so that according to the test criterion suggested
by Douglas we should come to the conclusion that 'wages are on
an average equal to the respective marginal products in Indian
manufacturing industries', which in all probability appears to be
the one far away from the reality at least so far as the cross-
section analysis is concerned. Obviously therefore the test
criterion suggested by Douglas and later on used by others
seems to be totally misleading and quite unsuitable for a general
application to any kind of situation. The reason for this,
perhaps lies in the fact that the average of the observed shares
of labour just cannot be taken as representing the whole series
if the coefficient of variation for the entire series is fairly
high and significant. The Douglas test would therefore be valid only
if the series of observed wage share does not show any significant
variation. And, as shown in Table II below, the coefficient of
variation turns out to be fairly high and significant for both the
cross-section series of observed wage share, while it turns out
to be quite low and insignificant for the time series of observed
wage share. We may therefore conclude that while the inference
drawn on the basis of the Douglas test criterion may be regarded
as acceptable and perhaps also somewhat conclusive in the case of
the time series data, the test appears to be just inapplicable,
and hence the inference drawn from it seems to be misleading and
unacceptable, in the case of the cross-section data. In fact we
may argue that the whole approach underlying the Douglas test of the
marginal productivity theory is rather indirect and roundabout, and
perhaps a more direct method of testing the marginal productivity
hypothesis such as the one which we have suggested here in
section II above seems to be more general as well as appropriate.

In view of all this, we have considered in Table II some
alternative criteria for testing the marginal productivity hypo-
thesis. Since the first two criteria given in the table have
already been discussed above, we may now examine the remaining

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[10]The computed t-values for the hypothesis that the estimated
elasticities are equal to the observed shares turns out to be
0.3833, 0.2784 and 1.2088 for the time-series, cross-section
1960 and cross-section 1964 data respectively.

Table II

Alternative Criteria For Testing The Marginal Productivity Theory of Wages

Test Criterion	Results obtained for		
	Time Series Data	Cross-Section Data	
		For 1960	For 1964
1) Elasticity v/s Relative Shares:			
Estimated elasticity of Y w.r. to L	0.5889*	0.3601*	0.3833*
Average of observed wage share	0.5187	0.3302	0.3040
Coefficient of variation for the series of observed wage share	0.0806	0.3637	0.3289
2) Regression of W on MP_L:			
i) Estimated value of Constant Term(a)	183	829	1093
a as % of the Mean Value of W	12.79	59.26	63.58
ii) Estimated value of parameter b in the Equation $W = a + b.MP_L$	0.7572**	0.3070**	0.2457**
iii) Estimated value of parameter b in the Equation $W = b.MP_L$@@	0.8683**	0.7534**	0.6744**
3) Comparison of the Means of W & MP_L:			
Mean of the series of Estimated MP_L	1648	1857	2546
Standard deviation of MP_L	579	1429	1668
Mean of the series of observed W	1431	1399	1719
Standard deviation of W	443	548	559
4) Average Deviation of the series of W from the series of MP_L : Absolute	266	1139	1552
As % of Mean of MP_L	16.14	61.34	60.96

*Significantly different from zero but not significantly different from the observed wage share at 5% level of significance.

**Significantly different from zero as well as unity at 5% level of significance.

@@This regression differs from the previous one in regard to the specification of the linear relationship itself. It assumes that there is no constant term and, in diagrammatic terms, amounts to fitting a straight line through the origin rather than any kind of straight line as implict in the earlier case. The estimation procedure followed in this case is known as the Ratio Estimate. For details, see W.G. Cochran: Sampling Techniques, (New York, 1963); Chs. 3 and 6.

Source: Appendix Table I.

two criteria considered in the table. The first of these, viz.,
a direct comparison of the arithmetic means and the standard deviations
of the estimated MP_L and observed wage rates, is perhaps the simplest
statistical test criterion to apply. However, it is quite rough and
crude in nature and hence the only conclusion that we might draw
from the relevant figures given in the table could be that the
difference between the means of MP_L and W appears to be quite small
and insignificant in the case of the time series data especially in
view of the relatively large values of the standard deviations of the
two series, which between them are also found to be quite in
agreement with each other.

The last criterion considered in the table makes a direct
attempt at measuring the extent by which the <u>entire series</u> of W
differs from the <u>corresponding series</u> of MP_L. This measure, named
here as the Average Deviation of the series of W from the series of
MP_L is derived by using the formula A.D. $= \left[\dfrac{(MP_i - W_i)^2}{n} \right]^{1/2}$,

where n is the total number of observations and (W_i, MP_i) with
i = 1, 2, ... n is the given set of observations and W & MP_L. It
can be readily seen from the table that the average deviation of W
from MP_L, so derived, is highly significant in the case of the
cross-section data, while it is relatively quite low in the case of
the time series data.

Thus, after considering all the alternative criteria given in
<u>Table II,</u> we might conclude that wages paid in Indian manufacturing
industries do not reflect the corresponding marginal productivity
of labour especially when we consider the industries at the two-
digit level of aggregation; though perhaps it appears that for the
organised industrial sector as a whole (i.e., at the highest level
of aggregation so far as the sector is concerned), the level as well
as temporal movements of the estimated value of marginal product
of labour and the observed wage rate were in fairly close corres-
pondence during the period 1946-64. It is also interesting to note
in the passing that on the whole W seems to be lying below MP_L, which is
precisely the kind of situation that might be expected to prevail
when there are market imperfections.

VI

Having concluded that the cross-section data on Indian industries
furnish the necessary statistical evidence for us to reject the marginal
productivity hypothesis, we may now examine a little more closely the
situation in those industries where the divergence between W and MP_L

is found to be highly significant in the sense that it is found to be greater than the average divergence observed between the means of the two series and make some rough guess about its implications. The industries which fall under this category (considering the situation in both the years taken together) are: Food Products (20), Beverages (21), Paper & Paper Products (27), Products of Petroleum and Coal (32), NonMetallic Mineral Products (33), and Iron & Steel (34).[11] It is interesting to observe that in each of these six industrial groups W lies considerably below MP_L; and also that each of these industries (with the only exception of Food Products and Mineral Products) is highly capital intensive, the average value of gross capital stock per worker at current prices for the two years taken together exceeding Rs.25000, and that too quite substantially in most of the cases. Inasmuch as high capital intensity is generally found to be highly correlated with the degree of concentration and market imperfection, we can regard these two observations relating to the six industries listed above as perfectly consistent with the conclusion that the observed divergence between W and MP_L in these industries has been caused by the significant imperfections existing either in the markets for their products or in the markets from where they get their labour supply. In particular, if we assume the former to be less significant than the latter, by assuming either nearly perfect competition in their product market or alternatively a high value of the elasticity of demand for their product of the magnitude of, say, five, then we we can readily quantify the degree of imperfection in their labour markets by computing the corresponding elasticities of supply of labour to reflect the extent to which the supply curve of labour is upward sloping. This can be done by using the formula

$$e_{LS} = \frac{AW}{MW-AW} = \frac{AW}{MRP_L-AW}$$

where AW and MW represent the average and the marginal wage rates respectively, and MRP_L represents the marginal revenue productivity of labour which equals MW under the assumption of profit maximizing behaviour. Since MRP_L equals $MR \times MFP_L$ where MR is the marginal revenue on the product and MPP_L is the marginal physical product of labour, all that we need in order to derive MRP_L from the value of marginal product of labour (MP_L) is some information on the elasticity of demand in the product market, for which we have already made two alternative assumptions. The computed elasticities of supply in those six industries are presented in Table III below:

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[11] For details, see Appendix Table I.

Table III

Estimated Elasticities of Supply of Labour in Selected Indian Industries

Industry	Assuming Perfect Competition in the Product Market		Taking Five as the Elasticity of Demand in the Product Market	
	Year 1960	Year 1964	Year 1960	Year 1964
(20) Food Products	0.72	0.82	1.09	1.30
(21) Beverages	0.99	1.17	1.65	2.07
(27) Paper & Paper Products	1.01	0.88	1.68	1.42
(32) Petroleum Products	0.90	0.65	1.45	0.97
(33) Non-Metallic Mineral Products	1.38	1.40	2.64	2.70
(34) Iron & Steel	0.75	0.72	1.16	1.10

Source: See the text.

It can be readily noticed from this table that the elasticities
of labour supply computed under the extreme assumption of a perfectly
competitive product market fall in the range of 0.72 to 1.17 (with the
exception of Mineral Products); while the corresponding range for a
more liberal assumption (of $e_d = -5$), which allows for imperfections
in the product market also, turns out to be 0.97 to 2.07. And it is
rather satisfying to note that the figures for the two different years
show a remarkable dimensional similarity. While we may not try to
read too much from this table, because the figures given there may
be regarded as only broad and tentative in nature, we may still
observe that the significantly low values of the elasticity of supply
of labour probably indicate the specificity of labour requirements
in these industries. Thus, it is quite possible that each of these
industries has a labour market with perhaps a large component which
is specific to it in terms of the skill requirements and specificity
of jobs in these industries. The whole labour market may therefore
be operating in the form of a conglomeration of a number of non-
competing groups of workers largely specific to individual industries
and this phenomenon might give rise to upward sloping supply curve of
labour to each individual industry. This seems particularly note-worthy

because the series of working force merely indicates the number of workers employed without any regard to their skill-composition and to that extent the inter-industry estimates of marginal products of labour may be said to be based on the assumption of a uniform skill composition of working force. This implies that varying skill-composition of working force among different industries might be at least partly responsible for the observed divergence between MP_L and W, inasmuch as the latter consists of the actual amount paid and therefore presumably includes the higher rewards to skilled workers while the former does not include its corresponding influence on productivity.

Finally, it should be noted here that, while interpreting any of the results presented above, it perhaps needs to be borne in mind that they are based on a number of simplifying assumptions such as constant returns to scale and unity elasticity of substitution between labour and capital in Indian industries, and therefore suffer from an unknown error margin to the extent to which these assumptions go wrong.

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Appendix Table I

Wage Rate, Value of Marginal Product of Labour and Capital Intensity in Indian Industries

(All figures are in Rupees at current prices)

Two-Digit Level Industry Group	Cross – Section Data						Time-Series Data		
	Year 1960			Year 1964					
	Wage Rate	MP_L	Gross Capital Per Worker	Wage Rate	MP_L	Gross Capital Per Worker	Year	Wage Rate	MP_L
1	2	3	4	5	6	7	8	9	10
20. Food Products	737	1767	16722	961	2128	19617	1946	684	921
21. Beverages	1087	2180	23205	1447	2683	28566	1947	847	896
22. Tobacco Products	682	633	3363	814	997	5734	1948	994	1111
23. Textiles	1391	1165	8713	1800	1591	12243	1949	1073	1158
24. Footwear & Wearing Apparel	1054	867	5491	1350	1071	6448	1950	1070	1228
25. Wood & Cork Products	807	1047	7378	966	1381	9734	1951	1180	1502
26. Furniture & Fixtures	1439	894	5760	1616	1369	9597	1952	1246	1355
27. Paper & Paper Products	1338	2667	31812	1578	3578	45564	1953	1290	1330
28. Printing & Publishing	1513	1288	10205	1826	1537	11573	1954	1299	1362
29. Leather & Fur Products	1114	1256	9807	1255	1694	13555	1955	1320	1383
30. Rubber Products	1767	1426	11957	2442	2233	21214	1956	1386	1503
31. Chemicals	1598	1426	11957	2135	4167	58327	1957	1447	1623
32. Petroleum & Coal Products	3264	6899	140451	3179	8087	170962	1958	1499	1723
33. Non-Metallic Mineral Products	984	1695	15663	1277	2188	20531	1959	1572	1328
34. Iron & Steel - Basic Metal	1866	4346	68226	2180	5205	83677	1960	1774	2097
35. Metal Products	1376	1412	11771	1683	1875	15981	1961	1862	2285
36. Non-Electrical Machinery	1493	1311	10491	2018	2152	19976	1962	2053	2534
37. Electrical Machinery	1509	1670	15299	1963	2518	25775	1963	2196	2690
38. Transport Equipment	1570	1330	10729	2077	1919	16587	1964	2395	2888

Source: See the Text.