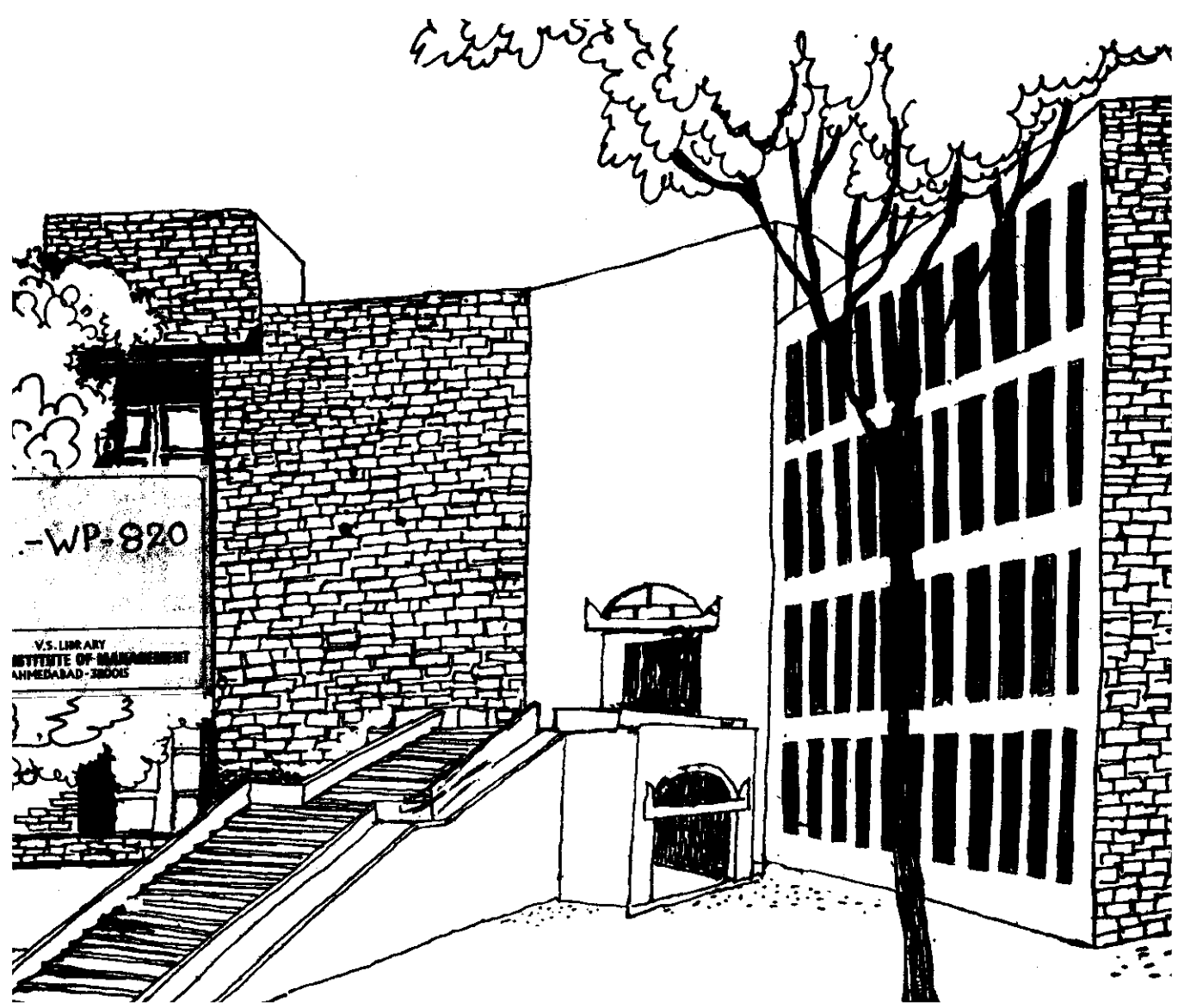# Working Paper

REGIONAL ASPECTS OF INDUSTRIALIZATION
IN INDIA

By

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WP820

WP
1989/820

W P No. 820

August 1989

INDIAN INSTITUTE OF MANAGEMENT
AHMEDABAD-380 056
INDIA

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- Ravindra H. Dholakia

Abstract

Removal of regional disparity in the levels of economic development as a national goal is translated into the removal of regional disparity in the levels of industrialization for the industrial policy. With the state as a regional unit this objective appears to be reasonable. Although average disparity in the levels of industrialization among states in India appears to have declined during the quinquanium 1979-84, there are very disturbing regional patterns discernible. These patterns, moreover, coincide with the classification of states based on the political parties ruling the Centre and states. In this context, if the reduction of regional disparity in industrialization without sacrificing the growth of industry is to be taken seriously, immediate attention must be given to the regional aspects of industrialization in India.

Regional Aspects of Industrialization in India

- Ravindra H.Dholakia

Efficiency and equity have been the explicitly stated prime concerns for the resource allocation under the planned development strategy in India. Efficiency is interpreted in terms of faster growth and higher resource productivity. Equity implies reduction of disparities in personal incomes and levels of economic development among regions. Industrialization has been thought to be the most effective strategy to achieve rapid economic development not only of the nation but also of the regions within the nation. Several policy issues emerge in this context. The important ones among them are: (a) should equity imply reduction of regional disparity in the level of industrialization as well? (b) should individual industries be geographically concentrated in a few regions? or should they be evenly spread over all the regions? (c) Should individual regional economies have diversified structure of industries? Or should they have high degree of specialization in a few industrial groups? In the present paper, we discuss these issues in the Indian context.

I.   Regional Disparity In Industrialization

By now it is widely accepted that economic development is a complex phenomenon involving qualitative, structural and institutional changes in the economy over time. It, therefore, eludes simple measurement by one or two yardsticks. It can be measured, if at all, by using multiple criteria to capture various dimensions of the entire process. Literacy, mortality, health, sanitation, infrastructural facilities, agricultural productivity, urbanization, non-agricultural employment opportunities, etc. are some of the important indicators reflecting economic development. It can be argued that the extent of industrialization has a very high degree of correlation with most of these development indicators.

Autonomous industrialization results in strong backward linkages strengthening the markets for the primary products of the region. It is also invariably associated with development of various types of infrastructural facilities in the region. Since it absorbs surplus labour in the region, it also relieves the agricultural sector of disguised unemployment. It may result in increased agricultural productivity. Since the labour productivity in the industrial sector is usually higher than in the primary sector, the wages in the regional economy would improve. The industrial employment being qualitatively of a different

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nature, it leads to skill formation, higher literacy and many other related benefits. These and similar arguments account for considering industrialization as an 'opportunity' for economic development of the regional economy. Since 'equity' implies providing equal opportunity to all, our commitment to ensure equity should also imply the goal of reducing regional disparity in levels of industrialization for the national policies - particularly, the industrial policy. The basic policy issue, then, is to define the region - should it be a zone, a state, a district, a block or some geophysical resource based region?

Considering the diversity and vastness of area, it is indeed difficult to agree to a single definition of 'the regional unit' in the context of industrialization. However, if the criterion of functional autonomy for reasonable amount of revenue generation is applied, a state appears to be the most viable regional unit.[*1] Thus, although it is possible to consider other alternatives, we have considered a state as the regional unit for further analysis here.

In order to examine whether the regional disparity in the level of industrialization is reducing over time in India or not, we need to define: (1) the scope of industrialization and (2) a measure of the level of industrialization in a state economy. The term - 'industry'

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incorporates a wide range of activities besides the manufacturing activity. For instance, it includes banking, insurance, tourism and of late even agriculture. In the narrowest sense, the term - industry would include only the large-scale (registered) manufacturing units; and in the traditionally broad sense, it would include all the secondary activities like registered and non-registered manufacturing, construction and generation, transmission and distribution of electricity, gas and water supply. We may restrict the scope of 'industrialization' to its traditional two definitions. Similarly, out of the numerous input and output indicators, we may use the most widely accepted 'net value added (NVA) measure to indicate the level of industrialization of a state economy. Table 1 provides the percapita incomes (value added) in the registered manufacturing and the secondary sectors of the 17 major state economies in India for the years 1979-80 and 1984-85.[*2]

It is clear from the table that the ratio of the maximum to the minimum income increased during 1979-80 to 1984-85 in India. This is true irrespective of scope of the definition of industrialization. Thus, in absolute terms, the disparity in the extent of industrialization had increased between industrially most developed and least developed states in India during 1979-84. If, however, all the states are considered in arriving at a single most

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TABLE-1 : PER CAPITA INCOME IN REGISTERED MANUFACTURING AND SECONDARY SECTORS IN STATE ECONOMIES IN INDIA, 1979-80 AND 1984-85

States	Population (in lakhs)		Per Capita Income in Reg. Mfg. (In Rupees)		Per Capita Income in Secondary Sector (in Rs.)	
	1979-80	1984-85	1979-80	1984-85	1979-80	1984-85
1. Andhra Pradesh	519.73	573.53	87.00	117.90	217.16	360.37
2. Assam	190.29	223.54	128.07	87.32	200.38	256.07
3. Bihar	676.52	754.74	71.57	152.20	151.10	286.54
4. Gujarat	328.04	370.03	288.14	514.53	475.70	839.20
5. Haryana	124.82	140.64	203.61	451.11	410.10	785.03
6. Himachal Pradesh	41.17	45.84	26.14	55.21	243.77	421.56
7. Jammu & Kashmir	57.45	65.30	30.04	78.55	213.09	382.50
8. Karnataka	358.49	408.58	159.68	190.63	413.47	568.82
9. Kerala	248.27	271.64	100.50	193.37	257.57	429.82
10. Madhya Pradesh	507.06	557.53	83.66	152.22	205.64	399.45
11. Maharashtra	603.77	678.32	437.25	610.77	699.37	1032.28
12. Orissa	256.68	281.37	74.76	31.28	152.74	164.29
13. Punjab	161.61	181.31	160.71	281.03	534.01	834.51
14. Rajasthan	328.30	377.86	53.08	102.73	193.69	321.02
15. Tamil Nadu	476.19	513.77	193.82	311.71	415.44	607.09
16. Uttar Pradesh	1069.47	1195.56	53.33	107.82	196.47	387.44
17. West Bengal	529.68	587.09	206.14	357.13	364.87	612.25
All India	6640.00	7370.00	144.67	252.72	318.36	548.90

Source: (i) CSO (1987): National Accounts Statistics, 1970-71 to 1984-85, January.

(ii) CSO (1986): Estimates of State Domestic Product, 1970-71 to 1984-85, November.

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widely used measure of regional disparity, viz., the
coefficient of variation weighted by population, the
following results are obtained:

Sector   Weighted Coefficient of Variation (in %)

                            1979-80   1984-85

Reg.Mfg. Sector   77.68   72.38

Secondary Sector   53.-8   46.74

Two observations can be made from the results: (1) The
extent of inequality is considerably lower for the
traditionally broad definition of industrialization. This
is true for both the years in question. This observation
implies that other sub-sectors like unregistered (household)
manufacturing, construction and electricity, gas and water
supply contribute significantly to reducing the regional
disparity in industrialization. Thus, all the secondary
activities taken together show much less extent of regional
disparity than the registered (large) manufacturing sector.
Since the development of unregistered manufacturing and
construction is a subject of state initiative, the state
governments in India seem to be conducting themselves so as
to reduce the interstate imbalances in industrialization.
Registered manufacturing sector, on the other hand, is a
joint responsibility of the state and central governments
with the latter having a major role. High degree of

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regional disparity in the development of the registered manufacturing sector has to be viewed in this perspective.

(2) The second observation from the results summarized above is that average dispersion or the extent of inequality in the levels of industrialization among states when considered using all the observations, appears to have declined during 1979-84. This is true for both the traditional concepts of industrialization. Such a finding is, however, likely to hide more than what it reveals. It may, moreover, provide ground for complacency on the part of the policy makers who may feel that the policy is working in the right direction as far as the aspect of regional disparity is concerned. The side effects of the policy may, however, be more disastrous sometimes, particularly if they accompany political overtones. Moreover, such an overall decline in the index of regional disparity hides some basic imbalances which are examined in the present study.

II.   Regional Pattern of Growth of Industry

In order to examine the phenomenon of reducing regional disparity further, we may compare the level and the growth of percapita net value added in the industrial sector over the period. Table-2 provides the result of this comparison.

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Table-2: Classifications of States According to the Level and Growth of Percapita NVA in Industry

Level	Growth	
	High	Low
High	Gujarat & Haryana	Maharashtra, Punjab, Karnataka, Tamil Nadu and West Bengal
Low	Jammu & Kashmir, H.P. U.P., M.P. and Bihar	Rajasthan, Andhra Pradesh, Kerala, Orissa & Assam

Note: High and Low are with reference to the national average.

It is clear from Table-2 that in ten out of the seventeen states, the level and growth are inversely associated. Thus, on an average reducing regional disparity in the level of industrialization during 1979-84 is on account of an interesting regional pattern of growth of industries in India.

It becomes clear from the Table-2 that all the southern states without exception have grown at the rate lower than the national growth rate in the net value added in industry. The northern states except Rajasthan and Punjab, on the contrary, have grown at a rate higher than the national growth rate in industry over the period 1979-84. Such a sharp regional pattern of growth of industry could not have been a matter of chance. It does reveal the

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intention of the government. Deliberate policy can only give rise to such sharp regional differentiation. Further probe into this aspect is, therefore, likely to prove more illuminating.

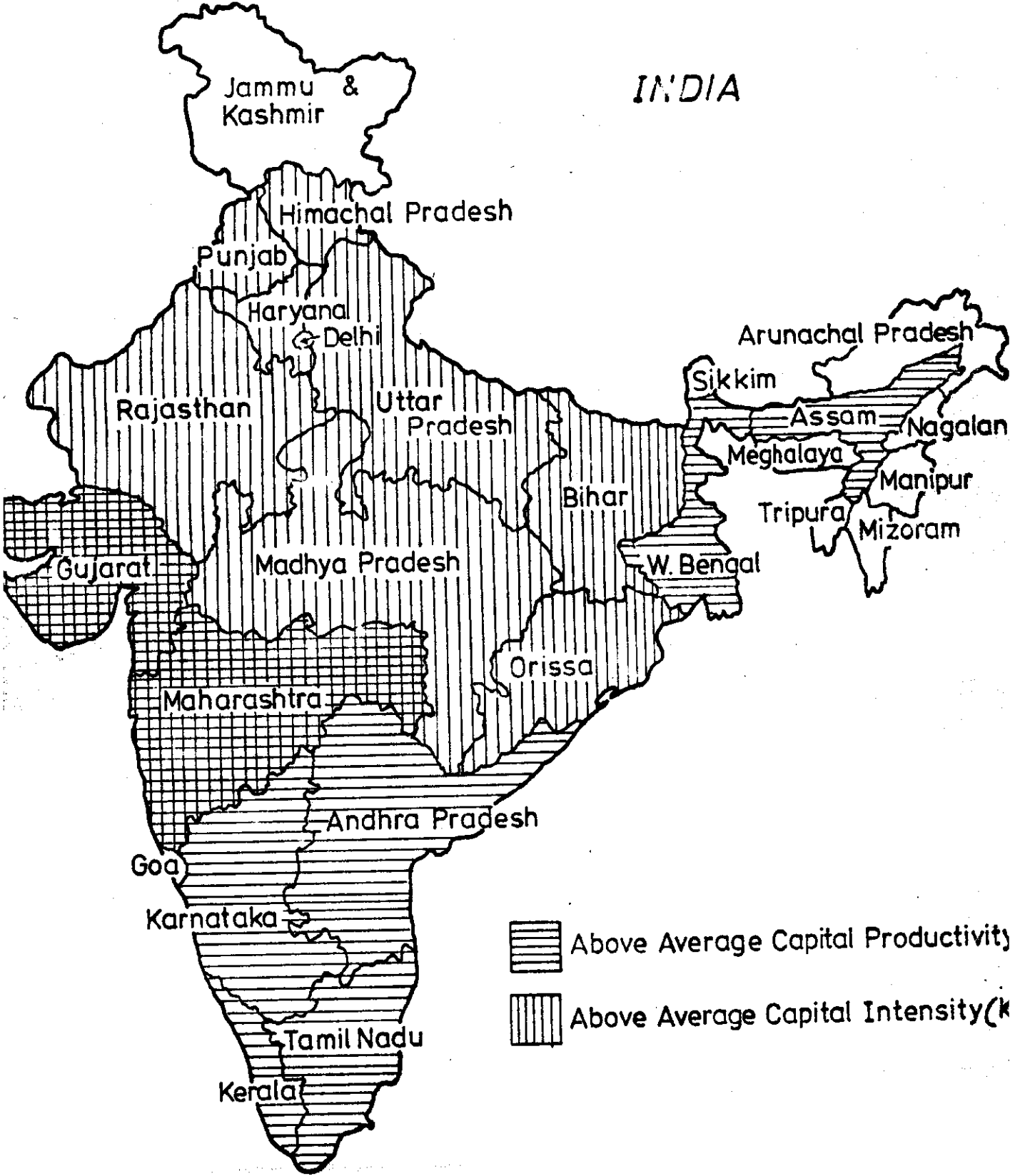### III. Capital per Worker and Capital Productivity

Growth and capital are considered so inseparable that most of our economic policies focus the attention only on investment as the only means to achieve growth. The reason for such a close association between the two is that capital per worker is an important component of the labour productivity, the other one being average capital productivity. This is because the relation is given by
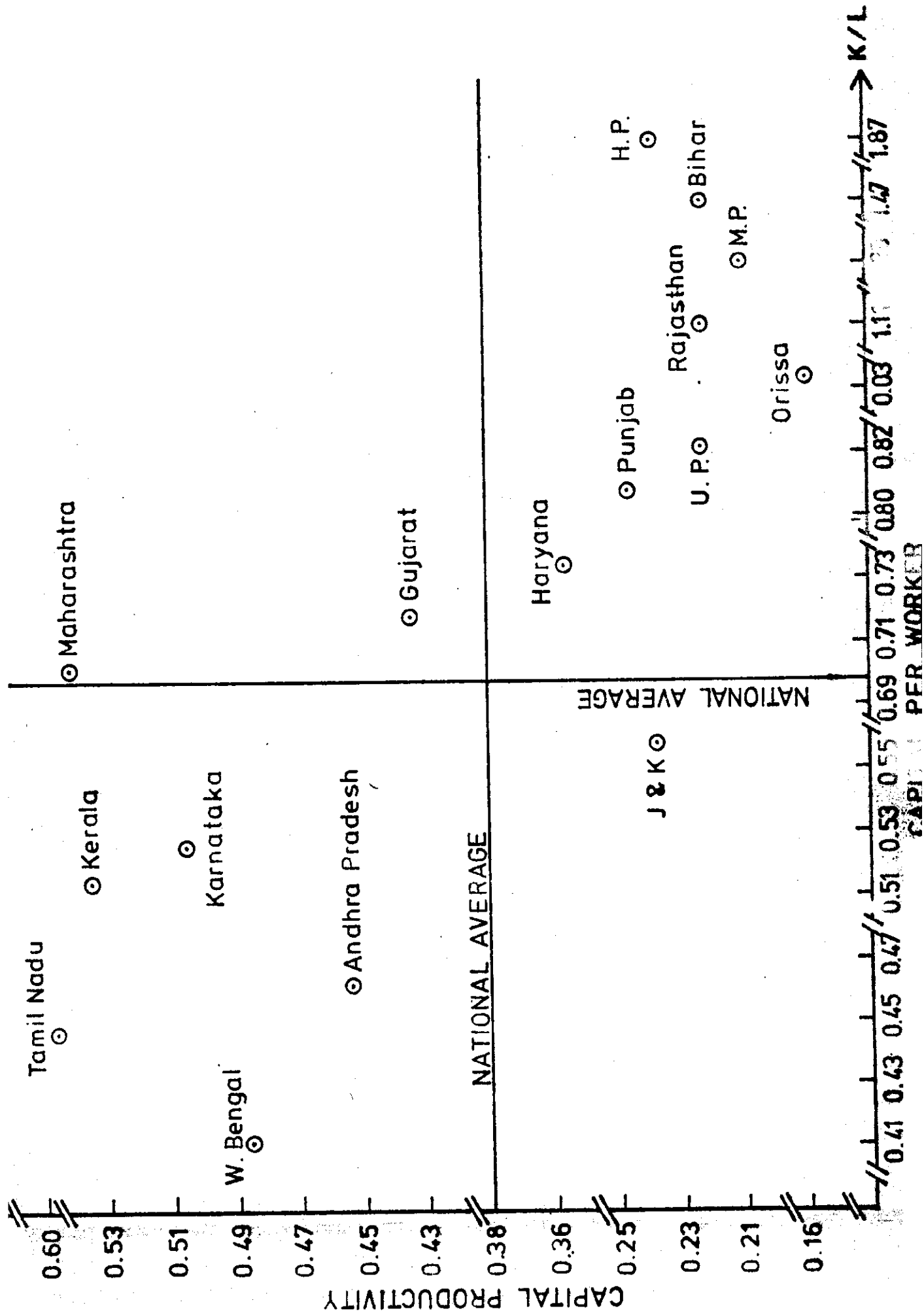
$$Y/L = (K/L).(Y/K)$$

Where Y, K and L are respectively income, capital and labour. Thus, (Y/L) is labour productivity (K/L) is capital per worker and (Y/K) is capital productivity. The growth in per capita NVA in industry is largely determined by growth in the labour productivity in industry. Thus, capital productivity and capital per worker are important variables in the discussion of the level and growth of industry.

It is interesting to examine the position of each of the major state economies in relation to the national average in both these components of the labour productivity. The map and the diagram provide the comparative picture in

INDIA

Jammu & Kashmir
Himachal Pradesh
Punjab
Haryana
Delhi
Rajasthan
Uttar Pradesh
Arunachal Pradesh
Sikkim
Assam
Nagalan
Meghalaya
Manipur
Tripura
Mizoram
Bihar
Gujarat
Madhya Pradesh
W. Bengal
Orissa
Maharashtra
Andhra Pradesh
Goa
Karnataka
Tamil Nadu
Kerala

Above Average Capital Productivity

Above Average Capital Intensity(k

CAPITAL PRODUCTIVITY

0.60
0.53
0.51
0.49
0.47
0.45
0.43
0.38
0.36
0.25
0.23
0.21
0.16

Tamil Nadu ⊙
⊙ Kerala
⊙ Karnataka
W. Bengal ⊙
⊙ Andhra Pradesh
NATIONAL AVERAGE

⊙ Maharashtra
⊙ Gujarat
Haryana ⊙
J & K ⊙

NATIONAL AVERAGE

⊙ Punjab
U.P ⊙
Rajasthan ⊙
Orissa ⊙
⊙ M.P.
⊙ Bihar
H.P. ⊙

0.41 0.43 0.45 0.47 0.51 0.53 0.55 0.69 0.71 0.73 0.80 0.82 0.03 1.1 1.7 1.87

CAPITAL PER WORKER

K/L

this regard based on the data from the Summary Tables of the
Factory Sector of the Annual Survey of Industries, 1984-85.
Very clear regional patterns are again discernible here.'
The Southern region (including W.Bengal and Assam) has a
considerably above average capital productivity in
manufacturing but has significantly less capital per worker
as compared to the national average. The northern region,
on the contrary has considerably high capital per worker but
is far below the national average in terms of capital
productivity. Only Maharashtra and Gujarat have both
capital productivity and capital per worker well above the
national average. Jammu & Kashmir, on the other hand, has
both these factors unfavourable as compared to the national
average.

To a large extent, the capital productivity reflects
the efficiency with which capital is employed and the nature
of technology used in the manufacturing. It is, therefore,
less likely to be increased directly by the policy changes
over a short period of time. The capital per worker on the
contrary is basically a policy variable. With increased
doses of investment, it is possible to raise capital per
worker in the manufacturing. High capital intensity in a
regional economy, therefore, indicates favourable attitude
of the government in allocating investment to the region.
It is also by now well established that public enterprises
are by and large more capital intensive as compared to the

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private sector units.   One of the important reasons for the

high capital intensity in the manufacturing of the northern

region during the mid-eighties is that the north has secured

a   much   larger   share   in   the   investments   in   the   new
                                                          *3
undertakings of the Central Government in the country. This

is again a matter of deliberate government policy.   In this

connection   it   may be noted that the states   having   higher

capital per worker in manufacturing are the ones with the

Congress(I) governments.   It is again not a matter of chance

but a crucial political factor which has to be duly

recognised   while   examining   the   question   of   regional

imbalances.

If,   however,   this   situation   of   sharp   regional

differentiation in terms of capital intensity and capital

productivity is to be exploited for fostering a rapid growth

of industry in the country, certain regional aspects of

future industrialization will have to be looked into.

IV.   Regional Spread of Industry

In   order   to achieve faster growth in the   Net   Value

Added (NVA) in industry,   should an industry be concentrated

in a few states or should it be spread among more states?

Whereas   the   answer   to   this question   would   differ   from

industry to industry, an overall average answer for all

industries together can be provided within the framework of

returns   to   scale.   To   increase   further   the   degree   of

regional concentration of an industry implies that the scale

of the activity expands in the region. If returns to scale are increasing, increased regional concentration of industry would lead to higher growth of NVA. If, however, there are decreasing returns to scale, increased regional concentration of industry would result in a lower growth of NVA.

With the help of the data on 23 two digit level industry groups available in the Summary Results of the Factory Sector of the Annual Survey of Industries, 1979-80 and 1984-85, we can find the average degree of association or correlation between the degree of regional concentration and per annum growth rate in NVA. The degree of regional concentration in an industry group is measured as the share of the top three states in terms of NVA in the given industry group (See, Table-3). The coefficient of correlation turns out to be -0.538 which is statistically significant at 1% level. The negative sign indicates that on the average, the returns to scale are diminishing in Indian industries. The regional spread of industry, therefore, is likely to prove growth promoting rather than growth hindering. The empirical evidence seems to support the hypothesis of complementarity between the objectives of high growth and reduction of regional disparity.

If we regress degree of regional concentration (RC) on the per annum growth rate of NVA (G) observed during 1979-84, we get the following estimated equation:

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Table-3: The Degree of Regional Concentration in 2 Digit Level

Industry Groups in India

2-Digit Code		Name of the Industry Group	Share of 3 Top States in NVA (in %)	Names of 3 Top States
(1)		(2)	(3)	(4)
1)	20-21	Food Products	35.7	Maharashtra, U.P., A.P.
2)	22	Tobacco Products	52.2	A.P., Maharashtra, T.N.
3)	23	Cotton Textiles	63.3	Gujarat, T.N., Maharashtra
4)	24	Wool, Silk & Synthetic Fibres	71.0	Maharashtra, Gujarat, Punjab.
5)	25	Jute, Hemp & Mesta Textiles	95.9	W.Bengal, A.P., U.P.
6)	26	Textile Products	41.1	Maharashtra, Delhi, Punjab.
7)	27	Wood & Wood Products	47.6	Assam, T.N., Karnataka
8)	28	Paper & Paper Products	77.6	Maharashtra, T.N., A.P.
9)	29	Leather, Leather Products, etc.	77.6	T.N., U.P., W.Bengal
10)	30	Rubber, Plastics, Petroleum & Coal Products	35.6	Maharashtra, Gujarat, U.P.
11)	31	Chemicals & Chemical Products	65.4	Maharashtra, Gujarat, T.N.
12)	32	Non-Metalic Mineral Products	40.3	M.P., Maharashtra, A.P.
13)	33	Basic Metal & Alloy Industries	60.7	Bihar, M.P., W.Bengal
14)	34	Metal Products & Parts	62.8	Maharashtra, W.Bengal, T.N.
15)	35	Machinery, Machine & Tool Parts	54.9	Maharashtra, T.N., Gujarat.
16)	36	Electrical Machinery, etc.	45.9	U.P., A.P., Karnataka.
17)	37	Transport Equipment & Parts	60.5	Maharashtra, T.N., Bihar.
18)	38	Other Industries	71.3	Maharashtra, W.Bengal, Karnataka
19)	40	Electricity	39.9	Maharashtra, Gujarat, U.P.
20)	41	Gas & Steam	77.4	Maharashtra, Bihar, Gujarat.
21)	42	Water Works & Supply	71.6	W.Bengal, Maharashtra, U.P.
22)	741	Cold Storage	79.5	U.P., W.Bengal, Maharashtra.
23)	97	Repair Services	43.9	Maharashtra, T.N., A.P.

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$$G = 22.3 - 0.16 \ RC \quad \text{with } R^2 = 0.2894$$
$$(-2.92) \ \text{(which is significant at 1\% level)}$$

The implication of this result is that if the degree of regional concentration of industry is reduced by one percentage point, it would raise the growth rate of the industry on an average by 0.16 percentage points. Regional spread of industries is, thus, a better policy unless there is a clear evidence to the contrary in the case of the industry group in question. Moreover, the degree of regional concentration does not have any statistically significant correlation either with the employment coefficient or with the capital coefficient. Thus, regional spread of industry appears to be neutral with respect to technology.

V.   Specialization v/s Diversification

Another important dimension of the regional industrialization is whether the regional economy should have more diversified industrial structure or a more specialised industrial structure. This question has to be investigated in the context of resource allocation at the regional level. It has the bearing on the growth of industry at national level only indirectly through its effects on the efficiency and factor proportions in the regional economies. Also, for all the regions the same

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strategy may not be the most optimal. In order to examine this aspect again at an aggregative level, we have to define first, the index of specialization/diversification of industrial structure. We have chosen to consider the share of the top three industry groups in each state as measuring the extent of specialization of the industrial structure of the state economy. The data for this index are again available from the ASI. (See. Table 4).

Having defined the index of specialization of industrial structure, it is possible to find the correlation between this index and the capital per worker. Such a correlation can provide very useful empirical verification for the hypothesis that, if the industrial structure of a regional economy is diversified, it invariably reduces the requirement of capital per worker in the manufacturing, whereas specialization leads to increase in the requirement of capital per worker. The justification for such a hypothesis is derived from the logic of diminishing returns to scale operating in the manufacturing sector. Specialization implies more investment in the industry groups which are already dominating the regional economy. If diminishing returns to scale operate in the economy, — and they do on an average as we have found earlier, — we require higher amount of capital per worker in order to maintain the labour productivity at the original level. Thus, specialization in industrial structure is expected to lead

Table-4:   The Extent of Specialization of the Industrial
           Structure of Major State Economies in India

States	Share of Top 3 Industry Groups in NVA (in %)	Top 3 Industry Groups (2-Digit level)
(1)	(2)	(3)
1. Andhra Pradesh	52.1	36, 40, 22
2. Assam	88.1	20-21, 30, 27
3. Bihar	69.9	33, 37, 35
4. Gujarat	63.1	31, 40, 23
5. Haryana	37.8	35, 30, 37
6. Himachal Pradesh	89.0	40, 35, 31
7. Jammu & Kashmir	61.1	31, 28, 24
8. Karnataka	40.3	36, 40, 23
9. Kerala	52.5	40, 31, 20-21
10. Madhya Pradesh	60.3	33, 36, 40
11. Maharashtra	38.2	31, 37, 35
12. Orissa	62.2	33, 99, 32
13. Punjab	50.8	20-21, 40, 24
14. Rajasthan	45.3	40, 31, 24
15. Tamil Nadu	34.7	23, 35, 31
16. Uttar Pradesh	46.5	36, 20-21, 40
17. West Bengal	39.9	25, 33, 37

to the increase in the capital intensity. The coefficient of correlation turns out to be +0.503 which is statistically significant at 5% level. The regression estimates between degree of specialization(s) and capital per worker (K/L) are as under:

$$\hat{(K/L)} = 0.12 + 0.01S \quad \text{with} \quad R^2 = 0.2530$$
$$(2.254) \quad \text{which is significant at 5\% level.}$$

This finding suggests that if the degree of specialization is increased by one percentage point, the capital per worker would increase by Rs.0.01 lakhs.

It is clear that empirical evidence for the Indian economy supports our hypothesis. Given the sharp regional differentiation in India in terms of capital intensity, such a finding can help deciding the broad direction of the future policy on specialization and diversification of the industrial structure in different state economies. It can be suggested, for instance, that all the southern states where the capital per worker is considerably below the national average, need to concentrate on consolidation and further specialization of their industrial structure rather than attempting to diversify. On the other hand, the northern states where the capital intensity is already well above the national average, need to diversify their industrial base. If this is done, there would be a tendency

towards equalization of factor proportions between the two regions which would help the process of achieving greater integration of the regional economies.

At this stage, it is also advisable to ask whether the degree .of specialization/diversification of industrial structure has any effects on the industrial growth, labour productivity and efficiency of the use of capital — in the economy. If increase in the degree of specialization shows significant positive association with industrial growth, labour productivity and capital productivity, one should be very careful in making policy recommendations in favour of diversifying the industrial structure in a region. However, the empirical evidence in the case of Indian states does not support a significant positive association between the degree of specialization of industrial structure and industrial growth as well as labour productivity. On the contrary, the coefficient of correlation between capital intensity (K/L) and capital productivity (Y/K) turns out to be −0.693 which is statistically significant even at 1% level of significance. As expected the correlation has negative sign indicating the inverse relationship between two variables. The following regression estimate is obtained:

$$(Y/K) = 0.61 - 0.28(K/L) \quad \text{with} \quad R^2 = 0.4802$$
$$(-3.723) \quad \text{which is significant at 1\%}$$
$$\text{level.}$$

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This regression suggests that, if capital per worker is reduced by Rs.1 lakh on an average, the capital productivity would increase by 0.28.

Thus, the empirical evidence from the regional data on the Indian economy lends further support and strengthens our policy prescription about considering diversification of the industrial base in the north and further specialization in the south. This would not only tend to equalize the factor proportions but would also tend to equalize the producitivity of capital in the industrial sector in the two regions. This, by itself, can correct several imbalances artificially created between the two regions such as disparity in wage-rates, interest rates, technology, etc.

VI. Concluding Remarks

In the present study, we have examined data on the industrial sector of 17 major state economies in India over the period 1979-84. Very significant regional differentiation in the pattern and growth of industry is discernible. The nature of industrialization in terms of capital per worker and capital productivity sharply divides the national economy into the North and the South (including West Bengal and Assam). This division also coincides with the one based on the political factor of the parties ruling the centre and the states. If reduction in regional

disparity in industrialization without sacrificing growth is an important aim of the national industrial policy, the present study strongly pleads for a serious consideration to be given to (i) greater regional spread of individual industries; (ii) diversification of industrial base for the northern states, and (iii) greater specialization of industrial structure for the southern states.

NOTES

(I am grateful to Dr.A.N.Oza for going through the draft of the present paper and making some useful suggestions)

*1 Even in terms of the migration, the extent is only half at the state level as compared to the district level. (1981 Census).

*2 1984-85 is currently the latest year for which the ASI summary results are available. The year 1979-80 is chosen here because (a) it provides five year period for comparison with the end-point dictated by the data availability; and (b) major political reshuffle took place at the Centre.

*3 See, Bureau of Public Enterprises. Annual Reports of the Working of Industrial and Commercial Undertakings of the Central Government, Government of India (various issues).

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