Regional Imbalances in MSME Growth in India

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1 Introduction

Over the past five decades, Micro Small and Medium Enterprises (MSME) sector has emerged as a highly vibrant and dynamic sector of the Indian economy. In addition to playing a crucial role in providing large employment opportunities at comparatively lower capital cost than large industries, SMEs also help in industrialization of rural and backward areas. Theirs is thus an invaluable contribution towards reducing regional imbalances, and assuring more equitable distribution of national income and wealth. Playing a complementary role to large industries as ancillary units, this sector is contributing enormously to the socio-economic development of the country (see https://msme.gov.in/about-us/about-us-ministry for more details). Also significant is their "contribution in domestic production, significant export earnings, low investment requirements, operational flexibility, location wise mobility, low intensive imports, capacities to develop appropriate indigenous technology, import substitution, contribution towards defence production, technology-oriented industries, and competitiveness in domestic and export markets thereby generating new entrepreneurs by providing knowledge, training and skill development" (Subina 2015, https://msme.gov.in/about-us/about-us-ministry).

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Over the years, the share of MSMEs in total manufacturing export has risen to a healthy level of over 40%. The "sector contributes significantly to manufacturing output, employment and exports of the country. In terms of value, the sector accounts for about 45% of the manufacturing output and 40% of total exports of the country. It is estimated to employ about 60 million persons in over 26 million units throughout the country. There are over 6000 products ranging from traditional to high-tech items, which are being manufactured by the MSMEs in India. It is well known that the MSME sector provides maximum opportunities for both self-employment and wage-employment, outside agriculture sector" (Ministry of Micro, Small & Medium Enterprises 2007).

The MSME sector in India is highly ***heterogeneous*** in terms of the size of the enterprises, location, variety of products and services, people employed, coverage of social sector, and leveraging information, communication and technology (ICT) in running their enterprises (Intellectual Capital Advisory Services Private Limited 2012). "MSME sector contributes not only to higher rate of economic growth but also in building an inclusive and sustainable society in innumerable ways through creation of non-farm livelihood at low cost, balanced regional development, and gender and social balance" (Ministry of Micro, Small & Medium Enterprises 2007).

In his seminal paper on the mechanics of economic development, Lucas (1998) observed that "…the problem of economic development…" is "… simply the problem of accounting for the observed pattern across countries and across time in levels and rates of growth of per capita income". While this definition addresses explicitly the issue of comparative economic development of countries, it is equally relevant for the comparative study of development of regions within a given country, especially so far a country as large as India, which is easily viewed as a collection of interconnected sub-economies, viz, the states which comprise the country needs, so to speak, to be studied both from without as well as within (Dasgupta 2000).

Methodology in brief

The study is carried out with three objectives in mind: The first intention is to have a detailed picture of the extent of diversity in MSME spread having a glance of various salient economic attributes contributing to the spread, its growth trends and scenario emerging from one time to another. We then find the relative levels of capital and employment as two major contributing factors of MSME spread and its growth. As corollary of the capital, and employment endowments and changes therein, the inter-state differentials emerged and changed from one census of MSME Sector to another.

Secondly, an analysis of the manner change in disparity over time is carried out. In view of the fact that during the period of convergence, the value of the state relative in base year and the percentage change or growth rate, i.e., Compound Annual Growth Rate (CAGR) of the same over time will move in opposite direction (converse is true, in case of divergence), the coefficients of correlation are computed

between the initial year value of the state relative and CAGR during initial and subsequent year (this way correlation is established: first census value and CAGR between first and second census value, second census value and CAGR between second and third census value and so on) are compared to have an inter-temporal changes in regional disparities.[1]

The paper also attempts to explain the changing tendencies of inter-state differentials with respect to different state values emerging. In doing so, it seems logical to consider a few infrastructure and institutional factors (including government initiatives) as possible explanatory variables.

The very first steps in the search for a clue lie in observations, i.e. in establishing whether the regions in question are truly diverse from the economic point of view. To the extent that economic development is largely concerned with per unit accumulation, this conclusion follows from the law of diminishing returns to capital. Sustainable growth rates fall as the capital stock expands relative to other factors, thereby allowing poorer regions to catch up with richer ones over time. Although the hypothesis has been questioned and subsequently modified, it has turned into an important point of departure for most investigations on inter-regional diversities.

As with most other recent studies on the subject, the investigation begins with references to the convergence hypothesis. The findings here are similar in certain respects to previous contributions. However, our convergence analysis differs from these in certain other important respects. For one thing, the data used in the paper is probably detailed/cleaner than that utilised by some of the existing papers. More importantly, the convergence analysis pursued here is more disaggregative in nature. For example, we attempt to provide a clear picture of the behaviour of the labour quotient (LQ henceforth, measured as ratio of employment share to working unit share), labour productivity (LP henceforth, measured as production turnover per unit employment), capital quotient (CQ henceforth, measured as ratio of capital share to working unit share) and Capital-labour ratios (CLR henceforth) to try to draw conclusions about the contribution to the overall convergence/divergence by each of these variables.

In the explanation to differentials and its convergence and divergence tendencies, a multi-dimensional factorial analysis in terms of relative convergence/divergence between states is attempted in terms of infrastructural development, government policy initiatives and other correlated factors (clustering of MSMEs, Technology/Innovations levels, access to credit facility).

[1]The issue here is more controversial than one might suppose. For example, a time honoured evidence of divergence amongst regions lies in observed differences in growth rates in labour and capital employed per unit. So, the so-called convergence hypothesis raised doubts on this score (Barro and Sala-i-Martin 1995). Following the dictates of the neo-classical growth model (Solow 1956), it claims that, two regions differing mainly in the levels and growth rates of economic attributes in question may actually be approaching closer, provided that the lower growth rate region was richer than the higher growth rate regions at some initial point of time.

Objectives:

The purpose of the present paper is to offer analytical description of the manner in which the Indian states have behaved vis-a-vis one another over the different Censuses carried out since the first one in 1972–73, and second census in 1987–88, in particular. The paper also aims to find out the main factors causing differential growth of MSME in the states (Table 1).

2 Regional Differentials

We have carried out our study using data from MSME Censuses conducted by Directorate of Census-MSME (DC-MSME).[2] The second census of small scale industrial units under the purview of Small Industries Development Organisation (SIDO) was undertaken by the Office of Development Commissioner, Small Scale Industries (DCSSI) in association with State/UT Governments and National Informatics Centre (NIC), during the period 1989–1991. Data collected relate to the base year (1987–88), field work for which commenced in right earnest from April 1990. The aspects on which information was collected included employment, investment, working capital, capacity, production, exports, raw materials, energy consumption, etc. "Third All India Census of Small Scale Industries (SSI) was conducted with reference year 2001–02. The Census covered both Registered and Unregistered Sectors for the first time. The census adopted different methodology for Registered and Unregistered Sectors. While complete enumeration of enterprises was adopted in Registered Sector, Sample Survey was resorted to in Unregistered Sector. The latest census conducted on Micro, Small and Medium Enterprises (MSME) is the Fourth All India Census of MSME 2006–07. The data was collected till 2009, results of which were published in 2011–12. The census adopted different methodology for Registered and Unregistered Sectors. While complete enumeration of enterprises was adopted in Registered Sector, Sample Survey was resorted to in Unregistered Sector. However, for activities under Wholesale/Retail trade, legal, educational and social services, hotel and restaurants, transports and storage and warehousing (except cold storage), which were excluded from the coverage of Fourth All India Census of MSME 2006–07, data was extracted from Economic Census 2005 conducted by Central Statistics Office, Ministry of Statistics and Programme Implementation for finalising the report on MSME Sector" (http://www.dcmsme.gov.in/ito_msme/censuses.htm).

There are significant geographical variations in India that impact the distribution of micro, small and medium enterprises. International Finance Corporation (2012) split the states in India into three broad regions based on the availability of natural

[2]But as the first census conducted in 1972–73 was not a complete census of all organised and unorganised units, for comparison purpose, the paper uses data and statistics of second (1987–88), third (2001–02) and fourth (2006–07) censuses.

Table 1 Terms used in paper and what they signify

Sl. no.	Term	What they signify
1.	LQ—Labour quotient	Ratio of employment share to working unit share in a state
2.	CQ—Capital quotient	Ratio of capital share to working unit share in a state
3.	CLR	Capital-labour ratio
4.	LP	Labour productivity
5.	LI—Labour intensity	Employment per unit
6.	CI—Capital intensity	Capital per unit

resources and other regional characteristics as also the type of an enterprise and scale of operations. The three categories are: 1. Low-Income States (LIS[27])—Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh, 2. North-eastern States (NES)—Assam, Arunachal Pradesh, Nagaland, Manipur, Meghalaya, Mizoram, Tripura and 3. Rest of India—All states other than Low Income States and North-eastern States (Intellectual Capital Advisory Services Private Limited 2012).

Our analysis is primarily based on MSME Censuses. There are large differentials in the spread of MSMEs across States according to the fourth Census, as the below table indicates. On the one hand the large number of states (16) have less than one percent of enterprises, six have one to three percent share of total enterprises. Bihar, Odisha, Punjab and Rajasthan have 3–5% of enterprises, while Gujarat Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh have between five and seven percent of enterprises. Four states that have large number of MSME enterprises (8–12%) are Maharashtra, Tamil Nadu, Uttar Pradesh and West Bengal. Similarly, 17 states have less than 1% of employment share, as against 20 states have less than one per cent investment share. In five states, employment as well as investment lies between 1 to three percent of the total. While five states have employment between 3 and 5% of total employment in MSME sector in the country, four states have 3–5% of total investment. Only three states, namely, Gujarat, Karnataka, and Kerala have between five and seven percent of employment and state of Maharashtra provide employment to almost 8.70% of labour, three states, namely, Tamil Nadu, Uttar Pradesh and West Bengal provide employment to more than 10% people. So far as investment is concerned, UP has 8.27% share, Maharashtra 10% while Gujarat more than 24% of investment (Table 2).

In the above context of wide variation in the number of enterprises, employment and investment, for better understanding of the spread of MSMEs particularly with respect to employment and investment, the, coefficients of localisation and the coefficient of specialisation have been calculated. The various *coefficients* that have been developed to quantify degrees of *specialisation* or diversification generally involve simple manipulations of profiles of proportions (e.g. *coefficients* includes those measures that are determined for each unit of analysis e.g. for all of the regions).

Table 2 Number of units shares, employment and investment share among states as per fourth census (2006–07)

Sl. no.	States/UTs	No. of working units share	Employment share	Investment share
1.	Andaman and Nicobar Islands	0.04	0.05	0.01
2.	Andhra Pradesh	7.15	8.78	4.83
3.	Arunachal Pradesh	0.39	0.15	0.14
4.	Assam	1.82	1.77	1.02
5.	Bihar	4.05	3.51	1.24
6.	Chandigarh	0.14	0.15	0.09
7.	Chhattisgarh	1.43	1.18	0.49
8.	Dadra and Nagar Haveli	0.02	0.05	0.03
9.	Daman and Diu	0.02	0.05	0.28
10.	Delhi	1.52	2.46	1.50
11.	Goa	0.24	0.23	0.56
12.	Gujarat	6.00	5.93	24.56
13.	Haryana	2.39	2.34	3.83
14.	Himachal Pradesh	0.79	0.58	0.82
15.	Jammu and Kashmir	0.85	0.71	1.25
16.	Jharkhand	1.86	1.60	0.74
17.	Karnataka	5.56	5.80	4.00
18.	Kerala	6.10	6.16	6.53
19.	Lakshadweep	0.01	0.01	0.00
20.	Madhya Pradesh	5.33	4.18	1.55
21.	Maharashtra	8.44	8.70	10.01
22.	Manipur	0.25	0.29	0.10
23.	Meghalaya	0.24	0.24	0.07
24.	Mizoram	0.08	0.10	0.06
25.	Nagaland	0.11	0.21	0.19
26.	Odisha	4.34	4.13	0.19
27.	Puducherry	0.10	0.13	0.17
28.	Punjab	3.99	3.33	5.47
29.	Rajasthan	4.59	3.82	3.75
30.	Sikkim	0.05	0.10	0.01
31.	Tamil Nadu	9.13	10.06	11.46
32.	Tripura	0.27	0.22	0.10
33.	Uttar Pradesh	12.13	11.47	8.27
34.	Uttarakhand	1.03	0.86	0.89
35.	West Bengal	9.55	10.65	5.81

The location coefficient of employment of a state is the ratio of share of total employment in MSME sector in a state over the share of total MSME enterprises in the state.

Atypically, Industry Location Quotients are calculated by comparing the industry's share of regional employment with its share of national employment. Herein we computed States' labour and capital share vis-avis States' enterprise share to understand relative employment to units' ratio in a state versus other states, as also while carrying out the same exercise over censuses whether this ratio is going up or down. A similar exercise with respect to capital provides whether units in one state are more capital intensive than others and how the capital intensity in a state going up or down.

"Spatial distribution could indicate patterns of underlying process. Incidents exposed to the impact of similar process tend to follow similar locating pattern. Hence, study on spatial cluster could reveal information about the underlying geographical process that generates the spatial pattern, which can further aid the comprehension of underlying geographical process and its relationship with the phenomenon under investigation" (Lu 2016). As we do not have sufficient time series information for all the states, such cluster analysis is not possible. To study the concentration in the state hence, Hirchman Herfindahl Index has been constructed for the different censuses. The index is computed for the labour and capital per enterprise using equation

$$\mathrm{HHI} = \sum_{(i=0)}^{n} P_i^2 / 100 \tag{1}$$

where P_i = percentages are of the ith state to the total.

HHI constructed for an investment across states in different censuses present an upward trend ever since second census while labour HHI is experiencing a fall, and so also to certain extent, the number of enterprises (Fig. 1; Table 3). The trend clearly indicates capital stock compilation and concentration in some states while employment is much more diversified since second census. So far as number of enterprises is concerned, there are fluctuating trends with overall decline signifying overall diversification (non-concentration) of enterprises across states over the censuses.

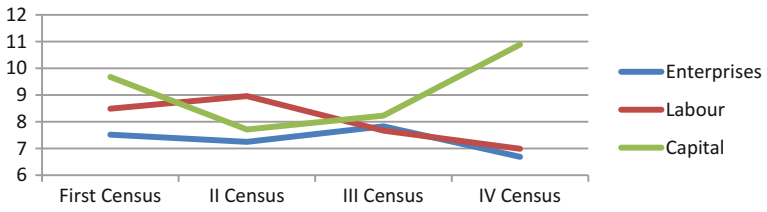

Fig. 1 Trend of HHI with respect of number of enterprises, labour and capital: first to fourth census

Table 3 HH index with respect to labour employed, investments, enterprises in different censuses

States	Enterprises	Labour	Capital
First census	7.52	8.49	9.68
II census	7.25	8.96	7.71
III census	7.83	7.67	8.23
IV census	6.69	6.99	10.89

Alternatively, the ***coefficient of specialization*** measures the degree to which a local or a regional economic system specializes in one or more economic sectors compared to the regional or the national economy (Rodrigue 2017). A value of zero denotes no *specialization* of the economy under study (compared to the reference economy).

$$\mathrm{SI} = \sum_i t_i^2 \Big/ \left(\sum_i t_i\right)^2 \tag{2}$$

where, t_i is share of employment per enterprise.

It is the total of squares of share of employment per enterprise in a state over the square of total employment per enterprise in the country as a whole. So, if the specialization index tends toward 1, such a result indicates that the terminal is highly diversified. If, inversely, the index tends toward 0, it means that the terminal's activity is specialized. Thus, the specialization index is called upon to appreciate the degree of specialization/diversification (Comtois 2017).

States/UTs	LSQ	CSQ
I census	0.04	0.06
II census	0.01	0.06
III census	0.14	0.08
IV census	0.07	0.14

LSQ (Specialisation coefficient of labour) has fallen from third census, but we found a gradual rise in CSQ (specialisation coefficient of capital), more rapid rise during third to fourth census.

Matching States quotient of Labour and Capital

So far as the relative coefficients of localisation of capital (CQ) and labour (LQ), the two major factors of production, namely, is concerned, the two coefficients have been juxtaposed in the following table to mark

1. Whether the two coefficients differed for different states, that is analysis pertaining to over different censuses, how were the values of LQ and CQ for different states varied; and
2. If there was a matching pattern of coefficients: that is, how across states LQ distribution is related with CQ distribution.

Table 4 K–S—Statistics for status of states* in terms of LQ and CQ in second, third and fourth census

States/UTs	Second census	Third census	Fourth census
	LQ versus CQ	LQ versus CQ	LQ versus CQ
D	0.17241	0.08600	0.31429
Critical Value	0.25255	0.22988	0.22988

*Status of states is 0: if value is less than Mean − 0.75 Std Dev
1: if value lies between Mean − 0.25 Std Dev to Mean − 0. 75 Std Dev
2: if value lies between Mean − 0.25 Std Dev to Mean + 0.25 Std Dev
3: if value lies between Mean + 0.25 Std Dev to Mean + 0.75 Std Dev
4: if value lies more than Mean + 0.75 Std Dev

We would be dealing the second question first that is to look into distribution pattern of CQ and LQ across states, and how the distribution pattern changed over time (over Censuses). For this, we used The Kolmogorov Smirnov D statistics. The Kolmogorov Smirnov D statistics defined as the maximum value of the absolute difference between two cumulative distribution functions measures the overall difference between two cumulative distribution functions (Table 4).

$$D = \max\ -\infty < x < \infty |\mathrm{SN1}(x) - \mathrm{SN2}(x)| \tag{3}$$

For comparing two different cumulative distribution functions SN1(x) and SN2(x), the K–S statistic indicates that there was not much of difference in the two coefficients during second and third census as the maximum difference value 'D' was below the critical value. But the fourth census atypically denotes a significant deviation from earlier two censuses as the 'D' has been found to be more than the critical value indicating localisation coefficients of labour distribution significantly differentiated from localisation coefficient of capital during the census.

Attempting analysis pertains to 'Whether the two coefficients differed for different states, that is analysis pertaining to over different censuses, how were the values of LQ and CQ for different states varied'.

(a) Spatial Cluster

"Spatial distributions with values at certain locations showing relationship with values at other locations are named spatial autocorrelation" (Lu 2016). Spatial cluster is positive spatial autocorrelation when similar values are spatially clustered together. On the opposite is the distribution with similar values separated/dispersed from each other, which is called negative spatial autocorrelation (Boots and Getis 1988; Lu 2016). For finding out spatial auto-correlation, co-variance is found out to LQ Values of different states as well as CQ Values of different states, in different censuses.

Changing Inter-state Differentials in LQ and CQ:

It is found that there is marked change in third and fourth census, particularly in fourth census with more states lying in categories of high labour-low capital or low capital-high labour. Thus in a way regional imbalances are on increase in the last census. A cross-check of states 'position on two factors of production' indicates the following:

States such as Maharashtra, T.N., Punjab, and Haryana had all high CQ and high LQ in the III Census; in the IV Census, all the four states had low LQ though high CQ. There was a major shift noted in case of Punjab and Haryana from II Census to III census, as these states shifted from low LQ and low CQ in II Census to high CQ and high LQ in the III Census. Another state which also was lying in low LQ and low CQ in II and III census but high CQ and high LQ in the last IV Census was J and K (refer Annexure).

A significant and notice worthy correlation trend between capital—labour ratio and labour productivity was found amongst three categories of states, viz. (1) High capital—low employment, states, (2) Low—capital and High labour states, and (3) other states. States with high capital and relatively low labour share, category 1 states, In this case the Pearson Correlation coefficient values between labour productivity and capital labour ratio '*r*' during fourth census was found to be 0.2313 (*T*-test value is 4.55076E−05). The value of '*r*' has declined from earlier period when it was 0.445522254 (*T*-test value being: 0.001180141). Correlation coefficient values between labour productivity and capital labour ratio are not only low but also have fallen from 0.44 in 2001–02 to 0.21 in last Census of MSME. These are the States of Maharashtra, Tamil Nadu, Punjab, Haryana, Jammu and Kashmir, and Pondicherry with high capital and relatively less labour share, which further could be significantly differentiated in terms of states having '*r*', value declining means as capital to labour ratio going up, labour productivity declining (This was indicative of capital—under use).

Second category of states, States with low capital but relatively high labour with the Pearson correlation '*r*', value 0.7764 (*T*-test value is 1.60626E−06) also experienced a decline from earlier period when it was 0.869747955 (*T* test value being: 0.002207113). Most of North East states and States of M.P, Chhattisgarh, Jharkhand are in this category. Herein, the correlation value between capital-labour ratio and labour productivity has been almost nearly 0.80 (declined marginally from 0.86 to 0.81).

For rest of the States: In this case the Pearson correlation '*r*' during fourth census was found to be 0.7989. *T*-test value is 0.00115622. The value of *r* has declined from earlier period when it was 0.835782715 (*T* Test value being: 2.53069E−06). Other states too have positive '*r*' and declining trend. Again '*r*' value is found to be nearly 0.80.

It is also noted that Pearson correlation '*r*' value between labour productivity and capital labour ratio differed significantly across states lying in three categories led us to make enquiry into the convergence and divergence trends in labour productivity among states (Fig. 2).

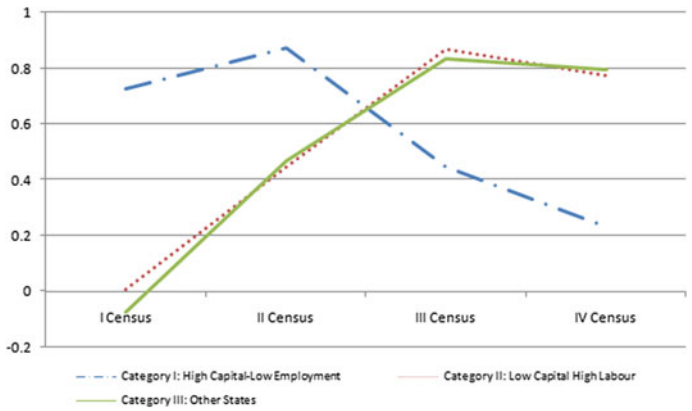

Fig. 2 Value of '*r*' capital-labour ratio as related to labour productivity trend for three types of states

3 Convergence and Divergence Trends: Changing Disparity Over Time and Its Correlates

The literature on disparities across Indian states is relatively scanty. Sarker (1994) studies the link between regional imbalances and plan outlays. He discovers a strong link between development (measured in terms of 14 variables including per capita consumption of electricity, percentage of villages electrified, per capita expenditure on health, effective literacy rates, etc.) and the plan outlays for the different states. He employs principal component analysis to construct a composite index of development according to which Punjab scores the highest and Bihar the lowest. The analysis is based on a study of 15 Indian states. Dholakia (1994) concludes in terms of a study of 20 Indian states over the period 1960–61 to 1989–90 that there are marked tendencies of convergence of long-term economic growth rates for the states. He identifies 1980–81 to the year of break in the trend of real incomes of India states. Several of the laggard states started growing after this date while the leaders began to stagnate (Dholakia 1994). Cashin and Sahay (1996) too claim absolute convergence on the basis of data relating to 20 Indian states over the period 1961–91, at the same time that the dispersion of real per capita income increased during the period. The present study seems to support the observations of Dholakia and Cashin and Sahay. In our analysis it is found that growth-differentials among regions prevail, as testing of tendencies of convergence/divergence according to Solow model gave us the following results.

Solow Model of Convergence and Factor Mobility:

$$\text{Standard Solow Model: } sf(k^*)/k^* = n \tag{4}$$

where

s saving rate (herein, Capital Investment per enterprise)
k^* steady state capital stock (herein, Capital-Labour Ratio)
n rate of growth of population (herein, Enterprises).

Long run growth implication of (1) is the labour productivity is constant over the long run when technological growth is determined (or restricted to) endogenously. So far as growth rates are concerned, Solow model states the countries with differential capital-labour ratio will follow differential growth paths. Country having lower labour productivity will grow at a faster rate. Negative correlation between LP in 2001–02 and growth rate during 2001–02 to 2006–07 (third and fourth census) proves that. In fact it is found that the correlation coefficient is −0.071 between the two.

Thus the states with higher LP in Third Census had lower growth of labour productivity subsequently and vice versa. So far as LP is concerned it is found that LP growth rate (that LP growth during third to fourth census) is again negatively correlated with Initial labour per enterprise (labour intensity, henceforth LI) values, that is LP level in a state in the third census. Interestingly LQ growth rate too is negatively varying with initial level of LQs.

Thus, over time the regions would converge in terms of LP as well as LI and LQ: Negative '*r*' values for LQ depicted a mobility of labour from one state to another, from state with lower LQ in third to have more LQ growth, and those with higher values in third census to have lower growth during third to fourth census. Simultaneously, negative '*r*' values for labour intensity with respect to Labour intensity growth again reflect inter-firm mobility. *This is to equivalent to saying that from the states where per enterprise employment was more (alternatively, less), there is a mobility to the states with lower (alternatively, higher) average employment per enterprise indicating a convergence with respect to enterprise level employment. In the same way, the states having higher share of employment compared to enterprise share tend to move to lower share of employment compared to enterprise share, and* vice versa*. This again reflects state-level convergence.*

However, as regards per capita income across states conclusions opposed to ours are reached by Raman (1996), as well as Ghosh et al. (1998). They report significant divergence across Indian states. Marjit and Mitra (1996) raise an interesting question with regards to productivity, however, in the presence of perfect factor mobility (as should be the case between Indian states, reflected from our above analysis), they wonder how far the predictions of the convergence hypothesis are valid as then technologically similar regions must instantaneously achieve equality of labour productivity, thus removing any possibility of differential growth rates. Thus, the absence of imperfect factor mobility is a necessary condition for the

convergence theory to hold. Alternatively, in the presence of factor mobility, differential growth rates across regions do not imply convergence (on account of diminishing returns). In other words, even if a negative relationship between initial per capita income and the overall growth rate is observed, it may not indicate convergence.

Our study does not seem to support the view of diminishing returns however. That is to say, study reflects a more or less static return to capital. This is attempted through comparing the growth of CQ as well capital per enterprise (capital intensity, (henceforth CI) values between the last two censuses (third and fourth census) against the growth of turnover per enterprise (production quotient, henceforth PQ) in the duration. Pearson coefficient value 0.96 in case of CQ and 0.68 in case of CI indicate almost unilateral growth though the relationship was insignificant as *P*-values was much more than required 0.15.

It is found that growth in production vary in tandem with growth in capital share to the units share, that is, higher is the production growth, capital share to the units share is higher, and vice versa. This is not only perceptible, over two periods, growth in fourth census over third census but also across states within a census. And thus, the observed convergence reported on basis of Tables 5 and 6 do not seem to support a perfect labour or capital mobility.

Table 5 Correlation between LP in 2001–02 and growth rate during 2001–02 to 2006–07

T-test: paired two sample for means	LP in 2001-02 and growth rate during 2001–02 to 2006–07
Pearson correlation	−0.071583374
t stat	6.242531132
$P(T <= t)$ one-tail	2.08916E−07
$P(T <= t)$ two-tail	4.17833E−07

Table 6 **a** Labour intensity in III census versus labour intensity growth third to IV census. **b** LQ in III census versus LQ growth during third to fourth census

(a)	
	Labour intensity in III census
Pearson correlation	−0.6289
t stat	8.679036
$P(T <= t)$ one-tail	1.93E−10
$P(T <= t)$ two-tail	3.85E−10
(b)	
T-test: paired two sample for means	
	LQ in III Census
Pearson correlation	−0.62883
t stat	6.724959
$P(T <= t)$ one-tail	5.81E−08
$P(T <= t)$ two-tail	1.16E−07

Table 7 **a** CQ versus PQ. **b** CI versus PQ

(a)	
Correlation	CQ
Pearson correlation	0.957786031
t stat	0.267591207
$P(T <= t)$ one-tail	0.395315324
$P(T <= t)$ two-tail	0.790630648
(b)	
T-test: paired two sample for means	
	CI
Pearson correlation	0.678495
t stat	−1.82309
$P(T <= t)$ one-tail	0.03868
$P(T <= t)$ two-tail	0.07736

Another way to prove inter-unit returns was: To check production growth versus change in capital per enterprise, CI per se, across the states as well as change in two parameters between third and fourth census. A double differential equation is determined to understand β-convergence that is if there exist diminishing returns to capital per enterprise growth (Table 7).

Growth in production also varied positively with growth in capital share per unit, indicating higher production growth as the capital per unit was higher, and vice versa.

Convergence relative to states specific steady states

The total factor productivity growth (TFPG) in a large number of industries seems to have improved across most of the states. Technology acquisition, efficient utilisation of resources and infrastructure development are some of the factors which possibly contributed to the increase in TFPG (Mitra 1999). Nagaraj et al. (1997) considered the growth performance of Indian states on per capita SDP during the 1960–94 period and found evidence of conditional convergence, i.e., convergence relative to states specific steady states. They also assess the contribution of various indicators of physical, economic and social infrastructure to growth trends. Compared to this, our viewpoint is rather mundane. In fact the present study analyses the LP convergence across states with state specific initial levels of CLR (Table 8).

A negative '*r*' value between initial state CLR and LP growth between initial (third census) and final (fourth census) indicates some sort of non-convergence, that is, the states having high level of CLR does not have high productivity and those with low CLR low LP growth. There seems rather an inverse trend. Despite higher CLR, LP declines and vice versa. A similar trend was observed while comparing LP growth and steady state CI, that is, a negative relationship is found that between LP growth with initial CI values that is if initial level of CI is more, LP growth is less and vice versa.

Table 8 **a** '*r*' between CLR and LP growth. **b** '*r*' between CI and LP growth

(a)

'*r*'	Labour productivity changes III and IV census	CLR III census
LP changes between III and IV census	1	
CLR III census	−0.29584	1
Pearson correlation	−0.297566632	
t stat	−9.112016681	
$P(T <= t)$ one-tail	7.8771E−11	
$P(T <= t)$ two-tail	1.57542E−10	

(b)

	LP growth III to IV census	CI in third census
Mean	−0.657788757	2.360084192
Variance	0.048932488	11.49218739
Pearson correlation	−0.116374189	
df	33	
t stat	−5.141112355	
$P(T <= t)$ one-tail	6.08424E−06	
$P(T <= t)$ two-tail	1.21685E−05	

In particular, we have not been able to come to any definite way of establishing or rationalising the existence of the state specific steady states (see in this connection Quah 1993).

Rao et al. (1999) analyses the issue of inter-state variation in growth, from perspective of studying not only the convergence but also examining the reasons for the observed pattern. However, they found the states to follow divergent growth paths, which they try to explain in terms of other variables besides the initial level of capital per enterprise. As our analysis, indicates, a consensus is yet to emerge on the convergence issue relating to the Indian states. It is therefore worth our while to take a fresh look into the question.

Behaviour of Growth Rates

We begin our analytical description with growth rates enjoyed by the respective states overtime. Interestingly enough, even for a straightforward issue such as this, there seems to be no unique way of examining the matter.

While the growth rate of LP, on an average, appears to be around 0.065%, most of the North East states had lower growth of employment than the national overall growth excepting for States of Arunachal Pradesh and Nagaland. All the states in extreme North, Jammu and Kashmir, Punjab, Haryana and Himachal Pradesh had higher growth of employment than National overall. Other states having more than

national employment growth were Goa, Dadra and Nagar Haveli, Kerala, Rajasthan and Pudduchery. Thus out of total 20 big states, other than the four on North, only three states Goa, Rajasthan and Kerala had more employment growth than all-India. As against the above growth, CLR growth was higher for some more states such as Chandigarh, Delhi, Maharashtra, Odisha, Tripura, Uttar Pradesh and West Bengal too. CQ growth also was negative in 17 out of 21 major states. A disturbing feature is that for almost all the states, LP growth was negative in the last census from previous one. There was a decreasing tendency throughout in 14 out of 22 major states with intermittent growth rates in rest.

So far as CAGR of LP, CQ and CLR are concerned, LP has had a negative growth rate in all major states excepting for Kerala. Gujarat had a much higher CAGR (0.42) compared to any other state followed by Kerala (0.20), Tamil Nadu (0.18), further by J and K (0.13), Himachal Pradesh (0.12). The only other states having positive CAGR of CQ are Jharkhand (0.06) and Karnataka (0.01).

Clearly so, the liberalisation of economy has had a special impact on the growth rates of all states. This observation leads one to expect that the capital investment should have played a significant role in the development of the states post-liberalisation. It is tempting to conjecture that the states which performed better in terms of the growth rates in LP, were perhaps better off in terms of their CQ and CLR levels. This conjecture though receives some support from the results reported but the analysis of the growth rates by computing the Census-to-Census growth rates for each state/union territory brought forth the facts: first, there are large fluctuations in these rates for each state (as reflected from Coefficient of Variation (henceforth CoV) of the CAGR of LP, CQ and CLR, (Refer Table 11), and secondly there is no state which did not experience a negative LP growth rates, during third to fourth census (Refer Table 9). To highlight these findings and to sharpen our understanding of the fluctuation in, the overall growth rates for each state (from first to fourth census: Refer Table 10) is brought out along with the standard deviation of growth rates between one census to next census across states, and so also the coefficient of variations of growth rates, and the maximum and the minimum CAGR (Table 11).

Correlation of LP CAGR with CAGR of CQ and CLR in nutshell proves that the states which performed better in terms of the growth rates in LP, were also better off in growth rates of CQ and CLR. But as the P-value for the CQ was more than 0.15, it was concluded that only CLR had a positive and significant correlation with LP growth rate. Hence, the developments post 2000s brings forth some positive

Table 9 CAGR of LP, CQ and CLR over censuses: states wise

States/UTs	Growth rate I and II census	Growth rate II and III census	Growth rate III and IV census	Growth rate I and II census	Growth rate II and III census	Growth rate III and IV census	Growth rate I and II census	Growth rate II and III census	Growth rate III and IV census
	LP			CQ			CLR		
Andhra Pradesh	0.182	0.088	−0.296	0.02	0.04	−0.17	0.09	0.21	−0.32
Assam	0.145	0.125	−0.288	0.03	−0.05	−0.04	0.11	0.14	−0.22
Bihar	0.099	0.122	−0.262	−0.02	−0.02	−0.08	0.09	0.19	−0.32
Chhattisgarh			−0.197			−0.08			−0.31
Gujarat	0.140	0.039	−0.128	0.02	−0.06	0.42	0.09	0.14	0.13
Haryana	0.148	0.113	−0.194	−0.01	0.05	−0.02	0.10	0.18	−0.16
HP	0.184	0.135	−0.105	0.07	−0.01	0.12	0.13	0.14	−0.09
J and K	0.133	0.137	−0.114	0.04	0.00	0.13	0.14	0.17	−0.10
Jharkhand			−0.154			0.06			−0.14
Karnataka	0.152	0.063	−0.141	0.00	−0.03	0.01	0.10	0.14	−0.20
Kerala	0.142	0.055	0.000	0.00	−0.06	0.20	0.13	0.13	−0.07
M P	0.170	0.079	−0.235	−0.06	0.02	−0.01	0.08	0.16	−0.26
Maharashtra	0.162	0.078	−0.225	0.02	0.01	−0.17	0.09	0.20	−0.26
Odisha	0.148	0.137	−0.331	0.04	0.01	−0.50	0.11	0.18	−0.56
Punjab	0.137	0.123	−0.170	0.00	0.05	−0.03	0.10	0.20	−0.17
Rajasthan	0.163	0.124	−0.250	0.03	0.04	−0.10	0.12	0.19	−0.24
Tamil Nadu	0.122	0.062	−0.089	0.02	−0.05	0.18	0.10	0.14	−0.05
Uttar Pradesh	−0.117		−0.239	0.01	−0.01	−0.06	−0.14		−0.27
Uttarakhand			−0.136			0.00			−0.25
West Bengal	0.117	0.154	−0.333	−0.03	0.05	−0.12	0.07	0.22	−0.27

results on account of labour productivity as capital vis-a-vis labour grows, though localisation of more capital does not indicate the same, significantly.[3,4]

Looking at the CoVs and the maximum and the minimum rates, we find large fluctuations among states in growth rates of LQ, CQ and LP. The fact that there could be alternative ways of calculating the growth rate of a variable over a given period of time and that one may arrive at divergent results depending on the formula used need emphasis. This preliminary investigation makes it evident that one should not hope to discover much homogeneity among the Indian states. Keeping this in mind, we proceed to investigate the convergence question a la Barro and Sala-i-Martin.

Another Analysis: α and β-Convergence

α-Convergence: As is well know, the concept of α-convergence does not relate directly to the growth rates of economies. Instead, it focuses attention on the

[3]In fact while correlating the LP with other variables like Location quotients of a Capital or Labour and lagged CLRs we found that P-value for the three censuses for all the relevant factors was observed to be much more than 0.15, we had to reconsider only the factors meeting criteria of *P*-value to be less than 0.15 and thus the above conclusion.

	Coefficients	**Standard error**	***t* stat**	***P*-value**
II census				
Intercept	4.57286104	0.67565688	6.76802258	5.3239E−07
CQ	0.84228019	0.70996803	1.18636355	0.24709074
CLR	−6.994E−05	5.0131E−05	−1.3951657	0.17574369
EQ	−0.3827057	0.77988853	−0.4907184	0.62808254
III census				
Intercept	5.42172098	0.40891236	13.2588827	2.4493E−13
CQ	−0.1102718	0.19778228	−0.5575414	0.58175107
CLR	3.2557E−05	2.0202E−05	1.61155858	0.11868795
EQ	0.01705631	0.01858035	0.91797585	0.3667595
IV census				
Intercept	3.818958	0.463308	8.242807	3.35E−09
CQ	−0.12369	0.147595	−0.83804	0.408637
CLR	1.9E−06	1.65E−06	1.147608	0.2602
EQ	0.58855	0.252571	2.330241	0.026709

[4]MitraArup and Prakash Singh, 'Trade liberalisation enhances productivity and wages at the aggregate level, and also in the case of basic goods and capital goods. However, in an attempt to raise productivity, firms may extract more work from those who are already engaged, and tend to pay them less than their due share in certain industry groups. Contractualisation and feminisation show similar effects for all the industry groups except the intermediate goods industries, and has a worsening effect on wages and also productivity'. Explanations Based on India's Industrial Sector: Why Wage Differences Exist across Sectors? Economic and Political Weekly, Vol. 51, Issue No. 38, 17 Sep, 2016).

Table 10 Overall growth rates between first and fourth census (1972–73 to 2006–07)

States/UTs	Overall growth rate			
	LP	EQ	CQ	CLR
Andhra Pradesh	0.061	0.01188	−0.00285	0.125
Arunachal Pradesh	0.087	−0.04021	0.03265	0.160
Assam	0.064	−0.00117	−0.01326	0.105
Bihar	0.049	−0.00383	−0.02764	0.113
Chandigarh	0.059	0.00802	−0.02447	0.116
Dadra and Nagar Haveli	0.119	0.01238	−0.00517	0.151
Delhi	0.059	0.01211	−0.00934	0.145
Goa	0.104	0.00053	0.01941	0.119
Gujarat	0.056	0.00034	0.03498	0.096
Haryana	0.079	0.00278	0.00971	0.114
Himachal Pradesh	0.121	0.02353	0.03974	0.111
Jammu and Kashmir	0.098	0.00203	0.03437	0.131
Karnataka	0.069	0.00219	−0.01029	0.101
Kerala	0.086	−0.01555	0.00412	0.112
Madhya Pradesh	0.066	0.00540	−0.01681	0.102
Maharashtra	0.064	−0.00722	−0.01431	0.120
Manipur	0.047	0.02021	−0.05319	0.059
Meghalya	0.054	0.01376	−0.02594	0.089
Mizoram	0.064	0.03315	−0.05168	0.019
Nagaland	0.080	0.02378	0.01755	0.137
Odisha	0.060	0.00256	−0.07596	0.122
Puducherry	0.120	0.01645	0.02019	0.109
Punjab	0.084	0.00267	0.01668	0.124
Rajasthan	0.079	0.01251	0.01609	0.127
Tamil Nadu	0.066	−0.00089	0.00949	0.098
Tripura	0.063	0.00950	−0.00453	0.127
Uttar Pradesh	0.065	−0.00312	−0.00915	0.123
West Bengal	0.054	0.00129	−0.01029	0.116

dispersion of per enterprise outputs over a cross-section of economies at each point of time. The economies are said to satisfy the condition of α-convergence if this dispersion decreases over time (EER 2017). A homogeneous group of sub-economies, such as regional subgroups within a national economy, are less likely to differ from each other on account of differences in parametric specifications or random causes. Consequently, they are expected to be α-convergence. This however, is not borne out by the Indian states.

Table 11 CoV, mean standard deviation, maximum and minimum of CAGR between censuses

CAGR	Particular	LP	CQ	CLR
Between I and II census	Mean	0.1411	*0.0189*	*0.0904*
	Standard deviation	0.0660	0.0538	0.0723
	Maximum	0.2550	0.1800	0.3000
	Minimum	−0.1170	−0.1000	−0.1400
	CoV	0.4676	2.8444	0.8006
Between II and III census	Mean	0.1158	0.0042	0.1703
	Standard deviation	0.0417	0.0523	0.0463
	Maximum	0.1880	0.0900	0.2600
	Minimum	0.0390	−0.1500	0.0400
	CoV	0.3598	12.4636	0.2721
Between III and IV census	Mean	−0.2168	−0.0682	−0.2326
	Standard deviation	0.0980	0.1862	0.1407
	Maximum	0	0.4200	0.1300
	Minimum	−0.3900	−0.5000	−0.5600
	CoV	−0.4521	−2.7292	−0.6049

We begin by calculating the CoV of LP across states for each census. Then, we fit a linear time trend over the series so generated. The striking result that emerges here is that the trend of the CoV is increasing. The adjusted R^2 values are found to be high and t-ratios for the intercept as well as the slope coefficient are highly significant. It is clear therefore that for the period under review, the Indian states do not exhibit convergence. In order to have deeper insight into the nature of convergence and divergence, the same CoV-trend analysis was carried out for other components of inter-state variations namely, CI, LI and LQ, where the last one was defined to include EQ to CQ on an average.

CoV was though fluctuated in case of CI but ultimately it too showed an increase from first to third and then to fourth census. Same holds truth for CQ. As against rise of CoV in case of CI, CQ and LP, there were marginal declines in case of LI, and LQ. As is anticipated with rise in CoV of CI and fall in CoV of LI, the CoV of CLR not only declined but also was negative in the fourth census. This conclusion is in concurrence with our earlier findings of simultaneous occurrence of convergence and divergence tendencies in factoral endowments through establishing negative and positive correlations between initial values of LP and LP growth rates, LQ and LQ growth rates, LI and LI growth rates, CI and CI growth rates, CQ and CQ growth rates. A CoV trend across census establishes strong evidence that the Indian states diverged in terms of labour productivity over the 35-years period under consideration. The details of the CoV are presented in Table 12 (Fig. 3).

Table 12 Coefficient of variation in different censuses

Parameters	CoV values			
	First census	Second census	Third census	Fourth census
CI	1.007	3.029	1.463	2.068
CQ	0.771	0.924	1.434	2.034
LP	0.329	0.658	1.048	1.613
CLR	1.359	0.776	3.352	−0.333
LI	3.041	3.895	3.029	3.018
LQ	3.014	3.226	2.980	2.963

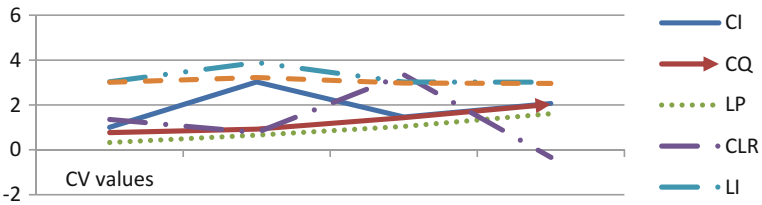

Fig. 3 Trend-lines of coefficient of variance over census

CoV in case of both LP and CQ is going up unabated from the first census to fourth. Labour Intensity variation across states however has mostly been at same level with intermittent rise during second census. Capital Intensity variation which exhibited a decline from second to third census again indicated a rise during third to fourth census. Thus the only CoV showing decline being the CLR, though during second to third census, there was a sharp rise, but a sharper decline was observed in the last census with overall CoV depicting a decline. It was found that the CoVs for CQ as well as LP have the positive trend, but for CLR shows a negative trend. Further, the values of R^2 were high in all cases.

β-Convergence

As already noted neo-classical theory suggests that at low levels of per capita output, an economy grows at a high rate and vice versa. If two economies, similar in terms of parametric specifications, differ only with respect to their per capita output levels at some initial point of time, then at any subsequent point of time, the economy that started off with a higher per capita output should grow at a slower rate. This leads to the hypothesis of absolute or β-convergence (Sharma 2013), which predicts a negative relationship between the rates of growth enjoyed by a cross-section of economies and the levels of their LP at a given initial point of time.

Our next step in this paper is to test for β-convergence amongst Indian states. Clearly, the results obtained so far lead us to believe that the hypothesis will be rejected. Nevertheless, academic rigour demands that this be actually verified. The problem was studied in two different ways. First, we looked at the secular behaviour of labour productivity by fitting a linear relationship of type $yt = \alpha + \beta yt - 1$. This was

done through estimating LP in successive period LPs using equation LPs $= a + \boldsymbol{\beta}\,\mathrm{LP_i}$ wherein initial LP, viz, LP in initial census ($\mathrm{LP_i}$). However, $\mathrm{LP_i}$ may be a weak indicator of initial conditions. Hence, an alternative indicator was tried, viz, measure of semi-log ($\ln yt = \alpha + \beta yt - 1$) trend to the data for each state for all the three series. For both forms, the estimated coefficients of LP during third census and LP during fourth census are positive and significant. This means that for all the states, LP had an increasing trend, though the R^2 values differ across them. The phenomenon of β-convergence occurs if the latter regression line yields a negative coefficient for $\mathrm{LP_i}$.

It may well be seen that in all the cases, it is clear that there is no evidence of β-convergence. There is a positive and significant relationship between current censuses (IV Census) LP with last census (III Census) LP,[5] that is,

LP = 24.32858 + 0.290629 LP.

Even semi-log relationship in case of fourth census LP with third census LP also is found to be significant.[6]

5

Regression statistics	
Multiple *R*	0.588684
R^2	0.346549
Adjusted R^2	0.326128
Standard error	292.1858

	Coefficients	Standard error	*t* stat	*P*-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	24.32858	70.03112	0.347397	0.730568	−118.32	166.9773	−118.32	166.9773
Labour productivity III	0.290629	0.070549	4.119556	0.00025	0.146926	0.434332	0.146926	0.434332

[6]And as a Semi log function:

Regression statistics	
Multiple *R*	0.662776
R^2	0.439272
Adjusted R^2	0.421749
Standard error	0.648952
Observations	34

	Coefficients	Standard error	*t* stat	*P*-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	4.410074	0.155541	28.35317	3.03E −24	4.093248	4.7269	4.093248	4.7269
Labour productivity III	0.000785	0.000157	5.006864	1.95E −05	0.000465	0.001104	0.000465	0.001104

In LP = 4.410074 + 0.000785LP
Further for Third Census LP and while linear relationships stand as
LP = 24.01388 + 5.978579 LP
Second Census LP it is
LP = 44.29027 + 5.883493LP
Similarly, semi-log relationship for third census being
In LP = 5.548645 + 0.006274LP
And for Second Census
In LP = 3.700063 + 0.060392LP

The model of beta convergence can be used to analyze the development of economic levels only retrospectively (i.e. in the past). β values have all through been positive and this indicates the states labour productivity have divergence tendencies. The coefficients of the indices of initial LP are positive and significant at the 5% level in all the regressions. The relationship is significant in all cases excepting for the semi-log relationship in case of second census LP as correlated with LP of first Census. Further, the values of R^2 were high in all cases excepting again in cases of second census LP (both log linear, and semi-log relationships) correlated with first census. The relatively low values of R^2 in second census estimates suggest that there are other important factors that need to be taken into account in explaining the behaviour of LP growth rates.

Reasons for Differential Growth Rates: Correlates of Regional Imbalances: Factorial Analysis

As stated earlier, the literature on disparities across Indian states studies the link between regional imbalances and plan outlays Sarker (1994). Sarker discovers a strong link between development (measured in terms of 14 variables including per capita consumption of electricity, percentage of villages electrified, per capita expenditure on health, effective literacy rates, etc.) and the plan outlays for the different states. In our analysis, it is attempted to correlate the CQ growth first and then LQ growth with the different infrastructure and government initiatives, particularly road infrastructure, power supply, Unregistered enterprises growth (reflecting ancillarisation and non-formal sector growth in MSME sector) and investment per enterprise growth (last factor while comparing Labour Quotient growth).

However Principal Component Analysis carried out over the same factors, three most important factors contributing to the Labour Quotient being Per Capita Power, Change in Capital Intensity 2003–07 followed by Length of Roads CAGR 2003–08 (Table 13).

So far as CQ growth is concerned, the two most important factors that emerge are Per Capita Power and CAGR % unregistered enterprises 2002–2007 (Table 14).

Table 13 Percent of variance explained by different infrastructure and other factors in determining LQ

Component matrix		
	Component	
	1	2
Length of roads CAGR 2003–08	0.709	
Change in capital intensity 2003–07		0.788
Per capita power	0.843	
Extraction method: principal component analysis		
a. 3 components extracted		

Table 14 Degree of variance explained by different infrastructure and other factors in determining CQ

Component matrix		
	Component	
	1	2
Per capita power	0.812	
CAGR % un-registered enterprises 2002–2007		0.870
Extraction method: principal component analysis		
a. 2 components extracted		

4 Conclusions

The paper has the following findings in a nutshell:

- Capital Stock is found to be more concentrated in the States of Maharashtra, Tamil Nadu, Punjab, Haryana, Jammu and Kashmir, and Pondicherry while employment over years has diversified across almost all the states.
- In the latest Census of MSME, that is the fourth census, localization of labour has significantly deviated in the sense, it has not remained limited to the states, where capital has concentrated. This has resulted in increased number of States lying in categories of 'High Labour as against Low Capital levels' as well as 'low-labour high capital levels'.
- Pearson's '*r*' coefficient between Capital Labour Ratio (CLR) and labour productivity was atypically low (0.21) in case of states with 'Low Capital - High Labour levels'. This was not so in cases of states with 'matching capital and labour levels', or States having 'High Capital but Low Labour levels' (in both cases, values being more than 0.84).
- As far as convergence and divergence trends are concerned, it is found that two types of convergence in employment seems to be occurring (a) enterprise level within a state, (b) state level. But the same does not seem to occur in case of

other factors of production, particularly, capital and this has also resulted in non-convergence in resultant productivity.

- Three most important determinants of MSME growth were found to be infrastructure development, in terms of power use per enterprise, road infrastructure levels in the states and capital intensity (capital per enterprise) growth rate. Yet it cannot be said for sure that which states are more benefited due to infrastructure spread among the three category states. Yet, on the whole this seems to lead to making certain policy prescriptions.

Annexure

Distribution of States According to LQ Versus CQ

	Census-II	Census-III	Census-IV	Remarks
Quadrant-1 (Low Labour and Low Capital)	M. P. (0.22,0.34) HP (0.58,0.72) Haryana (0.72,0.95) J and K (0.71,0.78) Mizoram (0.73,0.95) Punjab (0.72,0.78) Rajasthan (0.67,0.79) Bihar (0.83,0.60) Manipur (0.78,0.63) Meghalaya (1.03,0.95)	M.P. (0.55, 0.30) Bihar (0.58, 0.46) Chhattisgarh (0.60, 0.53) HP (0.77, 0.59) J and K (0.77, 0.78) Karnataka (0.96, 0.68) Uttarakhand (0.59, 0.85) Jharkhand (0.86, 0.29) Kerala (0.82, 0.43) Mizoram (0.75, 0.39) Assam (1.00, 0.67) Manipur (0.96, 0.70) Gujarat (0.93, 0.71) Arunachal (1.05, 1.08) UP (0.80, 0.94)	Arunanchal (0.38, 0.36) Assam (0.97, 0.56) HP (0.73, 1.04) Odisha (0.95, 0.04) Bihar (0.87, 0.31) Meghalaya (0.98, 0.28) Chhattisgarh (0.82, 0.34) M.P. (0.78, 0.29) Jharkhand (0.86, 0.40) Tripura (0.80, 0.36) UP (0.95,0.68) Karnataka (1.04,0.72) Rajasthan (0.82, 0.83) Uttarakhand (0.84, 0.8)	Five states, namely, Bihar, MP, Chhattisgarh, Jharkhand and HP in IV Census were still with low capital and low labour, and they were there in second and third census too While some of the states moved out from here: Andaman, J and K, Mizoram and Manipur appear only in census IV All the 5 States newly added to this category in Census III also figured in Census IV However 2 states newly figured in the category in Census III, Kerala and Gujarat moved out from the category in Census IV Rajasthan and Meghalaya figured in the category in Census II and re-appeared in Census IV Haryana moved out from this category Post-II census Odisha and Tripura were new additions in Census IV

(continued)

(continued)

	Census-II	Census-III	Census-IV	Remarks
Qudrant-2 (Low Labour and High Capital)	Karnataka (0.96, 1.02) Kerala (0.94, 1.05)	Rajasthan (1.03, 1.36)	Maharashtra (1.03, 1.19) T.N. (1.10, 1.26) Punjab (0.83, 1.37) Haryana (0.98, 1.60) J & K (0.84, 1.46) Goa (0.99, 2.37) Gujarat (0.99, 4.09)	There are different states figuring in the category in the three different censuses
Qudrant-3 (High Labour and High Capital)	Assam (1.24, 1.32) Odisha (1.33, 1.18) Goa (1.14, 1.68) Gujarat (1.28, 1.61) Delhi (1.93, 2.50) Maharashtra (1.89, 2.64) T.N. (1.49, 1.19) Tripura (1.98, 1.14) UP (1.66, 1.15) Nagaland (2.69, 2.5) Sikkim (2.41, 7.44)	WB (1.35, 1.18) Punjab (1.16, 1.62) Andhra (1.36, 1.75) Haryana (1.36, 1.80) T.N. (1.09, 1.54) Odisha (1.45, 1.38) Goa (1.73, 2.6) Maharashtra (1.69, 3.00) Nagaland (1.92, 4.20) Tripura (2.72, 2.97) Delhi (2.61, 8.4)	Nagaland (1.98, 1.75)	There seems a gradual reduction in this category of high capital intensity and high labour productivity Only Dadra Nagar Haveli, Damn and Diu, Nagaland and Pondicherry were consistently in this category for all the three Censuses; Chandigarh, Delhi, Goa, Maharashtra, Odisha, T.N., and Tripura were found to be in the category till III census
Qudrant-4 (High Labour and Low Capital)	Andhra (1.12, 1.00) WB	Meghalaya (1.21, 0.63) Sikkim (1.54, 0.79)	Manipur (1.17, 0.38) Andhra (1.23, 0.67) Mizoram (1.26, 0.74)	There is a general tendency of states to be appearing more and more in this category of high labour productivity and low capital intensity

(continued)

(continued)

	Census-II	Census-III	Census-IV	Remarks
			WB (1.12, 0.61) Kerala (1.01, 1.07) Sikkim (2.09, 0.23) Delhi (1.62, 0.98)	

Note Figures in parenthesis reflect: First Figure is: Capital LQs, Second Figure is: Employment LQ Low Labour and Low Capital <=1.00, High Labour and High Capital >1.00
Red means present in II Census, Light brown means present in III census and IV census too, Purple means appeared in II and IV Census, Black means new inclusion

References

Barro, R., & Sala-i-Martin, X. (1995). *Economic growth*. New York: McGraw-Hill.

Boots, B. N., & Getis, A. (1988). *Point pattern analysis*. Newbury Park, CA: Sage Publications.

Cashin, P., & Sahay, R. (1996). Internal migration, centre-state grants, and economic growth in the states of India. *IMF Staff Papers, 43*(1), 123–171.

Comtois, C. (2017). *The specialization index and the location coefficient*. New York, USA: Department of Global Studies & Geography, Hofstra University.

Dasgupta, D. (2000, July 1). Inter-state disparities in India. *Economic and Political Weekly, 35*(7), 2413–2422.

Dholakia, R. (1994, August 21). Spatial dimension of acceleration of economic growth in India. *Economic and Political Weekly, 29*(35), 2303–2309.

Ghosh, B., Marjit, S., & Neogi, C. (1998, June 27). Economic growth and regional divergence in India, 1960 to 1995. *Economic and Political Weekly, 33*(26), 1623–1630.

https://msme.gov.in/about-us/about-us-ministry.

http://www.dcmsme.gov.in/ito_msme/censuses.htm.

Intellectual Capital Advisory Services Private Limited. (2012, November). *Micro, small and medium enterprise finance in India: A research study on needs, gaps and way forward* (pp. 23, 29). USA: International Finance Corporation.

Lu, Y. (2016). *Spatial cluster analysis for point data: Location quotients verses kernel density* (page 2 of 24). Buffalo: Department of Geography, State University of New York (http://dusk.geo.orst.edu/ucgis/web/oregon/papers/lu.htm).

Lessmann, C., & Seidel, A. (2017). Regional inequality, convergence, and its determinants—A view from outer space. *European Economic Review*, *92*, 110–132.

Lucas, R. E. (1998). Ón the mechanics of economics development. *Journal of Monetary Economics, 22*(1), 3–42.

Marjit, S., & Mitra, S. (1996, August 17). Convergence in regional growth rates: Indian research agenda. *Economic and Political Weekly, 31*(33), 2239–2242.

Ministry of Micro, Small & Medium Enterprises. (2007). *Micro, small and medium enterprises in India: An overview*. Ministry of Micro Small and Medium Enterprise, Government of India.

Mitra, A. (1999, July 31). Total factor productivity growth and technical efficiency in Indian industries. *Economic and Political Weekly, 34*(31).

Nagaraj, R., Varoudakis, A., & Veganzones, M. A. (1997). *Long run growth trends and convergence across Indian states*. IGIDR, Mumbai (Mimeograph).

Quah, D. (1993). Empirical cross-section dynamics in economic growth. *European Economic Review, 37,* 426–434.

Raman, J. (1996). *Convergence or uneven development: A note on regional development in India*. USA: Valparaiso University (Mimeographed).

Rao, M. G., Shand, R. T., & Kalirajan, K. P. (1999, March 27–April 2). Indian states: A divergent view. *Economic and Political Weekly, 34*(13), 769–778.

Rodrigue, J.-P. (2017). The specialization index and the location coefficient in chapter 10 methods in transport geography. In *The geography of transport systems* (4th ed., 440 pages). New York: Routledge. ISBN 978-1138669574.

Sarker, P. C. (1994, March 12). Regional imbalances in Indian economy over plan periods. *Economic and Political Weekly, 29*(2), 621–633.

Sharma, N. (2013). *Growth and structural changes in Indian manufacturing since liberalization*. Discussion Paper No 6, in Development Economics and Innovation Studies, Centre for Development Economics and Innovation Studies, Punjabi University (https://www.scribd.com/document/311440162/6-Niharika-Sharma).

Solow, R. M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics, 70,* 65–94.

Subina, S. (2015). Role of MSMEs in the growth of Indian economy. *Global Journal of Commerce and Management Perspective, 4*(5), 40–43. ISSN: 2319-7285 (for 2, 3).