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Abstract

This paper seeks to understand what kind of economic activities are concentrated in which regions of India. Spatial concentration of jobs is measured by calculating the location quotient using information on the industry of work of the individuals in a region. The paper uses data from NSSO 2011-12 survey of employment and unemployment.

Keywords: Location Quotient, Spatial Concentration, Jobs

JEL Code: R10, R12

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Introduction: Whether people move to where jobs are available or whether firms locate where people live is a question that is not only of empirical but also of policy interest. Cities like Bhilai, Jamshedpur were planned industrial townships and people moved there since jobs were available. The population of Pimpri Chinchwad, a major industrial hub today, increased from 9,522 to 1.01 million over 1951-2001. In contrast to these examples, industry moved to take advantage of available human capital in cities like Bangalore, Chennai, Pune etc.

The question of spatial distribution of individuals and jobs has become important in the current economic environment of jobless growth. Further, in the recently concluded state elections, political parties promised to generate millions of jobs.

From the perspective of employment generation, we need to identify the role of localization economies (arising from geographical clustering of firms in same industry), industrialization economies (arising from agglomeration of industries) and urbanization economies (arising from agglomeration of population and reduction in cost of provision of basic services).

On the empirical front, a recent World Bank (2013) report examined the issue of concentration of jobs across different city size classes. However, the analysis stops at the year 2005 and does not cover all sectors and regions of the economy. On the policy front, neither India's national manufacturing policy nor the respective state government's industrial policies have any discussions on the issue of spatial concentration of jobs by sector and region. Hence, this paper focuses on two important and related questions. First, what kinds of economic activities are concentrated in which regions? Second, what is the extent of inequality in distribution of jobs in a specific section of industry at the sub-national level? The answers to these two questions provide a starting point for a discussion on what types of jobs can be created and where.

In order to answer these two questions this paper draws on the empirical literature measuring the geographic concentration or spatial distribution of economic activities as reflected by employment. We capture the notion of economic activity by exploiting information available in NSSO's survey on the industry of work of the individual based on the National Industrial Classification 2008. Since data on output by sections of industry is not available at the sub-national level we use employment as the indicator of economic activity.

Data and Measurement

This paper uses data from NSSO's surveys of employment and unemployment 2011-12. For each worker the survey collects information on place of residence. An individual could reside in one of the following three locations: rural, in a town with a population of at least one million, in towns with a population of less than one million. The name of the million plus town can be identified from NSSO's survey. For the analysis we combined all the union territories into one region and the North Eastern states except Assam into one region. Thus India can be divided into 73 regions: 22 rural state regions, 24 urban regions in a state and 27 cities with more than one million of population. Each individual's industry of work can be grouped into 21 broad sections (see Table 1). What we are interested in understanding is whether certain sections of industry (as reflected by jobs) are concentrated in certain cities or regions.

Of the two questions mentioned above, the first one is answered using the concept of Location Quotient (LQ) which is very widely used in the regional science and economic geography literature. Suppose X_{ns} denotes employment in region n (n $= 1,2\ldots, N$) and section of industry s (s $= 1,2\ldots, S$).

$$LQ_{ns} = \left(\frac{X_{ns}}{\sum_1^S X_{ns}} \Big/ \frac{\sum_1^N X_{ns}}{\sum_1^S \sum_1^N X_{ns}} \right)$$

A region is said to have a concentration of workers in a particular industry if the LQ, which is the ratio of share of the region's employment in that industry to the share of the industry's employment in the nation's employment, takes the value greater than one. The current LQ is on account of three factors: the initial distribution of employment in sections of industry in the region; employment growth in that industry in that region; and the overall distribution of employment across sections of industry at the aggregate level. It should be borne in mind that LQ provides us with relative rankings.

To answer the second question, we report the inequality in distribution of jobs in an industry as measured by the Theil Index. This index shows which sections of industry are more concentrated and which ones are dispersed at the sub-national level.

Spatial Distribution of Activities: The Evidence

Table 1 lists the top five regions based on location quotient for each of the nineteen sections of industry, i.e. these regions have the highest value of LQ for the particular section of industry. In the discussion that follows instead of trying to interpret the results pertaining to each and every ranking we focus on some of the more interesting ones.

<Table 1 Here>

Rural Chhattisgarh, Rural Maharashtra, Rural Gujarat and Rural Madhya Pradesh rank highest among the regions with a concentration of workers in Sections A& B (agriculture, mining etc). This does not come as a surprise since these states have a larger proportion of workers engaged as agricultural labourers as compared to the all India average. Further, over the intercensal period 2001-11 the percentage point increase in the proportion of agricultural labourers in these states was higher than the all India average. The increase was the highest in case of Madhya Pradesh from 36.1 percent to 48.6 percent followed by Chhattisgarh where the proportion of workers engaged as agricultural labourers increased from 34.1 percent to 47.3 percent. Madhya Pradesh and Chhattisgarh are now centers of production of wheat and rice and recently Madhya Pradesh became the state with highest agriculture production in the country. The only urban area with a concentration of workers in Section A& B is Indore. We do not have a ready obvious explanation for this expect to point to the fact that the result could be driven by mining activities and presence of agro-based industries, in particular oil extraction units.

Coming to the concentration of manufacturing industry (Section C), we find that all top five regions are million plus cities (Surat, Varanasi, Kanpur, Nashik, Agra). This highlights the point that even though the recent literature points to the churning of industries between rural and urban areas (Ghani et al 2012), urban areas continue to dominate in terms of concentration of manufacturing jobs. This is consistent with the findings in the World Bank (2013) report that the concentration is highest in the million plus cities. When we examine the regions ranked 6 to 10 in addition to Ahmedabad, Kolkata and Jaipur we find that Urban Himachal Pradesh and Urban Gujarat too feature in the list. Even if Himachal Pradesh does not have a million plus city it has attracted large investments. Gujarat appears to be generating employment opportunities in locations other than the million plus cities.

It has been pointed out that the states of Bihar, Rajasthan and Uttar Pradesh witnessed large increases in number of jobs in construction sector (Section F). However, barring Rural Rajasthan no other region from these states features in ranking of concentration of jobs in Section F. Jammu and Kashmir's 11th Five Year Plan (2007-12) recognized that the construction sector would be the most important sector that would generate substantial additional employment. Given the absence of an industrial base and or employment opportunities in other sectors, rural Jammu and Kashmir has the highest LQ in Section F.

In general, wholesale and retail trade (Section G) activities can be expected to be diffused at the sub-national level. If at all one would find a concentration of these jobs it would be in the urban areas. In addition to presence of two million plus cities Howrah and Lucknow, the urban areas of the states of Bihar, Assam and Uttaranchal appear in the rankings. Consistent with the conjectures in the literature, the million plus cities have a concentration of jobs in transportation and storage (Section H): Kalyan-

Dombivli, Thane, Hyderabad, Nagpur. The only surprise in the ranking is the appearance of Urban Andhra Pradesh. Not surprisingly, we find concentration of accommodation and food service activities (Section I) in urban areas.

Some of the rankings are in line with conventional wisdom. Pune has developed as an information and technology hub and it is among the top 5 regions with concentration of jobs in Section J (Information and communication). Not surprisingly, Bangalore is ranked first among all regions. Pune, Bangalore and Chennai have historically had a large pool of skilled workers and this has contributed to their rise as a hub of information technology activities. Further, notice that Bangalore and Pune appear in the rankings in professional, scientific and technical activities (Section M)

Some rankings can be correlated with recent patterns evident in job creation. Over 20 percent of urban jobs over the period 2004-05 and 2009-10 were generated in Maharashtra (Thomas 2013). As it turns out the following cities Greater Mumbai, Kalyan-Dombivli, Nagpur, Nashik, Pune, Pimpri Chinchwad, Thane figure prominently as regions with a concentration of one more section of industry. Across all the NIC sections, both Kalyan-Dombivli and Thane appear four times each in the rankings. This is not surprising since they are part of the Mumbai Metropolitan Region. Their rise is consistent with the evidence of growth in suburban areas (Chakravorty and Lall 2007). The estimates from NSSO's data also reveal that a large number of jobs were created in financial and insurance activities (Section K) in Maharashtra. Once again it turns out that in the rankings based on value of LQ the geographical units with concentration of jobs in Section K are cities from Maharashtra. In addition to the top five regions with concentration of jobs in real estate activities (Section L), the following regions have a LQ greater than 3: Urban Haryana, Bangalore, Urban Punjab, Faridabad, Thane, Hyderabad, Jaipur, Urban Kerala, and Urban Andhra Pradesh.

Extent of Inequality in Distribution of Jobs

In order to understand which sections of industry are more dispersed and which ones are concentrated we calculate the Theil index. The calculated values are as follows: Sections A and B (1.27), Section C (0.54), Section D (0.5), Section E (0.91), Section F (0.82), Section G (0.44), Section H (0.52), Section I (0.49), Section J (0.85), Section K (0.45), Section L (0.54), Section M (0.44), Section N (0.46), Section O (0.38), Section P (0.46), Section Q (0.36), Section R (0.49), Section S (0.56), Section T (0.71).

We find that section A and B have the highest inequality, because generally agriculture, mining and allied activities are more concentrated in rural regions whereas urban regions and cities hardly have jobs in agriculture. In line with expectation, the value is lower in the services sector (Sections G, H, I, K, L, M,

N, O, P, Q, R, S). In contrast while it is higher in human capital intensive industries (Section J) it is also higher in Section T for which we do not have a ready explanation. The fact that the index is high in Section E (water supply, sanitation etc.) can be attributed to the fact that these are more concentrated in urban areas rather than rural areas. Recent literature suggests the redistribution of manufacturing activity away from big cities and this is evident from the fact that the value of Theil index is relatively lower at 0.54 in comparison to other Sections. It is established that new jobs in construction sector were created only in a handful of states and it not surprising that the Theil index for Section F is higher than that of most sections.

Implications

From a perspective of policy formulation, what are the patterns we need to understand better? First, the larger urban agglomerations are reaching their carrying capacity in terms of population as a consequence of which one will see the rise of economic activities in cities and towns adjoining the million plus cities. This is evident from the case of Mumbai Metropolitan Region. Second, policies aimed at expansion of non-farm employment in rural areas need to focus on how conducive the urban employment pattern is in the nearby areas in order to facilitate employment generation. The third point relates to an issue not discussed in this paper. In the larger urban agglomerations one observes development of multiple business districts. This dynamic within the city is not well understood due to lack of disaggregated city level data.

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Table 1: Ranking of Regions Based on Concentration of Section of Industry

Sector of Industry	Ranking of Regions by Location Quotient (Top Five)				
	1	2	3	4	5
AB	R Chattisgarh	Indore	R Maharashtra	R Gujarat	R Madhya Pradesh
C	Surat	Varanasi	Kanpur	Nashik	Agra
D	U Goa	Nagpur	U Rajasthan	U Chattisgarh	Jaipur
E	U Gujarat	Pimpri Chinchwad	Varanasi	U Goa	Delhi (R+U)
F	R Jammu & Kashmir	Nagpur	R Jharkhand	R Punjab	R Rajasthan
G	U Bihar	U Assam	Howrah	Lucknow	U Uttaranchal
H	Kalyan-Dombivli	Thane	U Andhra Pradesh	Hyderabad	Nagpur
I	U Goa	Bangalore	Meerut	Greater Mumbai	U Uttaranchal
J	Bangalore	Pune	Chennai	Faridabad	Delhi (R+U)
K	Nagpur	Pimpri Chinchwad	Kalyan-Dombivli	Greater Mumbai	Pune
L	Delhi (R+U)	Chennai	Pune	Delhi MC	Nagpur
M	Kalyan-Dombivli	Delhi MC	Bangalore	Pune	Howrah
N	Patna	Thane	Chennai	Bangalore	U Himachal Pradesh
O	U NE States	Patna	Hyderabad	Delhi (R+U)	U Jammu & Kashmir
P	Faridabad	Kalyan-Dombivli	U Jammu & Kashmir	U NE States	U Himachal Pradesh
Q	Agra	Faridabad	Lucknow	U Punjab	U Kerala
R	U Orissa	Ludhiana	Delhi MC	Greater Mumbai	U Assam
S	Meerut	Ludhiana	Lucknow	U Assam	Thane
T	Pimpri Chinchwad	Chennai	Greater Mumbai	Kolkata	Thane

Note: Section A: Agriculture, forestry and fishing, Section B: Mining and quarrying, Section C: Manufacturing, Section D: Electricity, gas, steam and air conditioning supply, Section E: Water supply; sewerage, waste management and remediation activities, Section F: Construction, Section G: Wholesale and retail trade; repair of motor vehicles and motorcycles, Section H: Transportation and storage, Section I: Accommodation and Food service activities, Section J: Information and communication, Section K: Financial and insurance activities, Section L: Real estate activities, Section M: Professional, scientific and technical activities, Section N: Administrative and support service activities, Section O: Public administration and defence; compulsory social security, Section P: Education, Section Q: Human health and social work activities, Section R: Arts, entertainment and recreation, Section S: Other service activities, Section T: Activities of households as employers; undifferentiated goods and services producing activities of households for own use

*Delhi (R+U) includes rural and urban areas except Delhi Municipal Corporation (Delhi MC)

** R: Rural U: Urban