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Variations In Rural Manufacturing Sector Development: Empirical Evidence From Indian States

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Abstract: *Even though today the largest sector contributing to the national income is the Services sector its contribution is much lesser. Agricultural sector still remains the largest employer of labor with excessive disguised unemployment and high poverty. The main concern for all policy makers is the surplus labor in the agricultural sector that needs to be shifted to manufacturing and services so as to reduce rural poverty. In this context this paper examines the development of rural manufacturing sector across the Indian states. The development of employment in the rural manufacturing sector can be a major route through which occupational diversification can be achieved in the non-farm employment. Using NSSO data this study tries to bring out the pattern and extend of interstate variations in rural manufacturing sector .Further it explores the determinants of these variations .It was found that rural manufacturing sector across the states exhibits demand and supply side linkages to urban manufacturing sector. These results thus have important policy implications.*
Keywords*: development, employment, interstate, linkages manufacturing ,non-farm, rural*

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I. Introduction

At the eve of independence, India was an agrarian country. With the passage of time, it was expected that the main focus of the economy's activity would shift from the agricultural sector to the industrial sector and finally to the tertiary sector. This pattern of growth was observed by the developed countries, and a pre-notion was established that India and other developing countries would also be following this path of development. But India has exhibited a different growth trajectory. On inspecting the economic statistics of national income contribution and the employment generation in each sector, quite contrary outcomes were observed. The maximum share of gross domestic product shifted from the agricultural sector to the tertiary sector, completely skipping the secondary sector. As far as employment is concerned, the shift was not observed to be quite prominent, with the maximum share of employment still concentrated in the agricultural sector. The maximum national income contribution from the service sector was observed, but there still existed minimal employment absorption capacity in this sector. Alongside, the share of the agricultural sector in the national income declined, but the same was not observed for the employment levels in the sector. Thus, the skewness in the economic growth pattern became quite evident, with least level of development in the industrial sector. The lack of shift in employment of workforce to the industrial sector and the service sector has generated surplus labor force in the agricultural sector, with excessive disguised unemployment and high poverty. This disguised unemployment has untapped potential to increase the productivity of the industrial sector. Thus, the main focus of any policy makers has been on developing the industrial sector so as to shift the surplus labor force from the agricultural sector . But, in the past decade the growth of the manufacturing sector has been stagnant in terms of both, national income contribution and employment generation. Thus, potential for research in this field still remains open to researchers. The manufacturing sector has two components rural an urban .The focus of this study is on the rural part of manufacturing sector also referred to as rural industrialization. The rural manufacturing sector in India is still underdeveloped. This has mainly been due to competition with the urban industrial sector and the imported commodities, lack of profitability, lack of good quality products been manufactured, etc. Thus, this area is losing out on generation of employment and national income. The maximum share of population in India still resides in the rural area, with major chuck of the rural population employed in the agricultural sector in the rural area. The labour force in the rural agricultural sector is unskilled and illiterate. Thus, excessive surplus labour needs to be shifted either to the urban areas for potential employment, or to the rural manufacturing sector, which does not require a lot of skill. Migration to urban areas has its own problems, thus a way out is to develop the rural manufacturing. Employment in the rural manufacturing can be a major route through which occupational diversification can be achieved in the rural non-farm employment. Further, in the present scenario, rural manufacturing is of utmost importance for a country like India, mainly due to the fact that it will act as a medium to bridge the rural urban gap via spatial diversification of manufacturing activity and protecting the

traditional village industries. The gap between the levels of development of the rural manufacturing in the coastal and non coastal states can be reduced. The surplus labor in the agricultural sector can be shifted to the rural manufacturing to improve the productivity of excess labor in the country. Ancillary industries can flourish in the rural areas[5] due to cheap availability of raw materials, labor, land, etc.

The Government of India has adopted innumerable policies and programmers for the development of rural manufacturing in India. The main focus of the small and village industries committee of the five year plans have been to target the small scale industries, khadi and village industries, coir industry, handloom industry, power looms industry, sericulture, handicrafts, wool development, food processing industries, dairy and livestock products, etc. through Khadi and Village Industries Commission, Integrated Rural Development Programme, Weavers' Service Centers, Indian Institutes of Handloom Technology, National Handloom Development Corporation, National Cooperative Development Corporation, Power loom Service Centres, Craft Development Centres, Regional Design and Technical Development Centres, Wool Development Board etc. Irrespective of the endless list of measures, policies and programmes adopted, the rural manufacturing sector has failed to develop in India.

Thus the development of rural manufacturing sector in India needs to be examined in detail. India is a diverse country, with differences arising within the country due to the topography, availability of rivers and underground water, variations in temperature, level of rainfall and location of the states. There exist marked socio-cultural and linguistic variations across the different states. Wide diversity is also noticed in the level of urbanisation, and industrialization, level of agricultural development and degree of commercialization of agriculture, levels of per capita income, its growth rate and incidence of poverty among the states. Given these wide dissimilarities across the Indian states, it is very unlikely that the rural manufacturing sector may have developed at a uniform pace and pattern throughout the country. Thus, there is a good case to compare and analyze the pattern of development of the rural manufacturing sector at the disaggregated level across the states of India. By exploring the extent and determinants for these interstate variations, policy makers could take some clues. Thus, the main objectives of the present study are to study the pattern, extent and growth of interstate variations in rural manufacturing sector in India in the last decade and to assess the main determinants impacting these interstate variations and to identify the channels through which the development of rural manufacturing takes place

II. Data and Methodology

To study the level of development of any sector, it is imperative to observe the national income contribution of the sector under study. For the level of development of rural manufacturing, no data is available on national income contribution of rural manufacturing sector. The Central Statistical Organization (C.S.O.) publishes the Gross Domestic Product (GDP) and the Net State Domestic Product (NSDP) every year. But, only aggregate data is available, i.e., urban and rural manufacturing taken together. Another measurement used to study the level of development in any sector is via employment statistics. The size of a sector is reflected by the number of people employed in that sector. In India, employment data is collected by two very prominent agencies, namely, the Population Census and the National Sample Survey Organization (NSSO). Both the sources have data on rural manufacturing. So, data on either of the two can be used to study interstate variations in rural industrialization. To study the share of manufacturing sector within the rural non farm sector helps to study diversification of rural non farm sector in a better manner. Thus, by analyzing the data on employment in rural manufacturing as a proportion of rural non farm sector makes us attain two objectives. Firstly, to study interstate variations in the development of rural manufacturing. Secondly, to study the diversification of the rural non farm sector.

The data on rural manufacturing sector was taken from the 61st and 66th Round of NSSO. The 61st Round for the year 2004-05 was compatible with the 66th Round. The earlier rounds had concordance issues therefore they were not included. Also this time period coincides with a single political regime thus bringing out the impact of their economic policies. The employment in the rural manufacturing sector forms an important component of rural non farm sector. In the 61st and 66th Round, data for the distribution of workforce in various sectors and sub-sectors were available on rural males, rural females and rural persons. In this article, rural males and rural persons have been taken, deleting rural females. The main reason for not incorporating rural females in our analysis is because rural female employment leads to data discrepancies. As interstate data on rural females is not very reliable, so it is accepted among researchers that while exploring interstate variations in employment, males and person data gives you better and more reliable results. Further, in the field of research, analysis of data on rural males and rural persons is an accepted norm. In the present paper, analysis of data on rural males has been done. Similar results were observed in case of rural persons. The results can be made available on request.

The data on the employment in rural manufacturing was collected for the 20 states of India from the 61st and 66th Round of National Statistical Survey Organization. The rest of the states and union territories were

found to be outliers and were giving deceptive results and thus were not included in the analysis. Males employed in rural manufacturing as a proportion of males employed in rural non farm sector has been taken as a proxy to study employment in rural manufacturing. This also helps to study the extent of diversification in rural non farm sector. The explanatory variables have been collected from Population Census, 2001; Provisional Population Census, 2011; Central Statistical Organization; RBI Bulletin and Statistical Year Book.

To analyze the impact of the explanatory variables on the dependent variable, Ordinary Least Square (OLS) regression technique was used. Both dependent variable as well as explanatory variables is used in log form, which is as follow:

$$\log Y = a + b \log X + u$$

The estimated slope coefficients are elasticities and measure the percent change in the dependent variable with respect to 1 percent change in the independent variable. These elasticity coefficients also help in comparing the impact of different independent variables because each is now measured in percent term and is comparable. The pooling of data, via dummy variable techniques, was necessary because the cross sectional data f or 2009-10 consists of only 20 observations. With increasing the number of observations in the analysis, the results obtained in the univariate regression analysis and multivariate regression analysis could give accurate results, thereby obtaining more precise estimates and test statistics with greater power as compared to data analyzed with only 20 observations of 2009-10. Further, during the multivariate regression analysis, the problem of degree of freedom can be solved and it can be possible to include more explanatory variables at a time. Thus, testing for validity of pooling of 2004-05 and 2009-10 data was undertaken using the dummy variable technique.

The Pattern and Extent of Interstate Variations in Rural Manufacturing Sector

In a country like India, given its size and diversity, it is highly unlikely that the level of development of rural industries would have a uniform pattern throughout the country. To study this pattern, male workers employed in rural manufacturing as a proportion of male workers employed in total rural non-farm sector is presented in Table-I . The compound annual growth rates for each state have been computed in the table to observe the growth trend between the time periods 2004-05 and 2009-10. Table 1 shows the pattern and extend of interstate variations in employment in rural manufacturing in India for the time period 2004-05 and 2009-10. In 2004-05, the level of employment in rural manufacturing was 21.95% on an average across the states as indicated by the mean share of males employed in rural manufacturing in 2004-05. It was observed that maximum employment in the rural manufacturing sector took place in states like Gujarat (32.79%), Tamil Nadu (32.61%), Uttar Pradesh (28.57%), Maharashtra (26.57%) and Orissa (24.93%). The states with lower employment statistics comprised Assam (9.60%), Uttarakhand (14.17%), Himachal Pradesh (14.26%), Kerala (16.06%) and Rajasthan (18.89%). The extent of intestate variations in the employment in the rural manufacturing, studied with the help of coefficient of variation, was found to be 25.79%.

Table – 1:Interstate variations in Rural Manufacturing sector

Males Employed in Rural Manufacturing as a Proportion of Males Employed in the Rural Non Farm Sector						
S.No.	States	2004-05	Rank (2004-05)	2009-10	Rank (2009-10)	Compound Annual Growth Rate (%)
1.	Gujarat	32.79	1	27.18	2	-3.68
2.	Tamil Nadu	32.61	2	25.59	3	-4.73
3.	Uttar Pradesh	28.57	3	19.74	8	-7.13
4.	Maharashtra	26.57	4	22.18	6	-3.55
5.	Orissa	24.93	5	17.32	11	-7.03
6.	West Bengal	24.59	6	29.48	1	+3.69
7.	Karnataka	23.77	7	19.71	9	-3.68
8.	Haryana	23.32	8	22.24	5	-0.94
9.	Andhra Pradesh	23.08	9	20.81	7	-2.05
10.	Jammu &Kashmir	21.43	10	15.51	12	-6.26
11.	Madhya Pradesh	21.33	11	13.50	14	-8.94
12.	Chhattisgarh	20.92	12	23.98	4	+2.77
13.	Punjab	20.80	13	18.98	10	-1.81
14.	Bihar	20.66	14	13.68	13	-7.91
15.	Jharkhand	20.57	15	12.90	16	-8.91
16.	Rajasthan	18.89	16	11.16	18	-9.99
17.	Kerala	16.06	17	12.91	15	-4.27
18.	Himachal Pradesh	14.26	18	09.50	20	-7.80
19.	Uttarakhand	14.17	19	12.37	17	-2.68
20.	Assam	09.60	20	11.08	19	+2.91
Mean		21.95		17.99		
Coefficient of Variation (%)		25.79		31.79		

Notes:

1. Compound annual growth rate = {[Antilog {(log Y_i - log Y_0) / n }] – 1} * 100
2. Source: 61st and 66th Round of NSSO.

The level of development of rural manufacturing in Gujarat was 3.41 times the level of development of rural manufacturing in Assam in 2004-05.The pattern of interstate variations in employment in the rural manufacturing was seen to decline from 21.95 in 2009-10 to 17.99 by 2009-10. It was also observed that the states with highest employment statistics in rural manufacturing were West Bengal (29.48%), Gujarat (27.18%), Tamil Nadu (25.59%), Chhattisgarh (23.98%) and Haryana (22.24%). On comparing with 2004-05 estimates, it was observed that Gujarat's rank fell from its Number 1 position and was replaced by West Bengal in 2009-10. The ranks of Uttar Pradesh, Maharashtra and Orissa (which were in the top 5 in 2004-05) fell and Chhattisgarh and Haryana replaced them in 2009-10 as the states with highest level of development of rural manufacturing. In 2009-10, the lowest share of rural employment in manufacturing was observed in states like Himachal Pradesh (9.50%), Assam (11.08%), Rajasthan (11.16%), Uttarakhand (12.37%) and Jharkhand (12.90%). The states with lowest employment in rural manufacturing in 2004-05 and 2009-10 remained almost the same. Assam, which had the lowest rank for employment in rural manufacturing in 2004-05, was replaced by Himachal Pradesh in 2009-10. But Assam still remained one of the states with the lowest level of employment in rural manufacturing. The mean share of employment in rural manufacturing, portraying the pattern of interstate variations in employment in rural manufacturing for 2009-10, was found to be 17.99. The coefficient of variation, indicating the extent of interstate variations in employment in rural manufacturing sector had increased to 31.79% in 2009-10. The ratio of highest to lowest value was 3.10, implying that West Bengal's employment level in rural manufacturing was 3.10 times the employment level in Himachal Pradesh. On comparing 2004-05 and 2009-10 data, it was found that the pattern of interstate variations, i.e., the mean level of employment in rural manufacturing fell from 21.95% in 2004-05 to 17.99% in 2009-10. This clearly indicates that, on an average, the level of employment in rural manufacturing had declined over the period of time from 2004-05 to 2009-10. On observing the coefficient of variations, the extent of interstate variations in employment in rural manufacturing was found to increase from 25.79% in 2004-05 to 31.79% in 2009-10.

Table 1 also shows the compound annual growth rate. It has been observed that the value of compound annual growth rate has been negative for majority of the states except West Bengal (+3.69%), Assam (+2.91%) and Chhattisgarh (+2.77%). The negative value indicates that over the period of time, the level of employment in rural manufacturing has declined. This decline in the level of employment in rural manufacturing has been verified by the decline in the value of mean from 21.95% in 2004-05 to17.99% in 2009-10. The states with the highest decline include Rajasthan (-9.99%), Madhya Pradesh (-8.94%), Jharkhand (-8.91%), Bihar (-7.91%) and Himachal Pradesh (-7.80%). This was the reason why the ranks of these states were observed to decline. The decline in the rank was prominent for states like Uttar Pradesh (rank 3 in 2004-05 and rank 8 in 2009-10), Orissa (rank 5 in 2004-05 and rank 11 in 2009-10) and Madhya Pradesh (rank 11 in 2004-05 and rank 14 in 2009-10). The compound annual growth rate for West Bengal was +3.69% causing it to jump to Number 1 position in 2009-10. Assam was the state with the lowest share of employment in rural manufacturing (rank 20). Its compound annual growth rate was +2.91%. Irrespective of a positive compound annual growth rate, the state still remained in the lowest rank states with rank 19 in 2009-10. The most noticeable and prominent change was observed for Chhattisgarh. Chhattisgarh's rank was 12 in 2004-05. The sharp increase in the rank brought it in the top 5 states. The compound annual growth rate of Chhattisgarh was also favorable (+2.77%). Except West Bengal, Assam and Chhattisgarh, the compound annual growth rate has been a negative value indicating that, on an average, the level of employment in rural manufacturing has declined in all the states of India since 2004-05.

Rural Manufacturing Development: Regional Pattern

The regional pattern of employment in rural manufacturing was further explored with the help of dummy variable regression model that is an exact analogue of the analysis of variance that is usually employed for such purpose. The results for these are depicted in Table 2 and clearly bring out the regional pattern. Four intercept dummies were generated to study the impact of cropping pattern regions, northern and southern states regions, high and low per capita income regions and coastal and non-coastal regions on the employment in rural manufacturing. The results given in table 2 reveal no significant difference between the wheat producing and rice producing states in the level of employment in the rural manufacturing sector. The size of rural manufacturing employment also does not differ significantly in the northern states and southern states. Further states with high per capita income and low per capita income also do not have any significant difference in the size of the rural manufacturing employment.

Table 2: Regional Pattern of employment in Rural Manufacturing

Dependend Variable: (a) Males Employed in Rural Manufacturing in 2004-05. (b) Males Employed in Rural Manufacturing in 2009-10.					
		Intercept	Differential Intercept	R^2	Adjusted R^2
Coastal (D=0) Vs Non-Coastal (D=1) States	(a)	19.543 (13.273)[a]	6.007 (2.580)[a]	0.270	0.229
	(b)	15.387 (10.968)[a]	6.511 (2.846)[a]	0.310	0.272
Northern (D=0) Vs Southern (D=1) States	(a)	20.850 (13.680)[a]	3.653 (1.313)	0.087	0.037
	(b)	17.236 (10.908)[a]	2.518 (0.873)	0.041	-0.013
Rice(D=0) Vs Wheat/Cotton (D=1) Producing States	(a)	22.375 (12.475)[a]	-0.954 (-0.357)	0.007	-0.048
	(b)	18.929 (10.053)[a]	-1.876 (-0.704)	0.027	-0.027
Less (D=0) Vs Highly (D=1) Developed States	(a)	19.709 (11.364)[a]	4.474 (1.624)	0.156	0.109
	(b)	16.098 (8.936)[a]	3.786 (1.486)	0.109	0.060

Note: 1. Figures in the parenthesis are t values.
2. a indicates 1% level of significance.
3. From the regression equation Y = a + b D + u.
4. No. observations =20 for 2004-05 and 2009-10.

In all these three cases, the differential intercept dummy is not significant even at 10% level. Only in the case of coastal and non-coastal regions, a significant difference in the development of rural manufacturing was found. In the states of coastal regions, rural manufacturing employment was significantly higher than in non-coastal states. The differential intercept is significant at 1% level and has a positive sign. Thus significant regional pattern was seen in rural manufacturing employment in the coastal and non-coastal states. In the coastal states, rural manufacturing activities related to fisheries and shipping may be more developed and that may be responsible for this pattern. Also coastal region states are generally more developed compared to non-coastal region states due to favorable physical location for international trade.

Factors Impacting Interstate Variations in Rural Manufacturing Employment

In this section, we have tried to explore the factors responsible for the interstate variation in rural manufacturing employment. The analysis of determinants of rural manufacturing employment would help in understanding how the potential of rural manufacturing can be increased. Following factors were shortlisted as being responsible for development of rural manufacturing employment on the basis of clues from economic literature; and their impact was explored with the help of univariate and multivariate analysis namely Level of Development of the state proxied by per capita income of each state, level of literacy, degree of urbanisation measured by the percentage of urban population to total population, level of Agricultural Development measured by NSDP from agriculture per 1000 hectares of net sown area and urban Manufacturing Development level was proxied by persons employed in urban manufacturing as a proportion of persons employed in urban non farm sector .

Testing the Validity of Pooling

In this paper, 20 major Indian states have been intensively studied, making the number of observations too small. So before proceeding to the main determinants impacting rural manufacturing employment, it is imperative to increase the number of observations by adopting pooling technique. Table 3 and Appendix table 1 shows the results of dummy variable technique for testing validity of pooling.

Table 3:Testing the Validity of Pooling

Independent Variables	Dependent variable :Males Employed in Rural Manufacturing			
	2004-05		2009-10	
	Intercept Coefficient	Slope Coefficient	Intercept Coefficient	Slope Coefficient
Level of Development	0.682 (0.399)	0.236 (1.390)	-0.777 (0.633)	0.349 (0.500)
Literacy Rate	3.839 (1.822)[c]	-0.189 (-0.374)	1.464 (-0.594)	0.318 (0.542)
Degree of Urbanisation	1.762 (3.878)[a]	0.407 (2.862)[a]	1.436 (-0.518)	0.425 (0.094)
Level of Agricultural	3.203	-0.118	2.922	-0.056

Development	(30.320)[a]	(-1.879)[a]	(-0.952)	(0.684)

Table 3 and Appendix Table 1 shows the summary information on tests of pooling of data for the years 2004-05 and 2009-10. It is clear from the table that both the differential intercepts and differential slope intercepts for the independent variables, namely, level of development of a state, literacy rate, degree of urbanisation and level of agricultural development were found to be insignificant. Thus, since no structural transformation was observed, to examine the main factors impacting employment in rural manufacturing, univariate and multivariate regression analysis can be adopted with pooled data of 2004-05 and 2009-10.

Univariate Results

The univariate results showing the impact of each explanatory variable on employment in rural manufacturing are presented in table 4. A careful look at the results in table 4 reveals that coefficient of degree of urbanisation has a positive and highly significant (at 1% level) impact on the employment in rural manufacturing sector. A one percent increase in the degree of urbanisation leads to 0.4% increase in the employment in the rural manufacturing. So the states which have higher degree of urbanisation have more employment in the rural manufacturing sector. It is clearly evident if we relook at table 1.The highest employment in rural manufacturing is found in West Bengal, Gujarat and Tamil Nadu which have the highest proportion of urban population.

Table 4:Univariate regression analysis: Factors impacting employment in Rural Manufacturing

Explanatory Variables (log form)	Estimated Regression Coefficients			
	Intercept Coefficient	Slope Coefficient	R^2	Adjusted R^2
Level of Development	1.145 (0.974)	0.177 (1.533)	0.058	0.033
Literacy Rate	4.688 (2.921) [a]	-0.411 (-1.087)	0.030	0.005
Degree of Urbanisation	1.746 (5.101) [a]	0.371 (3.532) [a]	0.247	0.227
Level of Agricultural Development	3.077 (37.955) [a]	-0.096 (-2.075) [b]	0.102	0.078

Notes:

1. Figures in parenthesis are t-values.
2. a and c indicates 1% and 10% level of significance for a two tailed t-test, respectively
3. Number of observations = 40.
4. Equation estimated: double log form.

In the case of impact of level of agricultural development, it was found that higher levels of agricultural development have negative and significant impact on the interstate variations in the employment in rural manufacturing sector. In the case of literacy rate and level of development, no significant impact on the development of rural manufacturing sector is revealed. In a nut shell, the univariate analysis of factors affecting interstate variation in the employment in rural manufacturing has pointed towards degree of urbanisation as one of the major factor impacting rural manufacturing employment.

Multivariate Results

The univariate results are quite useful as a preliminary explanatory exercise, but not very reliable because the role of other factors is not controlled. To confirm the impact of these factors, as revealed by univariate results (table 4), a multivariate exercise by including different permutation and combination of the three explanatory variables was done. The results are reported in appendix table 2.On examining the impact of level of development on interstate variations in rural industrialization in a multivariate regression analysis, it was found that literacy rate has a negative impact on the level of rural industrialization, though the univariate results did not show any impact. The impact of level of agricultural development on the level of rural industrialization in a state was negative as indicated in the univariate analysis. The degree of urbanisation was found to be the only one of the variables impacting rural industrialization positively .The positive impact of urbanisation on rural manufacturing employment shown by our results can work through both demand and supply side channels. The demand side linkages indicate the linkages that arise due to the demand by the urban population for goods manufactured by rural industrial sector. One of the main reasons for urbanisation is the migration of population from the rural areas to the urban areas. This chunk of population, now in the urban area, has very low incomes. Thus, they cannot afford to purchase high priced commodities manufactured in the urban area. The rural areas adjacent to urban centers can meet the demand for such goods leading to small production units coming up in the rural sector. Another channel though which employment in rural manufacturing can be positively and favourably impacted by urbanisation is through the supply side linkages. Supply side linkages

indicate the linkages that arise due to the supply of goods manufactured from the rural areas to cater to the needs of the urban industries. It has been generally observed that factors of production like raw materials, labor, land, etc are available at a lower cost in the rural areas. So, it becomes profitable for the urban industrial sector to purchase the ancillary products from the rural area, impacting favorably the development of rural industries. This explanation needs to be further verified before drawing any substantive significant conclusion on the supply side linkages arising due to urbanisation on employment in rural manufacturing.

Impact of Urbanisation: A Disaggregated View

In the light of the discussion in the previous section, we tried to explore or rather disaggregate the impact of degree of urbanisation to locate the more probable channel through which it may be contributing to the employment generation in rural manufacturing sector. More than the demand side linkages, supply side linkages are expected to impact rural manufacturing. The supply side linkages could lead to the development of the ancillary industry in the rural areas. Thus, an exploration needs to be undertaken to study whether the development of the urban manufacturing sector leads to the employment generation in the rural manufacturing sector, which is used as an indicator of supply side impact of degree of urbanisation mentioned earlier.

For this purpose a new explanatory variable, namely urban manufacturing development, was introduced in our analysis. Urban manufacturing development was studied by taking persons employed in the urban manufacturing sector as a proportion of persons employed in the urban non farm sector as no separate data on NSDP originating in urban manufacturing is available. Structural transformation of data for urban manufacturing sector for the years 2004-05 and 2009-10 was done and no significant results were obtained (The results can be seen in appendix table2). Thus pooling of data on urban manufacturing development was done.

A regression analysis was undertaken with degree of urbanisation, along with urban manufacturing development, as the independent variables and employment in rural manufacturing as the dependent variable. The summary of the results are mentioned in table 5. The slope coefficient of degree of urbanisation which was consistently significant in all the multivariate regressions in the previous section became insignificant when the aforementioned regression analysis was done, with urban manufacturing development as the controlled variable. It was further observed that the coefficient of urban manufacturing development became highly significant, indicating that the impact of degree of urbanisation was mainly through the development of the urban manufacturing sector. It simply means that, as the level of urban manufacturing sector improved, so did the employment in the rural manufacturing. Due to a high level of development of the urban manufacturing sector, smaller ancillary production units were established in the rural areas, mainly due to low cost of production (land, labour, raw material, etc) in the rural areas.

Table 5:Impact of urban manufacturing development and degree of urbanisation

Dependent Variable: Log (Males employed in rural industries)	
Estimated Regression Coefficients	
Intercept coefficient	0.717 (2.384) [a]
Slope Coefficient for Urban Manufacturing Development	0.768 (6.001) [a]
Slope Coefficient for Degree of Urbanisation	-0.037 (-0.368)
R^2	0.618
Adjusted R^2	0.598

Notes:

1. Figures in parenthesis are t-values.
2. a indicates 1% level of significance for a two tailed t-test.
3. Number of observations = 40.
4. Equation estimated: double log form.

On close observation, it was noticed that the value of R^2 and adjusted R^2 also improved to nearly 62% and 60% (in case of rural males), indicating that this particular model was a better fit than any of the multivariate regression analysis in the previous section. Thus, the main determinant impacting employment in rural manufacturing in a state was found to be degree of urbanisation, impacting via its supply side linkages, which comprised development of the urban manufacturing sector.

To confirm the result that the supply side linkages are quite prominent in impacting the level of employment in rural manufacturing, univariate impact of level of development in urban manufacturing sector on employment in rural manufacturing. The results have been enumerated in table 6.

Table 6: Assessing the impact of urban manufacturing development on the employment in rural manufacturing

Dependent Variable: Log (Males employed in rural industries)	
Estimated Regression Coefficients	
Intercept coefficient	0.692 (2.389) [a]
Slope Coefficient	0.736 (7.825) [a]
R^2	0.617
Adjusted R^2	0.607

Notes:

1. Figures in parenthesis are t-values.
2. a indicates 1% level of significance for a two tailed t-test.
3. Number of observations = 40.
4. Equation estimated: double log form.

The slope coefficient of the level of development of urban manufacturing sector was significant at 1% level of significance. This clearly indicates a strong impact of the level of urban manufacturing sector on the level of rural manufacturing across the states of India. The R^2 came out to be approximately 0.61. So, 61% of total interstate variation in the level of employment in rural manufacturing is explained by the level of development of urban manufacturing sector. The regression coefficient 0.736 is highly significant at 1% level (7.825) indicating thereby 0.75% change in the level of development of the rural manufacturing as a result of 1% increase in the level of development of urban manufacturing sector (rural males).

At this juncture, it is worth noting the impact of the development of urban manufacturing sector on the employment in rural manufacturing taking the other explanatory variables as controlled variables. When such an endeavor was undertaken, the results obtained, depicted in table 7, were found to be quite intriguing.

Table 7:Assessing the impact of level of urban manufacturing development

Dependent Variable : Log (Males employed in Rural Manufacturing)				
Eq. No.	Control Variables	Coefficient	R^2	Adjusted R^2
1.	Univariate Coefficient	0.736 (7.825)[a]	0.617	0.607
2.	Degree of Urbanisation	0.768 (6.001) [a]	0.618	0.598
3.	Level of Agricultural Development	0.706 (7.280) [a]	0.631	0.611
4.	Level of Development	0.847 (8.000) [a]	0.655	0.636
5.	Literacy Rate	0.759 (8.658) [a]	0.679	0.662
6.	Level of Agricultural Development and Degree of Urbanisation	0.704 (5.025) [a]	0.631	0.600
7.	Level of Development and Degree of Urbanisation	0.824 (6.521) [a]	0.656	0.627
8.	Level of Development and Level of Agricultural Development	0.817 (7.564) [a]	0.669	0.641
9.	Level of Development and Literacy Rate	0.773 (6.873) [a]	0.680	0.653
10.	Level of Agricultural Development and Literacy Rate	0.748 (8.032) [a]	0.681	0.654
11.	Literacy Rate and Degree of Urbanisation	0.676 (5.560) [a]	0.688	0.662
12.	Level of Development, Level of Agricultural Development and Urbanisation	0.749 (5.554) [a]	0.675	0.638
13.	Level of Development, Level of Agricultural Development and Literacy Rate	0.771 (6.783) [a]	0.682	0.646
14.	Level of Development, Literacy Rate and Degree of Urbanisation	0.692 (4.927) [a]	0.688	0.653
15.	Level of Agricultural Development, Literacy Rate and Urbanisation	0.648 (4.195) [a]	0.691	0.655
16.	Level of Development, Level of Agricultural Development, Degree of Urbanisation and Literacy Rate	0.674 (4.700) [a]	0.693	0.648

Notes:
1. Figures in parenthesis are t-values.
2. a indicates 1% level of significance for a two tailed t-test.
3. Number of observations = 40.
4. Equation estimated: double log form.

The multivariate regression analysis with different combinations of the explanatory variables as controlled variables projected a positive and highly significant impact (at 1% level of significance) of level of urban manufacturing development on employment in rural manufacturing sector. On close observation, it was found that when level of agricultural development, level of development, literacy rate and degree of urbanisation were taken as controlled variables, the impact of the level of development of urban manufacturing sector on employment in rural manufacturing gave the highest values of R^2 and adjusted R^2, indicating that this model is the best fit model in our analysis.

Table 8: Main determinants impacting employment in rural manufacturing

Dependent Variable : Log (Males employed in Rural Manufacturing)	
Independent Variables (log form)	Estimated Regression Coefficients
Intercept Coefficient	3.447 (3.224) [a]
Level of Development	-0.063 (-0.493)
Level of Urban Manufacturing Development	0.674 (4.700) [a]
Literacy Rate	-0.538 (-1.406)
Level of Agricultural Development	-0.026 (-0.733)
Degree of Urbanisation	0.123 (1.107)
R^2	0.693
Adjusted R^2	0.648

Notes:
1. Figures in parenthesis are t-values.
2. a indicates 1% level of significance for a two tailed t-test.
3. Number of observations = 40.
4. Equation estimated: double log form.

The table 8 was tabulated after running a regression analysis with level of development, literacy rate, degree of urbanisation, level of agricultural development and level of urban manufacturing development as the explanatory variables. When males employed in rural manufacturing were taken as the dependent variable, it was found that all the slope coefficients were insignificant, except for the slope coefficient of level of urban manufacturing development. In the multivariate regression analysis, the best fit model was found to be with explanatory variables level of development, literacy rate, level of agricultural development and degree of urbanisation. On introduction of a new variable, namely, development of urban manufacturing sector, all the previously significant slope coefficients turned insignificant, making only the newly introduced variable having a significant and impactful coefficient. Thus, with the introduction of urban manufacturing development in our model, all the results turned insignificant except for the slope coefficient of urban manufacturing development.
Thus, to conclude, it can be said that the level of development of urban manufacturing sector is closely related to degree of urbanisation of the states. So the supply side linkages seem to be working in level of development of rural manufacturing sector. The subsidiary and ancillary units come up in rural areas in the state where urban manufacturing sector is highly developed. As a result, the urban manufacturing sector leads to increase in the level of employment in rural manufacturing as a spillover effect.

Policy implications of the study

The Government of India has adopted innumerable policies and programmes for the development of rural industries in India. The Planning Commission has devoted a full-fledged committee for the small and village industries sector. Irrespective of the endless list of measures, policies and programmes adopted, employment in the rural manufacturing sector has failed to develop. In Section I, declining trends have been noticed in employment in rural manufacturing for majority of the states. Further, on an average, the employment statistics of employment in rural manufacturing for India has been on a decline from the time period 2004-05 to

2009-10 (as indicated by the mean). Thus, a way out to the declining trend in the level of employment in rural manufacturing is the need of the hour.

In India, it has been observed that the growth of the urban manufacturing sector has declined over the period of time. In 2004-05, the level of development of the urban manufacturing sector was 24.6%. In 2009-10, it was observed that the level of development of the urban manufacturing sector declined to 23%. This decline in the level of development of the urban manufacturing sector has led to the decline in the level of employment in the rural manufacturing in India .

Thus, the most urgent need is to upgrade India's physical infrastructure to encourage domestic and foreign direct investment in the urban manufacturing sector. The spillover effects will help develop rural manufacturing and thus lead to diversification of the occupational structure.

The moderate interstate variations in the level of employment in rural manufacturing during 2004-05 and 2009-10 can be reduced by promoting the manufacturing sector in the urban areas. This will cause its repercussions on the rural manufacturing and bridge the gap within the various states of India.

In conclusion, the results of the study suggest that growth of employment in rural manufacturing is linked to the growth of the urban manufacturing sector. If the development in urban manufacturing sector declines, the spillover effects also reduce employment in rural manufacturing. So, this study has brought out that the thrust of the present day policies on employment in rural manufacturing is misplaced. That is why even with so many policies to boost the employment in rural manufacturing, no positive impact has been noticeable on the level of employment in rural manufacturing sector.

Appendix table 1
Summary information on tests for pooling of
2004-05 and 2009-10 data

Dependent Variable (log form) : Males Employed in Rural Industries		Significance of Differential Intercept/Slope Intercept for 2009-10		
S. No.	Independent Variables	Dependent Variables	A	B
1.	Level of Development	Rural Males	NS	NS
2.	Literacy Rate	Rural Males	NS	NS
3.	Degree of Urbanisation	Rural Males	NS	NS
4.	Level of Agricultural Development	Rural Males	NS	NS

Notes:

1. A = Differential intercept coefficient for 2009-10.
   B = Differential slope coefficient for 2009-10.
2. NS = Not Significant.

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