How Diversified is the Informal Manufacturing Sector Across Indian States?

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Abstract

The present paper examines the structure and diversification of informal manufacturing sector across Indian states. Using the National Sample Survey "quinquennial" rounds on unorganised manufacturing enterprises in India for the years 1994-95, 2005-06, and 2010-11, we have analysed the industrial structure of the states at two-digit industry level by employing location quotient and examined the degree of diversification of informal manufacturing sector in different states by employing diversification coefficient. We have also examined the co-location of informal manufacturing enterprises across states. The results show that most of the states have a narrow industrial base and diversification does not appear to be very wide across states. The findings provide strong evidences for significant positive correlation between the diversification of informal manufacturing sector and level of industrial development, and the presence of co-location of informal manufacturing enterprises across states.

Keywords: Industrial Base, Industrial Structure, Location Quotient, Diversification Coefficient, Informal Manufacturing Enterprises

Introduction

The informal manufacturing sector, also known in India as unorganised manufacturing sector,[1] plays a crucial role in India's industrial sector. The strategic role of informal manufacturing sector is mainly attributed to the greater prospects for creation of employment opportunities, especially for the semi-skilled and less educated workers that comprises most of the working poor in India (Sen, 2009), together with its contribution in terms of production, income generation, capital accumulation, and exports. The sector accounts for over 99 percent of manufacturing units, over 80 percent of manufacturing employment, and about 30 percent of manufacturing value added in India during 2010-11. The sector is not only vast, but also highly diverse, comprising a wide range of manufacturing activities dispersed all over the country in both rural and urban areas.

There is a large body of literature on growth, productivity, and employment in the informal manufacturing sector in India (Unni, Lalitha, & Rani, 2001; Mukherjee, 2004; Rani & Unni, 2004; Kathuria, Raj, & Sen, 2010, 2013; Raj, 2011). However, there are hitherto little or no studies that analyse the structural base and extent of diversification of informal manufacturing sector in India, both at the national and sub-national (state) levels. The existing studies on the industrial diversification in India have largely focused on the organised segment of the manufacturing sector and completely overlooked the informal segment (see literature review section).

In this study, we fill this gap in the literature by providing fresh evidence on structural base and extent of diversification of informal manufacturing sector across Indian states. Specifically, the study has the following objectives: (i) to examine the structural base of informal manufacturing sector across Indian states, (ii) to examine the degree of diversification of informal manufacturing sector in different states, and (iii) to examine the co-location of informal manufacturing enterprises across states.

1 The term "informal" is not used officially in India. The officially used term "unorganised" or "unregistered" manufacturing enterprises refers to the enterprises employing 10 or less workers using power and 20 or less workers without using power. The National Sample Survey Organisation (NSSO), which is the principal agency of collecting data on unorganised manufacturing enterprises in India, defines unorganised manufacturing enterprises as manufacturing units other than (i) those registered under sections 2m(i) and 2m(ii) of the Factories Act, 1948 and the Bidi and Cigar Workers (Condition of Employment) Act, 1966; and (ii) those run by government (central, state and local)/public sector enterprises (NSSO, 2012).

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The rest of the paper is organised as follows: importance of industrial diversification, review of existing studies, data source, methodology, structure of informal manufacturing sector, industrial base of the states, diversification of informal manufacturing sector, diversification and extent of industrialisation, co-location of informal manufacturing enterprises, and conclusion.

Importance of Industrial Diversification

Industrial diversification refers to the variety of industrial activities in a region. In the literature, the term diversification has been defined variously as – (a) the presence in an area of a great number of different types of industries (Rodger, 1957), (b) the extent to which economic activity of a region is distributed among a number of categories (Parr, 1965), and (c) balanced employment across industry classes (Attaran, 1986). In this study, we define industrial diversification as the degree of spread of industries in a region.

Diversification of industry has long been an important policy goal in regional planning in many countries, especially after the great depression of the 1930s (Dissart, 2003). The role of diversification has received considerable attention because of the widely held belief that industrial diversification has direct effect on economic growth and stability. Researchers have unanimously recognised that industrial diversification increases the aggregate and per-capita income, increases growth rates, reduces unemployment rates, and stabilises the level of aggregate and per-capita income, employment, and other regional economic characteristics (Rodger, 1957; Conroy, 1975; Kort, 1981; Simon, 1988; Trendle & Shorney, 2003; Izraeli & Murphy, 2003; Trendle, 2006). A diversified industrial structure promotes positive externalities through inter-industry technology spillovers across sectors (Jacobs, 1969; Chakravorty & Lall, 2007), which in turn, facilitate economic growth through returns to agglomeration (Attaran & Zwick, 1987; Pede, 2013). Further, the more diversified a region, the greater its ability to mitigate the adverse effects of business cycles (Hackbart & Anderson, 1975; Attaran & Zwick, 1987).

There is, however, a trade-off that policymakers are faced with to choose between industrial diversification and specialisation. The traditional economic theory suggests that specialisation on the basis of comparative advantage enhances economic growth. This rationale explains that growth requires specialisation on the industries that the regions have comparative advantage over other regions. The downside of specialisation is that it could lead to high unemployment and economic instability (Attaran & Zwick, 1987; Izraeli & Murphy, 2003). The solution to the problem is industrial diversification, which acts as a means to achieve economic stability. Therefore, the choice between industrial diversification and specialisation depends on whether policymakers seek to achieve high growth or economic stability. The policymakers wishing to achieve a stable economic growth would see a diverse industrial mix as the desirable goal of economic development.

Review of Existing Studies

The industrial structure in India has been dominated by traditional resource-based industries, the origin of which dates back to the British rule in India. Roy (2000) examines India's industrial structure during the colonial period (1921 to 1931) and finds that the industrial structure was, by and large, dominated by resource-based industries (cotton textiles, food, drinks and tobacco products, metals, minerals, woods, stones and glass, hides and skins) and labour-intensive industries. The textile industries dominated the industrial structure with about one-fourth share of total industrial workers, followed by metal and machinery; food, drinks and tobacco products; woods, stones and glass; chemicals, and hides and skins. Roy further shows that the industrial structure remained more or less unchanged even after three decades of economic planning in the country; textiles and food products accounted for 29.6 and 16.2 percent of industrial workers respectively in 1981. Bhat (2013) also exhibits high degree of specialisation in India's industrial structure. The study shows that about 60 percent of gross value added of the manufacturing sector was generated in the largest five industry groups (chemical products, basic metals, textiles, food products and beverages, and machinery and equipment) over the period 1991-92 and 2006-07.

In the context of the states, Alagh, Subrahmanian, and Kashyap (1971) examine the industrial structure of 15 major states (in terms of employment of organised manufacturing sector) at three-digit industry level for the period 1956 to 1965 and find that industrial base of most of the states were dominated by resource-based industries and there had been barely any structural shift

in the industrial structure during this period. They further find that Maharashtra, Tamil Nadu, and West Bengal were the most diversified states, while Andhra Pradesh, Gujarat, Madhya Pradesh, Mysore (Karnataka), Punjab, and Uttar Pradesh were the moderately diversified states and Assam, Bihar, Jammu and Kashmir, Kerala, Odisha, and Rajasthan were the least diversified states. Their conclusion is that the developed states, by and large, have more diversified industrial structure compared to the less developed states.

The Central Statistical Organisation in its *Monthly Abstract of Statistics* of July 1981 (CSO, 1981) reports estimates of location quotients and specialisation coefficients (in terms of factory sector value added) for major industry groups and different states respectively for the year 1976-77. The findings show that Maharashtra, Tamil Nadu, West Bengal, Karnataka, Andhra Pradesh, Rajasthan, Uttar Pradesh, Punjab, and Haryana were the diversified states in descending order, whereas Manipur, Meghalaya, Tripura, Assam, Orissa (Odisha), Jammu and Kashmir, and Himachal Pradesh were the specialised states. The study finds statistically significant positive relationship between the degree of diversification and level of industrialisation of the states, the later being measured by percentage share of manufacturing in net state domestic product (NSDP).

In Alagh, Kashyap, Shah, and Awasthi (1983) the industrial structure of the major states was examined (using specialisation coefficient) over the period 1960 and 1978. Evidence for remarkable industrial diversification was found for Andhra Pradesh, Gujarat, Haryana, Himachal Pradesh, Karnataka, Maharashtra, Punjab, and Tamil Nadu, whereas Bihar, Jammu and Kashmir, Kerala, Madhya Pradesh, Orissa (Odisha), Rajasthan, Uttar Pradesh, and West Bengal could not diversify their industrial structure. Awasthi (1991) concludes that though the Indian states, more or less, have diversified their industrial structure during 1961 to 1978, the industrial bases of most of the states have been dominated by resource-based industries. Awasthi also observes that the regional industrial structure has shown a tendency towards change from traditional consumer oriented industries to capital goods industries and the industrially developed states have a diversified industrial structure, which implies that industrial diversification leads to industrial development and vice-versa.

While the above studies focused on mainly the organised manufacturing sector, Papola, Maurya, and Jena (2011) examine the industrial structure of the states/union territories (UTs) in both the organised and unorganised segments of India's manufacturing sector respectively for the year 2006-07 and 2005-06. They find a high degree of specialisation in the industrial structure of the states in case of both the segments; the largest five industry groups accounted for over 75 percent of employment in 17 states/ UTs in the organised segment and in 31 states/ UTs in the unorganised segment. They also observe that the product structure of states appears to be much more diversified in the case of the unorganised manufacturing sector than the organised manufacturing sector. They analyse the industrial base of the states/ UTs with the help of location quotient technique based on National Sample Survey (NSS) data on employment for 2004-05 and find that Maharashtra, Haryana, Delhi, Chandigarh, and Pondicherry have relatively wide industrial base, whereas Manipur, Arunachal Pradesh, Odisha, Jammu and Kashmir, Nagaland, Andaman and Nicobar Island, and Assam have relatively narrow industrial base. Using the coefficients of specialisation they find that Kerala, West Bengal, Andhra Pradesh, Uttar Pradesh, Maharashtra, Rajasthan, Tamil Nadu, Punjab, Karnataka, Haryana, Himachal Pradesh, Gujarat, and Madhya Pradesh were relatively diversified states.

It can be summarised from the review of above studies that although the industrial structure of the states has been somewhat diversifying during the 1970s and afterwards, after a phase of stability during the 1950s and 1960s, yet the industrial structure of most states, especially the industrially backward states, still remains highly specialised and dominated by the traditional resource-based industries even in recent times. The existing studies, no doubt, are comprehensive, but all the studies except Papola *et al*. (2011) have focused on the organised manufacturing sector only. Even as the study by Papola *et al*. (2011) is for one time point (2005-06) only, whereas diversification is a dynamic process, and hence, require spatio-temporal analysis. There is, therefore, a need to analyse the structural base and extent of diversification of the informal manufacturing sector over time.

Data Source

The principal source of data on informal/ unorganised manufacturing enterprises in India is the NSS

"quinquennial" rounds on unorganised manufacturing sector. Started in 1958-59, the NSS, so far, has completed 10 rounds of survey on unorganised manufacturing sector (the other rounds are during 1968-69, 1974-75, 1978-79, 1984-85, 1989-90, 1994-95, 2000-01, 2005-06, and 2010-11). The data used in this study are taken from the 51st (1994-95), 62nd (2005-06), and 67th (2010-11) rounds of the NSS survey. While the data for the 51st and 62nd rounds are derived from the unit level data available on CD-ROMs supplied by the National Sample Survey Office (NSSO), the data for the 67th round are obtained from the published reports (Report No. 546 and 549) of NSSO (NSSO, 2012, 2013).

The changes in the classification of industries and product groups create a lot of problem to get a consistent data set for the three time points. While the 51st round provides information as per National Industrial Classification (NIC) 1987, the 62nd and 67th rounds provide information as per NIC 2004 and NIC 2008 respectively. Therefore, we first reclassify the NIC 1987 codes to NIC 2004 codes at three-digit level following the concordance suggested by CSO (2004) and then aggregated them to arrive at two-digit NIC 2004 codes. Then we identify 11 product groups which can be easily aggregated from the two-digit NIC 2004 and NIC 2008 codes (Table 1). It is worthwhile to note that since we tally the NIC 1987 and NIC 2004 classifications at three-digit level and NIC 2004 and NIC 2008 classifications at two-digit level, we are unable to cope with changes, if any, below the three-digit level in case of the former and below the two-digit level in case of the later. This is a major limitation of the data set used in the study.

Table 1: NIC 1987, 2004 and 2008 Classifications at Two-Digit Level

Product Groups	*NIC 1987*	*NIC 2004*	*NIC 2008*
Food products	20+21	15	10+11
Tobacco products	22	16	12
Textiles	23+24+25+26	17+18	13+14
Leather products	29	19	15
Woods products	27	20	16
Paper and printing	28	21+22	17+18
Chemical products	30+31+32	23+24+25+26	19+20+21+22+23
Metal and metal products	33+34	27+28	24+25
Machinery and electrical	35-36	29+30+31+32+33	26+27+28+33
Transport and transport equipment	37	34+35	29+30
Furniture and other manufacturing	38	36	31+32

Source: Author's Compilation

For the analytical purpose, we have used the gross value added of informal manufacturing enterprises, which is the additional value created by the process of production by an enterprise and is calculated as the difference between "total receipts" and "total operating expenses". We have considered 11 two-digit industry groups and 26 states of the Indian union for our analysis. These states together accounted for more than 99.5 percent enterprises and gross value added of the informal manufacturing sector during 1994-95 to 2010-11 and more than 99.5 percent of India's total population and geographical area as per 2011 Population Census. Since Bihar, Madhya Pradesh and Uttar Pradesh were bifurcated in 2000 to form the new states of Jharkhand, Chhattisgarh and Uttarakhand respectively, we have merged these three newly created states with the states from which they had been carved out so as to have consistent state identities for the entire study period.

Methodology

The empirical methodology of the study has three steps. In the first step, the industrial structure of the states has been examined by employing location quotient. The location quotient is a measure of relative regional concentration of a given industry compared to national magnitudes. The location quotient is expressed as the ratio of the share of a state's total value added accounted for by a given industry to the share of the country's total value added accounted

for by the same industry. If V_{ik} is the value added in i^{th} industry in k^{th} state, V_k is the value added in all industry in k^{th} state, V_i is the value added in i^{th} industry in all the states, and V is the total value added in all states, then the location quotient of the i^{th} industry in k^{th} state (LQ_{ik}) is computed as:

$$LQ_{ik} = (V_{ik}/V_k)/(V_i/V)$$

The location quotient takes values such that $LQ_{ik} > 1$ when i^{th} industry has a higher share in k^{th} state than its share at the national level and $0 \leq LQ_{ik} < 1$ when i^{th} industry has a lower share in k^{th} state than its share at the national level. The industries with location quotient greater than one constitute the industrial base of the state (Alagh *et al*., 1971; Awasthi, 1991). It is worthwhile to note that the location quotient measures industrial base of a state only relative to the industrial structure of the country. The industries with a higher share in the state's industrial structure compared to the country's industrial structure constitute the industrial base and these industries need not necessarily be the largest in the state (Papola *et al*., 2011). It is expected that industrialised states would have a wider industrial base, since they would be having more industries with a location quotient higher than one.

In the second step, we have employed the diversification coefficient to measure the degree of diversification of informal manufacturing sector. The diversification coefficient measures the extent to which a given state's industrial structure has a diversified pattern relative to the country as a whole. The diversification coefficient is derived by subtracting the sum of the difference of the denominator and numerator of the location quotient of different industries in a state without considering the sign from one. Thus, if there are n numbers of industries, the diversification coefficient for k^{th} state (DC_k) is computed as:

$$DC_k = 1 - \sum_{i=1}^{n} \left| (V_{ik}/V_k) - (V_i/V) \right|$$

The value of diversification coefficient lies between zero and one ($0 \leq DC \leq 1$), where zero implies that the state is completely specialised in one industry and one implies that the state's industrial structure is as diversified as the national industrial structure. Based on the diversification coefficient, we have classified the states into three categories, namely highly diversified states ($0.75 \leq DC \leq 1$), moderately diversified states ($0.50 \leq DC < 0.75$) and least diversified states ($0 \leq DC < 0.50$).

The third step involves analysis of the co-location of informal manufacturing enterprises. Various measures have been developed in the literature to measure the co-location of industries. Chakravorty, Koo, and Lall (2005) suggested for using coefficients of correlation between different industries to examine the existence of co-location. Following their study, we estimate the coefficients of correlation between different industries to examine the co-location of informal manufacturing enterprises across states.

Structure of Informal Manufacturing Sector

Before analysing the structure of informal manufacturing sector of the states let us first look at the structure of the sector at the national level. Table 2 shows the share of the two-digit industry groups in terms of gross value added for 1994-95, 2005-06, and 2010-11. It appears that the informal manufacturing sector of India is mainly comprised of a set of agro-based consumer goods and resource-based intermediate goods industries. The textiles product group alone accounted for over one-fifth of number of enterprises and over one-fourth of gross value added of informal manufacturing sector. The four largest industry groups namely, textiles, food products, other manufacturing, and woods products accounted for more than two-thirds of number of enterprises, whereas textiles, food products, other manufacturing, and chemical products accounted for more than two-thirds of gross value added of the sector during 1994-95 to 2010-11. On the other hand, the share of capital goods industries, such as, machinery and electrical products and transport and transport equipment is very meagre; the sector accounted for just 3-8 percent of number of enterprises and 7-8 percent of gross value added during 1994-95 to 2010-11. Between 1994-95 and 2010-11, the shares of woods products, tobacco products, and food products have declined in number of enterprises, whereas leather products, other manufacturing, and machinery and electrical products adds to the list of industries losing their share in gross value added.

Similar to the country, the informal manufacturing sector of the states also comprised of a small set of industries. However, it is not feasible that the states have a more diversified industrial structure than the national level and/or all the states have all the industries found at the national level. But, a diversified industrial structure is considered

desirable because of its positive impact on industrial growth. We have tried to identify the major industry groups of informal manufacturing sector in different states in terms of their contribution to gross value added (Table 3). In 2010-11, textiles features in the top-four product groups in all states, except Goa. Food products also have a similar presence in all states, except Delhi and Haryana. The next most ubiquitous product groups among the top-four are other manufacturing (appears in 20 states), wood products (appears in 11 states), and chemical products (appears in 10 states).

Table 2: Share of Major Industry Groups in Gross Value Added in India

Industry Groups	*Number of Enterprises*			*Gross Value Added*		
	1994-95	*2005-06*	*2010-11*	*1994-95*	*2005-06*	*2010-11*
Food products	20.68	20.13	18.32	18.32	17.99	14.26
Tobacco products	9.76	7.73	4.12	4.12	3.37	2.63
Textiles	18.76	22.45	20.46	20.46	25.38	30.74
Leather products	1.67	1.64	2.31	2.31	1.59	1.02
Woods products	19.03	14.96	11.25	11.25	6.44	6.34
Paper and printing	1.39	1.86	3.20	3.20	3.26	4.07
Chemical products	8.60	10.99	10.56	10.56	11.50	11.78
Metal and metal products	3.73	4.55	8.03	8.03	9.15	9.87
Machinery and electrical	3.02	3.05	6.79	6.79	6.75	5.66
Transport and transport equipments	0.23	0.42	1.11	1.11	1.26	1.01
Furniture and other manufacturing	13.14	12.21	13.84	13.84	13.31	12.63
Total	100	100	100	100	100	100

Source: Computed from the data derived from NSS 51st, 62nd and 67th rounds.

As far as the largest product group is concerned, different states show more or less a similar pattern. Textiles, being the largest group at the national level, appeared as the largest product group in 16 states in 2010-11 (nine states in 1994-95 and 10 states in 2005-06), whereas food products, the second largest product group at the national level, appeared as the largest product group in six states in 2010-11 (nine states in 1994-95 and 14 states in 2005-06). A single product group accounted for over one-third of gross value added in several states, especially less industrialised states. For instance, food products dominate in Sikkim and Tripura with 74 and 50 percent of gross value added respectively in 2010-11. In Manipur and Gujarat, textiles dominate with 54 and 49 percent of gross value added respectively. Textiles also dominate in Jammu and Kashmir, Tamil Nadu and Andhra Pradesh, though with small share (37, 37 and 36 percent respectively). Paper and printing products is the largest product group in Goa with 52 percent of gross value added. The dominance of single industry has declined during 1994-95 to 2010-11. The cases of single industry contributing more than one-third of gross value added in 1994-95 were 15, which declined to nine in 2005-06 and 2010-11.

The major product groups appear to be more or less similar among the states. In 2010-11, the top-four product groups at the national level namely textiles, food products, other manufacturing, and chemical products are also the top-four product groups in six states (Gujarat, Kerala, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal) and three of them feature among the top-four product groups in 15 states, whereas two of them feature among the top-four product groups in the remaining five states.

The above features suggest a high degree of specialisation in the product structure of informal manufacturing sector in the states. This is also reflected by the fact that the largest four product groups accounted for over 80 percent of gross value added in as many as 11 states, mostly the smaller states in 2010-11 (10 states in 1994-95 and eight states in 2005-06). Among the major states, Gujarat, Uttar Pradesh, West Bengal, and Punjab have over 75 percent of gross value added concentrated in top-four industry groups. On the other hand, the product structure of Haryana, Himachal Pradesh, Madhya Pradesh, and Delhi is relatively diversified with top-four industries contributing less than 70 percent of gross value added.

Table 3: Four Major Industry Groups of the States

States	1994-95					2005-06					2010-11				
	I	II	III	IV	% share	I	II	III	IV	% share	I	II	III	IV	% share
Andhra Pradesh	15	20	17-18	36	68.17	15	17-18	20	23-26	74.91	17-18	15	20	36	75.47
Arunachal Pradesh	15	27-28	36	17-18	98.71	15	27-28	17-18	36	97.03	15	36	20	17-18	85.89
Assam	15	36	17-18	23-26	78.48	15	17-18	36	20	82.44	17-18	15	36	27-28	84.29
Bihar	15	20	23-26	36	76.81	15	20	16	27-28	68.04	15	17-18	36	20	72.48
Delhi	17-18	29-33	27-28	36	69.34	17-18	27-28	19	29-33	73.36	17-18	29-33	36	21-22	68.53
Goa	15	36	27-28	23-26	80.19	15	36	29-33	27-28	69.39	21-22	36	15	27-28	89.52
Gujarat	36	17-18	27-28	15	81.68	36	17-18	29-33	23-26	76.05	17-18	36	23-26	15	82.74
Haryana	17-18	23-26	27-28	29-33	72.03	17-18	15	27-28	29-33	67.52	17-18	27-28	23-26	29-33	63.31
Himachal Pradesh	15	20	23-26	17-18	76.27	29-33	17-18	15	23-26	75.71	36	17-18	15	20	65.43
Jammu & Kashmir	15	20	19	23-26	74.40	17-18	23-26	15	20	85.15	17-18	20	15	27-28	88.56
Karnataka	17-18	15	20	23-26	66.94	15	17-18	23-26	27-28	79.58	17-18	15	27-28	23-26	72.11
Kerala	15	17-18	20	36	72.11	17-18	36	15	23-26	73.32	15	17-18	36	23-26	70.62
Madhya Pradesh	20	15	36	17-18	82.46	23-26	17-18	15	27-28	69.79	17-18	15	23-26	20	68.51
Maharashtra	17-18	15	27-28	23-26	58.20	36	17-18	29-33	23-26	72.64	17-18	27-28	15	36	72.04
Manipur	17-18	36	20	15	97.31	17-18	36	15	20	91.92	17-18	20	36	15	91.82
Meghalaya	15	20	36	17-18	90.01	23-26	15	20	17-18	74.29	17-18	15	20	36	80.60
Mizoram	36	15	17-18	27-28	85.29	36	17-18	15	21-22	84.56	36	17-18	27-28	15	80.70
Nagaland	17-18	15	36	20	89.62	15	17-18	36	20	88.76	17-18	15	20	34-35	83.57
Orissa	15	20	17-18	36	65.67	15	23-26	20	17-18	77.68	15	17-18	23-26	20	72.52
Punjab	15	29-33	17-18	23-26	64.22	17-18	15	36	29-33	62.06	17-18	15	36	27-28	75.64
Rajasthan	15	23-26	20	36	68.79	17-18	23-26	15	36	79.31	36	17-18	23-26	15	71.11
Sikkim	17-18	36	15	20	96.91	15	36	17-18	23-26	89.64	15	36	17-18	27-28	99.11
Tamil Nadu	17-18	15	36	29-33	69.18	17-18	23-26	15	27-28	71.18	17-18	15	23-26	36	71.04
Tripura	15	36	20	17-18	83.43	23-26	20	36	15	86.41	15	36	20	17-18	90.80
Uttar Pradesh	17-18	15	23-26	20	67.80	17-18	15	27-28	23-26	74.04	17-18	23-26	15	36	76.93
West Bengal	15	17-18	16	36	68.07	17-18	15	36	29-33	68.69	17-18	23-26	15	36	76.93
All India	17-18	15	36	20	63.87	17-18	15	36	23-26	68.17	17-18	15	36	23-26	69.41

Notes: Industry codes are as per NIC 2004 codes as given in Table 1.

Source: Based on Author's estimation on the basis of gross value added of informal manufacturing sector derived from NSS 51st, 62nd and 67th rounds

Industrial Base of the States

The industrial base ("informal manufacturing base" in this case) of the states has been examined by estimating location quotients of individual industries in terms of gross value added of informal manufacturing enterprises. The industries with a location quotient higher than one constitute the industrial base of the state. Table 4 reports the estimated location quotients of individual industries in different states for 1994-95, 2005-06, and 2010-11. It can be seen from the table that agro-based and resource-based traditional industries comprised the informal manufacturing base in most states. Capital goods industries, on the other hand, are confined mostly to the developed states, such as, Delhi, Haryana, Maharashtra, Punjab, and Tamil Nadu; and to some extent to Himachal Pradesh, Meghalaya, Nagaland, and Odisha in recent years and to Goa, Gujarat, Jammu and Kashmir, Karnataka, Madhya Pradesh, Uttar Pradesh, and West Bengal in the earlier years.

Industrial base of Punjab is relatively wide consisting of seven (out of 11) industries in 2010-11. Himachal Pradesh comes next with six industry groups having a location quotient higher than one, followed by Tamil Nadu, Delhi, Haryana, Bihar, Madhya Pradesh, Assam, and Meghalaya each with five industry groups in that category. Sikkim has the narrowest industrial base with only one industry group having a higher than one location quotient in 2010-11, followed by Goa with two industry groups in that category. Gujarat, Jammu and Kashmir, Manipur, Nagaland, Tripura, and Uttar Pradesh also have a narrow industrial base each with three industry groups having a location quotient higher than one. So is for Andhra Pradesh, Arunachal Pradesh, Karnataka, Kerala, Maharashtra, Mizoram, Odisha, Rajasthan, and West Bengal; each have four industry groups with location quotients greater than one. Incidentally, the most industrialised state Gujarat has only three industry groups constituting her industrial base. So is for Maharashtra (four industry groups), Delhi and Tamil Nadu (five industry groups each). Similarly, the larger states like Andhra Pradesh, Bihar, and Madhya Pradesh also have narrow industrial bases (3-5 industry groups). Contrarily, a smaller state like Himachal Pradesh has six industry groups constituting her industrial base in 2010-11 (though only three industry groups in 1994-95 and 2005-06). Similarly, Goa has seven industry groups constituting her industrial base in 2005-06 (though the number has declined to two in 2010-11).

Over the period 1994-95 and 2010-11, considerable changes have been observed in the industrial base of the states. Industrial base of Madhya Pradesh, Punjab, Himachal Pradesh, and Arunachal Pradesh have considerably become wider. Other states that have widened their industrial base to some extent are Assam, Kerala, Meghalaya, Tamil Nadu, Mizoram, West Bengal, Gujarat, and Nagaland. On the other hand, industrial base of Uttar Pradesh and Goa have significantly become narrower, while that of Sikkim, Delhi, Andhra Pradesh, Karnataka, Maharashtra, Rajasthan, and Jammu and Kashmir have become marginally narrower. Despite these changes, industrial base of most of the states, on the average, continues to comprise of a set of agro-based consumer goods and resource-based intermediate goods industries, whereas capital goods industries are mostly confined to the developed states, such as, Delhi, Haryana, Maharashtra, Punjab, and Tamil Nadu.

Looking at the industries comprising the industrial base of the states it appears that industrial bases of the eastern states (Bihar, Odisha, and West Bengal) are comprised of a set of agro-based consumer goods and leather, woods and chemical-based intermediate goods industries. West Bengal also has textiles in its industrial base, whereas capital goods industries are also in industrial base of Odisha and West Bengal. In the north, Delhi, Haryana, Himachal Pradesh, and Punjab have industrial base in capital goods industries, such as, machinery and transport equipment, apart from intermediate goods industries, such as, textiles, leather products, paper and printing, woods products, and chemical products. Himachal Pradesh and Punjab have also food products in their industrial base. Of the other states in the region, Jammu and Kashmir and Uttar Pradesh have industrial base in food products, textiles, woods products, and chemical products; whereas Rajasthan has industrial base in intermediate goods industries, such as, leather products, paper and printing, chemical products, and other manufacturing. In the south, industrial base of Andhra Pradesh is comprised of agro-based consumer goods and textiles and woods-based intermediate goods industries; industrial base of Karnataka is comprised of food and tobacco products, woods products, and metal products; industrial base of

Kerala is comprised of food products, woods products, and chemical products; and industrial base of Tamil Nadu is comprised of tobacco-based consumer goods industries, textiles and paper-based intermediate goods industries, and capital goods industries. In the central region, industrial base of Madhya Pradesh is comprised of a set of agro-based and leather, woods, chemical and metal-based intermediate goods industries. In the western region, Maharashtra's industrial base is comprised of a set of capital goods industries like machinery and transport equipment and intermediate goods industries like leather product, paper and printing, and metal products. Industrial base of Gujarat is comprised of a small set of industries like textiles, metal products, chemical products, other manufacturing, and machinery and electrical. Goa has industrial base in a wide range of industries, such as, food products, paper and printing, metal products, other manufacturing, machinery, and transport equipment; but in recent years its industrial base is comprised of only paper and printing and other manufacturing industries. Industrial bases of the north-eastern states are comprised of a set of agro-based consumer goods, woods-based intermediate goods, and other manufacturing industries. Manipur and Nagaland also have textiles in their industrial base. To a lesser extent, in recent years, some intermediate goods industries have appeared in the industrial base in some states; for instance, textiles in Assam; metal products in Assam and Mizoram; chemical products in Meghalaya; and transport and equipment in Meghalaya and Nagaland.

Diversification of Informal Manufacturing Sector

The extent of diversification of informal manufacturing sector of the states has been examined by estimating the diversification coefficient at two-digit industry level in terms of gross value added. The diversification coefficient shows the extent to which the distribution of gross value added by industry groups in a state deviates from such distribution at the national level. Table 5 reports the estimates of diversification coefficients for 1994-95, 2005-06, and 2010-11. In 1994-95, Karnataka was the only diversified state, whereas Uttar Pradesh, Kerala, Maharashtra, Andhra Pradesh, West Bengal, Tamil Nadu, Odisha, Rajasthan, and Punjab were moderately diversified states. On the other hand, the smaller states have a lower degree of diversification. Surprisingly, Delhi and Gujarat – the two industrially developed states – were found to be least diversified. By 2010-11, Tamil Nadu, West Bengal, and Uttar Pradesh have become diversified; whereas Karnataka slipped to moderately diversified category; Madhya Pradesh, Himachal Pradesh, Bihar, Delhi, Gujarat, Haryana, Assam, and Mizoram moved from least diversified to moderately diversified category; and the rest of the states (all are smaller states) remained least diversified.

Between 1994-95 and 2010-11, about two-third of the states (mostly least diversified states of the previous period) have significantly diversified their informal manufacturing sector, whereas states such as Tripura, Goa, Sikkim, Karnataka, Nagaland, Maharashtra, Kerala, and Odisha have witnessed more specialisation. Dividing the period into two sub-periods (1994-95 to 2005-06 and 2005-06 to 2010-11) shows that - (a) some states consistently achieved diversification, (b) some states consistently witnessed specialisation, (c) some states achieved diversification during the first sub-period, but witnessed specialisation during the second sub-period, and (d) some states witnessed specialisation during the first sub-period, but achieved diversification during the second sub-period. Madhya Pradesh, Gujarat, Meghalaya, Mizoram, Punjab, Tamil Nadu, Arunachal Pradesh, and Assam fall in the first category; Tripura falls in the second category; Haryana, Manipur, Jammu and Kashmir, Sikkim, Rajasthan, West Bengal, Kerala, Nagaland, and Goa fall in the third category; and Karnataka, Odisha, Himachal Pradesh, Maharashtra, Andhra Pradesh, Bihar, Delhi, and Uttar Pradesh fall in the fourth category. However, there seems to be no significant overall change in level of diversification across the states over the study period, as the average change in the diversification coefficient for all the states was only 0.06 during 1994-95 to 2005-06, 0.0004 during 2005-06 to 2010-11, and 0.06 during 1994-95 to 2010-11. In fact, the rank correlation coefficients between the diversification coefficients of the years 1994-95, 2005-06, and 2010-11 turned out to be fairly high and statistically significant at the conventional level of significance,[2] indicating the constancy of the relative rank orders of the states during this period.

2 The coefficients were found out to be 0.689, 0.730 and 0.730, respectively, between the diversification coefficients of 1994-95 and 2005-06, 2005-06 and 2010-11, and 1994-95 and 2010-11.

Table 4: Location Quotient by Two-Digit Industry Groups

States	*Year*	*Food Products*	*Tobacco*	*Textiles*	*Leather*	*Woods*	*Paper*	*Chemical*	*Metal*	*Machinery*	*Transport*	*Other*
Andhra Pradesh	1994-95	1.22	2.90	0.76	0.96	1.42	1.11	0.71	0.45	0.42	0.16	1.03
	2005-06	1.64	2.35	1.10	0.24	1.36	0.73	0.75	0.66	0.23	0.25	0.49
	2010-11	1.23	2.19	1.16	0.30	1.84	0.74	0.61	0.56	0.42	0.28	0.85
Arunachal Pradesh	1994-95	4.90	0.00	0.07	0.05	0.08	0.07	0.00	0.48	0.00	0.00	0.26
	2005-06	2.27	0.00	0.47	0.00	0.34	0.08	0.05	4.34	0.00	0.00	0.33
	2010-11	2.35	2.03	0.34	0.92	2.85	0.48	0.00	0.59	0.01	0.00	1.88
Assam	1994-95	1.98	1.28	0.59	0.15	0.85	0.38	0.95	0.54	0.08	0.13	1.45
	2005-06	1.69	0.15	0.81	0.14	2.20	0.63	0.57	0.84	0.07	0.03	1.29
	2010-11	1.42	0.08	1.02	0.04	2.06	0.12	0.12	1.42	0.05	0.17	1.47
Bihar	1994-95	1.93	1.17	0.20	1.91	1.50	0.23	1.37	0.71	0.49	0.03	0.73
	2005-06	1.49	4.07	0.45	0.26	2.25	0.17	0.96	1.44	0.18	0.08	0.54
	2010-11	1.84	1.12	0.61	0.36	1.95	0.58	1.01	0.83	0.26	0.30	1.20
Delhi	1994-95	0.33	0.01	1.63	1.29	0.12	1.84	0.58	1.25	2.46	7.24	0.66
	2005-06	0.13	1.57	1.22	6.59	0.21	2.11	0.30	2.35	1.54	1.50	0.41
	2010-11	0.47	0.03	1.07	2.75	0.38	2.13	0.71	0.84	2.97	2.80	0.81
Goa	1994-95	1.51	0.00	0.00	0.04	0.75	1.44	1.08	1.83	0.92	0.34	1.91
	2005-06	1.47	0.00	0.36	0.01	1.09	2.22	0.45	1.32	2.27	1.58	1.17
	2010-11	0.91	0.00	0.22	0.00	0.35	12.69	0.01	0.86	0.16	0.52	1.31
Gujarat	1994-95	0.43	0.10	0.86	0.16	0.34	0.37	0.66	1.32	0.80	0.14	3.29
	2005-06	0.54	0.38	1.01	0.62	0.56	1.45	0.87	0.37	2.19	0.18	1.93
	2010-11	0.41	0.16	1.59	0.48	0.35	0.85	1.07	0.59	0.79	0.37	1.22
Haryana	1994-95	0.48	0.00	1.74	1.22	0.81	0.27	1.42	1.42	1.46	0.94	0.38
	2005-06	0.95	0.00	0.86	0.50	0.63	1.16	0.97	1.80	1.79	2.06	0.76
	2010-11	0.98	0.00	0.58	0.66	1.19	0.49	1.29	1.63	2.50	4.95	0.60
Himachal Pradesh	1994-95	1.75	0.00	0.46	0.73	2.07	0.59	1.09	0.69	0.77	0.09	0.67
	2005-06	0.78	0.14	0.58	0.76	1.35	0.57	1.08	0.70	5.12	0.75	0.36
	2010-11	1.08	0.00	0.58	0.38	2.20	1.63	1.09	0.77	1.12	0.72	1.46
Jammu & Kashmir	1994-95	1.81	0.01	0.27	4.10	2.19	0.94	0.67	0.63	1.00	0.00	0.37
	2005-06	0.88	0.00	1.17	0.35	2.34	0.15	2.15	0.72	0.16	0.01	0.46
	2010-11	1.23	0.01	1.20	0.58	4.41	0.55	0.16	0.63	0.51	0.37	0.28

Table 4 Contd.

States	Year	Food Products	Tobacco	Textiles	Leather	Woods	Paper	Chemical	Metal	Machinery	Transport	Other
Karnataka	1994-95	0.98	2.15	1.11	0.40	1.37	0.57	1.03	0.88	0.86	1.90	0.47
	2005-06	2.26	1.27	0.98	0.36	0.67	0.68	0.68	0.69	0.53	0.47	0.36
	2010-11	1.51	2.16	0.89	0.44	1.36	0.58	0.83	1.36	0.73	0.53	0.48
Kerala	1994-95	1.75	0.82	0.77	0.75	1.12	0.51	0.99	0.71	0.68	0.39	0.84
	2005-06	1.00	0.29	0.85	0.71	1.37	0.82	1.26	0.75	0.80	0.65	1.44
	2010-11	1.42	0.40	0.65	0.90	1.69	0.90	1.06	0.97	0.54	0.44	1.43
Madhya Pradesh	1994-95	0.93	0.26	0.32	0.72	4.57	0.58	0.51	0.69	0.25	0.31	0.54
	2005-06	0.99	2.48	0.74	0.43	0.99	0.80	2.05	1.05	0.60	1.37	0.48
	2010-11	1.37	2.80	0.80	1.64	1.44	0.63	1.29	0.72	0.95	0.80	0.52
Maharashtra	1994-95	0.72	0.02	0.94	1.36	0.87	1.74	1.22	1.61	1.79	0.91	0.72
	2005-06	0.48	0.08	1.04	0.80	0.33	1.55	0.83	0.90	1.49	1.39	1.99
	2010-11	0.94	0.08	0.80	1.17	0.45	1.25	0.78	2.46	1.57	0.48	0.78
Manipur	1994-95	0.56	0.00	2.69	0.26	1.25	0.03	0.04	0.18	0.02	0.00	1.29
	2005-06	0.82	0.04	1.71	0.04	1.10	0.56	0.14	0.47	0.03	0.00	2.01
	2010-11	0.67	0.02	1.74	0.00	2.44	0.11	0.25	0.47	0.01	0.00	1.05
Meghalaya	1994-95	2.72	0.04	0.27	2.01	1.77	0.01	0.12	0.48	0.00	0.00	1.06
	2005-06	1.18	0.03	0.44	0.03	2.36	0.20	2.31	1.22	0.01	2.73	0.78
	2010-11	1.47	0.00	0.81	0.22	2.88	0.28	1.20	0.25	0.00	1.44	1.31
Mizoram	1994-95	1.17	0.59	0.46	0.01	0.43	1.91	0.13	0.98	0.00	0.01	3.37
	2005-06	1.18	0.05	0.89	0.00	1.33	3.68	0.10	0.58	0.04	0.00	2.15
	2010-11	1.04	0.00	0.71	0.00	1.35	0.00	0.69	1.65	0.46	0.00	2.20
Nagaland	1994-95	1.51	0.00	1.98	0.03	0.82	0.27	0.69	0.18	0.11	0.00	0.87
	2005-06	2.30	0.00	1.08	0.01	0.92	0.13	0.39	0.46	0.31	0.03	1.07
	2010-11	1.45	0.00	0.93	0.01	2.95	0.61	0.33	0.17	0.00	15.34	0.66
Odisha	1994-95	1.16	2.80	0.69	0.17	1.49	0.90	1.27	0.57	0.22	0.00	0.99
	2005-06	1.38	1.18	0.69	0.07	2.74	0.37	1.54	0.84	0.16	0.57	0.57
	2010-11	1.56	0.90	0.66	0.07	2.28	0.77	1.32	0.59	0.42	1.13	0.99
Punjab	1994-95	0.85	0.00	0.75	1.57	0.56	0.93	1.24	0.98	2.98	5.36	0.65
	2005-06	0.86	0.00	0.97	2.08	1.54	1.41	0.39	0.89	1.55	5.96	0.87
	2010-11	1.09	0.03	1.04	1.30	0.63	0.81	0.22	1.34	1.69	3.46	1.18

Table 4 Contd.

States	Year	Food Products	Tobacco	Textiles	Leather	Woods	Paper	Chemical	Metal	Machinery	Transport	Other
Rajasthan	1994-95	1.15	0.03	0.52	3.16	1.47	1.20	1.75	0.75	0.48	0.10	0.92
	2005-06	0.93	0.07	1.00	1.03	0.69	0.35	1.86	0.89	0.67	0.48	1.20
	2010-11	0.93	0.07	0.61	2.71	0.76	1.91	1.47	0.80	0.91	0.31	1.72
Sikkim	1994-95	1.09	0.00	2.20	0.27	0.44	0.00	0.10	0.17	0.01	0.00	1.95
	2005-06	2.36	0.00	0.71	0.00	0.38	0.05	0.89	0.85	0.00	0.00	1.42
	2010-11	5.22	0.00	0.35	0.00	0.01	0.21	0.00	0.26	0.00	0.00	0.92
Tamil Nadu	1994-95	0.74	1.15	1.73	0.37	0.61	1.14	0.77	0.74	1.36	0.61	0.79
	2005-06	0.74	1.33	1.35	0.85	0.99	1.72	1.19	1.06	0.62	0.83	0.44
	2010-11	0.82	1.25	1.19	0.73	0.86	1.00	0.97	0.65	1.10	2.80	0.90
Tripura	1994-95	1.91	0.00	0.60	0.08	1.15	0.50	0.95	0.39	0.15	0.59	1.69
	2005-06	0.53	0.87	0.16	0.12	2.43	1.19	4.02	0.23	0.03	0.04	1.12
	2010-11	3.49	0.14	0.19	0.00	2.19	0.14	0.42	0.29	0.03	0.26	1.69
Uttar Pradesh	1994-95	1.15	1.17	1.19	1.57	0.79	1.08	1.26	1.10	0.48	0.31	0.56
	2005-06	1.19	0.64	1.02	0.63	1.33	0.56	1.03	1.64	0.62	1.77	0.45
	2010-11	1.20	0.81	0.89	0.98	1.00	0.89	1.79	0.64	0.61	0.22	0.91
West Bengal	1994-95	1.60	2.72	0.80	0.61	0.79	1.00	0.83	0.66	0.53	0.77	0.80
	2005-06	0.99	1.91	1.08	2.59	0.83	0.66	0.61	0.66	1.08	0.14	1.21
	2010-11	0.81	3.26	1.02	1.55	0.60	0.85	0.97	0.72	0.73	0.31	1.33

Source: Author's estimation based on gross value added of informal manufacturing sector derived from NSS 51st, 62nd and 67th rounds

Table 5: Diversification Coefficients of the States

States	*Diversification Coefficients*			*Ranks of the States*		
	1994-95	*2005-06*	*2010-11*	*1994-95*	*2005-06*	*2010-11*
Andhra Pradesh	0.653	0.579	0.670	5	10	7
Arunachal Pradesh	0.022	0.060	0.103	26	26	23
Assam	0.493	0.518	0.530	11	13	17
Bihar	0.413	0.378	0.580	15	21	13
Delhi	0.296	0.267	0.570	19	24	14
Goa	0.383	0.450	0.008	17	17	25
Gujarat	0.315	0.559	0.564	18	11	15
Haryana	0.466	0.710	0.533	12	5	16
Himachal Pradesh	0.466	0.381	0.623	13	20	10
Jammu & Kashmir	0.291	0.478	0.379	20	15	20
Karnataka	0.752	0.529	0.677	1	12	5
Kerala	0.697	0.774	0.672	3	2	6
Madhya Pradesh	0.197	0.639	0.661	23	8	8
Maharashtra	0.685	0.601	0.624	4	9	9
Manipur	0.171	0.360	0.348	24	23	21
Meghalaya	0.133	0.374	0.493	25	22	19
Mizoram	0.226	0.409	0.513	21	18	18
Nagaland	0.409	0.477	0.335	16	16	22
Odisha	0.625	0.503	0.601	8	14	11
Punjab	0.558	0.670	0.703	10	7	4
Rajasthan	0.569	0.750	0.598	9	3	12
Sikkim	0.213	0.398	0.019	22	19	24
Tamil Nadu	0.630	0.696	0.820	7	6	1
Tripura	0.443	0.075	0.006	14	25	26
Uttar Pradesh	0.746	0.738	0.758	2	4	3
West Bengal	0.637	0.779	0.775	6	1	2

Source: Author's estimation based on gross value added of informal manufacturing sector derived from NSS 51st, 62nd and 67th rounds

Industrialisation and Diversification

How is the diversification of informal manufacturing sector related to the level of industrialisation across states? In principle, the industrial structure of a region in the early stages of industrialisation is likely to be comprised of resource-based industries and less diversified. With the progress of industrialisation it would move towards demand driven consumer goods industries as well as capital goods industries leading to diversification of the industrial sector (Awasthi, 1991). As a result, the industrial structure of the industrialised states is likely to be diversified compared to the less industrialised states. Suggesting this to be true in the Indian context, a number of studies (Alagh *et al*., 1971; CSO, 1981; Awasthi, 1991) come out with evidences for significant positive relationship between level of industrialisation and degree of diversification in case of organised manufacturing sector.

To test whether such a relationship exists in case of the informal manufacturing sector, we have plotted the diversification coefficient against the variables, such as, share of manufacturing sector in NSDP, share of unregistered manufacturing sector in NSDP, and per-capita NSDP from unregistered manufacturing sector of the states (Fig. 1). While the first variable measures the level of development of the overall manufacturing sector, the latter two variables measure the level development of the informal manufacturing sector. It is clear from Fig.

1 that diversification of informal manufacturing sector across states is positively associated with the level of development of the overall manufacturing sector (Panel A) as well as the informal manufacturing sector (Panel B and C). Further, we have estimated the coefficient of rank correlation between diversification coefficient and the above variables to test the statistical significance of their relationships and found that the coefficients are fairly high and statistically significant, except in two cases (Table 6). Thus, our findings for the informal manufacturing sector are similar to the findings of the existing studies related to the organised manufacturing sector. However, we have not found any consistent relationship between diversification and growth of the informal manufacturing sector across states; the relationship was positive and significant during 1994-95 to 2005-06, but negative (though not significant) during 2005-06 to 2010-11 and 2010-11 to 2013-14 (Panel D of Fig. 1 and Table 6).

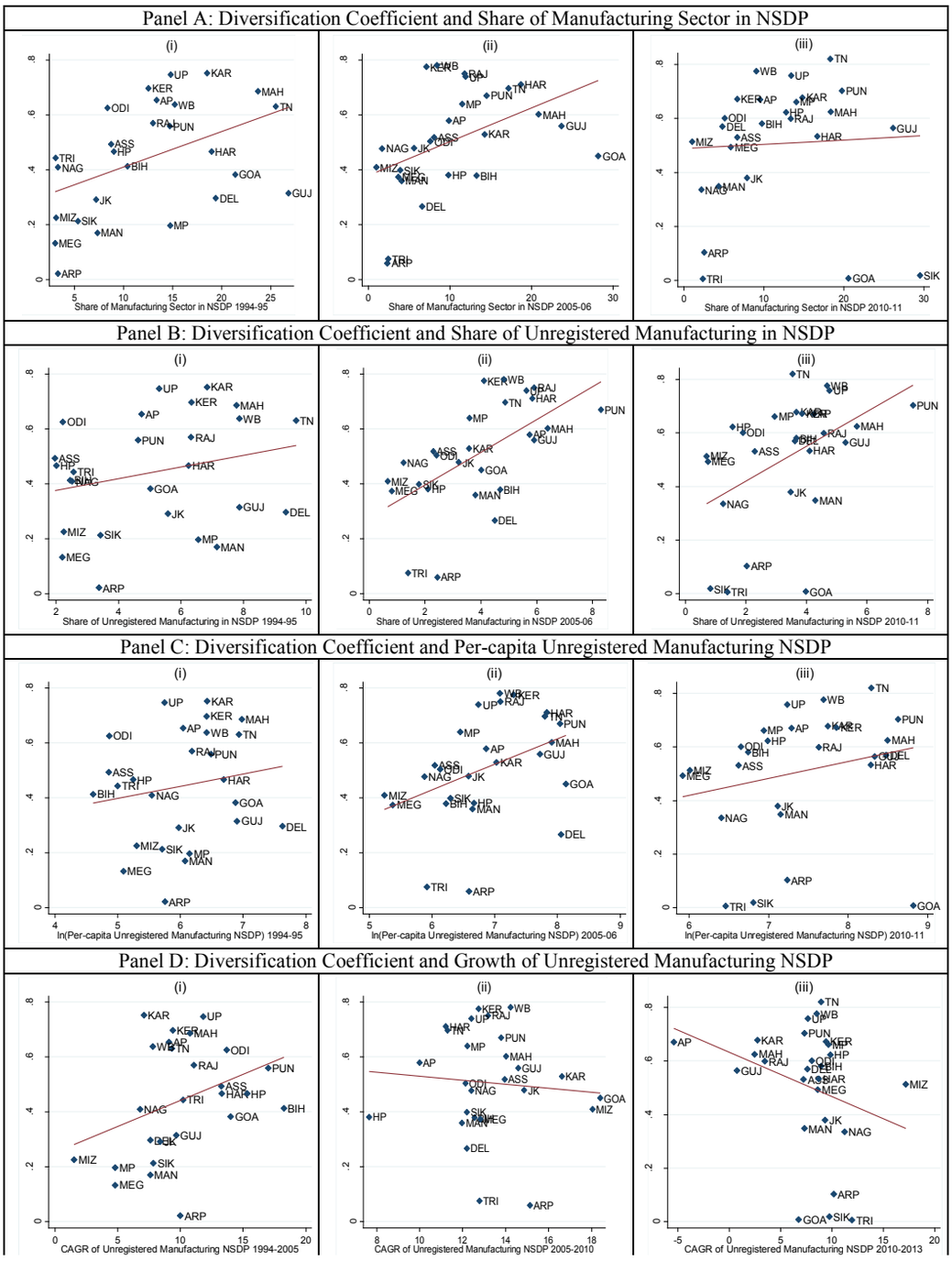

Fig. 1: Relationship between Diversification and Industrialisation

Source: Author's estimation

Table 6: Rank Correlation Coefficients

	Diversification Coefficient		
	1994-95	*2005-06*	*2010-11*
Share of manufacturing in NSDP	0.481**	0.547***	0.340*
Share of unregistered manufacturing in NSDP	0.227	0.628***	0.514***
Per-capita NSDP from unregistered manufacturing	0.220	0.449**	0.411**
Compound annual growth rate of NSDP from unregistered manufacturing			
1994-95 to 2005-06	0.345*	0.132	
2005-06 to 2010-11		-0.016	-0.197
2010-11 to 2013-14			-0.324

Notes: ***, ** and * indicate significant at 1, 5 and 10 percent level of significance respectively.
Source: Author's estimation

Co-location of Informal Manufacturing Enterprises

Given that different sets of industries emerged as the industrial base in different states, it is pertinent to question as to how the location of these industries across states is linked with each other. This can be examined by analysing the input-output or buyer-supplier linkages among different industries in an input-output framework. However, we refrain from such an analysis because of lack of separate input-output table for the informal manufacturing sector. Instead, this section examines the co-location of informal manufacturing enterprises across states.

Co-location occurs when industries from two sectors are present in the same neighbourhood (Chakravorty *et al*., 2005).[3] The idea of co-location of industries goes back to Marshall (1920), who argues that industries would tend to locate each other in space to realise external economies to offset the internal scale economies of large factories. In general, industries tend to co-locate in order to realise the external economies arising from inter-industry linkages, which may take different forms, such as, labour market pooling, technological spillovers, and buyer-supplier linkages. Accordingly, co-location of industries takes three forms: labour sharing co-location, technology sharing co-location, and buyer-supplier linked co-location. Chakravorty *et al*. (2005) point out that there is negligible evidence for technology sharing co-location of industries in India; the most dominant forms of co-location being labour sharing and buyer-supplier linked co-location. However, due to lack of information about sharing of technology, output, and labour among the informal manufacturing enterprises we could not estimate these three kinds of co-location separately. Therefore, we have estimated the overall co-location pattern for 11 two-digit industry groups across 26 states.

In order to examine the co-location of informal manufacturing enterprises across states we have estimated the coefficient of correlation for the 11 two-digit industries using gross value added data for 1994-95, 2005-06, and 2010-11. The findings are reported in Table 7. The result provides strong evidence for co-location of informal manufacturing enterprises across states. The gross value added of most of the industry groups has statistically significant correlation with other industry groups. In general, the degree of co-location is higher between chemical and metal, chemical and leather, metal and paper, chemical and paper, machinery and paper, chemical and food products, paper and textiles, machinery and metal, textiles and chemical, textiles and metal, paper and leather, food products and tobacco, and metal and leather in 1994-95. By 2010-11 the degree of co-location between these industries has declined, except for textiles and chemical, paper and leather, and paper and machinery. Between 1994-95 and 2010-11, the degree of co-location of metal products and chemical products with

3 The concept of co-location is fundamentally different from co-clustering. Co-clustering occurs if both the co-located industries are related through economic linkages such as input-output linkages, innovation, labour-market pooling, etc. (Chakravorty *et al*., 2005).

most other sectors has declined, whereas that of transport equipment, other manufacturing products, food products, leather products, woods products, and machinery equipment with most other sectors has increased. Some of the industry pairs which were not co-located in 1994-95, such as, transport equipment and food products, transport equipment and woods products, transport equipment and chemical products, transport equipment and other manufacturing, tobacco products and other manufacturing, leather products and other manufacturing, and woods products and other manufacturing have become co-located in 2010-11, whereas none of the industry pairs excepting metal products and transport equipment which had co-location relationship in 1994-95 have become not co-located in 2010-11.

Conclusion

This study has examined the structure and diversification of informal manufacturing sector in the Indian states. It also examined the co-location of these industries across states. Using the NSS unorganised manufacturing enterprises survey data for the years 1994-95, 2005-06, and 2010-11, the study found that the informal manufacturing sector in the country as a whole and in most states was mainly comprised of a set of agro-based consumer goods and resource-based intermediate goods industries, whereas capital goods industries were mostly confined to the developed states, such as, Delhi, Haryana, Maharashtra, Punjab, and Tamil Nadu. Textiles and food products appeared to be the largest industry groups in the country as a whole as well as in most states. The major product groups in different states appeared to be more or less similar. The largest four industry groups at the national level namely, textiles, food products, other manufacturing, and chemical products (in 2010-11) were also the largest four groups in six states and three of them featured among the largest four in all the remaining but five states. Thus, the product structure of most states is similar to that of the country as a whole.

Diversification was found to be not very wide across states, as the largest four industry groups accounted for over two-thirds of gross value added of the informal manufacturing sector in the country as a whole as well as in most states. All the states have a narrow industrial base, with a relatively less number of industries (less than six on average) constitute the industrial base. Surprisingly, the two most industrialised states Gujarat and Tamil Nadu have narrow industrial base. The estimates of diversification coefficient suggest that Tamil Nadu, West Bengal, and Uttar Pradesh were the diversified states, whereas Tripura, Goa, Sikkim, Arunachal Pradesh, Nagaland, Manipur, Jammu and Kashmir, and Meghalaya were the least diversified states in 2010-11. Our correlation analysis suggests that diversification of informal manufacturing sector is positively associated with the level of development of the informal manufacturing sector as well as overall manufacturing sector across the states. Furthermore, we found that most of the industries have a tendency to co-locate with other industries within the informal manufacturing sector.

On the basis of the evidences presented above, it may be concluded that diversifying the industrial sector is a necessary and very important condition for accelerating industrialisation and economic growth in India, especially in the backward states. The analysis carried out in this study mainly focuses on the characteristics of the structure of informal manufacturing sector of the states. We have not systematically examined the effect of diversification of informal manufacturing sector on the economic performance of the states. Further research is required in this area.

Table 7: Correlation Coefficients between Industry Groups

		Food Products	*Tobacco*	*Textiles*	*Leather*	*Woods*	*Paper*	*Chemical*	*Metal*	*Machinery*	*Transport*
Tobacco	1994-95	0.818***									
	2005-06	0.670***									
	2010-11	0.607***									
Textiles	1994-95	0.738***	0.556***								
	2005-06	0.759***	0.496**								
	2010-11	0.739***	0.523***								
Leather	1994-95	0.786***	0.387**	0.679***							
	2005-06	0.394**	0.483**	0.658***							
	2010-11	0.681***	0.444**	0.636***							
Woods	1994-95	0.691***	0.455**	0.504***	0.616***						
	2005-06	0.817***	0.682***	0.704***	0.358*						
	2010-11	0.871***	0.646***	0.639***	0.405**						
Paper	1994-95	0.747***	0.452**	0.864***	0.832***	0.593***					
	2005-06	0.480**	0.271	0.902***	0.566***	0.433**					
	2010-11	0.781***	0.376*	0.830***	0.894***	0.545***					
Chemical	1994-95	0.877***	0.530***	0.845***	0.920***	0.657***	0.898***				
	2005-06	0.710***	0.449**	0.892***	0.433**	0.746***	0.772***				
	2010-11	0.847***	0.492**	0.850***	0.736***	0.671***	0.825***				
Metal	1994-95	0.711***	0.321	0.834***	0.804***	0.579***	0.903***	0.922***			
	2005-06	0.734***	0.446**	0.862***	0.557***	0.786***	0.716***	0.844***			
	2010-11	0.723***	0.192	0.580***	0.687***	0.396**	0.791***	0.576***			
Machinery	1994-95	0.507***	0.185	0.798***	0.632***	0.415**	0.889***	0.742***	0.856***		
	2005-06	0.436**	0.169	0.820***	0.605***	0.349*	0.886***	0.685***	0.636***		
	2010-11	0.675***	0.262	0.743***	0.832***	0.403**	0.919***	0.676***	0.843***		
Transport	1994-95	0.174	0.066	0.424**	0.332*	0.079	0.492**	0.279	0.384*	0.638***	
	2005-06	0.492**	0.074	0.706***	0.391**	0.538***	0.691***	0.671***	0.820***	0.641***	
	2010-11	0.400**	0.292	0.535***	0.419**	0.366*	0.537***	0.409**	0.300	0.648***	
Other	1994-95	0.416**	0.225	0.553***	0.274	0.286	0.408**	0.506***	0.678***	0.481**	0.101
	2005-06	0.407**	0.142	0.784***	0.535***	0.323	0.855***	0.679***	0.574***	0.945***	0.586***
	2010-11	0.783***	0.554***	0.926***	0.777***	0.627***	0.869***	0.890***	0.612***	0.718***	0.428**

Notes: ***, ** and * indicate significant at 1, 5 and 10 percent level of significance respectively.

Source: Author's estimation based on gross value added of informal manufacturing sector derived from NSS 51st, 62nd and 67th rounds.

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