Industrial Location under Globalisation in India: Evidence from Unorganised Manufacturing Industries

Dissertation submitted in partial fulfillment of the requirements for the degree of Master of Philosophy in Applied Economics of the Jawaharlal Nehru University, New Delhi

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I hereby affirm that the work for the dissertation "***Industrial Location under Globalisation in India: Evidence from Unorganised Manufacturing Industries***" being submitted as a part of the requirements of the M. Phil Programme in Applied Economics of the Jawaharlal Nehru University was carried out entirely by myself. I also affirm that it was not part of any other programme of study and has not been submitted to any other university for the award of any degree.

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Certified that this study is the bona fide work of Dilip Saikia, carried out under our supervision at the Centre for Development Studies.

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Dedicated to

My

Grand Father & Grand Mother

and

Majoni

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Needless to say, all errors and omissions are mine.

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ABSTRACT OF THE DISSERTATION

Industrial Location under Globalisation in India: Evidence from Unorganised Manufacturing Industries

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Notwithstanding various policies to address regional disparities in industrial development, the issue of balanced regional industrial development still remains in India. The issue acquired renewed interest in the post-reform period as the spatial inequality has been widening and many argued that this is owing to the increasing spatial concentration of industrial growth during this period. In principle, the post-reform increase in spatial concentration of industries can be viewed in terms of the changing role of the State and the emergence of the market forces in shaping the economic landscape of a region. The existing studies dealing with the problem, however, mainly focused on the organised industries. In spite of the fact that the unorganised manufacturing sector occupies a dominant position compared to the organised sector, is quite diversified and recognised as the most potential sector for rapid employment creation; no attempt has been made so far to examine the regional pattern of the sector. The major objectives of the study are to analyse the trends and patterns of spatial concentration of unorganised manufacturing industries at different geographical scales in India in the pre- and post-reform periods and to identify the factors that influence the location decisions of unorganised industries.

The household (or enterprise) level data from the 51st (1994-95) and 62nd (2005-06) rounds of NSS survey on unorganised manufacturing have been used in the present study. These data sets have been supplemented by the ASI data on organised industries and sector wise NSDP series of national accounts provided by the CSO. Three approaches have been followed to address the objectives at hand: first, we have analysed the spatial distribution of unorganised industries at three geographical scales-districts, states and beyond states (regions); second, we have computed spatial concentration measures to determine the degree of spatial concentration of industries at three scales-inter-state, inter-district and intra-state; and finally, we have identified the factors influencing location of unorganised industries by estimating a model of industry location through OLS regression models.

The study has shown that unorganised industries are concentrated in few advanced states and within the states in few advanced districts. More precisely, biasness towards the metropolises and advanced districts on the one hand, and clustering of backward districts/states on the other are the emerging trends of location of unorganised industries in India. Spatial concentration is found to be high for the high and medium-high technology industries. Spatial concentration has declined, both across districts and states, for all and most of the two-digit industries in the post-reform period. We have also found considerable evidences for co-location of unorganised industries at the two-digit level. Our econometric analysis has shown that existing location of industry, industrial diversity, labour productivity, capital productivity, level of development and market size play significant role in location of unorganised industries at the district level in the post-reform period.

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Chapter 1

Introduction

1.1 Introduction

The Indian economy has been experiencing a spectacular growth in the post-reform period, especially in the most recent five years (2003-04 to 2007-08) with gross domestic product (GDP) growth averaging an annual rate of 8.8 percent.[1] However, this impressive post-reform growth is accompanied by increased inequality in all its dimensions. The distribution of income has been unequal and the gains of the rapid growth have not reached all parts of the country and all sections of the people in an equitable manner.[2] That disparity among states and regions within states, between urban and rural areas and between various sections of the community has been steadily increasing in the past few years not only in terms of income distribution, but also in other health, education, socio-economic infrastructure and any other development indicators.[3] Interestingly, it is the natural resource-rich states that have been continuously lagging behind, which in turn tightened the stranglehold of the Naxalite movement and demands for division of states in these areas (GOI, 2008). Of late, the steep rise in inter- and intra-state inequality has been recognised in the policy sphere and the Eleventh Five-Year Plan has emphasised the urgency for "Bridging the gaps" through providing "an opportunity to restructure policies to achieve a new vision based on faster, more broad-based and inclusive growth" (GOI, 2006).

The problem of regional inequality, however, is not a new phenomenon. It exists in all economies irrespective of the level of development, though more acute in developing economies. It is well known that regional growth is essentially an inequilibriating phenomenon owing to locational and structural variations and historical

[1] The growth of the economy in the post-reform period (1991-92 to 2007-08) recorded an average annual rate of 6.45 percent, which is better than ever since independence. At the same time aggregate investment rate stood at above 37 percent of GDP by 2007-08 (Economic Survey, 2008-09).

[2] Inequality in per capita gross state domestic products (GSDP) as measured by population weighted coefficient of variation (CV) and Gini coefficient among 28 states has increased from 34.55 to 38.44 and 0.192 to 0.241 respectively during 1993-94 and 2004-05 (GOI, 2008). Ramaswamy (2007) found that the Gini coefficient of per capita GSDP among 14 states has increased from 0.28 to 0.36 during the same. Similarly, Bhattacharya and Sakthivel (2004) found that the CV of growth rates of GSDP and per capita GSDP among 17 states has increased from 0.14 to 0.29 and 0.22 to 0.43 respectively during 1980-2000.

[3] It should be noted that inter-state inequality in terms of human development indicators has found to be declined in recent years (Dholakia, 2003). However, this could be because of the fact that most human development indicators have a value cap (GOI, 2008).

advantages between regions, for what Myrdal (1958) remarked "naturally geography sets the stage". There are several overlapping factors such as history, natural resources, human capital, local political economy, culture and other region specific factors responsible for the existence of disparity between and within the nations. Yet, it is argued that as economic development precedes the major source of regional variation in income distribution will be from industrial sector rather than agriculture (Heston, 1967; cited in Awasthi, 1991). Supporting such an argument several recent studies have observed that spatial inequality in industrial development is one of the major causes of spatial income inequality in most of the developing countries (see Puga, 1999; Kim, 2008; Fujita et al, 1999; Fujita and Thisse, 2002 and Kanbur and Vanables, 2005a).

The importance of industrialisation in economic development is well documented in the literature. Traditionally, industrialisation is considered as a critical factor for raising per capita income (Kuznets 1955, 1957; Kaldor, 1967) and transformation of the economy through backward and forward linkages (Hirschman, 1958), and thus, *sine qua non* for economic growth. In a modern view, economic growth is a story of dynamic cities, which are highly industrialised (World Bank, 1999).[4] Put differently, the regions which have industrialised are more productive and have higher level of incomes, standards of living and other development indicators such as literacy rate, longevity, infant mortality rate etc. than the regions that have not industrialised or less industrialised (Chakravorty and Lall, 2007).

Though the role of industrial sector in economic transformation in India has been a debated issue and studies observed that the sector has not played any significant role on the growth of domestic income (GDP) over the years (Balakrishnan and Parameswaran, 2007; Dholakia, 2007),[5] the sector found to have significant role on regional economic development in India (see Das & Barua, 1996; Rao et al., 1999; Dasgupta et al., 2000; Kar and Sakthivel, 2007; Khomiakova, 2008; Chakravorty, 2003a, 2003b, Lall and Chakravorty, 2005). These studies have observed that the growing regional disparity in industrial development is the primary cause of widening regional income disparity in the post-reform period. Put differently, the growing regional disparity in the post-reform

[4] For instance, the urban areas generate approximately 55 percent of gross national product in low-income countries, 73 percent in middle-income countries, and 85 percent in high income countries (World Bank, 1999).

[5] Contrary to the industry sector, these studies have observed significant impact from the primary and tertiary sectors in the pre- and post-1980s respectively.

period is owing to the differentiated growth pattern between more and less industrialised regions (Bhattacharya and Sakthivel, 2004).

It is speculated that if spatial disparity in industrial development continues to widen it will impede the achievement of the strategy of "inclusive growth" adopted in the Eleventh Five-Year Plan. Inclusive growth refers to an equitable allocation of resources with benefits accruing to every section of the society, no matter where they live (Suryanarayana, 2008; World Bank, 2006) in such a way that it reduces inequality.[6] As it is clear from the definition that it (inclusive growth) refers the need to make growth "more inclusive" by providing more benefits through more employment and income to those sections of society and regions of the country which have been bypassed by higher rates of economic growth (Nampoothiry, 2006). As the World Bank (2006) remarked, inclusive growth can be achieved by expanding access to assets and thriving markets, expanding equity in the opportunities to every section of the society and expanding the regional scope of economic growth.

Thus, if the economic activities, especially industrial activities tend to concentrate in a few already developed regions the achievement of inclusive growth will be impeded. The emphasis of the location of industrial activities over other activities is mainly due to the greater prospects of the sector for capital accumulation, its locational mobility unlike agriculture sector and its inter-sectoral forward and backward linkages, which could produce dynamic outcomes of growth, productivity and higher wages. Hence, the question of industrial location is very important to understand the development of the sub-national regions in India.[7]

1.2 Statement of the Problem

India, as in most other developing countries, has been experiencing a high concentration of industries in few locations since her independence. Faced with such situation the government has adapted a series of measures in order to achieve balanced regional industrial development and guided the industrialisation process by highly regulated policies, with many industries reserved for the public sector. The state has given preferential treatment to the less developed states in distribution of public sector

[6] There are several definitional and methodological problems relating to the concept "inclusive growth" and different authors have provided their own definition of the concept (see Suryanarayana, 2008 for a discussion). However, this is beyond the subject matter of our study.

[7] Note that our concern is not to examine the impact of regional variation in industrial development on the aggregate regional (income) inequality. The issue is well examined in sources like Rao et al. (1999), Dasgupta et al. (2000), Kar and Sakthivel (2007) and Khomiakova (2008) among others.

industries and most of the industrial policies such as industrial licensing policy, industrial location policy, freight equalisation policy etc. were designed to influence industrial location away from the large cities and towards the backward areas.[8] Apart from the policies for influencing inter-state distribution of industries, several policies were also designed for influencing intra-state distribution of industries.[9] These public sector investment policies for dispersal of industrial growth gathered momentum during 1970s, continued with greater force up to early 1980s and then by the mid-1980s gradually lost momentum due to its own inefficiency. Faced with strong pressure from the different political and other interest groups, a series of internal de-regulation policies were undertaken by the government during the mid-1980s and then in the wake of the severe fiscal and balance of payment crisis the government formally announced the structural reforms in July 1991 based on pro-market liberalisation and globalisation.

That the public investment policies were guided by the narrow interest of the vested groups and the state-led policy regime has failed to achieve the desired goals (Ramadhyani, 1984; Bhargava, 1995; Mohan, 1997) is a separate issue and need not to be discussed here. The point need to be considered is that the state-led policy regime has the potential for industrial development in the backward states, and thereby, reduces regional inequality in the level of industrial growth and regional development (Subrahmanian, 2009). However, the structural reforms have made large-scale de-licensing of industry and changes in the industrial location policies.[10] On the other hand, it has provided more emphasis on private sector investment, foreign capital, modern technology, access to international market and more competitiveness of Indian industries. As a result, in the new policy regime the role of the state as industrial owner and location

[8] Chakravorty (2000) has summarised the major policies to influence industrial location: "The industrial licensing system was used to direct investment into lagging areas, and heavy industry was discouraged (and eventually forbidden) from locating in metropolitan centres; large public sec-tor projects (steel plants, for example) were located in lagging States like Bihar, Madhya Pradesh, and Orissa; industrial estates or growth centres, were identified and received some investment in infra-structure; financial incentives for private industrial investment in designated lagging districts (about 60 percent of all the districts in India) were provided; the prices for "essential" items such as coal, steel, and cement were equalised nationwide by the Freight Equalisation Policy of 1956."

[9] These policies include (a) policies to encourage village and cottage industries as well as modern small-scale enterprises, (b) industrial estate programs; (c) the rural industries project program, (d) metropolitan planning and (e) incentives to promote industrial development in backward districts (Sekhar, 1983).

[10] Regarding the changes in policies Mohan (2006) observed, "The obsolete system of capacity licensing of industries was discontinued, the existing legislative restrictions on the expansion of large companies were removed, phased manufacturing programmes were terminated, and the reservation of many basic industries for investment only by the public sector was removed. At the same time, restrictions that existed on the import of foreign technology were withdrawn, and a new regime welcoming foreign direct investment, hitherto discouraged with limits on foreign ownership, was introduced."

regulator has lessened. The private enterprises, now a days, can establish industries without facing many restrictions, except a few environmental, pollution and other local land-use-related restrictions and also up to a certain distance from the metropolitan cities. Further, with the increasing integration of the economy with the rest of the world, foreign investment and external trade have become one of the driving forces of industrial growth in India. With the advent of such policy changes several questions of the contemporary Indian economy have been raised: What has happened to the regional distribution of industries in the post-reform period? Has concentration of industries declined in the post-reform period as suggested by the new economic geography models or the other way round? What role the combined forces of the State and market have played in shaping the economic landscape of the country after economic reforms?

Studies attempted to address these issues, however, have provided conflicting arguments and contradictory findings about the spatial concentration of industries in India before and after reforms. Some authors argued that under the dominance of the private sector in industrialisation it is likely that industries will be more spatially concentrated in the leading industrial regions, since new firms prefer to locate in profit maximising areas, which in turn, are the areas where industries are already concentrated owing to tangible benefits from enhance market access, inter- and intra-firm spillovers, thick labour market, better infrastructure, availability of finance and so on (see Chakravorty, 2003a, 2003b; Lall et al., 2003; Lall & Chakravorty, 2005). On the other hand, some others argued for the positive role that liberalised policies can play in reducing spatial concentration of industries (Subrahmanian, 2003, 2009). It is argued that though liberalisation has curtailed the role of the State, it has entrusted greater freedom and scope to the local governments. Accordingly, most of the state governments have responded by instituting their own industrial policy reforms[11] and are actively competing with each other in providing incentives such as relief from sales and income taxes, providing subsidy, and preferential treatment in government purchases etc. to attract private investment (including foreign investment) into the state. This will provide advantage to the industrially backward states to accelerate industrial growth through its own policies, and thus, reduce inter-regional disparities in industrial development.

[11] Typically these local reforms have four features: (a) foreign capital and technology is welcomed, (b) at the State level there is a new "single window" project clearance agency, which coordinates with district level administrators in matters such as land acquisition; (c) time-bound clearances or sanctions are promised; and (d) environmental hurdles were lowered (Chakravorty and Lall, 2007).

The empirical studies dealing with regional industrial growth and spatial concentration of industries under liberalisation in India are inconclusive and they have rarely drawn any generalised conclusion on the impact of economic liberalisation on regional industrial growth and spatial concentration of industries. (These studies have been reviewed in the next chapter). In fact, all the existing studies have focused on the location of organised (or registered) manufacturing industries. Despite the fact that the unorganised manufacturing sector not only occupies a dominant position compared to the organised sector, the sector is quite diversified and recognised as the most potential sector for rapid employment creation, and thus, a panacea to the burgeoning labour force, no attempt has been made so far to examine the regional pattern of the sector. The dearth of information on the regional pattern of unorganised manufacturing sector induced us to fill the void. The importance of the unorganised manufacturing sector in the Indian economy has been discussed in the next section.

1.3 Unorganised Manufacturing Sector in India

The unorganised/informal sector[12] represents an important part of the economy in many countries, especially in developing countries. The strategic role of the sector is perhaps the substantial employment creation, together with its contribution in terms of production, income generation, capital accumulation and exports.[13] Faced with rapid population growth and significant rural-urban migration leading to the problem of severe urban unemployment, the developing economies often see the unorganised/informal sector as the refuge of the marginalised surplus labour force. The growth of the unorganised/informal sector in a labour surplus developing economy can be best understood in a Lewisian dualistic framework, where the economic activities are divided into 'traditional' and 'modern' sectors and a gradual transition of the traditional sector from a pre-capitalistic mode of production system to capitalistic mode of production and,

[12] Note that the concept of informal sector is somewhat different from the unorganised sector. The former incorporates the unincorporated proprieties or partnership enterprises, whereas the later incorporates enterprises run by cooperative societies, trust, private and limited companies (non ASI) in addition to the unincorporated proprieties or partnership enterprises. *Per se*, the former can be considered as a sub-set of the later (NSSO, 2001). However, in India both the concepts are used interchangeably. (For a discussion on the concept of unorganised/informal sector see Sarma, 2006; CUTS, 2009; NSSO, 2001, NCEUS, 2008b).

[13] The unorganised/informal sector accounted for about 48 percent of non-agricultural employment North Africa, 51 percent in Latin America, 65 percent in Asia and 72 percent in Sub-Saharan Africa (ILO, 2002). In India, the sector accounted for about 85 percent of the total workforce, 58-60 percent of net domestic product (including agriculture and allied sectors), about 50 percent of gross national savings and 40 percent of total exports during 1993-94 to 2005-06. (These figures are for overall non-farm unorganised sector, which includes unorganised part of both the industry and services sector).

thereby, gradual evolution of the modern sector ultimately leads to economic development of the economy.[14]

However, the Indian experience in the last few decades, particularly after economic reforms is quite different. Despite the high growth of the organised manufacturing sector, employment generation in the sector is sluggish or nearly stagnant leading to "job-less" or "job-loss" growth in the post-reform period.[15] On the other hand, even the share of unorganised sector in total manufacturing output has declined, the sector is swelling in terms of number of enterprises and employment.[16] The unorganised sector, with more than 99.2 percent of total manufacturing enterprises during 1994-95 to 2005-06, accounted for about 80.40 percent of total manufacturing employment in 1994-95, which marginally increased to 80.53 percent in 2005-06.[17] This share, however, varies across the states: from 63.14 percent in Punjab, 64 percent in Haryana and 73.45 percent in Gujarat to 100 percent in Arunachal Pradesh, 97.9 percent in Manipur, 96 percent in Meghalaya and 94.8 percent in Orissa in 2005-06. Viewed in terms of value added the unorganised sector's share in total manufacturing declined from about 37.4 percent in 1984-85 to 22.4 percent in 1994-95 and thereafter increased to 25.65 percent in 2005-06. This share varies from 8 percent in Himachal Pradesh, 9.88 percent in Gujarat and 13 percent in Maharashtra to 100 percent in Arunachal Pradesh, 99.69 percent in Manipur and 75.35 percent in Tripura in 2005-06.[18]

That the unorganised manufacturing sector is quite diversified and differentiated in terms of its contribution in employment and output and varies across the regions/states, the sector's importance in shaping the economic profile of a region/state is different across regions/states. However, no study so far has focussed on the regional

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[14] However, the notion of traditional-modern dualism is fundamentally different from the informal-formal dualism: firstly, unlike the traditional sector, which proceeds the modern sector and die with the growth the modern industry, the informal sector exists and grows with the formal sector at the same space and time; secondly, while the traditional sector has few linkages with the modern sector and exists separately, the informal sector is linked with the formal sector (Chen, 2007).

[15] As per the report of the Planning Commission's special group on employment generating growth, the organised manufacturing sector grew at a rate of 20 percent per annum and the private organised sector at 30 percent per annum, whereas their contribution to total employment increased by 1.5 to 2.0 percent of the total during the Tenth Plan (cited in Rani and Unni, 2004).

[16] From a mere of 145 lakh units employing about 332 lakh workers in 1994-95, the sector expanded to 170.7 lakh units employing about 364.4 lakh workers in 2005-06. However, the number of units has declined compared to 1984-85 (197.2 lakh units), while number of workers has increased (369.5 lakh).

[17] The share was about 84.30 percent in 1984-85 and 82.5 percent in 2000-01.

[18] The other states which have considerable share of the unorganised sector in total manufacturing gross value added (GVA) in 2005-06 are Nagaland (59.54 percent), Meghalaya (54.64 percent), Jammu & Kashmir (52.16 percent), Delhi (43.83 percent), West Bengal (41.84 percent), Kerala (39.52 percent) and Uttar Pradesh (34.84 percent).

aspect of the unorganised manufacturing industries in India, except some focus on the regional variation in productivity of the sector by Subramanian and Pillai (1994), Mukherjee (2004), and Kathuria et al. (2010). Further, there is dearth of information about the association between the location of organised and unorganised industries, especially at the sub-national level in the post-reform period.

In principle, the relationship between the organised and unorganised industries can be explained through four channels viz. sub-contracting, input-output linkages, market linkages and technological linkages or in a broader sense, the relationship can be viewed as: (a) output or forward linkages through the sale of output, sub-contracting and marketing of products and (b) inputs or backward linkages via purchase of inputs and raw materials, acquisition of skill and technology and procurement of credit etc. (see Samal, 1991; Davies and Thurlow , 2009 and Chen, 2007 for a discussion on these relationships). These linkages between the organised and unorganised sectors could be viewed in different ways: for instance, some viewed the relationship as complementary, where the growth of unorganised sector is closely linked with the organised sector and some others viewed the relationship as exploitative, where the organised sector exploits the unorganised sector. Traditionally, the linkages between the organised and unorganised sectors have been weak and defused in India. Papola (1991) observed that until 1990s a very substantial part of the manufacturing activity in the unorganised sector has been operating independent of the organised sector and producing final products for the consumer market rather than intermediate products and parts of organised sector. Regarding the location of the two sectors, Roy (2000) observed that the location of organised industries and the small scale industry were different during the colonial period. While the large scale industries were concentrated in Bombay and Bengal provinces, small scale industries were concentrated in the united provinces, Punjab and Madras.[19] In a later study, Awasthi (1991) found that the rank orders of the states in the unorganised sector did not confirm their rank orders in the organised sector for the period 1961 to 1978-79. Further, his statistical analysis confirmed that the unorganised sector had developed independent of the organised sector across the states during this period. However, given the fact that the ongoing reforms and globalisation process has made structural changes in the organisation of production system between

[19] In 1931, Bombay and Bengal provinces accounted for about 52 percent employment of large scale industry, while their share in small scale industry was only 11.5 percent. On the other hand, the united provinces, Punjab and Madras together accounted for approximately one half employment of small scale industry (Roy, 2000).

the organised and unorganised sectors (see Rani and Unni, 2004; Bala Subrahmanya, 1995, 2004; Marjit and Maiti, 2005 and Sahu, 2007), many argued that a fairly sizable and growing proportion of the unorganised manufacturing sector is expanding through sub-contracting and ancillary relationship with the organised sector (Bala Subrahmanian, 2004; Sahu, 2007). As per the NSS 56th round about 30.7 percent of unorganised enterprises have sub-contracting relationship with organised sector in 2000-01, which increased to 32.0 percent in 2005-06 (NSS 62nd round). Therefore, it can be presumed that the locational linkages between the unorganised and organised sectors have increased in the post-reform period.

An important issue related to the location of unorganised manufacturing industries is the impact of spatial inequality in the sector on the spatial (income) inequality in India. The existing studies mainly focused on either the overall industrial sector (see Rao et al., 1999; Dasgupta et al., 2000; Kar and Sakthivel, 2007; Khomiakova, 2008) or organised manufacturing sector (Chakravorty, 2000, 2003a; Lall and Chakravorty, 2005; Chakravorty and Lall, 2007), observed that increased spatial inequality in both the sectors is one of the major reasons for widening spatial (income) inequality in India in the post-reform period. Interestingly, the question of inequality in the unorganised sector and its impact on spatial (income) inequality has been remained unanswered. It is possible that the unorganised manufacturing sector could play a compensating role in reducing regional inequality of the overall manufacturing sector, and thereby, regional (income) inequality. The logic is simple. Since the unorganised enterprises enjoy certain inherent features such as lower overhead costs, flexibility in production, informality in labour relations, easy entry and exploitation of local resources and skills; these enterprises can grow up anywhere, especially in rural and backward areas with small amount of investments and provide substantial numbers of employment opportunities.[20]

Of late, the Eleventh Five Year Plan has recognised the sector as the most potential sector for reducing poverty and the steep growing intra-and inter-regional inequality, and thereby, achieving the strategy of "more inclusive growth" (see GOI, 2008). As mentioned earlier, the concentration of industries in few already developed regions would impede the achievement of the strategy of "more inclusive growth". This

[20] Due to such opportunities, some argued for choosing the small scale industries over large scale industries in the backward regions. It follows that with the same amount of capital required for the establishment of an organised (large scale) industry, many small scale units can be started and more employment can be created. However, such an argument is contradictory.

necessitates a careful examination of the regional pattern of unorganised manufacturing industries in India from a spatial economic point of view. The central problem that the present study has tried to examine is: "which" unorganised manufacturing industries are concentrated "where" and "what" is the extent of concentration across the states/districts as well as across the industries. Further, in view of the changes in the policy environment owing to the liberalisation and globalisation process, we have attempted to make a comparative analysis of the pre- and post-reform periods, taking the structural reforms of 1991 as the reference point.

1.4 Objectives of the Study

Having elaborated the background, the present study attempts to explore into the trends and patterns of spatial concentration of unorganised manufacturing industries in India at different geographical scales in the pre- and post-reform periods. More precisely the specific objectives of the study are:

1. To examine the spatial distribution of unorganised manufacturing industries in India at different geographical scales- district, state and beyond state (region).
2. To analyse the trends and patterns of spatial concentration of unorganised manufacturing industries.
3. To identify the factors influencing the location decisions of unorganised manufacturing industries in India in the post-reform period.

1.5 Data Source and Methodology

The study is exclusively based on secondary data. The National Sample Survey Organisation (NSSO) is the principle agency, which collects data on unorganised manufacturing industries in India (see *Appendix I* for a note on the NSS database). Data on the organised manufacturing sector has been obtained from the Annual Survey of Industries (ASI) published by the Central Statistical Organisation (CSO), Government of India (see *Appendix I* for a note). We have also used some information provided by the National Accounts Statistics Division of CSO regarding state and district domestic product and Census of India for population, whenever necessary. The database has been specified in the relevant chapters.

The analysis refers to both the pre- and post-reform periods. One problem we have faced in selecting the year of analysis is that the national sample survey (NSS) data

are not available at yearly basis, rather at an interval of five years[21] and the 45th round of survey (1989-90), which could be a better representation of the pre-reform period is not comparable with the later rounds (51st, 56th and 62nd) of survey.[22] Since no other reliable data on the unorganised industries is available, we have no other alternative but to select the 51st round of survey (1994-95) to represent the pre-reform period. Though the 51st round of survey was conducted after three years of the initiation of reforms in 1991 and hence, may not be a proper representation of the pre-reform period, yet it will give us a picture at a very closer point of reforms. However, the most crucial reforms measure directed towards the unorganised sector in the form of de-reservation of items reserved for the small scale industries (SSI) was implemented in its full form after the recommendation of the Abid Hussain Committee in 1997.[23] Hence, considering the policy changes towards unorganised sector, the year 1994-95 seems to be reliable to represent pre-reform period. In fact, we observe that approximately 84.86 percent of the 1.92 lakh sample enterprises surveyed between July, 1994 and June, 1995 has reported their age to be more than or equal to 3 years, which means that these enterprises were in operation, whenever built, before the reforms measures were initiated in July, 1991. Therefore, it can be assumed that the newly established 15 percent sample enterprises between the initiation of reforms and the survey was conducted will not cause any significant structural change of the unorganised manufacturing sector and will not affect our analysis for the pre-reform period. The 62nd round (2005-06) of survey has been selected to represent the post-reform period. We have used the household (or enterprise) level data for these two NSS rounds (51st and 62nd) available on CD-ROMs supplied by the NSSO New Delhi (see *Appendix I* for a note on data aggregation and adjustment for these two NSS rounds). Henceforth, whenever we refer to the pre- and post-reform periods they will imply the years 1994-95 and 2005-06 respectively.

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[21] See *Appendix I* for the available years.

[22] The 45th round of NSS survey (1989-90) covered only the OAME (own account manufacturing industries) and NDME (non-directory manufacturing establishments) segments of the unorganised manufacturing sector. The lack of information on the DME (directory manufacturing establishment) industries makes it difficult to compare the rounds with the later rounds. However, some studies have used the 45th round of survey and compared it with the later rounds by taking the figures for DME enterprises from the Economic Census, 1990.

[23] The number of items reserved for the SSI sector was 47 in 1967, which increased to 873 by October, 1984. Following the recommendation of the Abid Hussain Committee (1997) the items reserved for the SSI sector are de-reserved in a phased manner like: dereserved 15 items in 1997-98, 9 items in 1998-99, ready-made garments products in 2000-01, 51 items in 2002-03, 75 items in 2003-04, 193 items in 2004-05, 180 items in 2006-07, 125 items in March 2007, 79 items in February 2008 and 14 items in October 10, 2008 (Annual Report, Ministry of Small Scale Industries, various years)

Our analysis of the industrial sector mainly covers the unorganised manufacturing industries. However, we have also made an attempt to compare the location patterns of unorgainsed manufacturing industries with its organised counterpart. By restricting the coverage of the study to the manufacturing sector, we have excluded the activities like electricity, water and gas supply undertakings, construction and repair services units, all of which count as industry. The manufacturing sector, in our study, covers 22 two-digit industries, NIC 15 to NIC 36 as per 2004 National Industrial Classification (NIC). The performance of the unorganised manufacturing sector can be measured in terms of various economic variables such as employment, output, value added or fixed assets etc. One or a combination of these variables has been used in the existing literature for this purpose. In the present study, we have used four variables namely number of enterprises, total employment, gross value added (GVA) and fixed assets. By and large they represent number of factories/units, employment, income and investment aspects of the unorganised manufacturing sector respectively.

For the analytical purpose, the present study covers 435 districts of 25 states of the Indian union, which accounted for more than 99.50 percent of India's total population and geographical area.[24] We have followed the undivided definition of the states and districts during the study period. That means we have merged Jharkhand with Bihar, Chhattisgarh with Madhya Pradesh and Uttaranchal with Uttar Pradesh to get the undivided Bihar, Madhya Pradesh and Uttar Pradesh respectively. Similarly, the newly created districts between 1994-95 and 2005-06 have been merged with the districts from where they were carved out to get the undivided district (see Chapter 3 for a discussion).

Various spatial statistical tools such as the spatial Herfindahl index, Entropy index, spatial Gini index, concentration ratio have been used to measure the spatial concentration of industries. Location quotient and specialisation coefficients technique have been employed to examine the regional industrial structure. These techniques and their uses have been discussed in Chapter 4. Further, an econometric analysis has been carried out in Chapter 5 in order to identify the determinants of location of unorganised manufacturing industries at the district level.

[24] Further, these 25 states accounted for more than 99.75 percent of unorganised manufacturing enterprises and employment and around 99.4 percent of unorganised manufacturing gross value added and fixed assets in 2005-06. Considering organised manufacturing sector, these states accounted for around 97 percent of enterprises, 97.5 percent of employment and more than 98.5 percent of gross value added and fixed assets in 2005-06.

1.6 Chapter Scheme

The present study is organised into six chapters (including this Chapter). Chapter 2 outlines the theoretical perspectives of industrial location in the context of regional economy under globalisation. We have particularly emphasised the changing role of the state and the emerging economic geography or market forces in shaping the regional industrial economy in a globalised economy. The chapter also provides a review of the existing literature on various aspects of regional industrial economy of India.

Chapter 3 analyses the spatial distribution of unorganised manufacturing industries at different geographical scales- districts, states and beyond states (or regions) in the pre- and post-reform periods. In particular, we map out the emerging location pattern of unorganised manufacturing industries and identify the leading and lagging locations. We show that the unorganised manufacturing industries are largely concentrated in the metropolises and advanced states in both the pre- and post-reform periods and this is particularly true for the DME enterprises and high-technology industries. We also show that the distribution of unorganised manufacturing industries across the states follows a similar pattern as that of the organised manufacturing industries.

In Chapter 4 we analyses the trends and patterns of spatial concentration of unorganised manufacturing at disaggregated industry level at three geographical scales- inter-state, inter-district and intra-state. We show that high-technology industries are highly concentrated both across states and districts, whereas the developed states have experienced high degree of intra-state concentration. We also show that the unorganised manufacturing base of majority of the states is in resource-based traditional industries and agro-based consumer goods industries and though, most of the states have diversified their industrial structure in the post-reform period, there has been hardly any change in overall level of regional diversification of unorganised manufacturing industries. Further, we show which of the (two-digit) unorganised manufacturing industries are colocated at the district level.

In Chapter 5 we identify the factors that influence location decisions of unorganised manufacturing industries in India in the post-reform period. We develop an analytical framework based on the new economic geography (NEG) literature and consider a wide range of variables representing economic geography, factor and resource endowments, infrastructure, political economy and spatial attributes of the regions (district). We analyse the overall unorganised manufacturing industries by sectors (rural

and urban) and enterprise types (OAME, NDME and DME). We show that the continuation of history (existing industry location), industrial diversity, labour productivity, capital productivity, level of economic development and market size plays significant role in determining the location of unorganised manufacturing industries in the post-reform period. These results are established using OLS (ordinary least square) regression models on district level data for 2005-06.

Finally, Chapter 6 summarises the key findings of the study and analyses them in the context of balanced regional development in India. We end with a note on the limitations of the study and scope for further researchers.

Chapter 2

Industrial Location: Theoretical Perspectives and Empirical Evidences

2.1 Introduction

Industrialisation is a complex process. Empirical evidences from many industrialised and newly industrialising countries suggest that spatial concentration is a general feature of the dynamic process. That industrial activity gets started in certain place at some point owing to natural, historical and political reasons (Awasthi, 1991), gets concentrated around it leading to the growth of industrial cities and gradually, after some point, spread to other regions (Chakravorty and Lall, 2007). This is the general path through which industrialisation gets started, evolve and gradually spread across industries and space. However, the success or failure of a region in industrialisation is not determined entirely by the location specific factors alone, rather it is the result of a set of complex factors comprising of some market forces such as proximity to resources and markets, localisation and urbanisation economics, transport costs and infrastructure facilities etc. and some political economy forces such as policies related to industry location, land use and regional trade etc. (Chakravorty and Lall, 2007). Though in a liberalised economy market forces become stronger and role of the state has curtailed, the state has to play active role in mediating the market forces. Therefore, the regional industrialisation processes have to be examined in terms of the interaction of market forces and the political economy or the state. Further, in view of the globalisation process, the regional industrialisation is not entirely confined to the domestic forces alone; rather international forces, policies and players play active role in shaping the economic geography of a region. Hence, one should also look into the impact of globalisation in understanding the regional industrialisation.

This chapter reviews the theoretical and empirical literature on industrial location and attempts to bring the issue of industrial location in a framework of regional development under globalisation. This has been done in section 2.2. Section 2.3 reviews the existing literature on industrial location in India. Section 2.4 briefs out the limitations of the existing literature.

2.2 Theoretical Framework

2.2.1 Perspectives of Industrial Location

The questions that where do different industries locate, why do industries concentrate in some regions and what factors influence the spatial distribution of industries etc. are the central issues of location analysis. However, these questions are not new. There has been a long-standing concern among the economists, geographers, and regional scientists with location choices. As is well known, Marshall (1920) highlighted knowledge spillovers, locally-traded intermediate inputs and the pooling of specialised skills as three potential mechanisms for the agglomeration of economic activity (Chakravorty and Lall, 2007). Subsequently, an extensive body of research in urban and regional economics examined the origins of cities, concentration of population across space and the location of industries and other economic activities across these population concentrations. In the early location theories firm's location decision is exogenously determined by given spatial distributions of natural resource endowments, technological differences, transport costs and factors endowments, what Krugman (1993a) termed as "first nature geography".[1] However, these ideas have been consigned with the successive technological innovation and shifting of interest towards inter-regional trade, inter-firm linkages, agglomeration economies and so on (Smith, 1981; Awasthi, 1991).

Of late, with the development of research on externalities, increasing returns to scale and imperfect competition (Dixit and Stiglitz 1977; Krugman 1991a, b; Fujita et al. 1999) the focus has shifted to these activity-specific features (the "second nature geography") in analysing the firm's location decisions. Krugman (1991a, 1991b) and Fujita et al. (1999) have analytically modeled increasing returns to scale, based on the technological externalities, pecuniary externalities, monopolistic competition and transport cost. With the focus shifted to the second nature geography, which is typically endogenous and could be influenced by policy (Redding, 2009), the location decision becomes entirely endogenous and intra- and inter-industry specialisation becomes the dominating location pattern. In these new models, known as the new economic geography (NEG), location choices are determined by the tension between "centripetal" or agglomeration forces, which promote the spatial concentration of economic activity, and "centrifugal" or dispersion forces, which favour an equal distribution of economic

[1] These theories are due to Weber (1929), Hotelling (1929), Palander (1935), Hoover (1937), Christaller's (1933), Losch (1939, 1956), Isard (1956), Von Thunen (1966) and Greenhut and Greenhut (1975), among others (see Webber, 1985; Smith, 1981 and Chapman and Walker, 1991 for a review of these theories).

activity across space. The agglomeration forces arise from pecuniary externalities (labor market pooling, input-output linkages, and migration induced demand linkages etc.) due to a combination of variety preferences, increasing returns to scale and transport costs. On the other hand, the dispersion forces arise in the form of high wages driven by competition among firms for skilled labour, high rent due to increased demand for housing and commercial land; and various negative externalities such as congestion, etc. Thus, the location decision of an industry in a particular place depends on the relative strength of these two opposite forces, which in turn depends on transport costs, so that changes in transport costs result in endogenous changes in the distribution of economic activity across space.

Thus, the insights from the NEG models suggest that apart from the first nature geography (natural advantage of resource and factors endowments, technological differences, etc), the role of second nature geography, that is, intra- and inter-industry specialisation, increasing returns to scale, transport costs, enhance market access, economic diversity and historical path dependence, etc. are more important in firm's location decisions. However, all these factors are not usually available in any location and all the factors are not equally important for each and every industry. Further, the influence of these factors varies from place to place and within the same place from time to time.[2] Hence, the net impact of the favourable factors over the unfavourable factors in a specific location compared to the same in other competing location becomes important for industrial location in a region (Sarma and Bezbaruah, 2009). Moreover, the disadvantage of a region in some of these factors (e.g. lack of infrastructure, financial institutions etc.) can be overcome with suitable government policies. Here comes the role of political economy (local wages, taxes, subsidies, incentives, nature of government etc.) as one of the most critical factors for determining industrial location.

2.2.2 Role of State and Market

Historically, the state has played an important role in shaping the economic geography of regions in the developing world. The role of the state varies from the establishment and privileging of port cities for external trade and administration during the colonial period, to the creation of a complex array of rules and regulations that

[2] For instance, Mani et al. (1997) have found positive effects of factor prices on industrial location in India, whereas Head and Ries (1996) have found no effect of factor prices on industrial location in China and Deichmann et al. (2005) and Henderson et al. (1996) have found negative effect of factor prices on in Indonesia (Deichmann et al 2008).

established location incentives and disincentives during the nationalist period (Chakravorty and Lall, 2007). As Chakravorty (2000) observed "the national state tried to be the principal agent of economic change, using an institutional and regulatory structure that emphasised centralisation over federalism, state ownership of heavy industry and infrastructure over private ownership, and self-reliance or import substitution over export orientation." In view of balanced regional development the role of the state is crucial, which varies from establishment of heavy industries and creation of socio-economic infrastructure in the backward regions to adopting regulatory policies and providing incentives to divert private sector investment towards the backward regions.

However, in a liberalised economy the role and nature of the state has been lessened. The state involvement in the ownership of industry and the regulatory structure affecting new investments are significantly weakened, entry barriers to multinational capital are lowered, export orientation is favoured over import substitution, and steps are taken toward some decentralisation of power and policy instruments in favour of sub-national states (Chakravorty, 2000). From a theoretical point of view, the role of the state in a liberalised economy is much debated. While in the neoclassical models the role of government involvement is relatively limited to infrastructure investments, the potential role for government intervention is significantly higher in the NEG models (Kim, 2008).[3] In practice, there is coexistence of both liberalising and protectionist policies in a liberalised state, which leads to inaction of the state in some areas while simultaneously there are more concerted actions in some other areas (Leinbach, 1996).[4] So after reforms the most critical question arises: What role the combined forces of the state and market have played in shaping the economic landscape of a country after economic reforms?

2.2.3 Impact of Globalisation on Industrial Location

The theoretical predictions about location of industries from macro models of liberalisation and deregulation are ambiguous. Despite the advances in "new growth" and 'new trade" theories, the effect of economic liberalisation and integration on national and

[3] First, due to the potential for "cumulative causation" forces, small subsidies can potentially have significant first-order effects. Second, infrastructural investments that increase the mobility of goods, labor, and capital may have significant impact on spatial inequality due to the self-enforcing nature of increasing returns. Third, since the equilibrium market allocations are inefficient in these models, markets will not reach the optimal level of spatial inequality without government intervention. (see Kim, 2005)

[4] For instance, in a liberalised economy the role of the nation-State is reduced as far as the promotion of regional balance is concerned, whereas its role is enlarged in terms of promoting selected metropolitan regions for receiving investment, especially foreign investment (see Chakravorty, 2000).

regional economic growth is still very much debated. Different theories and empirical analyses often reach contrasting results about the regional impact of economic liberalisation. Chakravorty (2003a) has identified three main strands of theory. The Myrdal (1957) and Hirschman (1958) approach of "cumulative causation" is the first strand of this literature, which suggested that regional imbalances in industrial development are likely to widen in the absence of state intervention. In this view industrialisation follows the classic virtuous cycle principles, where new firms tend to locate where other firms already exist, because the early-industrialised cities capture much of the new physical, human and financial capital at the cost of peripheral regions. This phase of development, which is the phase of backwash effect (according to Myrdal) and polarisation (according to Hirschman), may be followed by trickle down or spread effect, especially when there is effective political action (Chakravorty, 2003a).

The second approach, perhaps the most dominant and widely used approach in the literature, is the neoclassical approach, where "regional development models are equilibrium and convergence seeking, rest on export-driven growth and the economies of agglomeration in dynamic nodal region" (Chakravorty, 2000). This neoclassical "divergence followed by convergence" principle suggests that regional inequality increases during the early years of industrial development being concentrated in metropolitan areas, and begins to decline at some later indeterminate point (Williamson, 1965; Barro and Sala-I-Martin, 1995).

However, these models are based on the assumptions of policy continuity; that is, the regulatory conditions under which location decisions are taken do not change, and therefore, the key of urban and regional change is not political action, but the rise and fall of agglomeration advantages (Chakravorty, 2000). The fact that the assumption of policy continuity no longer holds, since the role and nature of the government as industrial owner and location regulator has reduced after reforms, therefore, many authors argued that the new policy regime may be biased towards the advanced, industrialised regions. Further, these models assume that regions have similar comparative advantage and technology. Unless regions and their cities have similar comparative advantage and identical exposure to trade, liberalisation is likely to increase spatial inequality, because the regions that have natural resources for exports and natural advantages such as near to coasts, market hubs and transportation networks etc. are likely to be benefited more from external trade, whereas those in remote areas are not (Kim, 2008).

Contrary to these theoretical predictions, the new economic geography (NEG) models have argued for an inverted U-shaped relationship between trade reforms and spatial concentration of industries, where regional inequality first rises and then falls in the presence of increasing returns to scale and transport costs.[5] In these models the key is not political action, but increasing returns to scale, monopolistic competition and transport costs, which create tension between the "centripetal" and "centrifugal" leading to rise and fall of agglomeration. Elizondo and Krugman (1992) have suggested that post-reform regional development is likely to be more evenly balanced. They argued that the magnitude of internal trade is much larger than foreign trade in inward-looking trade regimes, which leads to concentration of production and trading activities in large metropolis. When, trade is liberalised it breaks the monopoly power of these highly concentrated production and trading centres and weaken the traditional forward and backward linkages. The centripetal forces such as proximity to local markets, inter-firm spillovers and so on, become weaker because producers can now depend on external demand, while the higher wages, land-rent, high transport cost due to congestion in the established markets act as centrifugal forces compelling them to relocate to less established regions. Krugman and Venables (1995) showed how a gradual process of growing world trade due to falling transport costs can first cause the world to divide spontaneously and arbitrarily into a high-wage, industrialised "North" and a low-wage, primary-producing "South"; then, at a later date, cause the South to rise again at the North's expense. Similarly, Puga and Venables (1999) have suggested that, under certain circumstances, trade liberalisation reduces spatial inequality over time in sequential regional waves. They have argued that initially industries concentrate in one region given the agglomeration economies. When the wage gap widens between this region and the poor regions, industry will migrate toward one of the poor regions. Over time, as the process continues, more poor regions will join the group resulting spread of industries across the regions and, thereby, reduction of spatial inequality. However, though the increased openness to external trade leads to spatial deconcentration of manufacturing

[5] Note that the NEG models have three classes: first, Core-periphery models (Krugman, 1991a), which illustrates how the interactions among increasing returns at the level of the firm, transport costs and factor mobility can cause spatial economic structure to emerge and change; second, urban and regional systems models (Krugman, 1993a; Fujita and Krugman, 1995; Fujita and Mori, 1997), which focus on the spatial distribution of agglomerations, and third, Agglomeration and trade models (Elizondo and Krugman, 1992; Krugman and Venables, 1995; Puga and Venables, 1999), which explains the impact of external trade on agglomeration and internal geography (see Fujita and Mori, 2005).

activities as a whole, but it may lead to clustering of particular industry groups in few locations (Fujita et al, 1999).

Likewise the theoretical predictions, the empirical evidences are also inconsistence and inconclusive. Studies from various developed and developing countries have provided evidence for the possibility of both the increasing and decreasing spatial concentration following liberalisation and globalisation. For instance, Hanson (1992), Elizondo (1992) and Elizondo and Krugman (1992) have shown that following trade reforms in Mexico in the late 1980s there has been a shift of manufacturing activity away from Mexico City, especially towards the states bordering the US, such as Ciudad Juarez, Monterrey, and Tijuana and thus, bringing down the regional disparity. Between 1980 to 1993, the share of the border states in manufacturing employment has increased from 21 percent to about 30 percent, while the Mexico City's share has declined from 44.4 percent to 28.7 percent (Hanson 2005). However, the changing pattern of industrial location was not uniform across industries: some sectors found the pull to border regions stronger than others (Hanson, 1997).

In an early attempt Krugman and Venables (1995) have observed an inverted U-shaped relationship between economic integration and location of production in the case of US, and several other following studies have also reached at the same conclusion for the US, especially in the manufacturing sector (see Kim, 1995; Venables, 1996; and Puga, 1999). For instance, based on the locational Gini coefficient at the 2-digit and 3-digit industries, Kim (1995) found that manufacturing industries became more localised between 1890 and the turn of the twentieth century, but then became significantly more dispersed over the second half of the twentieth century. He argued that at any given point in time, the traditional, low-tech industries such as textiles, apparel, and tobacco were much more localised than the medium- to high-tech industries such as electricity, transportation, and so forth. Consequently, the gradual shift in manufacturing from low-tech to high-tech industries contributed to the general dispersal of manufacturing over time. Similarly, Brulhart and Torstensson (1996) have observed a similar inverted U-pattern of spatial concentration of manufacturing industries for the European Union (EU). They found that activities with larger scale economies were more concentrated in regions close to the geographical core of the EU during the early stages of European integration, while concentration in the core has fallen slightly in the 1980s. Tomiura (2003) also found that increasing import penetration weakened industrial concentration in Japan.

Turning to the other side, studies have also shown that the benefits of globalisation for many countries sharply increased their spatial inequality (Paluzie, 2001; Limao and Venables, 1999, 2001; Kim, 2005; Kanbur and Venables, 2005a, 2005b; Kanbur and Zhang, 2005). For instance, Kanbur and Venables (2005a, 2005b), based on their survey of over 50 developing nations argued that the uneven spatial impact of trade and globalisation played a major role in widening the regional and urban spatial inequalities in most of the developing countries in recent years. Fujita and Hu (2001) have provided evidences for increasing regional disparities in China following the trade liberalisation. Similarly, Kanbur and Zhang (2005) observed that inequality in China has risen substantially with decentralisation and the sharp rise in international trade during 1984-2000. Their econometric estimation showed that the variable measuring China's trade openness provides significant statistical explanation of increasing regional inequality in China since the start of the economic reforms in 1978.

In the similar way, Sala-i-Martin (1996, 1997) and Paluzie (2001) observed considerable evidences for increasing regional inequalities following Spain's entry in the EU in 1986. They found income convergence between Spanish regions during 1955-1990, but that the process came to a halt in the 80s and afterwards, when Spain was integrated with the EU. Following a NEG framework (developed in Krugman, 1991a; Venables, 1996; and Krugman and Venables, 1995) for the Spanish experience, Paluzie arrived at opposite results as that of Elizondo and Krugman (1992). Paluzie observed that if labour is mobile within the economy, then protectionist policies do not increase regional inequality. Moreover, with trade reforms the already developed regions with some initial advantages may capture the benefits of increasing returns from foreign trade while others remain more reliant on domestic trade and thus, regional inequality may go up. The basic point of departure between Elizondo and Krugman (1992) and Paluzie (2001) lies in the choice of centrifugal force; while the former used commuting-cost/land-rent, the latter used the pull of a dispersed rural market as the centrifugal forces. Paluzie argued that the model is more suitable to describe the kind of regional inequalities generated by the European integration, whereas the Elizondo and Krugman (1992) model is better suited to describe an urban concentration like the establishment of the Mexico City.

Thus, from the review of theoretical and empirical literature we found that there are contradictory arguments and inconsistent results regarding the impact of globalisation on industrial location and regional development. On the one hand, Hanson (1992, 1997,

2005), Krugman and Venables (1990, 1995), Elizondo (1992), Elizondo and Krugman (1992), Kim (1995), Venables (1996) and Puga (1999) found that globalisation leads to decline in spatial inequality/concentration. On the other hand, Paluzie (2001), Fujita and Hu (2001), Kanbur and Venables (2005a, 2005b), and Kanbur and Zhang (2005) found that spatial inequality has increased following globalisation.

However, whether the policy changes have impacted on regional variation of development is at the heart of some recent literature (in particular Redding and Venables, 2004; Morgenroth, 2003; Holmes, 1998; Brakman et al, 2005). These literatures argued that it is not the policy variables, but the geographic location of the region and economic geography variables that have considerable impact on regional development. For instance, Redding and Venables (2004) have shown that the increasing integration of world goods and financial markets has not caused the cross-country differences in income per capita and manufacturing wages, rather it (cross-country differences) is caused by each country's location relative to other countries, that is the economic geography. Using a structural NEG model (that of Fujita et al., 1999) for a cross-section of 101 countries, they found that access to the coast and openness yield predicted increases in per capita income of over 60 percent and 70 percent respectively, while halving a country's distance from all of its trade partners yields an increase of over 70 percent. They concluded that distance only matters for per capita income in so far as it affects a country's market access and supplier access.

The most important point to be considered is the ways through which economic liberalisation and integration influences industrial location and regional development. Puga (1999) and Fujita and Mori (2005) pointed out that the way in which agglomeration occurs and evolution of industrial location when the economy is liberalised depends largely on whether workers are mobile across regions or not. For Paluzie (2001) this is the force that generates the unequal geography within a country through industrial agglomeration and trade liberalisation reinforces this effect. The agglomeration of industry tends to raise local wages in locations with relatively many firms. If higher wages lead workers to relocate towards more industrialised regions (when workers are mobile), this intensifies agglomeration while eliminating wage differentials. If instead workers do not move across regions, interregional wage differentials persist. In this case, the reduction in trade costs as a result of integration makes the firms sensitive to wage differentials and will lead industry to spread across the regions. Topalova (2005) observed that mobility of workers across the states is extremely limited in India and that

the spatial inequalities are largely explained by the lack of inter-regional and inter-sectoral mobility of workers. Therefore, it is predicted (in theory) that a reform slashing barriers to entry and expansion would benefit the states where labor market laws and institutions are more business-friendly, and possibly harm states where there are biased in favour of workers (Aghion et al., 2005a).[6]

Chakravorty (2000), on the other hand, pointed out that the most important factor for a developing country like India is the availability of infrastructure, which is in its highest standard in the metropolitan regions compared to the other regions. According to Chakravorty, this concentration of infrastructure during the stage of state-controlled development was somewhat offset for two reasons: first, the state itself was the primary decision maker on where much of the capital was invested and second, state played important role in diverting private investments away from the metropolitan regions and towards the lagging regions through different incentive measures. However, after reforms these two factors are drastically changed: the state moves away from industrial ownership and location regulator and, thus, allow private industry to participate in all industrial arenas. At the mean time with the increasing integration with the rest of the world foreign investment become important key to spurring economic growth. The national government considers the metropolises as the likely destinations of foreign investments and, hence, invests in infrastructure in the leading metropolises and encourages competition between cities and other regions for such investments. The sub-national governments, at the same time, tend to react by further enacting local policies related to environment, land use and labour and so on, and emphasised the development virtues of the larger cities.

2.3 Empirical Evidences from India

It is somewhat a challenging task to summarise the studies on regional industrial development in India, as they differ on many dimensions such as geographic units of observation, indices of spatial concentration, variables of observation etc. as well as theoretical motivation and empirical specification. However, for the purpose of reviewing literature on regional industrial development in India we have divided the

[6] Examining the impact of trade liberalisation on poverty and inequality across Indian districts Topalova (2005) found that the impact of trade on relative poverty in India was most pronounced in areas with inflexible labor laws, where labor mobility was hindered. He concluded that if some of the immobility of labor is institutionally driven, then complementary measures to trade opening, such as labor market reform, can ease the shock of liberalisation and minimise its unequalising effects on inequality.

existing literature into four broad strands, which examined: (a) the spatial distribution of industries and the degree of spatial concentration over the years, (b) the regional industrial structure and emerging patterns of industrial base of various regions/states; (c) the factors that influence location decisions of industries; and finally (d) the impact of spatial concentration of industries on regional industrial performance and the regional economy.

2.3.1 Spatial Concentration of Industries

Inter-Regional Concentration

The uneven pattern of industrial development in India is not a new phenomenon; it extends back to the colonial period. One of the intrinsic patterns of industrial development during the colonial period was the uneven geographical spread of industries. Industries were mostly concentrated in and around the three major ports cities namely Bombay, Calcutta and Madras, which provided good avenue of transport for the goods being delivered and received from the interior and abroad (Roth, 1970; Mohan, 1997; and Meher, 2000). In 1913-14, the provinces of Bengal, Bombay and Madras together accounted for more than 73 percent of total companies, of which Bengal accounted for 973 (35.5 percent), Bombay 613 (22.3 percent) and Madras 427 (15.6 percent) companies. Though, the share of Bengal had increased by six percent at the expense of Bombay and Madras during 1938-39, these three provinces together maintained their dominance with approximately 68 percent share of the total companies at work in 1938-39.[7]

Thus, the regional pattern of industrial development was highly uneven and disparity was quite glaring at the time of independence. For, the state of Bombay, West Bengal and Madras together accounted for about 76.7 percent of total manufacturing workers and 77 percent of manufacturing output in 1948, of which the share of Bombay was 34.7 percent and 44.8 percent respectively and that of West Bengal was 31.7 percent and 23.7 percent respectively.[8] Though some industrial centres such as Ahmedabad, Delhi, Kanpur, Baroda, Coimbatore, Bangalore, Pune, Hyderabad and Faridabad etc. were developed after independence, Bombay, Calcutta and Madras dominated the

[7] These data are reported in Awasthi (1991).
[8] These data are reported in Chandra (1963) and cited by Awasthi (1991).

industrial sense of the country (Awasthi, 1991; Roy, 2000). In fact, most of these new centres grew in the states that already had established industrial clusters.[9]

The situation has barely changed even as late as mid-1960s (Alagh et al., 1971a; 1971b). Industries continued to concentrate in the four industrially developed states namely Maharashtra, Gujarat, Tamil Nadu and West Bengal, which together accounted for about 44.7 percent of factories, 37.9 percent of the fixed capital and 40.8 percent of productive capital of the registered manufacturing sector (Shetty, 1982).[10] The dominance of these four states, which accounted for more than one half of the nation's industrial income in 1960-61, even found to be continued in 1980s. Observing such evidences Subrahmanian and Pillai (1986) noted that neither has there been any perceptible fall in the relative share of the major industrialised states nor any significant improvement in the contribution of other states to the national industrial income or employment during the period 1960-1980.

While most of the studies focused at the aggregated industry level, Awasthi (1991) provided a disaggregated industry level picture of distribution of organised sector industries among 18 Indian states for the period 1961-1978. Extending the analysis to selected 35 three-digit industry groups, Awasthi found that the four highly industrialised states also dominated in almost all three digit industries; Maharashtra and West Bengal being accounted for more than 10 percent share of value added in 32 and 30 industries respectively. At the aggregated industry level, Awasthi observed that while there has not much decline in the share of four industrialised states in organised sector industries value added and employment during the period 1961-1978, but their shares have considerably declined in terms of investment during this period.[11]

As far as the extent of inter-state inequality in industrial development during this period is concerned, the evidences seem to be inconclusive. While some studies observed that inter-state inequality in industrial development has declined during the 1960's through 1970's (Seth and Gulati, 1974; Dholakia, 1979; Sekhar, 1983; Awasthi, 1991), some others suggested that inequality has increased during this period (Roth, 1970;

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[9] For instance, Baroda grew out of the clustering in Bombay (Mumbai) and Coimbatore out of Madras (Chennai) etc.

[10] These four states together with Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Karnataka and Bihar accounted for around 80 percent share in of factories, fixed capital, and productive capital factory employment (Shetty, 1982).

[11] The share Maharashtra, West Bengal, Gujarat and Tamil Nadu in organised sector industrial value added, employment and fixed capital has declined from 65.9, 59.24 and 56.12 percent respectively in 1961 to 55.75, 49.65 and 37.89 percent respectively in 1978.

Shetty, 1982). Sekhar (1983), for instance, observed a converging trend among the states during 1960-1975 in the share of the manufacturing sector in the state domestic product and value added per employee in the manufacturing sector. Further, the calculation of Hirschman-Herfindahl and Theil's Inequality Indices revealed that concentration of industrial value added and employment has declined among the states during 1960-1975.[12] Similarly, examining the share of value added generated in the manufacturing sector to state income, Awasthi (1991) observed that inequality (measured by coefficient of variation) has declined for both the organised and unorganised manufacturing sector during 1961-1978.[13] Based on Theil's index, Gini coefficient and Hirschman-Herfindahl index, Awasthi found that on the average inter-state inequalities in the organised industries has declined by approximately 15 percent in value added, 21 percent in employment and 28 percent in fixed capital during the study period. Further, dividing the study period into two sub-periods (1961-1969 and 1969-1978) showed that the decline in inequalities in the first period was more than the second period, particularly in case of fixed capital. This suggest that though the decade of 1970s has experienced a converging trend in inter-state inequality in industrial development, the decade of 1980s has shown a move towards divergence, compared to the earlier decade especially in industrial investment.[14] However, Dholakia (1994) found that though the ratio of maximum to minimum income from registered manufacturing as well as secondary sector has increased during 1979-80 to 1984-85, which is an indication of increasing inter-state inequality in industrial development; the population weighted coefficient of variation has declined for both the sectors during the same. He concluded that the declining regional inequality during 1979-1984 was owing to the differential pattern of regional industrial growth, where all the southern states grew at a lower rate and the northern states (except Punjab) grew at a higher rate than the national average in industrial net value added.

The evidences from the existing studies, thus far, revealed that despite the initiatives by the state decade after decade, the the problem of spatial concentration of industries has not removed during the state-led policy regime. Barring some

[12] Comparing the two years 1961 and 1975, Theil's index declined from 15.56 to 9.4 (about 40 percent decline) for value added and from 11 to 7.83 (30 percent decline) for employment, whereas the declined for Hirschman-Herfindahl index was from 14.09 to 11.54 (about 18 percent decline) and from 11.70 to 9.99 (about 15 percent decline) respectively (Sekhar, 1983).

[13] Awasthi (1991), however, found that the degree of variation is higher for the organised sector compared to the unorganised sector and the declining trend is more regular for the organised sector.

[14] This could be, as Awasthi noted, because of heavy public sector investment in backward states during 1961-1969 and latter, in favour of some developed states such as Gujarat and Maharashtra as a consequence of investment in the petrochemical industries (Awasthi, 1991).

achievements in curbing the shares of the older industrialised states and decline in inequality to some extent, the policy instruments were somewhat inadequate in greatly altering the distribution of industries across the country (we will discuss this point in a later section). In fact, the decline in inter-state inequality was not due to significant gain in the share of backward states, rather largely due to the decline in the share of industrialised states.

With the structural reforms in 1991 researchers become more concern about its on spatial concentration of industries and, as we have seen earlier, various arguments and counter arguments have been raised in the literature. Amidst of this debate Subrahmanian (2003) has found that there has not been any major change in the relative ranks[15] of the states in the post-liberalisation period as the already developed states continues to hold the top positions, implying the continuation of the earlier pattern of the spatial concentration of industries under the state-lead policy regime. A study jointly conducted by the World Bank and the Confederation of Indian Industry (CII) has observed the wide spread variation in the investment climate across the major states and found that shares of investment, especially foreign investment, have been concentrated in "more investor-friendly states such as Maharashtra, Gujarat, Karnataka, Andhra Pradesh and Tamil Nadu to the disadvantage of other states like Uttar Pradesh, Bihar and West Bengal" (World Bank, 2004).

Chakravorty (2003a) has found that there has been concentration of industrial investment on the west and east coast and sparseness of industries in Bihar, Uttar Pradesh and Madhya Pradesh in the post-reform period. Further the study shows that states like Andhra Pradesh, Bihar, Maharashtra, Uttar Pradesh, Kerala and West Bengal have lost their investment share in the post-reform period, whereas Assam, Gujarat, Karnataka, Madhya Pradesh and Orissa have gained during the same. Chakravorty (2003a) and Lall and Chakravorty (2005) observed that the source of investment matters in industry location. Both the study found that the private investments, which are profit oriented, were directed towards leading industrial regions, coasts and metropolises, and away from socialist states; whereas the state industrial investments were found to have some regional equity considerations, and therefore, less biased towards leading regions during

[15] The relative ranks have been on the basis of a composite index computed by using seven indicators to capture the industrial development of a state: (a) percentage share of factories in the registered factory sector, (b) percentage share of output of registered factory sector, (c)percentage share of employment in the registered factory sector, (d) value added per worker in the factory sector, (e) per capita value added, (f) percentage share of domestic product originating from manufacturing sector and (g) per capita output of each state.

1993-94 to 1998-99. They concluded that the private (including foreign) industrial investment is the primary cause of spatial divergence in industrial investment in the post-reform period.

Chakravorty (2000) and Chakravorty and Lall (2007) have examined the long-term trends in location of investment and employment of organised industries for the period 1961-1994 and found that though, there has not been any regular trend across the states over the years either in terms of investment or employment, the share of the eastern states, especially Bihar and West Bengal has significantly declined over the period 1961-1994 both in terms of investment and employment. On the other hand, the western states, especially Maharashtra, despite experiencing continuous deceleration in their employment share, continued to hold their positions in most spheres; whereas both the northern states and southern states (especially Tamil Nadu and Andhra Pradesh) have made significant gains in industrial capital and employment share, except decline of northern states' share in investment during 1984-1994. They concluded by noting that the declines in regional inequalities in the earlier decades was owing to the industrial decline in the east, and the further decline that took them well below the national average caused regional inequality levels to increase in the post-reform period (Chakravorty and Lall, 2007).

In view of the trends in spatial concentration of industries in the post-reform period the evidences are not consistence, though most of the studies have provided evidences for increasing spatial concentration in the post-reform period (see Soo, 2002; Chakravorty, 2000, 2003a, b; Lall et al., 2001; Lall et al., 2003; and Lall & Chakravorty, 2005). It is observed that different studies, in fat in some cases the same study, often reached at conflicting conclusions due to use of different concentration indices. For instance, Chakravorty (2003a) and Chakravorty and Lall (2007) found that spatial concentration of overall organised manufacturing industries across Indian districts has declined in terms of spatial Gini index (from 0.732 to 0.706) during 1994-94 to 1997-98, while it has increased in terms of Moran's-I (from 0.093 to 0.161) during the same.[16] Using the same data set Chakravorty (2000) also observed increase in the Moran's-I for the post-reform period. In another study Soo (2002) have examined the concentration of organised manufacturing industries across 16 major states for the period 1980-1997 using spatial Gini index and found that the mean value of Gini index has declined between

[16] It is worth noting that while spatial Gini index is a measure of spatial concentration, Moran's I is a measure of spatial clustering.

1980 and 1991 (from 0.565 to 0.519) and then increased to 0.551 in 1997. Further, at the two-digit industry level, most of the industries have experienced a decrease in concentration in the pre-liberalisation period (1980-1991), but most of the industries experienced an increase in concentration in the post-liberalisation period (1991-1997) as well as for the entire period (1980-1997).

Some other studies, on the other hand, examined spatial concentration for only one period across different industries (see Lall, Shalizi and Deichmann, 2001; Lall, Koo and Chakravorty, 2003; Kathuria and George, 2005).[17] For instance, Lall, Shalizi and Deichmann (2001) have examine spatial concentration (measured by spatial Gini index) for 11 organised manufacturing industries at the district level for 1994-95 and found that the leather products, metal products and food and beverages as the most concentrated industries. Using the same data set Lall and Koo (2004) also found similar results for 18 two-digit organised industries based on Ellison-Glaeser, Herfindahl and Gini indices. On the other hand, Kathuria and George (2008) have calculated Ellison-Glaeser index for 66 four-digit organised manufacturing industries at the state level for 1997-98 and observed that extracted industries (e.g. metals and certain chemicals etc.), traditional industries (e.g. leather, footwear, wearing apparel and carpentry etc.) and high-technology industries (e.g. pharmaceutical etc.) are the most concentrated industries, whereas food product industries like fruits and vegetables, bakery products, grain mill products etc. are least concentrated.

Intra-Regional Concentration

While the above studies have focused on inter-regional concentration of industries, another group of studies have focused on the concentration of industries at the district and city level (Sekhar, 1983; Chakravorty, 2003a, b; Lall et al., 2001; Lall et al., 2003; Lall & Chakravorty, 2005; and Chakravorty and Lall, 2007). In an early attempt, Sekhar (1983) has examined the distribution of industrial employment (both household and non-household industry) among different classes of cities and towns[18] for the period 1960-1975 and found that employment in non-household industry were heavily

[17] Chakravorty (2003a) and Chakravorty and Lall (2007) also examined spatial concentration for five industry-groups (viz. heavy, chemicals, textiles, agribusiness and utility) for both the pre- and post-reform period, whereas Soo (2002) examined spatial concentration for 19 two-digit organised industries for both the pre and post-reform periods.

[18] In a standard classification cities and towns are classified into six classes based on the size of population: class I (population of 100,000 and more), Class II (Population of 50,000 to 99,999), class III (Population of 20,000 to 49,999), class IV (Population of 10,000 to 19,999), class V (Population of 5,000 to 9,999) and class VI (Population of below 5,000).

concentrated in class I cities, while employment in household industries were found to be more concentrated in the smaller classes of towns.[19] Further, while inequality (measured by Theil index) among these six classes of cities declined for household industries during 1961-1971 (from 3.1 to 1.6), for the non-household industry it increased (from 2.38 to 2.52).[20] Roth (1970) observed that more than 70 percent of factory sector workers were employed in establishments located in areas of highest level of development in 1961, whereas only 3 percent worked in establishments located in 79 districts of lowest level development and 7 percent worked in 88 districts of the second level of development.[21]

The post-reform period has experienced a trend of increasing concentration of industries in the metropolises and already developed districts. In a district level survey in Gujarat Awasthi (2000) has found that investment have flown mostly to the districts that have proximity to some major industrial concentration with the advantage of forward and backward linkages, or are on major trunk route or near the ports. Similarly, Lall and Chakravorty (2005) have found that the location of new industrial investments, particularly foreign direct investment favours the coast, already advanced and existing metropolitan districts in the post-liberalisation period (1993-1998). Deichmann et al. (2008) observed that though metropolitan districts have lost their share of investment and the largest increase in the manufacturing investment during the period 1989 to 1996 have taken place in the some sub-urban districts and even non-urban districts, the metropolitan areas have retained their dominance in rapidly growing industrial sectors. Chakravorty, Koo and Lall (2003, 2005) have examined spatial clustering for eight organised manufacturing industries within the metropolitan regions of Mumbai, Kolkata and Chennai for 1998-99. They found that small industrial units are more clustered than are large units and that intra-metropolitan location decisions are influenced by land market and state actions in the land market.

In conclusion, it should be noted that these findings are not comparable due to the different time periods of the study, data base and statistical devices of analysis. But one

[19] In 1961, about 62.6 percent of non-household industry workers were employed in class I cities, which increased to 72 percent in 1971.Contrary to this, more than 55 percent of household industry workers were operating in cities falling in classes II, III and IV in 1961, which declined to around 50 percent in 1971. Class I cities accounted for about 31 and 42.8 percent of household industry workers in 1961and 1971 respectively. (see Sekhar, 1983)

[20] However, the situation varied across states: concentration among the cities rose significantly in West Bengal and Bihar, while fell considerably in Maharashtra, Gujarat, Uttar Pradesh, Andhra Pradesh and Karnataka (Sekhar, 1983).

[21] The Census Bureau has divided the country into four levels of development viz. lowest, second, third, and highest, on the basis of a ranking of the districts in each state based on certain broad stages of social, cultural, and economic achievement (see Roth, 1970 for a discussion).

can certainly infer from this review that the period up to 1980s was characterised by industrial decentralisation and declining regional inequality, whereas the period since mid-1980s, especially since early 1990s witnessed structural changes in the location of industries across the states and across different districts within the states. The remarkable structural change in the post-reform period, as obvious from most recent studies, is that of the inter-regional divergence and intra-regional convergence of industrial concentration, what Chakravorty and Lall (2007) has termed as "concentrated de-concentration".

Although these studies have tried to analyse the phenomenon of increasing spatial concentration of industries in view of liberalisation, but they failed to quantify the impact of liberalisation on industrial location. We have found some related studies which have tried to explain the impact of liberalisation on spatial inequality in India. For instance, Aghion et al. (2005a) have pointed out that the process of reforms in the 1980s and 1990's was associated with increasing cross-state inequality in industrial performance. They observed that the timing and the variation of the across industries inequality trends is associated with the process of delicensing. In particular, inequality started growing earlier for industries that de-licensed in 1985, while it only grew later for industries that de-licensed in 1991, and does not grow for industries that never de-licensed. They have emphasised that institutional differences across states are an important factor in the unequal response of state-industries, and illustrate the importance of the interaction between fast-moving product market deregulation (delicensing, trade liberalisation) and slow-moving labor market regulation in explaining the evolution of cross-state industrial performance. Similarly, Aghion et al. (2005b) observed that the response to delicensing varies significantly depending on the labor markets conditions prevailing in different Indian states. They have found that delicensing resulted in a reallocation of industrial output, employment, number of factories and capital accumulation from states with pro-worker labor institutions to states with pro-employer labor institutions. In pro-worker states delicensing actually depressed industrial performance relative to what would have happened had the license raj remained in place.

2.3.2 Regional Industrial Structure

There is another stream of literature which has focused on the industrial structure of the regional economies. This group of literature examines what types of industries are concentrated where. Put differently, it studies the industrial diversification pattern of the

states. Roy (2000) examined the industrial structure of India as a whole during the colonial period and found that the industrial structure of the country during 1921-1931 was, by and large, dominated either by natural resource based industries such as cotton textiles, food, drink and tobacco, metals, minerals, woods, stones and glass, hides and skins etc. or labour-intensive industries.[22] Further, as late as 1981, the industrial structure of the country as a whole remained more or less unchanged, textiles and food products being accounted for 29.6 and 16.2 percent of total industrial workers respectively.

Turning to the regional industrial base, Alagh et al. (1971a) has examined the industrial base of 15 major states of India for the period 1956 to 1965. Based on location quotient (LQ) estimation for organised sector employment at 3-digit industries the study found that industrial base of most of the states was dominated by traditional primary-resource-oriented base industries. Alagh et al. (1971b) observed that apart from the relatively diversified regions linked with the metropolitan regions of Calcutta, Bombay and Madras, industrialisation in other regions consists of a set of interrelated industries. Based on specialisation coefficient for 15 major states, Alagh et al. (1971a, b) found that Maharashtra, Tamil Nadu and West Bengal were the most diversified states, whereas states like Rajasthan, Bihar, Assam, Jammu & Kashmir, Orissa and Kerala were least diversified. They also observed that the least and middle diversified states, in general, specialised in resource-based industries, while the diversified states apart from resource based industries specialised in capital and demand oriented consumer goods industries. Even as late as the 1980s, there has not been any change in the regional industrial structure of India. Subrahmanian and Pillai (1986), in their study on Industrial development in Kerala, have found the same regional patterns of industrial diversification of the states in India for the period 1960 to 1980-81. This implies that the regional industrial structure has remained more or less same over a period of two and half decades.

In another study, Awasthi (1991) found that though the states, more or less, have diversified their industrial structure during 1961-1978, the industrial base of most of the states has been dominated by resource-base industries. The study observed that regional industrial diversification has been positively linked with the level of industrial development of the states; that is the industrially developed states have a diversified

[22] The textile industries dominated the industrial structure of India during 1921-1931 with about one fourth share of total industrial workers, followed by metal and machinery (11.5 percent); food, drink and tobacco (10 percent), woods, stones and glass (10 percent); chemicals (3 percent) and hides and skins (2 percent) (Roy, 2000).

industrial structure. The study also found that the regional industrial structure has shown a tendency towards change from traditional consumer oriented industries to capital goods industries. A comparison of Alagh et al. (1971a) and Awasthi (1991) has revealed that though most of the states have attained a more diversified industrial base in 1987 as compared to 1965, which was mostly confined to traditional manufacturing producing consumer goods, the industrial base of most of the states still dominated by traditional and resource-base industries; a phenomenon of greater diversification within the dominant group of industries.

2.3.3 Determinants of Regional Industrial Variation

The question that why do industries locate in some areas and not in others is as much important as the question where these industries are located. The review of industrial location theories in the earlier section reveals that the key distinction in thinking about the determinants of location is between the first-nature geography such as natural advantage, resource and factor endowments and technological differences; and the second nature geography such as market assess, inter-and intra industry linkages, economic diversity, localisation and urbanisation economies, infrastructure facilities and so on. From both the theoretical and empirical grounds the second nature geography variables have obtained greater emphasis as major determinants of industrial location decision particularly in the post-reform period, since these variables can be influenced through suitable policies, while the first nature geography variables are policy ineffective.

The existing studies dealing with explanations for the determinants of industrial location or causes of regional variation of industrial development in India can be broadly classified into three groups, which examined the role of: (a) historical factors, (b) public policies and, finally (c) market forces on the industry location decisions. In this section we review the existing literature under these three headings.

2.3.3.1 Historical Forces

Studies belonging to this group argued that the existing regional inequalities in industrial development have owing to the process of economic development of the regions during the British rule in India, which extended from 1757 to 1947. The industrial era in India started with the opening of coal mines by Alexander and Company in 1820 and the establishment of first cotton mill in Bombay by Cowasji Davar in 1851,

followed by two more cotton mills in 1860 (Lall and Chakravorty, 2007). The interest of the rulers was not to serve the home market, but to use the "dependent colony" as a supplier of raw materials for the British industries and the vast Indian market for British manufacturers. Therefore, industries were established in those areas which could provide good avenue of transport for the goods being delivered and received from the interior and abroad (Mohan, 1997) and thus, served as the principal seats of English economic and military power (Kosambi and Brush, 1988). These historical and political forces, as Awasthi (1991) observed, guided the development of three port cities namely Bombay, Calcutta and Madras, which in turn became the hub of industrial activities and emerged as a nucleus for the development of Maharashtra, West Bengal and Tamil Nadu respectively. It is further argued that the development of these presidencies during the British period was at the cost of the resource rich Bihar, Madhya Pradesh, Assam and Orissa.

Researchers, focusing on the causes of concentration of industries in the port cities during the colonial period, argued that the regional concentration of industries was a consequence of the development of railway and the uneven public investment in basic overheads made by the British government, and not due to locational advantages or disadvantages (Awasthi, 1991). Regarding the attraction of Bombay and Calcutta Roy (2000) remarked, "They were major ports and centres of transportation. Both cities had developed as points of export trade in the early nineteenth century. Calcutta had a connection of European settlement. The two provinces, moreover, had conditions suitable for cotton and jute production."

In a recent study, Lall and Mengistae (2005) have examined if there any relationship between exogenously established institutions during colonial rule and industrial development in India. For this they have followed Banerjee and Iyer's (2005)[23] classification of districts based on colonial land tenure and revenue systems in India and compared the average industry employment in three industry categories (high-technology, medium-technology and low-technology) in landlord and non-landlord districts for 2003. They have found that industry concentration is significantly lower in landlord districts for all industry types. Their econometric (OLS) estimation for the

[23] Banerjee and Iyer (2005) have analysed the different land revenue systems (viz. *Zamindari, Raiyatwari and Mahalwari)* instituted through the British colonial rule of India during the early nineteenth century and examined its impact on a variety of present day economic and social indicators. They have found that post independence agricultural investments and productivity were lower in districts where land rights were given to landlords compared to districts where rights were given to cultivators.

relationship suggested that having a historic landlord based land revenue system is negatively associated with industry concentration.

2.3.3.2 Role of Public Policy

Soon after independence, faced with glaring inter-regional inequalities the Indian Government had adopted a series of policy measures in order to achieve balanced regional industrial development. The policy instruments that were introduced by the government for achieving balanced regional industrial development can be categorised in four groups: (a) industrial licensing, (b) location of public sector undertakings, (c) distribution and pricing policies for basic industrial inputs and (d) incentives to industrially backward states. These policies are well documented in sources like Sekhar (1983), Ahmed (1974), Roth (1970), Bhagwati and Desai (1970) and Bhargava (1995). These policies, which were motivated by the equity and efficiency principles (Sekhar, 1983), were extensively used to locate public sector industries in the backward areas and divert the private sector industries away from the large cities towards the backward areas.[24]

There has been a strong argument that the state policies have resulted in greater regional imbalances in industrial development since the already industrialised regions have taken the initial advantages in attracting investments. However, there are differences among the scholars regarding the working of different policies in influencing industrial location. For instance, many researchers have argued that the resulted in increasing regional inequality in the post- independence period (Roth, 1970; Sekhar, 1983). The Industrial Licensing Policy Enquiry Committee or popularly known as Dutt Committee, 1967 pointed out that the four industrially advanced states of Maharashtra, West Bengal, Gujarat and Tamil Nadu have benefited the most from the operation of the policy. Between 1956 and 1965, these four states accounted for about 62.4 percent of industrial licenses approved, of which approximately 40 percent of the industrial licenses were concentrated in the three cities- Madras, Calcutta, and Bombay; whereas the poor states of Bihar, Orissa, Uttar Pradesh and Madhya Pradesh received only 15 percent of total licences approved (Ahmed, 1974). Further, approximately two thirds of industrial licenses were given to the class I cities and more that 90 percent licenses were issued to

[24] Efficiency justifications have focused on the inoptimal distribution of infrastructure and imperfectly functioning markets that have led to the concentration of industry in certain metropolitan regions to the neglect of smaller towns and backward areas. On the other hand, equity justification focused on promoting more equitable pattern of economic growth among the states. (see Sekhar, 1983)

the urban areas, which accounted for less 20 percent of population. Similarly, about 82 percent of the licenses were granted to the areas of highest level of development, whereas the licenses granted to areas of lowest and second level of development were only 1.69 and 3.6 percent respectively during the same period (Roth, 1970). However, these trends continued in later years also: between 1979 and 1992, the four industrially developed states of Maharashtra, West Bengal, Gujarat and Tamil Nadu received 46.4 percent of total licences approved, whereas the share of Bihar, Orissa, Uttar Pradesh and Madhya Pradesh was only 16.2 percent (Martinussen, 2001). Thus, it is difficult to believe that the industrial licensing policies really played any constructive role in promoting balanced regional development.

The location of public sector projects was found to have significant impact in reducing regional imbalances. Sekhar (1983) observed significant impact of public sector undertakings on the industrial development of the backward states like Bihar, Madhya Pradesh, and Orissa etc. However, some others have pointed out that the public sector undertakings established in backward states resulted in inefficiency, because of the existence of a traditional and technologically backward industrial sector and thus, have not any significant impact on their economies (Ramadhyani, 1984).

The distribution and pricing policy, which was aimed at equalising the prices and controlling the distribution of the basic industrial inputs such as cement, steel, coal etc. throughout the country, resulted in irrationalities in the industrial locations. The policy acted as a subsidy to the regions which did not produce these basic inputs (Awasthi, 1991) and thus, robbed the producing areas of Southern Bihar and Bengal, Western Orissa and Eastern Madhya Pradesh of their comparative advantage in industries using these products (Chakravorty, 2000). Similarly, the incentives policies, which were meant for providing financial incentives to establish enterprises in the backward areas, was also failed to meet the basic objectives. Up to 1980 almost 55 percent of capital subsidies went to only 25 out of 296 eligible lagging districts, and all 25 were in industrially advanced states (Chakravorty, 2000).

Enquiring explanations for the better performance of the larger states in India, Gupta (1971) observed that the better performance of the large states was owing to the unbalanced growth strategies adopted by them. Further, the study observed that government participation was found to have no consequence on the better performance of the larger states; whereas economies of scale, urbanisation economies and market forces were found to have significant role in the performance of these states.

2.3.3.3 Market Forces

Though, the historical forces and public policies were at the heart of most of the earlier studies, more recent studies largely focused on the market forces as the major determinant of industrial location in India (though, this does not imply that the earlier studies have not focused on these factors). In an early attempt, Sastry (1970) tried to provide some explanations for regional variation of industrialisation in India for the period 1951-1961. Based on a cross-section study of major states, Sastry observed that the per capita income and urban population explained approximately 80 percent of regional variation in industrialisation in India. This finding was in line with the theoretical argument that industrialisation progresses with the level of economic development. As it is obvious from Kuznets (1955 and 1966) argument that as per capita income increases, there is a distinct shift in the sectoral allocation towards the industrial sector. So, one can postulate positive association between per capita income and industrial development.

Availability of raw materials and factors endowments has been two of important factors affecting the regional variation in industrial development in India. That the industrial structure of most of the states has been dominated by resource based traditional industries over the years (Alagh, 1971a, b; Subrahmanian and Pillai, 1986), the spatial variability of raw materials has found to have positive impact on regional variation in industrial development by different researchers. Alagh et al (1982) found positive association between the regional variation in agricultural development and industrialisation.[25] However, Raj (1976) argued that the interrelationship between the regional industrialisation and agricultural development may hold good to a large extent for the small scale industries, while it may not hold good in case of large scale industries. While these studies have considered agriculture only as a supply side variables (supply of raw materials), Awasthi (1991) considered both the supply side and demand side (demand for agricultural inputs like fertilizer, tools and implements, etc.) of agriculture and found that, as against expectation, both the demand side and supply side agriculture

[25] The argument that regional variation in industrialisation is related to the regional variation in agricultural development is based on the interrelationship between the agriculture and industry. It follows that in the early years of development when per capita income increases, mainly from the agriculture and trade, it is likely to lead to increase demand for manufactured goods owing to the higher income elasticity, increasing rate of savings and invisible surplus for investment in industries. Similarly, at a later stage, industries are found to provide a push to the agricultural growth through providing agricultural inputs like fertilizer, tools and machinery, etc. (Rangarajan, 1982; Ahluwalia 1986; Ahluwalia and Rangarajan, 1986)

variables have negative impact on the regional variation of industrial development in India for 1969 and 1978.

Soo (2002) examined the impact of factor endowments and technological differences across 16 major states on industrial location in India for the period 1980-1997. Using total factor productivity (TFP) for the organised industries as technology variable, and fixed capital, population and its growth rate and two infrastructure variables viz. length of surfaced highways and total electricity generating capacity for factor endowments, the study found that factor endowments and technological differences have clearly played an important role in determining the location of industries in India.

There are some other studies, largely influenced by the NEG literature, which have examined the role of economic geography variables such as market assess, intra- and inter-industry linkages, economic diversity, infrastructure, historical path dependence, and so on in determining industrial location in India (see Chakravorty, 2003a, b; Lall et al., 2001, Lall et al., 2003; Lall and Chakravorty, 2005; Kathuria and George, 2005; Deichmann et al., 2008). Examining the determinants of firm's location decisions following different methodologies (e.g. cost function approach, production function approach etc.) at different geographical scales (e.g. state, district and metropolis) for the pre and post-reform period, these studies observed that economic diversity of the regions is the only single economic geography variable that has significant impact on location of overall industry and all individual industry sectors considered for analysis. These studies have provided little evidences for the impact of localisation and urbanisation economies on firm's location decision. The important factors influencing the location of new industrial investments at the district level, however, are found to be the size of existing industrial investments in the district and the existence and size of new investment in the neighbourhood districts. In short, both the historical process and clustering of industries are found to have played important role in determining firm's location decisions in India in the post-reform period. We will return to this point in detail in Chapter 5.

2.3.4 On the Impact of Spatial Concentration

Studies included in this group of literature have focused on the impact of spatial concentration of industries on industrial productivity and profitability. Empirical evidence from cross country Studies (e.g. Ciccone, 2001 and 2002 for European Countries) and country studies (e.g. Ciccone and Hall, 1996 for USA; Rice, Venables

and Patacchini, 2006 for UK; Bode, 2004 for Germany; Britto, 2008 for Brazil; Coulibaly et al., 2007 for Turkey) suggest that agglomeration forces have positive impact on productivity.[26] However, it should be noted that agglomeration forces is both the consequence and cause of high productivity, and agglomeration forces can affect productivity different ways, say increasing returns to scale, urbanisation, externalities, and transport costs etc. (see Ciccone and Hall, 1996 and Ciccone, 2002).

Empirical studies focused on the impact of agglomeration are rare in India. In recent years few studies have focused on the impact of agglomeration forces on productivity and cost of manufacturing firms (see Lall, Shalizi and Deichmann, 2001; Lall, Koo and Chakravorty, 2003; Koo and Lall, 2005 and Lall and Chakravorty (2005). Lall et al (2001) have examined the extent to which agglomeration economies contribute to economic productivity using firm level manufacturing data for the organised sector in India for the year 1994-95. Distinguishing three sources of agglomeration economise, viz. improved market access at the firm level, intra-industry linkages at the industry level and inter-industry urbanisation economics at the regional level, they observed that access to markets through improvements in interregional infrastructure is an important determinant of firm-level productivity, whereas benefits of intra-industry linkages are not likely to be very high and the benefits of urban concentration do not appear to offset the associated costs arising from higher wages, rents, and congestion etc. Lall et al (2003) and Lall and Chakravorty (2005), on the other hand, examined the impact of economic geography factors on cost structure of eight (organised) manufacturing industry sectors for the year 1998-99. Their estimated cost function showed that only industrial diversity (which provides a summary measure of urbanisation economies) has cost-reducing effects, where as other economic geography factors such as markets access and inter-industry linkages have little or no influence on profitability and own industry concentration has cost-increasing impact, which is significant for five industry groups (food and beverages; textiles; leather; chemicals and electrical).

Another group of studies have focused on the impact of regional variation in industrial development on regional (income) inequality. For example, examining the sectoral contribution to aggregate regional income inequality, Rao et al (1999) found that

[26] For instance, Ciccone and Hall (1996) observed that a doubling of employment density in a country increases average labor productivity by 6 percent in the US. Similarly, Ciccone (2001 and 2002) observed that agglomeration forces explained a large part of regional productivity differences in the USA and European countries and that the strength of agglomeration effects is similar between the USA and European countries; the estimated elasticity of average-labour productivity with respect to employment-density being 4.5 percent in European countries compared to 5 percent in the US.

while primary sector was largely responsible for rise in regional disparity from mid-1960s to 1990, it was the secondary sector that played significant role in regional inequality in the 1990s. Similarly, Dasgupta et al. (2000) have found that it was the agricultural sector, and to a certain extent the manufacturing sector, that had important roles to play in the regional divergence for the period from 1970 to 1995, while the tertiary sector had a stabilising influence, with regional inequality decreasing in this sector. Kar and Sakthivel (2007) have found that in the 1980s the aggregate regional inequality as well as the contribution of each of the three sectors (primary, secondary and tertiary) has remained largely unchanged, whereas in 1990s the contribution of agriculture sector has remained unchanged and that of industry and services has showed a rising trend, suggesting that the industry and services sector has played a significant role in the aggregate regional inequality in India in the post-reform period. In a recent study, Khomiakova (2008) observed that the sector's contribution to the widening regional income inequality is led by the industry sector (60.26 percent) and followed by services (54.34 percent), whereas agriculture plays a role of compensating the rate of aggregate inequality (-11.81 percent) during 1993-2004. Thus, the widening regional inequality in the post-reform period has been seen as a result of growing inequality in the industrial sector. Put differently, the growing regional disparity in the post-reform period is due to the differentiated growth pattern between more and less industrialised regions (Bhattacharya and Sakthivel, 2004).

2.4 Limits of Existing Studies

Though the literature on regional pattern of industrial development in India appears to be exhaustive and robust, they are not free from certain limitations. While most of these studies are descriptive, very few studies have attempted to provide some explanations for the location dynamics of industries across the regions/states. However, most of these findings are partial and the explanations are not based on proper treatment to the problem of industrial location, because these studies have considered very limited number of explanatory variables in their analysis.[27] Further, there is dearth of information

[27] For example, studies such as Chakravorty et al. (2003, 2005), Lall et al. (2001), Lall et al. (2003), Koo and Lall (2004) and Lall and Chakravorty (2005) have considered only the economic geography variables viz. localisation economies, urbanisation economies, economic diversity and market access in determining the firm's location decision.

on the contributory factors of structural changes in the industrial location across the states/regions over the years.

More importantly the existing studies have focused on the location of organised industries at the state level. Although the unorganised manufacturing sector occupies a dominant position in terms of number of enterprises and numbers of workers in comparison to its organised counterpart, no attempt has been made so far to examine the location pattern of the sector. The location pattern of the unorganised manufacturing industries may or may not follow the same pattern as that of the organised manufacturing industries, and this depends on the linkages between the two sectors. Further, the factors that influence the firm's location decision in unorganised sector may differ from those in the organised sector. It is well known that unorganised industries are small in size and characterised by low level skills and technology. Therefore, factors such as localisation and urbanisation economies, increasing returns to scale, inter-firm spillovers etc., which are generally more dominant in the industries with high level of skills and technology may not have significant impact on the location of unorgainsed industries. On the other hand, linkages with organised sector industries, availability of raw materials, availability of labour with specific skills (such as artisans, sculptors, handloom etc.) and other factors may play significant role in determining the location choice of unorganised industries.

Further, the existing studies, by and large, focusing on the states. Given the wide variation in the size of the states comparison between two states, say Uttar Pradesh and Kerala or Assam does not provide any meaningful insights to the nature of the problem.[28] Moreover, in India the intra-state variability is perhaps more intense. Differences exist not only in terms of geographical area and population size but also in terms of climatic, sociological, cultural, local political economy and ethnicity etc. Owing to such diversity at multiple scales, the extent of concentration may vary from state to state and within the states from region to region. For example, there may be less concentration at the state level, but within the state concentration may be very high and *vice versa*. There may be decline in concentration at the state level, but the intra-state concentration may increase and *vice versa*. Similarly, within the state some areas may lose their share in industrial base and some other areas may gain and thereby, concentration at the state level may not change over the years. Such possibilities, which could be the most possible outcomes of

[28] Uttar Pradesh accounted for about 166.20 million (16.41 percent) of India's population, whereas Kerala and Assam accounted for only 31.84 million (3 percent) and 26.66 million (2.58 percent) respectively as per 2001 Census.

the reforms process, have not been reflected in the studies carried out at the state level, and hence, such studies are virtually meaningless to provide a clear picture of the location dynamics of industries. Therefore, depending on the nature of the problem it is suggested that such analysis should be carried out at a smaller geographical scale than the state. Although some studies have focused on the problem at the district level (e.g. Chakravorty, 2003a, b; Lall et al., 2001; Lall et al., 2003; and Lall & Chakravorty, 2005 and Chakravorty and Lall, 2007), they have covered only the organised manufacturing industries at a very aggregated industry level and limited to selected states and three metropolitan regions (Calcutta, Delhi and Mumbai).

Considering the limitations of the existing studies the present study has examined the location of unorganised manufacturing industries in India at disaggregated (two-digit and three-digit) industry level at different geographical scales in the pre- and post-reform periods. The main departure of the present study from the existing studies is the consideration of the unorganised manufacturing sector in the regional set up. Further, the study also examined the locational linkages between the organised and unorganised manufacturing sectors and the contributing factors that influence the location decisions of unorganised manufacturing industries in India in the post-reform period.

Chapter 3

Spatial Distribution of Unorganised Manufacturing Industries in India

3.1 Introduction

Notwithstanding various policies to address regional disparities in industrial development, the issue of balanced industrial development still remains. The existing literature provides conflicting arguments and contradictory findings about the regional pattern of industrial development in India for the pre- and post-reform periods. To summarise, studies have found that inter-state disparity in the distribution of manufacturing industries has declined in the 1980s (see Awasthi, 1991 and Dholakia 1994), whereas it has significantly increased in the post-reform period (see Lall and Chakravorty, 2003a, and Lall and Chakravorty, 2005). While all these findings are for the organised manufacturing sector at the state level, there is dearth of information about the location of unorganised manufacturing industries in India.

Spatial disparity at the sub-national (state) level is obvious in most of the countries and particularly in developing countries like India, where disparity takes place at multiple geographical scales in different dimensions such as in terms of history, geography, local political economy, culture and so on. In fact, disparities do exist among different areas within the states and even there are areas within the highly developed states which are comparable to those of the poorest areas in the most backward States. It is credible that the experience at the state level may not hold good at the lower geographical scales. Therefore, it is claimed that, given the nature of complexity and the way diversity occurs, a state level analysis is virtually meaningless and, hence, analysis needs to be at a smaller geographical scale. The next largest administrative unit in India is the District. There are about 593 districts as per 2001 census; the number of district, however, is not fixed as like the state- because new districts are carved out of old ones on a regular basis.[1] However, studies on spatial aspects of industrial development at the district level for the country as a whole are rare in India.[2] In this chapter we consider

[1] The number of districts increased from 356 in 1971 to 412 in 1981 and then 466 in 1991. However, the largest increase in the number of districts has taken place between1991and 2001- from 466 to 593, an increase of about 27.25 percent. This is mainly because of the creation of three new states namely Chhattisgarh, Jharkhand and Uttaranchal in November 2000 (Kumar and Somanathan, 2009).

[2] Chakravorty (2000, 2003a, b) and Chakravorty and Lall (2007) are some examples, which have analysed the spatial aspects of industrialisation for the organised sector at the district level.

three geographical scales namely districts, states and beyond states (regions) for the purpose of analysing the location of unorganised manufacturing industries in India.

The main objective of this chapter is to analyse the regional pattern unorganised manufacturing industries in India at different geographical scales namely districts, states and beyond states (regions) in the pre- and post-reform periods. This has been addressed by analysing the spatial distribution of unorganised manufacturing industries in terms of number of enterprises, total employment, gross value added (GVA) and fixed assets. We have also examined the spatial imbalances in the productivity of unorganised industries.

The remaining of the chapter is organised in the following sections. Section 3.2 explains the data source and aggregation procedure. Section 3.3 analyses the regional pattern of overall manufacturing industries. Section 3.4 analyses the spatial distribution of unorganised manufacturing industries at different geographical scales- districts, states and beyond states (regions). Section 3.5 analyses the productivity differences in the unorganised manufacturing industries across the states and districts and finally, section 3.6 sums up the major findings of the chapter.

3.2 Data Source and Aggregation

The data used in this chapter are derived from the National Sample Survey (NSS) unit level data available on CD-ROMs for 1994-95 (51st round) and 2005-06 (62nd round). These two rounds of NSS surveys have provided information on different characteristics and variables on unorganised manufacturing sector in India both at the state and district levels.[3] For the purpose of analysis we have selected 25 states and divided them into five meta regions: eastern region (Bihar, Orissa and West Bengal), north-western region (Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab and Uttar Pradesh), central region (Gujarat, Maharashtra, Madhya Pradesh and Rajasthan), southern region (Andhra Pradesh, Karnataka, Kerala and Tamil Nadu) and the north-east (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura).[4]

[3] The 51st round of NSS survey provided information for about 452 districts of 32 states and union territories, which increased to 581 districts (of 35 states and union territories) in the 62nd round of survey. This increase in the number of districts is mainly because of the creation of new districts between the two survey periods and also increasing the coverage of the survey during the 62nd round in states like Jammu and Kashmir, Mizoram and Delhi.

[4] Andaman & Nicober Island, Chandigarh, Daman & Diu, Dadra & Nagar Haveli, Goa, Lakshadweep and Pondicherry are grouped as other states and excluded from analysis.

The reorganisation of state and district boundaries between the two periods has created problems in state and district comparisons over time. Therefore, we have merged Jharkhand with Bihar, Chhattisgarh with Madhya Pradesh and Uttaranchal with Uttar Pradesh. Similarly, to arrive at a comparable set of districts for both the periods, the newly created districts have been merged with the districts from where they were carved out. While, some districts were cleanly partitioned into multiple districts between these periods, some districts have experienced complex boundary changes. Put differently, the districts which were created by partitioning multiple districts have created problem for merging.[5] In this case, following Kumar and Somanathan (2009), we have used population weights for merging the new districts with the multiple parent districts (see *Appendix-III* for the adjustment of districts for their boundary change). The total number of districts for which NSS has provided information for both the rounds and the number of districts which are considered for analysis after merging for the second period is reported in Table 3.1.[6]

Table 3.1: Number of NSS Districts and Districts Selected for Analysis

States	Total Districts		Districts selected	States	Total Districts		Districts selected
	1994-95	2005-06			1994-95	2005-06	
Andhra Pradesh	23	23	23	Manipur	8	9	8
Arunachal Pradesh	8	9	6	Meghalaya	5	7	5
Assam	22	23	22	Mizoram	3	8	3
Bihar	42	55	42	Nagaland	7	8	7
Delhi	1	6	1	Orissa	13	30	13
Gujarat	19	25	19	Punjab	12	17	12
Haryana	16	19	16	Rajasthan	27	32	27
Himachal Pradesh	12	11	11	Sikkim	4	4	4
Jammu & Kashmir	3	10	3	Tamil Nadu	22	30	21
Karnataka	20	27	20	Tripura	3	4	3
Kerala	14	14	14	Uttar Pradesh	63	83	63
Madhya Pradesh	45	61	45	West Bengal	17	18	17
Maharashtra	30	35	30	**All India**	**452***	**581***	**435**

Note: * Includes a total of 13 districts of seven states namely Andaman and Nicobar Islands, Chandigarh, Dadra and Nagar Haveli, Daman and Diu, Goa, Lakshadweep and Pondicherry, which are not considered for analysis.

[5] For example, Davanagere district of Karnataka was created by partitioning three districts Bellary, Shimoga and Chitradurga districts. Similarly, Gautom Budha Nagar of Uttar Pradesh was created by partitioning Bulandshahr and Ghaziabad districts. (Also see Kumar and Somanathan, 2009).

[6] Note that, this district concordance has been followed for the district level analysis. For the regional and state level analysis we used the state level data.

3.3 Regional Pattern of Overall Manufacturing Sector

Before getting into the regional pattern of unorganised manufacturing sector it is worthwhile to look at the regional pattern of the overall manufacturing sector vis-à-vis its two sub-sectors, namely organised and unorganised sectors. In order to comprehend the level of overall industrial development of various states, we compare the share of the value added generated in manufacturing sector in the net state domestic product (NSDP) for 1994-95 and 2004-05 (see Table 3.2).[7] Gujarat with 26 percent value added from manufacturing to its NSDP emerged as the most industrialised state, followed by Tamil Nadu (25 percent), Maharashtra (24 percent), Haryana (18.5 percent), Karnataka (17.5 percent), Delhi (16.6 percent) and West Bengal (15.6 percent) in 1994-95. All these states are more industrialised compared to the remaining states, by virtue of being above the all-India level (15.07 percent). By 2004-05 all the states (except Madhya Pradesh, Himachal Pradesh Rajasthan, Bihar, Assam and Meghalaya) have lost share of value added from manufacturing to NSDP. The significant lose has been experienced by Tamil Nadu, Maharashtra and Delhi, whereas Madhya Pradesh and Himachal Pradesh have significantly improved their share of value added from manufacturing to NSDP. Though the industrialised states have lost their share of value added from manufacturing to NSDP, Gujarat, Tamil Nadu, Maharashtra, Haryana and Karnataka have managed to remain in the top five ranks in the later period. However, the middle level states have shuffled their relative ranks in the later period. For instance, Himachal Pradesh and Madhya Pradesh have moved to the sixth and seventh positions respectively, while Delhi has dropped to the fourteenth position. None of the industrially lagging states have improved enough to be considered in the category of developed states, rather the position of the states like Arunachal, Manipur, Mizoram, Nagaland, Orissa, Sikkim and Tripura have distorted in the later period.

Comparing the relative ranks, all the states except Delhi, Manipur and West Bengal have remained, by and large, in the same relative ranks for the organised and unorganised manufacturing sectors.[8] To confirm the association between the two sectors we have computed the rank correlation coefficients across the states, which worked out to be 0.575 in 1994-95 and 0.620 in 2004-05. The coefficients are significant at 1 percent

[7] Instead of 2005-06, we select the year 2004-05 because it is the nearest year for which the sector wise NSDP data is available for all the states in the same base year (at 1993-94 prices).

[8] Delhi, West Bengal and Manipur ranked 12th, 11th and 24th respectively in organised manufacturing as against the 1st, 4th and 6th respectively in unorganised manufacturing in 1994-95. The similar is the case in 2004-05 also.

level of significance, implying that the inter-state distribution of unorganised manufacturing industries is significantly associated with that of the organised industries, and that the association between the two sectors has become stronger in the post-reform period. This could be a broad justification to our argument that the locational linkages between the unorganised and organised manufacturing sectors would increased in the post-reform period, which could take the form of sub-contracting, input linkages, market linkages, and technological linkages as we have discussed in Chapter 1. However, analysing the locational linkages between the organised and unorganised sectors in terms of share of these sectors in NSDP may not reflect the actual relationship (the reason is discussed in a following paragraph) and hence, it is important to examine the relationship in terms of other variables such as employment, gross value added and fixed assets etc. This has been done in *Annexure 3.2* of this chapter.

Table 3.2: Share of Value Added Generated in the Manufacturing Sector as proportion of Net State Domestic Product (NSDP) at factor cost (in percent)

States	1994-95			2004-05		
	Organised	Unorganised	Total	Organised	Unorganised	Total
Andhra Pradesh	7.73	4.67	12.39	7.56	4.35	11.91
Arunachal Pradesh	0.00	3.13	3.13	0.00	2.49	2.49
Assam	6.34	2.08	8.42	6.53	1.82	8.35
Bihar	7.99	2.45	10.44	9.00	1.42	10.41
Delhi	7.22	9.41	16.63	4.04	5.07	9.11
Gujarat	17.21	8.88	26.09	18.38	7.02	25.40
Haryana	12.04	6.44	18.48	12.71	4.59	17.29
Himachal Pradesh	5.3	1.75	7.05	12.16	3.37	15.52
Jammu & Kashmir	3.33	5.33	8.66	2.73	2.00	4.73
Karnataka	10.7	6.88	17.58	10.56	6.56	17.12
Kerala	5.69	5.62	11.31	4.82	3.03	7.85
Madhya Pradesh	8.56	6.23	10.72	9.40	5.79	15.19
Maharashtra	16.17	7.74	23.91	11.35	6.78	18.13
Manipur	0.19	7.2	7.39	0.15	4.61	4.76
Meghalaya	0.88	1.7	2.57	1.53	1.13	2.65
Mizoram	1.10	1.63	2.73	0.37	0.83	1.20
Nagaland	0.67	2.33	3.01	0.25	1.03	1.28
Orissa	5.15	2.08	7.22	3.57	1.23	4.80
Punjab	10.01	4.4	14.4	8.58	4.63	13.21
Rajasthan	5.17	6.01	11.18	5.87	5.42	11.29
Sikkim	2.28	3.41	5.69	1.21	1.86	3.07
Tamil Nadu	16.1	9.21	25.31	10.60	7.79	18.39
Tripura	0.86	2.4	3.27	1.31	1.18	2.49
Uttar Pradesh	9.58	5.23	14.81	6.00	5.75	11.75
West Bengal	7.34	8.29	15.62	6.05	7.52	13.57
All-India	**9.93**	**5.14**	**15.07**	**9.70**	**5.45**	**15.15**
CV	0.759	0.520	0.609	0.779	0.591	0.648

Source: National Accounts Statistics, CSO, Government of India

Turning to the variation of the overall manufacturing sector and its two sub-sectors across the states over time it is observed that regional inequality (measured in terms of coefficient of variation) has increased for the overall manufacturing as well as its two sub-sectors in the post-reform period (see Table 3.2). However, the degree of variation is higher in the organised sector compared to the unorganised sector, due to which some argued that the main source behind regional inequality in India is the organised manufacturing sector (Dholakia, 1994; Awasthi, 1991). Though, the increased variation in the organised sector is concomitant with the findings of recent studies (e.g. Chakravorty and Lall, 2007, Lall and Chakravorty, 2005), the increased variation in the unorganised sector is not consistent with our findings in the next section based on NSS data on unorganised manufacturing industries, where we found that the coefficient of variation across the states has declined in terms of number of enterprises, employment, GVA and fixed assets of the unorganised manufacturing sector in the post-reform period. The empirical difference could be because of the factor discussed bellow.

The share of value added generated in the manufacturing sector to the NSDP depends not only the performance of the sector itself, but also depends on the performance of the other sectors of the economy, such as agriculture and services. Because of this it might not always reflect the relative strength of the manufacturing sector in the regional economy. Therefore, we have examined the per capita value added generated in the manufacturing sector as well as its two sub-sectors (see Table 3.3). However, the ranks of the states are more or less similar to that when the states are ranked according to the share of value added generated in the manufacturing sector to the NSDP. By 2005-06, none of the backward states have experienced any significant improvement to be included them in the developed category states, rather Punjab moved downward to join the moderately-developed states.

Thus, it is obvious that Gujarat, Maharashtra, Tamil Nadu, Delhi and Haryana are the industrially developed states, which have registered above the national average irrespective of the indicators used. On the other hand, Karnataka, Kerala, West Bengal and Andhra Pradesh are moderately developed states (which have accounted about two-third of the national average), and the states Bihar (including Jharkhand), Himachal Pradesh, Jammu & Kashmir, Kerala, Madhya Pradesh (including Chhattisgarh), Orissa, Rajasthan, Uttar Pradesh (including Uttaranchal) and the north-eastern states namely Assam, Arunachal Pradesh, Manipur, Nagaland, Meghalaya, Mizoram, Sikkim and Tripura are the Industrially backward states.

With this background of the regional pattern of overall manufacturing sector and its two sub-sectors, we now turn to analyse the spatial distribution of unorganised manufacturing industries at different geographical scales in the pre- and post-reform periods.

Table 3.3: Per Capita Value Added Generated in the Manufacturing Sector by States

(values in Rupees at 1993-94 prices)

States	1994-95			2004-05		
	Organised	Unorganised	Total	Organised	Unorganised	Total
Industrially Developed States						
Delhi	2128	1882	4010	2005	2512	4517
Gujarat	2096	884	2980	2349	2045	4394
Maharashtra	1877	922	2799	1824	1089	2914
Tamil Nadu	1543	961	2504	1478	1087	2566
Haryana	1407	698	2104	2170	1046	3216
Punjab	1248	582	1830	1438	777	2215
Moderately Developed States						
Karnataka	926	550	1477	1361	846	2207
Kerala	511	558	1070	644	404	1048
West Bengal	512	553	1065	693	861	1554
Andhra Pradesh	654	371	1025	939	542	1482
Industrially Backward States						
Rajasthan	510	377	887	561	517	1078
Uttar Pradesh	490	267	757	375	360	735
Himachal Pradesh	582	166	748	1557	478	2036
Madhya Pradesh	543	395	680	769	474	1243
Assam	381	112	493	467	130	598
Jammu & Kashmir	102	359	460	93	406	498
Orissa	302	114	417	233	81	314
Sikkim	163	253	416	153	236	388
Manipur	12	396	408	13	830	843
Bihar	302	93	395	447	70	517
Nagaland	68	216	283	54	28	82
Arunachal Pradesh	0	271	271	0	236	236
Mizoram	79	191	269	74	112	187
Tripura	44	152	196	175	157	332
Meghalaya	51	114	165	124	92	216
All-India	**966**	**562**	**1504**	**1427**	**1008**	**2435**

Note: (a) In order to arrive per capita value we took the estimates of mid-year population published by Register General of India

(b) States are arranged according to their per capita value added in the overall Manufacturing sector in 1994-95.

Source: Same as Table 3.2

3.4 Spatial Distribution of Unorganised Manufacturing Industries

This section examines the distribution unorganised manufacturing industries at three geographical scales- district, state and beyond state (region) in terms of number of enterprises, total employment, gross value added (GVA) and fixed assets in the pre- and post-reform periods. Two important points need to be kept in mind while looking at the share of these spatial units in the national total. First, the number of enterprises in any districts/states/regions depends on its geographical. Since, there are huge differences in geographical area across the districts/states/regions; share of the large districts/states/regions will be more as compared to that of the small districts/states/regions.[9] Similarly, the other variables such as employment, GVA and fixed assets will depend on the nature and types of enterprise, along with the geographical area of the districts/states/regions. Secondly, the predominant economic activity of the districts/states/regions differs from each other, and hence, the share of the industrialised districts/states/regions will be more as compared to others.[10] Hence, is not the absolute number or share of the districts/states/regions, but what matters more is the change in the share of the districts/states/regions between the two time points. We have also considered per capita fixed assets and per capita gross value added across the districts/states/regions.[11]

3.4.1 Distribution at the Regional Level (beyond States)

The distribution of unorganised manufacturing industries in terms of number of enterprises, total employment, GVA and fixed assets and the per capita GVA and per capita fixed assets across the five major regions in the pre- and post-reform periods are reported in Table 3.4 and Figures 3.1 and 3.2. It is evident that the regional disparity in the distribution of unorganised manufacturing industries varies by the nature of the variables considered for analysis; one of the observations we have made in the preceding chapter, because of which the findings of existing studies are contradictory and non-conclusive. This is also true at the state and district levels and hence, this point should be

[9] For instance, West Bengal and Uttar Pradesh have accounted for 16 percent and 14 percent of national total unorganised manufacturing units respectively in 2005-06, whereas the entire northern region (the group of 8 states) have together accounted for only 3 percent of national total unorganised manufacturing units at the same time. (For more detail see Table 3.1)

[10] For example, Punjab is basically an agrarian economy, while states like Gujarat, Maharashtra etc. are industrialised economy. Therefore, it is natural that the share of Gujarat and Maharashtra will be much higher than that of Punjab.

[11] The per capita fixed assets and GVA figures for 1994-95 and 2005-06 are obtained by dividing the total fixed assets and GVA by the estimated mid-year population published by Register General of India.

kept in mind when we discuss the performance of different geographical units with different variables throughout the study.

Looking across the five regions, very clear location patterns of unorganised manufacturing industries across the regions in the pre- and post-reform periods are discernible (Table 3.4 and Figures 3.1 and 3.2). It is apparent that while the eastern region is the leading region in terms of number of enterprises and employment, it is the lagging region in terms of GVA and fixed assets for both the periods. On the other hand, the central region, which accounted the least share among the major regions in number of enterprises and employment (about one fifth share in each), is the leading region in terms of GVA and fixed assets (about one third share in each). The other two major regions- north-west and southern regions- have accounted around one-fifth and one-fourth of national total respectively in all the four variables for both the periods. Thus, a clear mismatch is apparent between the eastern and central regions' shares in number of enterprises and employment on the one hand, and that of in GVA and fixed assets on the other. This could probably be explained by the differences between the two regions in terms of (a) productivity of the unorganised manufacturing sector and/or (b) the industrial structure in terms of types of enterprises and industry mix. These possibilities will be discussed elsewhere in this chapter.

The decline of eastern region and rise of southern region is found to be the foremost structural change in the location pattern of unorganised manufacturing industries at the regional level during the pre- and post-reform periods. The eastern region has experienced continuous decline in terms of all the variables in the post-reform period; the severe decline being in terms of number of enterprises and employment, in which the region has dominant position. The two eastern states of Bihar and Orissa have individually contributed to this decline, whereas the share of West Bengal has increased in both the variables. The similar is the case in terms of GVA and fixed assets (see Table 3.4) and also in terms of per capita GVA and per capita fixed assets (see Figures 3.1 to 3.4). Thus, irrespective of the variables we consider, the eastern region has experienced a continuous decline. The decline of the region in the post-reform period is associated with significant decline in the rural and OAME sector of the region as a whole and decline in the DME enterprises in Bihar (even Bihar has experienced declined in other sectors) and rural sector and OAME enterprises in Orissa (see Tables 3.1.A and 3.2.A). Similarly, the decline is also associated with significant decline in some of the important industries of the two states of Bihar and Orissa; for instance, the decline of the food products, leather

products, chemical products and machinery and equipment industries in Bihar; and tobacco products, paper products, chemical products and furniture and other industries in Orissa. On the other hand, West Bengal's improvement is associated with its improvement in textiles, leather products, woods products, chemical products, machinery and equipment and furniture industries (see Tables 3.3.A and 3.4.A).

The southern region, on the other hand, has improved in terms of all the variables in the post-reform period; the significant improvement being in terms of fixed assets. Within the region, all the states except Karnataka have experienced gain in number of enterprises and employment; and all states except Tamil Nadu have gained in GVA and fixed assets in the post-reform period. Similar is the result in terms of per capita GVA and fixed assets, where the region as a whole and all the states has experienced significant improvement in the post-reform period (see Figure 3.3 and 3.4).[12] The significant improvement of the region is associated with the significant gain of Andhra Pradesh, Karnataka and Kerala in the urban sector industries and Andhra Pradesh and Kerala in DME enterprises and also the overall gain of the region in industries like food products, paper and printing, chemical products and basic metal. However, the region as a whole and Tamil Nadu in particular has lost significantly in the machinery and equipment industries in the post-reform period (Tables 3.3.A and 3.4.A).

While the eastern region and southern region presented distinct trends, the other regions presented mixed results. For instance, the central region has gained in terms of all the variables except fixed assets, whereas the north-west region has experienced marginal decline in all the variables except fixed assets. Within the region also the results are mixed; for instance, in the central region all states but Gujarat has gained their share in all the variables (only Maharashtra lost in fixed assets and Madhya Pradesh in GVA); and in the north-west region Delhi and Uttar Pradesh have lost significantly, whereas Haryana, Jammu and Kashmir and Punjab have marginally gained in terms of all the variables (see Table 3.4). More or less same picture for both the regions is observed in terms of per capita GVA and fixed assets (Figure 3.1 and 3.2).

Turning to the question of disparity in the distribution of unorganised manufacturing industries across the five regions, it is apparent from Table 3.4 that inter-regional disparity (expressed as coefficient of variation) has declined in terms the share

[12] However, the southern region's significant improvement of the unorganised sector is found to be at the cost of the organised sector as we have observed from recent studies (Chakravorty, 2000, 2003a). Also, we will see in *Annexure 3.2* that the shares of all the southern states, except Karnataka have declined in the organised manufacturing sector in the post-reform period.

of the regions in number of enterprises, total employment, GVA and fixed assets in the post-reform period. Inter-regional inequality has also declined in terms of per capita GVA (from 0.30 to 0.24) and per capita fixed assets (from 0.54 to 0.51) during 1994-95 and 2005-06.

Table 3.4: Share of the States in all-India: Enterprises, Employment, GVA and Fixed Assets

(in percent)

States/ Regions	No. of Enterprises		Employment		Gross Value Added		Fixed Assets	
	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06
Bihar	9.00	7.97	7.41	6.60	4.78	4.04	3.57	2.46
Orissa	10.54	5.61	9.92	5.56	2.60	2.27	1.76	1.12
West Bengal	14.01	16.14	13.85	15.09	9.67	9.79	4.89	6.55
Eastern Region	**33.55**	**29.72**	**31.18**	**27.25**	**17.05**	**16.09**	**10.21**	**10.13**
Delhi	1.07	0.57	2.11	1.26	5.08	2.81	7.13	3.94
Haryana	0.77	1.34	0.88	1.49	2.23	3.22	2.11	6.11
Himachal P.	0.71	0.63	0.46	0.45	0.39	0.66	0.48	0.72
J & K	0.30	1.01	0.21	0.87	0.18	1.44	0.20	1.36
Punjab	1.32	1.72	1.39	1.65	2.84	2.70	3.65	4.24
Uttar Pradesh	16.43	14.19	17.45	14.9	14.83	12.03	12.47	11.75
North-West	**20.60**	**19.46**	**22.50**	**20.62**	**25.55**	**22.86**	**26.04**	**28.12**
Gujarat	4.51	3.83	5.75	5.08	10.51	7.37	10.75	7.14
Madhya Pradesh	4.07	6.21	3.72	6.03	4.26	3.96	2.81	3.65
Maharashtra	5.41	6.60	7.09	7.96	14.01	16.12	23.61	16.53
Rajasthan	3.01	3.73	2.45	3.56	3.02	4.48	3.29	4.40
Central Region	**17.00**	**20.37**	**19.01**	**22.63**	**31.80**	**31.93**	**40.47**	**31.72**
Andhra Pradesh	8.86	8.99	7.62	8.07	5.09	5.54	4.29	6.08
Karnataka	5.95	5.64	5.63	5.42	4.38	6.46	4.24	5.73
Kerala	2.12	3.86	2.10	3.82	2.04	4.02	1.74	5.02
Tamil Nadu	8.42	8.68	9.01	9.25	11.65	9.66	10.91	11.27
Southern Region	**25.35**	**27.17**	**24.36**	**26.56**	**23.16**	**25.67**	**21.18**	**28.10**
Arunachal	0.03	0.01	0.03	0.01	0.06	0.05	0.11	0.11
Assam	2.12	2.17	1.86	1.74	1.16	1.61	0.62	0.75
Manipur	0.46	0.31	0.23	0.22	0.17	0.15	0.23	0.15
Meghalaya	0.17	0.22	0.13	0.25	0.15	0.37	0.05	0.05
Mizoram	0.04	0.03	0.03	0.03	0.04	0.05	0.04	0.01
Nagaland	0.08	0.06	0.06	0.04	0.08	0.06	0.06	0.04
Sikkim	0.00	0.02	0.00	0.02	0.01	0.04	0.01	0.03
Tripura	0.43	0.27	0.39	0.40	0.20	0.40	0.12	0.11
N-E Region	**3.33**	**3.09**	**2.73**	**2.71**	**1.87**	**2.73**	**1.23**	**1.25**
Other Sates*	0.20	0.18	0.23	0.26	0.56	0.71	0.87	0.70
All India	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
CV across States	1.18	1.12	1.18	1.11	1.15	1.07	1.38	1.09
CV across Regions	0.56	0.52	0.53	0.50	0.57	0.55	0.76	0.67

Note: * Other states include Andaman & Nicober Island, Chandigarh, Daman & Diu, Dadra & Nagar Haveli, Goa, Lakshadweep and Pondicherry.

Source: Author's own computation using NSS unit level data on unorganised manufacturing sector

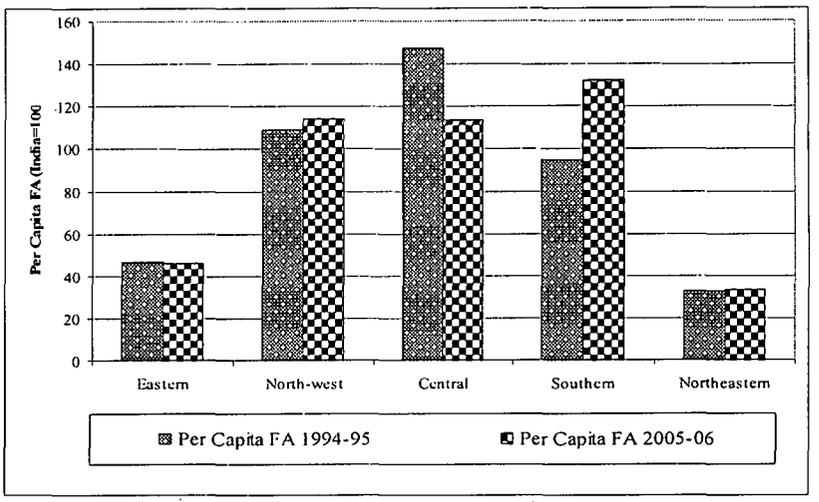

Figure 3.1: Region wise Distribution of per capita Fixed Assets (relative to all-India=100)
Source: Author's own computation using NSS unit level data

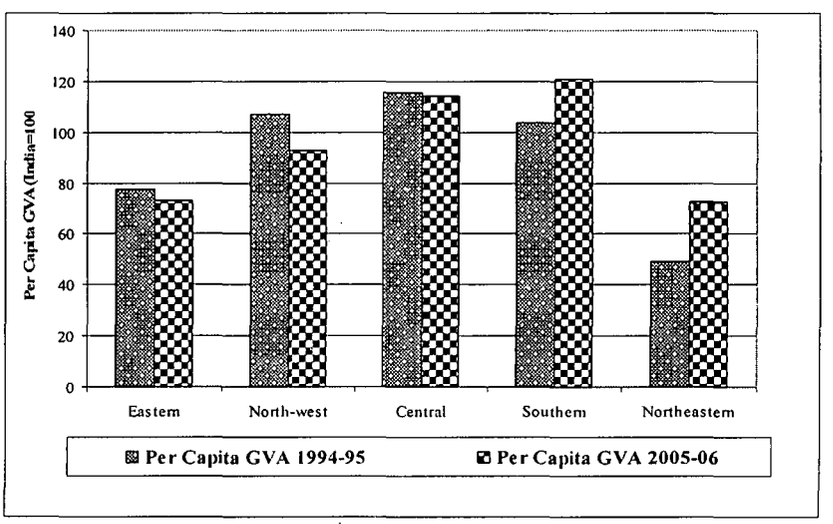

Figure 3.2: Region wise Distribution of per capita GVA (relative to all-India=100)
Source: Author's own computation using NSS unit level data

3.4.2 Distribution at the State Level

In India, states are considered as the standard unit of analysis for regional studies over the years. This is mainly because of two reasons: first, the easy availability of data at the state level and, secondly, from the point of policy formulation at the sub-national level, a state appears to be the most viable regional unit. In this section, we have analysed the inter-state distribution of unorganised manufacturing industries in the pre- and post-reform periods. Some of the major location patterns of unorganised manufacturing industries at the state level during the pre- and post-reform periods are the followings-

Decline of the Leading States

It is apparent that Maharashtra, Gujarat, Tamil Nadu, Delhi and West Bengal have appeared as the leading states in the unorganised manufacturing industries by registering considerably above the all-India average in terms of per capita GVA and per capita fixed assets (except West Bengal in per capita fixed assets) of the for both the pre- and post-reform periods (see Figures 3.3 and 3.4).[13] These states together accounted for around 50 percent of GVA, 57 percent of fixed assets, 38 percent of employment and 33 percent of enterprises of the unorganised manufacturing sector in India in 1994-95 (see Table 3.1). By 2005-06, the share of these states together have significantly declined in terms of GVA (to 45.75 percent) and fixed assets (to 45.4 percent), whereas their share have marginally increased in terms of employment (to 38.6 percent) and number of enterprises (to 34.8 percent). Individually all these states, except Tamil Nadu and West Bengal, have experienced significant loss in their share in fixed assets in the post-reform period. Significant decline is also observed in the share of Gujarat and Delhi in all other variables, while Maharashtra, Tamil Nadu and West Bengal have experienced marginal gains in other variables (except Tamil Nadu lost its share in GVA). Viewed in terms of per capita GVA and per capita fixed assets, a somewhat similar picture is discernable across the states for the pre- and post-reform periods. Delhi and Gujarat have experienced the highest decline in per capita GVA and per capita fixed assets in the post-reform period (see Figures 3.3 and 3.4).

Clustering of Backward States

The location pattern of the unorganised manufacturing industries is characterised by clustering of backward states for both the pre- and post-reform periods. From the data presented in Table 3.4 and Figure 3.3 to Figure 3.4 it is easy to indentify two clusters of backward states. The first one of such cluster is Bihar (including Jharkhand), Madhya Pradesh (including Chhattisgarh), Rajasthan, Uttar Pradesh (including Uttaranchal) and Orissa. These states together accounted for about 35-40 percent share in number of enterprises and employment and 25-30 percent of GVA and fixed assets for both the periods.[14] Similarly, in terms of per capita GVA and fixed assets all the states are much

[13] Other states which have registered above the all-india average in per capita GVA and per capita fixed assets for both the periods are Punjab and Haryana. However, in terms of the share to the national economy, their positions are very poor.

[14] Note that these states together accounted for about 35 percent of country's total geographical area and about 39.5 percent of total population as per 2001 census.

below the national average (see Figures 3.3 and 3.4). The second cluster of backward states is the group of 8 north-eastern states namely Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura, that we have discussed in the following.

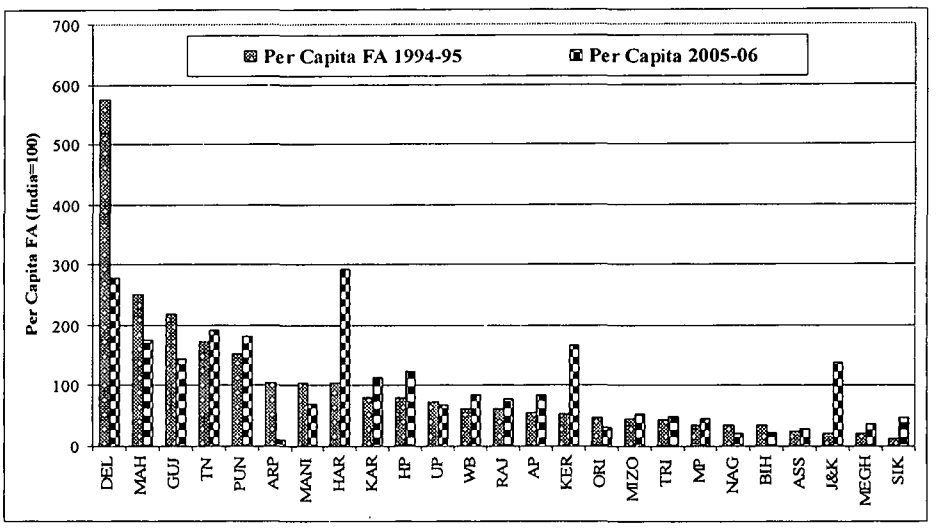

Figure 3.3: State-wise Distribution of Per Capita Fixed Assets (relative to all-India=100)
Source: Author's own computation using NSS unit level data

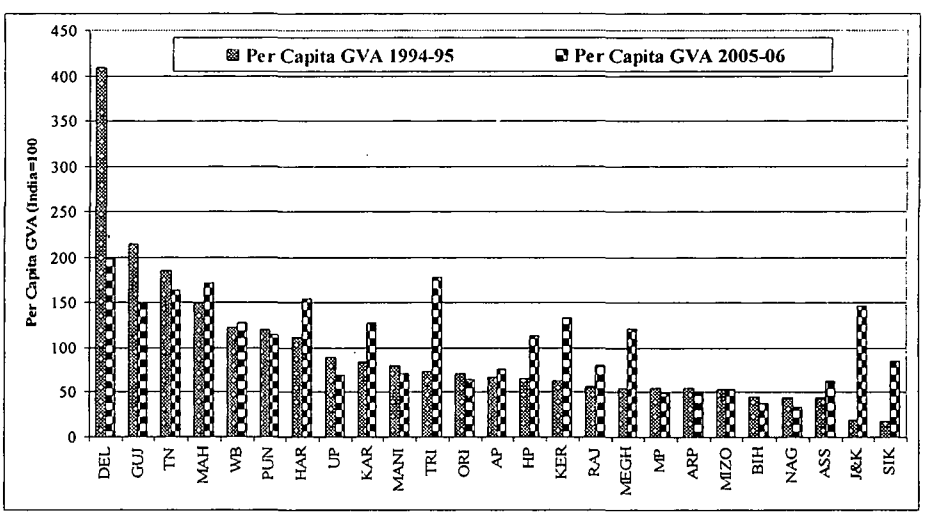

Figure 3.4: State-wise Distribution of Per Capita GVA (relative to all-India=100)
Source: Author's own computation using NSS unit level data

Lagging Northeast

The north-eastern states have been lagging behind the rest of the country not only in terms of development of unorganised manufacturing industries, but in terms of any other indicators of development. All the indicators of unorganised manufacturing

industries show that all the north-eastern states are out performed over the years and the situation has not changed in the post-reform period. These states accounted for only around 3 percent of enterprises, less than 3 percent of employment and GVA and less than 2 percent of fixed assets for both the periods. Viewed in terms of per capita GVA and fixed assets, all the north-eastern states have performed much below the national average, except Tripura and Meghalaya, which have improved their position in per capita GVA from a much below the national average in 1994-95 to above the national average in 2005-06. Further, excluding Assam, which is the central hub of the northeast, all other states have performed very poorly in all the industry sectors in both the pre- and post-reform periods (see Table 3.3.A and Table 3.4.A).

Decline in Inter-State Disparity

The analysis of distribution of unorganised manufacturing industries across the states in the pre- and post-reform periods leads us to identify the states that have gained in the post-reform period: West Bengal, Haryana, Jammu and Kashmir, Rajasthan, Andhra Pradesh, Karnataka, Kerala and Assam and the states that have lost their shares: Bihar, Orissa, Delhi, Uttar Pradesh and Gujarat. In spite of such significant gains and losses of different states in all the four variables, there has been barely change in the relative positions of the states in the post-reform period compared to pre-reform period.[15] To test it, we have computed the coefficients of rank correlation of shares of the states in unorganised manufacturing industries between 1994-95 and 2005-06, which worked out to be fairly high in terms of number of enterprises (0.961), employment (0.966), GVA (0.958) and fixed assets (0.888) and significant at 1 percent level of significance, implying that the relative ranks of the states remained unchanged between these two periods.

On the whole, inter-state disparity (measured in terms of coefficient of variation) in the distribution of unorganised manufacturing industries is found to be declined in terms of all the four indicators during 1994-95 and 2005-06 (see Table 3.4). Inter-state disparity is also declined in terms of per capita GVA (from 0.86 to 0.46) and per capita fixed assets (from 1.18 to 0.76) during the same period. However, the decline in inter-

[15] It is easy to identify the states that have significantly improved their relative ranks: Jammu and Kashmir in number of enterprises (from 20th to 16th); Madhya Pradesh in employment (from 10th to 7th), Kerala in GVA (from 15th to 10th) and Haryana and Kerala in fixed assets (from 13th and 15th to 6th and 9th respectively); and their opposite numbers, i.e. the states which have lost their relative ranks: Orissa in number of enterprises and employment (from 3rd to 9th and 8th respectively); Delhi in GVA (from 7th to 13th) and Bihar in fixed assets (from 10th to 14th).

state disparity does not follow a neoclassical "convergence-divergence" pattern where the initially backward states grow at a faster rate than the advanced states and, thereby, convergence occurs. In our case, we have not found any significant improvements of the backward states; rather the conditions of backward states such as Bihar, Orissa and the north-eastern states have worsened in the post-reform period. In fact, the observed decline in inter-state disparity is due to the deceleration of the industrially advanced states of Gujarat, Delhi, Tamil Nadu and Maharashtra in the post-reform period. Delhi and Gujarat are clearly the most affected in all the variables, whereas Maharashtra is the most affected state in fixed assets; which losses its share by 7 percent point (though it is still remained as the major industrial investment magnet).

Inter-State Distribution: A Disaggregated (two-digit) View

Till now we have analysed the inter-state distribution of the overall unorganised manufacturing industries. It is also worthwhile to examine the distribution of unorganised industries by sectors (rural and urban), enterprise types (OAME, NDME and DME)[16] and disaggregated industry level. Tables 3.1.A and 3.2.A report the share of the states in terms of employment and GVA by rural-urban sectors and enterprise types. Considering the rural and urban sectors, it is apparent that the leading states of Maharashtra, Gujarat, Delhi and Tamil Nadu have considerably higher share in the urban unorganised manufacturing industries in terms of both employment and GVA for both the pre- and post-reform periods. Among other states West Bengal, Uttar Pradesh, Andhra Pradesh and Karnataka have relatively better share in the urban unorganised industries (but their rural sector is larger than the urban sector) and the remaining states have negligible share in the urban industries. Relatively better share in the rural sector is observed for states like Bihar, Orissa, Madhya Pradesh, Kerala and Assam in the rural unorganised industries. By 2005-06, the urban unorganised sector has significantly declined in Delhi, Gujarat and Tamil Nadu in terms of both employment and GVA in both the pre- and post-reform periods.

Turning to the inter-state distribution of unorganised industries by enterprise types, it is observed that only a few states have considerable share in DME enterprises,

[16] Own account manufacturing enterprises (OAMEs) are enterprises run without a hired worker on a fairly regular basis. Non-directory manufacturing establishments (NDMEs) are establishments employing up to six workers, at least one of them being a hired worker employed on a fairly regular basis. Directory manufacturing establishments (DMEs) are establishments employing six or more (but less than ten) workers, at least one of them being a hired worker.

which is regarded as the modern skill and technology oriented unorganised sector. These enterprises are mostly concentrated in Maharashtra, Gujarat, Delhi, Tamil Nadu and Karnataka, which have accounted about 57.5 percent employment and 63.75 percent of GVA of the sector in 1994-95 and by 2005-06, there share remained as high as 52 percent and 55.7 percent respectively. These states also accounted for around 20 and 38.7 percent of employment and 29 and 44 percent of GVA in the OAME and NDME enterprises respectively in 1994-95, which have marginally declined in 2005-06. Among other states West Bengal, Uttar Pradesh and Andhra Pradesh have relatively significant share in the DME enterprises in both pre- and post-reform periods, but their OAME and NDME sectors are relatively larger than the DME sector and Kerala and Rajasthan have achieved some improvement in the post-reform period. Barring some considerable share for Bihar, Orissa, Madhya Pradesh, Punjab, Haryana and Assam in the OAME and NDME enterprises, the remaining states have significant share in any of the enterprise types.

Further, looking at the disaggregated two-digit industries (in terms of GVA) it is obvious that these leading states have significant share in most of the unorganised manufacturing industries (see Table 3.3.A). For example, out of the 11 two-digit industries[17] Maharashtra has more than 10 percent of shares in all the industries except tobacco and tobacco products in 1994-95. Similarly, Tamil Nadu has more than 10 percent share in 4 industries (tobacco, textiles, paper and printing and machinery); Gujarat in two industries (basic metal and furniture and other industries); Delhi in two industries (machinery and transport and transport equipment); and West Bengal in two industries (food products and tobacco and tobacco products).[18] On the other hand, the backward states of Bihar, Madhya Pradesh, Orissa, Jammu and Kashmir, Himachal Pradesh and all the north-eastern states have hardly any significant share in any of the industries. The situation has remained more or less same in 2005-06, except some significant changes among the leading states (see Table 3.4.A). For instance, West Bengal has significantly gained in textiles, leather, machinery and furniture and other industries; Gujarat gained in machinery industries; whereas Maharashtra experienced loss in food products and woods products industries and Delhi loss in machinery and

[17] For simplifying the analysis and data presentation in tables, we have reclassified the 22 two-digit industries into 11 two-digit industries. For details of the reclassification see *Appendix II.*

[18] Among the other states, Uttar Pradesh claimed more than 10 percent of share in as much as 8 industries (food products, tobacco products, textiles, leather products, woods products, paper and printing, chemical products and metal products), Punjab in transport and transport equipment, Andhra Pradesh in tobacco products and Madhya Pradesh in woods products sector.

transport and transport equipment industries. Thus, though the share of the leading states has declined in the unorganised manufacturing industry at the aggregate level in the post-reform period (as we have seen earlier), their dominance is still continued, especially in important industries. From Tables 3.3.A and 3.4.A it is apparent that a combination of these leading states have accounted for more than 50 percent share in almost all the 22 two-digit industries in both the pre- and post-reform periods.

3.4.3 Distribution of at the District Level

In this section we examine the distribution of unorganised manufacturing industries across 435 Indian districts in the pre- and post-reform periods. We begin our analysis by examining the share of the districts in national total in the number of unorganised sector enterprises, employment, GVA and fixed assets for 1994-95 and 2005-06. Table 3.5.A and Table 3.8.A report the share of the top 20 districts in number of enterprises, employment, GVA and fixed assets for 1994-95 and 2005-06 respectively. Very clear structural changes in the location pattern of unorganised manufacturing across the districts are discernable during the pre- and post-reform periods. Some of the major location patterns are the followings-

Decline of the Leading Districts

The figures presented in Table 3.5.A and Table 3.6.A inferred that only a few top ten districts form 1994-95 have managed to remain in the top ten positions in 2005-06 in terms of all the four indicators. These are Murshidabad in terms of number of enterprises; Delhi, Greater Mumbai, Mayurbhanj and Murshidabad in terms of employment; Delhi, Greater Mumbai, Surat and Thane in terms of GVA; and Delhi, Greater Mumbai, Surat, Thane, and Coimbatore in terms of fixed assets. The share of these leading districts to national total has declined in the post-reform period in terms of all the four variables (except for Greater Mumbai and Thane in terms of GVA and Thane and Coimbatore in terms of fixed assets). The severe loss is experienced by Delhi, Greater Mumbai and Surat between 1994-95 and 2005-06.[19] Delhi's share has declined from 5 percent of national total to 2.81 percent in GVA and from 7.13 percent to 3.94 percent in fixed assets, while that of for Surat has declined from 3.8 percent to 1.37 percent in GVA and 4.18 percent to 2.28 percent in fixed assets. The loss of Greater Mumbai's share (from

[19] The decline of investment share for Greater Bombay and Delhi is also occurred in the organised manufacturing sector, while Surat has gained investment share in the organised manufacturing sector during 1993-1998 (see Chakravorty and Lall, 2007).

16.86 percent in 1994-95 to 7.68 percent in 2005-06) in terms of fixed asset is more than that accounts for Maharashtra's total loss in fixed asset. In spite of this loss Greater Mumbai still remained in the top position as the investment magnet and also managed to increase its share in terms of GVA in the post-reform period.

By 2005-06, some of the top ten districts from 1994-95 have dropped out of the list of top 20 districts. They are Varanasi, Bankura, Sambalpur, Keonjhar, Surat and Pratapgarh in terms of employment; Moradabad, Bhavnagar, Varanasi, Madurai and Bhopal in terms of GVA; and Bhavnagar, Salem and Varanasi in terms of fixed assets. On the opposite count, districts like Ernakulam, Gulbarga, Kolhapur, Karimnagar, Tiruvanamalai, North Arcot and Chengai Anna in the south; Karnal, Yamunanagar and Meerut in the North-west; and Jaipur and Bharuch in the central region have developed as the new attraction for industrial investment in the later period. Given such changes, the share of top ten as well as top 20 and 50 districts has declined in terms of all the four variables during this period. The significant decline, however, has taken place in terms of fixed assets, where the share of top ten districts has declined from 39.79 percent in 1994-95 to 28.70 percent in 2005-06; the major decline being contributed by Greater Mumbai, Surat and Delhi. On the other hand, the share of bottom 100 and 200 districts has marginally increased in terms of all these four variables. However, it is heartening to note that a very negligible amount of investment of the unorganised manufacturing sector goes to the bottom 100 districts (1.19 percent in 1994-95, which marginally increased to 1.35 percent in 2005-06) and a very small portion of value added of unorganised manufacturing sector is generated in these districts (1.46 and 1.85 percent in 1994-95 and 2005-06 respectively).

On the whole, inter-district disparity (measured as coefficient of variation) in the distribution of unorganised manufacturing industries has declined in terms of all the variables viz. number of enterprises (from 1.37 to 1.30), employment (from 1.50 to 1.35), GVA (from 2.38 to 2.21) and fixed assets (from 4.10 to 2.27) in the post-reform period (see Tables 3.5.A and 3.6.A).

Emergence of New Metropolises and Sub-Urban Districts

It is apparent that all but three top ten ranks in terms of share in GVA and fixed asset are held by the metropolitan districts in 1994-95, whereas in 2005-06 all the top ten districts are metropolitan districts, though the composition of metropolises have changed

during this period.[20] However, all metropolitan districts (except Greater Mumbai and Thane in GVA and Thane and Coimbatore in fixed assets) in the top ten category of 1994-95 have lost their share in the post-reform period, while some other metropolitan districts such as Ahmadabad, Bangalore, Calcutta, Ernakulam and Meerut have moved to top ten in 2005-06. On the whole, the share of all metropolitan districts has declined in terms of GVA (from 42 percent to 39 percent) and fixed assets (from 50 percent to 45 percent) between 1994-95 and 2005-06 (see Table 3.5).[21] The decline in the share of metropolitan districts is largely contributed by the decline of Greater Mumbai, Delhi, Surat and Varanasi; the shares of the other metropolitan districts have increased, except marginal decline for Madurai, Bhopal, Agra, Pune, Patna and Kanpur. In fact, ignoring Greater Mumbai, Delhi, Surat and Varanasi, the rest of metropolitan districts together have experienced an increase in their share in GVA and fixed assets; the significant increase being experienced by Thane, Jaipur, Calcutta, Meerut, Bangalore and Hyderabad. Further, viewed in terms of number of enterprises and employment the share of all metropolitan districts together has marginally increased in the post-reform period.

The observed structural shift of the location of unorganised manufacturing industries at the district level is somewhat different from that of the organised manufacturing industries as depicted in Chakravorty and Lall (2007) and Chakravorty (2003, 2005). These studies have shown that the share of the metropolitan districts, except Calcutta in the organised manufacturing sector investment has significantly declined during 1993-1998, whereas some sub-urban and non-urban have emerged as the leading industrial districts during the same. Contrary to this, for the unorganised industries we observe that though some of the metropolitan districts in the top ten ranks in 1994-95 have dropped from the list in 2005-06, it is not sub-urban or non-urban districts rather some other metropolitan districts like Ahmadabad, Bangalore, Calcutta, Ernakulam and Meerut, which have emerged as leading industrial districts in the post-reform period. Further, except severe decline for Greater Mumbai, Delhi, Surat and

[20] There are about 35 metropolitan cities in India by the definition of urban agglomeration as per 2001 census. We have used the standard definition of "metropolitan districts". For example, the Calcutta metropolitan city includes the districts of Calcutta, Howrah, Hugli, North 24 Parganas and South2 4 Parganas; and Chennai metropolitan city includes the districts of Thiruvallur, Chennai and Kancheepuram. Similarly, for the metropolitan areas of Mumbai, Hyderabad, Ahmadabad, Vijayawada and Jamshedpur we have added additional districts following Census 2001.

[21] The decline of the share of metropolitan districts is also observed for the organised manufacturing sector in the post-reform period. Chakravorty and Lall (2007) have found that the share of metropolitan districts in investment of the organised manufacturing sector has declined from 23 percent to 18 percent during 1993-1998.

Varanasi, no other metropolitan districts have faced severe loss in their share in fixed assets.

However, like the experience of organised sector, rise of some non-metropolitan districts around the metropolitan areas is also observed for the unorganised sector: for instance, Karimnagar (near Hyderabad), Tiruvanamalai and Vellore (near Chennai), Jalandhar (near Ludhiana and Amritsar), Amreli (near Rajkot), Bhavnagar (near Ahmadabad), Aligarh and Firozabad (near Agra), and Medinipur and Murshidabad (around Kolkata). In conclusion, it can be noted that though the share of metropolitan districts together has declined during 1994-95 and 2005-06, they have still occupied the place of leading districts for the unorganised manufacturing industries. Similarly, the development of some sub-urban and non-metropolitan districts is an indication of a structural shift in the location of industries during this period.

Table 3.5: Share of Metro & Non-metro Districts and Inland & Coastal Districts

(percent to All-India)

Variables	Metro and non-Metro districts				Inland and Coastal districts			
	Metro		Non-metro		Inland		Coastal	
	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06
Enterprises	19.59	22.85	80.41	77.15	78.45	78.32	21.55	21.68
Employment	25.08	27.03	74.92	72.97	78.27	76.07	21.73	23.93
GVA	42.05	39.34	57.95	60.66	71.61	69.91	28.39	30.09
Fixed Assets	50.04	44.96	49.96	55.04	63.49	70.59	36.51	29.41

Source: Same as Table 3.4

Coastal vs. Inland Concentration

The share of the inland and coastal districts to all India total in terms of number of enterprises, employment, GVA and fixed assets for 1994-95 and 2005-06 (see Table 3.5) indicate that the experience of the unorganised manufacturing industries is quite opposite to that for the organised manufacturing sector depicted in Chakravorty and Lall (2007).[22] Chakravorty and Lall (2007) observed an unprecedented increase in the share of the coastal districts in the organised sector investment from bellow 35 percent to over 45 percent of national total during 1993-1998. Contrary to this, we observed that the share of the coastal districts in unorganised sector fixed asset (or investment) has significantly declined from over 36.5 percent to 29.4 percent during 1994-95 and 2005-06; their share

[22] Any district on the Arabian Sea or Bay of Bengal is considered as the coastal districts. We have identified about 61coastal districts for 1994-95 and 72 for 2005-06. This also includes the districts of the states namely Andaman and Nicobar Islands, Dadra and Nagar Haveli, Daman and Diu, Goa, Lakshadweep and Pondicherry, which are not included in the other part of our analysis.

in terms of number of enterprises, employment and GVA being remained more or less same or marginally increased. Unlike Chakravorty and Lall (2007), which observed that the coastal districts dominated all the top ten ranks in the post-reform period (1993-1998), we have not found any coastal biasness in the location of unorganised manufacturing industries; the number of coastal and inland districts in the top ten ranks being the same during 1994-95 and 2005-06. Thus, the theoretical prediction for coastal biasness of industrial location that industries are likely to prefer coastal areas in order to enjoy the benefits of easy shipment of goods and raw materials do not hold for the unorganised industries in India.[23]

Clustering of Lagging Districts

While industries are found to be historically concentrated in few industrially advanced districts of developed states and the new industrial districts have emerged in and around these regions; industrially backward districts are concentrated in the lagging states. For example, about 40 of the 100 most backward districts in terms of share in unorganised sector GVA are located in the north eastern region (NER) in 1994-95, which has barely changed in 2005-06. The NER together with Bihar, Uttar Pradesh, Madhya Pradesh and Orissa accounted for more than 70 of the 100 most backward districts in 1994-95 and more than 90 in 2005-06. Viewed in terms of per capita GVA and per capita fixed asset of unorganised manufacturing sector, these states accounted for approximately 81 and 90 of the 100 most backward districts respectively in 2005-06.[24]

3.5 Spatial Disparity in Productivity of Unorganised Industries

In the previous section we have hypothesised that the more concentration of number of unorganised manufacturing enterprises and employment in the eastern region (and also states and districts) and the high concentration of GVA and fixed assets in the central region (and also states and districts) could be because of the productivity differences across the regions. It is widely recognised that growth and capital are inseparable.[25] Since growth of output is largely determined by growth of labour

[23] This does not clearly prove whether costal advantage is a contributory factor of location of unorganised industries or not. A formal test of this issue has been made in Chapter 5.

[24] In terms of per capita GVA of unorganised manufacturing sector, about 17 of the 100 backward districts are located in NER and Uttar Pradesh each, 24 in Madhya Pradesh, 19 in Bihar and 4 in Orissa; whereas these figures are 28, 9, 18, 22 and 13 respectively in terms of per capita fixed asset in 2005-06.

[25] This close association between the two follows from the fact that capital per worker and capital productivity is the important components of labour productivity. It depends on the functional relationship-

productivity, which in turn is related to capital productivity and capital intensity, it is worthwhile to examine the spatial variation in these variables for the unorganised manufacturing sector. In this section we examine the spatial disparity in the productivity of unorganised manufacturing industries and the association between productivity and location of unorganised industries across the states and districts for the pre- and post-reform periods.

Productivity Differences across States

Table 3.6 reports the estimates of labour productivity (expressed as GVA per worker per annum), Capital productivity (expressed as GVA per unit of fixed assets) and Capital intensity (expressed as fixed assets per worker per annum) of unorganised manufacturing industries across the states for the pre- and post-reform periods. The figures show that capital intensity is positively associated with labour productivity. States with high labour productivity are also the states which have higher capital intensity for both the periods (except Arunachal Pradesh and Sikkim for 2005-06) and the rank correlation coefficients these two variables across the states are found to be 0.912 and 0.781 in 1994-95 and 2005-06 respectively and significant at 1 percent level of significance. Significant inter-state disparity is discernable in terms of labour productivity and capital intensity. The high and middle income states are the states which have higher labour productivity and capital intensity for both the periods.[26] On the other hand, capital productivity is negatively associated with labour productivity and capital intensity. States with high capital productivity are the states with low labour productivity and capital intensity. The rank correlation coefficient between capital productivity and labour productivity across states are found to be -0.508 in 1994-95 and -0.223 in 2005-06, whereas that of between capital productivity and capital intensity are turned out to be -0.703 and -0.737 during the same period.

The variations across the states are higher in terms of capital intensity than labour productivity and capital productivity.[27] On the average, inter-state disparity (measured as

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$Y/L = (K/L) \times (Y/K)$, where Y, K and L stand for output, capital and labour respectively and (Y/L), (K/L) and (Y/K) stand for labour productivity, capital intensity and capital productivity respectively.

[26] This is except for Arunachal Pradesh, Sikkim and Mizoram, which are backward states, but have higher labour productivity and capital intensity.

[27] The ratio of capital intensity between the state with highest and lowest capital intensity was found to be 40 between Delhi and Orissa in 1994-95 and 20 between Haryana and Orissa in 2005-06, whereas that of for labour productivity was 9.72 between Haryana and Orissa in 1994-95 and 14.4 between Arunachal Pradesh and Orissa in 2005-06 and for capital productivity was 5.34 between Meghalaya and Arunachal Pradesh in 1994-95 and 9.39 between Arunachal Pradesh and Haryana in 2005-06.

coefficient of variation) has increased in terms of all these three indicators viz. labour productivity (from 0.67 to 0.74), capital productivity (0.25 to 0.70) and capital intensity (0.69 to 0.74) during 1994-95 to 2005-06.

Table 3.6: Inter-State Disparities in Productivity of Unorganised Industries- 1994-95 and 2005-06

States	GVA per Worker (Rs)				FA per Worker (Rs)				GVA/FA			
	1994-95		2005-06		1994-95		2005-06		1994-95		2005-06	
Andhra P.	6329	*(21)*	16018	*(20)*	17264	*(19)*	29479	*(17)*	0.75	*(10)*	0.54	*(20)*
Arunachal	19133	*(5)*	137144	*(1)*	156192	*(2)*	47201	*(12)*	0.32	*(25)*	2.91	*(1)*
Assam	5903	*(23)*	21637	*(18)*	10454	*(23)*	16914	*(22)*	1.17	*(3)*	1.28	*(4)*
Bihar	6117	*(22)*	14275	*(24)*	14129	*(20)*	14540	*(23)*	0.85	*(8)*	0.98	*(7)*
Delhi	22773	*(3)*	52211	*(2)*	237923	*(1)*	122698	*(2)*	0.45	*(23)*	0.43	*(23)*
Gujarat	17307	*(7)*	33794	*(10)*	84880	*(6)*	54910	*(8)*	0.62	*(17)*	0.62	*(13)*
Haryana	24133	*(1)*	50483	*(3)*	98368	*(5)*	160673	*(1)*	0.67	*(15)*	0.31	*(25)*
Himachal P.	8128	*(16)*	33769	*(11)*	24216	*(16)*	61720	*(6)*	0.51	*(20)*	0.55	*(19)*
J. & K.	8186	*(15)*	38406	*(7)*	23776	*(17)*	60867	*(7)*	0.57	*(19)*	0.63	*(12)*
Karnataka	7381	*(18)*	27780	*(14)*	25362	*(14)*	41377	*(14)*	0.65	*(16)*	0.67	*(10)*
Kerala	9227	*(14)*	24556	*(15)*	29233	*(11)*	51448	*(9)*	0.74	*(12)*	0.48	*(22)*
Madhya P.	10858	*(12)*	15322	*(21)*	24632	*(15)*	23678	*(19)*	0.96	*(5)*	0.65	*(11)*
Maharashtra	18722	*(6)*	47249	*(5)*	155437	*(3)*	81246	*(4)*	0.38	*(24)*	0.58	*(18)*
Manipur	6917	*(19)*	15204	*(22)*	17475	*(18)*	25319	*(18)*	0.47	*(22)*	0.60	*(16)*
Meghalaya	10332	*(13)*	34958	*(9)*	11378	*(22)*	17874	*(20)*	1.71	*(1)*	1.96	*(3)*
Mizoram	15875	*(8)*	41276	*(6)*	36985	*(10)*	70088	*(5)*	0.74	*(13)*	0.59	*(17)*
Nagaland	11344	*(11)*	32785	*(12)*	25507	*(13)*	35309	*(15)*	0.79	*(9)*	0.93	*(8)*
Orissa	2483	*(25)*	9520	*(25)*	5930	*(25)*	7852	*(25)*	0.94	*(6)*	1.21	*(5)*
Punjab	19355	*(4)*	38218	*(8)*	98482	*(4)*	100677	*(3)*	0.49	*(21)*	0.38	*(24)*
Rajasthan	11687	*(10)*	29354	*(13)*	38946	*(9)*	48350	*(10)*	0.58	*(18)*	0.61	*(15)*
Sikkim	23280	*(2)*	49074	*(4)*	50412	*(7)*	46757	*(13)*	0.93	*(7)*	1.05	*(6)*
Tamil Nadu	12253	*(9)*	24354	*(16)*	46158	*(8)*	47673	*(11)*	0.68	*(14)*	0.51	*(21)*
Tripura	4814	*(24)*	23351	*(17)*	9662	*(24)*	10797	*(24)*	1.08	*(4)*	2.16	*(2)*
Uttar Pradesh	8053	*(17)*	18823	*(19)*	27026	*(12)*	30817	*(16)*	0.75	*(11)*	0.61	*(14)*
West Bengal	6617	*(20)*	15130	*(23)*	12423	*(21)*	16967	*(21)*	1.25	*(2)*	0.89	*(9)*
All India	**9475**		**23321**		**35609**		**39104**		**0.63**		**0.60**	
CV	0.67		0.74		0.69		0.74		0.25		0.70	

Note: Figures within parenthesis indicate the relative ranks of the states.
Source: Same as Table 3.4

Productivity Differences across Districts

At the district level also labour productivity and capital intensity are positively related. It is observed that a set of districts from some developed states like Gujarat, Haryana, Maharashtra, Punjab and Tamil Nadu, along with a set of districts from some backward states like Arunachal, Assam, Bihar, Meghalaya, Mizoram, Manipur, Madhya Pradesh, Orissa and Uttar Pradesh have appeared more frequently in the list of 20 leading districts in labour productivity and capital intensity for both the pre- and post-reform periods (see Table 3.7 and 3.8). The rank correlation coefficients between these two variables across the districts are worked out to be 0.705 and 0.787 for 1994-95 and 2005-

06 respectively and significant at 1 percent level of significance. On the other hand, almost all the leading districts in terms of capital productivity are from backward states for both the periods (except 7 and 3 districts in 1994-95 and 2005-06 respectively). Similar to the state level, capital intensity is negatively associated with labour productivity and capital intensity.

The variations across the districts are more pronounced in terms of labour productivity than in capital intensity and capital productivity for both the periods. On the average, inter-district disparity (measured as coefficient of Variation) is found to be increased in terms of labour productivity (from 1.17 to 1.25), capital productivity (from 0.74 to 0.86) and capital intensity (from 0.92 to 0.98) during 1994-95 to 2005-06.

Table 3.7: Inter-district Disparities in Productivity and Factor Intensity- 1994-95

Sl.	GVA per Worker (Rs)		FA per Worker (Rs)		GVA/FA	
No.	District (State)	Value	District (State)	Value	District (State)	Value
1	East Siang ARP	78468	G. Mumbai MAH	120897	Thoubal MANI	7.84
2	Lunglei MIZO	66183	East Siang ARP	62921	Koraput ORI	4.95
3	Bhopal MP	49593	West Siang ARP	61770	Lohardaga BI	4.32
4	Panipat HAR	42886	Rupnagar PUN	60081	North Sikkim SIK	4.21
5	Faridabad HAR	38410	Gurgaon HAR	59640	Bongaigaon ASS	3.68
6	G. Mumbai MAH	33256	Lunglei MIZO	59358	D. Kannada KAR	3.56
7	Madurai TN	32625	Gandhinagar GUJ	58026	Kalahandi ORI	3.55
8	L. Subansiri ARP	29165	Tamenglong MANI	53252	Singhbhum (E) BI	2.98
9	Tirap ARP	28874	Bathinda PUN	52028	South SIKIM	2.69
10	Ghaziabad UP	28595	Jalandhar PUN	51136	Khasi Hills(E) MEGH	2.54
11	Gangtok (E) SIK	28393	Ludhiana PUN	50894	Kishanganj BIH	2.54
12	N. Mongam SIK	28208	Delhi	50177	Osmanabad MAH	2.50
13	Rohtak HAR	26507	Rewari HAR	45732	Ukhrul MANI	2.50
14	Chennai TN	26033	Kurukshetra HAR	44802	Koch Bihar WB	2.47
15	Jalandhar PUN	25951	Karnal HAR	43717	Balangir ORI	2.44
16	Ludhiana PUN	23342	Thane MAH	42546	Khasi Hills(W) MEGH	2.40
17	Thane MAH	23295	Panipat HAR	41558	Birbhum WB	2.37
18	Delhi	22770	Chennai TN	40533	Kasaragod KER	2.34
19	Gandhinagar GUJ	22675	Sangrur PUN	40154	Dhanbad BIH	2.30
20	Surat GUJ	21765	Faridabad HAR	39832	Jaintia Hills MEGH	2.17
21	Ambala HAR	21564	Mandya KAR	38830	Rewa MP	2.13
22	Kapurthala PUN	21564	Gangtok (E) SIK	38743	Jorhat ASS	2.13
23	Rupnagar PUN	20882	Pune MAH	38302	Maldah WB	2.08
24	Dewas MP	20262	Garhwal UP	37494	Jalpaiguri WB	2.04
25	Bhavnagar GUJ	20132	Surat GUJ	37340	Tirap ARP	2.04
	All India average	**9519**	**All India average**	**14837**	**All India average**	**0.64**
	CV#	1.17	**CV#**	0.92	**CV#**	0.74

Note: # the CV is for across 435 districts

Source: Same as Table 3.4

Table 3.8: Inter-district Disparities in Productivity and Factor Intensity - 2005-06

Sl.	GVA per Worker (Rs)		FA per Worker (Rs)		GVA/FA	
No.	District (State)	Value	District (State)	Value	District (State)	Value
1	L. Subansiri ARP	400773	Tirap ARP	391135	Lohit ARP	7.33
2	Solan HP	225122	Hisar HAR	243327	Gulbarga KAR	6.22
3	Gulbarga KAR	181078	Yamunanagar HAR	229523	L. Subansiri ARP	5.41
4	Changlang ARP	127255	Ambala HAR	213042	Chandel MANI	4.90
5	Tirap ARP	120796	Karnal HAR	205994	Kalahandi ORI	4.54
6	G. Mumbai MAH	96708	Jammu JK	198243	Tamenglong MANI	4.19
7	Nilgiris TN	94762	Kurukshetra HAR	197438	Marigaon ASS	3.44
8	Faridabad HAR	93907	Rupnagar PUN	185967	Shimoga KAR	3.06
9	Jammu JK	76061	Lunglei MIZO	185343	West Khasi MEGH	3.00
10	Bharuch GUJ	71071	Ernakulam KER	171957	Seoni MP	2.98
11	Hisar HAR	67247	Kaithal HAR	167399	North Tripura TRI	2.78
12	East Sikkim SIK	66435	Faridabad HAR	164937	Kheda GUJ	2.60
13	Kheda GUJ	64069	Bangalore KAR	162275	Changlang ARP	2.53
14	Dhule MAH	57792	G. Mumbai MAH	153106	Singhbhum(E) BIH	2.52
15	Rohtak HAR	57088	Nainital UP	145324	Nagaon ASS	2.47
16	Yamunanagar HAR	55421	Akola MAH	141859	Darrang ASS	2.41
17	Bangalore KAR	54846	Solan HP	139944	Goalpara ASS	2.36
18	Kheri UP	54222	Sirsa HAR	138280	Araria BIH	2.32
19	Delhi	52211	Sirmaur HP	137209	Kishanganj BIH	2.29
20	Amritsar PUN	51666	Sonipat HAR	127513	East Garo MEGH	2.28
21	Aizwal MIZO	51652	Rohtak HAR	125773	West Garo MEGH	2.27
22	Ludhiana PUN	50531	Ludhiana PUN	124700	Lakhimpur ASS	2.24
23	L. Subansiri ARP	400773	Delhi	122698	Sambalpur ORI	2.17
24	Panipat HAR	50363	Sangrur PUN	121287	E. Nimar MP	2.16
25	Tawang ARP	49549	Ramanathapuram TN	120926	Dhemaji ASS	2.15
	All India average	**4730**	**All India average**	**39104**	**All India average**	**0.60**
	CV#	1.25	**CV#**	0.98	**CV#**	0.86

Note: # CV is for across 435 districts

Source: Same as Table 3.4

Relationship between Productivity and Location of Unorganised Industries

In order to trace the relationship between the productivity and location of unorganised manufacturing industries, we have computed rank correlation coefficients of these variables across the states and districts for both the pre- and post-reform periods. We have used per capita GVA (PCGVA) and per capita fixed assets (PCFA) to represent the location of unorganised manufacturing industries across the states and districts and per capita net state domestic product (PCNSDP) and per capita district domestic product (PCDDP) to represent economic development at the state and district level respectively. The results are presented in Table 3.9. It is evident that labour productivity is positively related to location of unorganised industries (PCGVA and PCFA) and level of economic development across the states and districts and the coefficients are more significant at the district level. By 2005-06, the relationship has improved in terms of location of PCGVA

and declined in terms of location of PCFA both at the state and district levels. Capital productivity, on the other hand, is negatively related to the location of industries and level of economic development both at the state and district level and the coefficients are more significant at the state level. The negative relationship of capital productivity with location of unorganised industries and level of economic development has strengthened in the post-reform period at both the state and district levels (except in terms of PCGVA at the district level for which the coefficients are insignificant for both the periods). However, from these coefficients it is not possible to conclude which one is the cause and which one is effect; that is whether high labour productivity leads to more location of industries or more location of industries leads to high labour productivity and, similarly, for the relationship between capital productivity and location of industries.

Table 3.9: Rank Correlation Coefficient between Productivity and Location of Unorganised Industries across States and Districts- 1994-95 and 2005-06

Variables	Labour Productivity		Capital Productivity		Capital Intensity	
	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06
			State Level (N=25)			
PCGVA	0.178	0.348*	-0.343*	-0.399**	0.339*	0.437**
PCFA	0.394**	0.322	-0.728***	-0.840***	0.627***	0.725***
PCNSDP	0.775***	0.575***	-0.553***	-0.587***	0.795***	0.692***
			District Level (N=435)			
PCGVA	0.370***	0.459***	0.102	0.075	0.208**	0.252***
PCFA	0.416***	0.376***	-0.422***	-0.503***	0.574***	0.574***
PCDDP@	NA	0.465***	NA	-0.288***	NA	0.525***

Note: Significant at *** 1%, ** 5%, * 10% level of significance. NA-data not available
PCGVA-per capita GVA and PCFA-per capita fixed assets of unorganised manufacturing industries, PCNSDP-per capita net state domestic product, PCDDP-per capita district domestic product.
@ For 425 districts only; PCDDP data for the districts of Nagaland and Tripura are not available.
Source: Author's own calculation

Similarly, the relationship between capital intensity and location of unorganised industries is found to be positively significant both across the states and districts and the relationship has strengthened in the post-reform period. Capital intensity, which is regarded as a policy variable (Dholakia, 1994),[28] is found to be positively related to the level of economic development across the states for both the pre- and post-reform periods and across the districts in the post-reform period (data on PCDDP is not available for the pre-reform period). This could probably imply, as Dholakia (1994) argued, the

[28] Contrary to labour and capital productivity, which are less likely to be influenced by policy changes, capital intensity is regarded as a policy variable as it can be increased by more investment in the economy and also adopting capital intensive techniques of production.

favourable attitude of the national government to the developed states and that of the state governments to the developed districts in allocation of investment.[29] This could also explain the strong market mechanism and the existing infrastructure facilities and better investment climate in the developed states/districts to attract private (including foreign) investments.

Given such differences in labour and capital productivity and capital intensity across the states/districts and increase in disparity in the post-reform period, the regional distribution of unorganised manufacturing industries has to be looked into from a spatial economic point of view in order to ascertain how the policy changes have affected the regional development of unorganised industries and what type of policy will be helpful for achieving more balanced and sustainable regional development in India.

3.6 Concluding Observations

In this chapter we have examined the spatial distribution of unorganised manufacturing industries at three geographical scales namely region, state and district for the pre- and post-reform periods. We have explored a new data set, i.e. national sample survey (NSS) unit level data on unorganised manufacturing industries for analysing regional pattern of unorganised industries in India. Since no studies, so far, have explored this data set for regional studies, the analyses presented in this chapter are fresh and a new contribution in the area of regional industrial studies. Though, the analyses are data exploratory, the findings are important in understanding the regional development of unorganised manufacturing industries and its implication for regional development in India. Before looking at the implications of the findings, let us summarise the major findings of the chapter.

(a) The unorganised manufacturing industries are found to be concentrated in few leading states namely Maharashtra, Gujarat, Tamil Nadu, Delhi and West Bengal during both the pre- and post-reform periods. Though the share of these states together has declined in the post-reform period, their dominance still continues and no evidence has been observed for improvement in the positions of the backward states.

[29] Dholakia (1994) pointed out that the high capital intensity in (organised) manufacturing industries of the northern states during the mid-eighties is mainly because of fact that the north has secured a much larger share in the investments in the new undertakings of the central government.

(b) At the district level, the unorganised manufacturing industries are found to be biased towards the metropolitan districts. However, the leading metropolises such as Greater Mumbai, Delhi and Surat etc. have lost their share in the post-reform period, whereas some new metropolises such as Ahmadabad, Bangalore, Meerut and Ernakulam etc. and some sub-urban districts around the metropolitan districts; for instance Karimnagar (near Hyderabad), Tiruvanamalai and Vellore (near Chennai), Bhavnagar (near Ahmadabad), and Medinipur and Murshidabad (around Kolkata) etc. have emerged as the new destination of the unorganised manufacturing industries in the post-reform period. However, there is little evidence for the coastal biasness of the unorganised manufacturing industries in India for both the pre- and post-reform periods.

(c) Spatial disparity in the distribution of unorganised manufacturing industries has declined in all the three geographical scales- region, state and district. Despite the decline in spatial disparity, the relative ranks of the regions/states/districts have remained more or less same in the post-reform period. In fact, this decline in disparity is not because of the improvements in the position of the lagging states/districts, rather due to the decline of the leading states/districts in the post-reform period.

(d) Widespread regional disparity is observed in terms of labour and capital productivity and capital intensity in the unorganised manufacturing industries across the states and districts and the disparity has increased in the post-reform period.

Given the location pattern of unorganised manufacturing industries, one could ask: Is there any relationship between the level of economic development and location of unorganised manufacturing industries? In order to answer the question we have computed the coefficient of rank correlation between the level of economic development (expressed as per capita NSDP for states and per capita district domestic product (DDP) for districts) and location of unorganised industries (expresses as per capita GVA) across the states and districts. The coefficients of rank correlation between the level of economic development and location of unorganised industries across the states are worked out to be 0.809 in 1994-95 and 0.724 in 2005-06 and significant at 1 percent level of significance. Similarly, the coefficients of rank correlation between the level of economic development and location of unorganised industries across the districts are turned out to be 0.464 for 2005-06 and significant at 1 percent level. This indicates that the location of unorganised manufacturing industries is positively related to the level of

economic development. This is also obvious from the above findings that unorganised industries are mostly concentrated in a few developed states (Maharashtra, Gujarat, Tamil Nadu and Delhi) and in the metropolitan and some newly emerged sub-urban districts. However, this is not a formal test of the relationship between location of unorganised industries and level of economic development. We will return to this issue in Chapter 5 for a formal relationship between the two variables.

Another related question in this context is: What is the impact of the unorganised manufacturing sector in aggregate spatial (income) inequality in India? We observed that the decline in spatial inequality in the unorganised manufacturing sector has occurred along with widening spatial income inequality in the post-reform period (the coefficient of variation of NSDP at 1993-94 prices across 25 states found to be increased from 0.40 in 1994-95 to 0.44 in 2005-06). There are also considerable evidences in the existing literature that inter-state income inequality has increased in the post-reform period (see Bhattacharya, 2004; Ramaswamy, 2007; Ahluwalia, 2002). Thus, it seems that the regional inequality in the unorganised manufacturing sector has no impact on the widening aggregate regional (income) inequality in India in the post-reform period (1994/05-2005/06). The observation, however, is not properly tested in the present study and no existing study, so far, has focused on it. Among the existing studies focusing on regional disparity and industrial development, some observed that regional disparity in the industrial sector is one of the major reasons of growing regional disparity in the post-reform period (see Rao et al., 1999; Dasgupta et al., 2000; Kar and Sakthivel, 2007; Khomiakova, 2008) and some other observed that regional disparity in the organised manufacturing sector is the main cause of widening regional disparity in India (see Chakravorty, 2000, 2003a; Lall and Chakravorty, 2005; Chakravorty and Lall, 2007). These studies are related to either the overall industry sector (which includes organised industry, unorganised industry, construction and electricity and gas and water supply) or the organised manufacturing sector, and thus, do not provide any information about the impact of regional disparity in unorganised manufacturing sector on overall regional inequality. Therefore, further research in this area is required to strengthen our understanding about the importance of the unorganised manufacturing sector on regional inequality, since the sector is expanding at a faster rate and also recognised as the most potential sector for creating employment opportunities, especially in the backward and rural areas and, thus, could be a instrument for achieving "more inclusive growth".

ANNEXURE 3.1: TABLES

Table 3.1.A: Share of the States in Employment and GVA by Sectors and Enterprise type - 1994-95

(in percent)

States/ Regions	Share in Employment					Share in GVA				
	Sectors		Enterprise type			Sectors		Enterprise type		
	Rural	Urban	OAME	NDME	DME	Rural	Urban	OAME	NDME	DME
BIH	9.28	3.06	9.31	4.11	2.48	8.28	2.13	9.14	2.90	1.11
ORI	13.75	1.04	13.75	1.89	1.08	5.29	0.55	5.14	1.27	0.57
WB	15.78	9.18	15.33	12.59	8.67	13.66	6.56	12.53	9.78	6.25
Eastern	**38.81**	**13.28**	**38.39**	**18.59**	**12.23**	**27.23**	**9.24**	**26.81**	**13.95**	**7.93**
DEL	0.46	5.80	0.44	4.74	6.37	0.94	8.09	1.22	6.98	8.01
HAR	0.69	1.43	0.66	1.52	1.45	1.84	2.64	1.55	2.67	2.90
HP	0.57	0.20	0.52	0.41	0.24	0.66	0.19	0.60	0.35	0.18
J&K	0.24	0.13	0.23	0.28	0.08	0.24	0.14	0.22	0.25	0.09
PUN	0.78	2.79	0.90	2.68	2.31	1.60	3.75	2.16	3.50	3.16
UP	18.58	16.05	18.47	18.46	14.80	20.06	11.71	18.62	14.00	12.42
Northwest	**21.32**	**26.40**	**21.22**	**28.09**	**25.25**	**25.34**	**26.52**	**24.37**	**27.75**	**26.76**
GUJ	2.58	12.75	3.54	6.56	13.26	5.31	14.19	8.00	7.58	14.79
MP	3.68	3.73	4.22	3.55	1.83	3.46	4.79	4.49	6.65	2.41
MAH	4.09	13.84	4.31	10.56	14.94	5.16	20.44	6.46	14.81	21.52
RAJ	2.28	2.87	2.88	2.37	0.96	3.85	2.44	4.85	2.72	1.26
Central	**12.63**	**33.19**	**14.95**	**23.04**	**30.99**	**17.78**	**41.86**	**23.80**	**31.76**	**39.98**
AP	8.36	5.79	8.57	6.11	4.93	7.15	3.48	6.90	5.37	2.82
KAR	6.03	4.71	4.89	4.65	9.10	5.15	3.89	4.72	4.17	4.27
KER	2.42	1.35	1.53	3.91	2.80	3.49	0.94	1.49	3.43	1.74
TN	6.76	13.98	7.06	12.16	13.81	10.20	12.60	8.87	10.58	15.16
Southern	**23.57**	**25.83**	**22.05**	**26.83**	**30.64**	**25.99**	**20.91**	**21.98**	**23.55**	**23.99**
ARP	0.04	0.01	0.04	0.01	0.01	0.10	0.03	0.10	0.02	0.03
ASS	2.42	0.54	2.16	2.31	0.28	2.00	0.50	1.65	1.70	0.24
MANI	0.26	0.16	0.33	0.04	0.02	0.29	0.08	0.35	0.07	0.03
MEGH	0.18	0.03	0.17	0.12	0.02	0.28	0.04	0.25	0.13	0.04
MIZO	0.03	0.02	0.03	0.02	0.01	0.06	0.03	0.06	0.07	0.02
NAG	0.07	0.04	0.07	0.08	0.04	0.12	0.04	0.11	0.10	0.02
SIK	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.02	0.01
TRI	0.50	0.13	0.49	0.37	0.03	0.32	0.10	0.32	0.25	0.03
NER	3.50	0.93	3.29	2.96	0.41	3.19	0.82	2.84	2.36	0.42
INDIA	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Note: AP-Andhra Pradesh, ARP-Arunachal Pradesh, ASS-Assam, BIH-Bihar, DEL-Delhi, GUJ-Gujarat, HAR-Haryana, HP-Himachal Pradesh, J&K-Jammu & Kashmir, KAR-Karnataka, KER-Kerala, MP-Madhya Pradesh, MAH-Maharashtra, MANI-Manipur, MEGH-Meghalaya, MIZO-Mizoram, NAG-Nagaland, ORI-Orissa, PUN-Punjab, RAJ-Rajasthan, SIK-Sikkim, TN-Tamil Nadu, TRI-Tripura, UP-Uttar Pradesh, WB-West Bengal

Table 3.2.A: Share of the States in Employment and GVA by Sectors and Enterprise type - 2005-06

(in percent)

States/ Regions	Share in Employment					Share in GVA				
	Sectors		Enterprise type			Sectors		Enterprise type		
	Rural	**Urban**	**OAME**	**NDME**	**DME**	**Rural**	**Urban**	**OAME**	**NDME**	**DME**
BIH	8.74	2.73	9.09	3.39	0.79	6.72	1.87	9.19	2.63	0.81
ORI	7.79	1.51	7.76	1.85	1.14	3.77	1.05	4.59	1.21	1.06
WB	17.82	10.15	16.81	14.20	9.95	12.29	7.77	11.97	9.60	8.18
Eastern	**34.35**	**14.39**	**33.66**	**19.44**	**11.88**	**22.78**	**10.69**	**25.75**	**13.44**	**10.05**
DEL	0.07	3.40	0.11	2.91	3.77	0.71	4.51	0.30	3.27	4.52
HAR	0.95	2.46	0.98	2.98	1.96	2.31	3.96	2.11	4.55	3.31
HP	0.62	0.15	0.53	0.43	0.22	0.69	0.63	0.58	0.39	0.87
J&K	1.07	0.51	1.10	0.64	0.31	2.36	0.70	2.25	1.01	1.05
PUN	0.99	2.84	1.32	3.24	1.44	1.46	3.71	2.54	4.50	1.77
UP	15.64	13.58	16.13	14.37	11.20	13.42	10.91	15.39	11.20	9.88
Northwest	**19.34**	**22.94**	**20.17**	**24.57**	**18.90**	**20.95**	**24.42**	**23.17**	**24.92**	**21.40**
GUJ	2.83	9.16	3.57	3.96	11.16	3.71	10.32	5.22	4.67	10.65
MP	6.33	5.48	7.65	3.45	2.66	5.06	3.07	5.63	3.13	3.14
MAH	4.27	14.62	5.21	10.02	15.58	6.03	24.28	7.78	18.53	21.27
RAJ	3.10	4.39	3.37	3.52	4.22	4.79	4.22	5.30	3.98	4.12
Central	**16.53**	**33.65**	**19.80**	**20.95**	**33.62**	**19.59**	**41.89**	**23.93**	**30.31**	**39.18**
AP	8.65	7.03	8.46	6.52	8.02	7.67	3.82	8.12	4.70	4.01
KAR	5.52	5.24	4.68	4.56	8.64	7.66	5.48	4.33	5.27	8.83
KER	4.30	2.93	2.84	7.26	4.26	6.21	2.24	2.71	6.76	3.42
TN	7.60	12.22	7.44	12.31	12.86	9.81	9.53	7.90	10.66	10.44
Southern	**26.07**	**27.42**	**23.42**	**30.65**	**33.78**	**31.35**	**21.07**	**23.06**	**27.39**	**26.70**
ARP	0.01	0.01	0.00	0.02	0.02	0.07	0.04	0.03	0.07	0.06
ASS	2.28	0.75	1.99	1.98	0.66	2.59	0.82	2.68	2.02	0.53
MANI	0.23	0.22	0.29	0.16	0.06	0.19	0.11	0.26	0.16	0.05
MEGH	0.35	0.06	0.21	0.39	0.25	0.74	0.07	0.39	0.47	0.30
MIZO	0.02	0.03	0.03	0.04	0.01	0.04	0.05	0.06	0.06	0.02
NAG	0.05	0.04	0.05	0.05	0.01	0.07	0.06	0.12	0.07	0.01
SIK	0.03	0.01	0.02	0.03	0.01	0.08	0.01	0.04	0.04	0.05
TRI	0.56	0.10	0.23	1.20	0.29	0.76	0.11	0.30	0.37	0.49
NER	**3.53**	**1.22**	**2.82**	**3.87**	**1.31**	**4.54**	**1.27**	**3.88**	**3.26**	**1.51**
INDIA	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Note: AP-Andhra Pradesh, ARP-Arunachal Pradesh, ASS-Assam, BIH-Bihar, DEL-Delhi, GUJ-Gujarat, HAR-Haryana, HP-Himachal Pradesh, J&K-Jammu & Kashmir, KAR-Karnataka, KER-Kerala, MP-Madhya Pradesh, MAH-Maharashtra, MANI-Manipur, MEGH-Meghalaya, MIZO-Mizoram, NAG-Nagaland, ORI-Orissa, PUN-Punjab, RAJ-Rajasthan, SIK-Sikkim, TN-Tamil Nadu, TRI-Tripura, UP-Uttar Pradesh, WB-West Bengal

Table 3.3.A: Share of the States in Gross Value Added (GVA) of Unorganised Industries by two-digit Industries- 1994-95 **(in percent)**

States/Regions	Food	Tobacco	Textiles	Leather	Woods	Paper	Chemical	Metal	Machinery	Transport	Furniture	All
Bihar	9.23	5.58	0.98	9.13	7.18	1.12	6.54	3.37	2.35	0.15	3.50	4.78
Orissa	3.01	7.29	1.78	0.43	3.88	2.33	3.31	1.48	0.58	0.00	2.56	2.60
West Bengal	15.51	26.34	7.76	5.90	7.61	9.53	8.00	6.40	5.13	7.49	7.72	9.67
Western	**27.75**	**39.21**	**10.52**	**15.46**	**18.67**	**12.98**	**17.85**	**11.25**	**8.06**	**7.64**	**13.78**	**17.05**
Delhi	1.70	0.06	8.29	6.57	0.63	9.36	2.95	6.36	12.49	36.77	3.37	5.08
Haryana	1.08	0.01	3.88	2.73	1.82	0.61	3.18	3.17	3.26	2.10	0.84	2.23
Himachal	0.68	0.00	0.18	0.29	0.81	0.23	0.43	0.27	0.30	0.04	0.26	0.39
Jammu & Kashmir	0.33	0.00	0.05	0.74	0.40	0.17	0.12	0.11	0.18	0.00	0.07	0.18
Punjab	2.42	0.01	2.13	4.46	1.58	2.65	3.51	2.78	8.45	15.23	1.86	2.84
Uttar Pradesh	17.10	17.42	17.71	23.32	11.74	16.02	18.72	16.38	7.10	4.54	8.36	14.83
North-west	**23.31**	**17.50**	**32.24**	**38.11**	**16.98**	**29.04**	**28.91**	**29.07**	**31.78**	**58.68**	**14.76**	**25.55**
Madhya Pradesh	3.95	1.10	1.38	3.08	19.45	2.47	2.16	2.94	1.06	1.31	2.30	4.26
Maharashtra	10.12	0.29	13.14	19.05	12.23	24.39	17.08	22.51	25.09	12.71	10.14	14.01
Rajasthan	3.47	0.08	1.57	9.55	4.44	3.61	5.30	2.26	1.44	0.31	2.78	3.02
Gujarat	4.56	1.04	9.05	1.67	3.59	3.90	6.90	13.83	8.41	1.43	34.59	10.51
Central	**22.10**	**2.51**	**25.14**	**33.35**	**39.71**	**34.37**	**31.44**	**41.54**	**36.00**	**15.76**	**49.81**	**31.80**
Andhra	6.18	14.77	3.88	4.90	7.25	5.66	3.60	2.28	2.12	0.81	5.24	5.09
Karnataka	4.31	9.43	4.86	1.73	6.00	2.49	4.50	3.85	3.77	8.33	2.04	4.38
Kerala	3.58	1.67	1.57	1.53	2.29	1.05	2.02	1.44	1.38	0.79	1.72	2.04
Tamil Nadu	8.62	13.39	20.20	4.33	7.08	13.22	8.98	8.59	15.79	7.08	9.19	11.65
Southern	**22.69**	**39.26**	**30.51**	**12.49**	**22.62**	**22.42**	**19.10**	**16.16**	**23.06**	**17.01**	**18.19**	**23.16**
Arunachal	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.01	0.06
Assam	2.29	1.49	0.69	0.18	0.99	0.44	1.10	0.63	0.10	0.15	1.68	1.16
Manipur	0.10	0.00	0.45	0.04	0.21	0.01	0.01	0.03	0.00	0.00	0.22	0.17
Meghalaya	0.40	0.01	0.04	0.29	0.26	0.00	0.02	0.07	0.00	0.00	0.15	0.15
Mizoram	0.05	0.03	0.02	0.00	0.02	0.09	0.01	0.04	0.00	0.00	0.15	0.04
Nagaland	0.12	0.00	0.15	0.00	0.06	0.02	0.05	0.01	0.01	0.00	0.07	0.08
Sikkim	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01
Tripura	0.38	0.00	0.12	0.02	0.23	0.10	0.19	0.08	0.03	0.12	0.34	0.20
North-east	**3.63**	**1.53**	**1.49**	**0.53**	**1.77**	**0.66**	**1.38**	**0.89**	**0.14**	**0.27**	**2.64**	**1.87**
India	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 3.4.A: Share of the States in Gross Value Added (GVA) of Unorganised Industries by two-digit Industries -2005-06 **(in percent)**

States/Regions	Food	Tobacco	Textiles	Leather	Woods	Paper	Chemical	Metal	Machinery	Transport	Furniture	All
Bihar	6.00	16.45	1.82	1.03	9.07	0.69	3.87	5.80	0.72	0.33	2.20	4.04
Orissa	3.14	2.67	1.56	0.16	6.20	0.83	3.49	1.91	0.36	1.29	1.29	2.27
West Bengal	9.69	18.67	10.62	25.33	8.10	6.47	5.98	6.49	10.54	1.35	11.83	9.79
Western	**18.83**	**37.79**	**14.00**	**26.52**	**23.37**	**7.99**	**13.34**	**14.20**	**11.62**	**2.97**	**15.32**	**16.10**
Delhi	0.37	4.40	3.43	18.53	0.58	5.94	0.84	6.60	4.34	4.23	1.16	2.81
Haryana	3.07	0.01	2.76	1.62	2.03	3.73	3.13	5.80	5.75	6.64	2.44	3.22
Himachal	0.51	0.09	0.38	0.50	0.89	0.38	0.71	0.46	3.37	0.49	0.23	0.66
Jammu & Kashmir	1.26	0.00	1.68	0.51	3.37	0.21	3.10	1.04	0.23	0.01	0.66	1.44
Punjab	2.32	0.00	2.62	5.61	4.17	3.81	1.05	2.39	4.18	16.09	2.36	2.70
Uttar Pradesh	14.31	7.73	12.25	7.59	15.97	6.79	12.38	19.68	7.50	21.24	5.40	12.03
North-west	**21.84**	**12.23**	**23.12**	**34.36**	**27.01**	**20.86**	**21.21**	**35.97**	**25.37**	**48.70**	**12.25**	**22.86**
Madhya Pradesh	3.91	9.83	2.93	1.69	3.92	3.15	8.13	4.16	2.38	5.44	1.91	3.96
Maharashtra	7.75	1.22	16.83	12.97	5.36	24.94	13.36	14.51	24.09	22.46	32.15	16.12
Rajasthan	4.16	0.30	4.46	4.62	3.07	1.56	8.31	3.99	3.00	2.13	5.36	4.48
Gujarat	3.97	2.81	7.43	4.54	4.15	10.65	6.41	2.75	16.12	1.30	14.21	7.37
Central	**19.79**	**14.16**	**31.65**	**23.82**	**16.50**	**40.30**	**36.21**	**25.41**	**45.59**	**31.33**	**53.63**	**31.93**
Andhra	9.10	13.04	6.12	1.32	7.52	4.06	4.15	3.65	1.27	1.37	2.71	5.54
Karnataka	14.58	8.23	6.32	2.33	4.36	4.40	4.38	4.46	3.41	3.03	2.34	6.46
Kerala	4.00	1.16	3.43	2.85	5.51	3.31	5.07	3.01	3.21	2.60	5.79	4.02
Tamil Nadu	7.19	12.80	13.08	8.21	9.52	16.59	11.48	10.26	5.99	8.04	4.21	9.66
Southern	**34.87**	**35.23**	**28.95**	**14.71**	**26.91**	**28.36**	**25.08**	**21.38**	**13.88**	**15.04**	**15.05**	**25.68**
Arunachal	0.12	0.00	0.03	0.00	0.02	0.00	0.00	0.23	0.00	0.00	0.02	0.05
Assam	2.73	0.24	1.31	0.23	3.54	1.01	0.93	1.36	0.10	0.05	2.09	1.61
Manipur	0.12	0.01	0.25	0.01	0.16	0.08	0.02	0.07	0.00	0.00	0.29	0.15
Meghalaya	0.44	0.01	0.16	0.01	0.88	0.08	0.86	0.45	0.00	1.01	0.29	0.37
Mizoram	0.05	0.00	0.04	0.00	0.06	0.17	0.00	0.03	0.00	0.00	0.10	0.05
Nagaland	0.14	0.00	0.07	0.00	0.06	0.01	0.02	0.03	0.02	0.00	0.07	0.06
Sikkim	0.10	0.00	0.03	0.00	0.02	0.00	0.04	0.04	0.00	0.00	0.06	0.04
Tripura	0.21	0.35	0.07	0.05	0.97	0.48	1.60	0.09	0.01	0.02	0.45	0.40
North-east	**3.91**	**0.61**	**1.96**	**0.30**	**5.71**	**1.83**	**3.47**	**2.30**	**0.13**	**1.08**	**3.37**	**2.73**
India	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 3.5.A: Share of the top 20 Districts in No. of Enterprises, Employment, GVA and Fixed Assets- 1994-95 **(in percent)**

Ranks	No. of Enterprise		Employment		Gross Value Added		Fixed Assets	
	District (State)	% share	District (State)	% share	District (State)	% share	District (State)	% share
1	Keonjhar ORI	2.03	Varanasi UP	2.40	G. Mumbai MAH	7.23	G. Mumbai MAH	16.86
2	Bankura WB	2.01	Delhi	2.11	Delhi	5.04	Delhi	7.13
3	Varanasi UP	1.99	G. Mumbai MAH	2.07	Surat GUJ	3.80	Surat GUJ	4.18
4	Sambalpur ORI	1.89	Mayurbhanj ORI	1.93	Moradabad UP	2.33	Salem TN	2.03
5	Mayurbhanj ORI	1.77	Bankura WB	1.90	Bhavnagar GUJ	2.24	Bhavnagar GUJ	2.02
6	Murshidabad WB	1.63	Sambalpur ORI	1.86	Varanasi UP	2.00	Thane MAH	1.72
7	Barddhaman WB	1.31	Keonjhar ORI	1.73	Madurai TN	1.92	Coimbatore TN	1.63
8	Pratapgarh UP	1.31	Surat GUJ	1.66	Bhopal MP	1.56	Varanasi UP	1.58
9	Hugli WB	1.29	Murshidabad WB	1.47	Salem TN	1.51	Pune MAH	1.40
10	Bhavnagar GUJ	1.24	Pratapgarh UP	1.36	Thane MAH	1.47	Moradabad UP	1.24
	Top 10 Total	**16.47**	**Top 10 Total**	**18.49**	**Top 10 Total**	**29.09**	**Top 10 Total**	**39.79**
11	Puri ORI	1.08	Barddhaman WB	1.29	Coimbatore TN	1.31	Bangalore (U) KAR	1.17
12	Delhi	1.06	Hugli WB	1.26	Ahmadabad GUJ	1.12	Madurai TN	1.10
13	Dakshina Kannada KAR	1.06	Moradabad UP	1.16	Howrah WB	1.11	Ludhiana PUN	1.07
14	Ganjam ORI	1.04	Allahabad UP	1.10	Bangalore(U) KAR	1.10	Ahmadabad GUJ	1.05
15	Medinipur WB	1.03	South Parganas WB	1.06	Pune MAH	1.08	Chengai Anna TN	1.03
16	Allahabad UP	1.02	Bhavnagar GUJ	1.06	Hugli WB	1.04	Howrah WB	0.98
17	Muzaffarpur BIH	0.99	Salem TN	1.05	Chengai Anna TN	1.00	Jalandhar PUN	0.80
18	Tirunelveli TN	0.98	Ganjam ORIS	1.00	Kolkata WB	1.00	Prakasam AP	0.75
19	South Parganas WB	0.96	Jaunpur UP	1.00	North Parganas WB	0.97	Chennai TN	0.71
20	Nadia WB	0.93	North Parganas WB	0.98	Ghaziabad UP	0.95	Jamnagar GUJ	0.70
	Top 20 Total	**26.64**	**Top 20 Total**	**29.45**	**Top 20 Total**	**39.77**	**Top 20 Total**	**49.13**
	Top 50 Districts	46.18	Top 50 Districts	48.61	Top 50 Districts	57.50	Top 50 Districts	63.79
	Bottom 200 Districts	9.48	Bottom 200 Districts	8.08	Bottom 200 Districts	6.79	Bottom 200 Districts	5.66
	Bottom 100 Districts	2.14	Bottom 100 Districts	1.72	Bottom 100 Districts	1.46	Bottom 100 Districts	1.19
	All India	**100.00**	**All India**	**100.00**	**All India**	**100.00**	**All India**	**100.00**
	CV	**1.37**		**1.50**		**2.38**		**4.10**

Table 3.6.A: Share of the top 20 Districts in No. of Enterprises, Employment, GVA and Fixed Assets- 2005-06 **(in percent)**

Ranks	No. of Enterprise		Employment		Gross Value Added		Fixed Assets	
	District (State)	% share	District (State)	% share	District (State)	% share	District (State)	% share
1	Medinipur WB	2.62	Medinipur WB	2.39	Greater Mumbai MAH	8.13	Greater Mumbai MAH	7.68
2	South 24-Parganas WB	2.34	South 24-Parganas WB	2.34	Thane MAH	2.94	Delhi	3.94
3	Murshidabad WB	1.64	G. Mumbai MAH	1.96	Delhi	2.81	Thane MAH	3.47
4	Nadia WB	1.47	Thane MAH	1.59	Kolkata WB	1.79	Bangalore KAR	2.66
5	North 24-Parganas WB	1.38	Murshidabad WB	1.27	Coimbatore TN	1.53	Coimbatore TN	2.39
6	Dakshina Kannada KAR	1.29	Delhi	1.26	Bangalore KAR	1.51	Surat GUJ	2.28
7	West Dinajpur WB	1.28	North 24-Parganas WB	1.25	Ahmedabad GUJ	1.46	Ahmedabad GUJ	1.64
8	Tirunelveli TN	1.25	Mayurbhanj ORI	1.21	Surat GUJ	1.37	Ernakulam KER	1.61
9	Karimnagar AP	1.21	West Dinajpur WB	1.19	Howrah WB	1.34	Kolkata WB	1.57
10	Kamarajar TN	1.17	Kolkata WB	1.17	Jaipur RAJ	1.27	Meerut UP	1.46
	Top 10 Total	**15.64**	**Top 10 Total**	**15.62**	**Top 10 Total**	**24.16**	**Top 10 Total**	**28.70**
11	Mayurbhanj ORI	1.12	Nadia WB	1.11	Moradabad UP	1.26	Jaipur RAJ	1.43
12	Sahibganj BIH	1.09	Coimbatore TN	1.02	South 24-Parganas WB	1.25	Ludhiana PUN	1.15
13	Hugli WB	1.03	Sagar MP	1.00	Gulbarga KAR	0.99	Chennai TN	1.11
14	Sagar MP	0.96	Hugli WB	0.98	Salem TN	0.90	Karimnagar AP	1.04
15	Anantapur MP	0.93	Kamarajar TN	0.96	Chengai Anna TN	0.89	Salem TN	0.96
16	North Arcot TN	0.93	Anantapur AP	0.94	North 24-Parganas WB	0.86	Chengai Anna TN	0.95
17	G. Mumbai MAH	0.90	Howrah WB	0.93	Bharuch GUJ	0.83	Tiruvanamalai TN	0.86
18	Ahmedabad GUJ	0.82	Ahmedabad GUJ	0.93	Kolhapur MAH	0.83	Ambala HAR	0.83
19	Thane MAH	0.81	North Arcot TN	0.90	Meerut UP	0.79	Yamunanagar HAR	0.81
20	Sultanpur UP	0.81	Salem TN	0.90	Ludhiana PUN	0.78	Pune MAH	0.81
	Top 20 Total	**25.04**	**Top 20 Total**	**25.29**	**Top 20 Total**	**33.54**	**Top 20 Total**	**38.65**
	Top 50 Districts	43.12	Top 50 Districts	44.73	Top 50 Districts	52.05	Top 50 Districts	56.95
	Bottom 200 Districts	10.80	Bottom 200 Districts	9.22	Bottom 200 Districts	8.20	Bottom 200 Districts	6.41
	Bottom 100 Districts	2.67	Bottom 100 Districts	2.10	Bottom 100 Districts	1.85	Bottom 100 Districts	1.35
	All India	**100.00**	**All India**	**100.00**	**All India**	**100.00**	**All India**	**100.00**
	CV	**1.30**		**1.35**		**2.21**		**2.37**

ANNEXURE 3.2

A Comparison of the Location of Unorganised and Organised Manufacturing Industries

The analysis in chapter 3 provides a clear idea about the spatial distribution of unorganised manufacturing industries at the different geographical scales in the pre- and post-reform periods. Given the findings, the obvious question arises: whether the location of the unorganised manufacturing industries follows the same pattern as that of the organised manufacturing industries? The question is important to understand the regional growth dynamics of the unorganised manufacturing industries. That is to ascertain whether the unorganised manufacturing sector is growing independent of its organised counterpart in a region or the other way round. This will let us to know whether the theoretical linkages between the two sectors, as we have discussed in Chapter 1, holds at the regional.

In this Annexure we make a comparison of the location pattern of unorganised manufacturing industries with its organised counterpart at the state level. We select the state as the unit of analysis because of the fact that data on organised manufacturing industries are rarely available at the district level.[1] The data for the organised manufacturing industries has been drawn from the Annual Survey of Industries (ASI), whereas the same NSS database has been used for the unorganised manufacturing industries, as used in Chapter 3. We add up the values of organised and unorganised industries to obtain the value for overall manufacturing industries.

Inter-State Distribution of Organised Manufacturing Industries

Let us start with analysing the distribution of organised manufacturing industries across the states. It is observed that the three major states namely Gujarat, Maharashtra and Tamil Nadu accounted for around 40 percent of enterprises, 37.5 percent of employment, 46 percent of GVA and 36 percent of fixed assets of the organised manufacturing sector in 1994-95 (see Table 3.7.A). These three states together with Karnataka and Andhra Pradesh accounted for 58.6 percent of enterprises, 54 percent of employment, 58 percent of GVA and 48 percent fixed assets during the same. By 2005-

[1] Annual Survey of Industries, which is the basic source of data on organised manufacturing industries used to provide data at the district level. But, it is difficult to get the data.

06, the share of these states together has increased in terms of all the variables except number of enterprises, the significant increased being in terms of fixed assets (about 12 percent point). Considering the changes between the pre- and post-reform periods it is obvious that the Bihar, Orissa, West Bengal, Delhi, Madhya Pradesh, Uttar Pradesh and Andhra Pradesh have lost their share, whereas states like Gujarat, Haryana, Karnataka, Himachal Pradesh and Jammu and Kashmir have gained in terms of all the variables (enterprises, employment, GVA and fixed assets). Maharashtra, Tamil Nadu, Kerala, Punjab and Assam have experienced mixed results in the post-reform period as they gained in terms of some variables and lost in another variable. More or less a similar picture is discernible in terms of per capita GVA and fixed assets (see Figures 3.1.A and 3.2.A). Gujarat, Haryana, Himachal Pradesh and Karnataka have experienced significant increase in both the per capita GVA and fixed assets, whereas both the variables have declined in Delhi, Punjab, Andhra Pradesh, West Bengal, Madhya Pradesh, Uttar Pradesh, Kerala and Rajasthan. Despite the increase in per capita fixed assets in Maharashtra and Tamil Nadu, both the states have experienced decline in per capita GVA.

In spite of such changes during this period the relative positions of the states have remained more or less unchanged. To confirm this we have worked out coefficients of rank correlations of the states between 1994-95 and 2005-06 in terms of share of the states in enterprises, employment, GVA, fixed assets, per capita GVA and per capita fixed assets. The coefficients of correlation are turned out to be 0.999, 0.974, 0.942 and 0.935 in terms of shares of the states in organised manufacturing enterprises, employment, GVA and fixed assets respectively and 0.809 and 0.885 in terms of per capita GVA and per capita fixed assets respectively and significant at 1 percent level of significance. This suggests that the relative positions of the states have hardly changed over a decade.

Looking at the inter-state variation of the organised manufacturing industries it is observed that on the average inter-state inequality in the distribution organised manufacturing industries (measured by coefficient of variation, CV) has increased in terms of GVA and fixed assets, whereas it remained more or less same in terms of employment and declined in terms of number of enterprises during the period 1994-95 to 2005-06 (see Table 3.7.A). The inter-state inequality (CV) in the organised manufacturing sectors is also increased in terms of per capita GVA (from 0.889 to 1.10) and per capita fixed assets (from 0.726 to 1.04) during 1994-95 to 2005-06.

Table 3.7.A: Share of the States in Organised Manufacturing Industry- 1994-95 and 2005-06

States/ Regions	Enterprises		Employment		GVA		Fixed Assets	
	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06
Bihar	2.79	2.31	3.71	2.40	4.12	4.11	5.24	3.58
Orissa	1.42	1.36	1.81	1.61	1.78	2.12	4.47	3.89
West Bengal	4.39	4.31	8.33	5.65	5.03	3.06	7.76	4.37
Eastern region	**8.60**	**7.98**	**13.85**	**9.66**	**10.93**	**9.29**	**17.47**	**11.84**
Delhi	3.10	2.30	1.91	1.38	2.71	0.80	1.24	0.43
Haryana	2.96	3.19	3.31	4.45	3.28	9.30	2.43	3.05
Himachal Pradesh	0.27	0.59	0.35	0.63	0.46	1.56	0.81	1.37
Jammu & Kashmir	0.23	0.38	0.23	0.45	0.11	1.09	0.04	0.19
Punjab	5.32	6.08	4.09	4.85	3.52	2.12	3.88	2.29
Uttar Pradesh	7.95	7.92	8.31	7.92	8.79	6.31	11.18	6.89
North-west	**19.83**	**20.46**	**18.20**	**19.68**	**18.87**	**21.18**	**19.58**	**14.22**
Gujarat	9.91	10.02	8.98	9.52	12.22	15.54	10.05	19.70
Madhya Pradesh	3.25	3.02	4.57	3.52	5.45	4.24	7.50	5.73
Maharashtra	14.52	13.37	15.06	13.64	22.62	22.31	15.63	16.80
Rajasthan	3.70	4.39	2.78	3.24	3.17	2.63	4.03	2.68
Central Region	**31.38**	**30.80**	**31.39**	**29.92**	**43.46**	**44.72**	**37.21**	**44.91**
Andhra Pradesh	13.78	10.99	11.25	10.46	6.85	5.59	8.99	6.48
Karnataka	5.09	5.51	5.35	7.05	5.26	6.57	3.63	7.20
Kerala	3.52	4.14	4.08	3.75	2.03	1.35	1.55	1.27
Tamil Nadu	15.32	15.28	13.38	15.09	11.25	9.04	10.00	9.94
Southern Region	**37.71**	**35.92**	**34.06**	**36.35**	**25.39**	**22.55**	**24.17**	**24.89**
Assam	1.22	1.36	1.51	1.44	1.07	1.12	0.70	1.24
Manipur	0.06	0.04	0.02	0.02	0.00	0.00	0.00	0.00
Meghalaya	0.02	0.04	0.01	0.05	0.00	0.07	0.01	0.05
Nagaland	0.07	0.07	0.06	0.03	0.02	0.01	0.01	0.00
Tripura	0.11	0.22	0.08	0.20	0.01	0.03	0.03	0.02
NER	**1.48**	**1.73**	**1.68**	**1.74**	**1.10**	**1.23**	**1.50**	**2.62**
Other States*	1.00	3.11	0.82	2.65	0.25	1.03	0.07	1.52
All India	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
CV	1.07	1.02	1.00	1.01	1.19	1.23	1.00	1.20

Note: Data for organised sector is not available for the Arunachal Pradesh, Mizoram and Sikkim.
* Other States include Andaman & Nicobar island, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Goa and Pondicherry.
Source: Author's own computation using ASI data

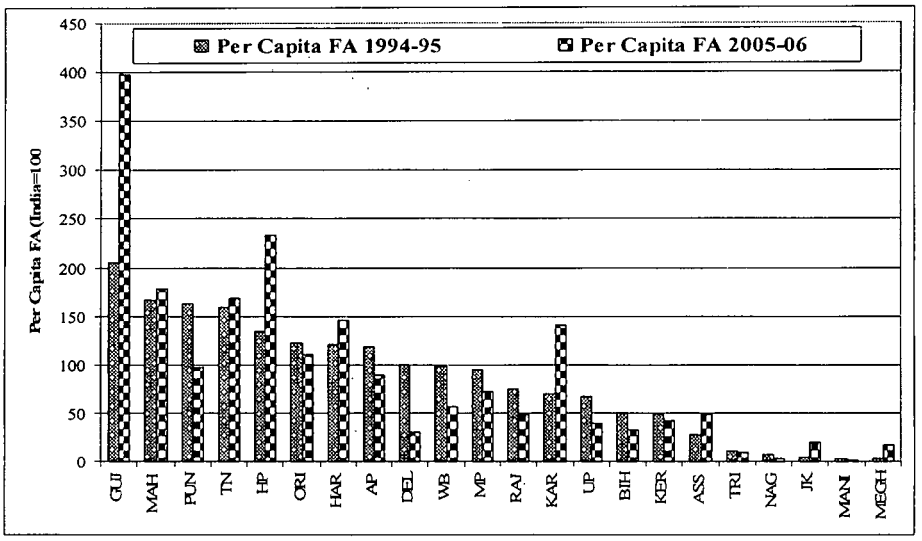

Figure 3.1.A: State-wise Per Capita FA (Rs) of Organised Manufacturing
Source: Author's own computation using ASI data

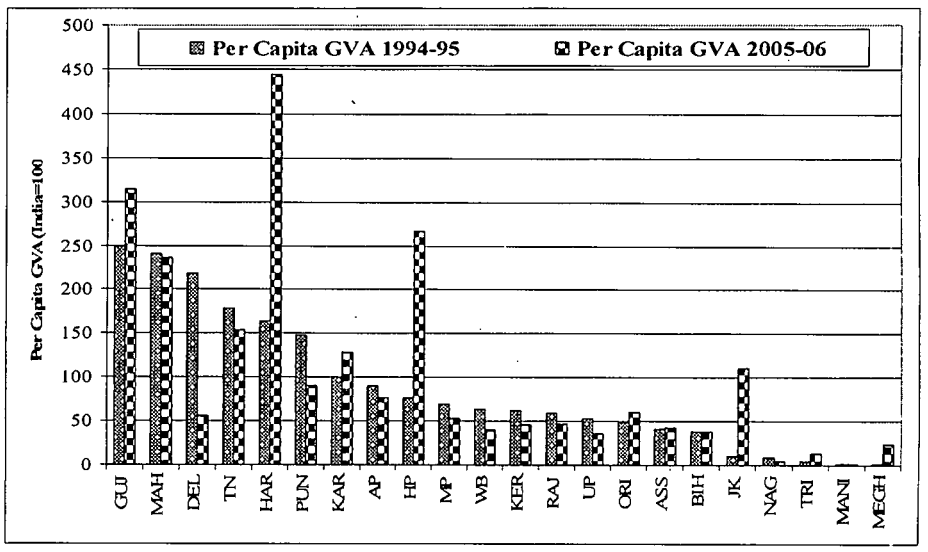

Figure 3.2.A: State-wise Per Capita GVA (Rs) of Organised Manufacturing
Source: Author's own computation using ASI data

A Comparison of location of Organised and Unorganised Industries

Now, let us make a comparison of the location pattern of the organised and organised manufacturing sectors. Comparing the shares of the states in organised and unorganised manufacturing industries (compare Table 3.4 of Chapter 3 and Table 3.7.A) and the position of the states in per capita GVA and fixed assets in both the sectors (compare Figures 3.3 and 3.4 of Chapter 3 and Figures 3.1.A and 3.2.A) the following conclusions can be drawn.

(a) It is obvious that some regions/states have relatively better position in the unorganised sector compared to the organised sector and vice versa. For instance, the eastern region accounted for around 30 percent of unorganised enterprises and employment, whereas it accounted only 8 percent of organised sector enterprises and around 10 percent of organised sector employment. On the other hand, the central and southern regions accounted for considerably higher shares in organised sector enterprises and employment compared to its unorganised counterpart. Looking at the per capita GVA and fixed assets the relative positions of the states like West Bengal, Delhi and Kerala are better off in the unorganised sector compared to the organised sector, whereas states like Gujarat and Karnataka are better off in the organised sector compared to its unorganised counterpart. The relative position of the states in both the organised and unorganised sectors in terms of different variables in 2005-06 is better understood from the Table 3.8.A.

(b) Looking at the changes in the share of the states in the organised and unorganised manufacturing sectors between pre-and post-reform periods we can have four groups of states: First, states that experienced improvement in the unorganised sector and decline in the organised sector (e.g. West Bengal, Madhya Pradesh and Kerala); second, states that experienced improvement in the organised sector and deceleration in the unorganised sector (e.g. Gujarat and Karnataka); third, states that experienced decline in both the sectors (e.g. Delhi, Bihar, Orissa and Uttar Pradesh) and fourth, states that improved in both the sectors (e.g. Haryana, Assam and Jammu and Kashmir). For Maharashtra, Tamil Nadu, Punjab and Rajasthan the situation is mixed, as in some variables they experienced improvement in the organised sector and in some other variable experienced improvement in the unorganised sector. For instance, in the unorganised sector Maharashtra gained in terms of enterprises, employment and GVA and lost in fixed assets, whereas it lost in terms of enterprise, employment and GVA and gained in terms of fixed assets in the organised sector.

(c) It is worth noting that if the organised sector of a region is improving it implies that the region is becoming more industrialised, irrespective of the shift in the unorganised sector. States like Gujarat, Karnataka, Haryana and Himachal Pradesh fall in this category (see figures 3.1.A and 3.2.A). On the other hand, if the organised sector of a region is decelerating and the unorganised sector is improving it implies

that the region is following a trend of informalisation of industries, so that states such as West Bengal, Rajasthan and Andhra Pradesh and to some extent Maharashtra and Tamil Nadu. However, states like Delhi, Bihar, Orissa and Uttar Pradesh have experienced decline in both the segments of manufacturing sectors. The decline of Delhi could be because of the operation of centrifugal forces in the form of high congestion cost, high land rent, environment related regulations etc., due to which industries are shifting from the core metropolis to its periphery regions like Noida etc. On the other hand, the decline of other three states could probably imply that these states have become less industrialised in the post-reform period.

(d) While inter-state inequality has declined in the unorganised manufacturing sector in the post-reform period, it has increased in the organised manufacturing sector during the same period. This leads us to conclude that while the organised manufacturing sector plays an inequality aggravating role, the unorganised manufacturing sector plays a role of inequality compensation during the post-reform period.

Table 3.8.A: Relative Ranks of the States in Organised and Unorganised Industries- 2005-06

States	Share of the states in all-India in								Per Capita GVA		Per Capita Fixed Asset	
	Enterprise		Employment		GVA		Fixed Asset					
	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg	Org	Unorg
AP	3	3	3	4	7	7	6	7	9	15	9	12
ASS	15	13	15	13	16	16	16	17	15	19	12	20
BIH	13	5	13	6	9	9	10	14	17	21	16	21
DEL	14	18	16	16	18	13	17	12	11	1	17	2
GUJ	4	11	4	10	2	5	1	4	2	6	1	7
HAR	11	15	9	15	3	12	11	6	1	5	5	1
HP	17	17	17	18	14	18	14	18	3	13	2	9
J&K	18	16	18	17	17	17	18	15	7	7	18	8
KAR	7	8	6	9	5	6	4	8	6	10	6	10
KER	10	10	10	11	15	10	15	9	14	8	14	6
MP	12	7	11	7	8	11	7	13	12	20	10	17
MAH	2	6	2	5	1	1	2	1	4	3	3	5
MANI	21	19	22	21	22	21	21	19	22	16	22	14
MEGH	22	21	20	20	19	20	19	21	19	11	19	18
NAG	20	22	21	22	21	22	22	22	21	22	21	22
ORI	16	9	14	8	12	15	9	16	10	18	7	19
PUN	6	14	8	14	13	14	13	11	8	12	8	4
RAJ	8	12	12	12	11	8	12	10	13	14	13	13
TN	1	4	1	3	4	4	3	3	5	4	4	3
TRI	19	20	19	19	20	19	20	20	20	2	20	16
UP	5	2	5	2	6	2	5	2	18	17	15	15
WB	9	1	7	1	10	3	8	5	16	9	11	11

Note: Org- Organised, Unorg- Unorganised. See *Appendix III* for the codes of the states
Source: Author's own computation using ASI and NSS data

Locational Linkages between Organised and Unorganised Industries

In order to trace out the relationship between the locations of organised and unorganised manufacturing industries we have computed the coefficients of correlation and rank correlation between the two sectors across the states (see Table 3.9.A). That the coefficients of rank correlation are fairly high and significant implies that the ranking of the states in both the sectors are more or less same. Similarly, the correlation coefficients are also significantly high, suggesting that the locations of the organised and unorganised manufacturing industries across the states are correlated to each other. This strengthened the evidence for locational association of the organised and unorganised manufacturing sectors observed earlier. It is evident that the association between the two sectors is stronger in terms of GVA and fixed assets compared to number of enterprises and employment. However, it is also true that the association become weaker in terms of GVA and fixed assets and become stronger in terms of number of enterprises and employment in the post-reform period. This could probably suggest that the most dominant form of locational association of the two sectors was the buyer-supplier linkages in the form of sharing of intermediate products, information spillovers etc., compared to labour-sharing linkages in the pre-reform period, whereas the labour-sharing linkages have strengthened and buyer-supplier linkages weakened in the post-reform period.

Table 3.9.A: Relationship between Location of Organised and Unorganised Manufacturing Industries across the States during 1994-95 and 2005-06

Variables	Rank Correlation		Correlation Coefficients	
	1994-95	2005-06	1994-95	2005-06
Share of states in number of enterprises of organised and unorganised sector	0.712***	0.772***	0.489**	0.543***
Share of states in employment of organised and unorganised sector	0.798***	0.836***	0.654***	0.658***
Share of states in GVA of organised and unorganised sector	0.934***	0.902***	0.869***	0.786***
Share of states in fixed assets of organised and unorganised sector	0.885***	0.826***	0.871***	0.762***
Per Capita GVA of organised and unorganised sector	0.809***	0.456**	0.757***	0.439**
Per Capita Fixed Assets of organised and unorganised sector	0.682***	0.492**	0.444**	0.353**

Note: ***, ** Significant at 1 and 5 percent level of significance
Source: Author's own computation using ASI and NSS data

The major problem in examining the relationship between the organised and unorganised manufacturing in India is non availability of suitable data. Except some information on whether an enterprise undertakes work on contract for any parent unit and the amount of purchases made by the public sector enterprises from the unorganised units and ancillaries, very little is known about the nature of relationship between the organised and unorganised industries. Constrained by data limitations, we worked out the share of enterprises operating on contract and the share of employment engaged in enterprises operating on contract across the states for the year 2005-06 (NSS 62nd round). The NSS 62nd round has provided information on the number of enterprises operating under contract by three types of contract viz. (a) working solely for enterprise/contractor, (b) working mainly on contract but also for other customers and (c) working mainly for customers but also on contract.

Table 3.10.A provides information on share of enterprises operating on all types of contract and also working only for contractors and the share of employment engaged in these two types of enterprise.[2] These figures provide considerable evidences to strengthen the argument we have made in the earlier section that the locational relationship between the organised and unorganised manufacturing industries across the Indian states could take the form of subcontracting and anciliarisation, which could take various forms such as buyer-supplier linkages, labour sharing, technology sharing, market linkages and so on. It is obvious that about 32 percent of unorganised manufacturing enterprises have worked on contract for the country as a whole in 2005-06, of which about 27 percent enterprises worked only for enterprise or contractor.[3] The share of employment engaged in these two types of enterprises under contract accounted for about 30 percent and 26 percent during the same. Looking at the state level, West Bengal has the highest share of enterprises operating on contract (54.34 percent), followed by Tamil Nadu (52.35), Delhi (51.65), Karnataka (38.91), Nagaland (38.18) and Uttar Pradesh (34.50). Most of these enterprises worked solely for the contractor, for instance, share of enterprises worked solely for contractor in West Bengal accounted for 49.0 percent, in Tamil Nadu 47.89 percent and in Delhi 41.0 percent. However, in terms of share of employment engaged in enterprises operating on contract Delhi has the

[2] We are not reporting by the other two types of contracting because of the fact that working only for contractor is the dominant form of contracting in almost all the states, except Assam, Arunachal, Manipur, Nagaland and Tripura where working mainly on contract but also for other customers and working mainly for customers but also on contract are the dominant form of contracting.

[3] In 2000-01, about 30.70 percent of unorganised manufacturing enterprises have worked on contract basis.

leading share (60.57 percent), followed by West Bengal (48.73) and Tamil Nadu (47.23). In order to access the impact of subcontracting relationship with organised industries on location of unorganised manufacturing industries, we have worked out the coefficient of rank correlation between the share of enterprises on contract only for contractor/enterprise and the share of the states to all-India in terms of employment, GVA and fixed assets of unorganised industries (as we observed in Chapter 3) for 2005-06. The coefficients are turned out to be 0.757, 0.776 and 0.743 in terms of employment, GVA and fixed assets respectively and significant at 1 percent level of significance. These evidences are considerable to suggest that subcontracting between the organised and unorganised industries plays important role in explaining the locational relationship between the organised and unorganised manufacturing industries in India.

Table 3.10.A: Extent of Contract in Unorganised Manufacturing- 2005-06

States	Share of Enterprises Operating on Contract (%)		Share of Employment in Enterprise Operating on Contract (%)	
	All types of Contract	Work only for Contractor	All types of Contract	Work only for Contractor
Andhra Pradesh	22.54	19.07	19.38	15.47
Arunachal Pradesh	13.88	0.00	12.11	0.00
Assam	12.18	2.69	12.39	3.11
Bihar	30.25	24.04	28.40	23.74
Delhi	51.65	41.02	60.57	50.41
Gujarat	24.40	19.71	22.80	15.29
Haryana	7.05	3.20	8.33	3.88
Himachal Pradesh	3.33	1.96	4.12	1.94
Jammu & Kashmir	25.62	21.58	24.88	20.51
Karnataka	38.91	37.20	26.75	24.02
Kerala	26.81	21.35	25.44	18.32
Madhya Pradesh	8.92	6.31	8.22	5.33
Maharashtra	19.93	14.02	24.91	17.42
Manipur	28.63	6.15	26.10	5.19
Meghalaya	3.33	0.14	4.22	0.50
Mizoram	4.54	0.12	6.75	0.13
Nagaland	38.18	0.91	39.05	2.26
Orissa	17.23	11.57	17.70	11.40
Punjab	22.85	18.10	19.86	14.05
Rajasthan	14.15	10.76	18.79	13.75
Sikkim	6.62	3.18	8.48	5.70
Tamil Nadu	52.35	47.89	47.23	41.20
Tripura	17.07	4.49	10.49	2.18
Uttar Pradesh	34.50	29.92	35.55	30.33
West Bengal	54.34	49.00	48.73	42.37
All India	**31.70**	**26.92**	**30.00**	**24.36**

Source: Authors own computation using NSS unit level data

Chapter 4

Spatial Concentration of Unorganised Manufacturing Industries in India

4.1 Introduction

In the preceding chapter we have analysed the broad trends and patterns of regional distribution of unorganised manufacturing industries in India at different geographical scales. We have observed significant spatial inequality in the distribution of manufacturing industries in all the three geographical scales-districts, states and beyond states (regions) and that unorganised manufacturing industries are mostly concentrated in few leading states and within the states in few districts, especially in metropolises and sub-urban districts near to metropolises. Though the observed location patterns of unorganised manufacturing industries at different geographical scales are informative and important in understanding the development of unorganised manufacturing industries across districts/states/regions, the descriptive statistical methods adopted could not provide much insight on the degree of spatial concentration of these industries.

In this chapter we have examined the extent of spatial concentration of unorgainsed manufacturing industries at aggregated and disaggregated industry level at different geographical scales. We have also examined the regional industrial base and diversification pattern of unorganised manufacturing industries for different states and also examined the existence for co-location of unorganised manufacturing industries at the district level. The same data source and aggregation for the states and districts has been followed as used in the preceding chapter.

The remaining of the chapter is organised in the following sections. Section 4.2 explains the concept and measures of spatial concentration. Section 4.3 examines the inter-state and inter-district concentration of unorganised manufacturing industries at aggregated and disaggregated industry level. Section 4.4 examines the intra-state concentration for 16 selected states. Section 4.5 examines the regional industrial base in unorganised manufacturing industries. Section 4.6 analyses the diversification pattern of unorganised manufacturing industries across the states. Section 4.7 tests for the existence of co-location of unorganised manufacturing industries at the district level. Finally, section 4.8 sums up the findings of the chapter.

4.2 Spatial Concentration: Concept and Measures

The term "spatial concentration" refers to the extent to which a given industry is concentrated in a few geographical units. The familiar examples of spatial concentration varies from the computer software industries in Silicon Valley, automobile industry in Detroit and carpet industries around Dalton and Georgia to the textile mills in Ahmadabad and Mumbai and the tanneries of Calcutta and South Arcot. Sometimes the terms "spatial concentration", "agglomeration" and "clustering" are used interchangeably, though they are fundamentally different to each other. It is worthwhile at this point to distinguish between these terms. In general, "agglomeration" refers to the geographic concentration of economic activity as a whole (for example industry, agriculture etc.), whereas "spatial concentration" refers to the geographic concentration of economic activity in a particular industry, after controlling for the geographic concentration of overall economic activity (Brulhart, 1998; Redding, 2009). Thus, existence of the agglomeration in the space means that there is also some spatial concentration, but the opposite is not necessarily true; that is there can have some spatial concentration without agglomeration. On the other hand, clustering is a term describing a phenomenon in which events or artifacts are not randomly distributed over space, but tend to be organised into proximate groups (Chakravorty and Lall, 2007). Clustering is best understood in the context of spatial autocorrelation, which is defined as the coincidence of value similarity with location similarity (Anselin, 1994 and 2003).[1] These spatial concepts, however, are distinct from "industrial concentration", which refers to the degree to which economic activities in a particular industry are concentrated in a small number of plants irrespective of their geographical location and "sectoral concentration", which is defined as concentration of economic activities of a region in few industries or sectors.

Measures of Spatial Concentration

There are many standard statistical indices proposed in the literature to measure spatial inequality or concentration, which vary from the traditional measures like coefficient of variation, spatial concentration ratio, spatial Herfindahl index, spatial Gini

[1] When the location of firms is spatially autocorrelated, it implies that the geographic distribution of firms is not random and is likely to be determined by factors attributable to the geographical unit. Hence, positive spatial autocorrelation implies that the attribute values of adjacent geographical units are closely related, whereas negative spatial autocorrelation implies that geographical units are surrounded by neighbours with very dissimilar values (Chakravorty and Lall, 2007).

index, entropy index and Location Quotient (LQ) etc. to the more recent measures like Ellison-Glaeser (EG) index and Moran's I etc. In India, the traditional measures have been more frequently used to measure spatial inequality or concentration. Over the years these measures have been criticised and proposed for alternative measures like Ellison-Glaeser (EG) index and Moran's I etc. (see Ellison and Glaeser, 1997; Dumais et al., 1997; Anselin, 1994, 2003 for a discussion of these two measures). The traditional measures are not purely spatial indices, as they hardly consider the geographical properties of the data and, in fact, they are derived from other fields of research (Ceapraz, 2008). For instance, the Gini index is applied more for measuring inter-personal income inequality and poverty, whereas Herfindahl index is specifically used in the studies of industrial organisations to measure industrial concentration. The measurement of concentration and the reliability and comparability of the available measures, however, is a separate issue for research, which is beyond the coverage of the present study and could be considered for further research. In the present study we have used the traditional measures, irrespective of their limitations. Since, none of the indices can be treated as precise and any single index is inadequate to measure concentration, we have employed a set of different concentration measures in order to arrive at a fairly reliable conclusion.[2]

At this juncture it is worthwhile to distinguish between absolute and relative measures of spatial concentration. The absolute concentration measures the space distribution of a specific industry between different geographical units (say, state/district), whereas the relative concentration measures the spatial concentration of a specific industry relative to the spatial concentration of the overall industries. Aiginger and Davies (2004) pointed out that the relative measures are important in some questions, whereas absolute measures are for some others. In the present study we have worked out a set of absolute measures such as spatial Herfindahl index, Entropy index, concentration ratio and coefficient of variation and a set of relative measures such as spatial Gini index and Location Quotient. These indices are discussed in the following.

Coefficient of Variation

The coefficient of variation (CV) is a measure of dispersion, which measures the variation of a variable in a distribution. A higher value of the CV, in our case, implies that there is more variation in the distribution of an industry across geographical units

[2] Note that the empirical findings and, thereby, conclusion of most of the existing studies, as we have seen in the preceding chapter, varied because of the use of different measures of concentration for the purpose of analysis.

(say state or district). The major limitation of CV is that it does not measure the extent of concentration of an industry, rather the variability in its spatial distribution.

Concentration Ratio

One of the commonly used measures is the k-regions/states concentration ratio. The concentration ratio is defined as the percentage share of employment or output (or any other variable) of an industry located in the largest few regions/states, ranked in descending order of shares of the regions/states. The major limitation of concentration ratio is that it does not consider the whole distribution, rather only the top entities of a distribution.

Spatial Herfindahl Index

A widely used index to measure spatial concentration is Herfindahl index, though it is commonly used in industrial organisation studies for measuring industrial or market concentration. The spatial Herfindahl index of an industry (H_i^C) is defined as the sum squares of employment (or output) shares of all the regions/states in the industry. Symbolically, $H_i^C = \sum_{k=1}^{n} (E_{ik}/E_i)^2$ where, E_{ik} is the employment (or output) of the k^{th} region in the i^{th} industry and E_i is the employment (or output) of all the regions in the i^{th} industry as a whole. The highest value for H_i^C is obtained one when the industry is located in a single region alone, whereas the lowest value is zero when all the regions have equal share. The basic advantage of the Herfindahl Index is that it considers the entire regions/states and, more importantly, by taking the square of shares of all the regions, it gives greater weight to the regions where the industry has larger share.

Spatial Gini Index

After Krugman (1991), the spatial Gini index became a standard measure for the studies relating to geographical specialization. It expresses the correspondence between the percentage of the distribution of industrial employment (or output) in certain geographic units and the percentage of the distribution of national employment (or output) within the framework of the same geographic units. Following Ceapraz (2008) we measure the spatial Gini index as the sum of the differences of the concentration rates by the addition of the differences of the weights of each industry and the weights of the

arithmetic mean obtained after the decreasing classification of each region's concentration rates. Symbolically,

$$G_i^C = \frac{2}{m^2 \overline{C}} \sum_{k=1}^{m} \Lambda_k \left| C_k - \overline{C} \right|$$

m = Number of regions

$C_k = S_{ik} / S_k$ for every region in the i^{th} industry

$\overline{C} = \frac{1}{m} \sum_{k=1}^{m} C_k$, mean of C_k for the regions

Λ_k = Rank of the region in the ranking of C_k in descending order

$S_{ik} = E_{ik} / E_k$, share of k^{th} region in total employment (or output) of i^{th} industry

$S_k = E_k / E$, share of k^{th} region in total employment (or output)

E_{ik} = Employment (or output) in the i^{th} industry of the k^{th} region

$E_k = \sum_{i=1}^{n} E_{ik}$, total employment (or output) in the k^{th} region of all industries

$E_i = \sum_{k=1}^{m} E_{ik}$, total employment (or output) in the i^{th} industry of all the regions

$E = \sum_{i=1}^{n} \sum_{k=1}^{m} E_{ik}$, total employment (or output) in all the regions

The index G_i^C takes values between zero and one, where zero value indicates that the concentration of i^{th} industry in the k^{th} region corresponds to the national distribution of the i^{th} industry and a value close to one indicates that the region presents a strong concentration in a specific industry.

Entropy Index

Aiginger and Davies (2004) have suggested for using entropy index for measuring spatial concentration. The basic advantage of the index is that it is decomposable into within-region and between-region components, which makes an exact and meaningful relationship between changes in the individual industries and the aggregate change for industry as a whole. Besides, the index has adding up property that is we can add up changes in individual regions/states to give an overall change and, also, it uses the complete distribution of regions' shares. Following Aiginger and Davies

(2004) we measure the entropy index of spatial concentration of an industry (E_i^C) as the summation of the products of the shares and log shares of each region/state to the country's total employment (or output) for that industry. Symbolically,

$$E_i^C = -(E_{ik}/E_i) \times \ln(E_{ik}/E_i)$$

The notations are similar to those used for Gini concentration index. The index takes values between $\ln(K)$ and zero. If the industry is equally distributed across all the regions, then $(E_{ik}/E_i) = 1/k$ for all k, and $E_i^C = \ln(k)$. Alternatively, if the industry is completely concentrated in one region, $E_i^C = \ln(1) = 0$. More generally, E_i^C increases the more evenly the industry spreads across the regions; it is therefore an inverse measure of concentration.

Location Quotient

The location quotient (LQ) is a measure of relative regional concentration of a given industry compared to total national magnitudes, which provides the basis for a qualitative judgment about the "structural base" of the region's industrial economy (Alagh, 1971a; Awasthi, 1991). It is defined as the ratio of the share of a region's total employment (or output) accounted for by the given industry to the share of the overall country's total manufacturing employment (or output) accounted for by the same industry. Symbolically,

$$LQ_{ik} = \frac{E_{ik}}{E_k} \Big/ \frac{E_i}{E}$$

The notations are similar to those used for Gini concentration index. The value of LQ_{ik} connotes that, if $0 \leq LQ_{ik} < 1$ then less than proportionate share of i^{th} industry is in k^{th} region compared to the all-India average and if $LQ_{ik} \geq 1$ then, more than proportionate share of i^{th} industry is in k^{th} region. For instance, $LQ_{ik} = 1$ implies that the share of i^{th} industry in k^{th} region is proportionate to the share of i^{th} industry in all-India and $LQ_{ik} = 3$ implies that the share of i^{th} industry in k^{th} region is three times than the share of i^{th} industry in all-India.

4.3 Inter-State and Inter-District Concentration of Unorganised Industries

4.3.1 Inter-State Concentration

The term "inter-state concentration" is used to measure the spatial concentration of unorganised industries across the (25 selected) states. The summary measures reported in Table 4.1 use the spatial Herfindahl index, spatial entropy index and coefficient of variation to measure the concentration for the overall unorganised manufacturing industries as well as by rural and urban sectors and enterprise types namely OAME, NDME and DME. The result shows that concentration of the overall unorganised manufacturing industries as well as its three sub categories has declined in terms of all the variables viz. number of enterprises, employment, GVA and fixed assets in 2005-06 compared to 1994-95. This is not surprising that concentration is high in DME enterprises, which are more capital and technology intensive compared to the OAME and NDME enterprises (which are household based industries). Further, though concentration has declined in both the rural and urban unorganised industries, the degree of concentration is higher in the rural unorganised industries compared to urban unorganised industries in terms of number of enterprises and employment, whereas the opposite is true in terms of GVA and fixed assets for both the periods.

Table 4.1: Inter-State Concentration of Unorganised Manufacturing Industries

Index	Enterprise Type	Enterprise		Employment		GVA		Fixed Assets	
		1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06
Un-weighted Coefficient of Variation	OAME	1.48	1.40	1.58	1.46	1.42	1.28	1.39	1.23
	NDME	1.42	1.36	1.45	1.35	1.36	1.37	1.60	1.38
	DME	1.57	1.47	1.57	1.46	1.74	1.52	2.27	1.57
	All	**1.44**	**1.37**	**1.44**	**1.35**	**1.40**	**1.30**	**1.63**	**1.32**
	Rural	1.54	1.46	1.59	1.47	1.48	1.22	1.34	1.27
	Urban	1.49	1.36	1.53	1.40	1.62	1.61	2.03	1.49
Spatial Herfindahl Index	OAME	0.098	0.091	0.107	0.096	0.093	0.081	0.089	0.077
	NDME	0.092	0.087	0.095	0.086	0.087	0.088	0.108	0.089
	DME	0.106	0.097	0.106	0.096	0.123	0.101	0.188	0.106
	All	**0.094**	**0.088**	**0.094**	**0.087**	**0.091**	**0.082**	**0.112**	**0.084**
	Rural	0.103	0.096	0.108	0.097	0.097	0.076	0.086	0.080
	Urban	0.099	0.087	0.103	0.091	0.111	0.110	0.156	0.099
Spatial Entropy Index	OAME	2.555	2.609	2.490	2.568	2.616	2.704	2.658	2.734
	NDME	2.624	2.678	2.604	2.686	2.648	2.687	2.524	2.639
	DME	2.428	2.531	2.448	2.540	2.377	2.587	2.161	2.528
	All	**2.592**	**2.640**	**2.585**	**2.654**	**2.624**	**2.724**	**2.525**	**2.686**
	Rural	2.518	2.580	2.487	2.577	2.612	2.768	2.708	2.728
	Urban	2.538	2.623	2.498	2.601	2.459	2.543	2.270	2.567

Source: Authors own computation using NSS unit level data on Unorganised Manufacturing

However, the trends and degree of concentration is not uniform across the industries. Extending the scale of analysis to the two-digit industries gives a better understanding of the degree of concentration across the industries and the variation in the direction of change in concentration across the industries (see Table 4.1.A). The result shows that spatial concentration (as measured by Herfindahl index) is high for the accounting and computing machinery (NIC 30), radio, television and communication equipments (NIC 32), petroleum and nuclear fuel (NIC 23) and wearing apparel (NIC 18).[3] It is obvious that out of 22 two-digit industries concentration has declined in 16 industries in terms of employment and GVA and in 20 industries in terms of fixed assets. Similarly, considering the other measures of concentration also it is found that concentration has declined for almost all the industries, except for leather and leather products (NIC 19), machinery and equipment (NIC 29), motor vehicle (NIC 34) and other transport equipment (NIC 35). It is obvious that for all unorganised manufacturing industry as well as almost all two-digit industries the degree of concentration is higher in terms of fixed assets compared to the other two variables and also concentration has declined more rapidly in terms of fixed assets.

Looking at the states where the industries are mostly concentrated (in terms of GVA) a more or less similar picture is discernable as we observed in the preceding chapter. The manufacturing of food, beverages and tobacco products (NIC 15-16) are found concentrated in Uttar Pradesh, West Bengal, Andhra Pradesh and Tamil Nadu. Similarly, manufacturing of textiles and wearing apparel (NIC 17-18) are mostly concentrated in Maharashtra, Tamil Nadu and West Bengal; metal and metal products industries (NIC 27-28) are concentrated in Delhi, Maharashtra and Tamil Nadu; manufacturing of chemical and petroleum products (NIC 23-26) are concentrated in Maharashtra, Tamil Nadu and Gujarat; machinery and electrical industries (NIC 29-33) are mostly concentrated in Tamil Nadu, Gujarat, Maharashtra, Delhi and Kerala; manufacturing of motor vehicle and transport equipment industries (NIC 34-35) are concentrated in Delhi, Maharashtra and Tamil Nadu.

Some remarkable changes in the pattern of concentration can be observed between 1994-95 and 2005-06. For instance, concentration of manufacturing of leather products (NIC 19) has shifted from Uttar Pradesh and Maharashtra to West Bengal and Delhi. Similarly, concentration of manufacturing of paper and paper products (NIC 21)

[3] However, the four-state concentration ratio has been found to be more than 50 percent for all the two-digit industries, indicating a very high degree of concentration.

has shifted from Maharashtra to Tamil Nadu; manufacturing of basic metals (NIC 27) has shifted from Gujarat to Delhi; manufacturing of Office, Accounting and Computing machinery (NIC 30) has shifted from Maharashtra to Kerala during the same period.

However, in most of the cases concentration has occurred at three-digit or even at four- or five-digit industry levels. Therefore, measuring concentration by aggregated industry sectors will not reflect the real picture of concentration. Accordingly, we have extended our analysis to 55 three-digit industry sectors.[4] Table 4.2 reports the spatial Herfindahl index (calculated in terms of GVA) for 15 most concentrated and 15 least concentrated industries and the ranks of these industries in terms of Herfindahl and Entropy index based on employment and GVA data for 1994-95 and 2005-06. It is obvious that at the state level the most concentrated three-digit industries are manufacturing of aircraft and spacecraft (NIC 353) followed by man-made fibers (NIC 243), watches and clocks (NIC 333), accounting and computing machinery (NIC 300) and manufacture of bodies for motor vehicles (NIC 322) for both the period.[5] These are known to be high technology industries. On the other hand, resource based industries like food, beverages and tobacco products; textiles (except wearing apparel); leather and footwear; woods products; paper, printing and publishing; manufacture of furniture are the diversified industries. However, industries like dressing and dyeing of fur (NIC 182), television and radio receivers, sound or video recording (NIC 323) and other electrical equipment (NIC 319), which were highly concentrated in 1994-95 have become less concentrated by 2005-06. Further, it is found that there is mismatch for some industry sectors in the degree of concentration measured in terms of employment and GVA in 2005-06. For instance, the industries like general purpose machinery (NIC 291), publishing (NIC 221) and basic precious and non-ferrous metals (NIC 272) are concentrated in terms of GVA, while they are less concentrated in terms of employment. Similarly, the industries like beverages (NIC 155) and electric lamps and lighting equipment (NIC 315) are less concentrated in terms of GVA, but they are concentrated in terms of employment.

[4] There are 59 three-digit industry sectors as per the National Industrial Classification (NIC) of 2004. While adjusting data for the year 1994-95, which are provided at the NIC 1987 codes we are able to get a reasonable industry group only by clubbing NIC 311-312 and NIC 341-343 together.

[5] The manufacturing of aircraft and spacecraft industry is located only in Maharashtra in both the periods, whereas manufacturing of man-made fibers, which was concentrated only in Bihar in 1994-95, has spread its location to Haryana, Karnataka, Uttar Pradesh and West Bengal in the later period.

Table 4.2: Inter-State Concentration of Unorganised Industries by 3-digit Industries

1994-95						2005-06					
Value of HHI in GVA		Ranks of the Industries				Value of HHI in GVA		Ranks of the Industries			
		Herfindahl		Entropy				Herfindahl		Entropy	
NIC@	HHI	GVA	EMP	GVA	EMP	NIC@	HHI	GVA	EMP	GVA	EMP
15 most concentrated industries by 3-digit industry sectors (NIC 2004)											
353	1.000	1	1	1	1	**353**	1.000	1	1	1	1
243	1.000	2	2	2	2	**333**	0.923	2	2	2	2
182	0.889	3	3	3	3	**300**	0.767	3	4	4	5
300	0.864	4	5	4	4	**322**	0.766	4	5	5	6
323	0.772	5	4	5	5	**243**	0.610	5	3	6	3
333	0.732	6	6	6	6	**173**	0.520	6	6	7	7
319	0.719	7	7	7	7	**341-3**	0.418	7	11	3	4
261	0.567	8	8	8	8	**323**	0.412	8	9	8	11
332	0.504	9	18	10	18	**291**	0.350	9	33	15	34
315	0.449	10	17	11	16	**221**	0.350	10	44	16	44
313	0.442	11	14	9	11	**272**	0.346	11	29	14	33
231	0.424	12	9	12	9	**351**	0.338	12	15	9	12
251	0.415	13	24	15	26	**232**	0.318	13	8	10	8
272	0.399	14	11	13	14	**261**	0.306	14	7	12	9
201	0.358	15	33	22	38	**359**	0.305	15	10	11	14
15 least concentrated industries by 3-digit industry sectors (NIC 2004)											
210	0.137	41	28	41	33	**315**	0.141	41	15	32	13
242	0.136	42	24	47	30	**242**	0.125	42	28	42	28
192	0.134	43	46	46	46	**160**	0.121	43	34	39	30
273	0.132	44	39	38	37	**252**	0.120	44	46	44	45
292	0.131	45	51	44	50	**154**	0.112	45	39	45	37
191	0.129	46	30	40	43	**192**	0.111	46	37	43	36
152	0.124	47	36	43	36	**155**	0.096	47	21	47	24
269	0.115	48	50	48	49	**151**	0.091	48	50	49	49
154	0.110	49	41	51	41	**153**	0.090	49	42	48	43
281	0.108	50	49	50	53	**281**	0.083	50	53	51	52
221	0.107	51	55	49	54	**361**	0.082	51	51	54	53
153	0.106	52	40	53	45	**269**	0.082	52	52	50	51
151	0.096	53	48	52	48	**181**	0.080	53	54	52	54
202	0.085	54	54	54	52	**202**	0.079	54	43	53	42
361	0.075	55	53	55	55	**201**	0.071	55	55	55	55

Note: HHI- spatial Herfindahl index, GVA- gross value added, EMP- employment
@ NIC codes are as per NIC 2004. For description of the industries see *Appendix-II*
Source: Same as Table 4.1

On the whole it is found that out of 55 three-digit industries about one third industries were highly concentrated in 1994-95, which declined to about one fifth in 2005-06 (see Table 4.3).[6] We have classified the three-digit industries according to their degree of concentration and the technology intensity of industries following the OECD-1997 classification of manufacturing industries into high technology, medium-high-

[6] About 7 industries were highly concentrated and 12 industries were moderately concentrated in 1994-95, which has declined to 5 and 7 respectively in 2005-06.

technology, medium-low-technology and low technology industries (see Hatzichronoglou, 1997).[7] The results are presented in Table 4.3. It is clear that the industries with high and medium technologies such as accounting and computing machinery, electrical, electronics and communications, Motor vehicles and transport equipment etc. are most concentrated industries, whereas industries with low technologies such as food, beverages, and tobacco; textiles, paper and printing (except publishing); woods and furniture and leather and footwear industries are least concentrated. However, contrary to the existing studies, which have found that leather and footwear; woods products and textiles are most concentrated industries in the organised sector (Kathuria, 2008), our study do not find any evidence of high concentration for these industries (except wearing apparel).

It is also observed that concentration has declined in 43 industry sectors out of 55 three-digit industry sectors (see Table 4.4) in 2005-06 compared to 1994-95. Concentration has declined for all highly concentrated (except NIC 333 and 353) and moderately concentrated industries, while it has increased for some diversified industries. Now, consider the implications of the general findings by looking at one instance, say manufacturing of wearing appeal (NIC 18). The significant decline in concentration is to be expected from the data presented in Table 3.1.A and 3.2.A in Chapter 3. The share of top two states Delhi and Maharashtra, which have accounted for 56 percent of employment, 68 percent of GVA and 84 percent of fixed assets in the industry in 1994-95, has declined to 16, 23 and 21 percent respectively in 2005-06; whereas the share of other states like Andhra Pradesh, Uttar Pradesh, west Bengal and Tamil Nadu have increased in the later period. Similar explanation could be given to the other industries also, where the share of the top states has declined and, thereby, backward states have higher share in the later period compared to the former (see Table 3.1.A and 3.2.A in Chapter 3).

[7] The OECD, 1997 classifies the manufacturing industries into high-technology, medium-high-technology, medium-low-technology and low-technology industries according to their global technological intensity. In this OECD classification, the technology intensity of industries is measured as the level of technology specific to the sector (measured by the ratio of R&D expenditure to value added) and the technology embodied in purchases of intermediate and capital goods (see Hatzichronoglou, 1997). The OECD classification is given according to Standard Industrial Classification (SIC). We have adjusted these SIC codes with the NIC codes by the product groups. See *Appendix II* for the classification of industries by technology intensity as per NIC 2004 codes.

Table 4.3: Classification of the 3-digit Industries according to Technology Intensity and Degree of Inter-State Concentration

Technology Intensity of Industries[#]	Degree of Spatial Concentration[@]		
	High	Medium	Low
	1994-95		
High	353, 300, 323, 333	332, 321	331, 322
Medium-high	243, 319	315, 313, 352, 314, 293	241, 242, 291, 292, 311-12, 351, 359, 341-343
Medium-Low		231, 251, 261, 272	232, 252, 269, 271, 273, 281, 289
Low	182	201	151, 152, 153, 154, 155, 160, 171, 172, 173, 181, 191, 192, 202, 210, 221, 222, 223, 361, 369
	2005-06		
High	300, 322, 333, 353	323	321, 331, 332
Medium-high	243	291, 341-43, 351	241, 242, 292, 293, 311-12, 313, 314, 315, 319, 352, 359
Medium-Low		272	231, 232, 251, 252, 261, 269, 271, 273, 281, 289
Low		173, 221	151, 152, 153, 154, 155, 160, 171, 172, 181, 182, 191, 192, 201, 202, 210, 222, 223, 361, 369

Note: NIC codes are as per NIC 2004. For description of the industries see *Appendix–II*

[@] Concentration is measured by Herfindahl concentration index in terms of GVA.

[#] The classification is based on the OECD-1997 classification of manufacturing industries according to their global technological intensity (see *Appendix II*).

Source: Same as Table 4.1

Table 4.4: Classification of 3 digit Industries according to Degree and changes in Inter-State Concentration

	Degree of concentration[@]		
	High	Medium	Low
Increase	333, 353		152, 154, 191, 210, 222, 241, 271, 273, 292, 361
Decrease	182, 243, 300, 319, 323,	201, 231, 251, 261, 272, 293, 313, 314, 315, 321, 332, 352	151, 153, 155, 160, 171, 172, 181, 182, 192, 201, 202, 223, 231, 242, 251, 252, 269, 281, 289, 293, 311, 313, 314, 315 319, 321, 331, 332, 352, 369

Note: NIC codes are as per NIC 2004. For description of the industries see *Appendix-II*

[@] Concentration is measured by Herfindahl concentration index in terms of GVA.

Source: Same as Table 4.1

4.3.2 Inter-District Concentration

We have used the term "inter-district concentration" to measure the spatial concentration of unorganised manufacturing industries across the (435 selected) districts for the country as a whole. The estimates of spatial Herfindahl index and spatial Entropy index (and also coefficient of variation) for the overall and 22 two-digit unorganised manufacturing industries in terms of employment, GVA and fixed assets for 1994-95 and 2005-06 are reported in Table 4.2.A. Manufacturing of office, accounting and computing machinery (NIC 30) has appeared as the most concentrated industry; being it located only in four districts namely Greater Mumbai, Pune, Delhi and West Singhbhum in 1994-95 and barely experienced any significant spread by 2005-06.[8] Other industries, which are relatively highly concentrated are- manufacturing of radio, TV and communication equipments (NIC 32); medical, precision and optical instruments; watches and clocks (NIC 33); manufacturing of motor vehicles, trailers and semi trailers (NIC 34); other transport equipment (NIC 35) and basic metal (NIC 27). As against the high concentration of these high and medium-high technology industries (as classified in the earlier section), the low technology and medium-low technology industries such as food products and beverages, tobacco products, textiles, leather products, woods products, publishing and printing, non-metallic mineral products and fabricated metal products etc. are found to be least concentrated.

Concentration has declined for the overall unorganised manufacturing industries in terms of all the variables; the extent of decline being more pronounced in terms of fixed assets. At the two-digit industry level concentration has declined in as many as 12 industries in terms of employment and GVA each and in 17 industries in terms of fixed assets. The significant decline has been experienced by manufacturing of wearing apparel (NIC 18), radio, TV and communication equipments (NIC 32), rubber and plastic products (NIC 25) and medical, precision and optical instruments and watches and clocks (NIC 33). Except manufacturing of other transport equipment (NIC 35) no other two-digit industry has undergone significant increase in concentration.

[8] Greater Mumbai accounted for 78 percent of employment, 87 percent of GVA and 30 percent of fixed assets of the office, accounting and computing machinery industry, while Pune accounted for 15 percent, 6 percent, and 68 percent of these variables respectively in 1994-95. However, by 2005-06 the industry has spread only to 11 districts. Trivandrum appeared as the new destination of the industry, as the district alone accounted for 82.4 percent of employment, 86.5 percent of GVA and 51.5 percent of fixed assets. By 2005-06, Greater Mumbai's share in the industry has sharply declined to 2.5 percent of employment, 2.6 percent of GVA and 6.4 percent of fixed assets; while the industry has disappeared from Pune and West Singhbhum. The other districts where the industry is located in 2005-06 are Delhi, Bangalore, Hyderabad, Kolkata, Kaithal, Jalandhar, Solan, Palakkad and Alappuzha.

4.4 Intra-State Concentration of Unorganised Industries

The previous section dealt with the estimation of spatial concentration of unorganised manufacturing industries across the states (inter-state concentration) and districts (inter-district concentration) for the country as a whole. However, one of the arguments we have made in the earlier chapter is that industries are concentrated not only in few states, but also in few districts within each state. That is "intra-state concentration", which is defined as concentration of industries across the districts within a state is another important feature of spatial concentration of industries. It is possible that the degree of intra-state concentration may vary from state to state depending on the level of development, location, natural resource endowments and other region/state specific characteristics.

Studies on intra-state concentration of industries are rare in India.[9] One of the main reasons could be the unavailability of comparable information on variables of interest at the district level. The lone studies by Chakravorty and Lall (2007) and Chakravorty et al. (2003; 2005) have examined clustering of industries in the metropolitan areas at the pin code level. But their studies have been limited only to the organised manufacturing industries in three metropolitan cities of Calcutta, Mumbai and Chennai. None of the studies have systematically analysed the intra-state concentration of industries even for the major states. In this section, we examine the intra-state concentration of unorganised manufacturing industries for 16 major Indian states.[10] The selection of these states is based on sufficient number of comparable districts for both the periods. The total number of districts for which analysis has been carried out for both the periods is reported in Table 3.1 of Chapter 3. These states have different levels of development conditioned by geographical location, agro-climatic conditions and level of

[9] In fact, intra-state analysis is a more recent phenomenon in India for other dimensions of disparities also. Only in more recent years few studies are undertaken for analysing intra-state disparities; among which some important are: Shaban (2006) for Maharashtra; Chakraborty (2009) for Kerala; Suryanarayana (2009) for Karnataka and Maharashtra; Dubby (2009) for Gujarat, Haryana, Kerala, Orissa and Punjab; Diwakar (2009) for Uttar Pradesh; and Bhattacharya (2009) for Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Uttar Pradesh and West Bengal. These studies have examined the intra-state disparities in terms of income/consumption inequality, incidence of poverty, human development and Government expenditure for these selected states.

[10] These states are: Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. However, because of the differences in the number of districts, concentration across the states is not strictly comparable; say intra-state concentration in Uttar Pradesh is not strictly comparable with that of Himachal Pradesh or West Bengal. Because the number of districts in Uttar Pradesh is 6 times higher than the districts in Himachal Pradesh and 4 times than West Bengal, the extent of concentration for Uttar Pradesh will show smaller than that of West Bengal or Himachal Pradesh by any measure of concentration if we will not adjust for size.

industrialisation. As obvious form preceding chapter Gujarat, Maharashtra, Tamil Nadu, Haryana and Punjab are the industrially developed states, whereas West Bengal, Karnataka, Kerala and Andhra Pradesh are close to the national average and others are industrially backward state.

The estimates of spatial Herfindahl index (and also coefficient of variation) used to measure the intra-state concentration of overall unorganised manufacturing industries for 16 states in terms of employment, GVA and fixed assets are reported in Table 4.5. In 1994-95, Maharashtra and Gujarat are the highly concentrated states (measured by Herfindahl index in terms of GVA) followed by Punjab, Haryana, Madhya Pradesh and Himachal Pradesh; whereas concentration is low in the states like Bihar, Rajasthan, Andhra Pradesh, Uttar Pradesh, Assam, West Bengal and Tamil Nadu; and the remaining states are moderately concentrated.

Table 4.5: Intra-State Concentration of Unorganised Industries- 1994-95 and 2005-06

	Spatial Herfindahl Index						Coefficient of Variation					
	Employment		GVA		Fixed Asset		Employment		GVA		Fixed Asset	
States	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06
AP	0.056	0.062	0.057	0.062	0.076	0.073	0.54	0.67	0.58	0.67	0.89	0.85
ASS	0.071	0.075	0.063	0.080	0.063	0.090	0.77	0.83	0.63	0.89	0.63	1.01
BIH	0.037	0.041	0.041	0.033	0.043	0.035	0.77	0.85	0.85	0.62	0.90	0.69
GUJ	0.147	0.102	0.202	0.118	0.208	0.175	1.37	0.99	1.73	1.14	1.76	1.57
HAR	0.095	0.076	0.155	0.098	0.120	0.094	0.74	0.48	1.26	0.77	0.99	0.74
HP	0.129	0.131	0.120	0.252	0.120	0.123	0.77	0.69	0.69	1.39	0.70	0.63
KAR	0.070	0.078	0.104	0.117	0.120	0.239	0.65	0.82	1.07	1.24	1.21	2.06
KER	0.118	0.098	0.096	0.098	0.103	0.155	0.84	0.63	0.61	0.63	0.69	1.12
MP	0.038	0.058	0.154	0.047	0.063	0.057	0.85	1.29	2.46	1.07	1.36	1.27
MAH	0.114	0.118	0.293	0.295	0.520	0.268	1.59	1.62	2.84	2.85	3.89	2.70
ORI	0.134	0.112	0.114	0.108	0.177	0.140	0.89	0.70	0.72	0.66	1.19	0.94
PUN	0.122	0.118	0.155	0.147	0.164	0.141	0.71	0.67	0.97	0.92	1.03	0.87
RAJ	0.047	0.081	0.051	0.114	0.053	0.132	0.53	1.11	0.63	1.47	0.66	1.64
TN	0.069	0.074	0.087	0.077	0.096	0.095	0.74	0.76	0.98	0.80	1.08	1.02
UP	0.045	0.026	0.058	0.037	0.045	0.039	1.36	0.79	1.64	1.16	1.37	1.22
WB	0.078	0.094	0.081	0.100	0.104	0.110	0.59	0.79	0.63	0.86	0.91	0.97

Note: See *Appendix-III* for the codes of the states
Source: Same as Table 4.1

By 2005-06, concentration has declined in about eight states- Madhya Pradesh, Gujarat, Punjab, Orissa, Haryana, Bihar, Tamil Nadu and Uttar Pradesh, while it has increased in six states- Himachal Pradesh, Rajasthan, West Bengal, Assam, Karnataka and Andhra Pradesh; and it remained more or less same for Maharashtra and Kerala.

However, there are some exceptions depending on the variable used. For instance, viewed in terms of employment and GVA concentration has remained more or less same for Maharashtra, but concentration has significantly declined in terms of fixed assets. Similarly, viewed in terms of employment concentration has declined in Kerala, while in terms of fixed assets concentration has significantly increased. In summary, it can be noted that concentration has declined in the highly concentrated states (exception is Himachal Pradesh) and increased in the least concentrated states, exception being Bihar, Tamil Nadu and Uttar Pradesh (see Table 4.6).

Table 4.6: Classification of States according to the Degree and Changes in Intra-State Concentration

Direction of Change	Degree of Concentration*	
	High	**Low**
Increase	Himachal Pradesh	Rajasthan, West Bengal, Assam, Karnataka, Andhra Pradesh
Decrease	Punjab, Orissa, Haryana, Gujarat, Madhya Pradesh	Bihar, Tamil Nadu, Uttar Pradesh
More or less same	Maharashtra	Kerala

Note: * The degree of concentration is measured by spatial Herfindahl index in terms of GVA
Source: Rearranged from Table 4.5

In order to find out the districts where unorganised manufacturing industries are mostly concentrated within the states we have estimated the four-district concentration ratio and listed out the four leading districts for each state. The results, reported in Table 4.7, are not surprising in the context of what we have presented earlier, but they are quite effective in making the point that industries are concentrated in a handful of districts in almost all the states. For instance, in Maharashtra the top four districts accounted for about 57 percent of employment, 78 percent of GVA and 77 percent of fixed assets of the unorganised manufacturing sector in 2005-06. Similarly, for Gujarat, Haryana, Karnataka, Himachal Pradesh, Punjab, Orissa and Kerala the top four districts accounted for more than 50 percent shares in employment, GVA and fixed assets of unorganised manufacturing sector. For the other states the proportions are relatively smaller. The relatively smaller share of the top four districts for Uttar Pradesh (including Uttaranchal), Bihar (including Jharkhand) and Madhya Pradesh (including Chhattisgarh) could

probably be a function of the fact that the total number of districts in these states is much higher than the other states.

Table 4.7: Share of the Leading Four Districts in the States-1994-95 and 2005-06

States	Year	Share of 4 Districts			Name of the Four Leading Districts (as per share in GVA)
		EMP	GVA	FA	
Andhra Pradesh	1994-95	31.55	32.62	42.44	Prakasam, Guntur, Krishna, Kurnool
	2005-06	39.23	37.47	42.25	Anantapur, Chittoor, Visakhapatnam, Karimnagar
Assam	1994-95	40.18	37.37	34.58	Jorhat, Kamrup, Bongaigaon, Karimganj
	2005-06	46.73	45.41	47.57	Kamrup, Nagaon, Dhubri, Barpeta
Bihar	1994-95	28.37	28.93	29.45	Patna, Singhbhum (W), Rohtas, Singhbhum (E)
	2005-06	30.86	20.38	24.31	Deoghar, Sahibganj, Munger, Patna
Gujarat	1994-95	65.11	74.63	73.94	Surat, Bhavnagar, Ahmadabad, Rajkot
	2005-06	56.38	58.99	71.43	Ahmedabad, Surat, Bharuch, Amreli
Haryana	1994-95	52.22	70.42	61.73	Panipat, Faridabad, Rewari, Rohtak
	2005-06	40.30	49.95	51.08	Faridabad, Hisar, Yamunanagar, Ambala
Himachal Pradesh	1994-95	60.44	61.58	58.80	Mandi, Kangra, Solan, Hamirpur
	2005-06	64.16	72.25	62.06	Solan, Mandi, Kangra, Sirmaur
Karnataka	1994-95	36.86	50.23	54.14	Bangalore, Dharwad, Belgaumv, Mysore
	2005-06	45.85	60.61	66.75	Bangalore, Gulbarga, Shimoga, D. Kannada
Kerala	1994-95	54.59	49.65	52.95	Thrissur, Alappuzha, Ernakulam, Kottayam
	2005-06	50.85	49.95	62.71	Thrissur, Trivandrum, Ernakulam, Palakkad
Madhya Pradesh	1994-95	29.50	53.86	36.50	Bhopal, Raipur, Rewa, Jabalpur
	2005-06	38.07	32.45	36.70	Raipur, Jabalpur, E. Nimar Khandwa, Seoni
Maharashtra	1994-95	51.32	73.63	86.53	G. Mumbai, Thane, Pune, Solapur
	2005-06	56.98	78.17	76.94	G. Mumbai, Thane, Kolhapur, Pune
Orissa	1994-95	66.38	58.35	74.25	Sambalpur, Ganjam, Puri, Cuttack
	2005-06	54.56	53.65	56.41	Cuttack, Kendujhar, Puri, Sambalpur
Punjab	1994-95	59.31	67.72	67.91	Ludhiana, Jalandhar, Gurdaspur, Amritsar
	2005-06	58.66	64.61	63.49	Ludhiana, Jalandhar, Amritsar, Gurdaspur
Rajasthan	1994-95	27.56	29.65	31.46	Ajmer, Jodhpur, Nagaur, Barmer
	2005-06	44.26	50.48	51.68	Jaipur, Alwar, Ajmer, Udaipur
Tamil Nadu	1994-95	40.27	49.57	50.13	Madurai, Coimbatore, Salem, Chengai Anna
	2005-06	40.94	41.20	47.98	Coimbatore, Salem, Chengai Anna, Chennai
Uttar Pradesh	1994-95	33.82	39.83	32.86	Moradabad, Varanasi, Ghaziabad, Allahbad
	2005-06	18.83	28.68	31.05	Moradabad, Meerut, Ghaziabad, Aligarh
West Bengal	1994-95	43.07	42.98	54.95	Howrah, Hugli, Kolkata, N. 24 Parganas
	2005-06	48.00	53.62	51.76	Kolkata, Howrah, S. 24-Parganas, N. 24-Parganas

Note: EMP- Employment, GVA- Gross Value Added, FA- Fixed Assets
Source: Same as Table 4.1

It is worth noting that the composition of leading industrial districts has changed for all the states over a period of decade (1994-2005), except for Punjab, where Ludhiana, Jalandhar, Gurdaspur and Amritsar have continued to be the leading districts

accounting for around 60 percent of employment and around 65 percent of GVA and fixed assets for both the periods (see Table 4.7). A complete shift is observed for Andhra Pradesh, where all top four districts of 1994-95 (Prakasam, Guntur, Krishna and Kurnool) have disappeared in 2005-06 and some new districts (Anantapur, Chittoor, Visakhapatnam and Karimnagar) have emerged as the leading industrial districts. Similarly, for Assam, Bihar, Haryana, Karnataka and Rajasthan three of the top four districts of 1994-95 have disappeared from the list of top districts in 2005-06. As against this, the changes in Maharashtra, West Bengal, Himachal Pradesh, Orissa and Tamil Nadu are minor.

Concentration and level of Development

The different pattern of intra-state concentration and changes therein across the states lead us to ask the basic question: whether intra-state industrial concentration is linked with the level of development of the state? Though the answer will be different for different states with different levels of development and industrial concentration, we can find the average degree of association between the degree of intra-state concentration and the level of development of the states. Figures 4.1 and 4.2 indicate that intra-state concentration is positively linked with the level of per capita NSDP (in logarithm scale) of the state for both pre- and post-reform periods.

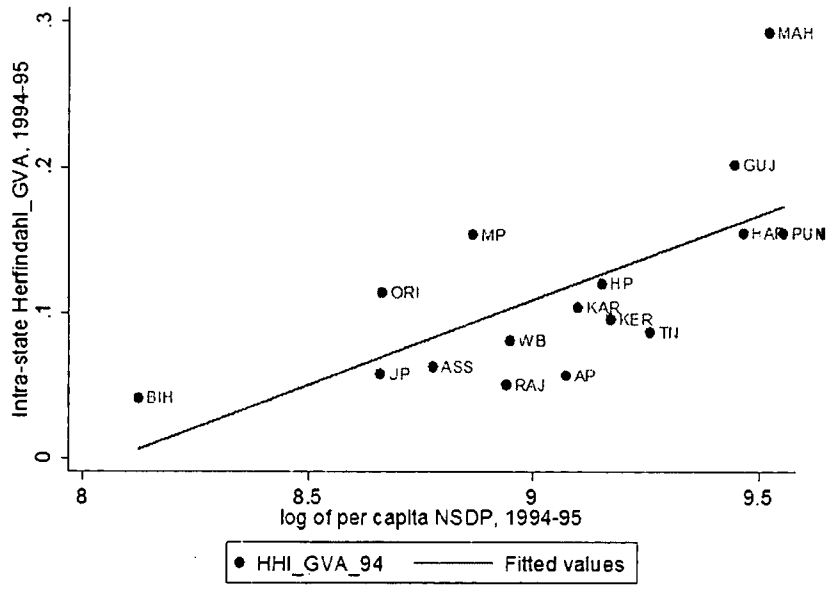

Figure: 4.1: Intra-State Concentration and Log Per Capita NSDP, 1994-95
Source: Authors own calculation using NSS unit level data

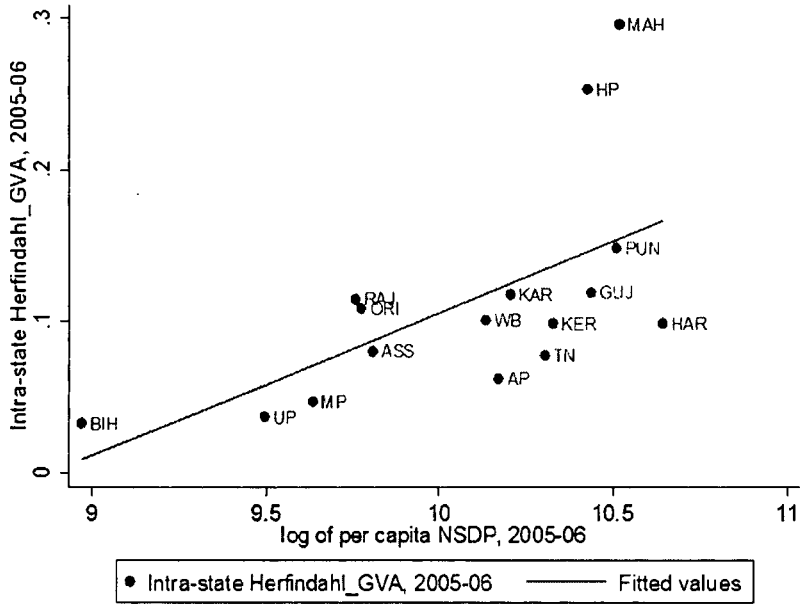

Figure: 4.2: Intra-State Concentration and Log Per Capita NSDP, 2005-06
Source: Authors own calculation using NSS unit level data

To confirm this association we have worked out coefficients of rank correlation between intra-state concentration (measured by spatial Herfindahl index in terms of GVA) and level of development (measured by log per capita NSDP and log per capita GVA from unorganised manufacturing) of the states. The coefficients are turned out to be 0.675 and 0.606 in terms of log per capita NSDP and 0.578 and 0.553 in terms of log per capita GVA from unorganised manufacturing for 1994-95 and 2005-06 respectively and they are found to be significant at 1 percent level of significance. This suggests that industrial concentration is positively associated with the level of development; that is industries are likely to more concentrate in the developed states. The empirical evidence, thus, seems to support the hypothesis of complementarity between the level of development and degree of industrial concentration.

4.5 Regional Industrial Base of Unorganised Industries

The reduction in spatial concentration of unorganised manufacturing industries in the post-reform period has evoked the question that how has the change taken place and what are the underlying factors behind this change? From the theoretical point of view such change could happen in several ways, for example, if the developed regions stop growing and backward regions grow; developed regions grow at a slower rate than the

backward regions; or/and developed regions bump into a declining phase, while backward regions remain even stagnant. According to Awasthi (1991) these phases might be witnessed owing to a variety of factors, such as industry mix of the regions and existing technological linkages; and is likely to be influenced by government intervention with the market forces. So, an enquiry into the industrial structure of the regions/states will provide some clue to the diverse performance of different states leading to reduction of spatial concentration of unorganised manufacturing industries in the post-reform period. In this section we examine the industrial base and diversification pattern of the states for 1994-95 and 2005-06.

In order to examine the industrial base of the states we have employed Location Quotient (LQ) technique. The construction and use of the LQ have already been explained in section 4.2. At this point it is important to clarify the concept of "industrial base". The "industrial base" of a region/state is a set of industries with LQ greater than unity, i.e. $LQ \geq 1$ (Alagh *et al.*, 1971a and Awasthi, 1991). Note that the term "industrial base" in our analysis does not mean the "industrial base" in overall industry sector; rather it implies the "industrial base" in the unorganised manufacturing sector.

The estimates of LQ of the states in 11 two-digit industry groups[11] in terms of GVA of unorganised manufacturing industries for 1994-95 and 2005-06 are reported in Table 4.8.[12] What appears from the table is that majority of the states have industrial base in resource based traditional industries. Capital goods industries are mostly confined to the developed states like Maharashtra, Delhi and Haryana; and to some lesser extent Gujarat, Punjab and Madhya Pradesh. The industrial base of the eastern states (West Bengal, Bihar and Orissa) is comprised of agro-based (food, beverages and tobacco etc.) consumer goods and wood- and chemical-based intermediate goods industries. Similarly, the industrial base of the southern states (Andhra, Karnataka, Kerala and Tamil Nadu) is largely in agro-based and textile-based consumer goods industries and to some extent in wood- and paper-based intermediate goods industries. In the north-west region, Delhi and Haryana's industrial base is predominated by capital goods industries (metal, machinery and transport) and textile, leather, paper and chemical-based intermediate

[11] We have also computed the LQ for 22 two-digit industries and found that a set of the sub-groups of the industry groups have been appeared as the industrial base for most the states. Therefore, in order to simplify the tabulation of data we have reported the LQ for 11 two-digit industry groups, which is a reclassification of the 22 two-digit industries. The re-classification is given in *Appendix-II.*

[12] We have also computed the location quotient in terms of employment and fixed assets and found that the observed pattern of industrial base of the states is more or less same as that of in terms of GVA.

goods industries. Himachal Pradesh and Jammu and Kashmir's industrial base is in wood and chemical based intermediate goods industries, while Punjab's industrial base is comprised of a set of wood and chemical-based intermediate goods and capital goods industries and that of Uttar Pradesh is in a wide range of agro-based, textiles, chemical and metal based industries; and in recent years newly emerged in wood-based intermediate goods and transport-based capital goods industries.

Table 4.8: Location Quotient of the States by Industry Sectors- 1994-95 and 2005-06

States	Food		Tobacco		Textiles		Leather		Woods	
	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06
Andhra P.	1.22	1.64	2.90	2.35	0.76	1.10	0.96	0.24	1.42	1.36
Arunachal	4.90	2.27	0.00	0.00	0.07	0.47	0.05	0.00	0.08	0.34
Assam	1.98	1.69	1.28	0.15	0.59	0.81	0.15	0.14	0.85	2.20
Bihar	1.93	1.49	1.17	4.07	0.20	0.45	1.91	0.26	1.50	2.25
Delhi	0.33	0.13	0.01	1.57	1.63	1.22	1.29	6.59	0.12	0.21
Gujarat	0.43	0.54	0.10	0.38	0.86	1.01	0.16	0.62	0.34	0.56
Haryana	0.48	0.95	0.00	0.00	1.74	0.86	1.22	0.50	0.81	0.63
Himachal P.	1.75	0.78	0.00	0.14	0.46	0.58	0.73	0.76	2.07	1.35
J& K	1.81	0.88	0.01	0.00	0.27	1.17	4.10	0.35	2.19	2.34
Karnataka	0.98	2.26	2.15	1.27	1.11	0.98	0.40	0.36	1.37	0.67
Kerala	1.75	1.00	0.82	0.29	0.77	0.85	0.75	0.71	1.12	1.37
Madhya P.	0.93	0.99	0.26	2.48	0.32	0.74	0.72	0.43	4.57	0.99
Maharashtra	0.72	0.48	0.02	0.08	0.94	1.04	1.36	0.80	0.87	0.33
Manipur	0.56	0.82	0.00	0.04	2.69	1.71	0.26	0.04	1.25	1.10
Meghalaya	2.72	1.18	0.04	0.03	0.27	0.44	2.01	0.03	1.77	2.36
Mizoram	1.17	1.18	0.59	0.05	0.46	0.89	0.01	0.00	0.43	1.33
Nagaland	1.51	2.30	0.00	0.00	1.98	1.08	0.03	0.01	0.82	0.92
Orissa	1.16	1.38	2.80	1.18	0.69	0.69	0.17	0.07	1.49	2.74
Punjab	0.85	0.86	0.00	0.00	0.75	0.97	1.57	2.08	0.56	1.54
Rajasthan	1.15	0.93	0.03	0.07	0.52	1.00	3.16	1.03	1.47	0.69
Sikkim	1.09	2.36	0.00	0.00	2.20	0.71	0.27	0.00	0.44	0.38
Tamil Nadu	0.74	0.74	1.15	1.33	1.73	1.35	0.37	0.85	0.61	0.99
Tripura	1.91	0.53	0.00	0.87	0.60	0.16	0.08	0.12	1.15	2.43
Uttar Pradesh	1.15	1.19	1.17	0.64	1.19	1.02	1.57	0.63	0.79	1.33
West Bengal	1.60	0.99	2.72	1.91	0.80	1.08	0.61	2.59	0.79	0.83

In the central region, Maharashtra's industrial base is comprised of a set of capital goods industries like metal, machinery and electrical and transport equipments; and intermediate goods industries like textiles, leather, paper and printing and chemical and petroleum. Contrary to the expectation, the industrial base of Gujarat, one of the most industrialised states, is in a limited range of industries. Though the earlier studies relating to organised manufacturing sector have shown that a wide range of industries like agro-based industries, textiles, chemical and non-metallic mineral industries etc. have comprised the industrial base of Gujarat's organised sector, our findings show that for the

unorganised sector Gujarat's industrial base has been only in metal-based and furniture industries in 1994-95 and in recent years industries like textiles, paper and printing and machinery have emerged as industrial base of the state's unorganised sector. The industrial base of the north-eastern states is predominated by agro-based consumer goods industries and woods and furniture industries. To a lesser extent, in recent years, some states of the region have emerged in intermediate goods industries like textiles (Nagaland and Manipur); paper and printing (Mizoram); Chemical (Meghalaya and Tripura) and metal (Arunachal and Meghalaya).

Table 4.8 (Contd.)

States	Paper		Chemical		Metal		Machinery		Transport		Furniture	
	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06
Andhra P.	1.11	0.73	0.71	0.75	0.45	0.66	0.42	0.23	0.16	0.25	1.03	0.49
Arunachal P.	0.07	0.08	0.00	0.05	0.48	4.34	0.00	0.00	0.00	0.00	0.26	0.33
Assam	0.38	0.63	0.95	0.57	0.54	0.84	0.08	0.07	0.13	0.03	1.45	1.29
Bihar	0.23	0.17	1.37	0.96	0.71	1.44	0.49	0.18	0.03	0.08	0.73	0.54
Delhi	1.84	2.11	0.58	0.30	1.25	2.35	2.46	1.54	7.24	1.50	0.66	0.41
Gujarat	0.37	1.45	0.66	0.87	1.32	0.37	0.80	2.19	0.14	0.18	3.29	1.93
Haryana	0.27	1.16	1.42	0.97	1.42	1.80	1.46	1.79	0.94	2.06	0.38	0.76
Himachal P.	0.59	0.57	1.09	1.08	0.69	0.70	0.77	5.12	0.09	0.75	0.67	0.36
J& K	0.94	0.15	0.67	2.15	0.63	0.72	1.00	0.16	0.00	0.01	0.37	0.46
Karnataka	0.57	0.68	1.03	0.68	0.88	0.69	0.86	0.53	1.90	0.47	0.47	0.36
Kerala	0.51	0.82	0.99	1.26	0.71	0.75	0.68	0.80	0.39	0.65	0.84	1.44
Madhya P.	0.58	0.80	0.51	2.05	0.69	1.05	0.25	0.60	0.31	1.37	0.54	0.48
Maharashtra	1.74	1.55	1.22	0.83	1.61	0.90	1.79	1.49	0.91	1.39	0.72	1.99
Manipur	0.03	0.56	0.04	0.14	0.18	0.47	0.02	0.03	0.00	0.00	1.29	2.01
Meghalaya	0.01	0.20	0.12	2.31	0.48	1.22	0.00	0.01	0.00	2.73	1.06	0.78
Mizoram	1.91	3.68	0.13	0.10	0.98	0.58	0.00	0.04	0.01	0.00	3.37	2.15
Nagaland	0.27	0.13	0.69	0.39	0.18	0.46	0.11	0.31	0.00	0.03	0.87	1.07
Orissa	0.90	0.37	1.27	1.54	0.57	0.84	0.22	0.16	0.00	0.57	0.99	0.57
Punjab	0.93	1.41	1.24	0.39	0.98	0.89	2.98	1.55	5.36	5.96	0.65	0.87
Rajasthan	1.20	0.35	1.75	1.86	0.75	0.89	0.48	0.67	0.10	0.48	0.92	1.20
Sikkim	0.00	0.05	0.10	0.89	0.17	0.85	0.01	0.00	0.00	0.00	1.95	1.42
Tamil Nadu	1.14	1.72	0.77	1.19	0.74	1.06	1.36	0.62	0.61	0.83	0.79	0.44
Tripura	0.50	1.19	0.95	4.02	0.39	0.23	0.15	0.03	0.59	0.04	1.69	1.12
Uttar Pradesh	1.08	0.56	1.26	1.03	1.10	1.64	0.48	0.62	0.31	1.77	0.56	0.45
West Bengal	1.00	0.66	0.83	0.61	0.66	0.66	0.53	1.08	0.77	0.14	0.80	1.21

Note: The Location Quotients are calculated based on Gross Value Added data
Source: Same as Table 4.1

However, considerable changes have been observed in the industrial base of the states between 1994-95 and 2005-06. A comparison of the location quotient figures for both the years reveals that most of the states have attained a wide range of industry mix and, thereby, a diversified industrial base by the 2005-06 as compared to 1994-95. Even it is observed that, on the average, the industrial base for all states except Maharashtra,

Delhi and Haryana and to a lesser extent Gujarat, Punjab and Madhya Pradesh, is comprised of a set of agro-based demand-driven consumer goods industries and resource based intermediate goods industries.

4.6 Regional Diversification Pattern

The concept of "regional diversification" can be best understood as the absence of "regional specialisation", which refers to the extent to which the economic activities of a region are concentrated in few industries or sectors.[13] As such, if the economic activities of a region are spread across different industries or sectors it is termed as regional diversification. Theoretically, spatial concentration and regional specialisation are closely related to each other and both are parallel processes.[14] For Aiginger and Davies (2004) regional specialisation and spatial concentration seem to be the two sides of the same coin: "..... statistically, specialisation and concentration are two perspectives to be derived from a matrix with the columns referring to countries (regions/states), and the rows to industries. Specialisation is observed by reading down each column, whilst concentration is observed by reading along each row". Thus, if inequality/concentration increases down the columns, they will also increase along the rows (Aiginger and Davies, 2004; Ceapraz, 2008), or in other words, if regional specialisation increases, it will lead to increase in spatial concentration. Accordingly, we can have a negative relationship between regional diversification and spatial concentration, implying that at a higher level of regional industrial diversification, spatial concentration of industries will be less.

Like the spatial concentration measure, various measures of diversification have been developed in the literature over the years. In the present study we have used two kinds of diversification measures: a relative measure (specialisation Coefficient) and an absolute measure (Herfindahl specialisation index). Both the indices measure specialisation, and hence, we subtracted these two indices from unity to get diversification measures, i.e. Diversification Coefficient (DC) and Herfindahl Diversification Index (HDV) respectively. Before getting into the measurement part it is worthwhile to explain these two diversification indices.

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[13] In that the term regional specialisation is similar to that of industry or sectoral concentration, as used in industrial organisation studies.

[14] The concept of regional specialisation is more closely related to international trade theories, whereas spatial concentration is related to the theories regarding the localisation economies (Ceapraz, 2008).

Diversification Coefficient (DC)

The diversification coefficient (DC) measures the extent to which a given region's industrial economy has a diversified pattern relative to the country as a whole. The DC is obtained by subtracting the specialisation coefficient (SC) from unity, which is computed by taking the sum of difference of the denominator and numerator of the location quotient of different industries in a region without considering the sign.[15] Formally,

$$SC = \sum_{i=1}^{n}\left(\frac{E_{ik}}{E_k} - \frac{E_i}{E}\right)$$

Where, E_{ik} stands for output (or employment) in the i^{th} industry of the k^{th} region, E_k total output (or employment) of all industries in the k^{th} region, E_i total output (or employment) in the i^{th} industry of all the regions and E output (or employment) of all industry in all regions. The value of specialisation coefficient lies between zero and unity $(0 \le SC \le 1)$, where zero implies complete diversification and one implies that the region is completely specialised in one industry. Thus, after subtracting the SC from unity to get the diversification coefficient $(0 \le DC \le 1)$, a value close to zero will imply least diversification, whereas close to one means highest diversification. Following Awasthi (1991), which have classified the states based on specialisation coefficient into three categories viz. highly diversified $(1 \le SC \le 0.70)$, moderately diversified $(0.30 < SC \le 0.50)$ and less diversified $(0.50 < SC \le 1)$, we have classified the states in into three categories based on diversification index as: highly diversified states $(0 \le SC \le 0.30)$, moderately diversified states $(0.30 < SC \le 0.50)$ and less diversified states $(0.50 < SC \le 1)$.

Herfindahl Diversification Index (HDV)

The Herfindahl diversification index (HDV) is an absolute measure of diversification. It is obtained by subtracting the Herfindahl Specialisation Index from unity, which is defined as the sum squared output (or employment) shares of all the industry sectors in a region, that is $H_k = \sum S_i^2$, where S_i is the output (or employment) share of i^{th} industry to total output (or employment) of all industry in k^{th} region.

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[15] Recall the expression for the Location Quotient (LQ) in section 4.2, where $LQ_{ik} = \frac{E_{ik}}{E_k} \Big/ \frac{E_i}{E}$

Accordingly, we get the HDV as $HDV = (1 - H_k) = (1 - \sum S_i^2)$. The value of HDV lies between zero and unity, where unity implies highest diversification and zero implies complete lack of diversification.

Findings for Regional Diversification

The aforesaid two diversification indices have been calculated for the unorganised manufacturing sector at the two-digit industry level in terms of employment and GVA for the pre- and post-reform periods. The results are reported in Table 4.9. It is evident that in 1994-95 Karnataka, Uttar Pradesh and Kerala are most diversified states; whereas Maharashtra, Andhra Pradesh, West Bengal, Tamil Nadu, Orissa, Rajasthan, Punjab and Assam are the moderately diversified states and the remaining states are found to be less diversified in terms of unorganised manufacturing sector. Importantly, Delhi and Gujarat, two industrially developed states, are found to be less diversified. In a period of ten years (1994- 2005) West Bengal, Rajasthan, Haryana, Tamil Nadu, Kerala, Punjab, Madhya Pradesh and Gujarat witnessed significant diversification in their unorganised manufacturing sector; while states like Assam, Jammu & Kashmir, Nagaland, Mizoram, Sikkim, Meghalaya, Manipur and Arunachal have shown very little change in their level of diversification; and Karnataka, Andhra Pradesh, Orissa, Himachal Pradesh, Bihar, Delhi and Tripura become more specialised.

However, it seems that there has not been any significant overall change in level of regional diversification of unorganised industries over the period, as the average change in the diversification coefficient for all the states in 2005-06 over 1994-95 is only about 0.012 and 0.064 in terms of employment and GVA and that of in the Herfindahl diversification index is only about 0.004 and 0.034 in terms of employment and GVA respectively. In fact, the rank correlation between the series of diversification coefficient for 1994-95 and 2005-06 turned out to be 0.873 and 0.687 in terms of employment and GVA respectively and that of the series of Herfindahl diversification index for 1994-95 and 2005-06 turned out to be 0.564 and 0.470 in terms of employment and GVA respectively. The coefficients are significant at 1 percent level of significance, implying the stability of the relative rank orders of the states between 1994-95 and 2005-06.

Table 4.9: Diversification Measures for the States-1994-95 and 2005-06

States	Diversification Coefficient				Herfindahl Diversification				Rank of the States[$]	
	Employment		GVA		Employment		GVA			
	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06
Diversified states										
West Bengal	0.545	0.805	0.637	0.779	0.810	0.823	0.841	0.844	6	1
Kerala	0.722	0.752	0.697	0.774	0.796	0.792	0.825	0.847	3	2
Rajasthan	0.609	0.631	0.569	0.750	0.848	0.805	0.855	0.826	9	3
Uttar Pradesh	0.693	0.797	0.746	0.738	0.795	0.788	0.850	0.837	2	4
Haryana	0.518	0.598	0.466	0.710	0.853	0.831	0.808	0.855	12	5
Moderately Diversified states										
Tamil Nadu	0.615	0.665	0.630	0.696	0.799	0.791	0.817	0.821	7	6
Punjab	0.541	0.430	0.558	0.670	0.856	0.780	0.870	0.864	10	7
Madhya Pradesh	0.545	0.451	0.197	0.639	0.813	0.810	0.690	0.850	22	8
Maharashtra	0.647	0.607	0.685	0.601	0.860	0.803	0.874	0.822	4	9
Andhra Pradesh	0.737	0.749	0.653	0.579	0.822	0.782	0.856	0.804	5	10
Gujarat	0.303	0.428	0.315	0.559	0.770	0.783	0.735	0.822	17	11
Karnataka	0.645	0.674	0.752	0.529	0.831	0.810	0.859	0.755	1	12
Assam	0.591	0.589	0.493	0.518	0.785	0.765	0.790	0.804	11	13
Orissa	0.460	0.311	0.625	0.503	0.826	0.766	0.854	0.832	8	14
Less Diversified states										
Jammu & Kashmir	0.459	0.508	0.291	0.478	0.805	0.663	0.801	0.795	19	15
Nagaland	0.460	0.545	0.409	0.477	0.711	0.739	0.730	0.727	16	16
Mizoram	0.332	0.242	0.226	0.409	0.770	0.747	0.715	0.797	20	17
Sikkim	0.386	0.397	0.213	0.398	0.778	0.771	0.682	0.734	21	18
Himachal Pradesh	0.470	0.551	0.466	0.381	0.780	0.767	0.806	0.809	13	19
Bihar	0.562	0.411	0.413	0.378	0.817	0.826	0.805	0.841	15	20
Meghalaya	0.210	0.320	0.133	0.374	0.714	0.815	0.683	0.824	24	21
Manipur	0.085	0.106	0.171	0.360	0.392	0.441	0.635	0.712	23	22
Delhi	0.188	0.143	0.296	0.267	0.802	0.788	0.823	0.823	18	23
Tripura	0.434	0.253	0.443	0.075	0.779	0.726	0.780	0.725	14	24
Arunachal Pradesh	0.044	0.129	0.022	0.060	0.129	0.634	0.190	0.658	25	25
All India					**0.850**	**0.881**	**0.867**	**0.892**		

Note: [$] the ranks are in terms of diversification index measured in terms of GVA
Source: Authors own computation using NSS unit level data

Given the diversification of unorganised industries across the states we have asked if there any relationship between the degree of diversification and level of industrial development of the states. It follows that in the early stage of industrial development, the industrial structure of a region is likely to be resource based industries and low diversified. As development proceeds, it will move to demand driven consumer goods industries as well as capital goods industries and thus the industrial structure diversified (Awasthi, 1991). So, the industrial structure of industrialised regions is likely to be diverse. In order to test this hypothesis we have worked out rank correlation between the diversification of unorganised industries (expressed as diversification coefficient in terms of GVA) and level of industrial development (expressed as the share

of value added generated from overall manufacturing sector to NSDP) across states. The coefficients of rank correlation are found to be 0.557 and 0.646 for 1994-95 and 2005-06 respectively and significant at 1 percent level of significance. We have also worked out rank correlation coefficient between diversification and level of development of unorganised industries across states, which are turned out to be 0.655and 0.728 for 1994-95 and 2005-06 respectively and significant at 1 percent level of significance. This suggests that the hypothesised relationship between diversification and level of industrial development turned out to be true for the unorganised manufacturing sector in India and that the relationship becomes stronger in the post-reform period.

Further, we asked whether the diversified states are less concentrated or not, since it is argued that the concentration and diversification moves in the opposite direction. To test this hypothesis, we have work out rank correlation coefficient between intra-state concentration (measured by spatial Herfindahl index) and diversification (expressed as diversification coefficient) of unorganised manufacturing industries across 16 states (recall that intra-concentration has been calculated for 16 states only). The coefficients are turned out to be -0.520 and -0.249 in terms of employment and -0.219 and -0.084 in terms of GVA for 1994-95 and 2005-06 respectively and significant for 1994-95 in terms of employment. Thus, though the hypothesised negative relative relationship between concentration and diversification of unorganised industries across states holds good, the relationship is significant only for 1994-95 in terms of employment and it has become weaker in the post-reform period in terms of both employment and GVA. This could also be seen by comparing the figures for 16 states in Table 4.5 and Table 4.9. It is evident that Maharashtra, Gujarat, Orissa, Himachal Pradesh and Punjab are the highly concentrated and least diversified states, whereas Andhra Pradesh, Karnataka, Madhya Pradesh, Rajasthan, Tamil Nadu and Uttar Pradesh are least concentrated and diversified states in terms of employment for both 1994-95 and 2005-06. Viewed in terms of GVA, however, both the categories of states are reduced to Maharashtra, Gujarat, Punjab and Haryana for the first category states and to West Bengal, Uttar Pradesh, Rajasthan and Andhra Pradesh for the second category states in 1994-95 and even reduced in 2005-06.[16] We will revert to this issue in Chapter 5, where we will examine the impact of diversification of unorganised industry structure on location of unorganised industries at the district level for 2005-06.

[16] Bihar is the exception compared to other states, which is least concentrated as well as least diversified in terms of both employment and GVA for both 1994-95 and 2005-06.

4.7 Co-location of Unorganised Manufacturing Industries

Given the findings that different sets of (unorganised) industries have been emerged as the industrial structure of different states/districts one could ask the question: how these industries are linked with each other or is there any association between these industries. The general way to get into the issue is to examine the input-output or buyer-supplier linkages between the different industries in an input-output framework. Another way is to examine the existence of co-location or co-clustering of different industries, that is to examine what type of industries are co-located across the regions. In this section we examine for the existence of co-location or co-clustering of unorganised manufacturing industries at the district level for the pre- and post-reform periods. Before analysing the results for co-location of unorganised industries it is worthwhile to explain the concept and the theoretical underpinnings of co-location or co-clustering of industries.

Co-location or co-clustering of industry is one of the important features of industry location, which occurs when industries from two sectors are present in the same neighbourhood.[17] The idea of co-location of industries goes back to Marshall (1920), who suggested that firms would tend to locate each other in space to realise external economies to offset the internal scale economies of large factories (Chakravorty, Koo and Lall, 2005). In principle, industries tend to co-locate in order to realise the external economies arising from inter-industry linkages, which may take different forms viz. labor market pooling, technological spillovers and buyer-supplier linkages and so on. Accordingly, we can have three kinds of industrial co-location: labour-sharing industrial co-location that depend on the local availability of labour; technology sharing co-location, where industries are benefited from each other by sharing their technical knowledge and buyer-supplier-linked industrial co-location. Chakravorty, Koo and Lall (2005) have pointed out that there is negligible co-location of industries due to technology sharing in India, most dominant form of co-location being the labour market pooling and buyer-supplier linkages. However, due to unavailability of information about sharing of technology, output and labour etc. among the industries, it is not possible for us to estimate these three kinds of co-location separately. We estimate the overall co-location pattern for 11 two-digit unorganised manufacturing sectors.

[17] Note that the concept of "co-clustering" is fundamentally different from "co-location". Co-clustering occurs if both industries that are co-located are related through economic (input-output, innovation, or labour-market) linkages (Chakravorty, Koo and Lall, 2005). However, we have used both the terms synonymously in this study.

Different devices have been developed in the literature to measure the co-location or co-clustering of industries. Chakravorty, Koo and Lall (2005) have suggested for using correlation coefficients between different industries in order to examine the existence of co-location. Following their study, we have computed correlation coefficients for 11 two-digit industries in terms of employment and GVA to examine the co-location of unorganised manufacturing industries across the Indian districts for 1994-95 and 2005-06. The findings are analysed in the following.

Findings for Co-location

The result reported in Table 4.3.A provides strong evidence for co-location of unorganised manufacturing industries sectors at the district level for both the pre- and post-reform periods. For instance, workers for every industry group are seen to have a statistically significant correlation with every other industry group, exceptions being for the tobacco industry for both the periods. In general, correlation coefficients are high for: 0.702 between transport and machinery; 0.602 between machinery and paper; 0.568 between metal and paper and 0.559 between machinery and metal in 1994-95. By 2005-06, the degree of co-location between these industry sectors has significantly declined (except between machinery and metal), while the industry sectors such as chemical and tobacco; furniture and leather and metal and woods which were not co-located in the earlier period have become co-located. However, the significant changes have taken place in case of transport and machinery (the highly co-located industry pair in 1994-95, become less co-located in 2005-06) and furniture and machinery (the low co-located industry in 1994-95, become highly co-located in 2005-06).

Viewed in terms of GVA, however, the correlations are higher for all the industry sectors, and more are statistically significant for both the periods. Similar to the workers, GVA in tobacco industry is generally not correlated with GVA in other industries: correlated only with chemical and metal in 1994-95, while leather and woods added to the list in 2005-06. By 2005-06 the degree of co-location has declined for all industry pairs, except 12 and 13 industry pairs out of 55 in terms of employment and GVA respectively. Further, the fact that GVA for almost all the industry group are highly co-located with every other industry sectors compared to workers could explain the case of high buyer-supplier linkages between the unorganised industry sectors than labour sharing linkages, a case that is observed for the organised manufacturing industries in India by Chakravorty, Koo and Lall (2005) for the post-reform period (1993-1998/99).

However, this requires further investigation on the issue to comment on whether the buyer-supply linkage or the labour sharing linkage is the dominant form of co-location of unorganised manufacturing industries in India.

4.8 Concluding Observations

In this Chapter we have examined the spatial concentration of unorganised manufacturing industries at three geographical scales- inter-state, inter-district and intra-state for the pre- and post-reform periods. We have also examined the regional industrial base and diversification pattern of unorganised manufacturing industries across the states and also tested for the existence of co-location of unorganised manufacturing industries at the district level during the same period. The major findings of the chapter are-

(a) Inter-state concentration of unorganised manufacturing industries has declined in all as well as 16 and 20 two-digit industries in terms of employment and GVA respectively in the post-reform period. At the three digit level, concentration has declined in as many as 43 out of 55 three-digit industries during the same period. Concentration is found to be high for high and medium-high technology industries such as accounting and computing machinery, electrical, electronics and communications, motor vehicles and transport equipment etc., whereas it is low for low technology industries such as food, beverages, and tobacco; textiles, paper and printing (except publishing); woods and furniture and leather and footwear etc.

(b) More or less same industries are also found to be highly concentrated at the district level. Inter-district concentration is high for office, accounting and computing machinery, radio, TV and communication equipments; medical, precision and optical instruments, watches and clocks; motor vehicles, trailers and semi trailers; basic metal and other transport equipment industries. Concentration has declined in all and as many as 12 and 17 two-digit industries in terms of employment and GVA in the post-reform period.

(c) Intra-state concentration of unorganised manufacturing industries is found to be high in Maharashtra and Gujarat, followed by Himachal Pradesh, Punjab, Orissa and Haryana; whereas it is low in Bihar, Uttar Pradesh, Andhra Pradesh, Tamil Nadu and Assam. On the average, intra-state concentration of unorganised manufacturing

industries is found to be positively associated with the level of development of the state; that is developed states are highly concentrated.

(d) There does not seem to be any change in the unorganised manufacturing base of the states. The unorganised manufacturing base of majority of the states is found to be in resource based traditional industries and demand-driven agro-based consumer goods industries for both the pre- and post-reform periods. Capital goods industries are mostly confined to the developed states like Maharashtra, Delhi and Haryana; and to some lesser extent Gujarat, Punjab and Madhya Pradesh.

(e) Notwithstanding majority of the states have diversified their unorganised manufacturing industrial structure in during 1994-95 to 2005-06, it appears that there has not been any significant overall change in level of regional diversification of unorganised manufacturing industries over the period. The degree of diversification of unorganised manufacturing industries is found to be positively correlated with the level of development of unorganised manufacturing industries and level of economic development across the states.

(f) The results provide strong evidences for co-location of unorganised manufacturing industries in terms of both employment and GVA for both the pre- and post-reform periods. Co-location is found to be higher and more statistically significant in many industry pairs in terms of GVA compared to employment. This could explain the case of higher buyer-supplier linkages between the unorganised industry sectors compared to the labour sharing linkages.

ANNEXURE 4.1: TABLES

Table 4.1.A: Measures of Inter-State Concentration of Unorganised Manufacturing Industries by the two digit industries- 1994-95 and 2005-06

Industry Sectors (NIC)	Spatial Herfindahl Index						Spatial Entropy Index[@]						Spatial Gini Index[$]					
	Employment		GVA		FA		Employment		GVA		FA		Employment		GVA		FA	
	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06	1994-95	2005-06
15	0.119	0.092	0.094	0.084	0.084	0.082	2.466	2.610	2.632	2.698	2.714	2.716	0.422	0.384	0.438	0.377	0.436	0.333
16	0.186	0.141	0.158	0.121	0.202	0.152	1.917	2.132	2.042	2.270	1.921	2.077	0.387	0.474	0.411	0.477	0.394	0.447
17	0.143	0.128	0.127	0.111	0.146	0.126	2.359	2.384	2.389	2.450	2.275	2.361	0.470	0.584	0.522	0.588	0.568	0.628
18	0.199	0.081	0.255	0.080	0.480	0.079	1.953	2.685	1.721	2.719	1.201	2.714	0.542	0.390	0.553	0.281	0.524	0.295
19	0.103	0.139	0.125	0.137	0.157	0.136	2.473	2.313	2.390	2.300	2.248	2.326	0.589	0.518	0.628	0.443	0.603	0.402
20	0.088	0.109	0.097	0.076	0.083	0.078	2.591	2.496	2.573	2.782	2.680	2.740	0.515	0.489	0.536	0.522	0.564	0.459
21	0.201	0.246	0.137	0.157	0.267	0.131	2.093	1.902	2.260	2.221	1.862	2.311	0.362	0.497	0.443	0.415	0.455	0.396
22	0.113	0.097	0.134	0.141	0.162	0.115	2.450	2.589	2.342	2.397	2.246	2.477	0.472	0.611	0.439	0.616	0.434	0.518
23	0.293	0.175	0.227	0.125	0.243	0.170	1.674	2.097	1.750	2.357	1.715	2.096	0.233	0.332	0.259	0.316	0.230	0.333
24	0.187	0.157	0.118	0.115	0.114	0.120	2.120	2.159	2.434	2.429	2.400	2.390	0.440	0.473	0.470	0.433	0.450	0.488
25	0.173	0.110	0.227	0.122	0.470	0.125	2.149	2.488	1.990	2.468	1.400	2.412	0.698	0.590	0.702	0.502	0.601	0.490
26	0.104	0.094	0.124	0.083	0.107	0.081	2.495	2.569	2.477	2.669	2.499	2.641	0.315	0.480	0.324	0.583	0.364	0.531
27	0.212	0.122	0.219	0.130	0.196	0.162	2.030	2.426	2.106	2.344	2.085	2.220	0.472	0.483	0.364	0.557	0.400	0.530
28	0.107	0.091	0.128	0.108	0.250	0.097	2.523	2.642	2.422	2.564	2.003	2.596	0.467	0.420	0.433	0.435	0.520	0.360
29	0.096	0.107	0.122	0.151	0.120	0.107	2.565	2.472	2.382	2.249	2.357	2.433	0.433	0.508	0.412	0.497	0.369	0.435
30	0.832	0.706	0.864	0.767	0.935	0.392	0.350	0.685	0.277	0.580	0.170	1.191	0.087	0.130	0.085	0.111	0.074	0.124
31	0.131	0.118	0.232	0.095	0.224	0.111	2.319	2.459	1.985	2.610	1.972	2.493	0.373	0.481	0.337	0.564	0.366	0.384
32	0.616	0.175	0.589	0.188	0.388	0.327	1.003	1.984	0.998	1.884	1.272	1.574	0.269	0.212	0.279	0.466	0.244	0.223
33	0.172	0.152	0.219	0.127	0.281	0.169	2.044	2.122	1.820	2.218	1.626	2.044	0.265	0.239	0.286	0.298	0.267	0.307
34	0.136	0.282	0.167	0.218	0.234	0.192	2.208	1.903	2.093	2.018	1.780	2.132	0.238	0.334	0.230	0.317	0.242	0.275
35	0.151	0.287	0.221	0.266	0.164	0.374	2.133	1.812	1.898	1.814	2.066	1.475	0.444	0.539	0.430	0.492	0.410	0.528
36	0.122	0.101	0.160	0.153	0.141	0.134	2.430	2.576	2.353	2.370	2.376	2.449	0.466	0.385	0.440	0.455	0.387	0.360
All	**0.094**	**0.087**	**0.091**	**0.082**	**0.112**	**0.084**	**2.587**	**2.654**	**2.626**	**2.724**	**2.525**	**2.686**	-	-	-	-	-	-

Table 4.1.A *(contd.)*

Industry Sectors (NIC)	Un-weighted Coefficient of Variation						Four-state Concentration Ratio						Four Leading states in terms of GVA	
	Employment		GVA		FA		Employment		GVA		FA			
	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994-95	2005-06
15	1.70	1.42	1.44	1.32	1.31	1.29	59.04	49.75	51.97	47.68	46.46	45.19	UP, WB, MAH, BIH	KAR, UP, WB, AP
16	2.26	1.53	2.04	1.73	2.38	1.56	76.52	65.29	71.91	60.96	76.63	70.14	WB, UP, AP, TN	WB, BIH, AP, TN
17	1.92	1.75	1.78	1.62	1.95	1.73	63.72	63.85	63.22	60.17	71.91	65.01	TN, UP, GUJ, MAH	MAH, TN, WB, UP
18	2.35	1.28	2.72	1.27	3.85	1.26	80.07	45.86	86.78	43.12	91.33	42.91	DEL, MAH, WB, TN	MAH, UP, TN, WB
19	1.54	1.65	1.76	1.87	2.04	1.58	56.20	61.32	61.05	65.04	66.12	63.44	UP, MAH, RAJ, BIH	WB, DEL, MAH, TN
20	1.37	1.61	1.48	1.21	1.31	1.24	46.36	58.69	51.03	42.66	44.31	43.93	MP, MAH, UP, WB	UP, TN, BIH, WB
21	2.37	2.32	1.87	2.04	2.79	1.50	71.80	78.03	65.99	65.36	76.68	65.23	MAH, WB, DEL, TN	TN, DEL, WB, MAH
22	1.64	1.45	1.84	1.90	2.08	1.63	59.30	51.94	64.78	62.01	67.69	58.28	MAH, UP, TN, WB	MAH, GUJ, TN, UP
23	2.94	1.51	2.54	1.76	2.65	1.48	83.69	75.30	86.39	62.01	85.56	72.37	WB, MAH, TN, KER	GUJ, MAH, TN, HAR
24	2.27	1.84	1.69	1.66	1.66	1.53	71.39	69.91	57.83	60.71	58.38	63.75	TN, KAR, PUN, MAH	TN, MAH, GUJ, KAR
25	2.17	1.43	2.55	1.73	3.81	1.57	68.86	56.79	73.25	59.12	84.23	60.59	MAH, GUJ, WB, DEL	MAH, KER, GUJ, TN
26	1.55	1.37	1.75	1.31	1.59	1.21	54.39	49.09	53.78	46.08	58.00	42.32	UP, BIH, RAJ, MAH	UP, RAJ, MP, TN
27	2.44	1.50	2.49	1.81	2.34	1.83	68.73	63.59	71.01	62.21	73.13	66.30	GUJ, DEL, UP, WB	DEL, MP, WB, TN
28	1.59	1.41	1.78	1.59	2.69	1.48	54.25	50.97	61.58	55.65	72.23	53.57	MAH, UP, GUJ, TN	UP, MAH, TN, BIH
29	1.46	1.37	1.73	1.99	1.71	1.36	51.95	55.79	61.28	67.59	61.24	56.95	TN, MAH, GUJ, PUN	MAH, GUJ, WB, TN
30	5.14	2.86	5.24	4.93	5.46	2.01	99.94	97.48	99.99	97.42	99.97	95.44	MAH, DEL, UP, BIH	KER, HAR, MAH, DEL
31	1.82	1.55	2.58	1.45	2.53	1.48	62.99	59.40	72.06	51.37	75.30	57.35	MAH, WB, DEL, TN	MAH, UP, HAR, WB
32	4.39	1.32	4.29	2.28	3.43	2.05	91.33	75.10	93.26	79.91	92.53	84.19	DEL, MAH, GUJ, PUN	DEL, KER, WB, GUJ
33	2.16	1.23	2.49	1.77	2.87	1.53	73.07	66.89	82.97	58.91	88.66	75.15	DEL, HAR, KAR, MAH	MAH, UP, WB, GUJ
34	1.86	2.27	2.12	2.48	2.59	1.67	67.36	73.56	73.82	75.57	84.85	68.31	DEL, MAH, WB, KAR	MAH, TN, HAR, MP
35	1.99	2.48	2.51	2.78	2.09	2.89	66.59	78.38	76.02	79.48	73.91	88.38	DEL, PUN, MAH, TN	UP, PUN, RAJ, DEL
36	1.73	1.49	2.06	2.00	1.90	1.81	59.51	55.00	62.29	63.98	64.17	56.87	GUJ, MAH, TN, UP	MAH, GUJ, WB, KER
All	**1.44**	**1.35**	**1.40**	**1.30**	**1.63**	**1.32**	**50.22**	**47.31**	**51.00**	**47.60**	**57.74**	**46.69**	**UP, MAH, TN, GUJ**	**MAH, UP, WB, TN**

Note: NIC codes are as per NIC 2004. For description of the industries see *Appendix-II.* For the description of state codes see *Appendix-III.*

[@] The entropy index takes a value between zero, implying highest concentration and $\ln(k) = \ln(25) = 3.219$ (k=observations) implying complete diversion

[$] The Gini index for the individual industry sectors is calculated relative to the average of the all industry. Therefore, we cannot calculate the figure for all industry

Source: Author's own computation using NSS unit level data on unorganised manufacturing sector

Table 4.2.A: Inter-district Concentration of Unorganised Manufacturing Industries by 2 digit Industry Sectors- 1994-95 and 2005-06

Industry Sectors (NIC)	No of Districts[#]		Coefficient of Variation						Spatial Herfindahl index						Spatial Entropy Index[@]					
			Employment		GVA		Fixed Assets		Employment		GVA		Fixed Assets		Employment		GVA		Fixed Assets	
	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06	1994 -95	2005 -06
15	433	431	1.65	1.64	1.39	1.76	1.41	1.37	0.008	0.008	0.006	0.009	0.007	0.006	5.35	5.40	5.46	5.38	5.50	5.51
16	212	194	5.40	3.73	4.63	3.44	6.75	5.27	0.067	0.033	0.049	0.028	0.103	0.064	2.65	3.83	2.22	3.97	1.53	3.52
17	392	359	2.56	2.66	3.18	3.43	4.55	4.24	0.017	0.018	0.025	0.028	0.048	0.042	4.41	4.52	4.06	4.22	4.03	3.98
18	167	429	8.30	1.41	10.06	2.38	14.27	2.25	0.154	0.007	0.226	0.015	0.452	0.013	2.86	5.50	2.32	5.22	1.52	5.17
19	283	210	3.43	5.96	4.56	5.39	5.98	7.04	0.028	0.081	0.048	0.067	0.081	0.112	4.15	3.39	3.75	3.46	3.71	3.19
20	426	424	1.57	3.14	3.22	1.34	2.19	1.81	0.008	0.024	0.025	0.006	0.013	0.009	5.34	5.00	5.07	5.49	5.15	5.26
21	146	173	5.00	8.54	6.25	6.00	10.25	5.98	0.057	0.164	0.088	0.082	0.234	0.082	3.56	3.08	2.91	3.31	2.19	3.29
22	281	314	3.87	3.32	4.59	5.72	5.96	4.59	0.035	0.027	0.049	0.075	0.081	0.049	4.17	4.46	3.59	3.79	3.32	3.96
23	54	40	5.75	7.38	5.72	6.66	5.69	7.37	0.075	0.123	0.074	0.101	0.074	0.123	3.12	2.66	3.01	2.80	3.02	2.54
24	195	205	5.00	4.98	4.02	4.44	5.07	4.40	0.057	0.057	0.038	0.046	0.059	0.045	3.67	3.55	3.88	3.83	3.57	3.73
25	169	191	6.36	3.98	8.26	4.89	13.50	5.04	0.092	0.037	0.153	0.055	0.405	0.058	3.36	3.90	2.91	3.63	2.06	3.55
26	382	372	1.95	1.81	2.91	2.28	3.73	2.98	0.011	0.009	0.021	0.014	0.033	0.022	5.12	5.18	4.90	4.95	4.56	4.79
27	123	133	7.97	4.12	8.27	6.98	7.63	7.99	0.143	0.040	0.153	0.110	0.131	0.144	3.12	3.72	2.95	2.92	2.92	2.84
28	392	411	3.38	2.23	4.98	3.65	8.92	3.36	0.027	0.013	0.057	0.032	0.178	0.027	4.64	5.02	4.11	4.44	3.22	4.38
29	331	251	2.23	3.62	4.67	6.16	4.31	3.92	0.013	0.031	0.050	0.086	0.043	0.036	4.92	4.28	4.08	3.43	4.01	3.92
30	4	11	16.99	17.57	18.62	18.41	15.40	13.08	0.640	0.687	0.768	0.754	0.526	0.382	0.67	0.75	0.47	0.63	0.73	1.25
31	142	261	4.42	2.64	7.65	3.37	7.75	3.49	0.045	0.018	0.131	0.027	0.135	0.029	3.72	4.62	3.06	4.29	2.95	4.24
32	35	42	16.62	8.00	16.24	8.57	13.06	11.89	0.612	0.144	0.584	0.165	0.379	0.316	1.18	2.49	1.13	2.21	1.38	1.82
33	42	54	8.47	5.47	9.74	5.42	11.14	6.31	0.161	0.069	0.212	0.067	0.276	0.091	2.38	3.09	2.04	3.01	1.81	2.82
34	41	79	6.62	9.58	7.38	7.35	9.25	6.10	0.099	0.206	0.123	0.122	0.191	0.085	2.74	2.68	2.59	2.84	2.16	3.16
35	94	106	7.04	10.30	9.42	10.18	7.20	12.51	0.112	0.237	0.198	0.232	0.117	0.349	2.99	2.39	2.49	2.30	2.80	1.79
36	422	424	3.95	2.75	4.80	6.09	5.35	5.58	0.037	0.019	0.053	0.085	0.065	0.071	4.51	4.89	4.27	4.16	4.03	4.31
All	**435**	**435**	**1.49**	**1.35**	**2.40**	**2.20**	**4.11**	**2.37**	**0.007**	**0.006**	**0.015**	**0.013**	**0.039**	**0.015**	**5.42**	**5.50**	**5.12**	**5.27**	**4.70**	**5.12**

Note: NIC codes are as per NIC 2004. For description of the industries see *Appendix-II.*

[#] Indicates the number of districts that have the particular industry

[@] The entropy index takes a value between zero, implying highest concentration and $\ln(k) = \ln(435) = 6.075$ (k=observations) implying complete diversification.

Source: Same as Table 4.1.A

Table 4.3.A: Correlation Coefficients for Industry Pairs- 1994-95 and 2005-06

Industry Sectors	1994-95										
	Food	**Tobacco**	**Textile**	**Leather**	**Woods**	**Paper**	**Chemical**	**Metal**	**Machinery**	**Transport**	**Furniture**
Food	**1.000**	0.195*	0.383*	0.307*	0.188**	0.412*	0.429*	0.347*	0.490*	0.288*	0.284*
Tobacco	0.265*	**1.000**	0.048	-0.017	0.045	0.031	0.291*	0.221*	-0.008	-0.012	0.019
Textile	0.237*	0.116**	**1.000**	0.424*	0.212*	0.643*	0.467*	0.510*	0.623*	0.543*	0.506*
Leather	0.134**	-0.024	0.201*	**1.000**	0.230*	0.589*	0.516*	0.546*	0.529*	0.372*	0.246*
Woods	0.394*	0.138**	0.207*	0.056	**1.000**	0.312*	0.286*	0.291*	0.240*	0.057	0.169**
Paper	0.273*	0.065	0.532*	0.437*	0.182**	**1.000**	0.655*	0.721*	0.791*	0.486*	0.356*
Chemical	0.319*	0.098	0.373*	0.296*	0.356*	0.495*	**1.000**	0.883*	0.608*	0.270*	0.278*
Metal	0.179**	0.103**	0.320*	0.359*	0.084	0.568*	0.402*	**1.000**	0.700*	0.361*	0.306*
Machinery	0.152**	0.061	0.389*	0.403*	0.050	0.602*	0.382*	0.559*	**1.000**	0.599*	0.334*
Transport	0.061	-0.017	0.311*	0.346*	-0.001	0.418*	0.196**	0.348*	0.702*	**1.000**	0.173**
Furniture	0.121**	0.030	0.305*	0.091	0.121**	0.278*	0.168**	0.182**	0.180**	0.117**	**1.000**
	2005-06										
Food	**1.000**	0.133**	0.218*	0.129**	0.198**	0.143**	0.235*	0.182**	0.150**	0.126*	0.137**
Tobacco	0.204*	**1.000**	0.091	0.153**	0.193**	0.080	0.114**	0.116**	0.015	0.017	0.007
Textile	0.343*	0.076	**1.000**	0.500*	0.166**	0.473*	0.451*	0.506*	0.552*	0.200*	0.456*
Leather	0.117**	-0.004	0.343*	**1.000**	0.108	0.570*	0.307*	0.437*	0.578*	0.146**	0.424*
Woods	0.247*	0.130**	0.115**	-0.008	**1.000**	0.137**	0.257*	0.185**	0.090	0.063	0.095
Paper	0.087	0.004	0.236*	0.405*	0.067	**1.000**	0.513*	0.435*	0.726*	0.162**	0.770*
Chemical	0.267*	0.144**	0.361*	0.179**	0.227*	0.429*	**1.000**	0.362*	0.482*	0.083	0.477*
Metal	0.154**	0.063	0.412*	0.350*	0.135**	0.267*	0.296*	**1.000**	0.464*	0.182**	0.380*
Machinery	0.094**	-0.030	0.423*	0.499*	-0.002	0.303*	0.201*	0.529*	**1.000**	0.149**	0.800*
Transport	0.060	-0.015	0.141**	0.105**	0.001	0.072	0.028	0.148**	0.135*	**1.000**	0.102**
Furniture	0.172**	0.063	0.362*	0.380*	0.114**	0.294*	0.252*	0.376*	0.513*	0.092	**1.000**

Note: * and ** Significant at 1 and 5 percent level

Above the diagonal figures are based on GVA and below diagonal figures are based on Employment data

Source: Same as Table 4.1.A

Chapter 5

Determinants of Location of Unorganised Industries in India

5.1 Introduction

The preceding chapters dealt with examining the trends and patterns of regional distribution and the degree of spatial concentration of unorganised manufacturing industries in the pre- and post-reform periods. We have seen what types of unorganised manufacturing industries are concentrated where and that the spatial concentration has declined in the post-reform period. However, the observed decline is marginal and the degree of concentration is still very high and divergent across the States. Given the findings, the important questions that arise are: first, what are the factors influencing the location of unorganised manufacturing industries in India? Secondly, what are the implications of the observed pattern of industrial location for comparative regional development in India? Both the questions are interrelated in that understanding the logic behind the location of new enterprises is very important to understand the prospect of comparative regional development. Therefore, to reach at a conclusion of the later, it is important to understand the former.

In this chapter we identify the factors that influence the location of unorganised manufacturing industries at the district level. At this point it is worthwhile to start with identifying the factors that determine industry location decisions. From the literature (Chapter 2) one could locate a large number of (overlapping) factors that influence industrial location, which can be classified into two groups: first nature geography and second nature geography.[1] In principle, the most important factors that influence firm's location are enhance market access, availability of infrastructure, economic diversity, agglomeration economics (in the form of localisation economics arising from knowledge spillover and intra-industry linkages; urbanisation economics arising from inter-industry linkages, access to specialised services, a diverse labour pool, general social infrastructure and urban amenities), state regulations on labour, land, environmental and pollution standards, incentives in lagging regions and the general level of political support, and historical forces (see Webber, 1984; McCann, 1998; Badri, 2007; Chakravorty and Lall, 2007).

[1] See Krugman (1991b and 1993a) for the terms "first nature geography" and "second nature geography".

Two broad approaches have been extensively used in the empirical literature to identify the factors influencing firm location: survey-based approach and econometric modelling approach (World Bank, 2004). In the survey-based approach, which is similar to the investment climate survey (ICS), the decision-makers are asked to identify factors influential in their location decisions and inferences are drawn from their responses. Since the present study is based on secondary data, there is no possibility of using the survey-based approach. The modelling approach is used to identify the revealed preferences based on region specific characteristics. There are several ways in modelling industrial location. One of the most used approaches is the estimation of cost or production function. This modelling approach is used to examine how the cost or productivity (and thereby profits) is impacted by the factors that influence firm's location decisions (see Lall, Shalizi and Deichmann, 2001; Lall, Koo and Chakravorty, 2003; Lall and Chakravorty, 2005).[2] Drawing upon the duality theorem this approach assumes that a profit maximising firm chose a location which will maximise its profits either through minimising costs or increasing productivity. Another commonly used approach is estimation of determinants of industrial location using ordinary least square (OLS) or logistic regression models, where spatial concentration of industry is taken as dependent variable and other factors that influence location decisions as explanatory variables (see Kathuria and George, 2005; Chakravorty, 2003a; Chakravorty and Lall, 2007). We have followed the second alternative. For doing this, we first explain the factors that influence firms' location decisions and the mechanism through which agglomeration occurs. Then we estimate the factors using OLS regression method with district level data for unorganised manufacturing industries for the year 2005-06.

The remaining of the chapter is organised in the following sections. Section 5.2 outlines a framework of analysis of firm location. This is followed by a review of existing studies focusing on the determinants of industrial location in India in section 5.3. Section 5.4 explains the model specification and the variables considered for analysis and construction of the variables. The database and estimation of econometric models are explained in sections 5.5 and 5.6 respectively. Section 5.7 reports the empirical results and, finally, section 5.8 summarises the major findings.

[2] The estimation of cost or production function is based on the assumptions related to the erogeneity of key variables, particularly output. In a production function, output is endogenous and input quantities exogenous, whereas within the dual cost function, input prices and the level of output are exogenous (Lall et al., 2001).

5.2 A Framework of Analysis

The analytical framework to examine the location of unorganised manufacturing industry in India is primarily based on the new economic geography (NEG) literature.[3] Krugman (1991a, 1991b and 1993a) and Fujita et al. (1999) have analytically modelled increasing returns based on the pecuniary externalities (labor market pooling, input-output linkages and migration induced demand linkages), monopolistic competition and transport (including transaction) costs. These models emphasised the importance of intra- and inter-firm spillover and transport costs in determining location decisions.

Based on Fujita and Thisse (1996) and Fujita et al. (1999) we model firms to benefit from externalities arising from being co-located with other firms. If $a(x, y)$ is the benefit to a firm at location x obtained from a firm at location y and $f(y)$ denotes the density of firms at each location $y \in X$, then

$$A(x) = \int_x a(x, y) f(y) dy \tag{5.1}$$

where, $A(x)$ represents the aggregate benefit that a firm at location x can enjoy from the externalities created in location x. Assuming that production utilises land (S_f) and labour (L_f), with rents and wages of $R(x)$ and $W(x)$ respectively at location x, a firm located at $x \in X$ would maximise profits subject to-

$$\prod(x) = A(x) - R(x)S_f - W(x)L_f \tag{5.2}$$

Thus, as an aggregate term, the density of firms at each location $f(y)$ represents regional economic attributes based on intra- and inter-industry relationships (i.e. economic geography). The concentration of firms in the same industry (or localisation economies) provides benefits from sharing of specialised input factors, skilled labor and knowledge, intra-industry linkages, and opportunities for efficient subcontracting. Adding to these supply side linkages, localisation economies are also realised on the demand side in the form of reduction of information asymmetries for consumers as well as attracting price and quality comparison shoppers (Lall et al, 2001). These location-based externalities benefit firms from locating near large concentrations of other firms in their own industry. There are considerable empirical evidences from various cross

[3] Note that the NEG framework is a general framework for location decisions of all economic activity or firm, not particularly for the unorganised manufacturing industries. We use the framework for the location of unorganised manufacturing industries with the assumption that the location dynamics of unorganised manufacturing industries is not different from any other economic activity or firms.

country and country-specific studies for the positive effect of localisation economics on industry concentration (see Henderson, 2000; Ciccone and Hall, 1995).

In addition to intra-industry linkages, firms benefit from locating in close proximity to firms in other industry i.e. from inter-industry linkages. The benefits from inter-industry linkages include sharing valuable information on their products, reduced transport costs through buyer-supplier linkages for intermediate goods, availability of general infrastructure such as telecommunications and transportation network, market hubs etc. The so called urbanisation economies also arise from the economic diversity of a region. Firms located in large metro areas, which are more diverse, are benefited not only from inter-industry technology spillovers, but also from easier access to business services such as banking, advertising, and legal services; heterogeneity of economic activity, increased range of local goods, increased output variety in the local economy etc. Thus, the benefits arising from intra- and inter-firm spillovers provide incentives for the firms to locate close proximity to each other, leading to agglomeration (Fujita and Thisse, 1996).[4]

Apart from the benefits from inter-firm externalities, transport costs are important in determining the location choice of firms. At a higher transport costs economic activities are dispersed, whereas at a lower transport costs firms are randomly distributed, as proximity to markets or suppliers will not matter.[5] Krugman (1991a) and Fujita and Thisse (1996) have pointed out that agglomeration occurs at the intermediate transport costs when the spatial mobility of labor is low. Therefore, the relationship between spatial concentration and transport costs takes an inverted-U shape as shown in Figure 5.1. Including the transport costs in firm's location decision, we can write equation (5.2) as-

$$\prod(x) = A(x) - R(x)S_f - W(x)L_f - TC(x) \qquad (5.3)$$

Where, $TC(x)$ represents the transport costs of the firm at location x. With a decline in transport costs, firms have an incentive to concentrate production in a few locations to reduce fixed costs. Transport costs can be reduced by locating in areas with

[4] However, the benefits from intra- and inter-industry concentration can be offset by costs such as increased competition between firms for labor and land causing increased wages and rents, increased transport costs due to congestion effects, etc. Henderson et al. (2001) observed that most manufacturing activities cannot afford the cost of wages and rents in large metropolitan areas. Lall et al. (2001) maintained that the net benefits of own- and inter-industry concentration may be marginal for sectors with low skilled labor and standardised technologies.

[5] In the extreme case, under autarky, every location must have its own industry to meet final demand.

good access to input and output markets. This provides benefits not only from inter-industry, but also from higher productivity, increased demand for firm's product and easier access to producer services such as legal services, banking etc. Thus, access to markets is a strong driver of agglomeration of locations, where transport costs are relatively low. In addition, availability of high quality infrastructure linking firms to urban market centers plays important in minimising cost of production by lowering transport costs of inputs and outputs. Besides, it generates consumer surplus by reducing cost of consumption thereby improving the general quality of life, increases the probability of technology diffusion through interaction and knowledge spillovers among firms, and also increases the potential for input diversity. Therefore, a location with high quality infrastructure attracts more private investment (Lall et al., 2001). Further, Henderson et al. (2001) pointed out that activities with increasing returns at the plant level are pulled disproportionately towards locations with good market access, since transport costs are low enough in these locations so that it is relatively cheap to supply markets due to availability of quality transport networks.

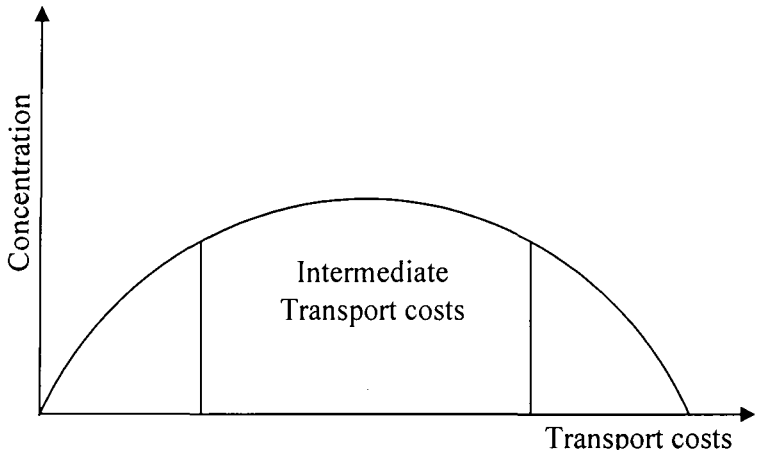

Figure 5.1: Transport Costs and Spatial Concentration of Economic Activity
Source: Adapted from Fujita et al. (1999)

Thus, the analytical framework in this chapter, following the NEG literature; suggest that the economic geography of a region plays important role in firm's location decisions. In short, the NEG literature suggest that Intra- and inter-industry concentration, the availability of reliable infrastructure to reduce transport costs and enhance market access, regional amenities, and economic diversity are important for influencing location and agglomeration of industry (Lall and Chakravorty, 2005).

One of the drawbacks of the NEG framework is its presumption that all the location decisions are made in the private sector by the profit maximizing firms; and thus, the state owned industries are neglected. But, in many countries, especially developing countries, the state has played an important role in industrialisation as industrial owner and location regulator (see chapter 2 for a discussion). The reasons why the consideration of location of state owned industry is important are summarised in Chakravorty and Lall (2007): first, state decisions on industry location are not always profit driven; secondly, state still owns the commanding heights of the industrial sector in many developing countries; and thirdly, state industrial location decisions have considerable influence on the location decisions of private firms, mainly through provision of shared infrastructure and localisation economies. In addition there are some industries, say security or defense related industries, which are under the control of the state, and are not dictated by market forces.

Further, by considering only the economic geography variables as the determinants of firm's location decisions, the NEG framework neglects the importance of factors such as the natural advantage of a region, factor and resource endowments, level of economic development of a region, level of agricultural development, human capital, local and national policy environment (e.g. local taxes, subsidies and incentives; regulations related to labour, land, environmental and pollution etc.) and several others. Studies have also recognised the importance of these factors in determining location decisions, some of which have been discussed in chapter 2 and some others will be discussed elsewhere. Therefore, in the present study we include both the economic geography and other general location factors in the same framework of analysis.

In conclusion, it should be noted that the influence and magnitude of these factors may vary from industry to industry, and for the same industry it may vary from place to place and within the same place from time to time. Further, all these factors operate in a mutually interdependent way, so that it is difficult to postulate a unidirectional causal relationship among them. However, whatever be the factors, either natural, or historical, or geographical, or economic, or political; the regional industrialisation is a sequential process: once an industrial activity starts in a particular location, it gets accentuated due to the "snow-balling effect" via migration, inter-regional trade, transfer of capital (including human capital) etc. (Awasthi, 1991).

5.3 Existing Empirical Evidences

The review of existing studies in Chapter 2 reveals that these studies have provided evidences for a wide range of factors as the determinants of industrial location in India, which can be classified into three groups namely historical forces, political economy and market forces. We have seen that while the earlier studies have largely focused on the natural advantages, industrial development during colonial period and more importantly public policies as determinant of industrial location (Sastry, 1970; Roth, 1970; Ahmed, 1974; Sekhar, 1983; Ramadhyani, 1984); more recent studies have focused on the market forces as the only factors that influence industrial location (Chakravorty, 2003a, b; Chakravorty et al., 2003, 2005; Lall and Chakravorty, 2005, Lall et al., 2001; Lall et al., 2003; Kathuria and George, 2005). We stop with the statement that "both the historical process and clustering of industries are found to have played important role in determining firm's location decisions in India in the post-reform period". In this section we will discuss, drawing upon the existing literature, the role of market forces, especially agglomeration forces, in determining industrial location in India.

Inspired by the development of NEG models, examining the role of economy geography i.e. market access and spatial agglomeration forces represented by intra- and inter industry spillovers and diversity of economic activity in the region etc. has become the major focus of most of the recent studies relating to the spatial aspects of industrialisation in India. In a pioneering attempt, Chakravorty (2003a) examined the determinants of new investment in the organised manufacturing sector by using regression techniques (OLS and logistic regression) on a set of explanatory variables like capital, labor, physical and social infrastructure, regulation and spatial attributes (coastal and metropolitan) at the district level in the post-reform period (for 1998-99). The major finding of the study was that both the existence and quantity of new industrial investments at the district level are largely determined by the existence and size of investment in the pre-reform period and that of new investment in the neighbouring districts. The study found positive and significant impact for the variables like district population, available industrial labour force, capital intensity and coastal dummy; whereas no significant impact for variables like availability of industrial credit, productivity of capital, social infrastructure (literacy and infant mortality rate) and physical (road, air port and close to port) and metropolitan dummy.

Using the same data set and same explanatory variables Chakravorty (2003b) and Lall and Chakravorty (2005) have examined the differences in the location factors of private and state industrial investment and found that : (a) both the continuity (quantity of investment in the pre-reform period) and clustering of new investment in the neighbouring districts have played significant role in determining private sector investment, while clustering effect is not significant in public industrial investment; (b) labour considerations play a significant role in the private sector location decision, but it is less important in public investment decision; and (c) infrastructure variable is significant for private sector investment, but not significant for public investment.

Although, extensive focus has been given on the spatial agglomeration forces in most of the recent studies, the evidences are varied and inconclusive about the sources and magnitudes of agglomeration economies between industry sectors, except for the economic diversity variable. Many studies have observed significant impact of economic diversity on industry location (see Lall et al, 2001; Lall and Chakravorty, 2005; Lall et al, 2003). For instance Lall et al. (2003) found that local economic diversity, expressed as industry mix in the district, has significant cost reducing benefits for all and eight individual industry sectors considered for analysis, and that the effect is highest for the small size firms than the medium and large size firms, implying that they can rely on location based externalities to a larger extent than medium and big firms. However, evidences in favour of the significant impact of localisation economies and urbanisation economies are very negligible. Chakravorty, Koo & Lall (2003, 2005) have found little evidence in support of localisation economies (either via local labor markets or via local buyer-supplier networks) within three Indian metropolises namely Mumbai, Chennai and Kolkata. Subsequent studies by Lall and Chakravorty (2005) and Lall et al. (2003) have found that both the localisation and urbanisation economies either have no benefits or in some instances their magnitude is very small. On the contrary, Lall and Mengistae (2005) have observed significant impact of localisation economies from clustering of firms in the same industry on industry location, and they observed higher magnitude of effect for the technology-oriented industry sectors. However, the evidences for localisation and urbanisation economies are inconsistent across the industries. For instance, Lall et al. (2001) have found that localisation economies (expressed as own industry employment in the district) have significant positive impact in electronics and computer equipment, basic metals and machinery and equipment sectors and negative impact in non-metallic mineral products sector; whereas urbanisation economies (expressed as urban density and

inter-industry input-output linkages) have significant negative impact beverages and tobacco and textiles sectors. Similarly, Koo and Lall (2004) have found positive and negative impacts of localisation economies (measured by district level location quotient) in 3 and 6 (out of 18) manufacturing sectors respectively; whereas the same for urbanisation economies (expressed as urban density) in 2 and 5 manufacturing sectors respectively. The presence of both positive and negative impact of localisation and urbanisation economies imply that both these externalities are subjected to the centrifugal forces as well as centripetal forces of economic geography, and their influence is different for different manufacturing sectors. Further, the probable reason for absence of considerable localisation and urbanisation economies in India, according to many researchers, could be the low technology and skill level of the manufacturing industries in India (Deichmann et al, 2008).

Similarly, the evidences for market access are also mixed across industry sectors. While in principle, good market access is likely to have cost reducing impact on the one hand, and productivity increasing impact on the other; Lall and Chakravorty (2005) for India have found that market access has significant cost reducing impact only for two industry sectors, namely metals and mechanical machinery. On the other hand, Lall et al. (2001) have observed that firms benefit from internal scale economies driven by market accessibility. Using two different indicators for market access viz. market accessibility and proximity to transhipment hubs, they found significant positive impact for leather products and electronics and computer equipment sectors, and negative impact for non metallic mineral products and machinery and equipment sectors.[6] Similarly, using the same indicators, Koo and Lall (2004) have found that market access and distance to transport hubs have significant impact in production activities in six and ten industries (out of 18 two digit industries) respectively.

The availability of a well developed transportation network, which is important for an improved market access, is also found to have mixed evidence across industries. Lall and Mengistae (2005) have addressed the transportation infrastructure issue by using proximity to international ports for cities in India, and found positive and highly significant impact on location decisions. However, Chakravorty (2003a) has found little overall significant evidence for infrastructure variable in determining the location of new

[6] The net effect of improved market access need not be positive always. This is because, improved market access not only increases demand for firms products and enables investment in cost saving technologies, and thus increase profitability; but it also increases competition with other domestic firms as well as products mad internationally, which reduced the monopoly power of firms in the region (Lall et al., 2001).

industrial investments. Using physical infrastructure index, expressed as an index of access to national highways, ports, and airports, Chakravorty found that the index appeared to be positive and significant in the all industry, and textiles, and utilities sectors. The mixed results for the transportation networks could probably be an artefact of the way in which the variable for transportation infrastructure is constructed (Chakravorty, 2003a); or due to the sources of industrial investment, according to Chakravorty (2003a) and Lall and Chakravorty (2005). Using the same infrastructure index and the same data set, the latter two studies have observed that physical infrastructure plays a positive role in attracting private sector investment, whereas it has no bearing on location of central government industrial investment.

The role of social infrastructure on industrial location has also been a major concern for many authors, as there has been a wide disparity across the Indian states and areas within the states in terms of social development. But, these studies came out with the findings that social infrastructure (expressed as literacy and infant mortality rate) has no role to play on industrial investment decisions, irrespective of sources of investment (see Chakravorty, 2003, lall and Chakravorty, 2005).

Among other location factors tested for Indian industrial sector, the important ones are factor prices, availability of utility services and local regulations related to labour, land use and environment and pollution related issues, which are found having significant negative impact on industrial location. It is expected that a high factor prices (e.g. wage rate, interest rate, land rent etc.) would have negative impact on firm's location decision. The empirical support for this hypothesis is provided by Lall and Mengistae (2005), which found that cross-city wage rate variation has a strong negative effect on industrial investment in high-technology sectors, but no effect in low-technology sectors. Enquiring the importance of easy availability of power and electricity, Mani, Pargal, and Huq (1997) have found that state-level power shortages and high energy prices have significant negative impact on firm location decision. Similarly, Kathuria and George (2005) also found significant negative effect of high electricity tariff on industry location across Indian states.

Lall and Mengistae (2005) using firm level data from the Investment Climate Survey (ICS)[7] across Indian cities for 2003 along with establishment level data from the

[7] The ICS survey of 2003 has covered a random sample of 1,860 manufacturing establishment from 40 cities in 12 major Indian states (e. g Andhra Pradesh, Delhi, Gujarat, Haryana, Kerala, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh, and West Bengal). The survey collected

ASI for 1998-99 found that the local business environment (expressed in terms of labor regulations, enforcement of business regulations, electricity, transport, access to land, access to finance and factor prices) has significant bearing on business location decisions. In particular, they observed that excessive regulation of labor and predatory enforcement of business regulations reduce the probability of a business locating in a city, whereas better access to finance and to land and greater availability of infrastructure attract firms to a city. Subsequent studies, Chakravorty, Koo & Lall (2003, 2005) have also found considerable evidence for significant impact of regulations related to land use pattern on industry location decisions within three Indian metropolises namely Mumbai, Chennai and Kolkata. Their major conclusion was that intra-metropolitan industrial location decisions are significantly influenced by the land-market rigidities created by state regulations, rather than market opportunities in the form of localisation economies. However, all types of regulations have not significant impact on industry location. For example, Mani et al (1997) have examined the impact of environmental regulation on industrial location across 14 Indian states for 1994 and used measures of the stringency of enforcement across states. Using a conditional logit model, they found that after controlling for other variables, the enforcement of environmental regulation has no effect on industrial location. On the other hand, Besley and Burgess (2004) found significant impact of the direction of labour regulations on manufacturing development in India. Considering the state level amendments of the Industrial Dispute Act of 1947 between 1958 and 1992, and coding these amendments as pro-worker, neutral and pro-business, they found that states with pro-worker labor regulations have higher number of workdays lost due to strikes and lockouts, and that pro-worker labor regulations has resulted in reduction of output, employment, investment and productivity in the registered manufacturing sector, and moved economic activity from registered to unregistered manufacturing. Similarly, from a survey of 1000 manufacturing establishments from 10 Indian states Dollar, Iarossi and Mengistae (2002) have found that managers would be willing to reduce their work force by 16-17 percent if there was greater labor market flexibility, indicating the negative impact of labor regulation on firm productivity (cited in Lall and Mengistae, 2005). So, it seems that regulations related labour have significant impact on the industrial location in India. In general, states which have passed pro-labour

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information for eight manufacturing sectors, viz. garments, textiles, leather, drugs and pharmaceutical, electronic goods and equipment, electrical white goods, auto parts, and food processing.

regulations are less attractive for industrial investment, compared to pro-employer or neutral states.

These and several other factors, some of which are discussed in Chapter 2, have been discussed in the existing literature as determinants of industrial location in India. Although, the findings of these studies are robust, they are partial in the sense that these studies tried to examine the location of industries in terms of a small set of variables. For example, studies such as Chakravorty et al. (2003, 2005), Lall et al. (2001), Lall et al. (2003), Koo and Lall (2004) and Lall and Chakravorty (2005) have considered only four economic geography variables namely localisation economies, urbanisation economies, economic diversity and market access. However, Lall and Mengistae (2005) have pointed out that inclusion of only economic geography variables in the analysis results in overestimation of the magnitudes of these variables, unless the other location factors are not considered as correction factors in the model. The fact that the list of factors influencing industrial location is exhaustive (see Webber, 1984, McCann, 1998; Badri, 2007 for an extensive review of location factors) and apart from the observed factors, there are several unobserved factors, which are considered by the entrepreneur but not observed in the data. Awasthi (1991) remarked that any attempt to examine the determinants of industrial location is most likely to remain incomplete or partial at best, until and unless all or most of the variables are taken into consideration. Therefore, in this exercise we tried to incorporate as many variables as possible, covering different aspects of firm's location choice.

5.4 Model Specification and Choice of Variables

5.4.1 Model Specification

Throughout our work we have argued that firms tend to locate near to existing concentration of other firms, that is existing concentration of firms in proximate areas plays important role in firm's location decision. In other words, intra- and inter-industry concentration plays important role in firm's location decision. These two forces, in turn, depend on a number of factors that we have discussed earlier. Therefore, location of an industry (*I*) in a region (here District) can be expressed as a function of a set of variables representing economic geography (*EG*), factor and resource endowments (*F*),

Infrastructure (*Infra*), political economy (*P*) and spatial attributes of the region (*S*).[8] Formally, the functional form can be written as-

$$I = C + EG + F + Infra + P + S + u \quad (5.4)$$

where, C (the intercept term) and u (the random error term) are interpreted in the usual way. More precisely, the random error term (u) in the model explains the impact of the unobserved factors on industry location decisions.

5.4.2 Choice of Variables

Though we have come across a long list of factors that determine industrial location decisions throughout the analytical framework and the review of existing empirical studies, the lack of adequate and reliable database for some variables such as inter-regional trade, intra- and inter-industry linkages, agglomeration economics, etc. and difficulties in quantifying some other variables such as local entrepreneurship, entrepreneur's interest, government's attitude and others with respect to the unorganised sector limit the scope of selection of variables. In this section, given the data constraints, we explain the construction of the variables included in the analysis.

To define the presence as well as size of unorganised manufacturing industry in a location (here district) we have used three variables: per capita gross value added (*PCGVA*), per capita fixed assets (*PCFA*) and total employment (*EMP*) at the district level. All these variables are expressed in logarithmic scale and they depend on the sectors (e.g. rural and urban) and types of enterprise (e.g. OAME, NDME and DME) being modelled. That is when all industry is considered *PCGVA, PCFA* and *EMP* are for all industry as a whole; and they are $PCGVA_{OAME}$, $PCFA_{OAME}$ and EMP_{OAME} when only OAME enterprises are considered. Similar is the case for the models for NDME and DME enterprises and models for rural and urban sectors.

[8] It should be noted that in addition to the observed attributes, it is possible that firms also optimise their decision based on a set of unobserved attributes, i.e. those that are considered by the entrepreneur but not observed in the data. The presence of these unobservable local attributes complicates the estimation procedure, particularly in identifying the contribution of agglomeration forces to firm's location decisions. However, such factors are not possible to include in the empirical models because of lack of appropriate indicators to represent these factors. Therefore, the analytical framework in the preceding section and the empirical model in this section presume that these factors do not have any significant impact, rather a set of variables representing market forces, political economy and spatial attributes of the regions are supposed to matter in Industry location decisions.

A. Economic Geography

(i) Existing Industry Location: It is argued that industries tend to concentrate where industries are concentrated, that is the historical concentration process plays important in industrial location. This is mainly because of the inter-industry spillovers enjoyed by the firms from being close to the other firms. The theorisation of inter-industry economies was provided by Marshall (1920), Arrow (1962) and Romer (1986), who pointed out that cost saving externalities (so called MAR externalities) are maximised when a local industry is specialised. Therefore, it is hypothesised that if the industry is subjected to MAR externalities, they are likely to locate in a few locations where other industry are already clustered. To measure the existing location of industries, we use statistics on presence and size of unorganised industry in the district in an earlier time point, i.e. we use data on per capita GVA, per capita fixed assets and total employment for the year 1994-95.[9] It should be noted that the variable depends on the type of enterprise and sector being modelled. For instance, when we modelled for all industry then we will use data for all industry, and when we modelled for OAME we will use data for only OAME enterprises; and similarly for NDME and DME enterprises and rural and urban sectors.

(ii) Urbanisation Economies: In principle, urban concentration is regarded as an important contributor to economic efficiency as the spatial concentration of economic activity leads to the conservation of economic and social infrastructure. The benefits from urbanisation economies include inter-industry linkages, access to specialised financial and professional services, and availability of general infrastructure such as telecommunications and transportation hubs (Lall et al, 2003). The scale economies from urbanisation arise from the overall size of urban agglomeration, which includes not only the number of firms, but also population, income, output and wealth etc. In our study, we use urban population size i.e. the percentage of urban population in the district as an indicator of urbanisation economics.

(iii) Economic Diversity: In addition to the buyer-supplier linkages, economic diversity is another source of inter-industry linkages, which provides a summary measure of urbanisation economics that accrue across all the industries and provide benefits to firms

[9] This variable depends on the dependent variable used for estimating the model. For instance, if we use per capita GVA (for 2005-06) as dependent variable, then this variable will be represented by per capita fixed assets for 1994-95. Similarly, for the models estimated for per capita fixed assets and total employment.

in the agglomeration. Chinitz (1961) and Jacobs (1969) argued that the diversity of local industry mix is an important factor for realising the externality benefits arising from important knowledge transfers across the industry sectors, and therefore, industries with such inter-industry linkages are likely to concentrate in more diverse areas. According to Chakravorty and Lall (2007) the benefits of locating in a large diverse area go beyond the technology spillovers argument, arising from access to business services such as banking, advertising, and legal services, heterogeneity of economic activity, increased range of local goods, increased the output variety in the local economy etc. The use of economic diversity over input-output linkages as an indicator of inter-industry linkages is more reasonable in our study because our focus is on the unorganised industry, which is characterised by low technology and skills. Because of the fact that technology spillovers are irrelevant in low-technology firms (Lall and Mengistae, 2005; Deichmann et al., 2005 and Chakravorty et al, 2005), the benefits from economic diversity is much more than the inter-industry technology spillovers in case of unorganised industries.[10] To examine the degree of economic diversity in the district we have used the Herfindahl diversity index, which is obtained by subtracting the Herfindahl specialisation index from unity.[11] Symbolically, $HDV_k = 1 - H_k$, where H_k is the Herfindahl specialisation index, defined as the sum the squared output (GVA) shares of all two-digit industry sectors in the district (that is, $H_k = \sum s_i^2$).

(iv) Market Access: From the theoretical point of view, improved access to markets increase the demand for a firm's products, thereby providing incentives to increase scale and invest in cost reducing technologies, which in turn increases productivity. Access to market is determined by the distance from and the size and density of market centers in the vicinity of the firm (Lall et al, 2001). There are several ways to measure the market access, of which the commonly used indicators are market accessibility, distance from transhipment hubs, market size and so on. Because of the data limitations on different distance variables between market centres for construction of market accessibility index

[10] Lall and Mengistae (2005) using data from the 2003 round of investment climate survey across Indian cities observed that inter-industry spillovers are highest for technology-intensive sectors. Similarly, Deichmann et al. (2005) for Indonesia found that inter-industry linkages are higher for high-technology industries (office computing) and lowest for footloose industries (garments and textiles). Lall et al (2003) pointed out that the benefits like heterogeneity of economic activity, increased range of local goods and increased the output variety in the local economy etc. are more important in developing countries, where most manufacturing industries are based on low skills and low wages, but abundant local labor forces.

[11] A higher value of Herfindahl specialisation index implies less diversity. Therefore, we subtracted the Herfindahl specialisation index from unity to get Herfindahl diversity index.

and distance from transhipment hubs, we use the third alternative way i.e. market size to measure market access. We use the total population size and population density in the district to measure the impact of market size on industry location.[12]

B. Factor and Resource Endowment

(i) Level of Economic Development: It is argued that industrialisation progress with the level of economic development of the region. Therefore, we expect positive impact of the level of economic development of a district on location of industry in the district. The level of economic development of each district is measured by per capita net district domestic product (NDDP) for 2005-06, expressed in logarithm scale.

(ii) Existence of Organised Sector Industry: It is argued that location of organised sector industry in the region plays important role in the location of unorganised sector industry. The empirical findings also suggest that there is significant correlation between the location of organised and unorganised industries across the states (see *Annexure 3.2* of Chapter 3). The presence and size of organised manufacturing industry in a district is expressed as the share of organised manufacturing sector in value added generated from the manufacturing sector in the district. We use sector wise disaggregated data on district domestic product (DDP) for 2005-06 to construct the variable.

(iii) Availability of Raw Material: As the findings in Chapter 3 shows that the industrial structure of most of the states is dominated by resource based traditional industries, it is natural that the spatial variation in the availability of raw materials will have significant impact on location of industries. Following Awasthi (1991) the availability of raw material is expressed as the combined share of value added from agriculture, forestry and logging, fishing and mining and quarrying to the district domestic product (DDP) for 2005-06.[13] It is expected that it will have positive impact on industry location.

(iv) Labour Productivity: Higher level of labour productivity always attracts new firms to a location, since increasing productivity and maximising gains is the major objectives of firms. Productivity of labour is defined as the value added per unit of worker of unorganised manufacturing sector in the district.

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[12] Note that though a high population density implies higher demand for products and, hence, a larger market; it may also work as centrifugal forces in the form of congestion cost, high land and housing rent, traffic problem etc.

[13] Awasthi (1991) used per capita output from forestry, mining and agriculture to represent raw material.

(v) Capital Productivity: Similar to the labour productivity, higher level of capital productivity also attracts new firms to a location. Productivity of capital is defined as the value added per unit of fixed capital of unorganised manufacturing sector in the district.

C. Infrastructure

The positive impact of improved infrastructure facilities and a well developed transportation network on industrial location has been discussed in several preceding sections. Therefore, we are not intended to repeat them here. We consider three types of infrastructure namely physical infrastructure, financial infrastructure and social infrastructure. Physical infrastructure is expressed by two variables namely length of road per 100 sq km and percentage of household having access to electricity as source of energy. Financial infrastructure is expressed as the number of commercial bank branches per lakh population in the district. Social infrastructure is measured by literacy rate, defined as the proportion of literate population in age group 7 years and above.

D. Political Economy

(i) Socialist: The ***Socialist*** dummy is used to represent the political will at the sub-national level. It is well known that the prime *mantra* of socialism is the egalitarianism and anti-capitalism, due to which distribution remains the major issue in such economy. However, the policy of distribution is always contrasted with efficiency issues. Therefore, many argued that the failure of the socialist economies is their local political economy, rather than some structural factors like infrastructure or skilled labour (Chakravorty, 2000). The ***Socialist*** dummy takes a value of one for every district in West Bengal and Kerala, the two consistently communist-ruled states in the country; and a zero value for the districts of other states.[14]

(ii) Reformist: Throughout our work we have argued that industrial policy changes as a part of economic liberalisation process in India have considerable impact on the location of industries in the post-reform period, and that those states, which followed pro-market policies have gained more in the post-reform period at the cost of the states which have not followed pro-market policies. To include the status of reforms at the sub-national level, we have divided the states into two groups: pro-market reform oriented states and

[14] Bihar and Tripura are the two other socialist states in India. However, the districts of Tripura have not used in the analysis and for Bihar, Chakravorty (2003) suggested not to include as socialist state: "Bihar has ..... a populist caste-based government, and giving it the distinction of socialism, for better or worse, may be inappropriate" (Chakravorty, 2003).

lagging reformer states, based on information provided by Bajpai and Sachs (1999)[15]. We use the ***Reformist*** dummy, by assigning a value of one for each district of the states those are classified as pro-market reforms oriented states and a zero value for the districts of other states.

E. Spatial Attributes of the Region

Spatial characteristics of a region such as coastal or metropolitan locations have significant impact on location of industries in the region. Coastal locations provide access to the external trade, which could be very important for export-oriented industries, whereas metropolitan locations provide localisation economies, urbanisation economies, large local market and access to well-developed transportation networks, financial institutions and so on. We use two dummies namely ***Coastal*** and ***Metropolitan*** to take into account the locational advantages of coastal and metropolitan locations. We assign a value of one for all the coastal districts[16] and metropolitan districts[17] and zero otherwise.

5.5 Data Source

The same database used in the preceding chapters i.e. the 51st and 62nd rounds of NSS (National Sample Survey) data has been used to obtain the variables such as total employment, gross value added and fixed assets of the unorganised manufacturing industries in India. However, several other data sources have been used to obtain the aforesaid variables, which are specified against the each variable in Table 5.1.A. Information on variables such as district-wise geographical area, population, percentage of rural and urban population and literacy rate and percentage of households with access to electricity for household consumption etc. has been collected from the Census of India, 2001. Data on district-wise number of commercial bank branches (as on March

[15] Bajpai and Sachs (1999) have classified the major 15 Indian states into three categories of reformers based on the progress of state-level policy reform. These are: reform-oriented states (Andhra Pradesh, Gujarat, Karnataka, Maharashtra, and Tamil Nadu), intermediate reformers (Haryana, Orissa, and West Bengal), and lagging reformers (Assam, Bihar, Kerala, Madhya Pradesh, Punjab, Rajasthan, and Uttar Pradesh). For the purpose of our analysis, we have considered only the first category of states as reform-oriented states, and the other two category states are considered as lagging reformer states.

[16] Any district on the Arabian Sea or Bay of Bengal is considered as the coastal districts. About 61 districts are identified as coastal districts by this definition. Since the districts in Andaman and Nicobar Islands, Dadra and Nagar Haveli, Daman and Diu, Goa, Lakshadweep and Pondicherry are not included in the analysis, the number of coastal district included in the analysis is 49.

[17] We have used the standard definition of "metropolitan districts". For example, the Calcutta metropolitan city includes the districts of Calcutta, Howrah, Hugli, North 24 Parganas and South 24 Parganas; and Chennai metropolitan city includes the districts of Thiruvallur, Chennai and Kancheepuram. Similarly, for the metropolitan areas of Mumbai, Hyderabad, Ahmadabad, Vijayawada and Jamshedpur we have added additional districts following Census 2001.

2002) has been collected from the Branch Banking Statistics (Vol. 3, March 2002) of Reserve Bank of India. Information on sector-wise gross district domestic products (GDDP) statistics for 2005-06, provided by the Directorate of Economics and Statistics (DES)[18] of various State Governments and published by the Planning Commission (website), Government of India, has been used to obtain the district-wise value added from the organised and overall manufacturing sector and agriculture, forestry, mining and quarrying sectors. District-wise total road length data has been obtained from the Directorate of Economics and Statistics (DES) of various State Governments and complied by INDIASTAT, a private company engaged in compiling of data on Indian economy.

5.6 A Note on Model Estimation

We model the location choice of unorganised manufacturing industries in terms of a set of variables such as economic geography, factor and resource endowment, infrastructure, political economy and spatial attributes (see Table 5.1.A for specification of the variables) taking the districts as the units of analysis for 2005-06.[19] This has been done for all as well as rural and urban sectors of unorganised manufacturing industries and OAME, NDME and DME enterprises separately.[20] It has been observed that all the dependent variables and most of the independent variables are highly skewed in their level form. Therefore, we have transformed these variables to their logarithmic form. The summary statistics of the variables by sectors (all, rural and urban) and enterprise types (OAME, NDME and DME) reported in Table 5.2.A reveals that the skewness of the variables is minimal in their logarithmic form.

We use a double-log form of ordinary least square (OLS) model to estimate the functional form of Industrial location as specified in equation (5.4) for all unorganised

[18] For Punjab it is Economic and Statistical Organisation; for Bihar and Jharkhand Directorate of Statistics and Evaluation; for Sikkim Department of Economics, Statistics, Monitoring and Evaluation; for Tamil Nadu Department of Economics and Statistics; for Uttar Pradesh State Planning Institute, Economics and Statistics Division; and for West Bengal Bureau of Applied Economics and Statistics.

[19] More precisely, it examines the factors that are responsible for regional variations in development of unorganised manufacturing industries at the district level in India for 2005-06.

[20] By modeling the location choice of rural-urban sectors and enterprise types of unorganised manufacturing industries, we can identify the differential impacts of location factors across sectors and enterprise types. For instance, in comparison to industries in the rural areas, industries in the urban areas are subjected to agglomeration forces such as localisation and urbanisation economies, market access etc. Similarly, in comparison to OAME, which are household based enterprises, NDME and DME enterprises are subjected to agglomeration forces and so on.

manufacturing as well as by sectors and enterprise types.[21] One of the problems with the use of OLS model is the violation of normality assumption of the dependent variable for the models by sectors or enterprise types, as some districts do not have these industries.[22] Hence, faced by problem in using the OLS model on the full data set, we have used the OLS model for the districts that have unorganised industries by sectors and enterprise types.[23] In order to tackle the problem of heteroscedasticity we have used the heteroscedastic-consistent standard error known as the robust standard error. We have performed variance information factor (VIF) and condition index (CI) test as suggested by Belsley (1991) in order to test the presence of multicollinearity, both of which suggested the presence of multicollinearity, but it is not a serious problem.

Another problem associated with this kind of a spatial analysis is the existence of spatial autocorrelation, which is a common feature of spatial distributions. Spatial autocorrelation can be defined as clustering of similar values in space, that is, high values are close to high values and low values are close to low values. The presence of spatial autocorrelation creates serious problems in spatial regression modelling, which is similar to the serial autocorrelation (see Anselin, 1995; 1999). Several measures have been developed to test the spatial autocorrelation, of which Moran's I is the well known one. However, due to the lack of specific spatial statistical packages to perform the diagnostic test for spatial autocorrelation, this has not done in the present exercise and we have not considered any remedy to tackle the problem.[24] So, we have to keep in mind the possibility of the impact of spatial dependence, which has not taken care of, while interpreting the results of the regression analysis in the next section.

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[21] Because of the use of double log form of OLS models the interpretations of the estimated coefficients will be different for different explanatory variables. For instance, for the independent variables, which are in the log form (e.g. log LAB-Productivity, log POP-Size etc.) the coefficient will represent the elasticity of the dependent variable with respect to the independent variable. On the other hand, for the independent variables which are in the level form (e.g. URB-POP, literacy etc.) the coefficient will represent the proportionate change of the dependent variables with respect to one unit change in the independent variable.

[22] Note that these are not missing values, but are real measure of absence of unorganised manufacturing industries in the district.

[23] The use of only none-zero data would not allow to analyse the absence of industries in the district and there is also possibility that the results would be biased. However, since the number of districts that have no industry is very less (except for the DME enterprises) it is assumed that the bias in the result will not be severe.

[24] Anselin (1999) suggested using a "spatial lag" term (defined as a weighted average of the values in locations neighbouring each observation) in the right hand side of the regression equation in order to dealing with the problem. However, constrained by information necessary to construct the "spatial weights" we have not followed this remedy in this exercise (see Anselin, 1999 and Chakravorty, 2003 on construction of spatial weight).

5.7 Empirical Findings

The findings of regression models of the location of unorganised manufacturing industries by sectors and enterprise types as well as the type of dependent variables for the year 2005-06 are reported in Table 5.1 through Table 5.3. Given the estimates for different sectors and enterprise types in terms of three dependent variables viz. per capita GVA, per capita fixed assets and total employment for each model (thereby a total of 18 models) it is difficult and also time consuming to explain each model. Therefore, we discuss the results by the type of the explanatory variables for the different sectors (all, rural and urban) and enterprise types (OAME, NDME and DME) together. Before doing that, let us consider all the models together. Comparing the adjusted R-square values for all the models it is obvious that the models estimated in terms of total employment performed the highest prediction of distribution of unorganised manufacturing industries across the districts; the adjusted R-square values range from a low 0.545 for DME enterprises to 0.749 in all industry. Let us turn to explanation of the model findings by the sets of explanatory variables for all the sectors and enterprise types together.

(a) Economic Geography Variables

Of the economic geography variables, the existing industry location is consistently positively significant in all the sectors and enterprise types in terms of all the three dependent variables. This indicates that the existing location of unorganised manufacturing industries (expressed as unorganised sector *PCGVA or PCFA or EMP*) from the pre-reform period has significant positive impact on the presence and quantity of unorganised manufacturing industries in 2005-06. Put differently, it implies that the continuity of industrial concentration process plays important role in industrial location. However, continuity of concentration is stronger for the rural industries; whereas it is least for DME enterprises (even the coefficient is not significant in terms of PCFA). This is an indication that while the location of traditional unorganised industries depends more on historical concentration process; that of the modern unorganised industries depends less on it. Industrial diversity (expressed as Herfindahl diversity index) of the district has also strong significant impact in all sectors and enterprise types (except in NDME enterprises) in terms of all the three dependent variables. The estimated coefficients are negative for all the models and very strong for DME enterprises followed by all and rural industries. This implies that industrial location/concentration is negatively related to

industrial diversity; that is industrially diverse districts are less concentrated. This, further, implies that industrial concentration/location takes the form of specialisation in few industries. For instance, the coefficient of -3.730 for of PCGVA of DME enterprises implies that one unit increase in a district's industrial diversity (Herfindahl diversity index) will reduce the district's PCGVA by 3.730 percent.

The other economic geography variables- market size (log POP-Size and log POP-density) and urbanisation economies (UBR-POP) are not significant in all the models in terms of all the dependent variables and their impact are not very strong. The variable POP-Size is positively significant in terms of all the dependent variables for the all and rural industries, for the other sectors it is significant only in terms of employment as the dependent variable.[25] For instance, the coefficient of 0.178 for *PCGVA* of all industry implies that a 10 percent increase in the population size is associated with a 1.78 percent increase in the district's PCGVA of all unorganised industries. Similarly, the variable POP-density is positively significant in NDME enterprises in terms of all the dependent variables and in all, rural and urban industries in terms of at least one variable. On the other hand, the variable representing urbanisation economies (URB-POP) is significant only in rural and urban industries; but sign of the coefficients are not consistent across the models. The variable also has little influence in determining the size of unorganised manufacturing industries.

In general, we can conclude that continuity of concentration process and industrial diversity are the two dominant economic geography variables that have strong significant impact on the presence and quantity of unorganised manufacturing industries in a district in India in 2005-06. These findings are consistent with empirical evidences for the organised manufacturing sector for India. Chakravorty (2003a) and Chakravorty and Lall (2007) observed significant positive impact of continuation of concentration and district population on location of organised industries at the district level for 1998-99. Similarly, Lall and Chakravorty (2005), Lall, Koo and Chakravorty (2003) and Lall, Shalizi and Deichmann (2001) found that industrial diversity is the only economic geography variable that has significant impact on productivity of organised industries and thus, agglomeration of industries.

[25] This could be a statistical artifact given the interdependence of both the variables. The fact that the coefficients of the variable in all the sectors and enterprise types are strong in terms employment could also because of the similar reason.

Table 5.1: Determinants of Location of Unorganised Industries: Dependent Variable=*logPCGVA*

Variables	All Industry	Rural Industry	Urban Industry	OAME Enterprise	NDME Enterprise	DME Enterprise
	N=399	N=395	N=397	N=399	N=391	N=369
Existing Industry Location	0.200***	0.211***	0.108***	0.163***	0.205***	0.084*
	(0.043)	(0.053)	(0.032)	(0.046)	(0.044)	(0.050)
Industrial Diversity	-1.507***	-1.393***	-0.839**	-0.608***	-0.071	-3.730***
	(0.261)	(0.339)	(0.358)	(0.235)	(0.367)	(0.689)
CAP-Productivity	0.277***	0.171**	0.191*	0.458***	0.382***	0.039*
	(0.076)	(0.080)	(0.109)	(0.062)	(0.094)	(0.022)
LAB-Productivity	0.378***	0.499***	0.661***	0.125*	0.531***	0.103
	(0.070)	(0.094)	(0.096)	(0.067)	(0.149)	(0.150)
PCDDP	0.470***	0.219	0.539***	0.275**	0.854***	1.363***
	(0.109)	(0.142)	(0.130)	(0.095)	(0.172)	(0.301)
Raw Material	-0.008**	-0.011**	-0.003	-0.005	-0.013***	-0.018*
	(0.004)	(0.005)	(0.005)	(0.004)	(0.005)	(0.011)
Organised Industry	-0.001	0.002	-0.006***	-0.001	-0.005**	0.0002
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.004)
POP-Size	0.178***	0.162**	0.107	0.112*	0.139	0.185
	(0.066)	(0.085)	(0.082)	(0.061)	(0.109)	(0.207)
POP-Density	0.086*	0.086	0.181***	0.026	0.177**	0.114
	(0.048)	(0.070)	(0.071)	(0.048)	(0.083)	(0.130)
URB-POP	0.0003	-0.001	-0.011**	-0.003	0.002	0.008
	(0.003)	(0.005)	(0.005)	(0.003)	(0.005)	(0.008)
Literacy	-0.010***	-0.010**	-0.011**	-0.013***	-0.018***	-0.013
	(0.004)	(0.005)	(0.005)	(0.003)	(0.006)	(0.013)
Electricity	0.004**	0.0001	0.006***	0.006***	0.004	0.007
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.005)
Banking	0.120	0.288*	-0.151	0.050	0.191	-0.041
	(0.127)	(0.167)	(0.124)	(0.110)	(0.182)	(0.285)
Road length	0.021	0.066	0.052	-0.044	0.159**	0.255**
	(0.050)	(0.067)	(0.063)	(0.053)	(0.080)	(0.109)
Coastal	0.138	-0.041	0.349***	-0.073	0.278**	0.409**
	(0.092)	(0.116)	(0.119)	(0.092)	(0.130)	(0.178)
Metropolitan	-0.162	-0.421***	0.093	-0.111	-0.422**	-0.068
	(0.128)	(0.148)	(0.153)	(0.113)	(0.220)	(0.372)
Socialist	0.185	0.588***	-0.331**	0.192	0.142	0.106
	(0.129)	(0.166)	(0.146)	(0.132)	(0.184)	(0.314)
Reformist	-0.182**	0.086	-0.231**	-0.119	-0.338***	-0.245
	(0.083)	(0.104)	(0.106)	(0.077)	(0.127)	(0.244)
Constant	-4.943***	-4.059**	-6.906***	0.128	-12.69***	-11.36***
	(1.460)	(2.104)	(1.946)	(1.487)	(2.466)	(4.668)
R square	0.5766	0.4590	0.4148	0.2681	0.5323	0.4714
Adj. R square	0.5565	0.4331	0.3869	0.2334	0.5097	0.4407
F-statistics	30.37***	14.98***	13.27***	6.07***	30.06***	19.33***

Note: Figures in the parenthesis are Standard Error

*** significant at 1 percent level of significance, ** significant at 5 percent level of significance and * significant at 10 percent level of significance

Source: Author's own estimation using data specified in Table 5.1.A

Table 5.2: Determinants of Location of Unorganised Industries: Dependent Variable=*logPCFA*

Variables	All Industry	Rural Industry	Urban Industry	OAME Enterprise	NDME Enterprise	DME Enterprise
	N=399	N=395	N=397	N=399	N=391	N=369
Existing Industry Location	0.175***	0.154***	0.100***	0.138***	0.198***	0.069
	(0.044)	(0.046)	(0.035)	(0.048)	(0.049)	(0.047)
Industrial Diversity	-1.344***	-1.450***	-0.708**	-0.465**	-0.030	-2.719***
	(0.275)	(0.332)	(0.354)	(0.237)	(0.371)	(0.665)
CAP-Productivity	-0.474***	-0.319***	-0.726***	-0.407***	-0.450***	-0.060**
	(0.070)	(0.052)	(0.122)	(0.086)	(0.111)	(0.028)
LAB-Productivity	0.394***	0.478***	0.600***	0.102	0.453***	0.005
	(0.074)	(0.093)	(0.098)	(0.068)	(0.155)	(0.132)
PCDDP	0.526***	0.218	0.687***	0.356***	0.955***	1.447***
	(0.118)	(0.148)	(0.141)	(0.101)	(0.187)	(0.307)
Raw Material	-0.008**	-0.014***	-0.001	-0.006*	-0.010*	-0.015
	(0.004)	(0.005)	(0.005)	(0.004)	(0.006)	(0.012)
Organised Industry	-0.002	-0.0001	-0.007***	-0.003**	-0.004	0.001
	(0.002)	(0.002)	(0.002)	(0.001)	(0.003)	(0.004)
POP-Size	0.166**	0.167*	0.025	0.089	0.063	0.172
	(0.072)	(0.088)	(0.088)	(0.065)	(0.117)	(0.203)
POP-Density	0.095	0.110	0.206***	0.050	0.223***	0.230*
	(0.052) *	(0.075)	(0.071)	(0.051)	(0.091)	(0.133)
URB-POP	0.001	0.001	-0.009**	-0.002	0.002	0.006
	(0.003)	(0.006)	(0.005)	(0.003)	(0.006)	(0.008)
Literacy	-0.011***	-0.012***	-0.012**	-0.012***	-0.019***	-0.007
	(0.004)	(0.005)	(0.006)	(0.004)	(0.007)	(0.015)
Electricity	0.006***	0.003	0.007***	0.007***	0.005	0.011**
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.005)
Banking	0.152	0.451***	-0.173	0.069	0.186	0.151
	(0.135)	(0.184)	(0.127)	(0.118)	(0.191)	(0.284)
Road length	0.052	0.082	0.059	-0.017	0.180**	0.309***
	(0.055)	(0.072)	(0.065)	(0.056)	(0.083)	(0.115)
Coastal	0.096	-0.117	0.344***	-0.085	0.244*	0.345*
	(0.095)	(0.131)	(0.123)	(0.089)	(0.146)	(0.191)
Metropolitan	-0.206	-0.547***	0.065	-0.136	-0.413*	-0.113
	(0.138)	(0.156)	(0.162)	(0.118)	(0.239)	(0.361)
Socialist	0.051	0.560***	-0.500***	0.001	-0.042	-0.192
	(0.144)	(0.186)	(0.152)	(0.139)	(0.198)	(0.325)
Reformist	-0.248***	0.051	-0.295***	-0.239***	-0.414***	-0.326
	(0.092)	(0.108)	(0.115)	(0.087)	(0.141)	(0.253)
Constant	-4.704***	-3.234	-5.532***	0.735	-11.19***	-13.29***
	(1.532)	(2.113)	(1.977)	(1.504)	(2.645)	(4.775)
R square	0.6465	0.4773	0.5097	0.4362	0.5796	0.5036
Adj. R square	0.6298	0.4523	0.4863	0.4095	0.5592	0.4748
F-statistics	42.02***	19.37***	17.13***	17.57***	32.85***	20.73***

Note: Figures in the parenthesis are Standard Error

*** significant at 1 percent level of significance, ** significant at 5 percent level of significance and * significant at 10 percent level of significance

Source: Same as Table 5.1

Table 5.3: Determinants of Location of Unorganised Industries: Dependent Variable=*logEMP*

Variables	All Industry	Rural Industry	Urban Industry	OAME Enterprise	NDME Enterprise	DME Enterprise
	N=399	N=395	N=397	N=399	N=391	N=369
Existing Industry Location	0.229***	0.288***	0.205***	0.171***	0.206***	0.102*
	(0.045)	(0.057)	(0.043)	(0.044)	(0.047)	(0.054)
Industrial Diversity	-1.497***	-1.387***	-0.856**	-0.587***	0.006	-3.583***
	(0.258)	(0.333)	(0.375)	(0.237)	(0.361)	(0.707)
CAP-Productivity	0.235***	0.142**	0.194*	0.423***	0.381***	0.038*
	(0.074)	(0.070)	(0.113)	(0.063)	(0.094)	(0.023)
LAB-Productivity	-0.546***	-0.450***	-0.352***	-0.812***	-0.437***	-0.866***
	(0.067)	(0.099)	(0.104)	(0.071)	(0.148)	(0.159)
PCDDP	0.487***	0.253*	0.675***	0.282***	0.898***	1.354***
	(0.104)	(0.136)	(0.133)	(0.093)	(0.168)	(0.294)
Raw Material	-0.009***	-0.012***	-0.001	-0.006*	-0.014***	-0.018*
	(0.004)	(0.005)	(0.005)	(0.003)	(0.005)	(0.011)
Organised Industry	-0.001	0.002	-0.005***	-0.002	-0.005**	0.0003
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.004)
POP-Size	0.931***	0.796***	0.971***	0.939***	0.915***	1.049***
	(0.087)	(0.115)	(0.111)	(0.078)	(0.120)	(0.213)
POP-Density	0.100**	0.116*	0.083	0.030	0.175**	0.139
	(0.049)	(0.071)	(0.075)	(0.048)	(0.085)	(0.132)
URB-POP	0.0002	-0.014***	0.020***	-0.003	0.003	0.010
	(0.003)	(0.005)	(0.005)	(0.003)	(0.005)	(0.008)
Literacy	-0.010***	-0.009**	-0.011**	-0.013***	-0.018***	-0.013
	(0.004)	(0.005)	(0.005)	(0.003)	(0.006)	(0.013)
Electricity	0.006***	0.003	0.010***	0.007***	0.004	0.007
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.005)
Banking	0.063	0.130	-0.245**	0.022	0.131	-0.037
	(0.118)	(0.154)	(0.125)	(0.106)	(0.178)	(0.283)
Road length	0.016	0.034	0.034	-0.048	0.159**	0.260***
	(0.050)	(0.070)	(0.069)	(0.052)	(0.082)	(0.110)
Coastal	0.129	0.049	0.356***	-0.076	0.279**	0.364**
	(0.091)	(0.121)	(0.124)	(0.090)	(0.129)	(0.184)
Metropolitan	-0.104	-0.352***	-0.086	-0.081	-0.391*	-0.075
	(0.120)	(0.143)	(0.153)	(0.107)	(0.219)	(0.372)
Socialist	0.136	0.528***	-0.388***	0.147	0.101	0.069
	(0.132)	(0.188)	(0.158)	(0.135)	(0.183)	(0.317)
Reformist	-0.232***	0.011	-0.369***	-0.153**	-0.392***	-0.248
	(0.081)	(0.102)	(0.114)	(0.077)	(0.126)	(0.251)
Constant	-3.598***	-1.437	-9.132***	1.089	-11.12***	-10.49**
	(1.450)	(2.158)	(2.121)	(1.432)	(2.574)	(4.662)
R square	0.7606	0.6238	0.7507	0.7566	0.6405	0.5700
Adj. R square	0.7492	0.6057	0.7388	0.7451	0.6231	0.5450
F-statistics	67.74***	32.94***	70.02***	58.67***	44.33***	28.44***

Note: Figures in the parenthesis are Standard Error

*** significant at 1 percent level of significance, ** significant at 5 percent level of significance and * significant at 10 percent level of significance

Source: Same as Table 5.1

(b) Factor and Resource Endowment

Of the variables representing factor and resource endowments- labour productivity (log LAB-Productivity) and capital productivity (CAP-Productivity) have significant positive role in attracting industries and have very strong influence in determining the size of unorganised industry for all the sectors and enterprise types.[26] For instance, the coefficient of 0.277 for CAP-Productivity in all industry (with log PCGVA as dependent variable) implies that a 10 percent increase in capital productivity is associated with an overall 2.77 percent increase in the PCGVA of all unorganised industry. Similarly, the coefficient of 0.478 for LAB-Productivity in rural industry (with log PCFA as dependent variable) implies that a 10 percent increase in labour productivity is associated with an overall 4.78 percent increase in the PCFA of rural industry. The findings for capital productivity is contradictory to the findings of Chakravorty (2003a), Lall and Chakravorty (2005) and Chakravorty and Lall (2007), which have found that capital productivity has negative impact on location of organised industries; whereas the positive impact of labour productivity is consistent with the findings of these studies. This is mainly because of the fact that these studies have considered investment (fixed assets) to represent industrial location and in our case also we have observed negative sign for capital productivity with fixed assets as dependent variable.

The variable representing level of economic development (PCDDP) also has significant and strong positive impact in attracting industries and has strong influence in determining the size of unorganised industries in all the sectors and enterprise types. Very strong influence is observed in case of DME enterprise followed by NDME enterprise and urban industries. This implies that the modern urban sector unorganised industries are more biased towards the economically developed districts compared to the household-based rural industries. For instance, the coefficients of 1.363, 1.447 and 1.354 for DME enterprise (with log PCGVA, log PCFA and log EMP as dependent variables respectively) imply that a 10 percent increase in the level of economic development of a district is associated with an overall 13.63 percent increase in per capita GVA, 14.47 percent increase in per capita fixed assets and 13.54 percent increase in total employment of the DME sector of unorganised manufacturing industries in the district.

[26] This is true except the LAB-Productivity in the model with employment as dependent variable and CAP-Productivity in the model with per capita fixed assets as the dependent, where the coefficients show significant negative impact for all the sectors and enterprise types. This could be because of the interdependence of the variables. Otherwise, both the variables show significant positive impact in all the sectors and enterprise types.

The variables representing access to raw materials and presence and size of organised industry are found to be inconsistently significant through the models and have little influence on the location and size of unorganised manufacturing industries. In fact, both the variables have a negative sign consistently through all the models, which is contrary to what have been expected. The implication of the raw material variable is that the districts with higher access to raw materials are less preferred for unorganised manufacturing industries and this is particularly true for all and rural industry and OAME and NDME enterprises. This is an unexpected result and could be because of the way the variable is constructed. Note that the variable is constructed as the share of the agriculture, mining and forestry sectors to district domestic product (DDP) and it is true that the share from agriculture sector is highest for all the cases. Thus, the estimated coefficient for the variable virtually suggest that the inter-linkages between the agriculture and manufacturing sectors has no longer exist in India, rather it suggest that the agriculturally developed districts appeared to be less attractive for unorganised manufacturing industries in general and rural industries and OAME and NDME enterprises in particular.[27] It could, further, be the effect of the metropolitan districts, where the industries are highly concentrated on the one hand and the contribution of agricultural sector to DDP is very low, on the other. Similarly, the finding for the presence and size of organised sector industry that the districts with high presence of organised sector industry are less preferred to the unorganised industries (and significant for urban industry and OAME and NDME enterprises) is quite contradictory to our findings in *Annexure 3.2* of Chapter 3, where we observed that the location of the unorganised manufacturing industry is closely related to the location of the organised manufacturing industry across the states. This could probably because of the change in the unit of geographical scale of analysis or could be a statistical artefact given the quality of data on DDP provided by the Department of Economics and Statistics of different States.[28]

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[27] This could, further, suggest that in most of the agriculturally backward districts the unorganised manufacturing industries in general and the household based (OAME) and rural industries in particular have grown in order to supplement the low income from the agriculture. That is the growth of unorganised sector in most of these districts is distress driven, other than prosperity driven. However, further investigation is required for such a conclusion.

[28] It is worthwhile to note that there are conceptual and measurement problems in measuring GDP at the district level and hence, various authors have expressed doubts about the reliability of this database (see Bhattacharya and Sakthivel, 2004). For many cases we found doubts about the quality of data. For instance, the share of organised (and unorganised) sector in value added of the manufacturing sector is

(c) Infrastructure

The infrastructure variables have overall little influence in determining the location and size of unorganised manufacturing industries. Of the physical infrastructure variables- access to electricity appears to be positively significant for all and urban sectors and OAME and DME enterprises, but it has little influence in determining the size of unorganised industries. Road length has positive impact for all the sectors and enterprises (except OAME enterprises) and is significant for NDME and DME enterprises. This implies that although better road connectivity is not a critical factor for location of house-hold based (OAME) and rural industries, it is a critical factor for location of NDME and DME enterprises, which are modern unorganised industries.

The social infrastructure variables- literacy is significant and has a negative sign for all the sectors and enterprise types (except DME enterprise). The implication is that in districts with high literacy rate, the tendency is towards less concentration of unorganised industries. This is not puzzling as it is quite understandable that educated people will hardly prefer to engage in unorganised industries since the sector is low paid, use low skill and no social security. The negative impact of literacy on industry location is also observed by Chakravorty (2003a) and Chakravorty and Lall (2007) for organised industries and they argued that this could probably be the effect of Kerala's combination of high literacy and low industrial investment. The financial infrastructure variable- number of commercial banks per lakh population is significant only for rural and urban industries and has positive effect on industry location through all the sectors and enterprise types (expect urban industry and DME enterprise).

(d) Political Dummy

Of the two political dummy variables, the socialist dummy is significant only in rural and urban industry, whereas the reformist dummy is significant in all and urban industries and OAME and NDME enterprises. The socialist dummy has negative impact on the urban industry, whereas it has strong and positive impact on the location of rural industry and for the other sectors also the impact is positive (though not significant), except for fixed assets of the NDME and DME enterprises. On the other hand, the reformist dummy has negative impact on all the sectors, except rural industry (where the dummy is not significant). The implication is that, in general, in districts belonging to

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found to be the same for all the districts of Kerala. Similar is the case for many districts of Bihar and Madhya Pradesh.

more reform-oriented states, the tendency is towards less concentration of unorganised industries. This is, however, not a surprising result as it is a confirmation of the argument of the NEG models that post-reform distribution of industries will be more equal.

(e) Spatial Dummy

Of the two spatial dummy variables, the Metropolitan dummy has negative impact for all the sectors and enterprise (except for GVA and fixed assets of urban industry) and is strongly significant in rural industry and NDME enterprises, whereas the coastal dummy has positive impact in all the sectors (except rural industry and OAME enterprises) and is strongly significant for urban industry and NDME and DME enterprises. The negative impact of the metropolitan dummy for rural industry and OAME enterprise is quite convincing, since the metropolises do not have any rural industry and also less of household based industry; for the other sectors it could either because of, as we have seen in Chapter 3, the decline of large metropolitan districts or the rise of some sub-urban districts as new industrial destination in the post-reform period. However, the positive and strong impact of the coastal dummy is contrary to our earlier findings in Chapter 3, where we found that the unorganised industries are not coastal biased and share of the coastal regions as a whole remained more or less same in the post-reform period. However, our findings in Chapter 3 was for the overall unorganised industry only (for which our regression coefficients are also insignificant) and a sector-wise and enterprise types breakup of such exercise may provide evidence for coastal biasness of urban industries and NDME and DME enterprises as shown by the regression estimates.

5.8 Concluding Observations

In this chapter we have analysed the factors that determine the location and size of unorganised manufacturing industries (expressed as per capita GVA, per capita fixed assets and total employment) at the district level in 2005-06. For doing this we have developed an analytical framework of industrial location based on the new economic geography (NEG) literature. Following this a functional form of industrial location decision has been developed based on a sets of explanatory variables representing economic geography, factor and resource endowment, infrastructure, political economy and spatial attributes of the location (here district). This functional relationship has been estimated by using a double log form of ordinary least square (OLS) model for different

sectors (All, Rural and Urban industries) and enterprise types (OAME, NDME and DME) of unorganised manufacturing industries.

The analysis in this chapter suggests that the most significant factors that determine the location and size of unorganised manufacturing industries in a district are the existence and size of unorganised industries from the post-reform period (existing industry location), industrial diversity, labour productivity, capital productivity, level of economic development, market size (expressed as population size of the district) and the level of economic reforms at the state level. These findings are supported by our earlier findings that the leading states and districts from the pre-reform period continue to be the leading states and districts in the post-reform period and that the level of development of the unorganised manufacturing sector is related to the level of development of the state/district. This suggests that the continuation of history plays important role in location of unorganised manufacturing industries in India. It is worth noting that the most significant and strong factors in determining location and size of unorganised industry are more or less same for all the sectors (all, rural and urban) and enterprise types (OAME, NDME and DME). The exceptions are the population density for urban industry and NDME enterprise, socialist dummy for rural and urban industry, metropolitan dummy for urban industry and NDME enterprises and coastal dummy for urban industry and NDME and DME enterprises.

However, it should be admitted that we are unable to identify all the factors that influence location of unorganised manufacturing industries. In addition to the observed attributes, as we have mentioned earlier, firms also optimise their decision based on a set of unobserved attributes, i.e. those that are considered by the entrepreneur but not observed in the data. For instance, different regions in India have distinct cultural, political, social and ethnic histories and clearly demarcated linguistic identities, which could have bearing on the attractiveness of a region as industrial destination. The presence of these unobservable local attributes complicates the estimation procedure, particularly in identifying the contribution of agglomeration forces to firm's location decisions. According to Ellison and Glaeser (1997) the effects of unobservable sources of "natural advantages or disadvantages" cannot be separately identified from those of production externalities between firms, which arise simply from firms locating near one another. Lall and Mengistae (2005) pointed out that simply including the number of firms or employment in a particular industry, which is a commonly used indicator in empirical studies evaluating localisation economies, will not allow us to distinguish whether firms

are attracted by a common unobservable, whether they derive benefits from being located in close proximity to one another, or whether it is some combination of the two.

There are several local factors related to policies at the state or local level such as subsidies, tax incentives and state's initiative in promoting industrialisation in backward areas. Now a days, various State and local governments are actively engaged in promoting export processing zones (EPZ), free trade areas (FTA), special economic zones (SEZ) and Techno Parks, Food Processing Park, Apparel Park, Automobile Park and other sectoral specific parks etc. However, such information are difficult to use in a modelling framework as these policies are varied from state to state and also there is lack of appropriate indicators or proxies to be used for such variables.

In addition to the policy factors, there are also factors such as work culture, entrepreneurship, personal preference and interest, tradition, specific skill for particular work etc. which have impact on attractiveness of a region for industrial establishment. For instance, the entrepreneurial culture of the local population is often referred for Gujarat's recent success in industrialisation (Chakravorty and Lall, 2007), whereas lack of entrepreneurial culture is often regarded as a major culprit for industrial backwardness of Kerala (Subrahmanian and Pillai, 1986). Similarly, there are some specific skills which are inherited by some cast/class of population of certain locations, which leads to cluster of industries based on such local skills, such as brass works in Moradabad, pottery in Mirzapur, bell metal industry in West Bengal and Assam, leather products in Kanpur, etc. These factors certainly have influence on attracting industries into a region. However, such variables are difficult to quantify and, therefore, difficult to use in a modelling framework. Nonetheless, it should be comprehend that industrial location decisions are based not only on a set of observable factors, but also a set of non observable factors, which could be explained by using other methodologies.

ANNEXURE 5.1: TABLES

Table 5.1.A: Specification of the Variables and Expected Sign			
Variables	**Explanation**	**Data Source**	**Sign**
Dependent Variables[@]	Per capita GVA (PCGVA) of unorganised industries in log scale for in 2005-06 (*log PCGVA)*	NSSO	
	Per capita fixed assets (pcFA) of unorganised industries in log scale for 2005-06 (*log PCFA)*	NSSO	
	Total employment (Emp) of unorganised industries in log scale for 2005-06 (*log EMP*)	NSSO	
Independent Variables			
Existing Industry Location[@]	Per capita GVA for 1994-95 ($log\ PCGVA_{1994\text{-}95}$)	NSSO	+
	Per capita FA for 1994-95 ($log\ PCFA_{1994\text{-}95}$)	NSSO	+
	Total employment in 1994-95 ($log\ EMP_{1994\text{-}95}$)	NSSO	+
Diversity	Herfindahl index of industrial diversification in terms of GVA in the district in 2005-06 *(Diversity)*	NSSO	-
Urbanisation Economies	Percentage of urban population in the district in 2001 *(URB- POP)*	Census 2001	+
Market Size	Total population in the district in 2001 (*POP-Size)*	Census 2001	+
	Population density in the district in 2001 (*POP-density)*	Census 2001	+
Capital productivity[@]	GVA per unit of fixed assets in 2004-06 *(CAP-Productivity)*	NSSO	+
Labour productivity[@]	GVA per worker (in log scale) in 2005-06 (*log LAB-Productivity)*	NSSO	+
Location of Organised Industry	Share of value added generated from the organised sector in value added from manufacturing sector in 2005-06 (*Organised Industry*)	DES, State Govt.	+
Level of Development	Per capita district domestic product in log scale in 2005-06 (*log PCDDP)*	DES, State Govt.	+
Access to Raw Material	Share of value added generated from forestry, mining and agriculture to district domestic product in 2005-06 (*Raw material)*	DES, State Govt.	+
Physical Infrastructure	Length of roads per 100 sq. km. of area in 2002-03 (*Road-length)*	Indiastat	+
	Percentage of household with access to electricity for household consumption in 2001 (*Electricity)*	Census, 2001	+
Financial Infrastructure	Number of commercial bank branches per lakh population in the district as on March 2002 (*Banking)*	RBI	+
Social Infrastructure	Literacy rate- percentage of the literate population in the district in 2001 (*Literacy)*	Census, 2001	+
Political Variable	*Socialist* (1=districts of Kerala and West Bengal; 0=otherwise)		-
	Reformist (1=districts of reform oriented states; 0=lagging reformer states)	Bajpai and Sachs (1999)	?
Spatial Attributes	*Coastal* (1=coastal districts; 0=otherwise)		+
	Metropolitan (1= Metropolitan districts; 0=otherwise)		+
Note: [@] these variables depend on the sectors (rural, urban and total) and types of enterprises (OAME, NDME and DME) being modelled.			

Table 5.2.A: Summary Statistics of the Variables

Variables	Mean	Median	St. Dv.	CV	Max.	Min.	Skewness	Kurtosis
Summary Statistics of Sector and Industry Specific Variables								
All Industry (N= 399)								
log PCGVA	6.20	6.17	0.84	0.14	8.66	3.69	0.18	2.91
log PCFA	6.59	6.60	0.98	0.15	9.48	4.08	0.27	2.90
log EMP	10.83	10.82	1.10	0.10	13.68	7.05	-0.13	3.14
log $PCGVA_{1994\text{-}95}$	5.22	5.19	0.87	0.17	8.10	2.99	0.39	3.51
log $PCFA_{1994\text{-}95}$	5.48	5.39	0.94	0.17	8.93	3.17	0.41	3.50
log $EMP_{1994\text{-}95}$	10.58	10.58	1.14	0.11	13.49	7.02	-0.02	3.04
CAP-Productivity	0.81	0.64	0.61	0.06	6.22	7.81	0.40	22.68
log LAB-Productivity	9.91	9.89	0.56	0.75	12.32	0.14	0.18	4.51
Rural Industry (N= 395)								
log PCGVA	5.81	5.86	0.97	0.17	8.45	0.69	-0.56	5.53
log PCFA	6.02	5.99	1.02	0.17	9.10	1.61	-0.26	4.89
log EMP	10.33	10.27	1.15	0.11	13.60	5.39	-0.17	3.73
log $PCGVA_{1994\text{-}95}$	4.87	4.83	0.89	0.18	7.58	-0.37	-0.25	5.78
log $PCFA_{1994\text{-}95}$	5.07	5.07	0.91	0.18	8.71	-0.04	-0.20	5.84
log $EMP_{1994\text{-}95}$	10.17	10.18	1.19	0.12	13.27	3.87	-0.26	4.57
CAP-Productivity	1.02	0.80	0.96	0.94	13.05	0.13	6.30	68.15
log LAB-Productivity	9.73	9.74	0.59	0.06	12.46	7.75	0.19	4.74
Urban Industry (N= 397)								
log PCGVA	6.74	6.69	0.89	0.13	10.18	3.37	0.14	4.20
log PCFA	7.37	7.37	1.03	0.14	10.26	2.40	-0.15	4.15
log EMP	9.40	9.42	1.42	0.15	13.48	5.17	0.01	2.78
log $PCGVA_{1994\text{-}95}$	5.56	5.57	1.35	0.24	12.85	-0.42	-0.08	6.33
log $PCFA_{1994\text{-}95}$	5.94	5.97	1.46	0.25	14.14	-1.90	-0.43	8.86
log $EMP_{1994\text{-}95}$	8.80	8.86	1.64	0.19	13.34	3.56	-0.26	3.39
CAP-Productivity	0.64	0.52	0.50	0.78	5.74	0.10	4.19	32.98
log LAB-Productivity	10.19	10.22	0.51	0.05	13.10	8.48	0.31	5.52
OAME Enterprises (N= 399)								
log PCGVA	5.41	5.38	0.61	0.11	7.41	3.21	0.02	3.26
log PCFA	5.87	5.85	0.73	0.12	7.92	3.58	0.11	3.04
log EMP	10.43	10.43	1.05	0.10	13.51	6.73	-0.06	3.31
log $PCGVA_{1994\text{-}95}$	4.59	4.53	0.76	0.16	7.66	2.11	0.23	3.47
log $PCFA_{1994\text{-}95}$	4.80	4.74	0.80	0.17	8.14	2.26	0.13	3.58
log $EMP_{1994\text{-}95}$	10.21	10.23	1.12	0.11	13.27	6.45	-0.02	3.33
CAP-Productivity	0.76	0.62	0.54	0.72	5.12	0.10	2.82	16.81
log LAB-Productivity	9.53	9.53	0.48	0.05	10.63	7.54	-0.32	3.54
NDME Enterprises (N= 391)								
log PCGVA	4.50	4.63	1.26	0.28	7.49	-0.71	-0.51	3.44
log PCFA	5.03	5.06	1.44	0.29	8.90	-1.31	-0.43	3.81
log EMP	8.68	8.74	1.43	0.17	12.06	2.56	-0.39	3.52
log $PCGVA_{1994\text{-}95}$	3.43	3.50	1.31	0.38	7.67	-2.10	-0.64	4.61
log $PCFA_{1994\text{-}95}$	3.88	3.91	1.36	0.35	7.55	-1.14	-0.45	4.18
log $EMP_{1994\text{-}95}$	8.30	8.40	1.46	0.18	12.18	3.26	-0.40	3.69
CAP-Productivity	0.75	0.55	0.76	1.01	8.98	0.05	5.02	42.39
log LAB-Productivity	10.37	10.37	0.42	0.04	11.81	8.67	-0.12	4.41

Table 5.2.A (Contd.)

Variables	Mean	Median	St. Dv.	CV	Max.	Min.	Skewness	Kurtosis
DME Enterprises (N= 369)								
log PCGVA	4.30	4.49	1.92	0.45	8.46	-1.35	-0.48	2.88
log PCFA	4.48	4.83	2.07	0.46	8.66	-2.41	-0.57	3.02
log EMP	8.17	8.32	2.14	0.26	15.24	1.95	-0.30	3.16
log $PCGVA_{1994\text{-}95}$	3.25	3.46	1.92	0.59	7.80	-2.68	-0.58	3.63
log $PCFA_{1994\text{-}95}$	3.42	3.58	2.07	0.61	8.59	-2.80	-0.65	3.66
log $EMP_{1994\text{-}95}$	8.15	8.17	1.97	0.24	12.89	2.08	-0.27	2.83
CAP-Productivity	1.56	0.77	4.43	2.85	63.64	0.06	11.27	145.27
log LAB-Productivity	10.72	10.69	0.81	0.08	15.09	3.43	-1.51	23.45
Summary Statistics of Common Variables# (N=399)								
Industrial Diversity	0.74	0.77	0.13	0.17	0.89	0.12	-1.86	6.96
log PCDDP	9.99	10.03	0.56	0.06	12.25	8.45	-0.33	3.34
Org. Industry	53.08	55.23	25.69	0.48	99.06	0.00	-0.23	2.12
Raw material	30.22	30.49	11.97	0.40	63.45	0.15	-0.14	2.76
log POP-Size	14.54	14.61	0.66	0.05	16.44	11.27	-0.78	5.01
log POP-Density	5.93	5.87	0.89	0.15	10.13	2.48	0.66	7.45
URB- POP	23.04	19.09	17.15	0.74	100.00	0.00	1.89	7.69
Literacy	76.19	77.40	9.40	0.12	95.90	34.23	-1.10	5.16
Electricity	52.35	57.70	27.50	0.53	97.85	3.30	-0.21	1.74
log Banking	1.81	1.75	0.39	0.22	3.13	-0.01	0.51	4.64
log Road length	4.26	4.30	0.76	0.18	7.46	1.95	0.23	4.13

Note: # These variables are common variable irrespective of the sectors (rural or urban) and types of enterprises (OAME, NDME or DME). The values of summary statistics of these variables may change due to the changes in number of observations. However, this variation is small since the difference in number of observations is nominal either by sectors or enterprise types, except for DME enterprises. So, we report only the values for all observations.

Chapter 6

Conclusion

The question of industrial location is very important to understand the development of sub-national regions, especially in a developing country like India where economic activities are historically concentrated in few States and within the States in few districts. This is because of the traditional belief that industrialisation is the engine of economic growth, and in more recent view, industrialised cities are the primary source of modern economic growth. In principle, industrialisation follows "cumulative causation", that is new enterprises locate where other enterprises already exist. This is in order to realise the productivity advantages from being close to other firms, enhance market access, thick labor markets, available infrastructure and knowledge and technology spillover. It is argued that concentration of industries in few locations leads to regional inequality, which in turn, is one of the major causes of aggregate inequality (expressed as per capita value added or output). However, all industries are not influenced by profit motive; the location of state owned industries are influenced by the consideration of balanced regional development. Further, in a liberalised economy the role of the state has lessened, and therefore, many argued that spatial concentration of industries is likely to increase when an economy is liberalised. Such an argument, however, is against the theoretical prediction of the new economic geography (NEG) models, which argued that post-reform regional development is likely to be more balanced. This is the theoretical context against which the present study tries to examine the location of unorganised manufacturing industries in India in the pre- and post-reform periods.

The regional variation in industrial development has been a matter of concern to the policy makers in India since independence. Faced with widespread regional disparity and concentration of industries in few locations at the independence, the policy makers have advocated the strategy of balanced regional development and adopted a series of policy measures to guide the regional industrialisation process with many industries reserved for the public sector until the mid-1980s. That most of these policies were guided by the narrow interest of the vested groups and that they failed to achieve the desired goals is a different issue. The point is that the state-led policy regime has the potential for industrial development in the backward states, and thus, reduced regional

inequality in industrial as well as economic development. However, the economic reforms initiated in the country since 1991 has made large-scale de-licensing of industry and changes in the industrial location policies, and provided more emphasis on private sector investment, foreign capital, modern technology, access to international market and more competitiveness of Indian industries. Thus, in the new policy regime the role of the state as industrial owner and location regulator has lessened. Therefore, the crucial questions after reforms are: How did the policy changes towards liberalisation and globalisation affect the location of industries? Has concentration of industries declined in the post-reform period? What role the combined forces of the states and market have played in shaping the economic landscape of the country after economic reforms? What are the factors that influence the location of industries in the post-reform period?

In the recent past, some attempts have been made to address these issues. Focusing on the variation in location of industries across states/regions these studies typically found that spatial concentration of industries has increased in the post-reform period. However, there are also arguments in favour of the positive role of the liberalised policies in reducing spatial concentration of industries. With such opposing arguments and inconclusive empirical evidences, the existing literature is unclear regarding the pattern of regional distribution of industries in the post-reform period. However, all the existing studies have focused on the location of organised (or registered) manufacturing sector. Thus far, no attempt has been made to examine the regional pattern of unorganised manufacturing industries despite the fact that the sector is not only larger than its organised counterpart, but it is fairly diversified and differentiated in terms its relative share in the workforce and national income (GDP) and that it could be an instrument to the steep growing intra-and inter-regional inequality in the post-reform period. The dearth of information on the location of unorganised industries induced us to fill the gap in the existing literature. The present study has examined the spatial concentration of unorganised manufacturing industries at different geographical scales-districts, states and beyond states (regions) in the pre- and post-reform periods and identify the factors that influence the location of unorganised manufacturing industries in the post-reform period.

In this chapter we will summarise the major findings of the study. This will be followed by a discussion on the implications of these findings in the context of regional development in India and policy implications for balanced regional development. We conclude with a note on the shortcomings of the study and scope for further research.

6.1 Summary of Findings

The main findings of the study are summarised below:

(a) The unorganised manufacturing industries in India are found to be concentrated in few advanced states such as Maharashtra, Gujarat, Tamil Nadu, Delhi and West Bengal and within the states in few advanced districts. More precisely, biasness towards the metropolises and the emergence of some sub-urban districts around the metropolises on the one hand, and clustering of backward districts/states on the other are the emerging trends of location of unorganised manufacturing industries in the post-reform period. Two such well-known clusters are the clustering of Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh and Orissa and the clustering of north-eastern states.

(b) The spatial concentration of unorganised manufacturing industries, both at the state and district levels, has declined in the post-reform period. However, the decline has not taken place in the desired path as it is not due to improvement of the lagging states/districts; rather owing to the decline in the share of the leading states of Maharashtra, Gujarat and Delhi at the state level and decline of the leading districts such as Greater Mumbai, Delhi and Surat at the district level.

(c) The decline in spatial concentration is not uniform across the individual industry sectors. It has declined in as many as 16 two-digit (out of 22) and 43 three-digit (out of 55) industries across the states and in 17 two-digit industries across the districts. While at the aggregate level the DME enterprises and urban industries are found to be highly concentrated, at the disaggregated industry level high and medium-high-technology industries such as accounting and computing machinery, electrical, electronics and communications, motor vehicles and transport equipment etc are found to be highly concentrated.

(d) Although concentration of unorganised industries across the districts of 25 Indian states as a whole has declined during the study period, the experience of inter-district concentration for the individual states is not uniform. Maharashtra and Gujarat are the highly concentrated states followed by Himachal Pradesh, Punjab, Orissa and Haryana; whereas states of Bihar, Uttar Pradesh, Andhra Pradesh, Tamil Nadu and Assam are less concentrate. On the average, intra-state concentration of unorganised

manufacturing industries is found to be positively associated with the level of development of the states.

(e) Co-location of industries is another feature of the location pattern of unorganised manufacturing industries in India in both the pre- and post-reform periods. Co-location is higher and statistically significant in many industry pairs in terms of GVA compared to employment, which could explain the case of higher buyer-supplier linkages between the unorganised industry sectors compared to the labour sharing linkages. In general, co-location is high between transport and machinery, machinery and paper, metal and paper and machinery and metal industries.

(f) The most significant and dominant factors in determining the location and size of unorganised manufacturing industries at the district level for 2005-06 are the existing industry location (existence and size of unorganised manufacturing industries from the pre-reform period), industrial diversity, labour productivity, capital productivity, level of economic development and market size (expressed as population size and density of the district). This indicates the continuation of history and the dominant role of the economic geography in determining the location of unorganised industries in the post-reform period.

6.2 Relevance in the Context of Regional Development in India

What the observed location pattern of unorganised manufacturing industries is meant for regional development in India? What can the backward regions do in order to get away from the under-development bottleneck? What further policy intervention is necessary to achieve balanced regional industrial development? These are some of the obvious questions that arise given the observed findings of the study. However, answering these questions is not easy. Ideally, it should be based on evaluation of the earlier policies directed towards balanced regional development and it should not merely be based on the Indian context alone, rather in the context of the policy instruments adopted by other countries in order to alleviate regional imbalances. However, such an exercise is beyond the coverage of the present study, though our entire work up to this point has focused on the regional industrialisation process in the context of balanced regional development in India. Therefore, in the next few pages we restrict our discussion on the options for the lagging states to fight with its backwardness.

We have started with the argument the industrialisation is *sine qua non* for development and the unorganised manufacturing sector could play a crucial role in industrial development of the lagging regions and thus, could reduce regional imbalances. Though the findings show that regional imbalances in unorganised manufacturing sector at all three geographical scales- districts, states and beyond states (regions) have declined in the post-reform period, the changes have not taken place in the presumed way. While there have been little evidences for the improvement of the lagging districts/states in the post-reform period, the decline in inequality has taken place at the cost of the declining position of the leading districts/states. It is thus pointed out that though the centrifugal forces have been operating in the unorganised sector of the developed regions, the centripetal forces in the most lagging regions are not strong enough to attract new industries. At the same time, regional imbalances in the organised manufacturing sector and the overall development (income) have been widening in the post-reform period. Further, we have seen that the continuation of history and economic geography have a heavy burden on the regional development in India. In view of these findings, the conclusions of the present study is not quite hopeful, for what the backward states like Bihar, Orissa, Uttar Pradesh and the north-eastern states can do, at least in the short run, in order to get away from the under-development bottleneck. It is well known that the development outcomes of these states significantly lag behind the rest of the country. The success of the policies adopted by the State in the past is very poor in enhancing the economic performance of these states, and these states have been remained as the poorest states with highest incidence of poverty, low literacy rate, high infant mortality rate, low life expectancy, low human development, low socio-economic infrastructure, low capital formation and any other development indicators. This is a disturbing facet of the regional economy of India over the decades, which increased social and political tensions, tightened the stranglehold of the Naxalite movement and even demands for division of states in these areas. Therefore, this is the high-time for the State to look back its earlier policies and find out the loopholes therein; and take the correct steps for mitigating the long standing problem before it worsens further and becomes more complex. Of late, the emphasis of the State in the Eleventh Five-Year Plan for the urgency of "more inclusive growth" brings a ray of hope for millions of population of the country. However, the success of the strategy depends on how actively both the Central and State Governments participate in the development programmes and

to what extent the policies were able to include the lagging sections and regions of the country, which have been bypassed by the higher rates of economic growth in the past.

Since, most of the lagging states are agrarian economy, development of the agriculture sector through increasing productivity should be the priority of the development strategy of these states. Further, these regions should give more emphasis on the development of socio-economic overheads. These regions always stand at the back foot in the competition with the advanced states for new private (including foreign) investments due to poor infrastructure facilities and lack of better investment climate. Therefore, development of socio-economic infrastructure that improves local conditions such as connectivity with leading market areas, human capital, electric power, easy finance etc. is a must condition for the backward regions. For improving the investment climate, restrictions and complex regulations should be removed and major focus should be given in providing the necessary policy framework and supporting business environment that makes the private investors to attract for new investments. There is also an enormous necessity for reformulating the local political and institutional base of these states. It is the reality that the caste-based politics of Bihar and Uttar Pradesh or the socialistic pattern of governments of Kerala and West Bengal or the fighting between the bordering states in the north-eastern region have never supported the development programmes in these regions. Therefore, these states should come out of the local policy based trap and should focus on reformulating its policies based on pro-market reforms oriented strategy, so that the private players can play a significant role in economic development.

Turning to the development of unorganised manufacturing sector in the backward states, development of agro-based and resource based industries would be a worth considerable strategy for these states, since these states are rich in natural resources. Development of these industries would also simulate the development of both the upstream and downstream industries. At the same time, these states should focus on strengthening the linkages between the unorganised and organised manufacturing sectors. We have considerable evidence to suggest that the expansion of the unorganised sector in most of the developed states has taken place through subcontracting with the organised sector, whereas such linkages are very weak in the lagging states. Development of such linkages will provide opportunities for both the organised and unorganised manufacturing sectors to sustain through their complementary relationship. Such subcontracting relationship, further, provides a readymade market to the unorganised

sector products, which could be a solution to the demand side problem arising due to the decline of public sector demand for the sector's products in the post-reform period.

Finally, and most importantly, there is an enormous need for strengthening the database of the backward regions to understand the nature of the problems between and within these areas. Until recently, even the basic economic indicators at the district level for most of the lagging states are rarely available in the public domain. In recent years, many States have been preparing estimates of GDP for districts, as many as 18 States have published State Human Development Reports (SHDRs) and initiatives are taken for preparing District HDRs (DHDRs) for at least selected and District Health Profiles for all the districts during the Eleventh Five-Year Plan. The improvement in database of the backward regions will lead to more research and development activities on these areas, which in turn, will be helpful in mitigating the problems of under-development.

6.3 Limitations of the Study and Scope for Further Research

Unlike the existing studies, which have mainly focused on the organised manufacturing sector, the present study attempts to analyse the spatial concentration of unorganised manufacturing industries in the pre- and post-reform periods in India. We have explored a new data set- national sample survey (NSS) household (enterprise) level data on unorganised manufacturing industries for analysing the location pattern of industries at aggregated and disaggregated (two- and three-digit) industry level at different geographical scales. The analysis carried out throughout the study is both qualitative and analytical in nature. Since no studies, so far, have explored this data set for regional studies, the findings of the study are fresh and a new contribution in the area of regional industrial studies in India. The findings are important in understanding the regional development of unorganised manufacturing industries and its implication for regional development in India.

The present study, however, is not free from some limitations. Firstly, the study mainly focused on the distribution of unorganised industries across different geographical units. It would also be a better idea to analyse the performance of unorganised industries in terms of growth rates across different geographical units between the two periods, which will let us to know how the growth differentials across the different geographical units leads to spatial concentration. Secondly, the values (gross value added and fixed assets) used in the study are expressed in terms of current prices.

Therefore, the analysis does not provide a clear idea about the absolute change in these two variables between the two periods. However, since our main interest is to examine the relative positions of different geographical units compared to all-India average, this is not a serious problem for our analysis. Thirdly, while calculating degree of spatial concentration, the study used traditional concentration measures such as spatial Herfindahl index, spatial Gini index, Entropy index, Location Quotient etc. These measures, however, are not purely spatial measures as they hardly used any geographical characteristics of the data (though extensively used in the literature). Use of standard spatial measures like Ellison-Glaeser index or Moran's-I would have strengthen our analysis.

Notwithstanding the limitations a few issues have emerged from the study. Firstly, the study found that the location of unorganised manufacturing industries follows a similar pattern as that of the organised industries across the states and the association has increased in the post-reform period. This is a new pattern, as the earlier studies (Roy, 2000; Awasthi, 1991) did not find any locational linkages between the two sectors. Therefore, question arises about the nature of linkages between the two sectors at the regional level. Secondly, though the study presumed that the unorganised manufacturing sector could play a role of compensating spatial inequality in India, no attempt has been made in the present study to test the presumption. The existing literature is also silent in this context. Further research in these areas is necessary to strengthen the understanding on the importance of the unorganised manufacturing sector in the regional economy, since the sector is expanding at a faster rate and also recognised as the most potential sector for creating employment opportunities, especially in the backward and rural areas, and thus, could be a instrument for achieving "more inclusive growth".

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APPENDIX-I

A Note on the Database

A. NSS Data on Unorganised Manufacturing Industries

National Sample Survey Organisation (NSSO) is the principle agency engaged in the collection of information about various dimensions of unorganised manufacturing industries in India. Recognising the importance of the unorganised manufacturing sector in terms of its share in GDP as well as in total employment, it started collecting information on unorganised manufacturing industries since 1958–1959 and since then it has completed nine-rounds of survey on unorganised manufacturing industries (the other rounds are during 1968–1969, 1974-1975, 1978-1979, 1984-1985, 1989-1990, 1994-1995, 2000-2001 and the latest one being for the period 2005-06). These rounds differ from each other in terms of coverage, sampling approach and the definition of various concepts. This leads to comparability problem between different rounds of survey.

In the NSS framework the term unorganised manufacture basically referred to all manufacturing enterprises, which are not covered by the Annual Survey of Industries (ASI). As such the sector includes all the manufacturing enterprises except (i) those registered under section 2m(i) and 2m(ii) of Factories Act, 1948 and Bidi and Cigar Workers (conditions of employment) Act, 1966 and (ii) those run by Government (Central Government, State Governments, Local Bodies)/Public Sector Enterprises. NSSO has provided the details of the definition and concept of variables, scope and coverage of the survey, sampling design and estimation procedure in its reports for every round of survey.[1] Therefore, we assume that it is well known to the concerned readers. A brief discussion on the data adjustment and aggregation procedure used in the present study has been discussed in the following.

Data Adjustment and Aggregation

The 51st round of survey has collected information at the 4-digit level of National Industrial Classification (NIC) 1987 codes, whereas the 62nd round of survey has collected information at the 5-digit level of NIC 2004 codes. For maintaining comparability between these two rounds, required adjustments have been made for the 51st round. The industrial codes of the 51st round which are based on NIC 1987 codes

[1] See Reports No. 433 and 434 for the 51st round and Reports No. 524, 525 and 526 for the 62nd round for a discussion on the survey design and estimation procedures.

have reclassified to the NIC 2004 codes following the concordance suggested by CSO (2004).

There are some industrial categories of the 51st round like the repair and maintenance of computers and computer based systems (NIC 87 code 3941), repair of office, computing and accounting machinery other than computers and computer based systems (NIC 87 code 3942), repair of heavy motor vehicles (NIC 87 code 3980), repair of footwear and other leather goods (NIC 87 code 970), repair of household electrical appliances (NIC 87 code 971), repair of TV, VCR, radio, transistor, tape recorder and other electronic appliances (NIC 87 code 972), repair of watches, clocks and jewellery (NIC 87 code 973), repair of motor vehicles and motor cycles except trucks, lorry and other heavy vehicles (NIC 87 code 974), repair of bicycles and cycle rickshaws (NIC 87 code 975), repair enterprises not elsewhere classified (NIC 87 code 979), which are not included under the manufacturing sector in the NIC 2004 codes, rather these are included under wholesale and retail trade, repair for motor vehicle, motorcycles and personal and household goods (NIC 2004, section G, two-digit codes 50, 51 and 52). We have excluded these manufacturing categories from the 51st round for making this round comparable with the 62nd round. Similarly, the 62nd round has included enterprises engaged in cotton ginning, cleaning and baling (NIC 2004 code 01405) and recycling activities (two-digit NIC 2004 code 37), which were not collected in the 51st round. We have excluded these manufacturing activities from the 62nd round to make it comparable with the 51st round. After making all these adjustment, we have considered the manufacturing enterprises which are within the two-digit codes 15 to 36 of NIC 2004 codes.

Further, depending on the nature of the problem under study, we require industry-wise disaggregate data at the district level. NSSO has provided information at the state level as well as regional, sub-regional and district level. However, one problem arises for the 62nd round is that for some observations identification of the districts against the state is not possible, due to (a) missing value in the district codes and (b) some district codes against the state(s) are not matching with the codes that are given by the NSSO to the users for identifying at different levels of geographical units. Therefore, to obtain a balanced data set of state-district-industry panel, we have deleted the observations for which identification of district against state is not possible. After doing all these cleaning on both the data sets, the final data set consists of 82671 sample observations for the 62nd

ınd 192029 sample observations for the 51st round. A summary of various :s for both the rounds are given in the following table.

ımary of the Variables

Variables	51st Round (1994-95)	62nd Round (2005-06)
ıle size	192029	82671
f Enterprises	12547368	17053017
oyment	29814446	36403667
(Rs Crore)	28251	84895
₹s Crore)	44680	142354
per Worker (Rs)	9475	23321
per Enterprise (Rs)	22515	49783
l Assets per Enterprise (Rs)	35609	83477
l Assets per Worker (Rs)	14986	39104
of GVA to FA	0.63	0.60
oyment per Enterprise	2.38	2.13

Throughout the study we have performed analysis both for the aggregated / level (or overall manufacturing) and disaggregated for 22 two-digit and 55 git individual industry groups (identified as per NIC 2004 codes). However, in cases for simplifying the analysis we have reclassifies the 22 two-digit NIC 2004 ıto 11 two-digit industry groups: food products and beverages, tobacco products, leather and leather products, woods and woods products, paper & printing, ıl and petroleum, metal and metal products, machinery and electrical, transport ısport equipment and furniture and other manufacturing (see *Appendix-II*).

ns with the NSS data

A note on the problems of the NSS data is worth mentioning at this point. The ɔns of NSS data in terms of conceptual and estimation difficulty, availability and ıbility over time as well as across industries and across states have been well nted in the literature (Pradhan and Saluja, 1998; Saluja, 2004; Bedi and Banerjee, Nagaraj, 1999). First, since the NSS data are survey data they are naturally :d to the problem of variation in response and therefore in coverage (both industry a). Second, the enterprises which do not maintain book account during the :e period, for them information were collected orally for the reference month. ɔe of information is subjected to the problem of variation in response. Thirdly, it known that the value added and output of the unorganised sector is timated. Fourthly, since the definition of industry was set by the Factories Act,

certain types of establishments such as software manufacturers and activities in the service sector are not covered. This is likely to affect the estimates for districts like Bangalore in Karnataka and Hyderabad in Andhra Pradesh, which by reputation at least, have attracted significant investments in the software sector. Fifthly, the estimates for the smaller states such as Arunachal, Manipur and Nagaland etc. are not free of doubt as the sample size collected from these states are very small. Sixthly, there are problems arising from the coverage of the NSS survey. The 62nd round of NSS survey of unorganised manufacturing has covered the whole of the Indian Union except (i) Leh and Kargil districts of Jammu & Kashmir, (ii) interior village of Nagaland situated beyond five kilometers of bus route and (iii) villages of Andaman and Nicobar Islands which remain inaccessible throughout the year. Similarly, the 51st round of survey has covered the whole of the Indian Union except (i) Ladakh, Kargil, Anantnag, Pulwara, Srinagar, Badgam, Baramulla and Kupwara districts of Jammu & Kashmir, (ii) 768 interior villages of Nagaland situated beyond five kilometers of the bus route and (iii) 195 villages of Andaman & Nicobar Islands which remained inaccessible throughout the year. Thus, when we refer to these states and/or all-India, we should keep it mind that it will omit these areas. These limitations have to be borne in mind while measuring locational concentration of unorganised manufacturing industries both at the state as well as district level. Despite these limitations the NSS data are the best available data set for the unorganised manufacturing sector of India.

B. ASI Data on Unorganised Manufacturing Industries

Data on the organised manufacturing industries at the state level are collected from the the Annual Survey of Industries (ASI) conducted by NSSO and processed by Central Statistical Organization (CSO). It covers industrial units registered under the sections 2m(i) and 2m(ii) of the Factories Act, 1948 and Bidi and Cigar establishment registered under the Bidi and Cigar Workers (Conditions of Employment) Act, 1966. ASI collects data using two methods: a "census" sector survey with 100 percent coverage of units employing 50 or more persons with the aid of power and employing 100 or more persons with the use of power; and a "sample" sector survey of the smaller units employing 10 or more persons with the aid of power and 20 or more persons without the aid of power. The same procedure has been followed for the adjustment and aggregation of industrial classification for the two time points (1994-95 and 2005-06) as we have done for the NSS data source.

C. Other Data Sources

Among other data sources, we have used the Population Census, 2001for information relation to state and district wise geographical area, population, percentage of rural and urban population, literacy rate and percentage of households with access to electricity for household consumption etc. Data on value added generated from the manufacturing sector and its two sub-sectors (organised and unorganised) at the state level are collected from the net state domestic product (NSDP) statistics published by the National Accounts Division of CSO. The gross district domestic products (GDDP) statistics provided by the Directorate of Economics and Statistics (DES) of various State Governments and published by Planning Commission (website) has been used to obtain the district-wise value added from the organised and overall manufacturing sector and agriculture, forestry, mining and quarrying sectors. The Branch Banking Statistics (Vol. 3, March 2002) of Reserve Bank of India has been used for information about district-wise number of commercial bake branches. Information about district-wise total road lengths has been collected from the road length statistics provided by the Directorate of Economics and Statistics (DES) of various State Governments and complied by INDIASTAT, a private company engaged in compilation of data on Indian economy.

APPENDIX-II

Name of manufacturing Industries and their NIC codes

Aggregation of Industry and Name of the 2 digit Industries as per NIC 2004 codes

Industry groups	NIC 2004	Industry Description
Food & Beverages	**15**	Manufacture of Food Products and Beverages
Tobacco Product	**16**	Manufacture of Tobacco Products
Textiles	**17**	Manufacture of Textiles
	18	Manufacture of Wearing Apparel; Dressing and Dyeing of Fur
Leather	**19**	Tanning and Dressing of Leather; Manufacture of Luggage, Handbags, Saddlery, Harness and Footwear
Woods Products	**20**	Manufacture of Wood and Products of Wood and Cork, except Furniture; Manufacture of Articles of Straw and Plating Materials
Paper & Printing	**21**	Manufacture of Paper and Paper Products
	22	Publishing, Printing and Reproduction of Recorded Media
Chemical and Petroleum Products	**23**	Manufacture of Coke, Refined Petroleum Products and Nuclear Fuel
	24	Manufacture of Chemicals and Chemical Products
	25	Manufacture of Rubber and Plastics Products
	26	Manufacture of Other Non-Metallic Mineral Products
Metal and Metal Products	**27**	Manufacture of Basic Metals
	28	Manufacture of Fabricated Metal Products, Except Machinery and Equipment
Machinery and Electricals	**29**	Manufacture of Machinery and Equipment, n.e.c.
	30	Manufacture of Office, Accounting and Computing Machinery
	31	Manufacture of Electrical Machinery and Apparatus, n.e.c.
	32	Manufacture of Radio, Television and Communication Equipment and Apparatus
	33	Manufacture of Medical, Precision and Optical Instruments, Watches and Clocks
Transport and Equipment	**34**	Manufacture of Motor Vehicles, Trailers and Semi-Trailers
	35	Manufacture of Other Transport Equipment
Furniture and other industries	**36**	Manufacture of Furniture; Manufacturing n.e.c.

Source: Based on the information published by central Statistical Organisation (CSO)

Name of the 3 digit Industries as per NIC 2004 codes

NIC 2004	Industry Description	Technology Intensity[@]
151	Production, processing and preservation of meat, fish, fruit vegetables, oils and fats	L
152	Manufacture of dairy products	L
153	Manufacture of grain mill products, starches and starch products, and Prepared animal feeds	L
154	Manufacture of other food products	L
155	Manufacture of beverages	L
160	Manufacture of tobacco products	L
171	Spinning, weaving and finishing of textiles	L
172	Manufacture of other textiles	L
173	Manufacture of knitted and crocheted fabrics and articles	L
181	Manufacture of wearing apparel, except fur apparel	L
182	Dressing and dyeing of fur; manufacture of articles of fur	L
191	Tanning and dressing of leather, manufacture of luggage, handbags, Saddlery and harness	L
192	Manufacture of footwear	L
201	Saw milling and planting of wood	L
202	Manufacture of products of wood, cork, straw and plaiting materials	L
210	Manufacture of paper and paper product	L
221	Publishing	L
222	Printing and service activities related to printing	L
223	Reproduction of recorded media	L
231	Manufacture of coke oven products	ML
232	Manufacture of refined petroleum products	ML
233	Processing of nuclear fuels	ML
241	Manufacture of basic chemicals	MH
242	Manufacture of other chemical products	MH
243	Manufacture of man-made fibers	MH
251	Manufacture of rubber products	ML
252	Manufacture of plastic products	ML
261	Manufacture of glass and glass products	ML
269	Manufacture of non-metallic mineral products n.e.c.	ML
271	Manufacture of Basic Iron & Steel	ML
272	Manufacture of basic precious and non-ferrous metals	ML
273	Casting of metals	ML
281	Manufacture of structural metal products, tanks, reservoirs and steam generators	ML
289	Manufacture of other fabricated metal products; metal working service activities	ML
291	Manufacture of general purpose machinery	MH
292	Manufacture of special purpose machinery	MH
293	Manufacture of domestic appliances, n.e.c.	MH
300	Manufacture of office, accounting and computing machinery	H

311	Manufacture of electric motors, generators and transformers	**MH**
312	Manufacture of electricity distribution and control apparatus	**MH**
313	Manufacture of insulated wire and cable	**MH**
314	Manufacture of accumulators, primary cells and primary batteries	**MH**
315	Manufacture of electric lamps and lighting equipment	**MH**
319	Manufacture of other electrical equipment n.e.c.	**MH**
321	Manufacture of electronic valves and tubes and other electronic components	**H**
322	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	**H**
323	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods	**H**
331	Manufacture of medical appliances and instruments and appliances for measuring, checking, testing, navigating and other purposes except optical instruments	**H**
332	Manufacture of optical instruments and photographic equipment	**H**
333	Manufacture of watches and clocks	**H**
341	Manufacture of motor vehicles	**MH**
342	Manufacture of bodies (coach work) for motor vehicles; manufacture of trailers and semi-trailers	**MH**
343	Manufacture of parts and accessories for motor vehicles and their engines	**MH**
351	Building and repair of ships & boats	**MH**
352	Manufacture of railway and tramway locomotives and rolling stock	**MH**
353	Manufacture of aircraft and spacecraft	**H**
359	Manufacture of transport equipment n.e.c.	**MH**
361	Manufacture of furniture	**L**
369	Manufacturing n.e.c.	**L**

Note: @ Technology intensity of industries is based on OECD-1997 Classification (see Hatzichronoglou, 1997). L- Low, MH- Medium High, ML- Medium Low, H-High

Source: Based on the information published by central Statistical Organisation (CSO)

APPENDIX-III

Adjustment of Districts for Boundary changes between 1994-95 and 2005-06

Name of the states and their Codes used in the study

Sl. No.	State Name	Codes	Sl. No.	State Name	Codes
1	Andhra Pradesh	AP	14	Manipur	MANI
2	Arunachal Pradesh	ARP	15	Meghalaya	MEGH
3	Assam	ASS	16	Mizoram	MIZO
4	Bihar	BIH	17	Nagaland	NAG
5	Delhi	DEL	18	Orissa	ORI
6	Gujarat	GUJ	18	Punjab	PUN
7	Haryana	HAR	20	Rajasthan	RAJ
8	Himachal Pradesh	HP	21	Sikkim	SIK
9	Jammu & Kashmir	J&K	22	Tamil Nadu	TN
10	Karnataka	KAR	23	Tripura	TRI
11	Kerala	KER	24	Uttar Pradesh	UP
12	Madhya Pradesh	MP	25	West Bengal	WB
13	Maharashtra	MAH			

Adjustment of Districts for Boundary changes between 1994-95 and 2005-06

State	District Name	Merged Districts
Arunachal Pradesh	Lower Subansiri	Papum Pare
Assam	Dhubri	Kokrajhar
Bihar (including Jharkhand)	Bhagalpur	Banka
	Bhojpur	Buxar
	Munger	Jamui, Lakhisarai, Sheikhpura
	Rohtas	Kaimur
	Saharsa	Supaul
	Sitamarhi	Sheohar
	Dhanbad	Bokaro (50%)
	Giridih	Bokaro (50%)
	Hazaribag	Chatra, Kodarma
	Palamu	Garhwa
	Sahibganj	Pakaur
Gujarat	Bharuch	Narmada
	Junagadh	Porbandar
	Kheda	Anand
	Banas Kantha	Patan
	Panch Mahals	Dohad
	Valsad	Navsari
Haryana	Ambala	Panchkula
	Hisar	Fatehabad

	Rohtak	Jhajjar
Karnataka	Bellary	Davanagere (15%)
	Bijapur	Bagalkot
	Dakshina Kannada	Udupi
	Dharwad	Gadag, Haveri
	Raichur	Koppal
	Shimoga	Davanagere (30%)
Madhya Pradesh (including Chhattisgarh)	Bastar	Dantewada, Kanker
	Bilaspur	Karba, Janjgir, Champa, Kawardha (32%)
	Hoshangabad	Harda
	Jabalpur	Katni
	Mandla	Dindori
	Mandsaur	Neemuch
	Morena	Sheopur
	Raigarh	Jashpur
	Raipur	Dhamtari, Mahasamund
	Rajnandgaon	Kawardha (68 %)
	Shahdol	Umaria
	Surguja	Koriya
	West Nimar	Barwani
Maharashtra	Bhandara	Gondiya
	Dhule	Nandurbar
	Greater Mumbai	Mumbai, Mumbai Sub-urban
	Parbhani	Hingoli
	Yavatmal	Washim
Manipur	Imphal	East Imphal, West Imphal
Meghalaya	East Garo Hills	South Garo Hills
	East Khasi Hills	Ri Bhoi
Nagaland	Kohima	Dimapur
Orissa	Balangir	Sonapur
	Baleshwar	Bhadrak
	Cuttack	Jagatsinghapur, Jajapur, Kendrapara
	Dhenkanal	Anugul
	Ganjam	Gajapati
	Kalahandi	Nuapada
	Koraput	Nabarangapur, Rayagada, Malkangiri
	Phoolbani	Kandhamal, Baudh
	Puri	Khordha, Nayagarh
	Sambalpur	Bargarh, Debagarh, Jharsuguda
Punjab	Bathinda	Mansa
	Faridkot	Moga, Muktsar

	Hoshiarpur	Nawanshahr (30%)
	Jalandhar	Nawanshahr (70%)
	Patiala	Fatehgarh Sahib
Rajasthan	Ganganagar	Hanumangarh
	Jaipur	Dausa
	Kota	Baran
	Sawai Madhopur	Karauli
	Udaipur	Rajsamand
Tamil Nadu	Chengai Anna	Thiruvallur, Kancheepuram
	Madurai	Theni
	Salem	Namakkal
	South_Arcot	Kuddalore, Viluppuram
	Thanjavur	Nagapattinam, Thiruvarur
	Tiruchirappalli	Ariyalur, Karur, Perambalu
Tripura	North Tripura	Dhalai (83%)
	West Tripura	Dhalai (17%)
Uttar Pradesh (including Uttaranchal)	Aligarh	Hathras (75%)
	Allahabad	Kaushambi
	Almora	Bageshwar
	Bahraich	Shrawasti
	Banda	Chitrakoot
	Basti	S. Kabir Nagar
	Bulandshahr	G. Buddha Nagar (45%)
	Chamoli	Rudraprayag (65%)
	Deoria	Kushinagar
	Etawah	Auraiya
	Faizabad	Ambedkar Nagar
	Farrukhabad	Kannauj
	Ghaziaba	G. Buddha Nagar (55%)
	Gonda	Balrampur
	Hamirpur	Mahoba
	Mathura	Hathras (25%)
	Meerut	Baghpat
	Moradabad	Jyoti Phule Nagar
	Nainital	Udham Singh Nagar, Champawat (22%)
	Pithoragarh	Champawat (78%)
	Tehri Garhwal	Rudraprayag (35%)
	Varanasi	Chandauli, S.R.Nagar
West Bengal	Dinajpur	Uttar Dinajpur, Dakshin Dinajpur

Note: Figures in the parenthesis indicates the percent share of the new state given to the parent state, based on the population weight.
Source: Kumar and Somanathan (2009) and Dubey (2009)