CHAPTER I

INTRODUCTION

1.1. Motivation for the study

The manufacturing sector is important in terms of its contribution to India’s economic growth. The sector accounted for 14-16 percent of national Gross Domestic Product (GDP) during the period 1991-92 to 2011-12 (Government of India, 2012a). The share of the manufacturing sector in total employment during 2009-10 and in total exports during 2011-12 was around 11 percent (Government of India, 2011a) and 60.6 percent (Reserve Bank of India, 2013) respectively. Given the importance of the manufacturing sector for employment and income generation, the Twelfth Plan has recognised it as the engine of national economic growth in the long term for India’s growth to be inclusive. The manufacturing sector grew at the rate of only 7.7 percent as compared to the targeted growth rate of 10-11 percent during the Eleventh Five Year Plan period till 2009-10 (Government of India, 2011b). The share of the manufacturing in national GDP had remained only about 15 percent as compared to 26 percent in Malaysia, 30 percent in China, 31 percent in South Korea, and 36 percent in Thailand. In addition, the share of manufacturing of about 11 percent to total employment is unfavorably low compared to other emerging economies where employment share of manufacturing range from 15-30 percent (Government of India, 2013a). Thus, special attention has been directed towards changing the growth trajectory of the overall manufacturing sector of India through a set of policies and plans. For instance, the recent National Manufacturing Policy, 2011 of the Government of India aims at (i) increasing manufacturing sector growth to 12-14 percent over the medium term, (ii) enabling manufacturing sector to contribute at least 25 percent of GDP by 2025, (iii) creation of increased job/employment opportunities of about 100 million in the manufacturing sector by 2025, (iv) increasing domestic value addition and technological depth of manufacturing, and (v) enhancing global competitiveness.

The growth and development of the Small Scale Industries (SSIs) or more recently Micro, Small and Medium Enterprises (MSMEs) sector has a direct impact on the growth of the manufacturing sector as well as overall growth of the national economy.
The SSIs/MSMEs contribute significantly in terms of output, employment and exports of the overall industrial sector of India. The SSIs/MSMEs accounted for 44.86 percent of total industrial production, 8.72 percent of overall GDP during 2008-09 at 1999-00 prices and generated employment of about 73.2 million during 2010-11, the second highest source of employment generation after agriculture (Government of India, 2012b). The contribution of the SSIs/MSMEs to the gross value of output of the manufacturing sector in 2005-06 was 39 percent (Government of India, 2008a) and to the total exports of the country in 2007-08 was 30.80 percent (Government of India, 2009) respectively. The SSIs in India are defined in terms of the original gross value of fixed investment on plant and machinery. This sector is further distinguished into registered and unregistered. Typically majority of the enterprises operating in the SSIs sector is unregistered and small in their size and scale of production. Given the smallness of size and scale, efficiency and productivity growth of the SSI sector is important for their survival, growth, and competitiveness. In the above context, the key motivations for the present study are as follows.

First, it is essential to look into the competitiveness of this sector in the new economic policy regime. One way of doing so is to examine the efficiency performance (either maximization of output or minimization of cost) and productivity growth. Efficiency and productivity growth are considered to be important determinants of growth and competitiveness. Economic liberalization and the new economic policies posed several challenges to the SSIs in terms of maintaining their competitiveness in both the domestic and the international market. Specifically, with the opening up of the Indian economy following the economic reform process in terms of shift from regulated and controlled policy to a liberal one by delicensing; deregulating; and dereservation, the SSIs have been faced with the challenges of increased competition and maintaining competitiveness. These calls for research exploration on whether the SSIs sector of India have been able to maintain their competitiveness in the new policy regime through efficiency and productivity growth.

Second, an inquiry into the patterns of manufacturing sector’s growth, particularly, from the point of view of Total Factor Productivity (TFP) growth is required. TFP growth is regarded as an important determinant of growth besides the usual inputs such as labour and capital. In the neo-classical growth theories, TFP growth is
measured with the assumption of existence of an aggregate production function along with optimal allocation of resources. An important limitation of the neo-classical approach to the measurement of aggregate TFP/TFP growth is its neglect of inter-sectoral misallocation of the factor of production. The manufacturing sector of India is dichotomised into organised/registered manufacturing and unorganised/unregistered manufacturing. This dichotomy needs a focus on measuring the impact of allocation of labour and capital on aggregate manufacturing TFP and TFP growth of India.

Third, a major focus of the recent policies pertaining to the SSIs sector is technological upgradation and skill development for increasing the competitiveness of SSIs sector of India through “clusters” of micro and small enterprises. The clusters are sectoral and geographical concentration of firms producing either similar or related products that can derive certain advantages from being located within clusters. Analysis of growth and productive efficiency of clusters of micro and small enterprises is policy useful to enhance and strength their competitiveness.

The above motivations lead to the following key research questions for the study.

1. How the micro and small enterprises of India have grown and contributed towards the economy? What are the major aggregate and disaggregate indicators of economic performances of this sector?

2. What is the performance of the SSIs sector of India in terms of efficiency levels and productivity growth? How such performance is measured and what are the determinants?

3. How does the misallocation of resources across different sectors impact on the measurement of aggregate TFP/TFPG and what are its implications for the growth of the manufacturing sector of India?

4. Whether cluster of small enterprises can improve their growth prospects? If, so, then what are the sources of growth of clusters?

5. What are the implications of efficiency, productivity growth, and other performance indicators on competitiveness of SSIs sector?
1.2. Review of literature by research questions

The review of literature is focused on the aforementioned research questions for the purpose of identifying the research gaps.

*How the micro and small enterprises of India have grown and contributed towards the economy? What are the major aggregate and disaggregate indicators of economic performances of this sector?*

A number of studies estimated the growth, contribution and economic performance of the SSIs sector of India since economic liberalization. The main focus of these studies is to measure growth rates of the number of units, value of production, employment and exports using a single or different official data sets and sources on the SSIs sector such as Census of SSIs, annual data of Development Commissioner for Small Scale Industries (DCSSIs), Reserve Bank of India (RBI) etc. These studies include Morris and Basant (2004), Das (2006), Narayana (2006, 2007), Vijay and Mahaprabhu (2010), Small Industries Development Bank of India [SIDBI (1999)] and National Council for Applied Economic Research [NCAER (1999)], Reddy (2008), United Nations Industrial Development Organisation [UNIDO (2001)], Subrahmanyabala (2005), Sonia and Kansal (2009), Shastri *et al* (2011), Mishra (2012) etc. These studies used data at the aggregate or national level. Few studies used data on unorganised sector along with data on SSIs for measuring total units and the performance indicators of the SSIs sector. Morris and Basant (2004) provided separate estimates of employment and value added for non-factory or unorganised manufacturing sector using National Sample Survey (NSS) data in addition to providing estimates of value of production, employment, and exports for registered SSIs using DCSSI data. But, the study did not estimate the number of units and the performance indicators of the unregistered SSIs sector. The study assumed that the unorganised sector includes both modern small firms (the non-factory component) and the household sector and is not reflective of the modern small firms. Government of India (1997, 2001a) compared between registered SSIs and unorganised manufacturing units in terms of value added and ownership pattern based on the assumption that the unorganised sector is consisted of unregistered SSIs. The subcommittee of National Commission for Enterprises in the Unorganised Sector [NCEUS (2008)] estimated value added for the SSIs in the unorganised sector for the

What is the performance of the SSIs sector of India in terms of efficiency levels and productivity growth? How such performance is measured and what are the determinants?

Studies during the 1980s and during the liberalization period of the 1990s such as by Page (1984), Little et al (1987), Bhavani (1991), and Government of India (1997) analysed the efficiency of the Indian SSIs using deterministic frontier approach which defines technical efficiency as the ratio of observed output to the maximum potential output. Page (1984) did an intra-industry comparison of specific SSI industry groups for 1979-81 and found that printing and machine tools industries are more efficient compared to other industry groups. Little et al (1987) found wide and substantial variations in total factor productivity and technical inefficiency. The study also found printing and machine tools industries to be more efficient than others. Bhavani (1991) did intra-industry comparison using data for metal industries from the First Census of Registered SSIs 1973-74 and observed that for all four metal industries and for all size classes average level of efficiency is quite high. The study found SSIs to be operating close to their maximum potential output level and that efficiency increases with increase in size up to a size class and declines. Government of India (1997) did a comparison of efficiency levels between SSIs and large scale industries using RBI and ASI data for the period 1984-85 and observed most SSIs to be less efficient and productive than their large industrial counterparts except for the leading exporting SSIs.

Goldar (1988) used RBI and ASI data for 37 industries and observed relative efficiency index is less than unity for 34 out of 37 industries suggesting that SSIs are less productive than large industries during the period 1976-77. Using RBI original unpublished data for 1979, Ramaswamy (1993) found no systematic relationship between relative efficiency of the small firms and firm size during 1976-77. Nath (1996) measured relative efficiency of SSIs in fifteen selected Indian states and did an inter-state comparison of these measures using data from the Second All India Census of SSIs 1973-74. It was found that consumer durable industries had the highest average efficiency indexes with smaller coefficient of variation across states while the intermediate product industries and the consumer non-durable industries had wider variations in their relative efficiency indexes across states. The study also found relative size of the SSIs to be a significant determinant of inter-state differences in relative efficiency of industries. SIDBI (1999) study on productivity of SSIs and large scale industries at the aggregate level for the period 1980-1994 showed that the index of TFP growth of the SSIs remained greater than one in every year except for 1987-88 (0.53) which implied that at the all India level the SSIs are more productive than the large scale industries.

Studies by Goldar (1985), Ramaswamy (1994), and Nikaido (2004) analysed technical efficiency of the SSIs using stochastic frontier model which decomposes the error term of the model into two components such as the one beyond the control of the firm and the other representing inefficiency. Goldar (1985) estimated Cobb-Douglas stochastic frontier using firm level data on small scale washing soap industry from the First Census of SSIs 1973-74. It was found that tiny units are inefficient compared to relatively larger units. The study also found positive relationship between firm size and efficiency, and between firm size and capital intensity. Ramaswamy (1994) found lower intra-industry variation in technical efficiency among four SSI groups for 1976-77. Moreover, profitability was found to be positively related to technical efficiency. Using industry-state wise data from Second All India Census of SSIs 1987-88, Nikaido (2004) found inefficiency in production of about 20% for all industries. The study found lower intra-industry variation in technical efficiency.

*How does the misallocation of resources across different sectors impact on the measurement of aggregate TFP/TFPG and what are its implications for the growth of the manufacturing sector of India?*
**Global studies**

Dinglu (2002) used data for six major sectors and 13 industrial sectors of the Chinese economy and examined the impact of inter-sectoral factor reallocation on productivity growth. The study found disappointing inter-sectoral factor reallocation effects as the cause of the slowdown in productivity growth of the Chinese economy during the post-reform period. Restuccia (2004) showed the presence of barriers to capital accumulation in a dual economy lowers the return to factor allocation in modern technology and thereby increases the share of factor allocation to the traditional technology. Such miss-allocation of the factors of production lowers the aggregate TFP of the economy endogenously. Restuccia and Rogerson (2008) argued that the misallocation of capital results in low aggregate output per worker and TFP. Hsieh and Klenow (2009) found that a hypothetical reallocation of capital and labour to equalize marginal products to the extent observed in the United States leads to manufacturing TFP gains of 30%–50% in China and 40%–60% in India. Temple (2003) verified whether the aggregate TFP could be raised by a reallocation of labour from lower to higher marginal productivity sector and found that the elimination of dualism raised aggregate TFP by around 10% at most. Vollrath (2006) and Cordoba and Ripoll (2006) assessed the importance of intersectoral differences in TFP, capital-output ratios, etc. on aggregate labour productivity. Vollrath (2006) suggested that aggregate productivity is depressed by inefficient factor markets that allocate too many factors to low productivity sectors. Chanda and Dalgaard (2008) argued that relative efficiency and productivity between sectors is affected due to misallocation of inputs across sectors which results in unequal marginal productivities of the factors of production in different sectors. Banerjee and Duflo (2005) identified a number of factors for understanding the differential rates of return to factor and investment rates in poor countries. These factors include government failure in terms of both excess intervention and lack of appropriate regulation in property rights and legal enforcements leading to misallocation of resources. The other factors include improper functioning of credit market in developing countries resulting in credit constraints and thereby miss-allocation of capital across firms/sectors, problems of functioning of insurance market in the traditional sector of a dual economy leading to risk aversion behaviour and thereby inefficient investment decisions, sector specific local externalities, and home/family based production. Azariadis and Kaas (2009) theoretically examined how credit market frictions limit capital mobility and slow
down the movement of resources from less to more productive sectors. The study found for the economies characterised by AK technologies, limited loan enforcement, and many sectors producing the same good, aggregate growth rate and TFP respond to random and persistent endogenous fluctuations in the sectoral distribution of physical capital which in turn depends on relative sector productivities.

**Indian studies**

A large number of empirical studies are found in the available literature on estimation of TFPG of the manufacturing sector of India including both organised and unorganised manufacturing sectors. These studies can be found in Trivedi et al (2011). Using different empirical estimation methodologies such production function, growth accounting, and data envelopment analysis and Annual Survey of Industries (ASI) data at different levels of disaggregation of industry groups for various states or at the national level, a number of studies estimated TFPG for the organised/registered manufacturing sector. These studies include Ahluwalia (1991), Balakrishnan and Pushpangadan (1994), Dholakia and Dholakia (1994), Majumdar (1996), Rao (1996a, 1996b), Pradhan and Barik (1998, 19999, 2004), Mitra (1999), Hulten and Srinivasan (1999), Trivedi et al (2000), Ray (2002), Trivedi (2003), Unel (2003), Das (2004), Mukherjee and Ray (2004), Goldar (2004), Veeramani and Goldar (2005), Banga and Goldar (2007), Rajesh and Mahapatra (2009) etc. Similarly, using NSS data the studies such as Mohanty (1992), Unni et al (2001), Raj and Mahapatra (2009), Raj and Duraiswamy (2008), Goldar and Mitra (2008), Kathuria et al (2010), Kathuria et al (2013a) estimated TFPG for the unorganised/unregistered manufacturing sector at different state levels as well as at all India level. Some of these studies also did a comparison of TFPG between registered and unregistered manufacturing sectors. These studies clearly indicate heterogeneity in TFPG across the two manufacturing sectors. Some of the recent studies by Kotwal et al (2011) and Kathuria et al (2013b) showed manufacturing dualism in India in terms of persistent wage gaps and productivity differentials between the organised/formal and unorganised/informal manufacturing sector. However, none of the above mentioned studies related allocation of factors of production with the measurement of manufacturing TFP/TFPG. Hsieh and Klenow (2009) is the only study in the context of registered manufacturing sector of India which examined how the misallocation of capital and
labour can lower aggregate TFP. The study used industry level data at 4-digit level to quantify the drag on productivity due to misallocation in manufacturing.

**Whether cluster of small enterprises can improve their growth prospects? If, so, then what are the sources of growth of clusters?**

**Theoretical studies**


**Empirical studies**

The empirical studies on sources of growth of clustered small firms explained the sources of growth in terms of several factors such as non-vertically integrated production, inter-firm relations, common socio-cultural identity, existence of business association, presence of traders and buyers and hence increased accessibility to markets, government support, and capability to absorb external shocks. The empirical studies are distinguished between global and Indian studies.
Global studies
The studies explaining the sources of growth of clusters in terms of factors such as inter-firm relations, common socio-cultural identity, existence of business association, and increased market accessibility due to presence of traders and buyers include Smyth (1991) study of Rattan furniture cluster of Tegalwangi in Indonesia, Weiss (1991) study of Sialkot sports goods manufacturing cluster in Pakistan, Villaran (1993) study of CBK Lima machine tools clusters in Peru, Schmitz (1992a) study of Sinos valley shoe cluster in Brazil, and Bair and Gereffi (2001) study of Torreon textiles cluster in Mexico. Moreover, some studies explained the sources of growth of clusters in terms of non-vertically integrated production structure and capability to absorb external shocks through inter-firm cooperation. These studies include Schmitz (1998) study of Sinos valley shoe cluster in Brazil, Nadvi (1999) study of Sialkot surgical cluster in Pakistan, and Rabellotti (1999) study of footwear clusters of Guadalajara and Leon in Mexico. In addition, few studies provided empirical evidence of better performance and productivity of clustered small firms compared to non-clustered small firms. These studies include Visser (1999) study of garment industry of Lima in Peru, and Madsen et al (2006) study of firm clusters at different industry levels in Denmark.

Indian studies
Among the Indian studies Cawthorne (1993) study on Tirupur knitwear cluster, Tewari (1990, 1992) studies on Ludhiana mixed product cluster and woollen knitwear cluster, Kashyap (1988, 1992) studies on woollen knitwear cluster of Ludhiana, and Knorringa (1999) study on Agra shoe cluster showed the presence of inter-firm production relations, trade networks, and socio-cultural identity are the main factors behind the functioning and growth of the respective clusters under study. Furthermore, studies such as by Knorringa (1999) of Agra shoe cluster found increased cooperation with suppliers of inputs and buyers of final product to be a major factor for most of the local clustered firms responding successfully to economic liberalization of 1990s. Das (2003) study of flooring tile cluster in Morbi town and garment cluster in the Ahmedabad city of Gujarat found intense inter-firm competition along with collective action in various forms led to reduction in both transaction and production cost and hence total cost saving. The latest study by Narayana (2014) analysed the determinants of size-class of production of clusters
using binary logistic model and found that potentiality for high and medium technology upgradation, export promotion, basing on market or resources are the key sources of growth effects of clusters in India. However, very few studies, for example, Narayana (2007) did empirical measurement and comparative analysis of economic size and performance of non-clustered and clustered SSIs and showed a bigger economic size and a higher economic performance of clustered SSIs as compared to non-clustered SSIs.

What are the implications of efficiency, productivity growth, and other performance indicators on competitiveness of SSIs sector?

Theoretical studies

A number of theoretical studies argued that competitiveness is a multi dimensional concept. These include Trivedi et al, (2011), Kathuria (1995), Narayana (1993), National Productivity Council (1999), Siaggel (2001), Banwet et al (2002), and Gowswami and Dollar (2002). According to the literature such as by Sharples (1990) and Ahearn et al (1990) competitiveness does not have a unique definition. The classic literature survey study by McGreehan (1968) does not provide any concrete definition of competitiveness. According to the Organization for Economic Cooperation and Development (OECD, 2001), competitiveness is the ability of companies, industries, regions, and nations to generate, expose to international competition, relatively high factor income and factor employment on a sustainable basis. The European Commission (2009) defines competitiveness as sustained rise in the standards of living of a nation or region. In the Global Competitiveness Report (2009-10), the component indices of the Global Competitiveness Index include both micro and macro determinants of competitiveness. According to Narayana (2004), the existing studies have described and measured competitiveness with respect to select indicators and indices as evident from the growth competitiveness indices of World Economic Forum (2000), indices of economic performance; efficiency; and infrastructure in the World Competitiveness Year Book of the International Institute for Management Development, competitiveness indices of the World Bank (2004a, 2004b), and indices of trade performance and competitiveness found in Research and Information System for Non-Aligned and Other Developing Countries (2004). The United Nations Industrial Development Organization (UNIDO) in the Industrial Development Report (2002-03) introduced the Competitive Industrial Performance
Index (CIP) which shows the national industrial performance in the global economy based on eight indicators of performance and then by taking their average. A comprehensive literature review on definition, measurement methods, is found in Latruffe (2010).

**Empirical studies: Indian**

Among the Indian studies, Narayana (2004), Bala Subrahmanya (2005), Rathod (2007), and Shastri *et al* (2011) analyses the determinants of competitiveness of SSIs in terms of improved credit flows, human resource development, provision of appropriate technology, ensuring high quality and low cost infrastructure facilities, and improved business environment. Competitiveness in these studies is measured at the aggregate level and by income and employment generation. The study by Kumar and Gupta (2008) accessed competitiveness of both organized and unorganized manufacturing sector at industry and state level using indices of value added, employment, wage, and partial productivities. But, the study is not specific to the SSIs segment and it did not use any aggregate index to measure competitiveness of India’s manufacturing sector. Trivedi *et al* (2011) used state level disaggregate data on organized manufacturing sector to find out the relationship between state level TFP growth and their competitiveness scores. The study took select state wise competitiveness scores from other sources in which competitiveness is measured by state level characteristics such as factor conditions, demand conditions, strategic context and supporting conditions. However, it did not find any systematic relationship between competitiveness and TFP growth of the states. In addition, it focused only on the organised manufacturing. The study by Indian Institute of Foreign Trade (2010) is the only study in this which used rigorous techniques such as modified Cleveland *et al* (1989) model and principal component analysis and detailed primary survey data to construct a competitiveness index for five specific sectors in the unregistered small sector. But, the scope of the study is limited to few sectors and states.

**1.3. Research gaps**

Based on the above review of literature, the following research gaps/researchable issues are identified:
1. The existing studies estimated contribution, growth and performance of the total SSIs sector at the aggregate. Very few studies did disaggregate measurement of contribution, growth and performance of the SSIs sector. Moreover, no separation is made between registered and unregistered sectors. This leaves a gap on estimation of contribution, growth, determinants, and impact of economic performance by registered and unregistered sector with a focus on the unregistered segment of the total SSIs sector.

2. The impact of factor market misallocation across sectors and sub-sectors on aggregate TFP has been examined in a number of global studies using both theoretical and empirical frameworks. The Indian studies separately estimated TFP growth of registered/large scale and unregistered/small scale manufacturing sectors at aggregate and different disaggregated levels using different empirical estimation methodology. However, factor market misallocation between large and small scale manufacturing sector and its impact on the measurement of aggregate manufacturing TFP/TFP growth is a new researchable issue.

3. A few studies measured efficiency and productivity changes of the registered SSIs sector at the aggregate and disaggregate levels such as industry or state. These studies are yet to be (a) updated according to the availability of the recent data sources on SSIs and (b) disaggregated to obtain the estimates of efficiency and productivity by unregistered SSIs sector.

4. The empirical studies on small firm clusters including both global and Indian studies are based on case studies. These studies leave a research gap to (a) distinguish between clustered and non-clustered or dispersed SSIs to measure the growth performance of SSIs and (b) show how clusters can be a potential source of improved growth and competitiveness of the SSIs at the national and sub-national levels.

5. Implications of productivity, efficiency and other performances are yet to be coherently analysed from the point of view of competitiveness of SSIs with special reference to unregistered sector.
1.4. Objectives of the study

The main objectives of the study are as follows:

1. Measurement of contribution, growth and economic performance of SSIs sector at aggregate and dis-aggregate levels, such as, at the industry level by distinguishing between registered and unregistered enterprises.

2. Estimation of efficiency and productivity changes of the unregistered manufacturing SSIs by various dis-aggregates.


4. Distinguish the economic performance between the non-clustered and clustered SSIs at national and sub-national levels. Identify the sources of growth of clusters of small enterprises and draw implications for growth and competitiveness of SSIs.

5. Measure competitiveness of the unregistered SSIs by linking efficiency, productivity, and other economic performance indices.

1.5. Methodology

Methodology for accomplishing the objectives of this study is presented by measurement techniques or estimation models, major data sources and time frame. These descriptions are given by each objective separately for clarity of exposition.

The methodology for the first objective is descriptive and comparative. The estimation of contribution, growth and select economic performances of SSIs is at aggregate and dis-aggregate levels. Aggregate contribution is measured by contribution to GDP, industrial production, employment, and exports. Aggregate economic performance of SSIs is measured by using indices such as number of units output, employment and exports. Growth of these indices is measured by using Compound Annual Growth Rate (CARG). The time frame for measuring the aggregate contribution, growth and performance is 1990-91 to 2005-06. The data sources used for aggregate analysis are various Economic Surveys of the Ministry of
Finance; Annual Reports of the Ministry of MSMEs; and Handbook of Industrial Policy and Statistics of the Ministry of Commerce and Industry. Estimation of total number of registered and unregistered enterprises and the economic performance indicators at the industry level disaggregation is based on all India data sources on SSIs/MSMEs sector. Specifically, the Third and the latest Fourth Census data on registered sector for 2001-02 and 2006-07 is used. The data on unregistered sector for the corresponding periods is taken from the sample survey of unregistered sector conducted by DCSSIs/MSMEs. Given the availability of disaggregate level data on unregistered sector only for 2001-02 and 2006-07, the time frame for comparison between registered and unregistered sector is between two periods: 2001-02 and 2006-07.

The methodology for the second objective is Data Envelopment Analysis (DEA) and Malmquist multi-factor productivity index. DEA is a mathematical linear programming method for construction of a non-parametric piecewise frontier over the given input-output data and thereby estimation of efficiency relative to the constructed frontier. The DEA method provides the estimates of technical efficiency, allocative efficiency as well as scale and cost efficiency. One of the important limitations of using DEA is the sensitivity of the efficiency estimates to sampling variations. To overcome this limitation, DEA with bootstrap technique is used to establish the sampling properties of the efficiency estimates. Estimated efficiency scores obtained in the first stage is regressed on the set of enterprise specific variables using a second-stage regression to analyse the determinants of technical efficiency. The bootstrap technique is applied to Malmquist DEA multi-factor productivity index to measure TFP growth from the given panel data and decompose the estimate into technical efficiency change and technical change. The Index is used to distinguish between pure technical efficiency change and scale efficiency change which captures the effect of firm size on productivity. The data used for the estimation of efficiency is the sample survey of unregistered micro and small enterprises conducted under the Fourth Census for 2006-07 and NSS unit level data on unorganised manufacturing enterprises for 2005-06 and 2010-11 respectively. Using the unit level data of NSS, it is not possible to obtain these estimates in a straight forward manner due to definitional differences existing between unregistered manufacturing SSIs and unorganised manufacturing enterprises covered under NSS. To overcome this
problem of comparability, definitional differences are adjusted by redefining the unorganised enterprises by the investment limits on plant and machinery. TFP growth of the unregistered SSIs is estimated covering the period 1994-95 to 2010-11. The justification for selecting 1994-95 to 2010-11 as the time frame for TFP growth analysis is due to the availability of NSS unit data on unorganised manufacturing for the periods 1994-95, 2000-01, 2005-06, and 2010-11. Like the case of efficiency, unregistered manufacturing SSIs are taken out from the unit level data of NSS for each of these periods.

A general equilibrium model of production (two-sector approach) is adopted from Chanda and Dalgaard (2008) for analysis of the third objective. This basic model explains the impact of factor market misallocation (captured in terms of factor productivity differences and reflected through factor price differentials across different sectors) on aggregate TFP level. This model is extended to analyse and estimate possible cases of factor market misallocation and their comparison with the optimal allocation. Four possible cases of factor market misallocation are distinguished: (1) misallocation in labour and capital market, (2) misallocation in capital market and not in labour market, (3) misallocation in labour market and not in capital market, and (4) misallocation neither in labour market nor in capital market has been considered. Considering organised manufacturing as large scale and unorganised manufacturing as small scale, the empirics of the model shows how movements from cases of misallocation to optimal allocation improve aggregate manufacturing TFP. The empirical estimation of TFP involves estimation of output elasticity of labour and capital in the organised and unorganised manufacturing. For this estimation purpose regression technique is applied by using data over the period 1994-95 to 2010-11 from ASI and NSS. It must be noted that ASI data is available annually over the entire period 1994-95 to 2010-11 whereas comparable NSS data is available only periodically for 1994-95, 2000-01, 2005-06, and 2010-11. The numerical simulation technique is used for determining the path of aggregate manufacturing TFP during the period 1994-95 to 2010-11.

The methodology for the fourth objective is descriptive, comparative, and empirical. Using all-India as well as state level data on clustered and non-clustered unregistered SSIs, select performance indices such as total number of units, output, employment,
exports, etc., has been compared between clustered and non-clustered unregistered SSIs. In addition, the contribution of clusters in terms of percentage share of clusters to total of unregistered SSIs sector’s number of units, production, fixed capital and employment has also worked out. The main data source for this is the Third All India Census of SSIs for 2001-02. The time frame would be restricted only to a single period: 2001-02 due to availability of data on clustered and non-clustered SSIs only for 2001-02. In addition, data from Small Industries Development Organization (SIDO) on 338 clusters for 2003 and Cluster Development Programme’s data on 358 clusters for 2003 is also used for the purpose. Concept of Location Quotient (LQ) is used for identifying the clusters of unregistered micro and small enterprises. LQ is a measure of concentration of an industry in a region compared to a larger geographic area (state or nation). It is calculated by comparing the industry specific share of regional employment with its share of national employment. Specifically, using NSS unit level data the clusters of small firms have been identified at different state and manufacturing industry level. Using logistic regression the determinants of unregistered small firm clustering has been done to identify the sources of growth of clusters. These analyses have been carried out for a single period i.e. 2005-06 based on the NSS data.

For the fifth objective, an aggregate index of SSIs competitiveness is constructed using eight individual performance indices. These individual performance indices are broadly related to size, contribution, efficiency, and productivity. The methodology followed for aggregating these individual performance indices is the Borda rule/ranking. Based on these ranks, the competitiveness of the industries is defined.

1.6. Organisation of the thesis

The thesis is organised in nine chapters. Chapter one is introductory and gives the motivation for the study, key research questions, review of literature, research gaps, objectives and methodology. Chapter two provides the analysis of contribution, growth and performance of the SSIs sector at aggregate and industry level disaggregation with special reference to the unregistered sector. Chapter three analyses the technical efficiency of the unregistered MSMEs by major industrial groups for 2006-07. Chapter four extends the Chapter three by focusing on the technical efficiency performance of the industries for 2010-11 and analysis of
determinants of technical efficiency at the enterprise level. Chapter five analyses the TFP growth of the unregistered SSIs by major industries over the period 1994-95 to 2010-11. Chapter six measures the impact of misallocation of the factors of production between large and small industries sector on the measurement of aggregate manufacturing TFP growth. Chapter seven does a comparative analysis of economic performance of clustered and non-clustered unregistered SSIs and finds out the determinants of small enterprise clustering. Chapter eight measures competitiveness of the unregistered SSIs by broad industries and examines the main sources of competitiveness including clusters. Chapter nine gives major conclusions, select implications, and potential extensions.