Exports by Indian Manufacturing SMEs
Regional Patterns and Determinants

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Acknowledgement: This study is prepared as a part of the research project, *Regional Patterns of Internationalization of Indian Firms: Learnings for Policy*, sponsored by the Indian Council of Social Science Research, New Delhi.

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Abstract: This study analyzes inter-state differences in the export performance of small and medium enterprises (SMEs) in India with an emphasis on determinants of such activities. Utilizing a unique firm-level dataset, it shows that the contribution of SMEs in the manufacturing exports from India is modest during 1991–2008 and it is mostly dominated by low technology products. Regionally, SME manufacturing exports is heavily concentrated with Southern states alone accounting for half of it during 200–08, followed by Western India. The export determinant analysis brought to the fore the significance of certain key physical and economic infrastructure for SMEs, particularly access to ports, power, telecommunications and loan finance. Local market conditions, namely the size, growth and per capita income of the host states also favourably affect SME export activities. Apart from improving the key business supporting infrastructure, the state policy makers may better enhance export orientation of SMEs by networking them to R&D facilities and providing easier access to information on overseas markets. This is because SMEs are more dependent on foreign technologies for enhancing their exporting rather than in-house R&D. Relatively smaller enterprises need greater support as they are disadvantaged by their size.

Key Words: *SMEs*, *Exports*
JEL Classification: *L11*; *F10*

1. Introduction

Small and medium enterprises (SMEs) play a prominent role in the industrial and growth dynamics of a number of economies (UNIDO, 2001). The fact that they account for more than 90 per cent of all enterprises in the world and contribute as high as 80 per cent of employment in manufacturing is a testimony to their ability to determine the magnitude and direction of economic development.

In India, an estimated 7.5 million SMEs including miro enterprises were engaged in manufacturing activities in the year 2006–07 and created over 30.4 million manufacturing jobs (DCMSME, 2009). The percentage contribution of this sector in national manufactured output and manufacturing exports are 45 per cent and 40 per cent respectively (Government of India, 2010). These SMEs are known to be active across a broad range of sectors covering over 8000 products[1].

Despite the general appreciation of the role of SMEs in India and their potential for promoting Indian exports, very little is known about SME manufacturing exports by states. As policy-makers in many Indian states like Gujarat, Maharashtra, Karnataka, etc., have recognized the importance of SME internationalization for export performance, the comparative performance of SME manufacturing exports across Indian states will be useful for policy implications. Moreover, there is paucity of empirical studies dealing with the factors that drive SME exports from India, especially from their origin in regional context.

The objective of the present study, thus, is to consider SMEs in Indian organized manufacturing sector and examine their export performance across Indian states. Drawing upon a unique locational dataset on Indian firms, it will presents preliminary findings on the regional trends and profiles of manufacturing SME exports from India. Further, it will concentrates on identifying regional, technological and non-technological factors that are important for improving export competitiveness of Indian SMEs. The empirical framework adopted in the study includes a set of region-specific factors in

[1] Data available at: http://dcmsme.gov.in/ssiindia/statistics/economic.htm#Employment

addition to firm- and sector-specific factors mostly focused in the existing literature on export determinants.
The outline of the present study is as follows: Section 2 provides a brief note on the data source and it offers a quantitative picture on the role of SMEs in manufacturing exports at the national and state levels. The conceptual and empirical literature relevant for SME export performance is reviewed briefly in Section 3. Results from econometric models estimated for large firms and SMEs are summarized and discussed in Section 4. The final section sums up the study.

2. Data Source and SMEs Manufacturing Exports

For exploring the role of SMEs in state level manufacturing exports, the study draws upon the SPIESR-GIDR locational dataset of Indian manufacturing firms. This dataset has been compiled for the ICSSR (Indian Council of Social Science Research) sponsored research project entitled *Exploring Regional Patterns of Internationalization of Indian Firms: Learnings for Policy*. It is a unique database that classifies a total of 8486 Indian manufacturing firms obtained from the Prowess database of the Centre for Monitoring Indian Economy (2009) into different Indian states and union territories based on their plant location, product profile (producer of single or multi-products), and size of production (capacity/actual). As the location information obtained from the Prowess were not comprehensive and there was no information available on the plant location of 1000 odd companies, those data gaps were filled with the information collected through intensive internet searches of company websites, annual reports, consultancy reports, etc. The Prowess database provides company specific financial variables like sales, exports, R&D, etc.

The SPIESR-GIDR database is found to have distributed a fair proportion of national manufacturing exports by states. The sample manufacturing firms covered in this SPIESR-GIDR database are estimated to accounts for about 58 per cent of national manufacturing exports during 1991─2008. The size classification of sample firms is undertaken following the criteria suggested by the Micro, Small and Medium Enterprise Development Act, 2006. Firms are divided into two groups, namely SMEs and large enterprises based on specified investment ceilings and available firm-specific latest year data on cumulative investment in plant and machinery. Manufacturing firms with an accumulated value of plant & machinery up to Rs. 10 crore are taken as SMEs and those with investment of above Rs. 10 crore are designated as large firms.

What role do SMEs play in manufacturing exports from the organized segment of the Indian manufacturing sector?

Table-1 presents an overview of export performance by firm size during 1991–2008. Unlike the export contribution of over 40 per cent by SMEs in India as indicated by government sources, our estimates suggest that exports by SMEs are not very large relative to total manufacturing exports from the organized sector. Of the total manufacturing exports from the organized sector estimated at $30.3 billion, SMEs accounted just 8.8 per cent in 1991–95. The share of SMEs in the sample firms' manufacturing exports in fact fell to 7.2 per cent in 2000–08. This falling export share of the SMEs is mostly due to plummeting export shares of small firms between 1991–95 and 2000–08.

Table-1 Manufacturing Exports by Firm Size, US$ billion

Firm Types	Manufacturing exports ($ billion)			
	1991–95	**1996–99**	**2000–04**	**2005–08**
Small Firms	1.7 (5.7)	1.8 (4.2)	4.0 (4.3)	8.2 (3.6)
Medium Firms	0.9 (3.1)	1.3 (3.0)	3.2 (3.4)	8.3 (3.6)
Large Firms	27.6 (91.2)	40.5 (92.8)	86.1 (92.3)	213.4 (92.8)
Grand Total	**30.3 (100)**	**43.6 (100)**	**93.3 (100)**	**229.9 (100)**

Note: Percentage shares to total exports are in parentheses.
Source: SPIESR-GIDR locational dataset of Prowess manufacturing firms (2010).

The sectoral breakdown of SME export (Table-2) shows that their exports are predominantly concerned the low technology intensive sector like food & beverage (20 per cent), other manufacturing (15 per cent), textiles (14 per cent), and leather (11 per cent) in 1991–99. SMEs exported technology intensive products like chemicals, electrical & optical equipment, metal and pharmaceuticals during this period but share of these products in total SME exports were only moderate.

In 2000–2008, the sectoral profile of SME exports became more concentrated. SME exports from other manufacturing totalled $13.2 billion or 56 per cent of their total exports. This is mainly because of SMEs impressive performance in gems and jewellery exports (SME World, 2011). The number two sector that contributes significantly to SME exports in manufacturing is food & beverage (19 per cent). It is clear that SME exports from India is continued to be dominated largely by low technology manufactures.

An analysis of the share of SMEs in total sectoral exports indicates that SMEs are important export contributors in a number of industries. In 1991–99, SMEs accounted for half of exports from leathers and about 20 per cent, 18 per cent and 14 per cent shares respectively in exports from other manufacturing, publishing & printing and electrical & optical equipment. However, the worrying trend is that the export share of SMEs contracted significantly for majority industries between 1991–99 and 2000–08. Its value in 2000–08 was less than half of the level in 1991–99 for as many as eight industries (diversified, publishing & printing, other non-metallic mineral products, drugs & pharmaceuticals, coke & petroleum products, electrical & optical equipment, basic metal & metal products, and chemicals & chemical products). Significantly declining export shares of SMEs were also seen for another five industries. In contrast, four manufacturing industries namely food & beverages, pulp & paper, wood, and other manufacturing seen a substantial rise in the exports accounted by SMEs in total industry exports.

Table-2 SME Manufacturing Exports by Sector

Sector	SME manufacturing exports (US$ million)		As a per cent of total exports		
	1991–99	2000–08	1991–99	2000–08	Growth (%)
Basic metal & metal products	380.0 (6.6)	834.6 (3.5)	3.8	1.5	-60.5
Chemicals & chemical products	526.2 (9.1)	684.3 (2.9)	6.1	2.6	-57.4
Coke & petroleum products	19.5 (0.3)	60.1 (0.3)	0.3	0.1	-66.7
Diversified	61.5 (1.1)	2.0 (0.0)	4.6	0.1	-97.8
Drugs & pharmaceuticals	361.5 (6.2)	546.2 (2.3)	8.1	2.3	-71.6
Electrical & optical equipment	438.9 (7.6)	578.2 (2.4)	13.5	4.8	-64.4
Food products, beverages & tobacco	1177.3 (20.3)	4576.1 (19.3)	14.6	23.4	60.3
Leather & leather products	629.4 (10.9)	773.3 (3.3)	49.3	34.7	-29.6
Machinery & equipment	226.2 (3.9)	583.9 (2.5)	7.4	5.9	-20.3
Other manufacturing	849.3 (14.7)	13232.2 (55.9)	19.8	49.6	150.5
Other non-metallic mineral products	81.8 (1.4)	54.8 (0.2)	3.2	0.9	-71.9
Publishing & printing	13.3 (0.2)	14.4 (0.1)	18.5	2.7	-85.4
Pulp & paper products	3.6 (0.1)	22.1 (0.1)	1.0	1.9	90.0
Rubbers & Plastics	104.9 (1.8)	248.3 (1.0)	3.5	3.2	-8.6
Textiles & textile products	834.8 (14.4)	1202.3 (5.1)	6.8	4.6	-32.4
Transport equipment	82.4 (1.4)	236.7 (1.0)	1.7	1.4	-17.6
Wood & wood products	2.5 (0.0)	9.6 (0.0)	3.1	6.3	103.2
Grand Total	**5793.2 (100)**	**23659.0 (100)**	**7.8**	**7.3**	**-6.4**

Note: Percentage shares to total exports by SMEs are in parentheses.
Source: SPIESR-GIDR locational dataset of Prowess manufacturing firms (2010)

Regional Profile of SME Manufacturing Exports

The manufacturing exports by SMEs mask significant regional disparities in India. West India accounted for the bulk of total exports by SMEs in 1991–99 with 49 per cent (Table-3). South India comes second with 32 per cent share in SME exports. Among individual states, Maharashtra (32 per cent), Tamil Nadu (13 per cent), Gujarat (11 per cent), and Karnataka (10 per cent) are leading states contributing towards SME exports during the same period.

By 2000–08, South India emerged as the most dynamic region in the rise of Indian SME exports with its share of SME exports rose to almost half of the total. SME export share of West India, however, declined to 32 per cent in 2000–08. At individual state level, Karnataka emerged as the home to more than 38 per cent of SME exports of manufactures from India in 2000–08. Maharashtra with 24 per cent and Delhi with 12 per cent are other major states contributing to SME exports. The share of Gujarat in SME exports fell to 6 per cent in 2000–08. This suggests that Gujarat while boasting a strong SME sector depend more on large firms for its export growth.

The share of SMEs in state-wise manufacturing exports demonstrates that Indian states' exports are mostly due to large firms. SMEs represent less than 10 per cent share in state-level exports for as many as 17 states and accounted for 10–19 per cent for another subgroup of eight states in 1991–99. Delhi is the only sub-national entity where SMEs had strong export contribution, accounting for above 67 per cent. Compared with the 1990s level, the share of SMEs in state-level exports declined for 19 states at different rates in 2000–08. Deviating from this negative trend, SMEs share in manufacturing exports rose for Karnataka by 86 per cent to reach 29 per cent in 2000–08 and similar sharp rise can be noticed for Pondicherry, Uttarakhand, and West Bengal.

Judging from these trends, it can be said that manufacturing exports by SMEs are pronouncedly concentrated among a few Indian states. Moreover, SMEs share in state-level exports is mostly moderate and vary across states. Policy-makers from states focusing on the need for SME internationalization to support their exports would be well advised to take note about the declining share of SMEs in state exports. So it is important for them to know what they can do for promoting their SMEs exports and in the next section the relevant issue of the determinants of SME exports are explored.

Table-3 SME Manufacturing Exports by States

Region/State	SME manufacturing exports (US$ million)		As a per cent of total exports	
	1991–99	2000–08	1991–99	2000–08
Central India	96.9 (1.7)	88.4 (0.4)	2.4	0.8
Chhattisgarh	1.0 (0.0)	6.8 (0.0)	0.2	0.3
Madhya Pradesh	95.9 (1.7)	81.6 (0.3)	2.7	0.9
East India	210.7 (3.6)	529.9 (2.2)	2.2	2.3
Bihar	2.6 (0.0)	1.7 (0.0)	0.2	0.1
Jharkhand	28.4 (0.5)	0.4 (0.0)	2.1	0.0
Orissa	49.0 (0.8)	14.8 (0.1)	2.1	0.2
West Bengal	130.7 (2.3)	512.9 (2.2)	2.8	4.9
North India	741.0 (12.8)	3627.9 (15.3)	6.0	8.8
Chandigarh	1.4 (0.0)	2.7 (0.0)	14.7	1.0
Delhi	142.1 (2.5)	2827.3 (12.0)	67.1	66.8
Haryana	117.4 (2.0)	195.9 (0.8)	3.8	2.3

Himachal Pradesh	27.9 (0.5)	3.9 (0.0)	3.4	0.1
Jammu & Kashmir	0.1 (0.0)	1.3 (0.0)	0.1	0.1
Punjab	59.0 (1.0)	95.7 (0.4)	2.4	1.4
Uttar Pradesh	354.9 (6.1)	267.9 (1.1)	8.1	2.1
Uttarakhand	38.2 (0.7)	233.2 (1.0)	3.2	6.8
Northeast India	63.4 (1.1)	31.9 (0.1)	4.4	1.8
Assam	63.4 (1.1)	31.9 (0.1)	4.4	1.9
South India	1858.1 (32.1)	11794.6 (49.9)	10.6	14.8
Andhra Pradesh	198.5 (3.4)	870.0 (3.7)	4.7	4.8
Karnataka	593.0 (10.2)	9064.8 (38.3)	15.6	29.0
Kerala	299.5 (5.2)	317.5 (1.3)	17.2	5.7
Pondicherry	2.9 (0.1)	10.1 (0.0)	2.5	6.1
Tamil Nadu	764.2 (13.2)	1532.0 (6.5)	10.1	6.2
West India	2823.1 (48.7)	7586.4 (32.1)	9.7	4.6
Dadra & Nagar Haveli	103.8 (1.8)	19.6 (0.1)	18.5	0.5
Daman & Diu	24.1 (0.4)	99.8 (0.4)	11.6	4.7
Goa	37.3 (0.6)	49.5 (0.2)	14.7	5.6
Gujarat	621.4 (10.7)	1346.9 (5.7)	5.9	1.7
Maharashtra	1868.5 (32.3)	5755.9 (24.3)	12.0	7.8
Rajasthan	168.0 (2.9)	314.6 (1.3)	8.4	4.4
Grand Total	**5793.2 (100)**	**23659.0 (100)**	**7.8**	**7.3**

Note: Percentage shares to total exports by SMEs are in parentheses.
Source: SPIESR-GIDR locational dataset of Prowess manufacturing firms (2010)

3. Theoretical Literature and Empirical Framework

During the last three decades, the internationalization behaviour of SMEs has received increasing academic attention. SMEs are theorized to be a distinct group of firms, different from large companies, because they possess a set of differentiated features. Resource constraints in the forms of capital, information, managerial expertise and other intangible assets and barriers to entry are critically higher for SMEs than for large companies limiting the scale of global activities undertaken by these firms (Acs et. al., 1997; Karagozoglu and Lindell, 1998; Hollenstein, 2005; Pradhan and Sahu, 2008). However, SMEs are also recognized to have advantages over large firms in terms of greater flexibility, quicker-decision making process, and niche business strategy (UNIDO, 2006; Zucchella and Palamara, 2006).

According to the stage theory a firm get internationalized in depth along with an evolutionary and sequential process comprising incremental stages (Johanson and Vahlne, 1977). This approach states that a firm incrementally increases its foreign involvements based on experience and knowledge that it acquire gradually about foreign markets. A firm hitherto producing and supplying within the domestic market internationalize by undertaking irregular and opportunist exports initially, then moves on to a stage of regular exports through independent agents, next establishes sales subsidiaries for direct exports and finally chooses foreign production. It is generally believed that this gradualist theory is a good representation of firms' internationalization behaviours especially for SMEs. Going global through least risk and lowest-investment modes like indirect export and then moving on to greater-risk and higher-investment modes like sales subsidiaries may be expected to be more suitable for resource constraint SMEs (Jones, 1999). Nonetheless, some SMEs from technology-intensive and service

sectors are reflecting what is termed as born global or international entrepreneurship phenomenon violating the prediction from the stage theory (Westhead et. al., 2001; Coviello and Cox, 2006).

A considerable stream of research shows that a firm's capacity to internationalize is critically linked to the size of its valuable resources (Rodríguez and Rodríguez, 2005; Roxas and Chadee, 2011). In the resource-based view (RBV), firms can sustain and improve their competitiveness and growth if they acquire various resources that are useful, unique and difficult to imitate and substitute (Wernerfelt, 1984; Barney, 1991, 2001; Newbert, 2007). These resources could be physical capital and intangible capital covering technological assets, human capital, organizational capital and social capital. Interpreting firms as a bundle of these resources acknowledge inter-firm heterogeneity in such resources so as to determine inter-firm variation in the degree of internationalization.

The growing literature on international trade models with heterogeneous firms could also be relevant for understanding SME export decision. In these models (e.g. Roberts and Tybout, 1997; Bernard et al., 2003; and Melitz, 2003) firms are required to incur sunk costs or to be productive to enter the foreign market. As the productivity of a firm grows to some critical value, the firm may found it profitable to start exporting by paying a sunk cost[2]. Accordingly, relatively productive SMEs are predicted to enter the export markets because they can commit resources required for overcoming the sunk costs in accessing foreign markets.

Inspired by different theories of internationalization, an increasing number of empirical studies are now directed at the analysis of SMEs' export behaviour. Pope (2002) analysed motivations for exporting for small firms based in California, U.S. at two levels—firms with 25 or fewer employees and those with more than 25 employees but less than or equal to 200 employees. Results from the analysis of variance (ANOVA) suggest that uniqueness of product and technological advantages are two motivating factors for firms with 25 employees or less to exports. Firms with more than 25 employees are found to export because they believe they possess a unique product and technological advantage and exporting helps them to achieve economies of scale and exploit foreign opportunities.
Yang, Chen and Chuang (2004) in their study of a sample of Taiwan manufacturing SMEs found that export decision of these firms are positively determined by their technology (R&D, technology importing and training investment), firm size (over a relevant range), skills of the workforce, and labour productivity. Findings on manufacturing SMEs from South Africa shows that enterprise export probability is positively affected by size class, age, competition in South Africa, access to borrowed finance, corporate tax, business linkages, and access to information (Gumede, 2004).

Ottaviano and Martincus (2011) reported that Argentinian SMEs have higher probability of exporting if they have large size (employment), source inputs from abroad, invest in product improvement and possess higher labour productivity. The export participation of U.K. firms are observed to be more for older, medium-sized and foreign-owned firms as compared to younger, small-sized and domestic-owned firm (Requena-Silvente, 2005). Fernández and Nieto (2006) found that export probability and intensity both are positively associated with the age, size, R&D and foreign ownership of Spanish SMEs. Firms' technological activities (product innovation, process innovation and product modification) and size are suggested as important determinant of exporting by Vietnamese SMEs (Ngoc, et. al., 2008). Pradhan and Sahu (2008) found that export performance of Indian SMEs from pharmaceutical sector improves with firm size, R&D, imports of capital goods, and fiscal incentives.

It is clear from above discussion that the extant export literature on SMEs largely considers the role of firm-specific factors, industry characteristics and export market features. The important limitation is stemming from non-integration of the role of space into the analysis of inter-SME export performance.

[2] They are costs involved in studying foreign demand and markets, undertaking packaging and product adaptation for foreign consumer preference and market standards and establishing marketing and distribution channels.

SME export activities are likely to differ substantially over regions within a country given the regional disparities in the presence of required infrastructure, institutions, and manpower.

The evolutionary and systemic approach to the study of technology development stressed that the firms' innovative performance is a localised and a locally embedded process (Storper, 1997; Cooke et. al., 1997; Doloreux, 2002; Doloreux and Parto, 2004; Asheim and Gertler, 2005; Pérez et. al., 2009). Regions are the levels at which firms innovate being a part of an interactive system involving regional networks of innovating firms, local clusters and research institutions (Lundvall and Borrás, 1997). Since regions vary greatly in terms of knowledge base, technological opportunities and infrastructural support and such regional differences may be vital for firms' R&D and export performance.

For Porter (1998) firms' competitive advantages reside in the locations in which firms are embedded. Regional differences in Porter's Diamond conditions like factor conditions, demand characteristics, presence of related and supporting industries, and competitive rivalry of the firms are likely to explain why firms from certain regions are more dynamic, innovative and export-oriented than those from other regions.

Location also matter as there is incentive for agglomeration of production and demand in regions offering large size of market, saving on transport cost, greater scope for forward and backward linkages, and increasing returns (Krugman, 1991a; Fujita and Krugman, 2004). Exporting is inferred to be more profitable from regions that possess large markets because the motivations for concentration of production are essentially to minimize transport costs and to exploit returns to scale (Krugman, 1991b; Fujita, Krugman and Venables, 1999). This led to the prediction that regions with large markets are likely to be more export contributing in a country than other regions with smaller market size.

The Empirical Framework

In the backdrop of the theoretical background as described above, we consider SME exports behaviour to be determined by heterogeneity in firm resources, sectoral characteristics, policy incentives and regional specificities. The empirical framework chosen for explaining inter-firm patterns of export intensity in the present study is provided below:

$$\begin{aligned} FEX_{it} = {} & \beta_0 + \beta_1 AGE_{it} + \beta_2 SIZE_{it} + \beta_3 SIZE^2_{it} + \beta_4 RDIN_{it} + \beta_5 ETP1_{it} + \beta_6 ETP2_{it} + \beta_7 ADV_{it} + \beta_8 AFF_i \\ & + \beta_9 BGA_i + \beta_{10} HI_{jt} + \beta_{11} RDS_{jt} + \beta_{12} FIS_{jt} + \beta_{13} FSB_{it} + \beta_{14} SDP_{kt} + \beta_{15} SDPG_{kt} + \beta_{16} PSDP_{kt} \\ & + \beta_{17} SRD_{kt} + \beta_{18} SERL_{kt} + \beta_{19} SPWR_{kt} + \beta_{20} SROD_{kt} + \beta_{21} SPRT_{kt} + \beta_{22} STI_{kt} \\ & + \beta_{26} SFN_{kt} + \beta_{27} SFF_{kt} + \beta_{28} SPL_{kt} + \beta_{29} SCRM_{kt} + \varepsilon_{it} \qquad \ldots\ldots\ldots\ldots (A) \end{aligned}$$

Where explanatory variables are as measured in Table-4 and ε_{it} is the random error term.

Table-4
Description and Measurement of Variables

Variables	Symbols	Measurements
Dependent Variable		
Firm Export Intensity	FEX_{it}	Goods and services exports of *i*th manufacturing firm as a per cent of sales in the year t.
Independent variables		
Region-specific variables		
Demand-related factors		
State Domestic Product (net)	SDP_{kt}	Natural log of SDP (constant 1999–00 Indian Rs.) of *k*th Indian statein year t.
Growth of SDP	$SDPG_{kt}$	Annual percentage change in SDP (constant 1999–00 Indian Rs.) of *k*th Indian state in year t.

Per capita SDP	$PSDP_{kt}$	Natural log of per capita SDP (constant 1999–00 Indian Rs.) of *k*th Indian state in year t.
Input-related factors		
State R&D	SRD_{kt}	Average R&D intensity of manufacturing firms of *k*th state in *t*th year.
State Higher Education Enrolments	$SERL_{kt}$	Higher education enrolments (1000) per firm in *k*th Indian state for *t*th year.
State Power Availability	$SPWR_{kt}$	Power generated (kWh) per 100000 population of *k*th Indian state for *t*th year.
State Road Infrastructure	$SROD_{kt}$	Total road length (km) per 100 square km area of *k*th Indian state for *t*th year.
State Port Infrastructure	$SPRT_{k}$	Dummy variable taking value 1 if *k*th Indian state possesses port facilities, 0 otherwise.
State Telecom Infrastructure	STI_{kt}	Telephones per 100 population in *k*th Indian state for *t*th year.
State Finance Availability	SFN_{kt}	Credit advances by Scheduled Commercial Banks (Rs. Crore) per 100000 population of *k*th Indian state for *t*th year.
Other regional factors		
State Incidence of Foreign Firms	SFF_{kt}	Percentage share of foreign firms in total number of firms located in *k*th Indian state in year t.
State Industrial Specialization	SPL_{kt}	Percentage share of high-technology sectors in total manufacturing production (proxied by sales) of *k*th Indian state in year t.
State Rule of Law	$SCRM_{kt}$	Incidence of total cognizable crimes per 100000 population of *k*th Indian state for *t*th year.
Firm-specific variables		
Firm Age	AGE_{it}	Natural log of the age of *i*th firm in number of years from the year of its incorporation.
Firm Size	$SIZE_{it}$	Natural log of total sales (Rs. Million) of *i*th firm in *t*th year.
Firm Size Squared	$SIZE^2_{it}$	Squared of the natural log of total sales (Rs. Million) of *i*th firm in *t*th year.
External Technology Purchase	$ETP1_{it}$	Expenses in royalties, technical and other professional fees paid abroad by *i*th firm as a per cent of sales in the year t.
	$ETP2_{it}$	Expenses on imports of capital goods and equipment by *i*th firm as a per cent of sales in *t*th year.
R&D Intensity	$RDIN_{it}$	R&D expenditure (capital+current) as a per cent of total sales of *i*th firm in *t*th year.
Product Differentiation	ADV_{it}	Advertising and marketing expenses of *i*th firm as a per cent of sales in the year t.
Affiliation to Foreign Firm	AFF_{i}	Assume 1 if *i*th firm has affiliation to a foreign firm, 0 otherwise.
Business Group Affiliation	BGA_{i}	Assume 1 if *i*th firm has affiliation to a domestic business group, 0 otherwise.
Industry-specific variables		
Sectoral R&D intensity	RDS_{jt}	R&D expenses (capital+current) of*j*th industry as a per cent of industry sales in *t*th year.
Sectoral concentration	HI_{jt}	Natural log of Herfindahl Index of *j*th industry in *t*th year based on domestic sales.
Competition from foreign investment	FIS_{jt}	Foreign firms' share in domestic sales of *j*th industry in *t*th year.
Policy variable		
Fiscal benefits	FSB_{it}	Total fiscal benefits related to exports activities received by *i*th firm as a per cent of sales in the year t.

Note: High-technology sectors include chemicals, pharmaceuticals, electrical & optical equipment, machinery & equipment and transport equipment; Higher education comprises universities, deemed universities, institutions of national importance, research institutes, colleges for professional education (e.g. engineering, technology, architectural and medical colleges) and colleges for general education.

The justification for inclusion of listed firm-specific and sector level factors is abundantly available in the standard firm-level literature on export behaviour. Firm size (*SIZE*) as a proxy for resource base of the firm has been found to be relevant for export performance of enterprises (Bonaccorsi, 1992; Calof, 1994; Roberts and Tybout, 1997; Bernard and Jensen, 1999; Bernard and Wagner, 2001). The age of firm (*AGE*) that reflect the effect of firm's accumulated learning and information over the past (Ericson and Pakes, 1995; Jovanovic, 1982), is expected to affect positively firm's export behaviour.

Firms' innovative capabilities covering their ability to acquire, assimilate, modify and create technology have evidently played a crucial role in the export competitiveness (Braunerhjelm, 1996; Wakelin, 1998; Bleaney and Wakelin, 1999; Lefebvre and Lefebvre, 2002; Yang, Chen and Chuang, 2004; Fernandez and Nieto, 2005; Singh, 2006; Anh et. al., 2007). The in-house R&D expenses, the technological payments made abroad and imports of capital goods are employed as measures of technological activities. While the first indicator measures firm's indigenous technological efforts, the

last two variables respectively represents acquisition of foreign technology in disembodied and embodied forms. Ceteris paribus, in-house R&D and embodied technology imports are expected to help the firm achieve higher export activities. However, disembodied technology imports are posited to have an ambiguous effect as technology contracts to developing countries like India come with export prohibition clauses which directly restrict the sale of manufactures produced using the imported technology to the technology importing country and with other conditionality like 'no reverse engineering' inhibiting effective technology transfers (UNCTC, 1984).

Given the rampant marketing entry barriers that exist in many segments of international market, marketing and advertising expenses can be an important source of firm's completive strength in the world market (Pradhan, 2008). By ensuring access to group infrastructure and reducing transaction cost through intra-group sharing of information, inputs, skills, technologies, etc., the affiliation of a firm with a business group is expected to add to its internationalization activities. Similarly, a firm's ownership links to multinational enterprises (MNE) may reflect greater export involvement as the affiliated firm get access to capital, technology, information, distribution channels and marketing skills of the MNEs and the global market controlled by them (de La Torre, 1971). MNE affiliation could be more important for export-oriented production in technology-intensive and dynamic products in world markets (UNCTAD, 2002).

The inter-industry difference in technological opportunities is included as an industry-specific potential export determinant. Firms coming from sectors with higher technological opportunities, measured by sector-level R&D intensity, are likely to possess higher product quality and efficiency, which may encourage their participation in foreign markets (Barrios, Gorg and Strobl, 2003). Competition from foreign firms (*FIS*) may force surviving domestic firms to increase their R&D efforts to reduce costs and improve product quality to protect their domestic market share and expand geography of their market operation. Thus, sectors facing more pressures from foreign firms are postulated to witnessed firms with higher export intensity than sectors relatively hosting less foreign investment.

The relationship between the level of industry concentration (*HI*) and firms export performance is apparently ambiguous. In one situation the strong market power of firms in a highly concentrated industry might provide more incentive to concentrate on domestic market, in another situation the dominant firms that possess strong intangible and tangible assets might be inspired to look beyond domestic markets (Wu, Fu and Tang, 2010).

Government policies in various forms like export credit, tax holiday on export income, duty drawbacks, export insurance programs, etc. can have influence on export performance (Fitzgerald and Monson, 1989; Roy, 1993; Pradhan and Sahu, 2008). These fiscal benefits release additional capital complementing a firm's own resources and may reduce the effective costs of its internationalization.

Among all the region-specific factors considered, except crime rate capturing the rule of law, are predicted to positively contribute to the firms' export activities. States with large sized market and/or higher growth are likely to have the advantage of scale, business-friendly investment climate and better quality of government support services for undertaking export activities. States leading in R&D activities may have abundance of critical firm-specific intangible assets required for participating and succeeding in international markets. Regional disparities in firm-level exports could also be related to the asymmetric evolution of internal supply capacity among regions (Redding and Venables, 2004), which in turn critically depend on the factors affecting cost of production and internal transport costs (Fugazza, 2004). These factors are adequate availability of low-cost manpower including skilled and technical workers, physical infrastructure covering transport (i.e., roads, railways, and ports), energy, telecommunications, and finance.

Apart from the market- and input-specific regional factors, regional profile of firms' export performance may also depend on regional distribution of foreign firms, technological pattern of industrial specialization and rule of law. States hosting relatively large number of foreign firms can be expected to have higher export performance as they help the host states in expanding supply capacities by transfer of tangible and intangible resources and also ensuring that their affiliated firms have access to the two-thirds of world export markets associated with the activities of TNCs (UNCTAD, 1999). Regions with specialization in technology-driven sectors are likely to have greater involvement in global markets than states that are continued to be industrializing around traditional low technology sectors. As higher rate of crimes are predicted to discourage investments and reallocation of resources towards security spending (Czabanski, 2008; Detotto and Otranto, 2010), regions with high incidence of crimes are likely to have lower export activities than a state with low crime rate.

4. Empirical Results and Inferences

The export model specified in the equation A has been estimated with the help of a multi-dimensional dataset, SPIESR-GIDR Locational Dataset on Indian Firms (**SG-LoDIF**), built for a given ICSSR project as mentioned earlier. While all the firm-level and sector-specific variables are derived mainly from the Prowess Database of the Centre for Monitoring Indian Economy (CMIE), the state-level information is created around different published sources from government and non-government agencies.

The annual data related to states' real SDP, growth of real SDP, and real per capita SDP were obtained from various Central Statistical Organization (CSO) Statements on State Domestic Products. The yearly data on state level higher education enrolments were collected from various issues of the *Selected Educational Statistics* published by the Department of Higher Education under the Ministry of Human Resource Development (MHRD) and various annual reports of the MHRD, Government of India. The state level tele-density data comes from the *Compendium of Selected Indicators of Indian Economy* (Volume I) of the CSO (2009). Total road length information was compiled from various issues of *Basic Road Statistics of India*, Ministry of Road Transport and Highways, Government of India. Statistics on gross power generation by states is taken from the *Annual Report on The Working of State Electricity Boards & Electricity Departments* of the Planning Commission (Power and Energy Division) and various General Reviews published by Central Electricity Authority, Ministry of Power, Government of India. Credit advance by commercial banks by states is sourced from various volumes of Money and Banking brought out by the CMIE. The data on SRD, SPL and SFF were calculated based on the information from the **SG-LoDIF** as indicated above. Incidence of total cognizable crimes for Indian states comes from various issues of *Crimes in India* published by the National Crime Records Bureau, Ministry of Home Affairs (MHA).

4.1. Method of Estimation

The export model was estimated for the SMEs and large firms separately. SMEs were again grouped according to technological classification of industries and the estimation was repeated for those subsamples. The idea was to see if there are possible differences of SME exports behaviours across different technological groups of industries. The estimated models for large firms, SMEs and three subsamples of SMEs based on technology intensity have been presented in Table-4.4. Estimation technique used is the Censored Quantitle Regression (CQR) based on Chernozhukov and Hong's (2002) three-step algorithm. This method is suitable for handling limited dependent variable like the export intensity in our case. Econometric theory suggests that Powell's (1986) CQR is more robust and provides consistent estimates when there is heteroscedastic, non-normal and asymmetric errors as compared to the Tobit estimation of censored dependent variable (Powell, 1986; Chay and Powell 2001; Wilhelm, 2008).

As a number of firm-level independent variables are not strictly exogenous, there is the problem of endogeneity in our model. For instance, firms R&D performance may be influenced by its export activities (e.g. Pradhan, 2011). Similarly, export intensity possess a favourable feedback with other factors like firm survival (age), size, purchase of foreign technologies and advertising expenses. To minimize any such bias, the study has introduced all the firm-specific variables, except *AFF* and *BGA* dummies, in one year lagged form.

Multicollinearity is another problem that the empirical estimations suffer from. A high correlation is reported between firm size (*SIZE*) and its squared term ($SIZE^2$). So to address this problem, mean centred series has been used in place of *SIZE* (and $SIZE^2$). Within the state-specific variables, *SPWR*, *STI*, and *SFN* are observed to be strongly correlated with *PSDP*. Each of these variables is regressed on *PSDP* and residuals from these regressions are used in the place of original variables.

4.2. Results

The CQR estimation of single-state based firms comprising 2489 large firms and 2209 SMEs over the 1995–2008 period have been summarized in Table-5 and descriptive statistics for both the samples are provided in appendix TableA1. All the fitted models showed up with F-values statistically not different from zero, thus, suggesting that the specified model succeeds well in explaining firms export performance over sizes.

Regional Determinants of SME Exports

SDP_{kt} has a statistically significant positive coefficient for the sample of SMEs while its coefficient sign is negative for large firms but never attains the levels of statistical significance. Therefore, export behaviours of SMEs are more dependent upon the size of local markets of their host states than large firms. The subsample estimations for SMEs show that the large market size of a host state is relevant for export propensity of SMEs in high- and medium-technology industries.

While the coefficient of $SDPG_{kt}$ is not significant for large firms, it has a strongly positive coefficient for SMEs. Hence, high growth achieved by host states is likely to make differences to their SMEs' export intensity. While SMEs as a whole appear to be benefiting from a growing local market for internationalization, the role of growth is not so clear once SMEs are segregated into technological subsamples.

$PSDP_{kt}$ emerges with a strong positive influence for both large firms and SMEs. Export-intensive large firms and SMEs, therefore, are more concentrated in states with high per capita income. Higher per capita income implies a sophisticated and diversified consumer demand and SMEs supplying to a differentiated local market are likely to go global. The estimations for SME subsamples show that the positive influence of income is limited to SMEs operating in high-technology sectors.

SRD_{kt} largely has an insignificant or a negative coefficient for SMEs and their subsamples but a significantly negative effect for large firms. It would appear that states' overall manufacturing R&D intensity is not an influential factor for observed inter-state patterns of firms' export intensity including SMEs.

The coefficient of $SERL_{kt}$ is not different from zero in statistical terms for both large firms and SMEs. In the subsample estimations for SMEs, it has a significantly negative coefficient for low-technology SME subsample. It would imply that the local availability of skilled labour force may not be a significant factor for explaining inter-state patterns of SME export intensity. Higher mobility of skilled workers across states ensures that SMEs based in states with poor human capital endowment are not strongly disadvantaged in undertaking exports.

$SPWR_{kt}$ has a negative but insignificant coefficient for both the samples of large firms and SMEs. For SME subsamples, it continued to have an insignificant effect for high- and medium-technology sectors, while its negative coefficient for low-technology industries turns out to be statistically different from zero. It would imply that states generating more electricity are not inevitably the home for export-oriented firms.

$SROD_{kt}$ comes up with a negative sign and is significant for both large firms and SMEs. As argued earlier, firms' export activities are adversely impacted as the advantage of arranging more roads in a state is being neutralized by the disadvantage of bad quality of existing roads. Not so significant influence of road length on SME subsamples further support the argument that the quality of road transport of Indian states are not up to the mark as to encourage the depth of SMEs' export activities.

$SPRT_{kt}$ has the expected positive sign and is statistically significant for large firms and SMEs. Therefore, port facilities in a state likely to add to firms' export activities. In the case of SME subsamples, the favourable effect of port is relatively more for medium- and low-technology sectors.

For both the categories of firms, STI_{kt} has a positive sign but is statically significant for large firms alone. Hence, export activities of large firms to a greater extent are impacted by the level of telecommunication infrastructure available in host states. Though SMEs are in general less influenced, medium- and low-technology SMEs are geared to more exports if the host state provides better telecom infrastructure.

SFN_{kt} has a hypothesized positive sign and is significant for both large firms and SMEs. In subsample estimations for SMEs, the coefficient of SFN_{kt} is not significant for high- and medium-technology industries but is statistically different from zero with a positive sign for low-technology SME subsample. It indicates that credit availability is necessarily a determining factor for SMEs higher export intensity in traditional and low technology products.

SFF_{kt} comes up with a significantly positive sign for SMEs while its coefficient for large firms falls in the insignificant zone. The learning for exporting effect from the presence of foreign firms in a state, thus, is an important factor influencing SME exports while it is of little consequence for exporting by large firms. Results from SME subsamples reflect that the positive influence of presence of foreign firms is relevant for SME exports from low-technology industries only.

Table-5 SMEs' Export Determinants in Indian Manufacturing Sector

Dependent Variable: Export Intensity

Independent variables	Coefficients (Absolute bootstrap t-statistic)				
	Large firms full sample	Small and Medium Enterprises			
		SME full Sample	High-tech SME subsample	Medium-tech SME subsample	Low-tech SME subsample
AGE_{it-1}	-1.85603*** (5.74)	0.58525*** (3.24)	0.16962 (0.50)	1.15657*** (3.61)	-0.46698 (0.94)
$SIZE_{it-1}$	3.10858*** (11.25)	0.67918*** (3.16)	0.74857*** (3.44)	0.82357** (2.16)	3.11342*** (3.29)
$SIZE^2_{it-1}$	-0.59652*** (10.14)	-0.07230 (0.48)	-0.58637*** (4.75)	-0.02671 (0.10)	0.87961 (1.53)
$ETP1_{it-1}$	-0.01175 (0.08)	0.83298* (1.90)	0.85978* (1.88)	3.09388 (1.26)	0.14998 (0.43)
$ETP2_{it-1}$	0.01009 (0.84)	0.79108*** (3.42)	0.00593 (0.02)	0.43063 (0.45)	-0.01178 (0.03)
$RDIN_{it-1}$	1.77901*** (6.64)	0.70602 (1.19)	0.41245 (0.74)	14.16525*** (3.39)	6.04855 (0.79)
ADV_{it-1}	0.00026 (0.01)	0.01177 (0.60)	-0.06827** (2.56)	0.01802 (0.33)	-0.06125 (1.02)
AFF_i	3.09380*** (5.19)	2.21217*** (2.66)	1.54185 (1.33)	8.31178** (2.29)	13.07196 (0.70)
BGA_i	3.27216*** (6.79)	-0.70559** (2.49)	-2.91256*** (5.25)	-0.07309 (0.14)	1.10852 (1.26)
HI_{jt}	-4.31103*** (13.11)	0.60331** (2.38)	1.06145** (2.14)	-1.70535** (2.30)	1.56489*** (2.99)
RDS_{jt}	4.06261*** (8.82)	1.58381*** (3.75)	0.78163* (1.80)	1.87749 (0.91)	-0.32314 (0.12)
FIS_{jt}	-0.21085*** (12.58)	0.08923*** (5.70)	0.01054 (0.28)	-0.12329* (1.93)	-0.04318 (1.34)
FSB_{it-1}	9.02704*** (30.15)	9.55149*** (13.91)	12.27847*** (11.73)	6.51870*** (15.75)	10.35253*** (11.78)
SDP_{kt}	-0.40833 (0.88)	0.77447*** (3.43)	1.34020** (2.35)	1.46623** (2.37)	-1.01314 (1.12)
$SDPG_{kt}$	-0.00438 (0.09)	0.05703** (2.52)	-0.01360 (0.28)	0.02949 (0.67)	0.07374 (1.28)
$PSDP_{kt}$	5.42590*** (4.04)	1.92603** (2.05)	5.81703*** (3.61)	-0.06548 (0.04)	-7.69621*** (2.99)
SRD_{kt}	-1.89490** (2.04)	-0.71971 (0.78)	-0.22327 (0.17)	-2.88238** (1.98)	1.56555 (0.50)
$SERL_{kt}$	-0.47776 (1.35)	-0.22844 (1.07)	0.09149 (0.24)	-0.60823 (1.28)	-2.63053*** (3.57)
$SPWR_{kt}$	-0.01715 (0.88)	-0.00980 (0.89)	0.03076 (1.23)	-0.03615 (1.62)	-0.10154*** (2.98)
$SROD_{kt}$	-0.00808*** (4.86)	-0.00241*** (2.60)	-0.00055 (0.21)	-0.00102 (0.50)	-0.00305 (1.14)
$SPRT_{kt}$	1.70528** (2.52)	1.72360*** (5.10)	-0.96986 (0.96)	2.15527** (2.30)	7.00892*** (4.05)
STI_{kt}	0.19332*** (3.06)	0.107723 (1.54)	-0.08404 (0.89)	0.22878* (1.82)	0.40506*** (3.57)
SFN_{kt}	0.01255*** (3.01)	0.0081137* (1.54)	0.0042662 (0.58)	0.00070 (0.10)	0.01803*** (2.86)

SFF_{kt}	-0.03410 (0.39)	0.23655*** (4.32)	-0.02938 (0.25)	0.04508 (0.37)	0.92052*** (3.87)
SPL_{kt}	0.01247 (0.55)	0.04581*** (3.50)	0.00242 (0.06)	0.09294** (2.43)	0.03605 (0.85)
$SCRM_{kt}$	0.01966*** (4.50)	0.00954*** (4.62)	-0.00280 (0.52)	0.00113 (0.25)	0.02854*** (2.68)
Constant	-10.66504 (0.93)	-38.07802*** (4.21)	-71.61037*** (4.36)	-9.86718 (0.66)	67.66928** (2.50)
F-value!	97.24	24.41	16.36	13.91	7.75
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	17125	9425	4864	1420	2510
No. of exporting firms@	1909	1137	598	176	353
No. of total firms@	2489	2209	1007	354	761
Proportion of exporting firms@	76.7	51.5	59.4	49.7	46.4

Note: Absolute value of bootstrap t-statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%; !-test values are obtained from the independent tests conducted to check if the coefficient of all explanatory variables are simultaneously zero using the testparm command in the STATA; @- Number of firms from the final sample obtained in the second step of the Chernozhukov and Hong's CQR algorithm as described in the text.

The significantly positive coefficient of SPL_{kt} for SMEs and its never significant effect on large firms would indicate that states with technology-intensive production structure are likely to have a competitive SME sector engaged in exports. In the subsample estimations, export success of medium-technology SMEs is observed to be strongly associated with the technological specialization of host states.

As observed in the case of full sample of firms, $SCRM_{kt}$ turns out with a positive and significant coefficient for both SMEs and large firms. Among SME subsamples, the strongly positive effect of $SCRM_{kt}$, however, is limited to SMEs in the low-technology sectors. This positive relationship between crime rate and export intensity is strange and there is a need for further work to fully understand the reasons behind such a result.

Firm Characteristics in SME Exports

The coefficient of AGE_{it-1} is significant for SMEs and large firms with a negative and a positive sign respectively. This shows that firms that succeed in exporting are generally young firms among large enterprises while export oriented firms are old ones among SMEs. It appears that the "born global' phenomenon among Indian firms is limited to newly established firms with some critical scale. Hence, firm age is specifically having a negative effect on exporting among large firms. SMEs, on the contrary, internationalize as they grow older and accumulate necessary information, skills and experiences. This result, thus, finds the stage theory of internationalization as an adequate explanation for exporting by Indian SMEs. The positive influence of age, however, is strongly born out for SME subsample in medium-technology industries.

$SIZE_{it-1}$ and $SIZE^2_{it-1}$ respectively came up with statistically significant positive and negative sign for large firms but only $SIZE_{it-1}$ is significant for SMEs with a positive coefficient. Hence, there is no limit for the positive effect of increasing size on export intensity of SMEs while size driven export advantage tapper off about a critical level for large firms. The linear relationship between firm size and exporting remain valid for SMEs in medium- and low-technology subsamples while SMEs producing high-technology products possess the same non-linear effect of firm size on export intensity as large firms.

Two variables related to foreign technology imports, $ETP1_{it-1}$ and $ETP2_{it-1}$, are each found with strongly positive coefficient for SMEs while their impacts are insignificant for large firms. Although foreign technology imports through disembodied and embodied forms are not an important source for export advantage for large firms, Indian SMEs do seem to rely on them for building capabilities for internationalization. While the positive influence of technology imports are not strongly disentangle for SME subsamples, the disembodied technology imports appear to be providing an export edge to SMEs in technology-intensive products.

$RDIN_{it-1}$ exerts a significantly positive effect on export intensity of large firms but it has an insignificant positive sign for SMEs. It would appear, thus, that export activities of large firms are stimulated by advantages derived from in-house R&D while SMEs export advantages are obtained from other factors than R&D. It could be due to weak R&D spending by SMEs (Pradhan, 2011c) or predominantly adaptive nature of R&D undertaken by them. The weak role of R&D is again confirmed for SME subsamples from both high- and low-technology products except the subsample of medium-technology SMEs for whom it has a strong positive effect.

ADV_{it-1} is observed to have an ineffectual impact on exports by large firms and SMEs. It turns up with a strongly negative sign for SMEs in high-technology industries but possess coefficients statistically not

different from zero for SMEs in medium- and low-technology sectors. Thus, SMEs as a distinct group of firms are unlikely to be using advertising as tool of export competitiveness.

AFF_i has a predicted positive sign throughout and is significant for large firms, SMEs, and a subsample of SMEs in medium-technology industries. Thus, SMEs sharing ownership affiliation to foreign companies are more likely to possess greater export depth than purely domestic owned SMEs. In fact SME exports originating from medium-technology sectors are due to SMEs with foreign shareholders.

Firms' affiliation to domestic business groups is found to play opposing roles in the exporting of large firms and SMEs. BGA_i has a significantly positive sign for large firms while a significantly negative sign for SMEs. Hence, large firms when get affiliated to domestic business groups become more export-intensive, while business group affiliated SMEs are likely to reduce their export-intensity. Large business groups are incorporating SMEs into their value chain for low-cost sourcing of components for group-affiliated companies. It could be that business groups while entering the export arena take the scale factor seriously and only affiliated large firms are encouraged to exports while affiliated SMEs are motivated to focus more on intra-group sourcing. The subsample estimations indicate that group affiliation has been a discouraging factor for SME exports from high-technology sectors.

Sectoral Determinants of SME Exports

HI_{jt} possess strongly negative and positive impacts on export intensity of large firms and SMEs respectively. Thus, an increasing concentration in domestic markets asymmetrically affects large firms and SMEs. When facing increasing competition, large firms with higher market shares tend to focus more on domestic market than exports but SMEs accounting for smaller market shares are forced to seek new markets through exports. Among subsample estimations, the strongly positive impact of market concentration is observed for SME exports in high- and low-technology industries.

RDS_{jt} possess a strongly positive effect on exports by large firms and SMEs. While its coefficients are not significant for SMEs from medium- and low-technology sectors, it showed up with a strongly positive effect for subsample of SMEs in high-technology sectors. Thus, R&D intensive industries are likely to be the source of export-intensive SMEs than low-technology industries.

FIS_{jt} emerges statistically significant with a negative sign for large firms and a positive sign for SMEs. Apparently, large firms with significant domestic market shares while faced with competition from the entry of foreign firms are turning aggressive on domestic markets. SMEs, on the contrary, appear to go global with an increased pressure from foreign firms. However, the export response of SMEs to foreign competition is not very prominent for SME subsamples as the coefficients of FIS_{jt} are either statistically not different from zero or modestly negative.

Fiscal Policy and SME Exports

FSB_{it-1} has a predicted positive sign throughout and is statistically significant for large firms, SMEs and three subsamples of SMEs. This would verify that government fiscal incentives strongly encourage SMEs to export a greater share of their production.

5. Conclusions

While a number of Indian states are interested in fully realizing the export potential of their SMEs there is little information available on the inter-state patterns of SME exports in India. This chapter has presented the preliminary statistics on inter-state SME exports from the organized segment of the Indian manufacturing and analysed their determinants at firm level from the perspective of regional heterogeneity.

The contribution of SMEs in organized manufacturing exports is found to be modest, and it showed a sign of marginal decline from 8.8 per cent in the early 1990s to 7 per cent in 2000–08. Apparently there is little change in the technological profile of SME exports with more than 60 per cent of their exports comprised of low-technology products.

Similar to the results obtained on manufacturing exports by all firms earlier, SME exports are found to be characterized by significant inter-regional differences. While South India is the source of half of the SME exports during 2000–08, West India accounted for 32 per cent. Among Individual states, Karnataka is the top contributor to SME exports from India with 38 per cent during this period, followed by Maharashtra with 24 per cent and Delhi with 12 per cent.

Given the above backdrop the export model developed earlier was applied to the sample of large firms and SMEs separately. The empirical findings indicate that all the three indicators of local markets, namely the size, growth and per capita income of the host states favourably affect SME export activities. The positive effect of the market size of the state exists for both high-technology SMEs and low-technology SMEs while the favourable effect of per capita income is limited to the SME subsample of high-technology industries.

This implies that smaller and low income states have to make more efforts than for encouraging SME exports larger states. If their SMEs are overwhelmingly local market dependent, low income states should actively encouraged these firms to have national market focus. It might be useful if these state governments extend assistance to their SME entrepreneurs to open distribution centres in other states and participate in fairs and exhibition there.

SME exports are found to be further positively influenced by a set of state-specific factors like the presence of port facilities, availability of credit, proximity to foreign firms and technological specialization of state manufacturing sector. While the negative effect of state road on SME exports is quite strong.

In view of the positive role of port facilities in SME exports, a careful look at SMEs access to port facilities may be required. Coastal states can focus on developing and strengthening port facilities while non-coastal states should plan good quality roads linking their principal manufacturing sites to port facilities in nearby states.

Enhancing the credit facility for SMEs may also help states to realize a greater export contribution from this sector. SMEs are found to be beneficiary from the presence of foreign firms as far as exporting is concerns. Therefore, state pursuing a proactive policy for foreign investments may indirectly help their SMEs from the operation of learn for exporting effects. Moreover, states promoting technology-based sectors may realize greater SME exports as knowledge-based sectors generate knowledge spillovers to other sectors hosting SMEs.

The negative or nor not so significant effect of road infrastructure on SME exports as thought to be a result of bad quality road, it is important that state governments should give serious attention to improve and maintain quality of their raods. Bad quality roads are likely to erode the competitiveness of SMEs for export activities.

Telecommunication infrastructure is having a positive impact on SME export intensity especially in medium- and low-technology traditional sectors. Thus, states' action in improving this critical infrastructure may stimulate their SME competitiveness and exports.

The positive impact of firm age suggests that relatively old and established SMEs are more active in exports from the SME sector. The lower export orientation of newly established SMEs could be due to their limited knowledge and information. Hence, state governments should proactively make provision of information on overseas business opportunities to newly formed SMEs and support training programmes for these young players on exporting.

The analysis has also confirmed the positive contribution of firm size in driving SME exports. As SMEs are inherently suffers from a smaller scale, host states can think of industrial cluster for SMEs as a remedial measure. Spatial proximity enables SMEs to enjoy better infrastructure, testing facilities, joint marketing, etc.

Among technological variables, SMEs are found to be more dependent on foreign technologies for enhancing their exporting rather than in-house R&D. This is surely a concern for policy makers as long term competitiveness of their SME sector lies in promoting greater in-house R&D activities. The poor R&D focus of SMEs is understandable given their resource-constraint, so state governments may consider instituting special incentives for SMEs to start R&D in-house.

Finally, affiliation of SMEs to foreign firms appears to have significantly promoted SME exports. Thus, governments can facilitate SME exports by encouraging these firms to seek partnerships of foreign entities.

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Appendix

Table-A1 Descriptive Statistics for Full Samples of SMEs and Large Firms

Variable	SMEs Full Sample				Large Firms Full Sample			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Dependent variable								
FEX_{it}	8.0	16.7	0	80.0	11.6	18.4	0	80.0
Independent variable								
AGE_{it-1}	2.9	0.8	0	4.9	3.0	0.7	0	5.2
$SIZE_{it-1}$	-0.1	1.0	-6.4	4.9	1.3	1.2	-5.0	7.5
$SIZE^2_{it-1}$	1.1	1.8	0.0	41.2	3.2	4.5	0.0	55.8
$ETP1_{it-1}$	0.1	2.1	0	122.4	0.2	4.3	0	300.4
$ETP2_{it-1}$	0.4	3.4	0	189.8	4.0	99.6	0	6375.0
$RDIN_{it-1}$	0.2	1.7	0	83.5	0.3	1.5	0	70.3
ADV_{it-1}	2.7	7.8	0	300.0	2.3	3.7	0	111.6
AFF_i	0.1	0.2	0	1	0.1	0.3	0	1
BGA_i	0.3	0.4	0	1	0.4	0.5	0	1
HI_{jt}	5.8	0.7	4.5	8.4	5.7	0.6	4.5	8.4
RDS_{jt}	0.6	0.9	0	5.4	0.4	0.7	0	5.4
FIS_{jt}	20.1	12.2	0	64.8	17.9	12.5	0	64.8
FSB_{it-1}	0.3	1.5	0	30.8	0.3	1.1	0	25.0
SDP_{kt}	11.7	0.7	7.2	12.8	11.6	0.7	7.2	12.8
$SDPG_{kt}$	6.8	5.1	-12.0	39.8	6.6	5.2	-13.6	39.8
$PSDP_{kt}$	9.9	0.3	9.1	11.0	9.9	0.3	8.7	11.2
SRD_{kt}	0.4	0.2	0.0	2.0	0.4	0.2	0.0	2.1
$SERL_{kt}$	1.3	1.0	0.2	17.9	1.6	1.2	0.2	22.3
$SPWR_{kt}$	19.7	18.4	-37.2	62.1	18.4	18.6	-42.5	62.1
$SROD_{kt}$	127.1	243.4	5.7	2010.3	107.7	161.5	0.9	2010.3
$SPRT_{kt}$	0.8	0.4	0	1	0.7	0.4	0	1
STI_{kt}	-1.5	6.2	-15.0	63.7	-0.6	6.8	-15.0	85.6
SFN_{kt}	-27.0	91.0	-285.4	957.4	-25.8	92.8	-285.4	1202.2
SFF_{kt}	10.4	2.9	1.0	21.1	10.2	3.0	0	21.1
SPL_{kt}	37.8	10.4	0.6	86.5	36.7	11.1	0.1	86.5
$SCRM_{kt}$	209.7	59.8	51.4	531.8	202.3	60.2	51.4	481.3

Note: No. of observations are 9425 and 17125 respectively for the SMEs and large firms; The statistics is for the final sample obtained in the second step of the Chernozhukov and Hong's CQR algorithm for each category of firms; $SIZE_{it-1}$ is the mean centred series of the original variable; *SPWR, STI, and SFN* are regression residuals as described in the text.