EXPORT GUARANTEES AND FIRM PERFORMANCE IN THE CONTEXT OF CORPORATE GOVERNANCE

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Abstract

Micro, small and medium enterprises (MSMEs) the forerunners of the Indian economy equipped with the greatest potential of growth and employment opportunities are the focus of this paper. By examining firm-level data for years 2007-2008 and 2017-2018, this paper captures the simultaneous expenditure on insurance premium and export earnings on the technical efficiency of firms. On applying stochastic frontier production function, results reveal that Indian MSMEs although being labour intensive have high average technical efficiency in the two comparative years. Results also indicate that factors such as firm size, age, ownership, technological imports both embodied and disembodied, expenditure on R&D, and export guarantees contribute to the technical efficiency of MSMEs. The top 25 percent of efficient MSMEs in 2017-2018 rely more on exports, have higher forex earnings with higher expenditure on marketing & advertising, and expenditure on export guarantees. This thus warrants a further improvement in technical efficiency through access to financial services, skilled labour, training of labour, enhancing and attracting foreign investment for operational collaborations, and incentives for easier and risk-free penetration in the world market.

Keywords: Corporate Governance, Firms, Technical Efficiency, Export Guarantees, Exports, MSME

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1. INTRODUCTION

Exports are a major component of a country's economic growth and one of the important drivers of a country's economic development. When on the one hand risk and uncertainty are underlying features of businesses, at the same time businesses engaged in exports are not only exposed to local risks but also international risks, like international financial crisis, currency appreciation/depreciation risks, political risks, etc. Financial frictions affect international transactions more strongly than domestic ones (Amiti & Weinstein, 2011). Most of the countries have their official Export Credit Agencies (ECAs), to support and promote their respective export industries. At a step ahead of ECAs, many countries have established their official export credit guarantee schemes, as a major policy tool to protect their domestic export industries and mitigate the adverse trade effects of international financial constraints due to market failures, political reasons, etc. Such credit guarantees are either directly provided by public entities or by banks or some agencies on behalf of the government.

Micro, small and medium enterprises (MSMEs) play a crucial in the economic and social development across most nations (Audretsch, van der Horst, Kwaak, & Thurik, 2009; Doern, 2009; Le & Harvie, 2010; Hussain, Hussain, Hussain, & Si, 2009). In the case of India too, MSMEs contribute significantly to employment, economic growth, business opportunities, and economic inclusion with several backward linkages for large firms (Audretsch et al., 2009; Doern, 2009; Le & Harvie, 2010; OSMEP, 2003). The total number of MSMEs in India is around 6.3 crores employing over 111 million persons (NSSO, 2016). It is the second-largest employer after agriculture. The sector accounts for 45% of total industrial production, 40% of total exports, and contributes 30% of the country's GDP and with approximately 98.5 percent of the industries falling under the category of MSMEs in India. The trend in the growth of MSME exports is in line with the total exports of the country. The MSME exports grew by 4.19% in 2014-2015, which declined to -5.85 % in 2015-2016. During the same period, total exports also declined from -1.29% to -15.49%. During 2016-2017 and 2017-2018, there was positive growth in the case of both MSME exports and total exports.

One of the major challenges faced by MSMEs is concerning to lack of finances and the non-availability of trade credit in times when buyers bargain for discounts, default in payments, the cost of production is high and low demand as well as an inclination towards availing credit insurance. Thus, there is a need for interventions and targeted policies to reduce the credit gap and effect timely payment to MSMEs. To date, government interventions have not been able to effectively deal with these requirements for enhancing the efficiency of firms and thus influence exports.

The present paper aims to identify the determinants of efficiency for MSME firms in the Indian manufacturing sector and analyse the influence of export guarantees on the efficiency level of exporting MSME firms. Although efficiency is a key component of growth, this paper compares efficiency differences in manufacturing MSME performance between 2007-2008 and 2017-2018 by considering the cross-section version of the stochastic frontier model. This comparison will enable in capturing the impact of export guarantees on firm-level exports in a holistic manner, where the increase in efficiency among MSMEs will indicate effective use of export guarantees and their claims.

With this, Section 2 deals with theoretical and empirical frameworks utilizing the resource-based view focussing on the resources of MSMEs. Section 3 provides the methodology used in the paper, providing a detailed description of SFA and the working of this production function. Section 4 deals with information on the data sources to perform a detailed analysis of manufacturing efficiency by using highly disaggregated firm-level data and construction of variables. Section 5 provides the result of hypothesis testing and finally, section six provides the conclusion and policy implications.

2. LITERATURE REVIEW: EXPORT GUARANTEES AND EFFICIENCY

The present paper employs the resource-based view (RBV) for assessing the determinants of firm-level efficiency. The resource-based view suggests that a firm improves its performance by utilising its resources to produce economically (Peteraf & Barney, 2003). This view further is based on two assumptions, first that firms are heterogeneous with respect to resources and their capabilities; second, resource heterogeneity may be consistent over time in case they are rare and imperfectly substitutable. The resources in this view are further divided into tangible and intangible assets. Tangible assets may consist of financial assets like investments, bank deposits, insurance, guarantees, and physical assets like land, plant, machinery, stocks, and equipment. Intangible assets consist of intellectual property, contracts, and networks (Fahy & Smithee, 1999). Tangible assets cannot be easily transferred as compared to intangible assets from one unit to another and are difficult to duplicate, measure and trade. While the capability of a firm is referred to as the firm's ability to integrate resources for better performance. Performance of firms and specifically the MSME firms can be assessed through numerous various approaches like employment generation, output growth, exporting, and financial performance (Bartlett, 2001; Chen, Zhou, & She, 2007; Kimura & Kiyota, 2007; Liedholm, 2002; Park, Shin, & Kim, 2009; Tambunan, 2008). Efficiency whether allocative, indicating reduction in cost or minimum use of inputs for maximum output or technical, indicating maximum output from given technology and inputs and thus operating on the production efficiency frontier (Arunsawadiwong, 2007; Coelli, Rao, O'Donnell, & Battese, 2005; Herrero & Pascoe, 2002; Murillo-Zamorano, 2004). A firm is technically efficient when it is located beneath the frontier. The most common approaches for estimating efficiency are data envelopment analysis (DEA) and stochastic frontier analysis (SFA) approaches (Coelli, 1996a, 1996b; Coelli et al., 2005; Mortimer, 2002). On comparing DEA with SFA, it is seen that DEA is a nonparametric approach for measuring technical efficiency by using linear programming to construct a production efficiency frontier while SFA is a parametric approach and it estimates production function statistically (Assaf, 2007; Coelli, 1996a; Coelli et al., 2005; Cooper, Seiford, & Tone, 2007; Kontodimopoulos, Papathanasiou, Flokou, Tountas, & Niakas, 2010; Lee, 2011, 2013, Admassie & Matambalya, 2002; Arunsawadiwong, 2007; Murillo-Zamorano, 2004; Vu, 2003; Zahid & Mokhtar, 2007). DEA does not identify random errors, while in SFA, the hypotheses tested, measure efficiency and also account for random shocks outside the firm which may influence output and are also in line with the production function theory (Coelli, 1996b; Coelli et al., 2005; Cooper et al., 2006; O'Donnell, Chambers, & Quiggin, 2009; Le & Harvie, 2010; Major, 2008; Wadud, 2003). Hence, SFA is preferred due to modelling and statistical reasons.

Export credit guarantees lead to an increase at the extensive and the intensive margins of international trade, as they lead to a reduction in fixed and variable cost as per new trade theory models with heterogeneous firms (Melitz, 2003). It has been seen across major exporting nations;

export guarantees primarily cover political and economic risks. It has been seen that that political risk has an impact on international trade but the area is not well researched upon.

As credit constraints strongly affect exports, export credit guarantees may lead to a more than proportional increase in exports (Chor & Manova, 2012; Heiland & Yalcin, 2020; Felbermayr, Heiland, & Yalcin, 2012; Badinger & Url, 2013; Lodefalk, Tang, Tano, Agarwal, & Wang, 2018) of firms. The relationship between exporting and productivity is treated synonymously with the relationship between efficiency and productivity. Exporting enhances the productivity and efficiency of firms by either learning by exporting (Bigsten & Söderbom, 2006; Wagner, 2007, 2012; Martins & Yang, 2009) or by exports from highly productive firms (Melitz, 2003; Melitz & Ottaviano, 2008). Small firms or comparatively new firms may have a small scale of trade and despite high productivity, they may have high foreign trade costs due to non-availability of external financing (Berman & Héricourt, 2010; Forlani, 2014; Muûls, 2015; Minetti & Zhu, 2011).

Export credit guarantees may be available against specific collaterals and may not be possible for firms with low productivity and with liquidity constraints and lack of external financing (OECD, 2013; USITC, 2010; Manova, 2013; Riding, Orser, Spence, & Belanger, 2012; Beck & Demirguc-Kunt, 2006; Carpenter & Petersen, 2002). Small or low productivity firms may target trade to safe destinations for which guarantees may be easily available at affordable costs (Eck, Engemann, & Schnitzer, 2015). It has also been noticed that firms with low productivity, completely abstain from trade and these guarantees also find important in times of financial crises where trade may be limited due to a deficit in funds due to economic risks (Ahn, Amiti, & Weinstein, 2011).

In both theory and practice, measuring the impact of guarantees is technically challenging (Chauffour, Saborowski, & Soylemezoglu, 2010). It is seen that export guarantees to an extent limit the market failures, mitigate financial constraints, provide access to trade credit and reduce trade costs. However, in the Indian case, the studies have been rather scarce in proving the impact of guarantee schemes on exports and that too for medium and small enterprises. Thus, it is imperative to examine the effectiveness of guarantees on promoting exports from India.

3. METHODOLOGY

The analysis involves export credit guarantee cover and participation in export in enhancing the efficiency of MSME firms. The performance of the firm can be mapped through its technical and allocative efficiencies; technical efficiency can be estimated using either data envelopment analysis (DEA) or stochastic frontier analysis (SFA). In this paper, we adopt SFA because of its advantage in estimating standard errors and testing hypotheses by using traditional maximum-likelihood methods, which could not be estimated earlier with deterministic models leading to violation of certain ML regularity conditions. Also, SFA can simultaneously estimate a stochastic production model and technical inefficiency effects model.

3.1. The model

The present paper adopts a two-stage model approach. In the first stage, firm technical efficiency scores are estimated for the sample of MSME firms using SFA[1] (Alvarez & Crespi, 2003; Battese & Coelli, 1992; Kumbhakar & Lovell, 2000) on a Cobb–Douglas production function. In the second stage, the estimated technical efficiency scores are regressed on hypothesised factors determining the technical efficiency (Admassie & Matambalya, 2002; Alvarez & Crespi, 2003; Coelli et al., 2005; Battese & Coelli, 1992; Battese & Coelli, 1992; Amornkitvikai & Harvie, 2011; Kim, 2003; Kumbhakar & Lovell, 2000).

3.1.1. The first stage

A three-input factor and one output Cobb–Douglas production function in logarithmic form considering cross-sectional data is expressed as follows:

$$LnY_i = \beta_0 + \beta_1 Ln(K_i) + \beta_2 Ln(L_i) + \beta_3 Ln(M_i) + (V_i - U_i) \quad (1)$$

i = 1,…, N,

where,

Y_i = output value of firm i;

K_i = the net value of fixed assets of firm i;

L_i = the total number of employees of firm i;

M_i = the material input of firm including power and fuel i;

V_i = a random error term for firm i, and is assumed to be an independently and identically distributed normal random variable with zero mean and variance V_i: $iidN(0, \sigma_v^2)$;

U_i = a non-negative random variable for firm i, accounting for technical inefficiency in the production function is assumed to be independently distributed such that U_i is defined by the truncation of the normal distribution with mean μ_1 and variance σ_u^2.

V_i and U_i are also assumed to be independently distributed for all firms (i = 1, 2,…, N) (Battese & Coelli, 1992; Coelli, 1996b; Coelli et al., 2005; Tran, Grafton, & Kompas, 2008). If U_i equals zero, the firm is defined as being technically efficient and at its maximum output level given the inputs used.

Nevertheless, if U_i is greater than zero, the firm is defined as being technically inefficient (Aigner, Lovell, & Schmidt, 1977; Meeusen & van den Broeck, 1977). Here, the subscript i refers to a firm, β_0 represents the intercept term, β_1, β_2, and β_3 represent the coefficient estimates of capital, labour, and material inputs.

3.1.2. The second stage

Although, no single theory can guide the selection of variables used in regression analysis as the possible causes of inefficiency of the production units (MSMEs) under examination. We have emphasised potentially important local characteristics of factors while being mindful of constraints or issues imposed by data availability.

In this context the following explanatory variables are emphasised in this study for

[1] A commonly used software package developed by Coelli (1996a) named as Frontier 4.1 in the literature is also used in this study.

the sample of Indian MSMEs: *age of firm* (learning by doing hypothesis), *firm ownership type* (domestic or foreign), *export intensity*, *export guarantee* variable, *R&D intensity*, *expenditure on marketing & advertising*, *expenditure on outsourcing of manufacturing jobs*, *total forex earnings*, *import of capital input*, *import of raw material and expenditure on royalty & technical know-how* (disembodied technology).

Supposedly the potential firm specific factors that influence technical efficiency can be modelled in an inefficiency functional form as follows:

$$U_i = \delta_0 + \delta_1 Age_i + \delta_2 Ownership_i + \delta_3 ExpM\_A_i + \delta_4 ExpOutsrce\_jobs_i + \delta_5 ExpRoyalty_i + \delta_6 ExpPackaging_i + \delta_7 ExpR\&D_i + \delta_8 ExportD_i + \delta_9 DXECG_i + \delta_{10} ForexEarn_i + \delta_{11} ImpCap_i + \delta_{12} ImpRM_i \quad (2)$$

Different variables with their expected signs are defined in Table 1 below.

The coefficients of the stochastic frontier production function and technical inefficiency effects model estimated by utilising the maximum likelihood method are defined in terms of the variance parameters as follows (Battese & Corra, 1977; Coelli et al., 2005):

$$\sigma^2 \equiv \sigma_v^2 + \sigma_u^2 \text{ and } \gamma \equiv \sigma_u^2/\sigma^2 \text{d} \quad (3)$$

where, σ_v^2 = random error variance; σ_u^2 = technical inefficiency effects variance.

If γ, representing the share of technical inefficiency in the overall residual variance is close to zero, the deviations from the frontier are largely attributable to noise, whereas if the value is close to unity, it indicates that deviations from the frontier are largely attributable to technical inefficiency (Coelli et al., 2005; Tran et al., 2008).

3.2. Hypothesis tests

Two hypothesis tests are estimated on the stochastic frontier production function and technical inefficiency effects model.

H1: absence of technical inefficiency effects.

H2: absence of stochastic inefficiency effects.

And hypothesis related to the association between technical efficiency and signs of the variables. These tests are conducted by considering the generalised likelihood ratio (LR) test which can be expressed as:

$$\lambda = -2\{log[L(H_0)] - log[L(H_1)]\} \quad (4)$$

where, $log[L(H_0)]$ and $log[L(H_1)]$ are the values of a log likelihood function for the stochastic frontier model under the null hypothesis (H_0) and the alternative hypothesis (H_1). The LR test statistic having an asymptotic Chi-square distribution with parameters equal to the number of restricted parameters imposed under the null hypothesis (H_0), except *Hypothesis 1* (*H1*) and *Hypothesis 2* (*H2*) containing a mixture of a Chi-square distribution (Kodde & Palm, 1986). *H1* and *H2* involve the restriction that λ is equal to zero which defines a value on the boundary of the parameter space.

4. DATA AND VARIABLE CONSTRUCTION

4.1. Data sources and description of variables

The empirical estimation takes the Indian firm-level data from the Prowess IQ, an online corporate database (Centre of Monitoring Indian Economy) for the years 2007-2008 and 2017-2018. The sample covers micro, small, and medium enterprises, characterised according to the definition given by the Ministry of MSMEs. This definition which got revised in June 2020 segregates firms according to the investment in plant and machinery. The micro enterprises with investment less than Rs 1 crore, small enterprises with investment less than Rs 10 crores, and medium enterprises with investment less than Rs 20 crores is the new categorisation to refine the business scenario for Indian enterprises but as the analysis compares two time periods before 2020, the definition of MSMEs for investment in plant and machinery has been considered. A microenterprise is one with up to Rs 25 lakh investment in plant and machinery, small enterprise has an investment between Rs 25 lakhs to Rs 5 crores and a medium enterprise has an investment of more than Rs 5 crores but does not exceed Rs 10 crore.

To capture the impact of export guarantees on the export performance of MSMEs, the "other insurance premium" variable is considered as it proxied the involvement of firms in an undertaking of insurance for exports. At 4-digit National Industrial Classification 2008 (NIC-2008), the total number of Indian manufacturing MSMEs included in the years 2007-2008 and 2017-2018 are 3556 and 3646, respectively. Almost 50% of the firms got deleted because of the misreporting of major variables of interest. The framework of variables in the frontier production function (stage 1) and the inefficiency model (stage 2) are explained below.

1. Output (Y): We considered the production value as an output variable, which consists of total sales in the year and the change in stocks of finished and semi-finished goods.

2. Capital (K): The database provides gross fixed assets (GFA) of the firm and its various components at historical cost. By considering the depreciation of GFA, we calculate the capital stock by perpetual inventory method.

3. Labour (L): Prowess provides the data on compensation to the employee. We take the average wage from the ASI data for the years and compensation to the employees by this wage rate. This generates the number of employees in each of the firms.

4. Raw materials (RM): The raw material input includes all expenditure on intermediate inputs and materials and energy consumed in the process of production for all the firms.

The construction of variables for determining the inefficiency model (stage 2) is explained below.

1. Size of the firm: One of the most important determinants of the innovative activities and financial risks undertaken by a firm is its size. We have separated the firms according to their investment in plant and machinery. Large firms can spread the fixed capital over large sales volume due to the availability of greater financial resources and the existence of scale economies (Cohen & Levinthal, 1989). But small firms, having greater flexibility in adjusting inputs in their production, resulting in less

costly adjustments to the business environment and economic shocks. Thus a *priori*, the impact of export guarantees on exports of firms increasing their efficiency will be more if the firm has more resources and is willing to take more risks in the form of higher exports. We assume a positive relation between firm size and technical efficiency.

2. Exports: The firm's extent of interaction with the foreign buyers and foreign markets and the consequent learning from them is represented by its value of export. Many empirical studies have found that exporting has a positive association with technical efficiency (Granér & Isaksson, 2009; Kim, 2003; Rankin, 2001) and it is for only exporting firms that are more in need of guarantees to support them in the time of uncertain foreign trade. Here, the export dummy has been taken. We assume a positive relationship between exports and the technical efficiency of firms.

3. Interaction of exports dummy and export guarantee proxy variable: The main variable of interest is "other insurance premium". Insurance means protection against future contingent losses. In business parlance, it is a contract in which the insured party makes a periodic payment to another party, known as an insurer, with the agreement that the insurer will compensate for or bear the insured losses, or a part thereof. This contract between the two parties is called an insurance policy. Now, to compensate for losses when importer fails to repay exporters, the role of export guarantees comes into the picture. And, while all those firms which simultaneously export and pay a premium for the risk of trade loss, is what is captured by the interaction dummy here. In a priori, we postulate that technical efficiency should increase if firms take export guarantees leading to an increase in exports.

4. Technology imports: In developing countries, the major source of technology transfer is through the import of technology which can either be in the form of embodied or disembodied. Here embodied technology consists of imports of capital goods and disembodied technology refers to royalties, licensing, and technical fees paid by domestic firms for using the technology of foreign firms. Based on the results of the previous studies, Agarwal and Goldar (1999), Driffield and Kambhampati (2003), Parameswaran (2002), and Keshari (2012), we postulate a positive relationship between technology imports and technical efficiency (TE).

5. Import of raw material: The import of raw materials including spare parts and stores add to the technological strength of a firm and fulfil the production requirements of the final goods which could not be met domestically (Driffield & Kambhampati, 2003; Goldar, Renganathan, & Banga, 2004; Ray, 2006; Keshari, 2012). Therefore, a firm with higher intensity to import raw material may produce output with greater value addition. Hence, a positive relationship is hypothesized between TE and the import of raw material.

6. Ownership of firm: The literature argues that MNCs carry out most of the innovative activities in their home countries (Cantwell, as cited in Tingvall & Poldhal, 2006). This may have access to efficiency-enhancing technology and skills from their corresponding MNCs. This thus could lead to a higher level of efficiency for FDI-affiliated firms in relation to domestic firms in the industry. However, if these MNCs are domestic-market seeking then their motive to increase the real efficiency of domestic firms will not be existing (Oczkowski & Sharma, 2005). We use foreign promoters' share[2] to capture the effect of foreign equity participation and thus consider a dummy for it.

7. Expenditure on research & development expenditure: A firm's efforts to develop, adapt and absorb new technology are measured by its R&D intensity. As most of these activities are efficiency-enhancing, the higher R&D expenditures are expected to lead to higher TE (Driffield & Kambhampati, 2003; Wu, Yeung, Mok, & Han, 2007; Keshari, 2012). Therefore, a positive relationship is expected between TE and R&D.

8. Age of firm: The age of the firm is included in the inefficiency model to control for the effect of the experience of the firm on technical inefficiency. Thus, the experience of the firm is expected to have a favourable impact on TE (Kathuria, 2001). On the contrary, if a firm's age reflects the plant vintage and/or rigidity in outlook or inflexibility towards the changing market conditions, this could have a negative influence on TE. Thus, the relationship between age and TE cannot be predicted on a *priori* basis.

9. Advertising and marketing expenditure: Advertising and marketing expenses are important for determining product differentiation by promoting a corporate image, brand equity, and customer loyalty. Hence, higher expenditure on marketing & advertising may lead to higher sales, giving efficiency advantages to a firm.

10. Outsourced manufacturing jobs: Outsourcing is defined as the practice of having certain job functions done by another individual/enterprise, instead of getting it done internally, captures all those expenses incurred by a company for getting their manufacturing requirements done from outside parties. The key objective of outsourcing is cost saving. Apart from that, outsourcing also helps a company optimise its labour resources and use them efficiently while offloading certain non-core processes to outside parties. Outsourcing also helps bring aboard expertise without having to spend on recruitment and training of the workforce. Thus, we assume a positive relationship between technical efficiency and outsourced jobs.

11. Packaging and packing expenses: These are expenses incurred by companies on packaging the products and in the process, bringing them from their finished state to saleable condition. Some products are by their very nature, not deliverable to the final consumers unless they are packed in some packing material. Thus, packing is done to enable convenient transportation of the product. And we assume a positive relationship between technical efficiency and packaging and packing expenses.

12. Total forex earnings/Total income: This is a derived indicator of foreign exchange transactions. Total forex earnings include exports of goods, services, and dividends, and interest income in foreign exchange. A high ratio means that a company is dependent on export markets to generate revenue. And, thus is export-oriented. Firms with higher forex earnings are expected to be more technically efficient.

[2] The foreign firms are those having foreign promoters' share ≥ 10% which is consistent with the definition of foreign firms as given by the Reserve Bank of India.

Table 1. Description of variables

No.	*Explanatory variables*	*Description*	*Expected signs*
1.	Size	Gross expenditure on plant and machinery (segregation according to MSME)	+
2.	Export dummy ($ExportD_i$)	1- firms exporting 0- firms not exporting	+
3.	Interaction of export dummy and other insurance premium variable ($DXECG_i$)	1- firm's undertaking both exports and spending on other insurance premium. 0- firm's participation in either of the activities or none of the activities.	+
4.	Age of firm (Age_i)	1- firms incorporation after 1991 (new firms) 0- firms incorporation before 1991 (old firms)	+/-
5.	Firm ownership type ($Ownership_i$)	1- foreign promoter 0- Indian promoter	+
6.	Intensity of expenditure on advertising and marketing ($ExpM\_A_i$)	Advertising and marketing expenditure as a % of net sales	+
7.	Intensity of expenditure on outsourced manufacturing jobs ($ExpOutsrce\_jobs_i$)	Expenditure on outsourced manufacturing jobs as a % of net sales	+
8.	Disembodied technology imports intensity ($ExpRoyalty_i$)	Royalties and technical fees paid as a proportion of the firm's net sales	+
9.	Intensity of expenditure on R&D ($ExpR\&D_i$)	The ratio of R&D expenditure to net sales	+
10.	Intensity of expenditure on packing and packaging ($ExpPackaging_i$)	The ratio of packing expenditure to net sales	+
11.	Forex earning ($ForexEarn_i$)	The ratio of forex earning to the total income of the firm	+
12.	Intensity of capital goods import (IMPCG) ($ImpCap_i$)	The ratio of imports of machinery and equipment to net sales	+
13.	Raw material imports intensity ($ImpRM_i$)	The ratio of the value of imported raw materials to total raw materials used in production in a year	+

4.2. Descriptive statistics

The size effect is a disguised element of efficiency enabling larger firms to benefit from increasing returns to scale. Table 2 provides the summary statistics of the key indicators included in our empirical analysis. A comparison of the mean values of net sales and indicators, mainly comprising of compensation to employees, no. of labours, gross fixed assets and power & fuel among MSMEs show that from 2007-2008, in 2017-2018 the expenditure on these indicators increased. The larger the size of firms greater is sales and expenditure. The difference between expenditure on labour and capital by the micro firms is on average quite less, whereas this difference for medium firms is large. Even for energy consumption, micro and medium firms have vast differences. Apart from focussing on absolute expenditure, Table 2 also highlights the expenditure intensity of indicators (proportion of net sales). In 2017-2018, the number of foreign firms decreased among MSMEs, the fewest being for micro firms. In the same year, for small-size firms, an overall decline in the number of firms was witnessed. This trend could be because of the higher number of small firms converting into medium-size firms. Also, in 2017-2018, many new MSMEs incorporating after 1991 came into existence.

For small firms, on average both intensity of R&D and import of raw materials increased in 2017-2018. Signalling the value addition and creation among these firms belonging to sectors like the manufacture of chemicals and chemical products and the manufacture of base metals. But, other expenditures like packaging, marketing & advertising, and outsourcing of manufacturing jobs as a proportion of net sales witnessed a decline in 2017-2018. However, on average the simultaneous expenditure on insurance premium and export earnings increased in 2017-2018.

On average, the micro and medium firms have relied more on disembodied technology import than on embodied technology imports. But, R&D intensity for the years taken has remained at the same low level. The import intensity of raw material although being quite high on average in 2007-2008 has declined in 2017-2018. The micro firms mainly belong to sectors like the manufacture of food products and manufacture of machinery and equipment, whereas medium firms belong to sectors like the manufacture of chemical and chemical products and manufacture of textiles. The simultaneous expenditure on insurance premium and export earnings increased in 2017-2018 for both micro and medium enterprises. However, the number of firms doing exports and using other insurance premiums increased for micro firms but declined for medium firms. The export intensity also declining in 2017-2018 for medium firms signals that in comparison to micro and small firms, the medium firms are major undertakers of export guarantees. In comparison to the year 2007-2008, among other expenditures like packaging, marketing & advertising and outsourcing of manufacturing jobs as a proportion of net sales, both micro and medium firms witnessed a decline in the share of advertising and marketing in 2017-2018.

Table 2. Expenditure intensity across firms (Mean)

No.	Indicators	2007-2008			2017-2018		
		Micro	Small	Medium	Micro	Small	Medium
1.	Compensation to employees (in million)	13.11	24	60	41	63	151
2.	No. of labours (*L*)	14	31	78	45	64	158
3.	Gross fixed assets (*K*) (in million)	22.15	61	234	41	125	353
4.	Net sales (in million)	361	510	1048	585.5	927.5	2160
5.	Power & fuel (in million)	2.21	12.86	40	2.73	15	53
6.	Mkt & advert exp/net sales (*ExpM_A*)	0.409	0.192	0.026	0.008	0.007	0.009
7.	Outsource jobs/net sales (*ExpOutsrce_jobs*)	5.525	0.179	0.024	0.610	0.053	0.027
8.	Disembodied technology imports intensity (*ExpRoyalty*)	0.938	0.013	0.008	0.018	0.007	0.009
9.	Packaging/net sales (*ExpPackaging*)	0.031	0.017	0.016	0.070	0	0
10.	R&D/net sales (*ExpR&D*)	0.002	0.001	0.002	0.001	0.003	0.002
11.	*DXECG* (in million)	70.462	1131.209	903.895	126.627	1411.16	1326.944
12.	Total forex earnings/Total income (*ForexEarn*)	0.081	0.109	0.139	0.093	0.439	0.197
13.	Capital goods imports intensity (*ImpCap*)	0.003	0.006	0.121	0.003	0.003	0.008
14.	Raw material imports intensity (*ImpRM*)	0.309	0.109	0.139	0.069	0.410	0.092
15.	Ownership: 0 – domestic firms; 1 – foreign firms	0-291; 1-2	0-1548; 1-21	0-1656; 1-38	0-358; 1-1	0-1278; 1-20	0-1951; 1-23
16.	Age group: 0 – before 1991; 1 – after 1991	0-114; 1-179	0-740; 1-829	0-825; 1-869	0-107; 1-252	0-456; 1-837	0-757; 1-1227
17.	No. of firms doing exports and using other insurance premium (*DXECG*)	91	588	965	99	469	912
18.	Export intensity	0.08	0.105	0.146	0.111	0.112	0.114

5. EMPIRICAL RESULTS

5.1. Hypothesis test results

Table 3 provides results for hypotheses tests for the size of manufacturing in the period 2007-2008 and 2017-2018. The first null hypothesis ($H1_0$) tests for the absence of technical inefficiency in the model is rejected at the 5% level of significance for small and medium-size manufacturing firms only for the year 2017-2018, as specified by equations (1) and (2). The second null hypothesis ($H2_0$), that technical inefficiency effects are not stochastic, is also rejected at the 1% & 10% level of significance, implying that the technical inefficiency effects model is applicable for the size of manufacturing SMEs in 2017-2018 mainly, given by equations (1) and (2).

Table 3. Hypothesis tests of the stochastic frontier model and technical inefficiency effects

Years	2007-2008			2017-2018		
	Micro	Small	Medium	Micro	Small	Medium
(H1) null hypothesis: No technical inefficiency effects ($H1_0: \gamma = \delta_0 = \delta_1 = \cdots = \delta_{12} = 0$)						
LR statistics	22.01	11.29	12.50	15.40	282.39	32.40
Critical value* 25.68						
Decision	Accept $H1_0$	Accept $H1_0$	Accept $H1_0$	Accept $H1_0$	Reject $H1_0$	Reject $H1_0$
(H2) null hypothesis: No stochastic inefficiency ($H2_0: \gamma = 0$)						
t-ratio	0.61	0.04	0.03	1.74**	51.42***	1.66**
Decision	Accept $H2_0$	Accept $H2_0$	Accept $H2_0$	Reject $H2_0$	Reject $H2_0$	Reject $H2_0$

*Notes: * for both 2007 and 2017, micro, small and medium-sized enterprises have 16 explanatory variables. All critical values of the test statistic are presented at the 5% level of significance and obtained from a Chi-square distribution obtained from Table 1 of Kodde and Palm (1986). ** and ***significant at 10% & 1% level.*

5.2. Estimation of results for input elasticities, gamma parameters, and technical efficiency (the first stage)

The maximum likelihood estimates (MLE) of the parameters of the stochastic frontier and technical inefficiency effects models, equations (1) and (2), are simultaneously estimated using the computer program Frontier Version 4.1 developed by Coelli (1996a). The estimation technique is a three-step procedure wherein step 1, the ordinary least squares (OLS) is applied to obtain unbiased estimates of the parameters of the production function, step two involves taking the OLS estimates to be used as starting values to estimate the final maximum likelihood model, where the value of the likelihood function is estimated through a grid-search of γ varying between 0 and 1 given the values of the β's derived by OLS. Thirdly, an iterative Davidon-Fletcher-Powell algorithm is used to calculate the final parameter estimates, taking the values of the β's from the OLS and the value of γ from the intermediate step as starting values. The estimated results are reported in Table 4 along with an estimate of average technical efficiency.

Table 4 provides the results for the size of manufacturing MSMEs in 2007-2008 and 2017-2018. For 2007-2008 both labour (β_2) and raw material (β_3) inputs have positive coefficients and are significant at the 1% and 10% level for micro and small enterprises. Medium-sized firms along with labour and raw material inputs have significant (at 1%) and positive capital (β_1) input. However, it is only small-size enterprises that exhibit marginal increasing returns to scale as the sum of the estimated input coefficients is greater than unity (1.01). By contrast, micro and medium-sized firms operate around constant returns to scale. While input elasticities differ among MSMEs, the elasticities of raw material (β_3) input which includes all expenditure on intermediate inputs and energy consumed in the process of production in the stochastic production functions are much higher than that for capital (β_1) and labor (β_2).

From Table 4, the elasticities of labour (β_2) in micro, small and medium-sized firms are equal to 0.19, 0.10, and 0.04, respectively, indicating that micro firms are particularly labour dependent in their production. The elasticities of capital (β_1) in micro, small and medium-sized firms are 0.31, 0.28, and 0.20, respectively. Indicating that micro-sized firms are more dependent on capital input than small and medium firms in their production. Raw material (β_3) input elasticities for micro, small and medium-sized firms are 0.39, 0.64, and 0.72 respectively indicating that medium-sized firms are more dependent on raw material input. Further, the inefficiency parameter (γ) for micro, small, and medium-sized firms is equal to 0.05, 0.02, and 0 in 2007-2008, respectively, indicating a low degree of technical inefficiency in production mainly for medium-sized firms.

Table 4 also shows the results of estimation by the size of manufacturing MSME in 2017-2018. All inputs, capital (β_1), labour (β_2), and raw material (β_3) have positive coefficients and are significant at the 1% level for all firms. Again, the elasticity of raw material (β_3) input is the highest among different-sized firms. For micro-firms, the elasticities of capital (β_1), labour (β_2), and raw material (β_3) are 0.11, 0.36, and 0.55 respectively, and are significant at the 1% level. Except for capital input, the other two inputs are higher than the coefficients for 2007-2008, indicating a higher contribution to production in 2017-2018. Also, these firms now exhibit increasing returns to scale in production as the sum of the input coefficient exceeds unity (1.03). The estimated γ for micro MSMEs is 0.05 indicating a low degree of technical inefficiency but is significant at a 10% level. For small-sized firms, the elasticities of capital (β_1), labour (β_2), and raw material (β_3) are 0.09, 0.23, and 0.71, respectively, and are significant at the 1% level, and except for capital input, other inputs have a higher contribution to production compared to 2007-2008. For this year also, small enterprises have to increase to scale (1.03). However, the estimated γ of 0.74 has resulted in high technical inefficiency amongst small-sized firms. For medium-sized firms in 2017-2018, the elasticities of capital (β_1), labour (β_2), and raw material (β_3) have been 0.11, 0.17, and 0.75, respectively and are significant at the 1% level. Even for medium enterprises, except for capital input, other inputs have a higher contribution to production compared to 2007-2008. The same is true for increasing returns to scale (1.02) witnessed by medium-sized firms in 2017-2008. Although during this period γ of 0.05 implied a higher technical inefficiency in comparison to the year 2007-2008.

Table 5 presents and compares the average technical efficiency of manufacturing MSMEs by size in 2007-2008 and 2017-2018. In 2007-2008, maximum mean technical efficiency was attained by small firms among other MSMEs, whereas in 2017-2018 it was medium enterprises that achieved overall maximum technical efficiency. Except for small enterprises, in 2017-2018, both medium and micro firms witnessed improvement in their average technical efficiency levels of 92% and 91%, respectively.

Table 4. MLE for parameters of the stochastic frontier model and technical inefficiency effects model by size of manufacturing

Years	*2007-2008*						*2017-2018*					
Variables	*Micro enterprises*		*Small enterprises*		*Medium enterprises*		*Micro enterprises*		*Small enterprises*		*Medium enterprises*	
No. of observations	*293*		*1569*		*1694*		*359*		*1293*		*1984*	
	Coeff.	*t-ratio*	*Coeff.*	*t-ratio*	*Coeff.*	*t-ratio*	*Coeff.*	*t-ratio*	*Coeff.*	*t-ratio*	*Coeff.*	*t-ratio*
Stochastic frontier model												
Constant	2.49	0.83	1.19	1.24	1.15	11.54	1.62	9.08	1.16	18.52	0.90	11.29
Capital	0.31	0.58	0.28	0.78	0.20	11.30*	0.11	3.07*	0.09	5.94*	0.11	8.84*
Labour	0.19	1.64***	0.10	2.61*	0.04	7.04*	0.36	9.52*	0.23	20.17*	0.17	20.74*
Raw material incl. power & fuel	0.39	6.12*	0.64	3.71*	0.72	79.01*	0.55	21.36*	0.71	77.49*	0.75	81.39*
Technical inefficiency effects model												
Constant	0.22	0.04	0.00	0.00	0.27	7.30	0.17	1.27	-3.01	-26.39*	0.05	0.37
Age group	-0.18	-0.09	0.02	0.02	0.02	0.66	-0.10	-1.77***	-0.01	-0.19	0.05	0.60
Ownership	-0.05	-0.03	0.00	0.00	-0.06	-0.86	-2.39	-2.88*	1.06	5.79*	-0.34	-0.30
Mkt & advertising/net sales	0.02	0.30	-0.01	-0.03	-0.01	-0.27	0.00	0.03	0.00	0.00	0.00	0.00
Outsourcing jobs/net sales	-0.01	-0.04	0.02	0.85	0.19	4.20*	0.00	0.35	0.07	0.63	-0.06	-0.91
Disembodied technology imports intensity	0.06	0.05	0.01	0.01	0.00	0.03	0.17	0.73	1.00	0.99	-0.07	-0.28
Packaging and packing expenses/net sales	0.07	0.04	0.00	0.00	-1.05	-4.74*	-0.37	-0.38	-0.23	-0.41	-0.76	-0.78
R&D intensity	0.01	0.01	0.00	0.00	1.84	2.49**	1.98	1.12	3.39	3.35*	-0.18	-0.17
Export dummy	0.01	0.00	-0.02	-0.02	-0.22	-9.36*	-0.20	-1.97**	-3.80	-29.44*	-0.03	-0.74
DXECG	-0.01	-2.73*	-0.01	-0.29	-0.01	-3.83*	-0.01	-1.48	-0.01	2.27**	-0.01	-2.15**
Total forex earnings/Total income	-0.22	-0.06	0.00	0.00	0.13	3.82*	0.29	1.96***	0.08	3.97*	0.01	3.12*
Capital goods imports intensity	0.04	0.03	0.01	0.01	0.02	4.86*	2.80	1.68***	7.49	7.15*	0.11	2.63*
Raw material imports intensity	-0.03	-0.08	-0.01	-0.01	-0.09	-1.88***	-0.19	-0.98	-0.01	-0.17	-0.23	-1.11
Sigma-squared	1.30	1.68***	0.42	1.23	0.25	30.71*	0.73	12.24*	0.92	27.40*	0.14	24.53*
Gamma	0.05	0.61	0.02	0.04	0.00	0.03	0.05	1.74***	0.74	51.42*	0.05	1.61
LR test	22.01		11.29		12.50		15.40		282.39		32.40	
Log likelihood function	-453.27		-1534.67		-1236.80		-457.53		-967.49		-820.46	
Returns to scale	0.89		1.01		0.96		1.03		1.03		1.02	

Source: CMIE Database – Prowess IQ.
*Notes: *, ** and *** indicate that the coefficients are statistically significant at 1%, 5% and 10%, respectively.*

Table 5. Simple average technical efficiency of Indian manufacturing MSMEs

Years	*2007-2008*	*2017-2018*
Categories	The simple average technical efficiency	The simple average technical efficiency
Micro enterprises	0.79	0.91
Small enterprises	0.93	0.86
Medium enterprises	0.87	0.92

5.3. Estimation results from the technical inefficiency effects model (the second stage)

The estimated results from the technical inefficiency effects model are summarised in Table 4. Negative coefficient signs indicate technical efficiency.

In comparison to the year 2007-2008, more firm-specific variables in the year 2017-2018 for all MSMEs significantly impact technical efficiency. Considering the age of firms, the firms incorporated after 1991 are associated with higher technical efficiency than for those firms which were incorporated before 1991 mainly for micro and small enterprises. However, between these two sized firms, micro firms incorporated after 1991 significantly impact technical efficiency in 2017-2018. For medium enterprises, in both 2007-2008 and 2017-2018, the firms incorporated before 1991 impact technical efficiency. In the case of ownership, the foreign firms although being few, micro firms with foreign ownership significantly and positively impacted technical efficiency, and for small enterprises, domestic ownership in 2017-2018 increased efficiency. Even the foreign medium enterprise owners positively impacted technical efficiency in the same year but the coefficient is not significant.

Among the expenditure variables, packaging and packing expenditure has contributed positively and significantly to the technical efficiency by medium firms in 2007-2008. Although, for other MSMEs also, the technical efficiency is positively associated but is not significant. Whilst in present times, it is a normal practice followed by companies to outsource a part of their requirement or certain manufacturing jobs to outside parties, but for medium enterprises, it contributed to higher technical inefficiency significantly in 2007-2008.

The impact of technology adoption and creation mainly through learning by doing and learning by using is also captured in this empirical analysis by considering both embodied and disembodied technology imports and performing R&D by the firm itself. As can be seen from Table 4, disembodied technology import intensity did not much aid in improving technical efficiency for all MSMEs during the year 2007-2008. However, in 2017-2018, the technical efficiency for medium firms increased but not significantly. In fact, the import intensity of capital goods led to significantly higher technical inefficiency among MSMEs in 2017-2018. It is the import intensity of raw materials that have led to improvement in technical efficiency for all MSMEs majorly in 2017-2018. In 2017-2018, it was only for medium-sized firms, that import intensity of raw material positively and significantly impacted technical efficiency in contrast to R&D intensity and capital goods import intensity.

Among MSMEs, medium-sized firms in 2007-2008 and micro and small firms in 2017-2018 improved their technical efficiency by exporting. For micro and small firms in 2007-2008, exports did not improve technical efficiency. But when all these MSME firms simultaneously exported and spent on other insurance premium (a proxy for export guarantees), their technical efficiency significantly improved both in 2007-2008 and 2017-2018. Thus, this interaction of export guarantees and firms doing exports implies that MSMEs are dependent on insurance coverage in the form of different guarantees for exports available in India to increase their technical efficiency.

With the above analyses focussing on the determinants of technical efficiency, the next section provides a comparison between the top and bottom 25% of the firms in their efficiency performance through the factors which are necessary or lacking in that performance.

5.4. Comparison of top 25% and bottom 25% efficient firms

In this paper, we have chosen all those MSME firms which spent on other insurance premium in 2007-2008 and 2017-2018. The total number of micro, small and medium firms in 2007-2008 were 293, 1569 and 1694, respectively. While the total number of micro, small & medium firms in 2017-2018 are 359, 1293, and 1984, respectively. Thus, in 2017-2018, except for small-sized firms, micro and medium-sized firms increased in number. In Table 6, we have further taken the top and bottom 25% of the highest and least efficient number of firms for comparison among the determinants affecting technical efficiency.

Howbeit, the comparison of mean values of some of the key variables for the top 25% and bottom 25% of firms in terms of technical efficiency for the year 2007-2008 suggests that the top efficient firms among MSMEs tend to export more (the number of exporting firms), are larger, are more productive, have higher forex earning and raw material import intensity, spend low on outsourcing manufacturing jobs and marketing & advertising per unit of sales. But, equally importantly, the most efficient firms have both higher export earnings and spend more on other insurance premiums. Also considering the factors such as age group and ownership, among the top 25% of firms, both small and medium firms incorporated before 1991 were more efficient. The opposite was true for micro firms. Moreover, foreign-owned firms had higher efficiency in 2007-2008. For the same year, the bottom 25% of the efficient firms among MSMEs are micro firms (smaller in size), incorporated after 1991 (for small and medium firms), are domestically owned, spend high on marketing & advertising expenditure, outsourcing of jobs and disembodied technology (micro firms mostly). Also, these firms are less export-oriented and thus spend less on insurance premiums.

In 2017-2018, the top 25% of efficient firms among MSMEs were micro firms in comparison to

medium and small-sized firms. In comparison to 2007-2008, efficient firms were those which were incorporated after 1991 (especially for micro firms). Also, these were the export-oriented firms (micro and small firms dominate) with higher expenditure on insurance premium. Medium firms earned maximum forex earnings. However, the bottom 25% of efficient firms (small firms being least efficient) were majorly incorporated after 1991 spent more on outsourcing of jobs and royalty & technical know-how fees, were less export-oriented, and thus did not spend much on insurance premium.

Table 6. Comparison of top 25% and bottom 25% efficient firms: Mean value of variables

Year	*2007-2008*						*2017-2018*					
Variables	*Micro top 25% of firms*	*Small top 25% of firms*	*Medium top 25% of firms*	*Micro bottom 25% of firms*	*Small bottom 25% of firms*	*Medium bottom 25% of firms*	*Micro top 25% of firms*	*Small top 25% of firms*	*Medium top 25% of firms*	*Micro bottom 25% of firms*	*Small bottom 25% of firms*	*Medium bottom 25% of firms*
Technical efficiency	0.86	0.94	0.98	0.71	0.92	0.75	0.99	0.92	0.95	0.82	0.80	0.89
Age group dummy	0.90	0.13	0.38	0.04	0.97	0.64	0.77	0.60	0.44	0.23	0.71	0.98
Ownership dummy	0.00	0.02	0.07	0.00	0.00	0.00	0.01	0.01	0.07	0.00	0.02	0.00
Mkt & advert exp/net sales	0.03	0.47	0.02	1.52	0.23	0.03	0.00	0.00	0.00	0.03	0.00	0.00
Outsourced jobs/ net sales	0.05	0.02	0.01	21.95	0.65	0.06	0.02	0.02	0.08	1.76	0.07	0.01
Disembodied technology imports intensity	0.00	0.02	0.00	0.00	0.02	0.02	0.01	0.01	0.03	0.06	0.01	0.00
Packaging/net sales	0.00	0.02	0.03	0.09	0.01	0.00	0.02	0.01	0.02	0.00	0.01	0.00
R&D intensity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Export dummy	0.51	0.80	0.98	0.25	0.02	0.01	0.78	0.94	0.75	0.06	0.01	0.05
DXECG (Mn)	276.66	4403.21	2689.73	0.47	0.02	0.14	454.08	750.11	4093.47	1.18	0.08	11.76
Total forex earnings/Total income	0.24	0.21	0.15	0.01	0.01	0.01	0.09	0.23	0.23	0.10	0.03	0.31
Capital goods imports intensity	0.00	0.00	0.02	0.01	0.01	0.44	0.00	0.00	0.00	0.00	0.00	0.03
Raw material imports intensity	1.04	0.20	0.29	0.05	0.05	0.01	0.06	0.14	0.31	0.13	0.03	0.00

Source: CMIE Database – Prowess IQ

6. CONCLUSION

This paper being one of the first few studies has conducted a comprehensive review of the technical efficiency performance of Indian manufacturing MSMEs undertaking export guarantees. Its findings are important as manufacturing MSMEs are vital to future growth and employment generation in India. Also, many MSMEs are cogs in the country's larger industrial wheel and important input suppliers to various factories. The role of export guarantees in covering the risks of exporters while these firms focus on their exports has been a pivotal point in further empowering MSMEs. In this paper, the data collected from Prowess IQ takes care of export guarantees in the form of "other insurance premium" variable. However, a limitation of this paper is to use a proxy for guarantee cover rather than a direct variable.

Descriptive statistics show that in 2017-2018, MSMEs relied on export guarantees to minimise their export losses and which simultaneously led to an increase in exports starting from the year 2007-2008. Except for small firms, this study shows an up-gradation in the technical efficiency of manufacturing MSMEs in 2017-2018 in comparison to the year 2007-2008. Manufacturing MSMEs remaining predominantly labour intensive, and focused on low-skill and low value-adding activities, achieved increasing returns to scale in 2017-2018. The technical efficiency analysis presents that it is the medium firms that were incorporated after 1991 with foreign ownership and significant raw material import intensity leading to an increase in technical efficiency. Similarly, for micro-sized enterprises, the ones incorporated after 1991 with foreign ownership and reliance on import of raw material have increased efficiency in 2017-2018. But when all these MSME firms simultaneously exported and spent on other insurance premium (a proxy for export guarantees), their technical efficiency significantly improved both in 2007-2008 and 2017-2018.

The literature on technical efficiency examines the issue of whether trade and technology and knowledge created by firms enhance productivity but considering the export credit as one of the determinants in capturing technical efficiency of Indian firms in general and MSMEs, in particular, is not documented in the literature. The comparison of mean values of some of the key variables for the top 25% and bottom 25% of firms in terms of technical efficiency for years 2007-2008 and 2017-2018 throws light that majorly medium-sized, export-oriented firms with export guarantees and high expenditure on raw material import and disembodied technology are among the top 25% of MSMEs.

This thus points to how the production among MSMEs should be based on innovation, knowledge, and skill-intensive activities for R&D intensity and technological variables to significantly and positively impact technical efficiency. Firm size, longevity, and experience in certain sectors will not enable future success in the contemporary economic environment if adaptability and flexibility to rapidly changing market circumstances are not paid heed to. Policies could be developed to encourage foreign direct investment in MSMEs in well-targeted sub-manufacturing sectors along with an increase in support of export activities.

To date, Government policy measures have been largely trying to address the issue of improving

MSME technical efficiency and competitiveness. In the current times with global uncertainty in demand, a vast majority of MSMEs operating below their capacity are strapped for cash and weighed by logistic challenges. However, on the availability of financial resources like the Atma Nirbhar Bharat Package, hope can be raised on enhancing capabilities and capacity.

Also, further research addressing the growing disparity or convergence between technical efficiency and the impact of undertaking export guarantees by MSMEs in India and other key regions in emerging markets is important to be carried out. The Government and state ownership need to be carefully reviewed, while cooperative ownership should be encouraged in well-identified activities in the rural sector.

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