

# “Relationship of exports, Forex and MSMEs in India: an econometric study”

<b>AUTHORS</b>	Namita Rajput  <a href="http://orcid.org/0000-0001-7978-0959">http://orcid.org/0000-0001-7978-0959</a> Ajay Rajput Geetanjali Batra Shelly Oberoi
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Namita Rajput (India), Ajay Rajput (India), Geetanjali Batra (India), Shelly Oberoi (India)

## Relationship of exports, Forex and MSMEs in India: an econometric study

### Abstract

Micro, small and medium enterprises (MSMEs) have been accepted as the engine of economic growth and for promoting equitable development. The objective of this paper is to highlight the role of MSME sector in India and its contribution in Indian economy. This paper examines the relationship between MSMEs and exports in India to examine a causal relationship between exports, MSMEs and Forex reserves. To estimate this we employ, Augmented Dickey Fuller Test and Philip Perron, tests of stationarity, Johenson's cointegration approach, and Granger causality/Block Exogeneity Wald tests to conclude the objective of the study. The data span for the study is from 1992-93 to 2009-10. Amongst the key results it is found: that there is a cointegration between exports and MSMEs confirming a long-term relationship and bidirectional causality using Granger causality and block exogeneity test. The results of relationship between exports, Forex and MSMEs are confirmed using Vector Autoregression and by Granger causality and VAR Granger causality/block exogeneity Wald tests showing bidirectional causal relationship in all variables. Therefore, this study concludes by recommending, the strategy to improve the manufacturing ability of the MSME sector to improve the competitiveness of their products and enhance exports and Forex reserves.

**Keywords:** manufacturing exports, co-integration, Granger causality, micro small medium enterprises, sustainable development, competitiveness, equitable development.

**JEL Classification:** C12, C22, L52, L60, O10.

### Introduction

In India, micro, small and medium enterprises are defined on the basis of their investment in plant and machinery (for manufacturing enterprise) and on equipment (for enterprises rendering services). The defined limit on investment for enterprises to be classified as micro, small and medium enterprises is as follows (see Table 1).

Table 1. Limit on investment for enterprises to be MSMEs

Classification	Manufacturing enterprises*	Services enterprises**
Micro	Rs 2.5 Million/Rs 25 Lakh	Rs 1 Million/Rs 10 Lakh
Small	Rs 1 Million/Rs 10 Crore	Rs 20 Million/Rs 2 Crores
Medium	Rs 1 Million/Rs 10 Crore	Rs 50 Million/Rs 5 Crores

Notes: \*Investment limit in plant and machinery. \*\*Investment limit in equipment.

MSME sector plays a major role in India's present export performance. MSME sector contributes 45%-50% of the Indian exports. Out of total exports MSME direct exports from report for approximately 40% of total exports and about 15% to exports indirectly which mainly takes place in the course of merchant exporters, export houses and trading houses. It can also take the form of production of parts, components for use of finished exportable goods. Non-traditional products account for more than 95% of MSME exports.

The share of MSMEs in total exports is spread across different product segments. In case of items like textiles, leather goods, processed food, engi-

neering goods and gems & jewellery, export performance has been commendable over the years. Sectors like sports goods are almost 100% export oriented. In view of this, export promotion from MSME sector has been accorded high priority in India's export promotion strategy which includes oversimplification of procedures, encouragement for higher production of exports, special treatment to MSMEs in market development fund, simplification of duty drawback rules etc.

There is a radical change in the economic environment in which MSME are operating, domestic as well as international. Hence as a result now they are open to intensive, dynamic global environment. Therefore, it becomes essential for MSMEs to reinforce their competitiveness for the basic survival and expansion. Technology is one of the factors that add determinedly in constructing the competitiveness in industries as well as nations. The important role of MSME sector can be seen with the rise in the number of MSME in India (see Figure 1). It is against this backdrop that growth and good health of MSMEs becomes crucial for the economy as a whole and for protecting the livelihood and well being of a very large section of the population.

The engagement with exports is very important for MSMEs according to the following reasons. The first reason which can be attributed for increasing the exports and keep benchmarking their competitiveness is because of lowering of trade barriers and massive competition in domestic markets. The main indicator of their competitiveness is exports ability vis-a-vis, their corresponding part in other nations. The position of MSME sector improves when they

are more exposed to global market trends, quality and standards. The second reason is that by actively participating in exports MSMEs can be more open to global quality standards, budding market trends with the help of which they can take more rational

decisions. Another reason why MSME should help in increasing exports is that, this will induce positive externalities, which will eventually bring higher wage structure, better management practices and good working conditions.

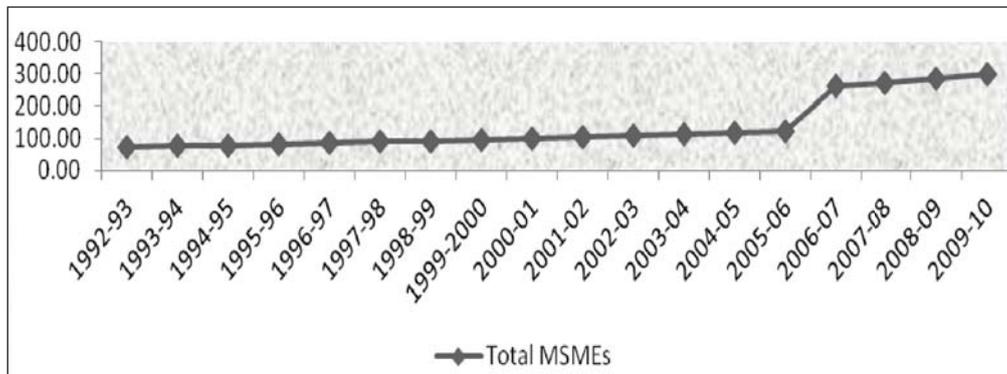


Fig. 1. Total MSMEs

Hence worldwide, the MSMEs have been accepted as the engines of economic growth for promoting equitable development and have emerged as the single most important sector generating employment, next only to the agricultural sector, helps in increasing exports which in turn helps in increasing Forex reserves, which are very important for economic development of the country. They encompass a heterogeneous group of activities in the manufacturing, services, and trade and agribusiness sectors. The major advantage of this sector is its employment potential at low capital cost. The labor intensity of the MSME sector is much higher than that of the large enterprises. In India too, the MSMEs play a pivotal role in the economy of the country. In recent years, this sector has consistently registered higher growth rates compared to the overall industrial sector. With its agility and dynamism, the sector has shown an admirable innovativeness and adaptability to survive the recent economic downturn and recession.

India is witnessing an unprecedented economic boom and is seeing increasing activity in the manufacturing as well as services sectors. Its export sector is thriving and various industry sectors such as IT, ITES, pharma, ship building, auto ancillary and textile produce goods for markets across the world. While the growth rate is showing a positive trend, export-oriented SMEs, MSMEs and corporates are also more exposed to currency fluctuations – for many of them an unfamiliar territory.

There are many types of risks associated with SME’s export performances like competition, inefficient production cost, product quality, export barrier from country destinations, low capability in high production, delay in transportation, communi-

cation barrier, government agencies that presume to become barrier, lack of international market knowledge, barrier of entering international market, long duration of export document process, export administrative procedures, unofficial fee in processing export documents, inability to supply product in time, lack of knowledge of methods of transaction, time limitation in cargo, delay of shipping. Payment defaults and currency fluctuations major challenges for exporters mainly because costs are in rupees and revenues are in foreign currencies. It is important to manage risk due to Forex fluctuations. There was an appreciation of Rupee to 39.4 per US Dollar in January 2008, compared to 44.00 a US Dollar in March 2007. After appreciating for almost 16 months, the Rupee then started depreciating and fell to an unprecedented level and all time low of 51.2 a US Dollar in March 2009, due to Foreign Institutional Investors (FII) outflows. Today it is trading in the INR44-45/US Dollar range. This kind of volatility has exposed the MSME, corporate and other export-oriented units to vast currency risks which are eating up their profits. It has become essential for these sectors to manage currency exposures to mitigate risks.

However, there is not much awareness in this area and most exporters, out of ignorance, live with such risks. Given the cut-throat competition in the international markets, MSMEs and other corporates need to operate at very low margins to retain market share or enter new markets. If profits are reduced by Forex losses, it is not a good thing for the businesses. Hedging in the currency futures market is an effective tool to lessen risks. Currency futures are exchange traded derivatives which can benefit the small and medium exporters through hedging their currency risk and minimizing loss due to currency volatility.

In this backdrop the objective of this study is to empirically validate the role of MSME sector in increasing exports and Forex reserves.

The study tries to answer the following questions:

1. To examine the role of MSME sector in increasing the export potential of India.
2. To analyze the relationship of rise in Forex reserves and exports owing to rise in MSME sector in India.

The paper is divided into following sections. The present section gives the overview of role of MSME sector in India followed by the review of literature contained in section 1. Section 2 gives the description of data and methodology used to conclude and achieve the objectives of the study. Section 3 gives the analysis and interpretations of results. Summary and conclusion are presented in the final section.

### 1. Review of literature

Goldar (1988) finds that the small scale sector is not as competent as large sector due to lack of economies of scale, efficient management practices and superior technology. Goldar (1985) measures technical efficiency of washing soap industry by calculating a frontier production function using firm level data from CSSI (census of SSI units) and concludes that the technical efficiency of small units is less as compared to large ones. Bhavani (1991 & 2007) and Nikaido (2004) observe that the mechanical effectiveness (generally 70-80%) in small sector is higher as compared to large sector. According to Government of India (1997), in comparison with large sector, MSME sector is less productive and competent. Dhar & Lydall, Hajra & Sandesera (1966 & 1969) report an optimistic relationship between the size and output-capital ratio using annual CMI/ASI data. Doi and Cowling (1998) find that rapid development of SSI plays an important role in creating employment opportunities and provides competitive advantage in terms of exports. A study by SIDBI (1999) based on index number approach reveals that output of MSME is higher as compared to large sector. Davis, Junior R. and Gaburici, Angela (2001), examine the impact of MSMEs on the development of sustainable rural livelihoods by doing a survey on 74 firms in Brasov and Dolj countries of Romania. They analyze information about unregistered gathering, hawking, and handicraft activities through qualitative social development studies and conclude that only few registered rural non-farm firms are commercially oriented and operate in a competitive market. Roberto Alvarez (2004) analyze Chilean firms and conclude that efforts in international business, process innovation, and the utilization of export promotion programs contribute posi-

tively to export performance in MSMEs. Trade shows and trade missions do not create permanent markets, but exporter committees have a positive and significant impact on exports. Tulus Tambunan (2005) suggest cluster approach for development in MSME whereby MSME cluster is linked to domestic or foreign markets. Tulus Tambunan (2006) analyze secondary data on the development of MSME in Indonesia and find patterns of transformation of MSMEs in the course of economic development. Leora Klapper (2006) examine the case of Nafin reverse factoring program in Mexico and conclude that factoring is larger in countries which have greater economic development and developed credit information bureaus. Carlo Pietrobelli, Roberta Rabbellott (2006) opine that participation in global markets does not always ensure sustainable income growth for developing countries. They suggest "high road" for Latin American small and medium-sized enterprises (SMEs) which involves increasing productivity, salaries and profits instead of "low road" wherein firms compete by decreasing wages and revenues. Hernan Banjo Roxas (2007) propose a conceptual framework showing how the social capital of a community shapes the innovation performance of MSMEs using absorptive capacity as the variable mediating the relationship between the two.

Braybrooks (2008) concludes that there is a need to incorporate regional factors related to culture into centralized entrepreneurial policy so that a strong policy model can be created and implemented. Keshab Das (2008), critically analyzes the impact of economic reforms introduced by Government of India in 1991 on MSMEs and concludes that MSMEs, especially in the rural areas have not been able to perform well. Sierdjan Koster, Shailendra Kumar Rai (2008) use the GEM-model and conclude that with an increase in economic development level of entrepreneurship is increasing, the quality of the small firms remains stable and the share of registered firms remains equal over time. Chhibber, Ajay and Thangavel Palanivel (2009) study how Indian industries survived the global financial crisis but need major reforms in areas of infrastructure, poverty alleviation, labor laws, education and health, fiscal and monetary policies and political stability for sustained inclusive growth. Ranchay Bhateja, Amit Tyagi and Mani Tyagi (2012) evaluate the performance of SSI in terms of units, employment, outputs and exports and conclude that Small Scale Industries occupy a special place in Indian economy. However from the year 1991 SSI have been facing strong competition due to globalization and economic liberalization. Shambhu Ghatak highlights the key constraints faced by the MSMEs like access to credit and tech-

nology, red-tapism. He concludes that the policy environment for promoting MSMEs changed from 'protectionism' during the pre-1990s to 'export orientation' during the post-1990s. Ghosh, Duke, Anupa Ghosh, (2009), using Strategic Niche Management (SNM) approach suggested technological innovations relating to energy conservation and use of renewable sources of energy to control the escalating costs of MSMEs. Perumal Koshy (2009) suggest use of Information and Communication Technology applications by Micro and Small Enterprises (MSEs) to keep pace with fast evolving global market dynamics. Shuchi Gupta & Neetu Mehndiratta (2009), use statistical tool t-test explore the impact of the global financial crisis on India's exports and imports with different regions of the world. They suggest ways to raise India's global competitiveness through fiscal and non-fiscal measures to limit the impact of the global crisis on the Indian economy. Shamika Ravi (2010) analyzes state level data from 1991 to 2002 relating to total production, total output, total employment and total exports from the MSME sector to study the impact of financial subsidies to the MSME sector, state investment in industrial parks, clusters aimed at this sector and the state expenditure to support technology within the MSME sector. They conclude that specific policies that are aimed at the MSME sector have no significant impact on the growth of this sector, but general development policies such as expenditure on infrastructure and access to finance have significantly positive impact on growth of the MSME sector across states in India. Suneel Kumar, Rajyashree, Preeti Sagar Pathak (2010) analyze the role of culture, education and other environmental forces in developing entrepreneurs in two different districts Bareilly and Ghazipur in Uttar Pradesh, India. Ghazipur (a backward region) showed a high level of interest in starting a new venture than its counter parts at Bareilly (a relatively developed region) and they demonstrated important characteristics of a successful entrepreneur. Elvira A. Zamora (2010) suggest management of technology (MOT) framework for the success & sustainability of MSME. They analyze Philippine government programs for MSME promotion and development, namely SMED Plan 2004-2010 and the Department of Science and Technology's (DOST) Small Enterprise Technology Upgrading Program (SETUP) and identify the key factors behind success of some high-performing small enterprises of Philippine like: Innovatronix Incorporated, Digital Info Structure and Consulting Corporation, and Moon Dish Foods Corporation by doing SWOT analysis. Carlos M.B. (2010) identify important factors that contribute to the success of

MSME, S and T-based industries under different regional settings in Philippines. Shastri, R.K., Ravindra Tripathi and Anushree Singh (2010) examine the changes in the employment scenario of India following the pursuance of the trade liberalization strategy and the possible effects of further trade liberalization. Kumta G.A. and S. Mukherjee (2010) opine that despite a lot of incentives and support provided to SMEs, their focus is mainly on day to day management of business rather than on leveraging organizational learning. Pradhan Krupasindhu and Munda Santosh Kumar (2010) opine that Sustainable Development of any economy depends on MSMEs as MSMEs help in employment generation and utilization of locally available natural and human resources. Khan, Mohd Azam and Tosib Alam (2010), analyze the impact of liberalization on Indian Small Scale Industries. They suggest technology development and strengthening of financial infrastructure to boost SSI. Grant Thornton (2011), analyze economic performance of MSMEs in terms of their ability to generate employment and contribution to exports. They point the key challenges MSMEs are facing are access to finance, marketing facilities, poor infrastructure, access to technology and environmental constraints. Gajendra Jha and Julius Aind (2011) highlight the contribution of SSIs in the economic development of India in terms of output, employment and exports and the need for a strategy for a horizontal geographical spread of the various outreach programs for balanced growth based on five pillars like skill development, markets, technology, infrastructure and credit availability. They suggest greater awareness regarding incentives and schemes announced by the central as well as state governments. Suresh Chandra Bihari (2011) suggests use of customer relationship management (CRM) by MSMEs to successfully identify, acquire and retain their clients. Rashi Naresh Gupta (2011) analyze the role of industrial associations in development of MSMEs. Nina Nurani (2011) applies normative juridical approach and concludes that IPR (Intellectual Property Rights) protection over industrial design creativity contributes significantly to the designer's creative ideas of micro, small and medium industry in Indonesia. Prabhat Dwivedi (2011) examine two marketing models: model of Hill and model of Carson & Gilmore to conclude that there is a gap in marketing practices being performed in SMEs and which should be performed. He concludes that marketing theory of 4 Ps cannot be directly applied to SMEs as their marketing practices are very different from large enterprises. Sahana Roy Chowdhury (2011) concludes that the impact of financial crisis was more on those with higher de-

pendency on external markets for trade and finance and the small businesses with lower diversification of product base and little option for downsizing. Venkata Ramanaiah (2011) pointed that due to the liberalization, privatization and globalization (LPG), the importance of the government has shifted from labor intensive industries to capital intensive industries which has resulted in decline of small-scale industries during post LPG period. Asghar Afshar Jahanshahi, Khaled Nawaser, Seyed Mohammad Sadeq Khaksar, Amin Reza Kamalian (2011) opine that Government must adopt more horizontal structures for developing and implementing an integrated policy approach to encourage the growth of local MSMEs as they can help directly in alleviating poverty by increasing income levels and creating jobs. Afshar Jahanshahi Asghar, Khaled Nawaser, Morteza Jamali Paghaleh and Seyed Mohammad Sadeq Khaksar (2011) evaluate the policies of Indian government with respect to the MSMEs and the performance of these enterprises in relation to these policies and assistance. They conclude that the countries which have given more emphasis on Entrepreneurship Development Program succeed in achieving higher growth of MSME. Sharma Shallu, Dhaliwal Navkiranjit Kaur (2011) analyze secondary data for the period from 2005-06 to 2009-10 from annual reports of banks and other publications relating to various financing schemes of Small Industries Development Bank of India (SIDBI) undertaken for the MSME sector and conclude that the role of SIDBI in financing of MSME sector has shown a positive trend and it was the highest in 2008-09. Jha Brajesh (2011) identifies problems of non-farm employment in rural sector by studying pattern and process of rural employment using data from the NSS quinquennial survey results on employment, unorganized manufacturing and also the CSO Economic Census results. Rinku Das and Ashim Kumar Das (2011), highlight the cluster development initiatives by Government of India in North Eastern parts of the country and their implication on economic and industrial development in rural areas of North East. Priya Solomon (2012) analyzes how availability and ease of accessibility of credit and stronger capital market impacts growth and viability of MSME in terms of units, employment output and exports. They opine that future of MSME depends on skill development, markets, technology, and infrastructure and credit availability. S.N. Babar (2012) analyze the contribution of the role of small-scale industrial units in economic development of India for the period of 15 years from 1991-92 to 2007-08. Nishant Joshi, R.K. Sharma (2012) analyzes the role of Madhya Pradesh Financial Corporation (MPFC)

which is a state owned financial corporation established with the primary objective of growth and development of MSME in the Madhya Pradesh State of India. Ashish Soti, Ravi Shankar, O.P. Kaushal (2012) suggest a methodology to apply six sigma to SMEs using contradiction matrix for problem solving. They develop a standard solution matrix for manufacturing-related problems using questionnaire-based research. They suggest integration of theory of inventive problem solving (TRIZ) with six sigma in manufacturing industries. Jeshvin Vincent, H. Hariharasudhan, S. Gopinath (2012) highlight the different issues in MSME using case study approach on 20 manufacturing organizations in India and suggest mitigation strategies.

After review of literature it is very clear that MSME plays a significant role in the economic development of the economy. The government's report of the Task Force on MSME has estimated that currently there are around 26 million MSMEs operating in India. This sector comprises 8% of GDP, accounts for 40% of our total exports and over 45% of total manufacturing output. It also employs 60 million people and is instrumental in facilitating industrialization in rural and backward areas. It is against this backdrop that growth and good health of MSMEs becomes crucial for the economy as a whole and for protecting the livelihood and well being of a very large section of the population. In this backdrop it is important to empirically confirm the vital role which these MSME are playing in the Indian economy. In India there is a paucity of literature in this regard on account of many reasons. The period of study is quite elongated and the vector auto regression is employed to understand in a comprehensive way the relationship between MSME, exports and its impact on Forex reserves. Hence this study is a modest attempt in this direction.

## 2. Data and methodology

The data used in this study is secondary mainly taken from Ministry of Micro, Small & Medium Enterprises, publications, special reports and surveys, Government of India and many sources of RBI from the handbook of Indian economy. The period of study is from 1992-93 to 2009-10. Given the nature of the problem and the quantum of data, we first study the data properties from an econometric perspective starting with the stationarity of data. We employ cointegration technique to understand the causality in exports and MSME sector. The time series stationarity of sample price series has been tested using Augmented Dickey Fuller (ADF). The ADF test uses the existence of a unit root as the null hypothesis. To double check the robustness of the

results, Phillips and Perron (1988) test of stationarity has also been performed for the sample series. Descriptive of the data will be analyzed to understand the nature of the data. Then VAR model will be employed which is a statistical model used to capture the linear interdependencies among multiple time series. VAR models generalize the univariate *auto-regression* (AR) models. All the variables in a VAR are treated symmetrically; each variable has an equation explaining its evolution based on its own lags and the lags of all the other variables in the model. VAR modeling does not require expert knowledge, which previously had been used in structural models with simultaneous equations. When specifying a VAR, one first has to decide which variables to include into the model. Since one cannot include all variables of potential interest, one has to refer to economic theory for any priori ideas when choosing variables. This involves some process of marginalization, in that the joint probability density of the VAR model must be interpreted as having been marginalized with respect to some variables that are potentially relevant (see e.g. Clements and Mizon, 1991; Canova, 1995). Having specified the model, the appropriate lag length of the VAR model has to be decided. In deciding the number of lags, it has been common to use a statistical method, like the Akaike information criteria. Alternatively, one can choose a rather large lag length a priori, and thereafter check that the results are independent of this assumption (this is the approach taken in Blanchard and Quah (1989)). However, a large lag length relatively to the number of observations, will typically lead to poor and inefficient estimates of the parameters. On the other hand, a too short lag length will induce spurious significance of the parameters, as unexplained information is left in the disturbance term. Forecasts from VAR models are quite flexible because they can be made conditional on the potential future paths of specified variables in the model. In addition to data description and forecasting, the VAR model is also used for structural inference and policy analysis. In structural analysis, certain assumptions about the causal structure of the data under investigation are imposed, and the resulting causal impacts of unexpected shocks or innovations to specified variables on the variables in the model are summarized. These causal impacts are usually summarized with impulse response functions and forecast error variance decompositions.

**2.1. The stationary auto regression model.** Let  $Y_t = (y_{1t}, y_{2t}, \dots, y_{nt})$  denote an  $(n \times 1)$  vector of time series variables. The basic  $p$ -lag vector autoregressive (VAR ( $p$ )) model has the form

$$Y_t = c + \Pi_1 Y_{t-1} + \Pi_2 Y_{t-2} + \dots + \Pi_p Y_{t-p} + \varepsilon_t,$$

$t = 1, \dots, T,$

where  $\Pi_i$  are  $(n \times n)$  coefficient matrices and  $\varepsilon_t$  is an  $(n \times 1)$  unobservable zero mean white noise vector process (serially uncorrelated or independent) with time invariant covariance matrix  $\Sigma$ .

Once we have established the long run relationship between the variables of the VAR model, the next logical step for our purpose is to examine the Granger-causal relationship among the variables.  $X$  is said to “Granger-cause”  $Y$  if and only if the forecast of  $Y$  is improved by using the past values of  $X$  together with the past values of  $Y$ , than by not doing so (Granger, 1969). Granger causality distinguishes between unidirectional and bi-directional causality. Unidirectional causality is said to exist from  $X$  to  $Y$  if  $X$  causes  $Y$  but  $Y$  does not cause  $X$ . If neither of them causes the other, then the two time series are statistically independent. If each of the variables causes the other, then a mutual feedback is said to exist between the variables. In order to test for Granger causality, we will estimate variable VAR model as follows, where all variables are initially considered symmetrically and endogenously. Then we have adopted the VAR Granger causality/block exogeneity Wald tests to examine the causal relationship among the variables. Under this system, an endogenous variable can be treated as exogenous. We used the chi-square (Wald) statistics to test the joint significance of each of the other lagged endogenous variables in each equation of the model and also for joint significance of all other lagged endogenous variables in each equation of the model.

### 3. Analysis and interpretation of results

**3.1. Trends and patterns of MSMEs in Indian economy.** The data clearly exhibit the rising trend of establishment of MSMEs in India. Total information on the number of registered and unregistered micro, small and medium enterprises in the country is at present assessed through periodic conduct of All India Census for the sector. The latest All India Census of Micro, Small & Medium Enterprises (MSMEs) was conducted with reference year 2006-2007. As per the “Quick Results: Fourth All India Census of Micro, Small & Medium Enterprises 2006-2007”, the number of registered and unregistered micro, small and medium enterprises in the country is 26100797. As per the statistics, there are 1552491 units are in registered sector while 24548306 units are in unregistered sector. The maximum number of units is in Uttar Pradesh where 3113316 units have their presence of which 187522 units are in registered sector while 2925794 units are in unregistered sector (<http://www.smeworld.org>), which is a clear evidence of their exponential growth owing to specific role they are playing in the

economic development of the country. MSMEs are considered to be home grown MNCs which are considered world class and with global foot prints.

The country's GDP is increasing at an average of 8.6 percent over the past 4 years. These MSMEs have a special role to play in the Indian economy. MSMEs are of the highest relevance as they constitute over 90% of all enterprises in most of the economies including India and are engines of economic growth and equitable development. They are credited with generating the highest rates of employment growth and account for a major share of industrial production and exports. By adding capacities and supplying cost efficient quality goods, MSMEs play a key role in the development of economies. As new technologies and globalization reduce the importance of economies of scale, the potential contribution of smaller firms is progressively improved. MSMEs take emerging markets toward higher growth and enhance their international competitiveness. Considering the growing influence of MSMEs, they can contribute significantly to the Indian economic development and national endeavor of self reliance.

**3.2. Causal relationship of exports and MSME sector.** The export rate has gone up in recent years. These are the highest common denominators that attest to the fact that India is emerging as an economic power house which can be easily attributed to MSMEs operating in India. The role of MSME have fuelled comprehensive growth and contributed in a profound manner towards constructing radiating global India. The underbelly of the present India's corporate landscape is MSMEs which have propelled the nation into the big union. There are many factors which have given boost to this sector like influential workers, low cost benefits, decline in market instability, availability of resources; an aspiring Indian populace is some of the classic motivations why global corporations are at present very enthusiastic to control India's growing economic strength and vigor. There are many cities in India which were mainly dots on the map of world have now emerged and metamorphosed into a very important economic destinations facilitating the basic interests of these MNCs like Gurgaon, Ahemedabad and Pune and in increasing exports of the country. Both MSMEs and exports exhibit a rising trend from 1992-2010 as seen in Figure 2.

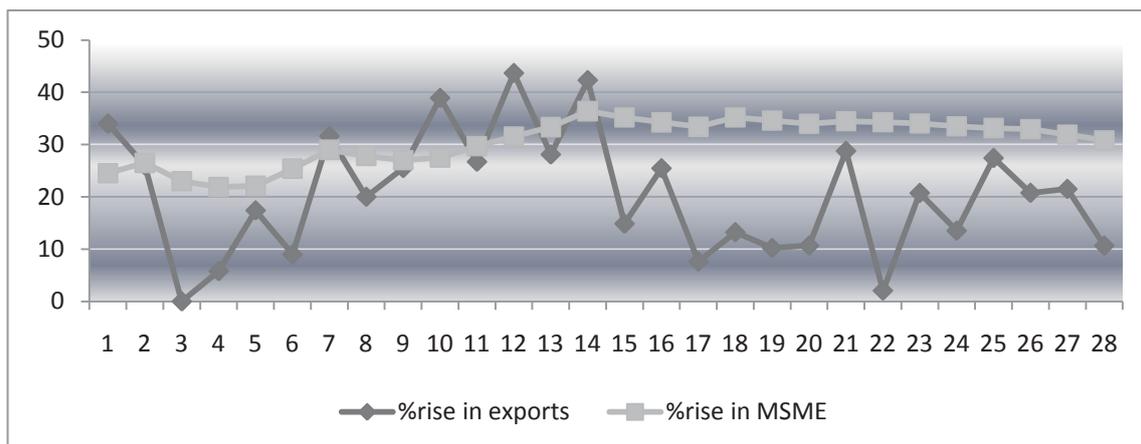


Fig. 2. Trends of percentage rise in exports and percentage rise in MSME

There is a strong contention that there is a strong relationship between MSMEs and exports and the rise in exports is attributed the growth of MSMEs operating in India. The exports from MSME sector have been clocking excellent growth rates in this decade mainly fuelled by performance of garments, leather, jems and jewellery for this sector. The product groups in which MSME sector dominates in the area of exports are sports goods, readymade garments, woollen garments, knit-wear, plastic products, processed foods and leather products. There is a reorientation of MSME sector export strategy embedding the trade regime of WTO and also improving & innovating the work culture through inclusion of ICT. The government of India is constantly changing the policy regime in the favor of MSME sector owing to its importance and role

which it can play in Indian economy. One end in case of MSME spectrum contains highly innovative and high growth enterprises which includes textiles and garments, leather and leather products, auto components, food processing. These sectors not only have high potential for growth but also contribute significantly in enhancing the country's exports. To understand the long-term relationship between the two Johansen's cointegration tests was employed, which confirm the long term dynamics between these variable and confirm at least causality in one direction. If two or more series are themselves non-stationary, but a linear combination of them was stationary, then the series are said to be co-integrated. Before we employ cointegration test, we check that the series are non stationary. Hence we have done stationarity test on the sample series,

the results of stationarity tests are given in Table 1 which confirm non stationarity of commodity price data, hence we repeat stationarity tests on return series (estimated as first difference of log prices) which are also provided in Table 2.

Table 2. Results of data stationarity

Name	Panel A		Panel B	
	ADF test	Phillips-Perron test	ADF test	Phillips-Perron test
	T-Statistics	T-Statistics	T-Statistics**	T-Statistics**
Exports	-1.09	-0.51	-41.98 **	-41.98 **
MSME	1.12	-1.38	-41.35 **	-41.32 **
Forex	0.78	0.65	-32.96 **	-42.7 **

Note: \*\*Significant at 5% level.

The sample return series exhibit stationarity thus conforming that sample series are integrated to the first order. Panel A shows existence of unit root, and Panel B shows results of unit root as integrated to order 1, i.e. I (I) using both Phillips-Perron test (PP) and Augmented Dicker Fulley test (ADF).

To employ cointegration technique it is a pre condition that the series have to non-stationary which is

met. Hence we employ co-integration techniques to determine the existence of a stable long-run relationship between the exports and MSMEs operating in India.

Cointegrating methodology fundamentally proceeds with non-stationary nature of level series and minimizes the discrepancy that arises from the deviation of long-run equilibrium. The observed deviations from long-run equilibrium are not only guided by the stochastic process and random shocks in the system. Cointegration implies linear combinations of both level series cancelling the stochastic trend; thereby producing a stationary series. Johansen's cointegration test is more sensitive to the lag length employed. Besides, inappropriate lag length may give rise to problems of either over parameterization or underparametrization. The objective of the estimation is to ensure that there is no serial correlation in the residuals. Here, Akaike information criterion (AIC) is used to select the optimal lag length and all related calculations have been done embedding that lag length is coming to be 2 lags. The results are presented in Table 3.

Table 3. VAR lag order selection criteria lag

	Log L	LR	FPE	AIC	SC	HQ
0	-473.2137	NA	1.43e+22	59.52672	59.67158	59.53414
1	-429.2685	65.91790	1.87e+20	55.15856	55.73800	55.18823
2	-400.2649	32.62899*	1.80e+19*	52.65812*	53.67214*	52.71004*

Notes: \*Indicates lag order selected by the criterion. LR is the sequential modified LR test statistic (each test at 5% level). FPE is the final prediction error. AIC is the Akaike information criterion. SC is the Schwarz information criterion. HQ is the Hannan-Quinn information criterion.

The cointegration results are reported in Table 4. Results of cointegration are obtained using the op-

timal lag length calculated using VAR lag length order selection criterion.

Table 4. Results of Johansen's cointegration test

Name	Hypothesis		Lag length	Trace	Critical value**	R = 0, accept R = 1 reject P-value (0.031)
	Null	Alternative	Criterion(Sc)			
Exports & MSME sector			-13.03			
	$r = 0$	$r \geq 1$	2 lags*	37.78	16.78396	15.49** Reject

Note: The null hypothesis is rejected at five percent level and there is a significant cointegration in MSME sector and exports as is evident from the P-value significant at 5% level (\*\*).

After analyzing that there is a significant cointegration in the sample series we employ Granger causality test to know the causality between the two variables. Granger causality is a statistical concept of causality that is based on prediction. According to Granger causality, if a signal  $X_1$  "Granger-causes" (or "G-causes") a signal  $X_2$ , then past values of  $X_1$  should contain information that helps predict  $X_2$  above and beyond the information contained in past values of  $X_2$  alone. "Granger causality" is a term for a specific notion of causality in time-series analysis. The idea of Granger causality is a pretty simple one:

A variable  $X$  Granger-causes  $Y$  if  $Y$  can be better predicted using the histories of both  $X$  and  $Y$  than it can using the history of  $Y$  alone.

Table 5. Results of Granger causality, pair wise Granger causality tests, lags two

Null hypothesis	F-statistic	Probability
TOTAL_MSMEs does not Granger cause EXPORTS	4.99430	0.028**
EXPORTS does not Granger cause TOTAL_MSMEs	5.99727	0.007**

Note: \*\* Shows significant relationship at 5% level.

The results exhibited in Table 5 confirm the bidirectional causality between MSMEs and Exports with  $p$ -value  $< 0.05$  in both cases which signifies rejection of null hypothesis. Hence the test results confirm bidirectional causality of the two variables namely MSME sector and Exports. To give robustness in the results of causality the process is repeated using Var Granger Causality/Block Exogeneity Wald Tests. The optimal lag length is taken into consideration using AIC information criterion. The results are reported in Table 6.

Table 6. VAR Granger causality/Block Exogeneity Wald tests

Dependent variable: EXPORTS		
Excluded	Chi-sq	Prob.
TOTAL_MSMEs	9.988605	0.0068**
All	9.988605	0.0068**
Dependent variable: TOTAL_MSMEs		
Excluded	Chi-sq	Prob.
EXPORTS	11.99454	0.0025**
All	11.99454	0.0025**

Note: \*\* Shows significant causality at 5% level.

The results of the VAR Granger causality/Block Exogeneity Wald tests also convey and confirm the bidirectional causality as exhibited by Granger causality test, with significant P-value  $< 0.05$ .

**3.3. VAR model.** We employ Vector Auto Regression (VAR) which is a statistical model used to capture the linear interdependencies among multiple time series. It is very important to find out the lag selection criterion before the application of this model to capture the accuracy in the results. The results of which are exhibited in Table 7.

We use AIC AND SC criterion to select the lag length to be used in VAR model and it is coming significant at lag 2 in both cases AIC & SC. Hence lag 11 is used to analyze the model of VAR, which is an econometric device to model multivariate time series.

The equation of VAR:

$$X_t = \alpha + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \beta_3 Y_{t-3} \dots + \gamma_1 Z_{t-1} + \gamma_2 Z_{t-1} \dots + \delta_1 X_{t-1} + \delta_2 X_{t-2} \dots$$

Table 7. VAR lag order selection criteria

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-473.2137	NA	1.43e+22	59.52672	59.67158	59.53414
1	-429.2685	65.91790	1.87e+20	55.15856	55.73800	55.18823
2	-400.2649	32.62899*	1.80e+19*	52.65812*	53.67214*	52.71004*

Notes: \* Indicates lag order selected by the criterion. LR is the sequential modified LR test statistic (each test at 5% level). FPE is the Final prediction error. AIC is the Akaike information criterion. SC is the Schwarz information criterion. HQ is the Hannan-Quinn information criterion.

The results are significant on the second lag at 5% level of significance, hence we analyze this model on the second lag. Vector auto regression estimates exhibit a significant relation of MSME sector exports and Forex as is evident from significant T-statistic value [2.8] after the end of first lag.

Table 8. Vector auto regression estimates

Vector auto regression estimates	D(EXPORTS)	D(FOREX)	D(TOTAL_MSMEs)
D(EXPORTS(-1))	0.288199 (0.28587) [ 1.00816]	3.020925 (2.25743) [ 1.33821]	0.003070 (0.00108) [ 2.84041]
D(EXPORTS(-2))	0.943949 (0.26106) [ 3.61580]	4.980462 (2.06156) [ 2.41587]	0.004489 (0.00099) [ 4.54689]
D(FOREX(-1))	0.139889 (0.03938) [ 3.55185]	0.625226 (0.31101) [ 2.01028]	-0.000305 (0.00015) [-2.05085]
D(FOREX(-2))	-0.067407 (0.02832) [-2.38022]	-0.584897 (0.22363) [-2.61543]	-0.000326 (0.00011) [-3.04620]
D(TOTAL_MSMEs(-1))	-257.0155 (66.1246) [-3.88684]	547.8933 (522.174) [ 1.04925]	-0.754758 (0.25005) [-3.01849]

D(TOTAL_MSMEs(-2))	-294.095 (102.707) [-2.86342]	-2116.194 (811.062) [-2.60917]	0.106810 (0.38838) [ 0.27501]
C	-476.8356 (2656.45) [-0.17950]	-7773.293 (20977.5) [-0.37055]	-22.83536 (10.0452) [-2.27327]
R-squared	<b>0.873417</b>	0.900646	0.809562
Adj. R-squared	<b>0.778480</b>	0.826130	0.666733
Sum sq. resids	2.18E+08	1.36E+10	3120.299
S.E. equation	5222.732	41242.95	19.74936
F-statistic	<b>9.199930</b>	12.08663	5.668064
Log likelihood	-144.9812	-175.978	-61.31633
Akaike AIC	20.26415	24.39707	9.108844
Schwarz SC	20.59458	24.72750	9.439268
Mean dependent	13609.93	78659.00	14.56533
S.D. dependent	11096.62	98909.29	34.21032

Notes: Standard errors are in brackets and t-statistics in square brackets.

The relationship becomes more significant at the end of second lag which is evident from significant T-statistics of all the three parameters of VAR model (see Table 7), Exports [-2.3], Forex [-2.61], total MSME [-3.04]. The R-square is .87 (87%), adjusted R-square .77 (77%). F-statistic is 9.1.

**3.4. Causality test.** To verify the results of VAR, causality tests are performed in Table 6. They confirm the bidirectional causality between MSMEs and exports, exports and Forex and Forex and MSME sector with  $p$ -value  $< 0.05$  in all cases which signifies the rejection of null hypothesis. Hence the test results confirm bidirectional causality of all variables namely MSME sector, Forex and Exports. The results are calculated embedding lag length by AIC and SC criterion.

Table 9. Pair wise Granger causality tests

Lags: 2 (AIC Criterion)		
Null hypothesis	F-statistic	Probability
D(TOTAL_MSMEs) does not Granger cause D(EXPORTS)	5.40642	0.03270**
D(EXPORTS) does not Granger cause D(TOTAL_MSMEs)	5.74603	0.02837**
D(FOREX) does not Granger cause D(EXPORTS)	14.8713	0.00202**
D(EXPORTS) does not Granger cause D(FOREX)	8.09691	0.01195**
D(FOREX) does not Granger cause D(TOTAL_MSMEs)	0.29840	0.0039**
D(TOTAL_MSMEs) does not Granger cause D(FOREX)	14.6851	0.00106**

Note: \*\* Shows significant relationship at 5 % level.

To have the robustness in the results causality is tested using VAR Granger causality/block exogeneity Wald tests (see Table 7). Taking exports as dependent variable when Granger causality is done the results exhibit that the relationship is significant i.e. total MSMEs and Forex play a very significant role in exports with  $p$ -value  $< 0.05$  at 5% level of significance. When total MSMEs are taken as dependent variable both Forex and exports play a significant role with  $p$ -value  $< 0.05$ , significant at 5% level of significance. On taking Forex as dependent role of exports and MSMEs also cannot be ignored with  $p$ -value significant at 5%. Hence in all the variables taking on variable as dependent we cannot ignore the significance of the other two variables as in all cases  $p$ -value is coming on to be significant at 5% level of significance.

**3.5. Wald tests.** Table 10 presents VAR Granger causality/Block Exogeneity Wald tests. The causality test justifies our model of causality between MSME, exports and Forex. This information is of vital importance to the policy makers to draft the policies to promote MSMEs which have a strong and

significant causality to enhance exports and Forex reserves.

Table 10. VAR Granger causality/Block Exogeneity Wald tests

Dependent variable: EXPORTS		
Excluded	Chi-sq	Prob.
TOTAL_MSMEs	8.044391	0.0179**
FOREX	21.41291	0.0000**
ALL	55.64511	0.0000
Dependent variable: TOTAL_MSMEs		
Excluded	Chi-sq	Prob.
EXPORTS	5.763758	0.0360**
FOREX	12.04216	0.0024**
ALL	64.12914	0.0000
Dependent variable: FOREX		
Excluded	Chi-sq	Prob.
EXPORTS	3.253925	0.0015**
TOTAL_MSMEs	8.643681	0.0133**
ALL	21.99040	0.0002

**Conclusion**

Hence worldwide, the MSMEs have been accepted as the engines of economic growth for promoting equitable development and have emerged as the single most important sector generating employment, next only to the agricultural sector. It helps in increasing exports which in turn helps in increasing Forex reserves, which are very important for economic development of the country. They encompass a heterogeneous group of activities in the manufacturing, services, and trade and agribusiness sectors. The major advantage of this sector is its employment potential at low capital cost.

The labor intensity of the MSME sector is much higher than that of the large enterprises. In India too, the MSMEs play a pivotal role in the economy of the country. Hence, an important strategy which will improve the manufacturing ability of the MSME sector is very important that will help to improve the competitiveness of their products and enhance exports. It is empirically proved in the study that there is a confirmed strong causality between MSME sector and exports. Key areas which are vital in policy formulation include skill development and training, infrastructure development, access to affordable credit, momentum for technology upgradation and innovation, providing marketing sustainability and brand building with adequate institutional structure and special support for MSMEs.

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