Examining the Role of India's Micro, Small, and Medium Enterprise Sector in Exports and Foreign Exchange Reserves

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Abstract

Across the globe, MSMEs have come to be seen as a key driver of economic expansion. When it comes to boosting inclusive growth and making significant contributions to economic development, the MSMEs sector plays a crucial role.The focus of this study is on the role that micro, small, and medium-sized enterprises (MSMEs) play in the Indian economy.This research tries to examine the link between exports, foreign exchange reserves, and the MSMEs industry.To establish the association, the augmented Dickey-Fuller Test and Philip Perron tests were employed to assess the amount of stationarity of the data, additionally Johanson's cointegration technique and Granger causality tests were utilised to determine the purpose of the study. The timeframe scope of the study encompasses the period from 1992-93 to 2021-22. One of the primary findings of this study is the presence of a unidirectional association between micro, small, and medium enterprises (MSMEs) and exports, as proven by a causality test. Therefore, the conclusions drawn from this study suggest the need to prioritize the implementation of initiatives aimed at enhancing the condition ofMSMEs and establishing a conducive environment for their long-term viability.This is crucial in order to bolster India's export capabilities and foreign exchange reserves.

Keywords: MSME sector, export, forex reserves, Augmented Dickey Fuller Test, PhilipPerron test, Johanson's cointegration approach, Granger causality

Introduction

Industrial sector expansion is closely associated with a nation's economic growth.The industrial sector consists of large, medium, small, and micro-sized businesses. While large industries contribute to the economic development of a nation, Micro, Small and Medium Enterprises (SMEs) have a key role in generating employment, promoting industrial output, and facilitating exports. Small-scale enterprises possess several advantages, including a high degree of labour intensity, utilisation of low-cost technology, requiring minimal investment, and exhibiting a short gestation period.

The name of Micro, Small, and Medium Enterprises (MSMEs) automatically conveys their significance in driving the growth and development of a nation. In many countries, as their economies progress, there has been a decline in the contribution of agriculture to the gross domestic product (GDP), leading to an excess of available labour. During the period of 1950-51, the agricultural sector accounted for 51.9 per cent of India's GDP. The percentage decreased to 19.0% in the fiscal year 2021-22. In 1951, a significant

majority of the Indian population, exceeding 70 percent, relied on agriculture as their primary means of sustenance. However, at present, this proportion has declined to approximately 45 percent.

The employment of surplus labour force from the agriculture sector by micro, small, and medium enterprises (MSMEs) is a significant aspect observed in numerous nations, including India. According to the findings of the National Sample Survey (NSS) 73rd cycle, which was conducted from 2015 to 2016, the MSMEs sector has been responsible for generating a total of 11.10 crore employment opportunities in both rural and urban regions throughout the nation. Not only do they serve as a fundamental means of sustenance, but they have also significantly enhanced the quality of life for several households throughout the course of time.

MSMEs play a significant role in India's economy, accounting for around 30% of its GDP. Furthermore, these enterprises are responsible for a substantial 39.6% share of the country's overall industrial output and contribute to 45% of its total exports (Rane, 2021). A small 48.8% of the overallMSMEs are in urban regions, while the remaining 51.2% are situated in rural areas inside states such as Uttar Pradesh, Maharashtra, Tamil Nadu, West Bengal, Andhra Pradesh, and Karnataka, among others. This phenomenon results in a fair allocation of the country's revenue, the reduction of poverty, and the promotion of economic progress that includes all members of society.

The Micro, Small and Medium Enterprises Development (MSMED) Act was officially announced in 2006 with the purpose of tackling policy concerns that impact MSMEs as well as addressing the scope and investment limits of this sector. The objective of the Act is to promote the growth and advancement of these enterprises, as well as to improve their ability to compete in the market. The legislation establishes the initial legal structure for acknowledging the notion of "enterprise," encompassing both manufacturing and service companies. This document provides a definition for medium firms and aims to incorporate the three tiers of these enterprises, specifically micro, small, and medium, into a unified framework. The legislation also includes provisions for a formal collaborative system at the national level, ensuring fair representation of all stakeholders, including the three categories of firms. This process is designed to fulfil various advising roles. The Act includes provisions for the allocation of dedicated funds to support, develop, and improve the competitiveness of micro and small enterprises. It also mandates the notification of schemes and programmes aimed at achieving these objectives. Additionally, the Act promotes progressive credit policies and practises, grants preference to products and services provided by micro and small enterprises in government procurements, and establishes more effective mechanisms to address issues related to delayed payments. Furthermore, the Act ensures the availability of a scheme to facilitate the closure of business operations for these enterprises.

The absence of a wide definition for MSME is demonstrative of the lack of consensus among nations. Various nations employ distinct criteria to define this sector. Most of these definitions are founded around the concepts of investment ceiling and employment.

The previous method of defining MSMEs was established based on the MSMED Act of 2006. There were existed variations between manufacturing and services units. Additionally, it exhibited a significant deficiency in terms of budgetary constraints.

The Atmanirbhar Bharat package, introduced on May 13, 2020, included a modification to the definition of MSME. According to the news, the Union Ministry of Micro, Small and Medium Enterprises (M/o MSMEs) has released a Gazette notification to facilitate the implementation of the revised definition and criteria for MSMEs throughout the nation. The revised definition and criterion were implemented on July 1st, 2020. A fresh composite classification method has been officially announced for industrial and

service units. Currently, the distinction between the production and service sectors has been abolished. Additionally, a novel criterion pertaining to turnover has been introduced.

Table 1: Classification of MSMEs

Classification	Micro	Small	Medium
Manufacturing Enterprises and Enterprises rendering Services	Investment in Plant and Machinery or Equipment: Not more than Rs.1 crore and Annual Turnover; not more than Rs. 5 crores	Investment in Plant and Machinery or Equipment: Not more than Rs.10 crore and Annual Turnover; not more than Rs. 50 crores	Investment in Plant and Machinery or Equipment: Not more than Rs.50 crore and Annual Turnover; not more than Rs. 250 crores

Source: The Gazette of India

Literature Review

(Urata, 2002) examines the development of micro, small, and medium enterprises (MSMEs) in Japan during the post-war era. The findings of this research indicate a significant decrease in the rate of new business entries during the past twenty-five years. This tendency is found across many sectors of the economy and among firms of different sizes.The researchers investigated the factors that influence entry into the Japanese market. Through their cross-sectional analysis, they identified that cost disadvantages resulting from small scale operations and a scarcity of technical resources serve as the primary obstacles to entry. The proponents called for the reduction of technical hurdles. They suggested that the government may offer technical education and training to individuals interested in starting small and medium-sized enterprises (SMEs). Additionally, they proposed that financial aid be provided to alleviate the financial or capital requirements that may pose as barriers for potential SME entrants.

(Wiboonchutikula, 2002) conducted an analysis on the development of small and medium-sized enterprises (SMEs) in Thailand. The study focused on various aspects such as the growth in the number of SMEs, employment generated by these enterprises, their export capacity, and their involvement in subcontracting activities. Additionally, the study examined the productivity of SMEs by assessing measures such as technical efficiency and total factor productivity. Finally, the study also explored the challenges and limitations faced by SMEs in Thailand. The researchers have discovered that SMEs mostly rely on manual labour, have a little reliance on imported raw materials, and establish connections with larger organisations through subcontracting arrangements. There is no universal correlation between the size of a corporation and its level of technological efficiency or productivity. Additionally, it was noted that the rate of expansion of small-sized enterprises is highest during periods of poor real income growth.From this perspective, it can be argued that small and medium-sized enterprises, particularly those that are exceptionally small, serve as a protective measure against reduced employment rates during challenging economic periods.

(Albert Berry, 2002) examinedan empirical data from Indonesia to assess the performance of the small and medium-sized enterprise (SME) manufacturing sector. The study focused on evaluating the role and historical growth patterns of the SME sector in recent years.Moreover, the researcher examined specific variables that impact the efficiency, competitiveness, and longevity of SMEs in Indonesia. These

variables encompassed the SMEs' engagement in clusters and subcontracting endeavours. The author also conducted a comprehensive examination of Indonesian SMEs within the context of the progressively liberalised economy that has undergone significant changes in the past few decades. Additionally, an analysis was conducted on the Indonesian government's actions and strategies in response to the recent economic crisis.

(DR. K.A. GOYAL, 2012)conducted a study that examined various significant elements contributing to industrial sickness and the extent of its impact. The researcher discovered that despite the various incentives and resources provided by the Industrial strategy and the extensive efforts to foster a significant number of MSMEs over time, a considerable number of these units have encountered numerous challenges that have led to their deterioration or closure. The individual proposed the necessity of identifying illness at its early stages and implementing corrective actions prior to the beginning of the illness.

(Dr. Dheeraj Gandhi, 2015) the focus was on examining the core competencies possessed by entrepreneurs in small and medium manufacturing and exporting enterprises. The study also aimed to determine the extent to which the success of these enterprises can be attributed to their competitive advantage. Additionally, the study explored the relationship between entrepreneurial competencies and the achievement of success through competitive advantage.The discussion has revolved around many aspects that contribute to the growth of entrepreneurship in Uttar Pradesh. These elements are significant as they contribute to the economic development by diversifying products and promoting exports.

(Rajeevan N., 2015)investigated the contribution of MSMEs to the Indian economy in terms of employment generation. The findings revealed that this sector plays a significant role by employing approximately 60 million individuals across 26 million enterprises. When considering the generation of employment, the role of MSMEs is closely comparable to that of the agriculture sector. This study is characterised by its analytical and descriptive nature, relying primarily on secondary data sourced from various government organisations. The findings of this study indicate that unregistered firms contribute to over 80% of employment opportunities. Upon calculating the Compound Annual Growth Rate (CAGR) within the MSMEs sector in India, it is evident that the CAGR pertaining to job growth during the post-reform period surpasses that of the pre-reform period.

(DEVASENA, April 2018) concluded that in a country like India, which has a shortage of capital but many workers, MSMEs have made a huge contribution in terms of fundamental economic criteria. In addition to this, he stressed the fact that the roles performed by MSMEs in our country are underappreciated, even though this industry is the second largest employer in the country.

(Mannar, 2019) the Indian economy is seeing fast industrial expansion, which is expected to effectively support national initiatives such as the 'Make in India' programme. The author reached the conclusion that this industry has demonstrated sufficient resilience to maintain its existence through the utilisation of conventional skills and experience, as well as the incorporation of new technology, money, and inventive marketing methods.

(Mathur, 2019) the contribution of MSMEs to the Indian economy lies in their ability to generate significant job possibilities for individuals with varying levels of expertise.This article concentrates its attention on the latest governmental efforts and plans implemented for MSMEs in India, as well as the role these enterprises play in enhancing the national economy. This paper emphasises the persistent challenges faced by the MSMEs sectors, including limited financial resources, inadequate infrastructure, and a lack of technology. However, it also recognises the potential of this sector as a vibrant and

dynamic opportunity for young entrepreneurs to initiate their ventures. Furthermore, it acknowledges the significant contribution of the MSMEs sectors in addressing regional imbalances within the country through their involvement in manufacturing, production, and export activities.

(Vijai, 2020) has attempted to explain the current state MSMEs in India, as well as the financial support and credit provided by Public, Private, and foreign institutions to foster the growth and development of MSMEs. This study utilised secondary data obtained from the official website of MSMEs to analyse the current situation of MSMEs across different states in India, as well as the bank credit provided by Scheduled Commercial Banks to MSMEs in India. The analysis involved employing Percentage Analysis and ANOVA techniques. ANOVA is employed to ascertain the disparity between the levels of Outstanding Bank Credit to Micro and Small Enterprises and the corresponding levels within the banking sector. The research effectively illustrated the current situation of Micro, Small, and Medium Enterprises (MSMEs) in different states of India, as well as the significant amount of bank loans provided to MSMEs by Public, Private, and Foreign Banks in the country.

(Borad, 2020) an analysis was conducted on the present state of MSMEs in India. The study focused on assessing the strengths, weaknesses, opportunities, and threats (SWOT analysis) associated with MSME. It has been discovered that in India, there are over 40 rules that are applicable to MSMEs. Additionally, there are more than 50 inspectors who possess the authority to conduct visits to the factories of these enterprises. Furthermore, these inspectors are vested with the right to impose penalties on small firms. In this context, it becomes challenging to allocate sufficient attention and resources to critical domains, including production, marketing, and technological advancements. It has been proposed that the utilisation of SWOT analysis facilitates the comprehension of both internal and external aspects, which is beneficial not only for MSMEs, but also for huge corporations and other entities.

(A. Adisesha, July 2020) an evaluation was conducted to analyse the performance of MSMEs in India across multiple dimensions. The researchers primarily focused on the examination of the ownership structure of MSMEs and discovered a significant prevalence of male proprietors within this sector. There was no statistically significant variation observed in this pattern between urban and rural areas, however the prevalence of firms owned by males was slightly more pronounced in urban areas compared to rural areas.

(Dr. Aditya Kumar Sharma, 2021) underscored the significance of regional resources in influencing export activities within the four regions of Uttar Pradesh, as well as the presence of inter-regional variations. In order to achieve this objective, the researchers employed the Generalised Method of Moments (GMM) approach for panel data analysis in order to identify statistically significant characteristics that influence the overall exports of each region. The study concludes that there are interregional variances in the factors that influence exports in two regions, specifically the eastern and western regions of Uttar Pradesh. The data indicates that there continues to be a substantial share of total exports in the region attributed to conventional exports.

(RAJAGOPAL, 2022) an analysis was performed on the distribution of enterprises in the MSME sector. The analysis focused on categorising the enterprises based on their activity, employment type, and gender. Additionally, the study examined the comparative distribution of the top 10 states in terms of percentage. The majority of MSMEs are predominantly created in rural areas. MSMEs play a crucial role in aiding the larger sectors.

(Dr. Nalla Bala Kalyan, 2022)there is evidence of the growing impact of MSMEs throughout the economy. These enterprises are responsible for producing a wide variety of goods and services to meet

the demands of both domestic and international markets. In order to comprehend the allocation of funds towards MSMEs, the authors have classified the funds into three distinct categories: short-term finance, medium-term finance, and long-term finance. The author's conclusion suggests that credit guarantee has been a well-established and effective approach in facilitating the provision of credit to the Micro and Small Enterprises (MSE) sector on a global scale. To a significant degree, the provision of enhanced credit guarantee support would serve as a contributing factor in mitigating the credit gap.

(Manu Pal, 2022) the significance of rural entrepreneurship in Uttar Pradesh was examined. The researcher collected data from 400 respondents across four regions of rural Uttar Pradesh. The findings indicate that most of the respondents recognise the potential of rural entrepreneurship to enhance the economic value of the rural sector in the present era. However, the study also highlights the existence of certain obstacles that need to be addressed.

Objectives

The literature review must be followed by an empirical validation of the function of the MSME sector in increasing exports and foreign exchange reserves.

This paper attempts to achieve the following goals:

1. To comprehend and analyse the role of the MSMEs sector in boosting India's exports.
2. To determine the causal relationship between India's Forex reserves and its MSMEs sector.

Data and Methodology

The study utilised secondary data, primarily sourced from EM 2nd (Entrepreneur Memorandum), UAM (Udyog Aadhaar Memorandum), annual reports from the Ministry of Micro, Small & Medium Enterprises, publications, special reports, gazettes of the Government of India, and various sources from the handbook of the Indian economy published by the RBI. The timeframe under investigation spans from the academic years 1991-92 through 2021-22. Considering the inherent characteristics of the issue at hand and the substantial volume of data, our initial focus is to examine the attributes of the data from an econometric standpoint, commencing with the assessment of data stationarity. The cointegration technique is employed to ascertain the causal relationship between exports and the MSMEs sector. The stationarity of the sample price series has been assessed through the application of the Augmented Dickey Fuller (ADF) test. The ADF test employs the null hypothesis that a unit root exists.

In order to verify the reliability of the findings, a stationarity test using the Phillips and Perron method was conducted on the sample series. The data will be studied in order to gain an understanding of its nature. The statistical model adopted in this study will be the Vector Autoregressive (VAR) model, which is commonly used to describe the linear interdependencies among several time series. VAR models are a generalisation of univariate autoregressive (AR) models. In a Vector Autoregression (VAR) model, all variables are symmetrical. Each variable is associated with an equation that describes its evolution, considering its own lagged values as well as the lagged values of all other variables in the model. When selecting a VAR (Vector Autoregression) model, it is necessary to decide regarding the variables that will be included in the model. Given the impossibility of incorporating all variables of possible relevance, it becomes necessary to consult economic theory in order to obtain a priori ideas for selecting variables. This entails a process of marginalisation, whereby the joint probability density of the VAR model needs to be regarded as having undergone marginalisation with regards to certain variables that may be of significance. Once the model has been described, it becomes necessary to determine the suitable lag

length for the VAR model. When determining the appropriate number of delays, it is important to employ a statistical technique such as the Akaike information criteria. Alternatively, it is possible to select a lag duration of considerable magnitude in advance and thereafter verify that the outcomes remain unaffected by this assumption. This methodology was employed in the study conducted by(Quah, 1989). Nevertheless, when the lag time is significantly larger compared to the number of observations, it is expected that the estimates of the parameters will be suboptimal and less efficient. Conversely, employing a lag duration that is excessively brief may result in the emergence of false significance in the parameters, as it fails to account for unexplained information that remains in the disturbance term. The flexibility of forecasts generated by VAR models stems from their ability to incorporate conditional information regarding the likely future trajectories of certain variables inside the model. Furthermore, the VAR model is utilised not just for data description and forecasting, but also for structural inference and policy research.

The stationary auto regression model.

Let $Y_t = (y_{1t}, y_{2t} \ldots \ldots y_{nt})$ denote an (n×1) vector of time series variables.

The basic p-lag vector autoregressive (VAR (p)) model has the form

$$Y_t = C + \pi_1 Y_{t-1} + \pi_2 Y_{t-2} + \pi_3 Y_{t-3} + \ldots \ldots + \pi_n Y_{t-n} + \varepsilon_t$$

t = 1…T,

where Π_i are (n×n) coefficient matrices and ε_t is an (n×1) unobservable zero mean white noise vector process (serially uncorrelated or independent) with time invariant covariance matrix Σ.

After establishing the long-term link between the variables in the VAR model, the subsequent stage is to investigate the Granger-causal relationship among these variables, in line with our objectives. X is considered to exhibit "Granger-causality" on Y when the prediction of Y is enhanced by using the historical data of X in conjunction with the historical data of Y, as opposed to excluding such information. The concept of Granger causality allows for the differentiation between unidirectional and bi-directional causality. Unidirectional causation is commonly posited when X is identified as the causal factor for Y, whereas Y is not identified as a causal factor for X. If neither of the time series influences the other, then it can be concluded that the two-time series are statistically independent.Initially, all variables will be treated as symmetric and endogenous. We have utilised theGranger causality tests to analyse the causal relationship between the variables.

Analysis and interpretation of results

**(A) Current trends and patterns of MSMEs in Indian Economy**

The data depicts clearly the rising trend of establishment of MSMEs in India. Complete information on the total number of registered MSMEs in India is at present assessed through Udyam Registration Publication published by the Office of Development Commissioner M/o Micro, Small and Medium Enterprises Government of India. Earlier it was published as UAM (Udyog Aadhaar memorandum) and before that it was provided by EM-2nd.

According to Udyam Registration Publication a total of 80,16,195 enterprises were registered on Udyam Portal during the period 01.07.2020 to 31.03.2022 out of which 95.1%, 4.4% and 0.4% have been classified as micro, small and medium enterprises, respectively. The State of Maharashtra (20%) had the maximum share in the total number of MSMEs registered on the portal followed by Tamil Nadu (11%) and Gujarat (8%). 4. The State of Maharashtra had the highest share of MSMEs in Micro category

followed by Tamil Nadu and Rajasthan. Under Small and Medium category, maximum registrations were from Maharashtra followed by Gujarat and Tamil Nadu respectively which is clear evidence of their exponential growth owing to specific role they are playing in the economic development of the country. MSMEs are home grown MNCs which are considered world class and with global foot prints.

The GDP of country is increasing at 6-7% on average in the last decade. These MSMEs have a significant role to play in boosting the Indian economy. MSMEs are the second largest employment provider after agriculture and constitute over 90% of all enterprises in the Indian economy and considered as the engines of economic growth and equitable development. They also account for a major share of industrial production and exports. MSMEs take emerging markets toward higher growth and enhance their international competitiveness which will complement the 'Aatmanirbhar Bharat Abhiyan' by fostering innovation, encouraging ideation, incubating new business and entrepreneurship by developing quality standards, improving practices and processes, enhancing market access, deploying technological tools and 'Industry 4.0' to make MSMEs competitive and self-reliant.

(B) A causal relationship between export and MSMEs sector

These are some common factors to decide the fact that India is emerging as an economic power house which can be easily attributed to MSMEs working in India.The role of MSME have been prominent in fuelling comprehensive growth of 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 availability of easy and cheap workers, low-cost benefits, integrated market especially after implementation of GST, availability of resources and an abundant demographic dividend which attracts major MNCs to work in India.

Trends of percentage rise in exports and percentage rise in the registration of MSME
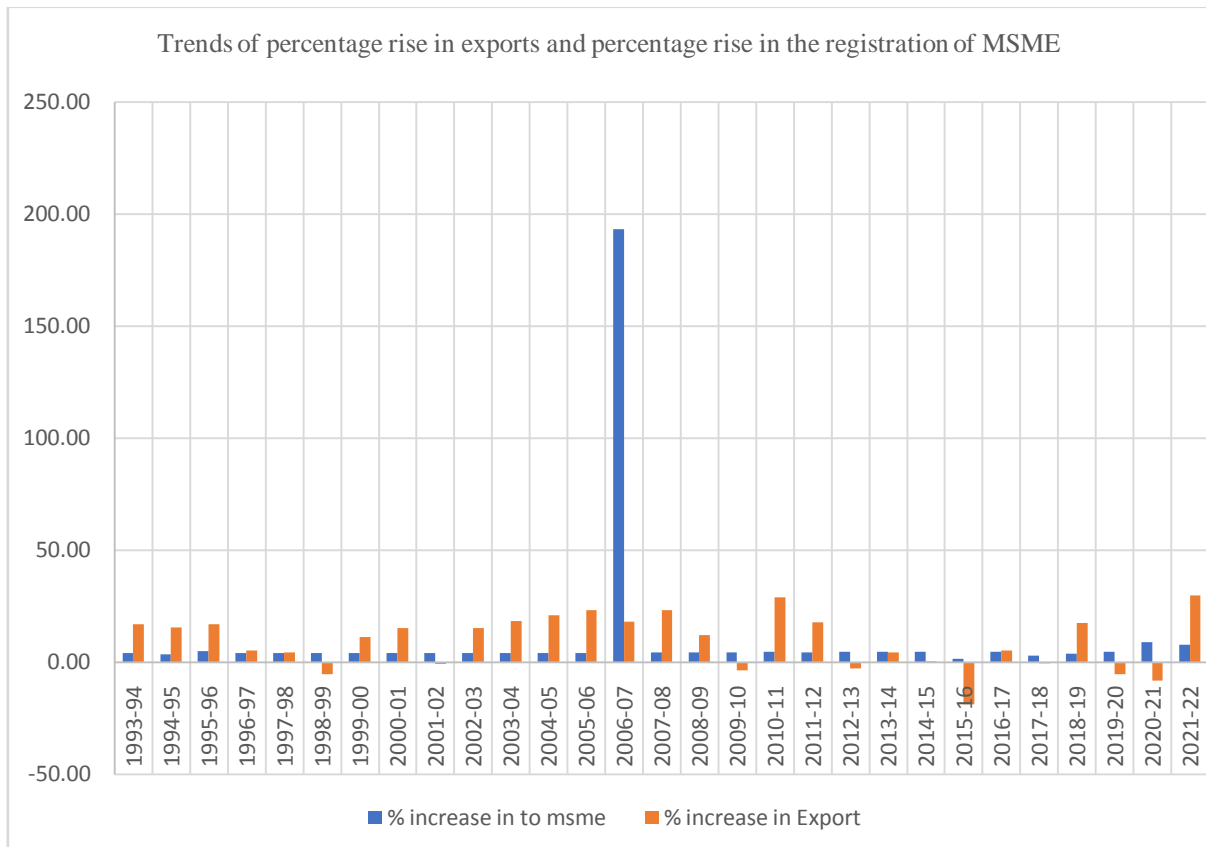
Source: Author's own calculation

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. As we can see from the figure that there has been hike in the registration of MSMEs in the year 2006-07 owing to MSME act 2006 which formalised the definition of MSMEs for the first time in India and encourages their registration in the formal economy, further we can witness hike in the MSMEs from 2015-16 to 2016-17 because of MSME amendment act 2016 which led easy funding for the MSMEs.

The exports from MSME sector have been clocking excellent growth rates in the last decade mainly fuelled by performance of garments, leather, Jem, and jewellery. 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 improving and innovating the work culture through inclusion of ICT. The government of India is constantly changing the policy regime in the favour of MSME sector owing to its importance and role.

In order to get insight into the enduring association between the two variables, the application of Johansen's cointegration tests is utilised. These tests validate the existence of long-term dynamics between the variables and establish causation in at least one direction. If multiple series exhibit non-stationarity individually, but their linear combination demonstrates stationarity, these series are co-integrated. Prior to doing the cointegration test, it is necessary to verify the non-stationarity of the series. Therefore, a stationarity test was conducted on the sample series. The results of the stationarity tests are presented in Table 2, indicating that the given series is non-stationary. Consequently, additional stationarity tests were performed on the return series, which was obtained by calculating the first difference of log values. The results of these tests are also provided in Table 2 (panel B).

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
MSME	0.501451	0.550397	-5.296895*	-5.297920 *
Exports	0.347558	0.583166	-4.037745*	-4.076207*
Forex	1.409516	1.813290	-5.543989*	-5.499297*

Note: *Significance at 5% level

Source: Author's own calculation

Panel B demonstrates that the initial difference of the logarithmic series displays stationarity, so indicating that the sample series are integrated to the first order. Panel A presents evidence of the presence of a unit root, whereas Panel B displays the outcomes of the unit root being integrated to order 1, denoted as I (I). This integration is assessed using both the Phillips-Perron and Augmented Dickey-Fuller tests.

In order to utilise the cointegration technique, it is necessary for the series to exhibit nonstationary, a criterion that is satisfied in this case. Therefore, co-integration methodologies are utilised in order toascertain the presence of a stable long-term association between exports and micro, small, and medium enterprises (MSMEs) operating in India.

The cointegrating methodology is based on the recognition that level series are non-stationary and aims to reduce the disparity that occurs from deviations from long-run equilibrium. The deviations seen from long-run equilibrium are influenced not only by the stochastic process but also by random shocks in the system. Cointegration is a statistical concept that suggests the existence of linear combinations between two level series, which effectively eliminate the presence of a stochastic trend and result in the creation of a stationary series.

The sensitivity of Johansen's cointegration test is influenced by the choice of lag length. Additionally, the selection of an improper lag length might lead to issues of either excessive parameterization or insufficient parameterization. The primary aim of the estimate process is to ascertain that the residuals do not exhibit any form of serial correlation. In this context, the Akaike information criterion (AIC) is employed for the purpose of determining the most suitable lag length. The findings are displayed in Table 3.

Table 3. VAR lag order selection criteria lag

	Log L	LR	FPE	AIC	SC	HQ
0	-856.3869	NA	9.16e+22	61.38478	61.52751	61.42841
1	-787.7099	117.7320	1.30e+21	57.12213	57.69308*	57.29668
2	-773.5693	21.21080*	9.23e+20*	56.75495*	57.75411	57.06040*

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.

Source: Author's own calculation

From the above Table, using AIC as a criterion for selection of lag which provides lag of 2. The cointegration results are reported in Table 4. Results of cointegration are obtained using the optimal lag length calculated using VAR lag length order selection criterion.

Table 4. Results of Johansen's cointegration test

Hypothesized Number of Co integrating Equations	Eigen Value	Trace Statistics	Critical Value at 5% (p-value)	Maximum Eigen statistics	Critical Value at 5% (p-value)
None*	0.697575	47.27428	29.79707 (0.0002)	32.28989	21.13162 (0.0009)
At most 1	0.369237	14.98439	15.49471 (0.0596)	12.44227	14.26460 (0.0951)

*Denotes rejection of the hypothesis at the 0.05 level

Source: Author's own Calculation

Upon doing an analysis, it has been shown that there exists a substantial level of cointegration within the sample series. Subsequently, the Granger causality test is employed to ascertain the causal relationship between the two variables. Granger causality is a statistical concept that revolves around the notion of causality, mostly relying on predictive capabilities. Based on Granger's findings

In the context of causation, if a signal X1 is said to "Granger-cause" (or "G-cause") a signal X2, it implies that the historical values of X1 possess additional information that aids in predicting the values of X2, beyond what can be inferred from the historical values of X2 alone. The phrase "Granger causality" refers to a particular concept of causation within the field of time-series analysis.

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

Null hypothesis	F- statistics	Probability
TOTAL_MSMES does not Granger cause EXPORTS	4.42920	0.0236**
EXPORT does not Granger cause TOTAL_MSMES	0.67071	0.5211**

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

Source: Author's own calculation

The results exhibited in Table 5 confirm the uni-directional causality between MSMEs and Exports with p-value < 0.05 in first cases which signifies rejection of null hypothesis. Hence the test results confirm uni-directional causality as the number of MSMEs increases, export also increases.

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 already exhibited in Table 3. We use AIC criterion to select the lag length to be used in VAR model and it is coming significant at lag 2. Hence lag 11 is used to analyse the model of VAR, which is an econometric device to model multivariate time series.

The equation of VAR

$$X_t = \alpha + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \beta_3 Y_{t-3} + .. + \gamma_1 Z_{t-1} + \gamma_2 Z_{t-2} + .. + \theta_1 X_{t-1} + \theta_2 X_{t-2} + ...$$

Table 6. Vector auto regression estimates

	EXPORT_...		FOREX__...	TOTAL_M...
EXPORT__M_US$_(-1)	0.649782		-0.229063	0.000281
	(0.25038)		(0.22953)	(0.00034)
	[2.59520]		[-0.99799]	[0.82735]
EXPORT__M_US$_(-2)	-0.065151		0.416777	0.000256
	(0.24300)		(0.22276)	(0.00033)
	[-0.26812]		[1.87099]	[0.77881]
FOREX___M_US$_(-1)	0.369891		0.815802	0.000434
	(0.18705)		(0.17147)	(0.00025)

	[1.97754]		[4.75776]	[1.71493]
FOREX___M_US$_(-2)	-0.012968		0.595580	0.000561
	(0.24044)		(0.22041)	(0.00033)
	[-0.05393]		[2.70210]	[1.72424]
TOTAL_MSMES__LA...	63.28805		282.4881	0.412854
	(159.397)		(146.121)	(0.21585)
	[0.39705]		[1.93325]	[1.91267]
TOTAL_MSMES__LA...	-85.43633		-661.5637	-0.445877
	(156.664)		(143.616)	(0.21215)
	[-0.54535]		[-4.60649]	[-2.10170]
C	8364.476		22244.67	46.91712
	(10988.2)		(10073.0)	(14.8799)
	[0.76123]		[2.20835]	[3.15305]
R-squared	0.962923		0.984467	0.977740
Adj. R-squared	0.952329		0.980029	0.971380
Sum sq. resids	1.54E+10		1.29E+10	28258.38
S.E. equation	27088.68		24832.54	36.68293
F-statistic	90.89727		221.8248	153.7305
Log likelihood	-321.4951		-319.0602	-136.5674
Akaike AIC	23.46394		23.29002	10.25482
Schwarz SC	23.79699		23.62307	10.58787
Mean dependent	173775.5		234231.6	330.3221
S.D. dependent	124068.5		175719.3	216.8334

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

Source: Author's own calculation

Vector auto regression estimates exhibit a significant relation of MSME sector exportsand Forex. The relationship becomes more significant at the end of second lag which is evidentfrom significant T-statistics of all the three parameters of VAR model (see Table 6). The R-square is .96 (96%), adjusted R-square .95 (95%).

Causality test

In order to verify the results of VAR, causality tests are performed in Table 7. They confirm the uni-directional causality between MSMEs and exports, and MSMEs sector and Forex reserve with p-value < 0.05 in all cases which signifies the rejection of null hypothesis. The results are calculated embedding lag length by AIC criterion.

Table 7. Pair wise Granger causality tests

Null hypothesis	F-statistic	Probability
(TOTAL_MSMES) does not Granger cause (EXPORTS)	4.42920	0.0236**
EXPORTS) does not	0.67071	0.5211**

Granger cause (TOTAL_MSMES)		
TOTAL_MSMES) does not Granger cause (FOREX)	9.20803	0.0012**
FOREX) does not Granger cause (EXPORTS)	8.82527	0.0014

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

Source: Author's own calculation

Taking exports as dependent variable when Granger causality is done the results exhibit that the relationship is significant i.e., total number of MSMEs and Forex play a very significant role in exports with *p*-value < 0.05 at 5% level of significance. From the above analysis it is very clear that there is a uni-directional relationship between total number of MSMEs and export, and further it is also helpful in raising the level of forex which also plays crucial role in enhancing the export

Conclusion

This study aims to objectively evaluate the correlation between the quantity of Micro, Small, and Medium Enterprises (MSMEs), the overall exports of India, and foreign exchange rates. The analysis is conducted using annual data spanning from 1992-93 to 2021-22. The co-integration test study has verified that there is co-integration among the total number of MSMEs, exports, and forex reserve, thereby confirming the presence of a relationship between these variables.

The presence of uni-directional causality, specifically from the increasing number of MSMEs to exports, was ultimately validated by the Granger causality test. The export industry is contingent upon two key variables, namely the quantity of MSMEs) and the level of foreign exchange reserves. This study proves the significant importance of exports in both the economic development of the Indian economy and the overall growth trajectory of India. Moreover, this research effectively proves the correlation between the export sector and the MSMEs sector.

Therefore, it may be inferred that MSMEs have been recognised as the primary drivers of economic growth in fostering development.Key areas that are crucial in the process of policy formulation encompass skill development and training programmes, infrastructure development, access to affordable credit, technology upgrading and innovation, dissemination of information regarding various government schemes pertaining to MSMEs among the general public, ensuring marketing sustainability and brand building through appropriate institutional framework, and offering specialised support for MSMEs.

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