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A Study on Indo-China Bilateral Trade Relations in the Post-Liberalisation Era

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Abstract – China and India contribute to an exceptionally older history and relationship. All through the first millennium, they were the centres of pious and sacred activities. Sacred and edifying interactions survived amid them for the duration of the first few centuries. The Islamic invasion in India made two countries living as aliens until nineteenth century, when Europeans colonized both. Prior to European Colonisation, China and India reported for about 33 percent and 25 percent correspondingly of the world's manufactured goods. India China trade affairs are the most key ingredient of two-sided relations between India and China.. The India China trade affairs are regulated by the India China JBC, which ensures a free exchange of products and services between the two nations. The major trade indicators used in the study are Import and Export. Another trade indicator used in the study is Commodity Composition. The major economic indicators used in the study are GDP (Real Annual Growth %), GDP per capita, Balance of Trade. Although there are many gaps that define the Indo-China relationship like trade gap (trade deficit between both the Countries), the border perception gap & the GDP growth rate gap etc. Instead of the trade gap between both the Countries, among the most encouraging recent developments in India-China ties is the rapid increase in bilateral trade.

Keywords : Bilateral Trade, China, India, Relations, Post-Liberalisation

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I. INTRODUCTION

A bilateral trade is the trade of goods between two Countries promoting trade and outlay. The two nations will cut or get rid of tariffs, import quotas, export restraints, and other trade obstacles to encourage trade and investment. In the United States, the administrative centre of Bilateral Trade dealings curtails trade deficits through negotiating free trade agreements with recent nations, supporting and improving active trade harmony, promoting economic growth out of the Country, and other actions. Among the largely encouraging current developments in **India China market** and India-China ties is the quick increase in bilateral trade. The **drivers of bilateral trade** i.e. **Comparative Advantage & Rapid Economic Growth** of India and China provide grounds for strong economic exchange as the sheer size and growth rates of these economies have boosted bilateral trade, as bigger economies have more to buy and sell.

1. NATURE OF THE PROBLEM

The title of the present study is “A study on Indo-China trade relations in the post-Liberalisation era”. The emergence of both the Asian Giants “India” and “China” after Liberalisation has been considered as the World’s fastest developing economies, therefore, focusing on Analysing the trade relations.

2. LITERATURE REVIEW

A vital and essential aspect of a research project is the survey of related literature which means to read and evaluate the past as well as the current literature of research that is related with the planned investigation.

According to **G. V.VIJAYASRI, 2013**, In the recent globe, there is mutual interdependence of the different national economies. Nowadays, it is tough to find the example of a closed market. All economies of the globe have turned into open. But the level of openness varies from one nation to another. Thus, in the contemporary globe, no nation is entirely self-reliance. Self-reliance, in the sense used here, means the percentage of the goods and services addicted to their total productivity with in a nation. But the scale of self-reliance varies from one nation to another.

S.**P. Gupta and Alaka Singh, 1994,** in their article, "Economic Reform in China and India: A Comparison," had considered the procedure of economic reforms in China and India. A closed economy, china started its developments in 1978, with effectively no debt. But it's only in 1993-94 when India penetrated its augmentation and structural amendment phase, much latter than China. The Chinese market grew by 13% in 1992, and growth rate for 1993 is imagined to be higher than 13 per cent in actual terms. This fetch the average development rate in the 16 years (1978-1993) to over 9 percent per year far higher than the 6.1 per cent figure for the preceding 26 years (1953-78) which is outstanding given China's huge population and local diversity. The Indian economy grew at 4.3 percent in real terms in 1992-93 and around an assessed 4.0 percent in 1993-94, tracked by a dip to 1.2 percent in 1991-92 once transformations were initiated in 1990-91. The present research tries to fill the gap by considering the post-liberalisation era for Indo-China relationship. The study also studies the future relationship between the Countries with the help of Time Series Analysis

Swapan K. Bhattacharya and Biswa N. Bhattacharya (2007) in their paper disclosed that India and the People's Republic of China have significant bilateral trade possibility, which was not explored until now. These countries are currently negotiating for free trade arrangements between them based on their complementarities. This paper did calculations to know approximately the likely benefits in terms of gains or losses in imports of both India and China due to diverse privileged trading arrangements and free trade arrangements using the gravity model.

Prof. T P Bhat, Team Leader, Mr Atulan Guha & Dr Mahua Paul (2006), in their Report on "INDIA AND CHINA IN WTO"-Building Complementarities and Competitiveness in the External Trade Sector sponsored by Planning Commission explained the bilateral trade relationship with the economic indicators like imports, exports, balance of trade, commodity group but this research has not considered some other economic indicators like GDP, GDP per capita etc. which are also helpful in understanding the bilateral trade relationship. Also, the study focused on finding the trade trends for the future of both the Countries.

3. OBJECTIVES OF THE STUDY:

1. To study and Analyse the Indo-China bilateral trade relationship with the help of different macro-economic indicators like **Exports and Imports.**

2. To understand and analyze the Indo- China trade trends in the last two decades (1991-92 to 2017-18).

II. MATERIALS AND METHODS

The framework of the study is based on identifying the bilateral ties between India and China with the help of various economic parameters like import, export, GDP (Real Annual Growth %), GDP Per Capita, Commodity Composition & Balance of trade etc. The study not only identifies the past trend between both the Countries but also identify the future trends as well.

1. **Methodology of the study:** The method of research would be suitable which includes following characteristics:

2. **Hypotheses of the study:** Before describing the hypothesis, it is pertinent to mention the trade & economic indicators/macro-economic variables/factors considered for studying the present research.

2.1 Hypotheses Testing

Hypothesis testing determines the validity of the Hypothesis. In the present study, the Hypothesis was tested at 5% level of significance.

2.1.1 Objective 1:

To study and analyses the Indo-China bilateral trade relationship with the help of different macroeconomic indicators like.

Exports and Imports

It was proposed that the lifeblood of the global market is trade. Exports and Imports affect the bilateral trade relationship as Exporting and importing helps grow national economies and expands the global market. Every country is endowed with certain advantages in resources and skills. To study and analyses the objective, the present study has undertaken Import and Export as major trade indicator. To find out the trade relationship between India and China on the basis of major trade/macro-economic indicator imports and exports, the following hypothesis was formulated:

Research Question based on *Exports & Imports (1)*

Is there any significant/positive bilateral trade relationship between India and China in the post-Liberalisation era?

HYPOTHESES BASED ON RESEARCH QUESTION (1):

Ho_0 : There is no significant/positive bilateral relationship between exports and imports since 1991 to 2017-18.

Ha: There is significant/positive bilateral relationship between exports and imports since 1991 to 2017-18.

2.1.2 Objective 2:

To understand and analyze the Indo- China trade (export & import) trends in the last two decades (1991-92 to 2017-18). Based on the objective, the following Research Question was formulated.

The present study has undertaken to analyses the trade trends between India and China on the basis of the major trade indicator i.e. export & import as Analysing the past trend of export and import between Countries helps in Analysing the future trade relationship between the Countries.

Research Question (2) based on *Indo-China trade (export & import) past trends.*

Is there any significant past trend of export & import which helps in Analysing the future trade relationship between Countries?

1. SOURCES OF DATA:

The research is based mainly on secondary data sources. Data and information from secondary sources were collected by consulting various relevant journals, EXIM Bank, Economic review, World Bank, WITS, publication of WTO and Ministry of Commerce, Govt. of India. The information published in the different newspapers and websites in recent times have been consulted in order to present the recent trade and performance of Indian and Chinese economies. The collected data and information were then processed, tabulated and analyzed to present the findings in a logical and objective manner.

The study's **Source of data** used was from World Bank, Ministry of Commerce, WTO & WITS

4. STUDY DESIGN:

The present study entitled "A study of Indo-China trade and economic relations in the post-Liberalisation era" is Exploratory cum Descriptive type of Research.

- Finally as the researcher has planned the study carefully including the tests to be used, the Exploratory cum Descriptive Research Method was employed for the present research. The significance and nature of Exploratory Research has been explained as :

- An **Exploratory research** is research conducted for a problem that has not been studied more clearly, intended to establish priorities, develop operational definitions and improve the final research design. Given its fundamental nature, this type of research often relies on techniques such as secondary research - such as reviewing available literature and/or data.

- The significance and nature of Descriptive Survey Method has been explained as:

Descriptive survey study describes and interprets 'what is'. It is concerned with conditions or relationships that exist, opinions that are held, processes that are going on, effects that are evident, or trends that are developing. Therefore, the researcher found it justifiable to use Descriptive Survey method for the present study.

4.1 Tools & Models used in the study:

Macro-economic indicator	Tools & Model used in the study
Imports from China	Time Series Analysis & Time Series Multiplicative Model
Exports to China	Time Series Analysis & Time Series Multiplicative Model
Real Annual Growth Rate (%)	Time Series Analysis
GDP Per Capita	Time Series Analysis/Multiple Regression Model

5. PROCEDURE METHODOLOGY

For analysis of desired status of the study, the tester should analyse the past and future pattern for different macro-economic indicators, **"Time Series analysis"** should be applied to understand the relationship with China with the help of components of Time Series i.e Secular Trends (or General Trends), Seasonal Movements, Cyclical Movements, Irregular Fluctuations. The **"Regression equations"** can also be formed for observing a significance regression amongst the independent and dependent variables. Further, **"Time Series Multiplicative Model"** can be used for calculation of values of macro-economic indicators if the Trend and Cyclic components are moving simultaneously. In order to predict the value of one variable for other variable, the **"Time-Series Regression Model"** can be developed.

The mass of data collected through the administration of the tools is required to utilize data meaningfully. The role of statistics in research is to function as a tool in designing research, analyzing its data and drawing conclusion there from. Most research statistics result in a large volume or raw data, which must be used for further analysis. The

graphical presentation was also made to visually depict the data as much as possible to enhance understanding of the results.

6. Statistical analysis

Data were analyzed by applying statistical operations through Social Sciences (SPSS) Version 20.0. SPSS Statistics 20.0 is a comprehensive system for analyzing data. SPSS Statistics can take data from almost any type of file and use them to generate tabulated reports, charts and plots of distribution and trends, descriptive statistics and complex statistical analyses. SPSS Statistics makes statistical analysis more accessible for the beginner and more convenient for the experienced user. Simple menus and dialogue box selections make it possible to perform complex analyses without typing a single line of command syntax. The data offers a simple and efficient spreadsheet- like facility for entering data and browsing the working data file.

III. RESULT

After collection of data, it is analyzed and interpreted through Time Series Analysis, Linear Regression analysis, Time Series Multiplicative Model Analysis, ANOVA (Analysis of Variance), Time Series Regression and Multiple Regression. The results of different statistical techniques have been presented according to the objectives of the study. It would be interesting and important to analyse to what extent the bilateral trade and economic relations helps in maintaining the overall relationship between India and China.

TABLE 1 : REPRESENTS TRADE RELATIONS BETWEEN INDIA AND CHINA IN TERMS OF EXPORT & IMPORT VALUE AND % SHARE (US $ MILLION)

YEAR	INDIA IMPORTS FROM CHINA	INDIA TOTAL IMPORTS	% SHARE OF TOTAL INDIAN IMPORTS	INDIA EXPORTS TO CHINA	INDIA TOTAL EXPORTS	% SHARE OF TOTAL INDIAN EXPORTS
1990-91	196.6	24072.5	0.82	614.7	18145.2	3.39
1991-92	127.1	19410.5	0.65	662.5	17865.4	3.71
1992-93	296.4	21881.6	1.35	906.3	18537.2	4.89
1993-94	490.7	23306.2	2.11	1528.7	22238.3	6.87
1994-95	1047.8	28654.4	3.66	1771.6	26330.5	6.73
1995-96	1200.0	36675.3	3.27	2154.1	31794.9	6.77
1996-97	756.91	39132.4	1.93	614.8	33469.7	1.84
1997-98	1112.05	41484.5	2.68	717.95	35006.4	2.05
1998-99	1096.71	42388.7	2.59	427.16	33218.7	1.29
1999-00	1282.89	49670.7	2.58	539.04	36822.4	1.46
2000-01	1502.2	50536.5	2.97	831.30	44560.3	1.87
2001-02	2036.39	51413.3	3.66	951.95	43826.7	2.17
2002-03	2792.04	61412.1	4.45	1975.48	52719.4	3.75
2003-04	5545.9	78149.1	7.10	2955.08	63842.6	4.63
2004-05	7097.98	111517.4	6.36	5615.88	83535.9	6.72
2005-06	10868.05	149165.7	7.29	6759.10	103090.5	6.56
2006-07	17475.03	185735.2	9.41	8321.86	126414.1	6.58
2007-08	27146.14	251439.2	10.80	10871.34	162904.2	6.67
2008-09	32497.02	303696.3	10.70	9,353.50	185,295.36	5.05
2009-10	30824.02	288372.9	10.69	11,617.88	178751.4	6.50
2010-11	43479.6	369769.1	11.76	15482.70	251136.2	6.17
2011-12	55313.58	489319.4	11.30	18076.55	305963.2	5.91
2012-13	52248.33	490736.65	10.65	13534.88	300400.68	4.51
2013-14	51,034.62	4,50,199.74	11.48	14,824.36	3,14,405.30	4.71
2014-15	60,413.17	448,033.41	13.48	11,934.25	310,338.48	3.848
2015-16	61,707.95	381,007.76	16.20	9,011.36	262,291.09	3.44
2016-17	61,283.03	384,357.03	15.94	10,171.89	275,852.43	3.69
2017-18	76,271.72	465,578.29	16.38	13,336.78	303,376.22	4.40

Source : Ministry of commerce, Export-Import Data Bank

Detailed Analysis of Indo-China bilateral trade relationship by using "IMPORTS" as macro-economic indicator:

First, the pattern is analyzed for "Imports from China (in USD Million)". Time series analysis is applied to understand the import relationship from China. A forecasting model is presented with use of trend and cyclic components.

In the study, time is taken as independent variable (t) and imports from china is taken as a dependent variable (y) for analysis.

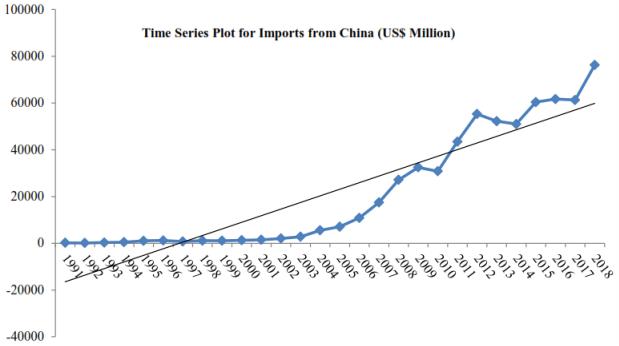

Fig. 1

The time series plot presents the movement of imports from China over the period of time in post liberalization era. One could observe that Indian imports have grown phenomenally in post liberalization era especially after 2003. The graph best fits with the linear trend line and a simple linear regression equation can be generated by using linear regression analysis for prediction of imports from china in 2019. Following tables present the result for regression;

Table 2 (Analysis of variance)

	Df	*SS*	*MS*	*F*	*Significance F*
Regression	1	14604120634.15	14604120634.15	134.87	0.00
Residual	26	2815338190.74	108282238.11		
Total	27	17419458824.89			

One can observe a significance regression amongst time (t) and imports from China (y). Hence, the Regression equation is formed. Next table presents the components for regression.

Table 3 (Regression coefficients)

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-19311.81	4040.83	-4.78	0.00
T	2827.28	243.45	11.61	0.00

The regression forecasting equation with above components can be given by;

$$"y_1 = (-19311.8 + 2827.277 \times t) \dots (1)"$$

By using the regression equation (1) the forecasting for imports from China for successive years can be given. Forecasted value of imports from China for year 2019 can be given as following.

$$"y_1 = (-19311.8 + 2827.277 \times 29) = 62679.24\ MIllion\ USD;\ for\ t_{2019} = 29" \dots (2)$$

Since trend is not the only component therefore we further use **Time Series Multiplicative Model Analysis for Imports from China** Following table studies the multiplicative model of time series in which seasonal and irregular trends are not considered as they are not seen in the chart plotted above. The model calculates the Import value as under;

$$"y = T \times C \dots (3)"$$

Where T is linear trend and C is cyclic trend

Table – 4 Time series analysis of India Imports from China

Time	T	India Imports from China (y)	Trend value (T)	Cyclic Trend (C = T/y)
1991	1	196.6	Negative	Negative
1992	2	127.1	Negative	Negative
1993	3	296.4	Negative	Negative
1994	4	490.7	Negative	Negative
1995	5	1047.8	Negative	Negative
1996	6	1200	Negative	Negative
1997	7	756.91	479.13	1.58
1998	8	1112.05	3306.41	0.34
1999	9	1096.71	6133.69	0.18
2000	10	1282.89	8960.96	0.14
2001	11	1502.2	11788.24	0.13
2002	12	2036.39	14615.52	0.14
2003	13	2792.04	17442.80	0.16
2004	14	5545.9	20270.07	0.27
2005	15	7097.98	23097.35	0.31
2006	16	10868.05	25924.63	0.42
2007	17	17475.03	28751.91	0.61
2008	18	27146.14	31579.18	0.86
2009	19	32497.02	34406.46	0.94
2010	20	30824.02	37233.74	0.83
2011	21	43479.6	40061.02	1.09
2012	22	55313.58	42888.29	1.29
2013	23	52248.33	45715.57	1.14
2014	24	51,034.62	48542.85	1.05
2015	25	60,413.17	51370.13	1.18
2016	26	61,707.95	54197.40	1.14
2017	27	61,283.03	57024.68	1.07
2018	28	76,271.72	59851.96	1.27

From fig. – 4, it can be observed that the cyclic trend appears in *y* from 2007 onwards. Therefore, the cyclic trend is averaged out from 2007 onwards. The average component of cyclic trend thus calculate is *C =1.04.* The time – series equation including trend and cyclic variation can be given by;

$$"y_{1T} = (-19311.8 + 2827.277 \times t) \times C \dots (4)"$$

By using equation (3) the prediction for 2019 imports from china can be calculated as;

$$"y_{1T} = (-19311.8 + 2827.277 \times 29) \times 1.04 = 65134.17\ Million\ USD for\ t_{2019} = 29" \dots (5)$$

Further, the researcher is analysing overall imports of India. Following graph presents the output in graphical form.

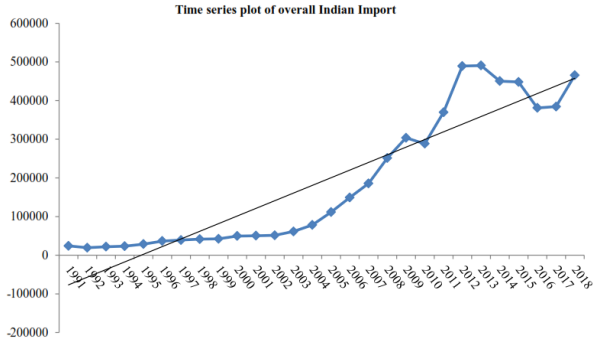

Fig. -2

One can observe from the above graph that post liberalization imports actually took off after 2002. The cyclic trend in the imports can be observed after 2007. We use multiplicative model described in (1) to predict the imports for coming years. The cyclic trend in the data can be observed 2007 onwards; therefore the component of cyclic trend is incorporated in the model only after 2007.

Following time series regression equation can be used to forecast overall trade.

Table -5 ANOVA

	Df	*SS*	*MS*	*F*	*Significance F*
Regression	1	716055450595.88	716055450595.88	141.88	0.00
Residual	26	131222115529.72	5047004443.45		
Total	27	847277566125.60			

One could observe that the variation in overall imports data over the period of time is significant to develop a regression equation for forecasting. A linear regression equation can be developed from following regression table.

Table -6 Regression coefficients

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	**-96448.31**	**27587.25**	**-3.50**	**0.00**
T	**19797.21**	**1662.06**	**11.91**	**0.00**

It can be observed that the intercept and coefficient with respect to time are significant, hence following regression equation can be developed for forecasting overall imports.

$$"y_2 = (-96448.31 + 19797.21 \times t)" \dots (6)$$

For 2019, the predicted value of imports can be given by;

$$"y_2 = (-96448.31 + 19797.21 \times 29) = 477670.869\ Million\ USD\ ;for\ t_{2019} = 29" \dots (7)$$

Same way overall import for successive years can be projected. Now time series analysis is applied to incorporate cyclic component. Following table shows Time series analysis.

Table -7 Time series analysis of overall imports of India

Time	t	Overall India Imports (y)	Trend value (T)	Cyclic Trend (C = T/y)
1991	1	24072.5	Negative	Negative
1992	2	19410.5	Negative	Negative
1993	3	21881.6	Negative	Negative
1994	4	23306.2	Negative	Negative
1995	5	28654.4	2537.76	11.29
1996	6	36675.3	22334.97	1.64
1997	7	39132.4	42132.18	0.93
1998	8	41484.5	61929.40	0.67
1999	9	42388.7	81726.61	0.52
2000	10	49670.7	101523.82	0.49
2001	11	50536.5	121321.04	0.42
2002	12	51413.3	141118.25	0.36
2003	13	61412.1	160915.46	0.38
2004	14	78149.1	180712.67	0.43
2005	15	111517.4	200509.89	0.56
2006	16	149165.7	220307.10	0.68
2007	17	185735.2	240104.31	0.77
2008	18	251439.2	259901.53	0.97
2009	19	303696.3	279698.74	1.09
2010	20	288372.9	299495.95	0.96
2011	21	369769.1	319293.17	1.16
2012	22	489319.4	339090.38	1.44
2013	23	490736.65	358887.59	1.37
2014	24	450,199.74	378684.80	1.19
2015	25	448,033.41	398482.02	1.12
2016	26	381,007.76	418279.23	0.91
2017	27	384,357.03	438076.44	0.88
2018	28	465,578.29	457873.66	1.02

From fig. -2, it can be observed that the cyclic trend appears in '*y*' from 2007 onwards. Therefore the cyclic trend is averaged out from 2007 onwards. The average component of cyclic trend thus calculate is *C =1.07.* The time-series equation including trend and cyclic variation can be given by;

$$"y_{2T} = (-96448.31 + 19797.21 \times t) \times C" \dots (8)$$

Hence the new projected value of overall imports in India can be given by

$$"y_{2T} = (-96448.31 + 19797.21 \times 29) \times 1.07 = 512559.14\ Million\ USD\ ;for\ t_{2019} = 29" \dots (9)$$

Detailed Analysis of Indo-China bilateral trade relationship by using "EXPORTS" as macro-economic indicator

Following graph present the Indian exports to china.

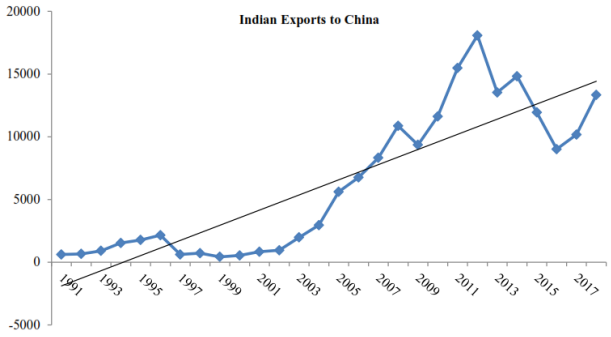

Fig. -3

From above figure, it can be observed that there is overall growth in Indian Export, though the cyclic trend in exports is observed after 2007. Hence the exports from India to China is projected in two different ways by using simple linear regression equation and trend and by incorporating cyclic trend and using multiplicative model of time-series.

First the regression outputs are observed in following tables.

Table – 8 ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	294936791416.91	294936791416.91	173.51	0.00
Residual	25	42496468840.39	1699858753.62		
Total	26	337433260257.30			

One can observe that the regression is significant and the regression equation that is to be used for forecasting exports is statistically significant and can be driven from following table.

Table – 9 Regression coefficients

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-67057.39	17217.86	-3.89	0.00
T	13418.61	1018.71	13.17	0.00

It can be observed that the intercept and coefficient of regression i.e. time both are playing a significant role in the equation. A simple linear regression equation can be given by;

$$"y_3 = (-67057.39 + 13418.61 \times t) = 322082.30\ Million\ USD\ ; for\ t_{2019} = 29" \dots (10)$$

Now the time series analysis is used to forecast exports in 2019 and henceforth. Following table presents the results of Time series analysis.

Table -10 Time series calculation for Indian exports to china

Time	t	Indian Exports to China (y)	T	C=y/T
1991	1	18145.2	-53638.78	-0.34
1992	2	17865.4	-40220.17	-0.44
1993	3	18537.2	-26801.56	-0.69
1994	4	22238.3	-13382.95	-1.66
1995	5	26330.5	35.66	738.32
1996	6	31794.9	13454.27	2.36
1997	7	33469.7	26872.88	1.25
1998	8	35006.4	40291.49	0.87
1999	9	33218.7	53710.10	0.62
2000	10	36822.4	67128.71	0.55
2001	11	44560.3	80547.32	0.55
2002	12	43826.7	93965.93	0.47
2003	13	52719.4	107384.54	0.49
2004	14	63842.6	120803.15	0.53
2005	15	83535.9	134221.76	0.62
2006	16	103090.5	147640.37	0.70
2007	17	126414.1	161058.98	0.78
2008	18	162904.2	174477.59	0.93
2009	19	185,295.36	187896.20	0.99
2010	20	178751.4	201314.81	0.89
2011	21	251136.2	214733.42	1.17
2012	22	305963.2	228152.03	1.34
2013	23	300400.68	241570.64	1.24
2014	24	314,405.30	254989.25	1.23
2015	25	310,338.48	268407.86	1.16
2016	26	262,291.09	281826.47	0.93
2017	27	275,852.43	295245.08	0.93
2018	28	303,376.22	308663.69	0.98

Using cyclic trend average value after 2007 (1.05) the time series equation can be given by;

$$"y_{3T} = (-67057.39 + 13418.61 \times t) \times 1.05 = 337752.92\ Million\ USD\ ; for\ t_{2019} = 29" \dots (11)$$

Further looking into overall Indian exports, following chart presents the results.

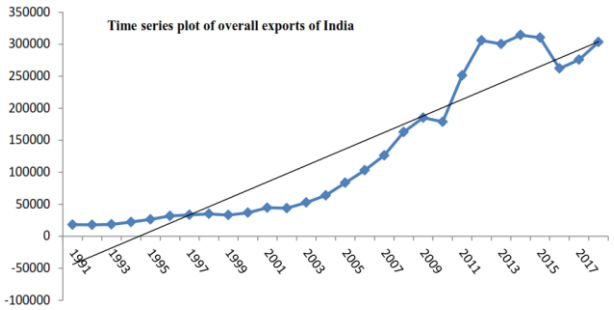

Fig. 4

One can see from figure above that overall exports have grown over the period of time after post liberalization. The faster growth in overall exports is observed after 2002. In order to project the overall exports from India in 2019 and years after first the linear regression analysis has been used as the linear trend is best fitting trend in this case. Following tables present the regression analysis.

Table -11 ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	303474472483.81	303474472483.81	168.05	0.00
Residual	26	46951349894.38	1805821149.78		
Total	27	350425822378.19			

One can observe that the regression is significant as the F-calculated is above the F-significant. Following table presents the coefficients of regression equation.

Table -12 Regression Coefficients

	Coefficients	Standard Error	*t Stat*	*P-value*
Intercept	-56802.53	16501.71	-3.44	0.00
T	12888.19	994.19	12.96	0.00

The table above shoes that the intercept and slope both are significant as the p-value is below the level of significance i.e. $\alpha = 0.05$. Hence a significant regression equation for predicting overall exports is given by;

$$y_4 = (-56802.53 + 12888.19 \times t) = 316954.87\ Million\ USD\ ; for\ t_{2019} = 29 \dots (12)$$

As we can see that the cyclic trend is occurring in data from 2007 onwards and there is no irregularity or seasonal component present in the data hence we use time series analysis and smooth cyclic trend after 2007. The average level of cyclic trend is given by C=1.06 in this case. Following table shows the calculations of trend and cyclic trend.

Table –13 Time series analysis of overall exports from India

Time	t	Overall Indian Exports (y)	T	C=y/T
1991	1	18145.2	-43914.35	-0.41
1992	2	17865.4	-31026.16	-0.58
1993	3	18537.2	-18137.97	-1.02
1994	4	22238.3	-5249.79	-4.24
1995	5	26330.5	7638.40	3.45
1996	6	31794.9	20526.59	1.55
1997	7	33469.7	33414.77	1.00
1998	8	35006.4	46302.96	0.76
1999	9	33218.7	59191.14	0.56
2000	10	36822.4	72079.33	0.51
2001	11	44560.3	84967.52	0.52
2002	12	43826.7	97855.70	0.45
2003	13	52719.4	110743.89	0.48
2004	14	63842.6	123632.08	0.52
2005	15	83535.9	136520.26	0.61
2006	16	103090.5	149408.45	0.69
2007	17	126414.1	162296.64	0.78
2008	18	162904.2	175184.82	0.93
2009	19	185,295.36	188073.01	0.99
2010	20	178751.4	200961.20	0.89
2011	21	251136.2	213849.38	1.17
2012	22	305963.2	226737.57	1.35
2013	23	300400.68	239625.75	1.25
2014	24	314,405.30	252513.94	1.25
2015	25	310,338.48	265402.13	1.17
2016	26	262,291.09	278290.31	0.94
2017	27	275,852.43	291178.50	0.95
2018	28	303,376.22	304066.69	1.00

Further the time series regression equation can be given by;

$$y_{4T} = (-56802.53 + 12888.19 \times t) \times C = 332802.00\ Million\ USD\ ; for\ t_{2019} = 29 \ldots (13)$$

Further we see the contribution of India's exports to China with respect to overall exports. Following chart presents the result.

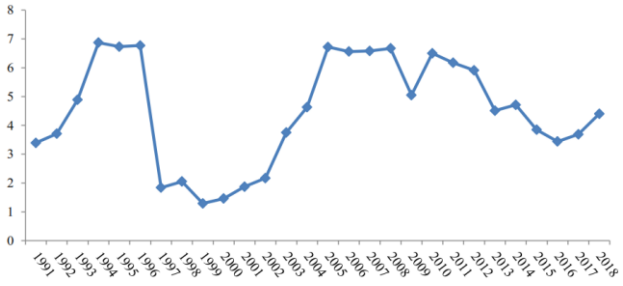

Fig. 5 Contribution of India's exports to China with respect to overall exports

One can see that the exports to china has taken a real swing from 1995 to 1996 the exports to china went down phenomenally it started recovering in 2002 reached a high in 2004 and started dipping from 2010 onwards. A recovery phase can be observed in 2019. Since china in itself is a one of the largest manufacturing hubs of the world hence the scope of supplying finished goods to China is very low. Exports of raw material or edibles have a higher scope comparatively.

Research Question based on *Exports & Imports* *(1)*

Is there any significant/positive bilateral trade relationship between India and China in the post-liberalisation era?

HYPOTHESIS BASED ON RESEARCH QUESTION (1) :

Hoo: There is no significant/positive bilateral relationship between exports and imports since 1991 to 2017-18.

Ha : There is significant/positive bilateral relationship between exports and imports since 1991 to 2017-18.

Table -14 Significant relationship between Indian Exports to China and Indian Imports from China

t-Test: Two-Sample Assuming Unequal Variances		
	Indian Imports from China	*Indian Exports to China*
Mean	190611.28	6270.106786
Variance	31380650597.24	32891782.34
Observations	28.00	28
Hypothesized Mean Difference	0.00	
Df	27.00	
t Stat	5.50	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.70	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.05	

One can observe that the imports from china are far higher than that of export to China. One can also see that there is a significant difference as p-value is less than level of significance i.e. $\alpha = 0.05$. Therefore the null hypothesis is rejected and conclude that the difference between exports and imports is statistically significant.

IV. DISCUSSION

India has been enjoying the trade surplus with China since 1991 to 1996. Since then, the trend has been negative. India's rising trade deficit with China is now close to US $ 62 million in 2018 leading to serious concerns over India's ability to sustain it. The deficit is the result of China's structural shift from a primary products base to a manufacturing regime. The major change in imports and exports can be observed after 2002, this may be due to the Third Trade Policy Review of India given by the Trade Policy Review Body of the WTO on 19 and 21 June 2002. There were jumps in 2011-2012 and 2014-15, mainly due to an increase in Chinese exports to India, but trade has been somewhat stagnant in recent years.

Since China has emerged as India's largest trading partner and increased India's dependence on its products, addressing the trade deficit is crucial to ensuring that the Sino-Indian relationship continues to prosper.

- Imports from china are forecasted to drop by 18% with respect to 2018 in 2019 if calculated with respect to trend purely while it shall be dropped by 15% in comparison to 2018 if the cyclic trend is also considered. This forecasted dip in trend can be due to multiple political and non-political reasons such as make in India initiatives taken by Government.

- Overall imports of India to rise by approximately 10% in 2019 while the share of imports from china with respect to overall import shall remain around 18% in 2019.

- Overall exports from India shall grow by 10% if cyclic and trend components are considered in 2019 while the exports to china shall rise by 11.33% approximately in 2019.

V. CONCLUSION

It can be concluded that the rapid growth of China and, more recently, of India, is having major effects on every facet of the global economy, including the environment, and this influence is projected to continue to expand in the foreseeable future. The growth of these two 'giants' in the developing world has produced a massive surge in manufacturing exports as well as in imports of both intermediates and primary commodities. In manufactures, even as competitive pressures have sharpened in labor-intensive export sectors, new growth opportunities have emerged for complementary expansion. China attaches great importance to strengthening of economic and trade relations with all her neighbors. The Chinese side desires to establish an overall, long-term and stable economic and trade relationship with India while the Indian business community strongly desires to strengthen the trade and economic ties with China. The bout of tactful action sustained into 2018, with not only a focal point on justifying security matters but also taking in hand economic barriers in the rapport. At the freshly completed 11th conference of the India-China Joint Group on Economic Relations, Trade, Science and Technology, the two countries **explored** ways to develop bilateral trade and investment support, handling upon ways to trim down their trade imbalance and potentially starting dialogues on a Free Trade Agreement (FTA). Indian and Chinese delegates also take part in the fifth iteration of the bilateral **Strategic Economic Dialogue** to communicate means to develop their lucrative assurance and clear any obstacles in doing so. These developments are testimony to the verity that notwithstanding security and geopolitical concerns, there is acknowledgment in both countries that there is potential for and common help in making India-China economic cooperation more tough.

- This includes economic constraints, border disputes and perception problems. Difficulties aside, the two countries' common interests provide the bases for a brighter future for India-China relations.

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