

US-CHINA TRADE WAR: IMPACT ON CHEMICAL EXPORTING FIRMS FROM INDIA TO US

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Abstract

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With the onset of the US-China trade war in July 2018, the trade patterns between China, the US, and India have undergone a tremendous change. The number of products in which China had a competitive advantage in terms of exports to the US has declined in the last 9 months. A number of developing countries may be benefitted from the ongoing tariff war between the US and China, like Vietnam, Brazil, India, and Korea. In the present study, an attempt has been made to analyse the impact of the US-China trade war on exports of India to the US. The sector which has been selected is the chemical sector comprising of organic and inorganic chemicals as chemicals are one of the top-exported products from India to the US. To analyse the impact, the difference-in-differences technique of regression has been applied. The results indicate that after July 2018, i.e., the commencement of the US-China trade war, the impact on firms exporting chemicals from India to the US has been significant and firms in India may be a potential source for chemicals for the US provided the right policy measures are exercised in India. The results indicate that the trade war between the US and China has had a positive impact on the chemical exports from India to the US. The chemical exports from India to the US have increased post-July 2018, though not at a steep rate. This indicates that India has the potential to export chemicals to the US.

Keywords: Trade Policy, Exports, Trade War, Chemical

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1. INTRODUCTION

Since the 1950's continuous attempts have been made to lower international trade barriers. While in 2018, the US increased tariffs on a number of sectors for various countries. Import tariffs rose from 2.6% to 17% for imports accounting for approximately \$303 billion of US imports annually. The US repeated the protectionist trade policies implemented by it in 1930 and 1971 (Irwin, 1998; Irwin, 2013). The major trading partners of the US, in retaliation, imposed a number of tariffs on US exports. This has affected US exports worth \$96 billion and increased

tariffs from 6.6% to 23% as compared to 2017. In terms of countries, China has emerged to be the one that is being adversely affected by this trade war. It has thus become clear that the two largest economies of the world are at war and intend to harm each other globally as well as the global economy by suppressing world trade.

Since the onset of trade tensions between China and the US in 2018, a large number of studies have been conducted to estimate the impact of a trade war on emerging economies, developing economies at the macro-level as well as for sectors and value chains. These studies have been carried

out by researchers, policymakers as well as global organisations. These studies have been aimed at assessing the impact of the US-China trade war on a number of economies.

In a study on emerging countries and the effects of the trade war between the US and China (Carvalho, Azevedo, & Massuquetti, 2019), two scenarios are examined, one where only US protectionist measures are considered, and another, in which Chinese retaliation is taken into account. In both scenarios, there would be an increase in the production of the steel and aluminium sectors in the US, preferential targets of the protectionist measures of that country. The impact on emerging economies has been mainly witnessed through a reduction in the trade balance of most of the sectors in contrast to the US and China. Trade improvements signify welfare gains as export prices increase due to higher demand. In each country, the benefits are different for every sector. Brazil and Argentina gain benefits in the primary sector, Mexico and India in the manufacturing industrialised sector and mainly in the electronic equipment and machinery sector. The “Key Statistics and Trends in Trade Policy 2018” (UNCTAD, 2019) only specifies the trends in various macroeconomic variables for developing countries and for major sectors. In another study by the World Bank (Devarajan, Go, Lakatos, Robinson, & Thierfelder, 2018), it is seen that due to protectionist measures and a potential trade war between major economies, developing countries are dealing with the impact of these measures on their domestic markets. The countries are also contemplating various policy responses. There are mainly four strategies for developing countries to opt from, which are to retaliate by joining the trade war, stay neutral, enter into trade agreements with non-US countries and liberalise tariffs on US products being imported. A report by McKinsey & Company (Lund et al., 2019) examines the impact of trade developments on the dynamics of global value chains in 23 industries across 43 countries including India. The industry value chains are classified based on factor inputs, trade intensity, and country participation.

The studies conducted so far do not provide specific inputs for India and enhancing exports from India to the US. This has been the main motivation for prosing this study. In addition to this, in the scenario of growing trade across nations, there is a need to compete and innovate as well as benefit from the opportunities as far as possible. The imposition of sanctions by the US on China has opened one such arena of benefit for India. As per past data, it is seen that one of the major sectors where Chinese imports have dominated in the US is the chemicals sector. Similarly, the chemical sector is also a sector of huge advantage to Indian exports. Most of the exports from India are of chemicals. Thus, in order to pave way for future benefits and in order to develop the US as a major trading partner for India, the present study is being carried out. This will also help in assessing and suggesting future possibilities for Indian chemical exports to the US. The existing studies have been unable to assess the potential and implications of the fallout between the US and China on their economies and also for India. With already a year

into the trade war, it is suggested to examine the export potential of Indian products to the US at the earliest.

In the present paper, an attempt has been made to assess the impact of the US-China trade war on India with special reference to the chemical sector. Assessing the impact on the entire economy may not provide robust and reliable results as a large number of commodities are exported to the US from India. The paper also takes into account monthly data from July 2017 to July 2019. Monthly data will provide insights into minute fluctuations post-July 2018.

The remainder of the paper is structured as follows. Section 2 indicates the theoretical and the literature review. Section 3 indicates the trends and patterns in trade between China, the US, and India. Section 4 indicates the sectoral dimensions of chemical exports, followed by Section 5 which enumerates data and methodology. Section 6 indicates the empirical analysis followed by Section 7 indicating the conclusion.

2. LITERATURE REVIEW

A large number of theoretical concepts have been presented by various economists. The most popular ones are deadweight loss and Harberger's triangle. Deadweight loss refers to the loss of economic efficiency when equilibrium for a good is not achieved. It leads to loss of welfare mainly due to tariffs and pricing (Coughlin, 2010; Dixon & Rimmer, 2010; Irwin, 2010; Porcher, 2014). In the case of tariffs, deadweight loss is the burden created due to the loss of benefits to the stakeholders. Imposing a tariff on imports leads to a higher new equilibrium price (Chen & Ma, 2012). This leads to trade reduction for both countries. Harberger's triangle is mainly used to analyse the deadweight loss created by government intervention (Magee, 2011; Perelman, 2011; Sørensen, 2011; Harberger & Just, 2012; Wang & Chen, 2012). The Harberger's triangle when applied to the US-China trade war signifies that US buyers have to now pay a greater price for Chinese goods indicating that consumers pay more and sellers receive less.

An economic conflict resulting from increased protectionism usually leads to a trade war. Protectionism here mainly refers to unprecedented rise in tariff or non-tariff barriers by two countries on each other. A country can raise apprehensions on misappropriating benefits from free trade due to other countries' unfair trading practices (Krugman, 2016; Zoellick, 2017). Protectionism results in a decline in international trade despite the intentions of protecting domestic industry from imported goods in a country and thus protecting jobs in the domestic industry (Coughlin, Chrystal, & Wood, 2000). A similar step has been recently taken by the US in 2018, where restrictions have been imposed on imports from a set of countries, specifically China which accounts for maximum imports for the US and it is also a location where most of the jobs from the US have been outsourced (Costinot, 2009; Zoellick, 2017). China in retaliation also imposed restrictions on the US, thus rekindling protectionism in international trade (Findlay, 2017; George, 2017; Irwin, 2017b; Alden, 2018).

Protectionism may have a number of advantages and disadvantages both practically as well as validated by economic theory. It is argued in standard economic theory that protectionism has adverse effects on the economy and can lead to a rise in the domestic price of manufactured goods (Draper, 2017; Fong, 2017; Zissimos, 2017; Weingast, 2018). Protectionism may lead to a slowdown in economic growth as well as cultural exchanges. Few economists are of the view that protectionism with suitable policies provides a competitive advantage and leads to the generation of more jobs in the domestic market (Costinot, 2009; Abboushi, 2010).

The ongoing US-China trade war has been described as Trumponomics as it is mainly the economic policy of President Donald Trump. Trumponomics (Ruccio, 2017; Ghosh, 2017; Jakupc, 2017; Locke, 2017; Jakupc, 2018) takes an “America first” approach and poses a risk for creating a polarised global economy. This has been an attempt towards reducing the large US-China trade deficit and impelling China to revise its economic policies. This step has been mainly taken for protecting the high-tech sectors of the US from China and other emerging economies (Rugman & Li, 2007; Hsiang, 2016; Lee & Schwartz, 2016; Rugman, 2016). China has adopted a number of countermeasures and that has led to the deterioration of the Chinese-US relationship. Since 2017, the US has considered China as a manipulator of currency and time, and again threatened to impose tariffs on its exports (Li, 2017). Since 2018, the government of the US increased tariffs on Chinese imports and indicated reason as unfair trading practices (Li, He, & Lin, 2018). China also retaliating in the same way and imposed tariffs on US products. Though there have been a number of negotiations, this imbalance has not been connected to date (Sheng, Zhao, & Zhao, 2019; Lukin, 2019; Wang et al., 2018). Studies also suggest that the US-China trade conflict can be attributed to differences in exchange rate market

systems and trade invariances. Trade protectionism leads to recession while it has been seen that dependence of a country on a particular nation leads to trade frictions (Lin & Wang, 2018; Irwin, 2017a; Kim, 2019; Stiglitz, 2018; Glaser & Viers, 2016).

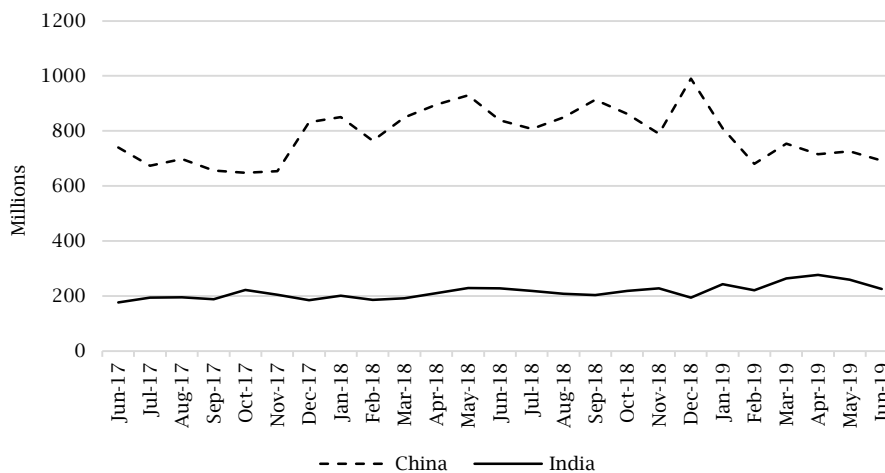
US-China trade war being a comparatively recent phenomenon, cannot be aptly covered by the ongoing debates. It cannot be clearly estimated as to what will be the impact of the US-China trade war. The present study is an attempt to identify and leverage the impact of the US-China trade war on exports from India.

3. TRENDS AND PATTERNS IN TRADE BETWEEN CHINA, US, AND INDIA

Amidst the growing US-China trade war, India can leverage the situation if it can strategically push its exports to these countries. In the year 2017, China's total exports to the US accounted for \$525.80 billion and in 2018, it increased to \$563.24 billion. In the case of India, the total exports to the US accounted for \$50.52 billion in 2017 and \$56.44 billion in 2018. In 2017, the share of China's exports to the US out of that of world exports stood at 21.85% as compared to India's share at 2.10%. In 2018, the shares touched 21.56% for China and 2.16% for India. On comparing the shares of China and India in US exports in June 2018, it is seen that China accounted for 21.41% share while India accounted for 1.99%. In April 2019, the shares of China and India in total exports to the US from the world stood at 16.93% and 2.45%, respectively. China has been a constant exporter to the US over the years and India has been retaining its position.

Post-July 2018, it has been observed that China's exports to the US increased till October 2018 but then have been drastically falling. While exports from India to the US have slightly increased (Figure 1).

Figure 1. Total exports from China and India to US (month-wise July 2017-July 2019 in US millions of dollars)



Source: United States Census Bureau.

On examining the export basket of China to the US, a number of products are seen. The top products being exported from China to the US are

as enumerated in Table 1 for 2017 and 2018. Similarly, in Table 2, the top products of India's exports to the US in 2017 and 2018 can be examined.

Table 1. Export products from China to US (US billions of dollars)

<i>Products</i>	<i>2017</i>	<i>2018</i>
Telecommunications equipment	83.66	83.72
Automatic data process machines	51.06	52.43
Furniture & bedding accessories	26.83	29.41
Toys and sporting goods	27.49	28.68
Electrical machinery and apparatus	14.72	17.37
Parts for office machines & ADP machines	15.56	16.97
Articles of plastics	13.36	15.91
Footwear	14.84	14.64
Television receivers	11.67	12.71
Household type electric & nonelectric equipment	11.02	12.69
Parts and accessories of motor vehicles	9.93	11.63
Articles of apparel of textile fabrics	10.86	10.86
Manufactures of base metal	7.93	9.21
Made-up articles of textile materials	8.31	8.90
Lighting fixtures and fittings	7.88	8.60
Electrical apparatus for switching or protecting	6.47	7.07
Household equipment of base metal	6.43	6.89
Office machines	6.98	6.75
Trunks, suitcases, vanity cases, and briefcases	6.67	6.74
Miscellaneous manufactured articles	6.07	6.60

Source: United States Census Bureau.

It can be noticed that there is a stark change in the export basket of India to the US from 2017 to 2018 due to US-China relations and exports from

China to the US of these products tremendously falling, while the exports of India in these products rising.

Table 2. Export products from India to US (US billions of dollars)

<i>Products</i>	<i>2017</i>	<i>2018</i>
Pearls, precious & semiprecious stones	8.77	9.68
Medicaments (including veterinary medicaments)	6.14	6.32
Oil (not crude)	2.61	3.03
Made-up articles of textile materials	2.59	2.63
Crustacean	2.08	2.11
Jewelry, goldsmiths' & silversmiths' wares	1.87	1.90
Articles of apparel of textile fabrics	1.31	1.36
Parts and accessories of motor vehicles	1.06	1.32
All motor vehicles	0.11	1.19
Women/girls coats, not knit	1.12	1.14
Floor coverings	0.89	0.96
Organic-inorganic & heterocyclic compounds	0.90	0.92
Furniture & bedding accessories	0.71	0.83
Crude vegetable materials	0.71	0.78
Aluminium	0.38	0.62
Nitrogen-function compounds	0.37	0.45
Carboxylic acids, halides, & derivatives	0.34	0.41

Source: United States Census Bureau.

As the trade war began about 12 months ago, it is an apt time for India to leverage it towards its benefit and tap the US market for its exports. In order to enhance exports to the US, it is important to identify key exports. For the current study, the chemical sector has been chosen as exports of chemicals from China to the US that has been declining while that from India has increased.

4. SECTORAL DIMENSIONS OF CHEMICAL EXPORTS FROM INDIA

To fulfil the objective of the paper it is necessary to understand the sectoral dimensions of exports of the chemical sector from India and China to the US. Table 3 clearly indicates the share of the chemical sector in exports from India and China to the US from June 2017 to June 2019. The time period being

examined is pre- and post- the onset of the trade war between China and the US.

It is inferred from the below depiction that the share of exports of the chemical sector from China out of total world exports to the US in June 2017 stood at 15.08% and the share of India's exports was 3.6%. Over the last two years, the shares of China and India fell and rose respectively to 14.12% and 4.6%. It is interesting to note that China's exports of chemicals to the US grew at 13.27% from June 2017 to June 2018 and declined by 17.37% from June 2018 to June 2019. From June 2017 to June 2019, China's chemical exports declined by 6.39%. For India, exports of chemicals to the US grew at 28.76% from June 2017 to June 2018 and declined by 0.99% from June 2018 to June 2019. From June 2017 to June 2019, India's chemical exports increased by 27.48%.

Table 3. Share of exports from India and China to US as compared to the world (% for 6 months)

Month	China	India	Growth rate of exports from China (year-on-year)	CAGR India
Jun-2017	15.0814	03.6063	13.2777	28.7678
Dec-2017	16.5695	03.6825		
Jul-2018	15.0195	04.0672	-17.37	-0.998
Dec-2018	19.2605	03.7819		
Jun-2019	14.1267	04.6008	-06.399	27.4832

Source: Authors calculations based on data from United States Census Bureau.

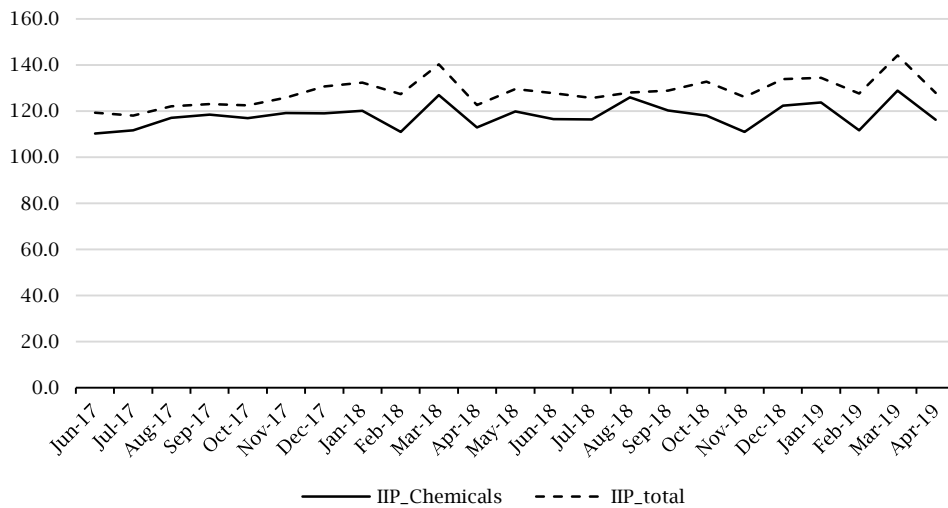
The main reason for selecting the chemical sector for the current study is due to the rising share of India’s exports as compared to the world and also it is one of the established traditional sectors of India. The chemical industry is an input industry to various sectors like leather, plastics, textile, food, printing, pharmaceuticals, etc. The contribution of the chemical sector in India in the manufacturing sector can be assessed by examining the index of industrial production (IIP) as given by the Ministry of

Statistics and Programme Implementation (MOSPI) and is depicted in Figure 2. It is seen that the IIP for chemicals and in general, the entire economy has been moving together.

The exports of chemicals from India to the US have also been rising for the selected time period as depicted in Figure 3.

One reason for the rise in exports maybe the rise in foreign exchange rates. The monthly exchange rates are depicted in Figure 4.

Figure 2. Index of industrial production for chemical sector and manufacturing sector of India



Source: MOSPI, Government of India.

Figure 3. Chemical exports to the US from India (US millions of dollars)

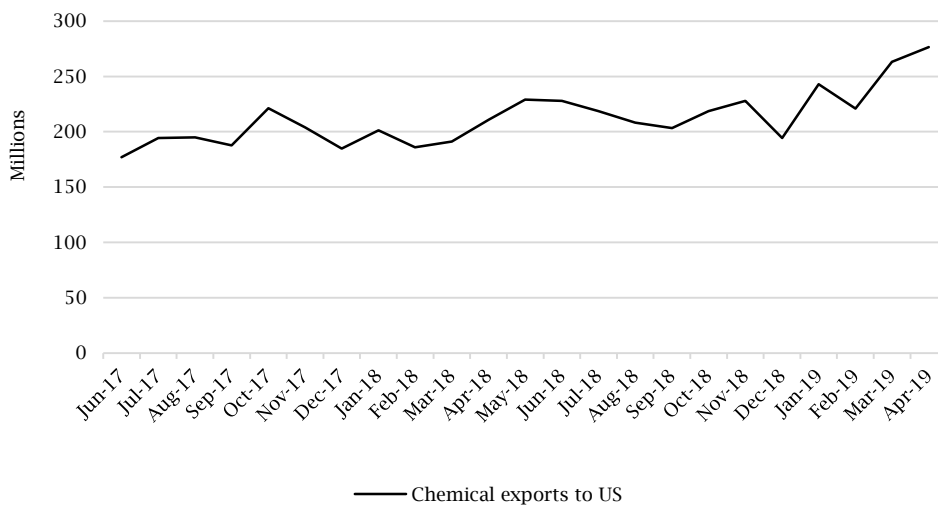
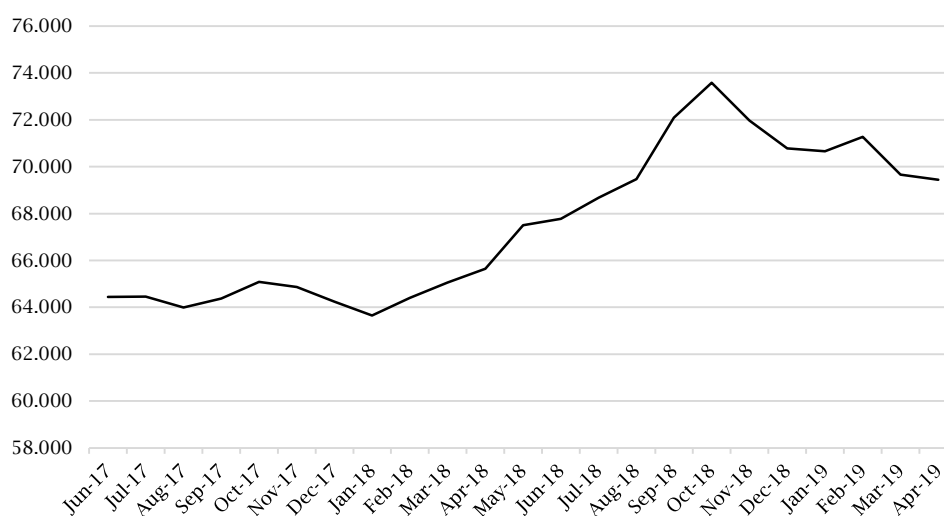


Figure 4. Monthly foreign exchange rates (INR to USD)

Source: Reserve Bank of India, Government of India.

It can also be seen from Figures 2 and 3 that IIP and exports have been moving in a similar fashion thus indicating that exports of chemicals are highly dependent on domestic manufacturing.

A large number of nations apart from India may benefit due to the US-China trade war,

specifically in the chemical sector. The main competing nations for India in chemical exports to the US are Brazil, Canada, China, Germany, Ireland, Japan, Switzerland, and the UK. Table 4 depicts the rate of growth of chemical exports from June 2017 to June 2018, and June 2018 to June 2019.

Table 4. Chemical exporting countries other than India and China to US (% yearly growth rate)

Year	Brazil	Canada	Germany	Ireland	Japan	Switzerland	The UK	World total
Jun 2017 to 2018	-57.76	-8.13	-25.12	7.06	47.54	255.49	-2.18	13.05
Dec 2017 to 2018	113.31	2.71	-10.81	19.13	5.96	-77.57	-16.33	-11.60

Source: Authors calculations based on data from United States Census Bureau.

It can be seen that the country which witnessed high growth of chemical exports to the US after July 2018 are Brazil, Canada, Ireland, and Japan. The share of these countries when compared between June 2017, December 2017, June 2018, December 2018, and June 2019 is as depicted in Table 5.

On examining the shares of chemical exports in total world exports for the competing nations, it is seen that exports from Ireland increased manifold. Thus indicating that Ireland is the largest exporter of chemicals to the US after China.

Table 5. Major chemical exporting competitors for India

Months	Brazil	Canada	Ireland	Japan
Jun-2017	03.2391	10.3117	16.8029	03.4961
Dec-2017	03.9174	09.1366	18.8467	04.2116
Jun-2018	01.2103	08.3801	15.9131	04.5628
Dec-2018	03.5564	08.4976	19.6231	05.3635
Jun-2019	02.9204	09.7361	21.4442	05.469

Source: Authors calculations based on data from United States Census Bureau.

India has to compete globally with Brazil, Canada, Ireland, and Japan to be a major source of chemicals for the US in times of trade tensions between the US and China.

5. DATA AND METHODOLOGY

The present study is an attempt towards examining the impact of the US-China trade war on India, specifically for chemicals from June 2017 to June 2019. The data for exports is collected from the Office of the United States Trade Representative (USTR). In the present study, data for the last two years has been considered to examine the impact of an event, i.e., a trade war in 2018.

The methodology adopted to assess the impact of the US-China trade war on exports from India to the US is the difference-in-difference method. In this technique, there are two groups: treatment and control. It is a form of linear regression comparing two time periods. It is mainly used to analyse the impact of a policy or intervention before and after the decision. This technique removes unobserved heterogeneity and accurately verifies the difference between treatment and control groups.

In the present study, the treatment group is the exports of chemicals from India to the US and the control group is all exports from India to the US. The assumption of non-parallel trends is applicable to the selected groups.

The general equation is given as below:

$$Y = \beta_0 + \delta_0 d_2 + \beta_1 d_T + \delta_1 d_2 * d_T + \text{other factors}$$

$$T = \sum \left\{ \begin{matrix} (= 1 \text{ if in Treatment group}) \\ (= 0 \text{ if in Control group}) \end{matrix} \right\}, \quad d_2 = \sum \left\{ \begin{matrix} (= 1 \text{ if Post_policy}) \\ (= 0 \text{ if Pre_policy}) \end{matrix} \right\}$$

where, Y is the dependent variable that is to be studied pre- and post-policy period. *Other factors* are other independent variables that affect Y ; d_T and d_2 are the dummy variables introduced in regression. Their value is 1 or 0 depending on Treatment/Control or Post/Pre-periods, respectively.

The variable $d_2 * d_T$ is the difference-in-difference variable and is used to estimate the difference between the treatment group and the control group due to the policy difference.

Table 6. DID indicator

	<i>Before change</i>	<i>After change</i>	<i>Difference</i>
Group 1 (Treatment)	Y_{t1}	Y_{t2}	$\Delta Y_t = Y_{t2} - Y_{t1}$
Group 2 (Control)	Y_{c1}	Y_{c2}	$\Delta Y_c = Y_{c2} - Y_{c1}$
Difference			$\Delta \Delta Y, \Delta Y_t - \Delta Y_c$

Using this technique, the equation is formulated:

$$\begin{aligned} \text{Chemical Exports} = & \beta_1 + \beta_2 * \text{Dummy_Tradewar} + \beta_3 * \\ & \text{Dummy_Time} + \beta_4 * \text{Dummy_Tradewar} * \\ & \text{Dummy_Time} + \beta_5 * \text{IIP} + \beta_6 * \text{Forex} + \varepsilon \end{aligned} \quad (1)$$

The *Dummy_Time* variable will take the value of 0 pre-trade war period, i.e., from June 2017 to June 2018, and the value of 1 post-trade war, i.e., from June 2018 to June 2019. Similarly, the *Dummy_Tradewar* variable will assume the value of 1 for the treatment group which includes the chemical exports from India to the US. *IIP* is the index of industrial production and *Forex* is the USD to the INR exchange rate. The difference-in-difference estimator is β_4 .

It is important to understand that in the case of a non-stationary series, the results and inferences from the regression are spurious and hence meaningless. Thus, the data series are checked for stationarity through unit root tests. The Augmented Dicky-Fuller test (ADF) has been applied to check the robustness (Dickey & Fuller, 1981). In the case of the ADF test, the distinction is made between

stationary and non-stationary processes. The equation of the test is as follows:

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \sum_{j=1}^p \beta_j \Delta Y_{t-j} + \varepsilon_t \quad (2)$$

The null hypothesis in this test is that the variable being tested has a unit root. The null hypothesis should be rejected for the series to be stationary.

The non-stationary series are usually transformed into stationary series. To analyse non-stationary data at the level, the data series have to be cointegrated in the same order. Cointegration tests are applied as in the case of non-stationary data, long-run equilibrium may exist. A number of tests exist like the Johansen cointegration and Kao test to assess the long-run equilibrium in the variables.

As the series is for a short period of time and bound to fluctuate, the fully modified or dynamic OLS technique will be applied. The utility of this method is to augment the regression with lags and leads. Fully modified or dynamic OLS is preferred over OLS regression as it takes care of small sample bias by considering the leads and lags of first differenced regressors. Dynamic OLS is preferred over fully modified OLS for the current study as the variables are not cointegrated and non-stationary at level (Masih & Masih, 1996).

6. EMPIRICAL ANALYSIS

Descriptive statistics are calculated to assess the basic feature of the data. The descriptive statistics are depicted in Table 7. It is seen that the mean to median ratio is around 1 and quite low. The difference between maximum and minimum values is also less. The standard deviation also depicts equality across sectors. Considering the values of kurtosis and skewness, the dataset is normally distributed.

Table 7. Descriptive statistics

<i>Descriptive</i>	<i>Chemical exports</i>	<i>Forex</i>	<i>IIP</i>
Mean	212373935.8	67.52585	118.0087
Median	208135117	67.49892	118
Standard deviation	24914660.02	3.195392	5.255639
Kurtosis	0.922944288	-1.37541	-0.42834
Skewness	0.997060051	0.360534	0.324965
Minimum	176951307	63.6514	110.2
Maximum	276516224	73.585	128.9
Jarque-Bera	0.029	0.113	0.531

On applying empirical tests to non-stationary series, the results may be spurious. Stationarity in the present series is tested through individual and common tests. The series is transformed into a log and the results are depicted in Table 8.

The results suggest that all the above-stated variables have a unit root at the level and are non-stationary. While at the first difference level, none of the variables have a unit root and hence are stationary.

Table 8. Unit root test

Variable	Test		ADF - Fisher chi-square Statistic
	Level	First Diff	
Exports	Level		-0.908(0.776)
	First Diff		-7.48(0.00)**
IIP	Level		-0.873(0.787)
	First Diff		-9.71(0.00)**
Forex	Level		-1.467(0.54)
	First Diff		-5.089(0.0001)**

Note: ** Significant at 1% level of significance.

The data series are stationary at the first order of integration and hence a need arises to test it for cointegration. The study employs the Johansen

cointegration test and the results obtained accept the null hypothesis. In other words, no cointegration exists between the variables as shown in Table 9 below.

Table 9. Johansen cointegration test

Hypothesized No. of CE	Eigenvalue	Trace statistic	0.05 Critical value	Prob.
None	0.392	26.599	29.797	0.118
At most 1	0.097	4.649	15.494	0.8449
At most 2	0.003	0.141	3.841	0.7067

In the Johansen test for cointegration it can be seen that the null hypothesis is rejected as the probability is greater than 0.05 and hence, cointegration does not exist in the data set. Thus, now it is advisable to apply the difference-in-difference technique of dynamic regression to equation (1).

The results of the regression are presented in Table 10. The results indicate that the US-China trade war has had a significant impact on chemical exports from India to the US.

Table 10. Dynamic OLS

Variable	Dynamic OLS (Difference-in-differences)		
	Coefficient	t-statistic	Prob.
C	6.81e + 09	0.952	0.000
Forex	-25027467	-0.266	0.792
IIP	-511815	-0.233	0.817
Time	5.52e + 08	0.831	0.414
Treatment	-4.38 + e09	-17.600	0.000**
Time*Treatment (DID indicator)	-3.82e + 08	-1.757	0.092*
R-squared		0.988	
Adjusted R-squared		0.978	

Notes: ** Significant at 1% level of significance; * Significant at 10% level of significance.

Though, the US-China trade war has a significant impact on exports of chemicals from India to the US. The increase in exports has been examined in relation to IIP and the foreign exchange rate of INR and USD. It is seen that forex and IIP have no significant impact on exports of the chemical sector from India to the US. The adjusted R-squared value indicates that the results explain the current trends to a large extent.

A major limitation of the study is that as the trade war is a recent phenomenon, capturing the actual impact in such a short time period may not be significant. Also, the technique applied of difference-in-differences may be biased as it is impossible to check the assumptions in the model as they may be unobservable.

7. CONCLUSION

It is widely believed and has been validated theoretically and empirically that changes in the global environment either political or economic

leads to change in trade patterns. In recent times where all nations are highly integrated and a rise in protectionism is being noticed, changes in trade patterns are inevitable. The ongoing trade tensions between the US and China have had a positive as well as a negative impact on world exports and imports. In the present study, the impact of the US-China trade war has been analysed on India and specifically for the chemical sector over a two-year time period. The time period chosen is one year pre- and one year post-trade war, i.e., June 2017 to July 2019.

The chemical sector is one of the major sectors for the Indian economy in terms of export as well contribution to India's GDP. China has been India's major competitor in exports of Chemicals. In the midst of the trade war, India can effectively leverage this opportunity and aim at being a major source of Chemicals for the US.

The results obtained through empirical analysis indicate that the trade war between the US and China has had a positive impact on the chemical

exports from India to the US. The chemical exports from India to the US have increased post-July 2018, though not at a steep rate. This indicates that India has the potential to export chemicals to the US.

The study suggests that the Indian economy should focus on expanding and exploring the potential for the export of chemicals to the US. There is an urgent need to develop a sector-based export promotion policy for chemicals from India. The rise in chemical exports will benefit the Indian economy in terms of the growth of the chemical sector in order to meet its domestic and foreign demand. This may also lead to increase in investments if a robust investment policy is formulated. The chemical sector in India can in the near future emerge as a major export-oriented investment-led sector.

The present study is different from other scholarly studies as it focuses on a particular sector, i.e., chemicals, and a particular country, i.e., India. In most of the studies which have been carried out recently, the focus has been in terms of resolving the trade conflict as well as promoting the US and China to trade amicably. This study indicates that how the dynamics of comparative and competitive

advantage can be made use of effectively by a third nation when there is a trade conflict between two nations. In this study, India primarily is trying to increase its exports to the US and that too of a sector in which it has a comparative advantage and has a stronghold in the international market. Indian chemicals are being exported to China as well as Middle Eastern countries. Export of chemicals to the US in the current scenario when China's imports have been restricted provides Indian exports some leverage in order to benefit from the conflict and enhance trade with the US. The present study suggests that India can develop the US as its major market in the near future considering the tensions in the relationships between the US and China.

A major limitation of the present study is that the model does not indicate a long-term effect of the US-China trade conflict. The analysis discussed here focuses only on a particular sector and does not take into account its linkages with other sectors. The analysis is based only on data available and does not include any control variables. Future studies made look into the investment employment and inflation aspects of various sectors and assess the impact of the US-China trade war effectively.

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