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COVID-19 and international trade: insights and policy challenges in China and USA

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ABSTRACT

Like the other spheres of economic activity, international trade is also a victim of the current Covid-19 pandemic. Therefore, taking this into consideration, this study examines the impact of the novel Covid-19 virus on international trade, by using monthly data from China and USA. For this purpose, we have referred to the novel Fourier causality test. The findings of the test show that there is a direct causal relationship between the Covid-19 related deaths and the exports and imports of China, while the Covid-19 cases do not have a causal relationship with the exports and imports of China in the pandemic. Moreover, the Covid-19 cases and deaths have a causal relationship with the exports and imports of USA. Thus, we found that there were heterogeneous effects experienced in both the countries. Based on these empirical findings, some policy implications have been suggested for the Chinese and USA economies.

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1. Introduction

The history of contagious diseases which shocked the world is quite vast and is traced back to the ancient times. However, in the modern times, these diseases spread at a rate of knots, as people are now better connected due to better transport infrastructure, and an enormous increase in the global population. In the last century, the most notable outbreaks that have hit the world were the 'Spanish Influenza' of 1918, the 'Asian flu' of 1957 and, the 'Hong Kong flu' of 1968. In the same context, the start of the 21st century was not favourable either, and the various epidemics that have affected various regions of the world include the SARS, bird flu, MERS, and Ebola in the years 2002, 2009, 2012, and 2014, respectively. Last, but not the least, the worst outbreak of the 21st century, in terms of its social, health related, and economic effects, is the novel coronavirus, also known as Covid-19 (Gao et al., 2021). The

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economic impact of Covid-19 has been quite significant in nature, as compared to all the previous outbreaks. This is primarily because the COVID-19 has ominously dented the economies of the most advanced nations as well (Mirza et al., 2020; Rizvi et al., 2020). Moreover, Covid-19 has impacted both the supply as well as the demand-side; hence, it has an impact on the global trade in terms of the goods and services (Baldwin & Di Mauro, 2020; Batool et al., 2020; Mirza et al., 2020; Rizvi et al., 2020; Shaikh, 2020).

In the last few decades, trade has become a major contributor to the economic development of many advanced economies, and the US and China are no exceptions to this growth trend (Su et al., 2020, 2021; Sun et al., 2021). According to the World Bank, in the year 2019, the contribution of exports in the total GDP of China was almost 36%, and for the US, this number was at 26%. In the same regard, it has been evident that global trade has also been experiencing positive trends since the 1950s (Ortiz-Ospina et al., 2018), while from the year 1980 to 2002, world trade has, perhaps, tripled (Barriel & Dean, 2005). However, certain instances and circumstances have negatively affected the pace of world trade as well, and the most recent one of these is the novel coronavirus pandemic. Since the pandemic has engulfed the world, almost all of the world's major exporters have experienced a decline in their exports due to the impacts of COVID-19. While some of these exporters have recovered, some are still barely struggling to recover from the after effects of this deadly virus. For instance, China experienced a dip of US$48 billion in its exports in February 2020, as compared to the exports recorded in the same month in the previous year.

Nevertheless, it recovered quickly, and its exports increased by US$40 billion in July 2020, in comparison to the situation in July 2019. On the other side of the spectrum, the exports coming from USA have not yet been able to fully recover from the adverse effects of the pandemic, and its exports fell by an amount of US$20 billion in July 2020, against the export statistics pertaining to the same period in the previous year, that is July 2019 (Papakonstantinou, 2019). Following the same context, (Vidya & Prabheesh, 2020) observed that as a result of COVID-19, there has been a considerable amount of reduction in the trade relations and volumes traded amongst the countries. They also noted that the pandemic had altered the trade network, and the trade pertaining to most of the economies had been adversely affected by the end of the year 2020.

Moving on in the discussion, the old debate regarding the comparative advantage vs. resilience has now resumed because of the present global pandemic. The theory of comparative advantage suggests that trade is beneficial in the case if the relevant countries specialize in those goods in which they have a comparative advantage. However, the theory faces a trade-off in the presence of the global supply shocks, particularly when countries depend upon the global supply chain for essential goods. Besides this, the standard trade theories assume that the transportation costs have been given. However, the COVID-19 pandemic has disrupted these typical implications pertaining to conventional trade theories, and now a debate has been initiated on the implications of the transportation costs for global trade performance. After the phenomenon of the Great Depression of the 1930s, and the Global Financial Crisis of 2008, the world is now recently going through the most severe global economic pandemic, i.e., the COVID-19 (Mirza et al., 2020). The possibility for contentment is, to

some extent, narrow for most of the countries around the globe, as they are going through the harrowing phenomenon of decelerating trade, deteriorating economic development, growing global imbalances, and devastating financial markets, therefore freezing their monetary systems, and their economies. It is a well-known fact that the Global Financial Crisis of 2008 happened to be a colossal shock to both the financial and the global trade markets. Just like that specific phenomenon, the current pandemic of the COVID-19 is also considered to have disrupted both the supply and demand functions of the affected economies. According to the projections made by (Annual Report 2020, n.d.), the COVID-19 pandemic has brought about several adverse effects with it. One of these being that the world's gross domestic product (GDP) has been anticipated to reduce significantly in the year 2021. Moreover, even the developed economies are anticipated to contract by 7 percent in the year 2020. However, the developing and the emerging economies are anticipated to shrink by 2.5 percent. In the same pattern, in the year 2020, global trade is projected to shrink by up to 13 percent. These estimates indicate that there is an expectation of a substantial deterioration in the global trade due the COVID-19 pandemic. In March 2020, a substantial increase in the cases of COVID-19 had been witnessed in countries such as China, Germany, Italy, Japan, Korea, and the United States. In order to cover the spread of this deadly and rapidly contagious disease and infection, the strategy of lockdown was applied in several countries around the globe. Due to the implementation of the lockdown, the industrial sector completely came to an abrupt halt in these economies. As the industrial sector in these economies is connected with the international trade network, the COVID-19 pandemic thus created critical supply chain disturbances as well (Yarovaya et al., 2020).

Due to the reduction in the international trade, the capacity of the container shipment also reduced by a significant amount. In this regard, it is essential to revisit the international trade situation before the COVID-19 pandemic. When studying the effects of the pandemic, it was observed that a major part of international trade comprised of Global Production Networks (GPN) that essentially helped many developing countries in promoting their industrial sectors, and increasing their productive capacity. GPN has thus far played a significant role in narrowing the gap between the central and the border regions. On the other hand, the diversification of trade, and the disintegration of production have led to the introduction of sophisticated trade-in mediators, and thus, economies such as China, Korea, and India have became the leaders and the export centres of goods in the international market (Vidya & Prabheesh, 2020). In specific terms, USA and China emerged as the 'centre' of the international supply chains, when it came to the majority of the industrial goods, mainly because of their relative advantage in the distribution and production arena. Furthermore, China thus regained its position as the major supplier of manufacturing goods and their parts, and has now become a 'workshop of the world'.

The global governments' limitations on the economic and personal activities have resulted in the disruption of international trade in two waves. The first effect emerged from China in the form of supply-side disturbances, specifically the manufacturing sector, but the other countries also became a part of the impact, as all the countries are interlinked. These supply disturbances have prevailed, and will continue to prevail

in other countries as well. As a result of the decline in production, the supply of the exports has also experienced a fall that will likely to continue. The second effect has emerged in the form of a reduction in the demand. Due to the ceased economic activities, the consumer outlets have been forced to close down, and the retail businesses have tended to stop taking orders of new stocks, both domestically and internationally. As a result, the incomes of consumers have experienced a decline, which has led to a further dip in the demand. In addition to this, the manufacturers of automobiles have all sparing a few, terminated their production in Europe and China. However, the agricultural trade-in products have remained quite immune to these disturbances, as the governments have to play a significant role in keeping food supply chains effectively operative. Similarly, in this pandemic, the households' incomes have also experienced a decline, but their budget remains quite stable for food, as compared to the other products (Mirza et al., 2020; Rizvi et al., 2020; Yarovaya et al., 2021).

The focus of this study is to investigate the impact of the recent pandemic on the trading behavior of China and the US. The primary reason for selecting these two economic giants for this specific study pertains to the fact that the two are the world's largest economies, that too with a combined GDP of approximately USD 36 trillion. Hence, any shock to the world economic leaders automatically has a trickled down impact on the whole world. In terms of exports, the mutual share of both the countries is USD 6 trillion, in the world's total trade of USD 25 trillion (Annual Report 2020, n.d.). It is noteworthy that the COVID-19 pandemic originated from inside China, and later on, the US became the worst-hit country in the world. Hence, from such an angle, it is deemed to be pertinent to observe the responses of the two world economic leaders to the COVID-19 pandemic, particularly in terms of their trade behaviours. This study, therefore, provides robust policy insights of trade in the context of China and USA.

Against this background, the present study contributes to the literature by exploring the causal links between COVID-19 and the trade dynamics for the USA and China, using the monthly data from December 2019 to December 2020. In order to determine the causal relationships, we thus employed a novel Fourier causality test. In the context of COVID-19, the Fourier causality regression was deemed to be the most suitable technique, as it provides robust estimates following the structural breaks. Unlike the existing literature, which is largely based on a descriptive analysis, reports, and news stories, this study provides a scientific inquiry into the economic aftermath of the Covid-19 pandemic. In addition to this, the study also provides a comparative analysis of the world's two largest economies, which would eventually offer suitable policies for both the economies, as well as for the rest of the world.

2. Data and methodology

The present study draws a link between the COVID-19 pandemic and international trade, specifically in the world's top two large economies, namely the USA and China. Thus far, the study uses international trade volume as a measure of exports in goods (Billions US Dollar) and imports in goods (Billions US Dollar). Moreover, the

Table 1. Variable definitions.

Variables	Definitions	Sources
Export	Exports in goods (value) US Dollar, Billions	OECD (2021)
Import	Imports in goods (value) US Dollar, Billions	OECD (2021)
COVID-19 cases	Number of confirmed COVID-19 cases	ECDPC (2021)
COVID-19 deaths	Number of deaths	ECDPC (2021)

Source: Author Estimations.

number of COVID-19 confirmed cases, as well as the deaths are also referred to as a proxy of COVID-19. The export and import data have been taken from OECD, while the data pertaining to the number of COVID-19 cases and deaths has been retrieved from the European Center for Disease Prevention and Control (ECDPC). The selected variables have been transformed into their respective log forms. The details of variables and definitions are thus presented in Table 1.

In the existence of COVID-19, the Fourier causality regression is the most suitable technique which provides robust estimates by following the structural breaks that are experienced in the data. Therefore due to this very reason, the current study employs the Fourier causality approach offered by (Enders & Lee, 2012), in order to examine the nexus between COVID-19 and the exports and imports in the top two economies of the world. Similarly, in their study (Pata, 2020) argued that the Fourier causality method is also capable of detecting the spatial features of COVID-19, on the macro variables over time.

The present study, however, does not follow the conventional unit root test, primarily because it is not suitable for checking the stationarity properties of the COVID-19 variables, and the COVID-19 related macroeconomic variables, and simply reveals the appropriate policy recommendations. Moreover, even the traditional tests such as the ADF, PP, KPSS, DF-GLS, and NP tests do not incorporate the structural breaks in the data. However, (Rodrigues & Robert Taylor, 2012) and (Enders & Lee, 2012) proposed the Fourier unit root test that incorporates the specific break periods, their count, as well as their arrangement, while their measurement issue has been altered and modified into slotting in the appropriate frequency modules within the models. Consequently, due to these advantages, we have applied (Enders & Lee, 2012) the Fourier ADF unit test on the regression at an early stage, correspondingly. Once we checked the stationarity properties of the COVID-19 and macroeconomic variables to be allowed to establish policy recommendations, at the second stage, we employed the Fourier causality test in order to estimate the causality between COVID-19 and international trade. Therefore, the Fourier causality model applied in the analysis is shown as:

$$\Delta y_t = \eta + \lambda_1 \cdot \mathrm{Sin}\left(\frac{2\Pi st}{T}\right) + \lambda_2 \cdot \mathrm{Cos}\left(\frac{2\Pi st}{T}\right) + \pi_1 y_{t-1} + \ldots + \pi_{p+dmax} y_{t-(p+dmax)} + \mu_t$$

In the equation, yt indicates the vector, including the variables of international trade and the COVID-19 cases and deaths, s denotes the frequency numbers, λ_1 and λ_2 signify the movement and amplitude of the frequency, t denotes the time trend, T denotes the sample size, and π is the coefficients matrix. In Eq. (3), we can also test

Table 2. Descriptive statistics.

		COVID-19 cases	**COVID-19 cumulative cases****	COVID-19 deaths	Exports	Imports
USA	Mean	8.062	160.19	4.965	4.771	5.265
	Median	10.20	127.60	6.758	4.808	5.299
	Maximum	12.18	540.48	7.787	4.925	5.361
	Minimum	0.000	0.000	0.000	4.499	5.108
	Std. Dev.	4.787	162.4	3.146	0.137	0.083
	Skewness	−1.046	1.000	−0.837	−0.713	−1.001
	Kurtosis	2.329	3.355	1.912	2.386	2.567
	Jarque-Bera	1.012	2.235	2.159	6.423*	12.27***
	Probability	0.191	0.327	0.340	0.091	0.002
China	Mean	4.338	0.411	1.271	5.359	5.142
	Median	3.555	0.025	0.000	5.396	5.155
	Maximum	8.412	3.819	5.247	5.520	5.235
	Minimum	2.485	0.002	0.000	4.973	5.005
	Std. Dev.	1.752	1.068	1.745	0.133	0.080
	Skewness	1.207	2.799	1.110	−1.891	−0.498
	Kurtosis	3.424	9.379	3.017	6.668	1.930
	Jarque-Bera	7.256*	39.02***	12.66***	15.03***	1.157
	Probability	0.096	0.000	0.003	0.001	0.561

*p-value < 0.10; **p-value < 0.05; ***p-value < 0.01.
Source: Author Estimations.

the null of the Fourier causality on the $\chi 2$ distribution. Through the Fourier causality specification, we then consider the structural breaks with the unknown date(s). This testing procedure has provided better outcomes in the context of policy building.

Further on into the analysis, we have referred to the monthly data for carrying out the analysis. In this regard, Table 2 reports the descriptive statistics pertaining to China and USA, where the data from USA shows the highest number of COVID-19 cases at 8.062, while in China it shows 4.338. Moreover, the data from USA shows that the highest number of deaths is 4.965, and the same in China has been recorded at 1.271. Similarly, based on trade, it is evident that China has more exports than the USA, while the USA has more imports than China, in the COVID-19 pandemic. The trends and fluctuations of the export and imports of China and the USA are reported in Figures 1 and 2, respectively. In addition to this, the Jarque-Bera (JB) test shows that the COVID-19 cases and deaths are not normally distributed in the USA, however but they show a normal distribution in China.

3. Results and discussion

Table 3 shows the Pearson correlation coefficient between COVID-19 and the trade pertaining to USA and China. The results show that there is a negative correlation between COVID-19 and imports that are relevant to China and USA. While a similar relationship seems to have existed between COVID-19 and the exports in China and USA, it also reveals a negative association between COVID-19 and exports, as the level of significance is higher in USA than in China. Another interesting finding is that the COVID-19 cases are also positively associated with COVID-19 deaths in China and USA alike. Overall, it has been affirmed from the correlation matrix that the COVID-19 cases and deaths have acutely influenced the imports and exports of China and USA, but the level of impact is varied in both the economies.

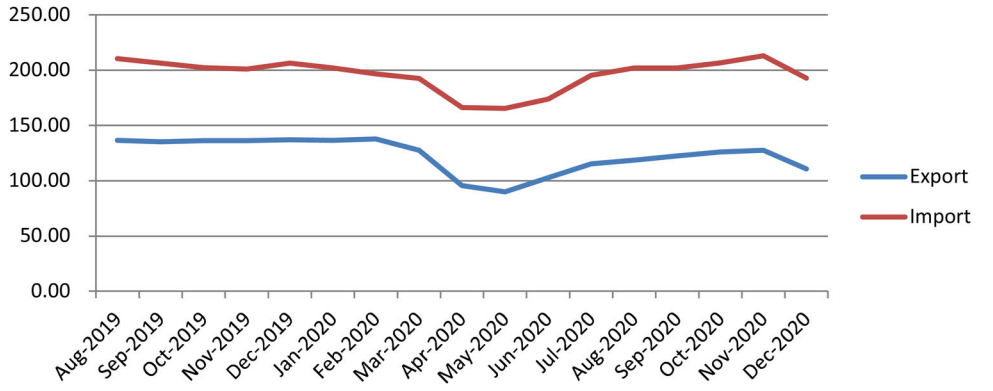

Figure 1. COVID-19, exports, and imports in USA.
Source: Author Estimations.

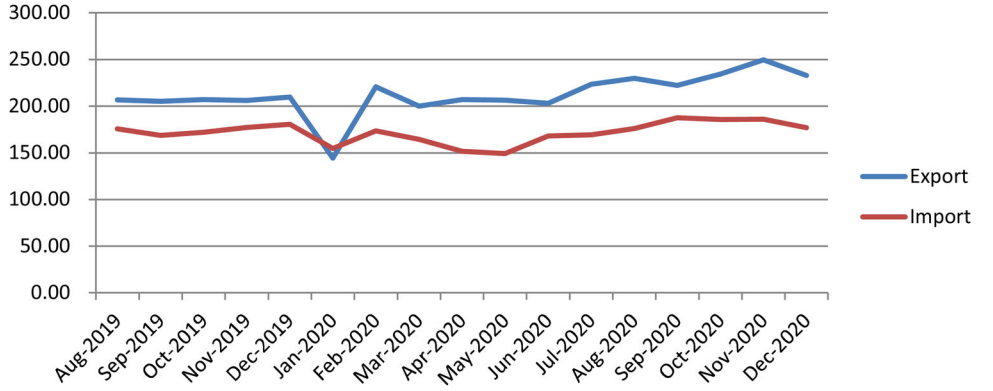

Figure 2. COVID-19, exports, and imports in China.
Source: Author Estimations.

Table 3. Correlation matrix.

		Imports	COVID-19 cases	COVID-19 deaths		Exports	COVID-19 cases	COVID-19 deaths
USA	Imports	1			Exports	1		
	COVID-19 cases	−0.179	1		COVID-19 cases	−0.598**	1	
	COVID-19 deaths	−0.292	0.968***	1	COVID-19 deaths	−0.701***	0.968***	1
China								
	Imports	1			Exports	1		
	COVID-19 cases	−0.289*	1		COVID-19 cases	−0.433*	1	
	COVID-19 deaths	−0.356*	0.866***	1	COVID-19 deaths	−0.444*	0.866***	1

Note: ***, **, and * denote significance level at 1%, 5%, and 10%, respectively.
Source: Author Estimations.

Following the same context, Table 4 reports the Fourier ADF unit root test results for USA and China, respectively. In the case of USA, COVID-19 cases, deaths, and imports are non-stationary at various levels. However, these variables have become stationary at the first difference, whereas the exports are level stationery. Thus, it can

Table 4. Fourier ADF unit root test.

	USA			China		
	Level	First difference	Number of Fourier	Level	First difference	Number of Fourier
COVID-19 cases	−1.596	−2.814*	1	−2.748*		1
COVID-19 deaths	−1.596	−2.776*	1	−1.621	−3.267***	1
Imports	−1.374	−2.961*	1	−1.673	−5.157***	1
Exports	−2.617*		1	−2.736*		1

Note: ***, **, and * denote significance level at 1%, 5%, and 10%, respectively.
Source: Author Estimations.

also be observed that no variable is stationary at the second difference. The number of Fourier is 1 for all the selected series. Similarly, in China, the COVID-19 cases and exports are level stationery, while the COVID-19 deaths and imports are stationary at the first difference. Given the outcomes of the Fourier ADF unit root test, we have then proceeded with the causality analysis.

Thus, Table 5 reports the causality test results for the COVID-19 cases, deaths, exports, and imports. The top panel presents the causality results for China, while the bottom panel presents the results for USA. The causality analysis for China indicates that a unilateral causality exists from COVID-19 deaths to exports, while no causality exists from COVID-19 cases towards the exports. Similarly, a factor of unilateral causality exists from COVID-19 deaths to imports as well. Thus, COVID-19 deaths have been observed to have a negative and significant effect on both the exports and imports. The increasing death cases in response to the global pandemic have led to aggressive policy actions in China. These policy actions include measures such as complete and aggressive lockdowns, travel bans, trade restrictions, and cargo bans, among others. Such policy actions by China, USA, and other countries have severely affected the economic interactions, including their trade flows.

Moreover, the cancellation of flights and travel bans has also negatively affected the air cargo availability, whereas the high demand for urgent goods such as medical products, ICT goods, and food has increased the cargo prices. In this regard, (Curran, 2020) estimated that the air freight costs increased by 30%, as compared to those in October 2019 between China and North America, and more than 60% for some key Europe-North American routes. In this situation, the trade flows for medical products, ICT, and food have also been adversely affected. The standard trade theories assume the transportation costs as given. However, the outburst of COVID-19 has disrupted the implications of the conventional trade theories, and now a debate has been initiated on the new and unknown implications of the increase in the transportation costs for an effective global trade performance.

It is noteworthy that countries have maintained tariffs of up to 10 percent on the COVID-19 test Kits during the pandemic crises (Evenett, 2020; Umar et al., 2020). Such anti-trade policies have also discouraged effective and smooth trade flows. Therefore, in such a situation, the "expediting certification" procedure is deemed to be important for new products such as the COVID-19 related medical instruments. Besides this, many countries have also revised the "port protocols" which may include port closure, quarantine policies, extra documentation, and checks, all of which have negatively affected smooth trade flows. When the virus out broke, a large number of

Table 5. Causality test for COVID-19, exports, and imports.

Prob.	F-statistic Adj R2	P		
China				
COVID-19 cases → Exports	2.177	0.194	0.06	10
COVID-19 deaths → Exports	4.296*	0.069	0.07	10
COVID-19 cases → Imports	1.009	0.418	0.03	10
COVID-19 deaths → Imports	3.984*	0.078	0.05	10
USA				
COVID-19 cases →Exports	8.296***	0.000	0.05	12
COVID-19 deaths →Exports	5.296**	0.049	0.08	10
COVID-19 cases →Imports	7.211***	0.000	0.04	10
COVID-19 deaths →Imports	6.200***	0.009	0.08	11

Note: ***, **, and * denote significance level at 1%, 5%, and 10%, respectively.
Source: Author Estimations.

shipping containers were parked at the Chinese port. A restriction on their movement created a shortage of products, which then increased the prices, adversely affecting food availability and affordability as well. Moreover, aggressive lockdowns also strictly discouraged the movement of workers, including labour for unloading the ships at ports. In general, the practice and implementation of lockdowns adversely affected the global supply chain, as additional health and safety measures increased the transaction costs.

In 2019, China was the top manufacturer of "surgical masks," covering one-half of the global production. In the early months of 2020 however, China curtailed the exports of masks and instead became an importer. Meanwhile, in the midst of the crises, China increased the production of masks from 20 million a day to 116 million a day, and finally became the exporter of masks again (Evenett, 2020). Furthermore, food supply chains were also disrupted because trade-related food products faced challenges such as the lack of "appropriate biosecurity arrangements," "food loss and waste," and sudden shut down of restaurants.

The causality analysis for the USA showed that a factor of unilateral causality exists from the COVID-19 cases (deaths) towards the exports. Similarly, unilateral causality also exists from COVID-19 cases (deaths) towards the imports. Thus, both COVID-19 cases and deaths have a negative and significant effect on both the exports and imports in USA. Therefore, it can be fathomed that the increasing COVID-19 cases and death incidents have disrupted the economic potential of USA, including its global trade flows. The pandemic has also adversely affected USA exports, both directly and indirectly via the global supply chain. Other than that the global lockdown policies have disrupted the world supply chain, adding a steep decline in USA's production and export performance. The greatest loss in exports has been observed in the oil, gas, apparel, and the auto industry. Particularly the auto industry, which has been adversely affected by the reduction in production, as well as the associated supply chains.

Besides this, the excessive dependency of the USA on the global production of medical essentials has also exposed the weaknesses of the present world trade system. The old debate of comparative advantage vs. resilience has thus resumed due to the present global pandemic. In this regard, the theory of comparative advantage suggests that trade is indeed beneficial, in the countries that specialize in those goods in which

they have a comparative advantage. However, the theory faces a trade-off in the presence of global supply shocks, when countries depend upon on global supply chain for essential goods.

4. Conclusions and implications

The ongoing COVID-19 pandemic has created a huge loss of human life and has also disrupted the global economic, social, and political interactions. The virus currently also persists in proliferating across countries, putting health systems under severe pressure in the battle to save lives. Another grave concern is the ambiguity about the scale and pace of infection, as well as the risk of "second wave" cases, including the prospects for "future waves" infections. In this scenario, the global supply chains and trade patterns are also deemed to be disruptive for the global economies. It is noteworthy that China and the USA are the largest global economies, and comprise of a major share of the world trade and GDP. Any adverse shocks to these economies tend to have grave consequences for the rest of the world as well. Therefore, the COVID-19 crisis has severely affected, and continues to do so, to both economies. Remarkably, the USA is bearing great suffering from the present pandemic.

The present study explores the causal links between COVID-19 and trade for USA and China, using the monthly data from December 2019 to December 2020. In order to determine the causal relationships, we have therefore employed the novel Fourier causality test. The results have revealed that there happens to be a negative association between COVID-19 and trade. The causality analysis has also confirmed the negative effects of COVID-19 on USA's and China's trend analysis trade patterns. It has been observed that on a comparative basis, USA has thus far suffered more from the ongoing pandemic, than China. This study also suggests that the trade effects of COVID-19 are substantial, and appropriate policies are required on an urgent basis. In such a situation, the health policy also needs to be prioritized and aligned with smooth trade flows moving along side.

Moreover, in the present situation, trade policy is an effective instrument to counter the negative effects of COVID-19. The global supply chain needs to be effectively maintained by removing the tariff and non-tariff barriers. That is to propagate that in particular terms, the trade-related COVID-19 products need to be liberalized. Moreover, in order to counter the negative shocks on global trade, subsidies and the removal of tariff and non-tariff barriers is a critical measure. Specifically, the role of the government to facilitate COVID-19 vaccination is crucial in the contemporary global economy. Moreover, the trade flows related to the vaccination need to be prioritized, using favourable trade policies such as subsidizing vaccination production and exports, and removing barriers in their imports.

We therefore conclude that given the severity of the present global health issues caused by COVID-19, the interruption in the global trade flows needs to be cared for on a priority basis. Policymakers, trade experts, and government officials can effectively contribute towards this end in the following ways. Facilitating supply chain flows, particularly for health essentials and food, avoiding unnecessary trade restrictions, boosting confidence in trade and global supply chain by adopting

complementary policies, and enhancing trade transparency are some of the measures that they can effectively and actively participate in. Finally, governments also need to ensure serving the 'public interest' instead of 'vested interest', in order to avoid any further losses and damages. In addition to this, new tariffs or other anti-trade measures need to be avoided, and rules-based trade needs to be managed as well.

This study has certain limitations. First, the empirical analysis is based on a short span of monthly data, which cannot be generalized over a longer period of time. Moreover, this study mainly focuses on the aggregate patterns of trade; whereas, any future research can focus on a disaggregated trade analysis in relation to COVID-19. Besides this, future research also needs to be conducted, which ideally isolates the COVID-19 effects on the medical equipment trade.

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