Impact Of The COVID-19 Outbreak On World Trade in Goods And Services: A Structural Break Analysis

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Abstract

COVID-19 pandemic has started in Wuhan, China in November 2019. To prevent the spread of the pandemic, curfews, etc. measures have been implemented in many countries. Due to the measures implemented, economic activities around the world have come to a standstill. The pandemic also harmed the goods and services trade. The study analyzes how the World goods and services trade affected by the pandemic and to contribute to the literature. As a result, it was determined that there was a break in World Trade and travel variables in 2020:03, government services 2020:04, total services 2020:05, transportation 2020:02, goods-related services 2019:12 and other commercial services 2020:06. Structural change analyses showed that goods trade soon returned to its pre-pandemic level; but it was observed that the recovery in services was slow.

Keywords: COVID-19, international economics, international trade, structural break

Article Type: Research Article

COVID-19 Salgının Dünya Mal ve Hizmet Ticareti Üzerindeki Etkisi: Yapısal Bir Kırılma Analizi

Özet

2019 yılı Kasım ayında Çin'in Wuhan kentinde COVID-19 pandemisi başlamıştır. Salgının yayılmasını önlemek için birçok ülke sokağa çıkma yasakları vb. tedbirler uygulamaya koymuştur. Uygulanan tedbirler nedeniyle dünya genelinde ekonomik faaliyetler durma noktasına gelmiştir. Salgın mal ve hizmet ticaretine de zarar vermiştir. Çalışma, dünya mal ve hizmet ticaretinin salgından nasıl etkilendiğini analiz etmekte ve literatüre katkıda bulunmaktadır. Sonuç olarak, Dünya ticaret ve seyahat değişkenlerinde 2020:03, devlet hizmetlerinde 2020:04, toplam hizmetlerde 2020:05, ulaşımda 2020:02, mal bağlantılı hizmetlerde 2019:12 ve diğer ticari hizmetlerde 2020:06 dönemlerinde kırılma olduğu belirlenmiştir. Yapısal değişim analizleri, mal ticaretinin kısa sürede pandemi öncesi düzeyine döndüğünü göstermiş, ancak hizmetlerde toparlanmanın daha yavaş olduğu gözlenmiştir.

Anahtar Kelimeler: COVID-19, uluslararası iktisat, uluslararası ticaret, yapısal kırılma

Makale Türü: Araştırma Makalesi

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1. INTRODUCTION

Epidemics are a phenomenon that has existed since ancient times of history. According to historical sources, the first outbreak that appeared around 1200 BC was the Babylonian flu epidemic. Among the epidemics experienced to this day, the plague epidemic, called The Black Death, with 75–200 million people, caused the most decimation. Looking at the history of the world, it is observed that on average, large outbreaks occur every 100 years (Kimball, 2006: 5). COVID-19 is an infectious disease caused by the SARS-COV-2 virus. The first case of COVID-19 was seen in December 2019 in Wuhan, China. After that, the epidemic quickly spread to various parts of the world through the development of transport facilities. To reduce the spread of the epidemic, travel restrictions, curfews, etc. have been imposed by many countries. precautions have been taken. Because of these measures, economic activity around the world has slowed. The COVID-19 outbreak has caused both health and an economic crisis. The epidemic affected some sectors negatively and some sectors positively. Industrial, domestic and foreign trade, airlines, logistics, tourism and entertainment sectors adversely affected, while e-commerce, distance education, food, medical, cleaning supplies, mask-making, and communication platforms that provide film and television sectors of the plague were influenced positively (Ateş, 2021: 618). Epidemic; increased health expenditures, decreased tax revenues and brought additional burdens to state budgets through direct income support to the public.

The epidemic has affected the world economy, both in terms of supply and demand. The epidemic brought the global supply chain to a standstill, so many production branches were adversely affected. The disruptions in production and uncertainties about the future increased unemployment and deterioration in the cash flow balances of the companies. Increases in unemployment and deterioration of firm cash flow balances caused both household and firm income to decrease. These effects combined have decreased the demand for raw materials, products and services. To overcome the problems experienced in supply and demand, expansionary monetary and fiscal policies were implemented on a global scale. Expansionary policies implemented in this context; reducing interest rates, providing loan supports, providing direct income support, submitting, tax collections can be counted as.

The epidemic also negatively affected foreign trade. This effect; it occurs due to the closure of borders between countries, financial difficulties of export-import companies, disruptions in the supply chain, increase in trade costs and decrease in demand. Additionally, many countries have banned or authorized the export of medical and agricultural products (Gruszczynski, 2020: 339) Due to the measures taken to reduce the spread of the epidemic, the economic shock spread to other countries, accelerated and caused some disruptions in the global value chain. According to World Trade Organization data, there was a 14.3% decrease in global goods trade in the second quarter of 2020 compared to the first quarter of 2020 (Barlow et al., 2021: 102). This decline was greater than the decrease in trade volume (10.2%) caused by the recession between the first and third quarters of 2008 (Minondo, 2020: 59). As of March 2020, the exports of France, Germany, Turkey and the USA are respectively according to the averages of the previous years; decreased by 38, 23, 25, and 12 percent (Demir and Javorcik, 2020: 397). The process of decreasing trade in goods, experiencing setbacks in the supply chain, and stopping the flow of capital is called a temporary reversal of globalization (Barua, 2020: 2).

The aim of the study; It is to analyze how the COVID-19 epidemic affects the world trade in goods and services. During the literature review, although studies analyzed the impact of the epidemic on world trade, there were few studies analyzed whether the epidemic caused a break in trade data and when exactly the effect of the epidemic began affecting trade data. The current study closes this gap. In

the second part of the study, there is a literature review on the subject. In the third chapter, the effect of the epidemic on world trade in goods and services is examined. In the fourth chapter of the study, information about the analysis is given and the results of the analysis are evaluated. In the last part, policy recommendations were made according to the results of the analysis.

2. LITERATURE REVIEW

In this part of the study, studies that analyzed the impact of the COVID-19 outbreak on world trade are summarized. According to this;

In the study Fernandes (2020), the economic effects of the pandemic were tried to be estimated from 30 countries. According to the estimates made over various scenarios, it is estimated that world GDP will decrease by 4.5 percent on average if there is a 1.5-month full shutdown, 6.2 percent on average in case of a three-month shutdown, and 10.7 percent on average in a 4.5-month shutdown.

In the study Vidya and Prabheesh (2020), the interdependence of trade between countries before and after the COVID-19 outbreak was measured and the future direction of trade was predicted. Trade network analysis and artificial neural networks were used in the study. In conclusion; It has been estimated that after the COVID-19 epidemic, there will be a serious decrease in trade links and trade intensity between countries, there will be a noticeable change in the structure of trade, China's central position in world trade will not be affected by the epidemic, and there will be a serious decrease in the trade of most economies until December 2020.

In the study Ozili and Arun (2020), the effect of social distancing policy on economic activities and stock market indices has been analyzed econometrically. As a result of, it has been determined that the number of days under quarantine, monetary policy decisions and international travel restrictions seriously affects the level of economic activity and the closing, opening, lowest and highest stock prices of major stock market indices. However, although the number of coronavirus cases did not have a significant effect on economic activities, it was determined that the restriction on domestic mobility and higher fiscal policy expenditures had a positive effect on the level of economic activity.

In the study Barua (2020), the possible effects of the epidemic on world trade were tried to be determined and the possibility of the epidemic to change the world trade balances was evaluated. In conclusion; It has been foreseen that the epidemic may reveal new world trade patterns, in addition, it may affect trade relations and globalization, making some economies winners and other losers.

In the study of Bekkers and Koopman (2020), the effect of the epidemic on trade was examined with the GTAP model. Three (V, U and L-shaped recovery) models were established in the study. In conclusion; It is estimated that world trade will contract by 8 percent in the V-shaped recovery scenario, 17 percent in the U-shaped recovery scenario, and 20 percent in the L-shaped recovery scenario.

In the study Maliszewska and Mattoo (2020), the effect of the pandemic on trade and GDP was examined with the GTAP model. Two models were established (global pandemic and amplified global pandemic) in the study. In both models, the economic shock that occurred after the epidemic were transferred to other countries via China. In the global epidemic model, all goods and services trade costs were increased by 25 percent and tourism was reduced by 50 percent. In both models, all services and goods trade costs were increased by 25 percent, while tourism was reduced by 50 percent. The difference between the two models is that in the first model, the recovery was faster after the economic shock of the epidemic, while it was slow in the second model. In conclusion; In the first model, GDP is 2.09 per

cent and trade volume is 2.5 percent; In the second model, GDP decreased by 3.86 percent and trade volume decreased by 4.57 percent.

In the study Carreño et al. (2020), with the emergence of the epidemic, the European Union, like many countries, has implemented trade-restrictive barriers in some products. In the study, the trade barriers in some products put into practice by the European Union were examined. The purpose of this application is to prevent the shortage of food and medical equipment, which is critical during the epidemic.

In the study Hayakawa and Mukunoki (2020), the impact of the COVID-19 outbreak on international trade was examined with the first quarter data of 2020 and for 186 countries. Analysis was done with gravity model and PPML estimator was used. The disease burden of the epidemic is measured by the number of cases and deaths. In conclusion; First, the COVID-19 burden in exporting countries has had a significant negative impact on trade. Second, this negative impact of the COVID-19 burden on exporters is more evident in exports from developing countries rather than from developed countries. Third, the COVID-19 burden in an exporter's neighboring countries has a positive effect on its exports. Fourth, the COVID-19 burden of importers has positive effects on trade in the agricultural sector, while the COVID-19 burden of exporters has negative effects, especially in the textile, footwear and plastic sectors.

In the study Akçaci and Çinaroğlu (2020), the effects of the epidemic on logistics and foreign trade have been studied. The study was carried out in a descriptive manner. For this purpose, the change in the number of airline passengers and freight traffic between 2018 and 2020 was analyzed and it was revealed how this epidemic the logistics sector and trade.

In the study Espitia et al. (2020), the role of trade and trade policy is examined to address the emerging health crisis in developing countries with the highest number of registered cases. Analysis was done with panel model and OLS estimator was used. It has been stated that the export restrictions of the leading producers may cause significant disruptions in supply and this may lead to price increases. Tariffs and other restrictions on imports further hinder the flow of critical products to developing countries.

In the study by Benz et al. (2020), the impact of the epidemic on service trade has been tried to be analyzed with various scenarios. In conclusion; It is estimated that trade costs in service trade will increase by 12 percent on average in the medium term. It was stated that this would have a reducing effect on world service trade.

In the study by Verschuur et al. (2021), analysis was conducted with the ship monitoring data before and after the outbreak. As a result, it was observed that there was a decrease in trade, but contrary to the findings in the studies in the literature, this decrease was slow. Additionally, it is estimated that countries with strong trade ties with China will be more affected by this negative shock due to their supply chains.

In the study Vo and Tran (2021), it was stated that the epidemic increased trade costs and this negatively affected world trade. Additionally, it was stated that trade, which was mainly done by sea before the epidemic, started to be conducted over the inexpensive railways after the epidemic, and this may continue after the epidemic.

In the study Hayakawa and Mukunoki (2021), it has been investigated how the effects of the epidemic on international trade have changed over time. For this, monthly data on the exports of 34

countries to 173 countries between January and August in 2019 and 2020 were used. Analysis was done with gravity model and PPML estimator was used. In conclusion; First, it has been observed that the epidemic has significant negative effects on the international trade of both exporting and importing countries. Second, these effects, especially those of the epidemic in importing countries, have tended to become negligible since July 2020. This result shows that the harmful effects of COVID-19 on international trade began to decrease to some extent after the first wave of the pandemic. Third, the negative impact of the epidemic appeared to differ between industries. While the negative effects on non-essential, durable products continued for a long time, positive effects were observed in the sectors that provide medical products.

In the literature review, it has been seen that the impact of the epidemic on world trade in goods and services is analyzed by establishing simulations with certain scenarios. No study has been found in the literature that analyzes the impact of the epidemic on trade in goods and services with both graphical and structural breaks. It is thought that this study will fill this gap in the literature. With this study, it can be seen in which periods the epidemic caused a structural break in the trade of goods and services, and if it created a break, whether it was restored to the old situation.

3. EFFECTS OF THE EPIDEMIC ON WORLD TRADE IN GOODS AND SERVICES

The COVID-19 pandemic has caused both a health crisis and an economic crisis. The epidemic has affected some sectors negatively and some sectors positively. E.g; While industry, domestic and foreign trade, airline, logistics, tourism and entertainment sectors were adversely affected, e-commerce, distance education, food, medical products, cleaning materials, mask making, platforms providing movies and TV series, and communication sectors were positively affected by the epidemic. Epidemic; increased health expenditures, decreased tax revenues and brought additional burdens to state budgets through direct income support to the public.

The epidemic affected the world economy, both in terms of supply and demand. However, it can be said that the epidemic created three types of shocks in the economies. These (Bekkers & Koopman, 2020: 7);

Labor Supply: Labor supply has been restricted due to the epidemic. The reasons for this are curfews, treatment processes of those who have the disease, and quarantine for those who have been in contact with sick individuals, etc. situations can be counted. Due to these effects on labor supply, production has been disrupted.

Supply and Demand Shock: Social distancing rules have been implemented in all countries to reduce the spread of the epidemic. Country borders are closed, restaurants, bars, concerts, movie theaters etc. events have been canceled. Thus, disruptions were experienced in the supply of products and this situation caused a supply shock. Simultaneously, households and companies with falling incomes have chosen to reduce their consumption. This resulted in a demand shock.

Increased Trade Costs: Transport costs of goods and services have increased for four reasons. First, there has been an increase in the cost of both passenger and cargo flights due to social distancing rules. Second, due to increased border controls, the transit time of goods has been prolonged. Third, trade costs have risen in the service sector due to travel restrictions. Fourth, the investments have become more costly due to the difficulties experienced in the transportation of equipment and expert workers.

Additionally, the epidemic brought the global supply chain to a standstill, therefore many production lines were adversely affected (Simola, 2021: 14). Disruptions in production and uncertainties

about the future increased unemployment and deterioration in the cash flow balances of companies. Increases in unemployment and deterioration of firm cash flow balances caused both household and firm income to decrease. These effects combined have decreased the demand for raw materials, products and services.

To overcome the problems in the world economy, global expansionary monetary and fiscal policies have been implemented. Expansionary policies implemented in this context; reducing interest rates, providing loan supports, providing direct income support, submitting tax collections, etc. can be counted as.

The epidemic also had a negative impact on foreign trade. Considering that China, the origin of the epidemic, accounts for 65 percent of the world's manufacturing and 41 percent of the world's manufacturing industry exports, the impact of the epidemic on world trade can be better understood. This effect; It can be said that it occurs due to the closure of the borders between countries, the financial difficulties of export-import companies, the disruptions in the supply chain and the decrease in demand. Additionally, many countries have started to prohibit or permit the export of medical and agricultural products (Gruszczynski, 2020: 339). According to the WTO, most of the restrictions consist of products listed by the World Customs Organization (WCO) related to the fight against the epidemic (Covid-19 test kits, personal protective equipment, thermometers, disinfectants, medical devices, medical consumables and soap). However, 17 countries also restricted the export of foodstuffs (Federation of German Industries (BDI), 2020: 2). The process of decreasing trade in goods, experiencing setbacks in the supply chain, stopping the flow of capital is called a temporary reversal of globalization (deglobalization) (Barua, 2020: 2). Figure 1 shows the monthly course of the world trade volume between 2013:01-2020:11. It is seen that the COVID-19 effect was seen especially in April and May 2020, and then it recovered in a "V" shape and approached its old levels.
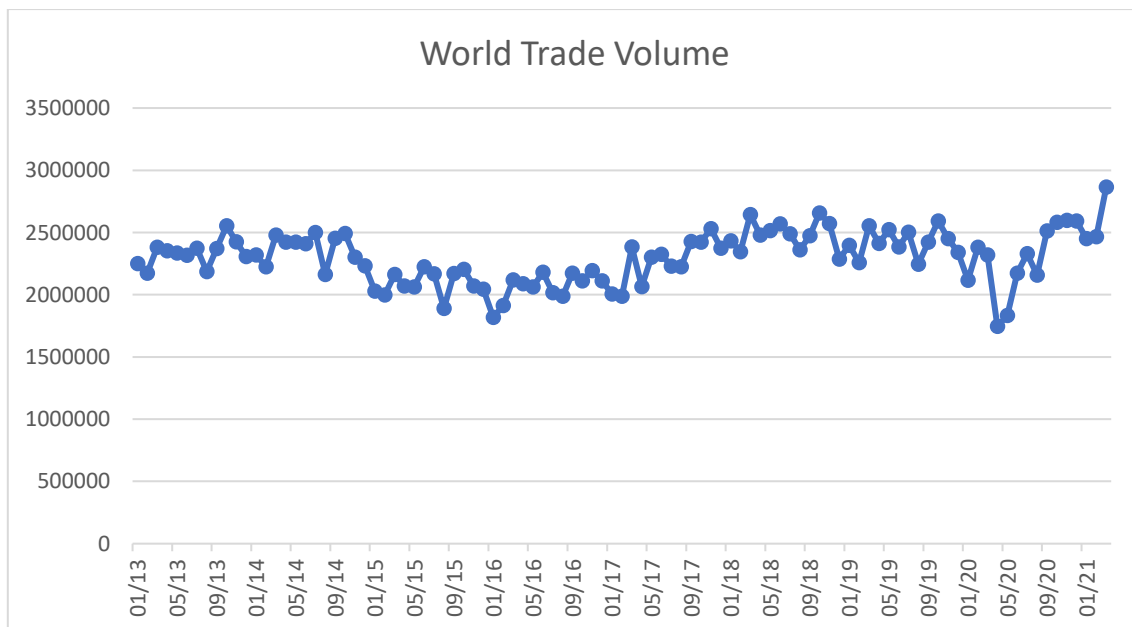

Figure 1. World Trade Volume (01/2013- 03/2021, Million USA Dollar)

For Table 1, the monthly averages of the world trade volume for the 2013–2019 period are calculated. It has been tried to see how much the epidemic deviated the world trade volume from the period average. According to the table, the world trade volume, including March and August 2020,

remained below the average. In particular, large deviations of 18.9 percent in April and 20.69 percent in May were observed. It is thought that these deviations are not only due to the supply and demand shocks caused by the epidemic, but also that many countries apply measures such as additional tariffs and quotas, especially for food and medical products. Due to the epidemic, the member countries of the World Trade Organization have implemented 109 trade-restrictive measures (Kumari and Bharti, 2021: 3).

Table 1. Deviations from the Average in World Trade Volume (2020- %)

January	February	March	April	May	June	July	August	September	October	November	December
-3,25	12,56	-3,20	-18,90	-20,69	-8,30	-3,19	-1,70	4,51	2,48	7,28	43,80

Globalization and its reflection in production, the global value chain, can be cited as the reason for the deep negative impact of the epidemic on foreign trade. Countries with high participation in the global value chain were more affected by the epidemic (Espitia et al., 2021: 5). It is thought that the epidemic has an unequal effect on world trade in terms of sectors (Susskind and Vines, 2020: 5). The manufacturing industry, foreign trade, airline, logistics, tourism, jewelry, accommodation and entertainment sectors were adversely affected by the epidemic. E-commerce, distance education, food, medical products, cleaning materials, mask making, platforms providing movies and TV series, and communication sectors were positively affected. It can be foreseen that the elimination of the effects of the epidemic will not be equal. While it is estimated that the graph of areas such as manufacturing industry and foreign trade will improve in a "V" or "U" shape after the epidemic; It is estimated that the graphics of the services sector, especially tourism, accommodation and entertainment, will be "L" shaped, that is, it will not be able to recover in the short term (Baldwin and Mauro, 2020: 82).

Within the scope of the epidemic, the service sector has been injured. To give a few examples; The global tourism industry lost over $200 billion in revenue, while the aviation industry lost over $113 billion. The education sector was also affected by the epidemic and the expected increase of 290.5 million worldwide was interrupted. (Ozili and Arun, 2020: 6).

The transportation sector, which is one of the most important determinants of costs in the trade of goods and an important part of the service sector, was also affected by the epidemic. These effects are as follows (Vo and Tran, 2021: 5);

Air Transport: Air freight costs increased by approximately 20-30% across the Asia-Pacific region and by 50% for some European and American routes.

Sea Transport: The sanitary and quarantine procedures applied to the crew resulted in delays and extended transport times. According to the Federation of International Forwarders Associations (FIATA), it was stated that there was a 20% increase in transportation costs between May and June 2020 compared to January 2020, due to the products stored in the border areas due to the shortage of personnel to transport.

Land Transport: To slow the spread of the epidemic, many countries have closed their land borders or imposed some restrictions on crossings. This has disrupted supply chains, leading to disruption of global supply chains. According to the International Road Transport Association (IRU) 70% of the trucks are unusable due to a lack of drivers. There was a 40% increase in transportation costs in April 2020 due to driver shortages.

Rail Transport: It is the type of transportation that is least affected by the epidemic. The reasons for this can be shown as the lower transportation costs due to large-volume transportation, and the fact that it can pass through medical quarantine procedures faster because it requires fewer drivers. As a result, it has been observed that rail transport has increased by 70% as of May 2020.

4. DATA, METHOD, AND ANALYSIS

In the study, the impact of the COVID-19 epidemic on world trade in goods and services was analyzed. For this purpose, the period 2013:01 to 2021:03 was examined. Seasonal effects have been eliminated in the data and the logarithms of the variables have been studied. The data in the study were taken from the website of the World Trade Organization. World trade volume (million USD) is used for commodity trade. For trade in services, the distinction in the technical note in the data source is used.(WTO, n.d.: 6). The distinction in the technical note is shown in Table 2.

Table 2. Trade in Services Distinctions in the Technical Note

Source: (WTO, n.d., p. 8)

For service trade; five headings in the technical note prepared for the data were used. These;

1) Goods-Related Services,
2) Transport,
3) Travel,
4) Other Commercial Services,
5) Goverment Services.

The current study analyzes the effects of the epidemic on world trade in goods and services. For this reason, it has been tried to see how the epidemic changed the data of world trade in goods and services. For this, firstly, the Bai and Perron multiple structural break test were applied. The reason for applying this test is that the test determines the structural break dates. Afterward, a graphical analysis was conducted on the monthly world goods and services trade data. In the study, Bai and Perron tests were made with Eviews and visualizations were made with R program (Anirudh, 2016; Lianghe, 2020).

Some events (epidemic, earthquake, economic crisis, civil war) can reach a dimension that can change the structure of economic variables. The COVID-19 pandemic is one of them. Structural break tests can be divided into three categories. The tests in the first group examine whether the series is broken at a certain date. The tests in the second group determine the break at any moment in the series.

Possible break dates are also determined by the test results in this group. In the third category tests, first the unknown date of the break is estimated, then the break test is performed. Bai and Perron test is in the first group. (Eksi, 2009: 5). The reason for applying this test is that the test determines the structural break dates.

Bai and Perron (1998) examined the case of structural break in a linear model estimated using the least squares method (Bai and Perron, 1998: 49). Bai and Perron's (2003) method has been put forward in the empirical application of the study. In the studies of Bai and Perron (1998, 2003), (i) estimation of the break date, (ii) constructing confidence intervals for break dates under various hypotheses regarding the structure of the data and the error term in the breakout model, (iii) different distributions for data and residual terms between breaks, and considering that there may be different autocorrelations for residual terms, the creation of tests, (iv) the estimation of the number of breaks was examined in detail (Bai and Perron, 2003: 74).

Bai and Perron (1998) defined the multiple linear regression model, which is considered to have m pieces of refraction, as follows (Bai & Perron, 2003: 73);

$$y_t = x_t'\beta + z_t'\delta + U_t \qquad\qquad t = T_{j-1} + 1, \dots, T_J \;\; \text{ve j} = 1, \dots, \text{m+1}$$

In this model, yt is the dependent variable observed at time t, xt and zt it shows the covariance vectors of dimension (p × 1) and (q × 1), respectively, The vector of corresponding coefficients β and δj, j=1, 2,...,m+1, and the error term corresponding to the time ut at T. T1, defined as the breaking points T1,….,Tm it is assumed that their value is not known in advance. (To=0 and Tm+1=T). Here, since the β parameter is not dependent on changes, this model is a partial structural change model, and the estimation of the model is performed using the entire period. If p=0, a pure model is obtained in which the invariance of all parameters is in question. At the same time, it is not necessary that the variance of the error term ut be constant (Emirmahmutoğlu et al., 2010: 12).

In the analysis part of the study, firstly, the world trade volume of goods and world service trade volumes were examined. Fracture numbers were determined according to the Schwarz criterion. Two breaks were detected in the world trade in goods during the period examined. These break dates are shown in Table 3. The outbreak was determined to have caused a break in March 2020.

Table 3. Structural Fracture Test Results for World Trade Volume

Terms	Intercept	Trend	Breaks	Sum of Sq. Resids.	Log-L	Schwarz Criterion
2013(1)- 2017(2)	14,7014	-0,003720	0	0,842266	9.548.067	-4.720.364
2017(3)- 2020(3)	14,6429	0,000697	1	0,659494	1.075.895	-4.872.156
2020(4)- 2021(3)	11,5082	0,033774	**2**	0,475913	1.237.383	**-5.105.563**
			3	0,455036	1.259.588	-5.057.591
			4	0,446622	1.268.826	-4.983.424
			5	0,444982	1.270.648	-4.894.273

As of April 2020, it can be said that the world trade volume has recovered rapidly due to the increase in the trend value. In Figure 2, there is a visual prepared for the world trade volume, which includes the break dates and the trend line. From here, it is seen that the world trade volume has recovered in a "V" shape as of April 2020. This is also observed from the slope of the trend curve.
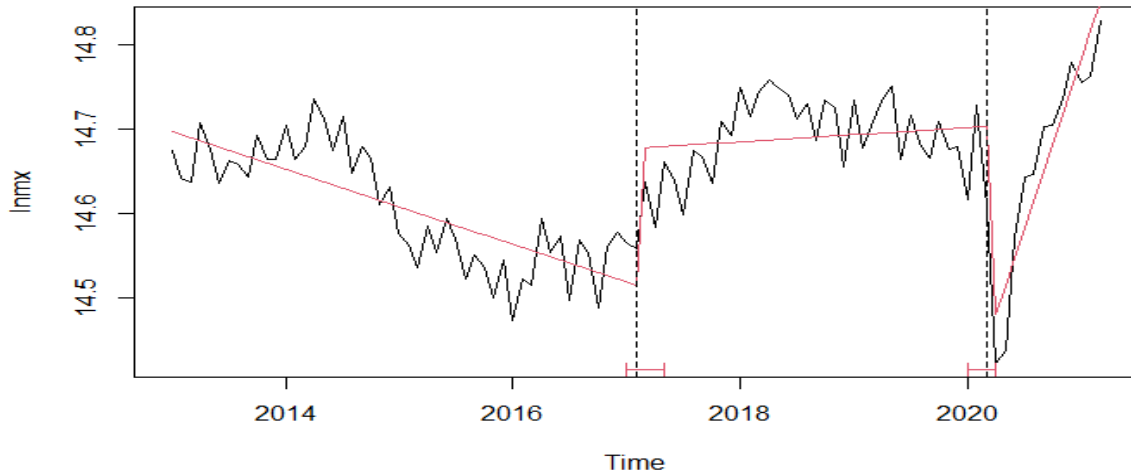
Figure 2. Structural Change Dates in the World Trade Volume Series

Three breaks were detected in the world total service volume during the period examined. These break dates are shown in Table 4. The outbreak was determined to have caused a break in May 2020.

Table 4. Structural Fracture Test Results for World Services Volume

Terms	Intercept	Trend	Breaks	Sum of Sq. Resids.	Log-L	Schwarz Criterion
2013(1) - 2017(7)	13,9458	0,002511	0	1,2928	7.427.186	-4.291.903
2017(8) - 2019(8)	13,9684	0,003582	1	0,575643	1.143.207	-5.008.141
2019(9) - 2020(5)	17,6993	-0,042103	2	0,469776	1.243.808	-5.118.543
2020(6) - 2021(3)	11,7598	0,025421	3	0,406801	1.315.053	**-5.169.643**
			4	0,379564	1.349.358	-5.146.114
			5	0,370171	1.361.762	-5.078.342

As of June 2020, it can be said that the world services have recovered rapidly due to the increase in the trend value. In Figure 3, there is a visual prepared for the world services trade volume, which includes the break dates and the trend line. From here, it is seen that the world trade volume has recovered in a "V" shape as of June 2020. This is also observed from the slope of the trend curve.
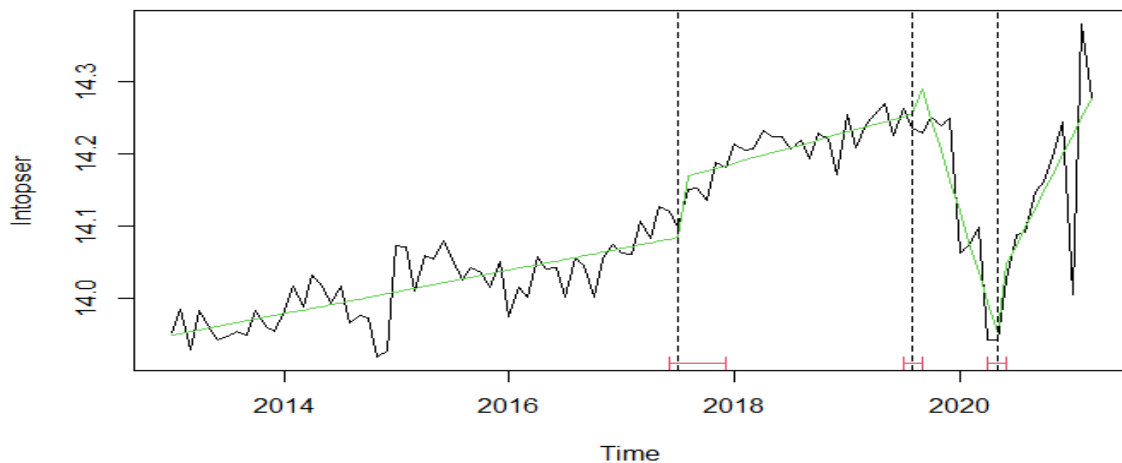

Figure 3. Structural Change Dates in the World Services Volume Series

Three breaks were detected in the world goods-related service volume during the period examined. These break dates are shown in Table 5. The outbreak was determined to have caused a break in December 2019. In short, it has been observed that the epidemic has had an impact on goods-related services in the early stages of the epidemic.

Table 5. Structural Fracture Test Results for World Goods-Related Services Volume

Terms	Intercept	Trend	Breaks	Sum of Sq. Resids.	Log-L	Schwarz Criterion
2013(1) - 2015(12)	13,85582	0,00299668	0	1.388.956	7.072.018	-4.220.152
2016(1) - 2017(10)	13,64411	0,00714727	1	0.563498	1.153.763	-5.029.465
2017(11) - 2019(12)	13,98771	0,00218249	2	0.496310	1.216.609	-5.063.597
2020(1) - 2021(3)	12,13915	0,02092704	3	0.441857	1.274.136	**-5.086.982**
			4	0.412268	1.308.446	-5.063.463
			5	0.407314	1.314.430	-4.982.723

As of January 2020, it can be said that the world goods-related services have recovered rapidly due to the increase in the trend value. In Figure 4, there is a visual prepared for the world goods-related services trade volume, which includes the break dates and the trend line. From here, it is seen that the world goods-related service volume has recovered in a "V" shape as of January 2020. This is also observed from the slope of the trend curve.
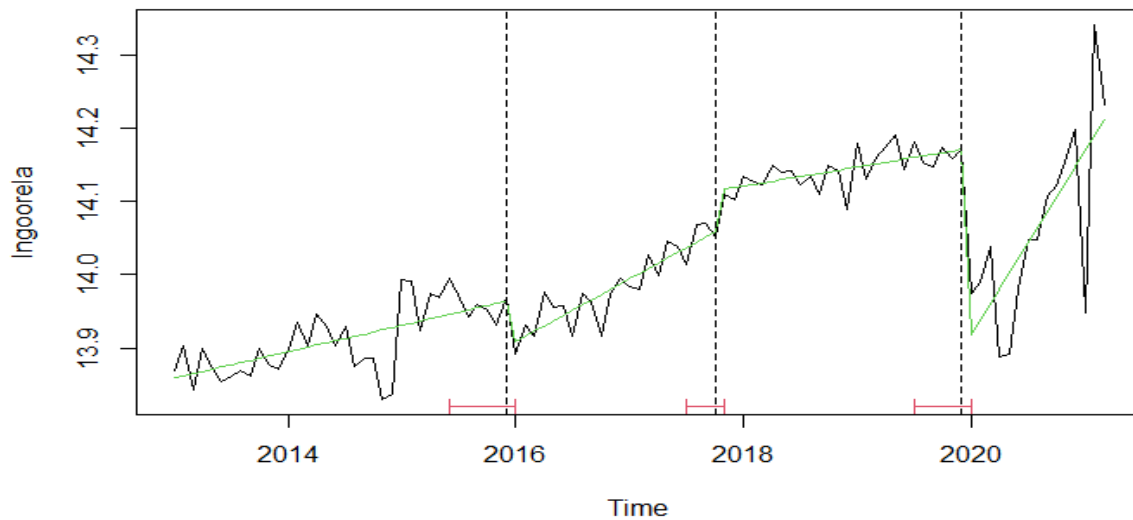

Figure 4. Structural Change Dates in the World Goods-Related Services Volume Series

Two breaks were detected in the world transport service volume during the period examined. These break dates are shown in Table 6. The outbreak was determined to have caused a break in February 2020.

Table 6. Structural Fracture Test Results for World Transport Services Volume

Terms	Intercept	Trend	Breaks	Sum of Sq. Resids.	Log-L	Schwarz Criterion
2013(1) - 2017(4)	10,54419	-0,0009743	0	0.829409	9.624.207	-4.735.746
2017(5) - 2020(2)	10,55924	0,0010001	1	0.648293	1.084.374	-4.889.286
2020(3) - 2021(3)	7,44616	0,0321134	2	0.371785	1.359.608	**-5.352.483**
			3	0.341974	1.400.981	-5.343.234
			4	0.334557	1.411.834	-5.272.329
			5	0.329928	1.418.731	-5.193.431

As of March 2020, it can be said that the world transport services have recovered rapidly due to the increase in the trend value. In Figure 5, there is a visual prepared for the world transport services volume, which includes the break dates and the trend line. From here, it is seen that the world goods-related service volume has recovered in a "V" shape as of March 2020. This is also observed from the slope of the trend curve.
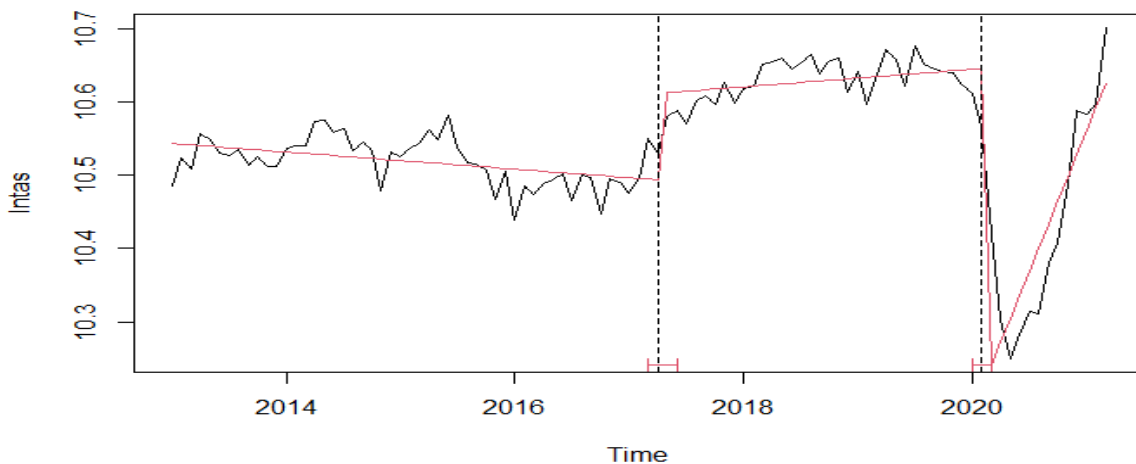

Figure 5. Structural Change Dates in the World Transport Volume Series

Two breaks were detected in the world travel volume during the period examined. These break dates are shown in Table 7. The outbreak was determined to have caused a break in March 2020.

Table 7. Structural Fracture Test Results for World Travel Volume

Terms	Intercept	Trend	Breaks	Sum of Sq. Resids.	Log-L	Schwarz Criterion
2013(1) - 2019(6)	10,742215	0,00372663	0	1.724.922	-5.398.095	-1.700.938
2019(7) - 2020(3)	16,188625	-0,0633561	1	4.664.966	1.074.953	-2.915.793
2020(4) - 2021(3)	4,194565	0,05963918	2	3.888.945	1.975.570	**-3.004.905**
			3	3.723.120	2.191.270	-2.955.650
			4	3.681.261	2.247.238	-2.874.126
			5	3.664.224	2.270.199	-2.785.934

As of April 2020, it can be said that the world travel services have recovered rapidly due to the increase in the trend value. In Figure 6, there is a visual prepared for the world travel services volume,

which includes the break dates and the trend line. From here, it is seen that the world travel volume has recovered in a "V" shape as of April 2020. This is also observed from the slope of the trend curve.
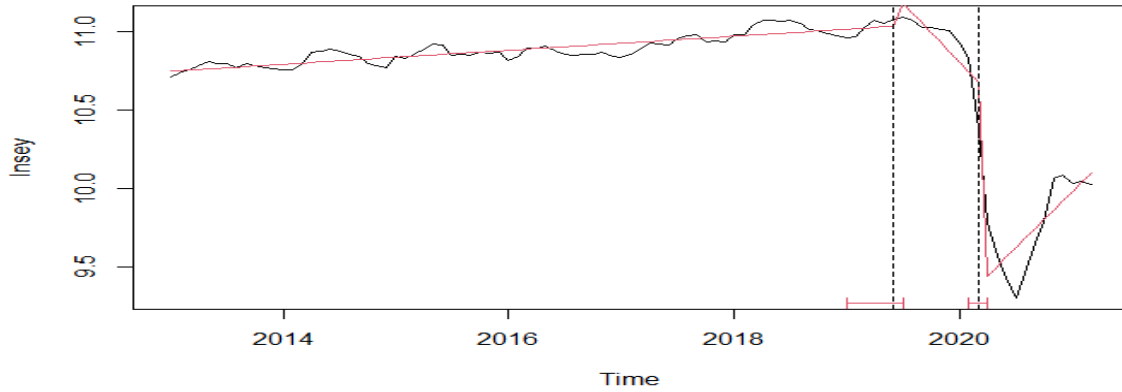

Figure 6. Structural Change Dates in the World Travel Volume Series

One break was detected in the world other commercial services volume during the period examined. These break dates are shown in Table 8. The outbreak was determined to have caused a break in June 2020.

Table 8. Structural Fracture Test Results for World Other Commercial Services Volume

Terms	Intercept	Trend	Breaks	Sum of Sq. Resids.	Log-L	Schwarz Criterion
2013(1) - 2020(6)	8,695019	0,0067343	0	5.931.691	-1.151.198	-0.465810
2020(7) - 2021(3)	53,799626	-0,4922731	1	3.817.513	-9.330.460	**-0.813690**
			2	3.605.768	-9.047.991	-0.777923
			3	3.534.483	-8.949.152	-0.705060
			4	3.518.844	-8.927.200	-0.616664
			5	3.515.393	-8.922.344	-0.524814

As of July 2020, it can be said that the world other commercial services have recovered rapidly due to the increase in the trend value. In Figure 7, there is a visual prepared for the other commercial services trade volume, which includes the break dates and the trend line. From here, it is seen that the world other commercial services volume hasn't recovered during March 2021.
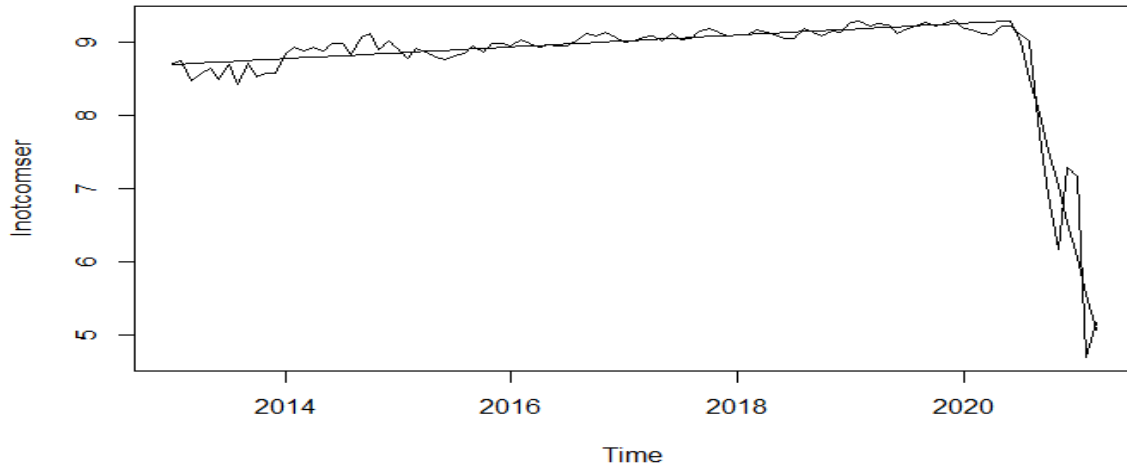
Figure 7. Structural Change Dates in the World Other Commercial Services Volume Series

Two breaks were detected in the world government services volume during the period examined. These break dates are shown in Table 9. The outbreak was determined to have caused a break in April 2020.

Table 9. Structural Fracture Test Results for World Government Services Volume

Terms	Intercept	Trend	Breaks	Sum of Sq. Resids.	Log-L	Schwarz Criterion
2013(1) - 2017(9)	8,09613	-0,001532	0	0.405791	1.316.285	-5.450.622
2017(10) - 2020(4)	8,166586	-0,0006661	1	0.349076	1.390.806	-5.508.339
2020(5) - 2021(3)	7,37487	0,00724541	2	0.305380	1.457.003	**-5.549.241**
			3	0.280886	1.498.390	-5.540.020
			4	0.273420	1.511.725	-5.474.130
			5	0.275057	1.508.770	-5.375.329

As of May 2020, it can be said that the world government services have recovered rapidly due to the increase in the trend value. In Figure 8, there is a visual prepared for the world government services volume, which includes the break dates and the trend line. From here, it is seen that the world government service volume has recovered in a "V" shape as of May 2020. This is also observed from the slope of the trend curve.
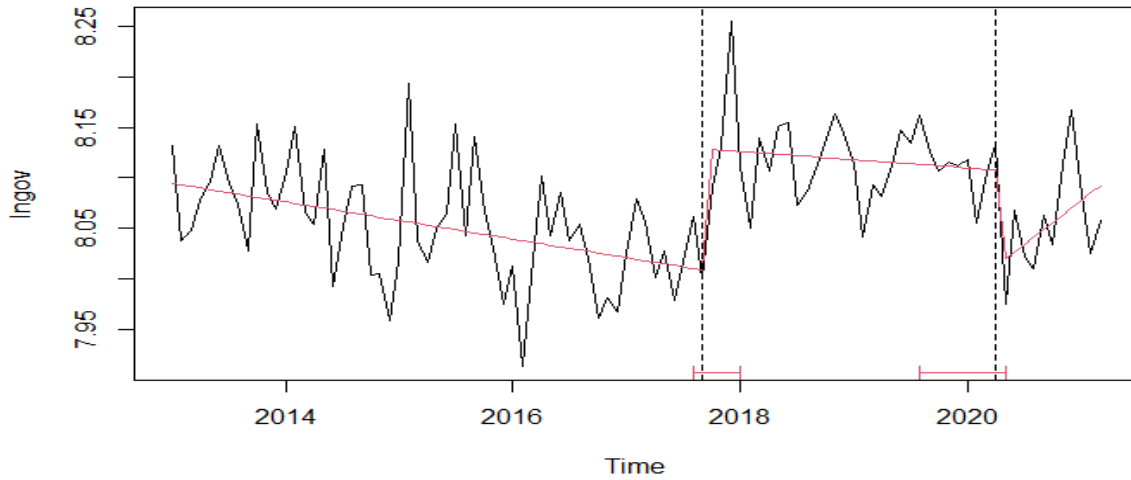
Figure 8. Structural Change Dates in the World Government Services Volume Series

5. RESULT AND DİSCUSSİONS

In the study, it was examined how the COVID-19 pandemic affected the world trade in goods and services. It was determined that the pandemic caused a break in all trade items examined. As can be seen from the slope of the trend curves after the breakout, a "V" shaped recovery was observed in all trade items except for the other commercial services item. It was determined that all items except world travel and other commercial service items returned to their pre-epidemic levels.

The results obtained in the study are similar to the results of the studies in the literature. It has been observed that the impact of the epidemic on foreign trade is negative, but the degree of impact differs depending on the product groups. It is believed that the level of participation of the mentioned product in the global value chain is also effective in differentiating the level of its impact. It is obvious that the COVID-19 epidemic has enormous economic effects on an unprecedented scale in world history. As seen in the study, these effects were overcome in a short time and trade volumes returned to their pre-epidemic levels. However, considering that the epidemic has not yet ended and that there may be new epidemic waves, it can be thought that the problems experienced in the supply chains may increase even more. New increases in the number of cases can reduce trade between countries. To minimize these risks, it is necessary to increase the vaccination activity worldwide and to provide vaccination aid to countries and continents that are in the number of vaccinations.

With the globalization of trade, the economic ties of the countries have strengthened. For this reason, an economic negative that has been experienced has global effects in a short time. The Covid-19 pandemic has also had such an impact on world trade. The negative effects of the epidemic on both trade and the economy will only be eliminated if countries can carry out co-guided policies. For this purpose, all countries, especially developed countries, should aim at policies aimed at the global interest. For example; increasing financing opportunities, supporting difficult countries and removing tariff and non-tariff barriers to trade, etc. applications should be disseminated.

Ethical Statement

During the writing and publication of this study, the rules of Research and Publication Ethics were complied with, and no falsification was made in the data obtained for the study. Ethics committee approval is not required for the study.

Ateş, E. (2022). Impact Of The COVID-19 Outbreak On World Trade in Goods And Services: A Structural Break Analysis. *KMÜ Sosyal ve Ekonomik Araştırmalar Dergisi,* 24(43), 686-703.

Contribution Rate Statement

All the authors in the study contributed to all processes of writing and drafting the study and the final version of the study has been read and approved by them.

Conflict Statement

This study has not led to any individual or institutional/organizational conflict of interest.

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