Impact of Geopolitical Risk on International Trade: Evidence from Container Throughputs

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It is of great importance for manufacturers and consumers that raw materials and products can be delivered on time without any disruption in the supply chain. The fact that production chains can be located in more than one country in the globalized world makes the smooth operation of the supply chain partially difficult. For this reason, especially suppliers may stop doing business with countries where geopolitical risk is high, and this may change the container traffic of countries. Therefore, this study empirically tests whether geopolitical risks change the container volumes of countries. Our sample includes 15 of the 19 countries in the world for which the geopolitical risk index is calculated because some values of the excluded countries are missing. The countries included are Argentina, Brazil, China, Colombia, India, Indonesia, Korea, Malaysia, Mexico, Philippines, Russia, Saudi Arabia, South Africa, Thailand, and Türkiye in alphabetical order. The period covered consists of 21 observations annually, covering the years between 2000 and 2020. The asymmetric causality test method was applied to consider the possible asymmetrical consequences of the geopolitical risk on the container trade in the countries. The panel causality test results obtained show that positive shocks in geopolitical risk cause negative shocks in container traffic. These results show that the security and stability of the countries around them are critical for the country's economy, as well as the security and stability of the countries themselves. Countries that want to grow commercially should develop their policies by considering regional security and stability.

KEY WORDS

~ container throughput
~ economic stability
~ geopolitical risk
~ international trade

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1. INTRODUCTION

Container shipping, which is the most important transportation way in the world supply chain with its feature of transporting and handling the cargo by various vehicles, constitutes 50% of sea transportation in value (Song, 2021). Any disruption in container shipping will in turn slow down maritime trade and world trade as it will hit the supply chain. Container transportation is directly affected by the economic volume in the world as it has a derived demand structure (Branch, 2012:1). Therefore, any factor that determines the economic volume also affects the cargo traffic transportation.

Globalization not only contributes to the development of the world economy but also causes the threats to reach serious dimensions (Yatsenko et al., 2018), as globalization causes the factors of production to occur in many countries. Thus, the stable situation in economies of each country becomes important. A factor that most affects the global and regional economy is geopolitical risk. Risk can generally be defined as a deviation from expectations, and this deviation can be positive or negative (Nesheva-Kiosseva, 2018:196). Geopolitical risk, on the other hand, is the potential for unexpected events in or around the country resulting from the country's position in the world. Such risks may arise from the country's own political and economic events, or may arise from events in the surrounding countries. Whatever the reason, it can directly affect the economic volume and investments in the country (Gupta et al., 2019, Dedeoğlu et al., 2019) and express various uncertainties and political pressures such as terrorist attacks, war risks, military threats, climate changes, natural disasters, and international conflicts (Caldara ve Iacoviello, 2018). Developing countries are particularly affected by sudden changes in trade and capital flows. Geopolitical risk, which is one of the main factors triggering these changes, can cause delay in both consumers' consumption decisions and companies' investment decisions. This situation may cause a slowdown in economic activities in the relevant countries (Bloom, 2009). In the academic literature, the effects of geopolitical risk on the economy have been investigated and significant results have been obtained. Most of these studies revealed that GPR negatively affects world trade (Gulen and Ion, 2016, Buluş et al., 2021, Dedeoğlu et al., 2019). Additionally, the increase in geopolitical risk decreases the fixed capital investments of the companies. Investors investing in a country want to see the future and want to keep the risk premium low. In parallel with this, the increase in risk increases unemployment rates (Caldara and Iacoviello, 2018). These findings show how important geopolitical risk is for macroeconomic indicators. Geopolitical factors may present both opportunities and constraints, but these situations are not static and can replace each other over time.

The fact that changes in risk affect economies, probably also affect maritime trade due to the derived demand structure. However, this may not be the case in every country, or there may be an asymmetric interaction and the increased risk in one country may be transferred to other countries. In addition, monetary indicators may not represent international trade objectively because they are subject to inflationary and populist effects. The best way to measure international trade alternatively is to track container traffic. Although the cargo content is not standard, the container traffic at the ports is an important indicator for measuring the trade volume. Measuring the impact of geopolitical risk using this variable in the literature has not attracted enough attention. Therefore, in this study, we examined the effect of the change in geopolitics risks of selected countries on their respective container traffic. We used the Geopolitical Risk Index to measure the risks of countries. The empirical results show that an increase in the risk of the included countries decreased their respective international container traffic.

In the second part of the study, the literature on geopolitical risk and how its components affect countries is examined. In the third part, the dataset and methodology used in the research are introduced. The results of the applied asymmetric causality test are presented in the fourth part.

2. LITERATURE REVIEW

In the geopolitical risk literature, the effects of geopolitical risk on macroeconomic variables have generally been the main subject of research. Apart from this, a few studies have also mentioned the effects of risk on companies' microeconomic decisions. Our study aims to be a complementary study to the studies that reveal the negative effect of risk on macroeconomic factors. Studies in the literature have determined that the increase in risk causes decreases in investments, employment, consumption and real exchange rate. Due to the derived demand structure of maritime transport, it is natural that these decreases are also reflected on port traffics of the countries. We revealed the effect of risk on this variable by considering container traffic as a more objective tool than the inflationary and populist macroeconomic measurement tools. Thus, we took a complementary role to the research in the literature and introduced an innovative approach.

We selected some studies examining the effect of geopolitical risk on macroeconomic variables and briefly mentioned the results. In the study by Cheng ad Chiu (2018), the effect of geopolitical risk on some macro variables of developing countries was examined with VAR models. In the analysis conducted with 38 developing country samples, it was determined that geopolitical risk affects real output, consumption, trade balance, investments and real exchange rate in different ways. Shock in risk decreases real output, consumption and investment. Additionally, the increase in risk causes depreciation in the real exchange rate and an improvement in the trade balance. These situations slow down economic growth. The negative effect of geopolitical risk on economic growth has also been examined empirically through the fragile five by Doğan and Özarslan Doğan (2021). According to the results analyzed using the augmented mean group method for panel data, it was discovered that geopolitical risk had a negative effect on the growth of the countries. In addition, the slowdown in economic growth also negatively affects the investment decisions of capital owners. In this direction, empirical studies have found that increases in geopolitical risk decrease foreign direct investment rates (Gupta et al., 2018, Dedeoğlu et al., 2019, Canh et al., 2020). Reflections of economic growth and activities also affect the stock markets of countries. Positive and negative news coming to the stock market due to economic and political factors are priced and reflect the current situation and expectations. Here, news originating from the geopolitical situation is probably priced in the stocks. When the relationship between geopolitical risk and the stock market was examined by Caldara and Iacoviello (2018), it was discovered that increases in risk caused decreases in the stock market. This result may be due to the expectations about the decrease in volume, trade alternatives and stability in the business sector. Considering that the movements in the stock market may reflect the demand for maritime transport (Başer and Açık, 2018), the negative effect of the increase in risk on the stock market is likely to reflect negatively on the container traffic of the countries.

It is also necessary to mention a few studies conducted with microeconomic indicators on geopolitical risk. In the study by Kotcharin and Maneenop (2020), the effect of geopolitical risk on companies' financial leverage choices was examined in the BRI and non-BRI countries. The increase in risk of companies in the BRI region decreases their financial leverage. Financial resources are naturally demanded to be used for investment. The decrease in demand also decreases investment. In this context, in the study by Caldara and Iacoviello (2019), it was determined that an increase of 2 standard deviations in the geopolitical risk index decreased the fixed investments of the companies by 1.8%. Since fixed capital decisions can be based on a longer period, the ratio may seem small, but it makes a significant difference in the long run. Additionally, the authors found that the lack of investment caused by the increase in risk also decreased the employment levels of the companies.

Another economic impact generated by geological risk is related to military expenditures. States that are located in risky regions and are in constant struggle with terrorist or enemy elements allocate a larger share of their economy to defense expenditures. Here, there is a decrease in the investments made in the country to support the economy. Thus, the increase in risk has a negative impact on the economies of countries by increasing defense expenditures, taxes, and deficits. In this direction, in a study by Eckstein and Tsiddon (2004) for Israel, it was determined that if the geographical conflicts could be ended, the Israeli economy would be 2.5% larger. Similarly, in the study of the Basque country in Spain by Abadie and Gardeazabal (2003), the

Basque GDP per capita would have been 10% higher if there had not been regional conflicts. These empirical studies can be multiplied, and there are studies of the opposite view. However, as a general belief, geopolitical risk can slow economic growth by increasing military spending. According to Blomberg et al. (2004), while this negative effect is lower in developed countries, it is much higher in undeveloped countries.

The general framework drawn so far reveals how geopolitical risk has a negative impact on the economies of countries and companies, both at the macro and microlevel. As the study that directly examines the relationship between container traffic and geopolitical risk does not exist in the literature to the knowledge of the authors, it is useful to cite a few studies that are closely related to the conceptual structure of the research. An increase in geopolitical risks in the regions may indirectly increase uncertainty. To measure uncertainty, the Uncertainty Index was produced in a manner similar to the risk measurement tool. In the maritime literature, the relationship between the uncertainty index and container traffic has been analyzed by Açık (2020) in Turkey. The results show that the traffic increases as uncertainty decreases. However, the opposite situation could not be detected. This reveals the positive effect of decreasing risk on trade, investment, and economic activity.

The increased risk in terms of the maritime sector may also indicate increased risks such as accident, hijacking, and confiscation. These increases make the insurance costs of the ships and the transportation costs per unit increase. However, since the ship owners who want to carry cargo to the risky area will be limited, supply shortages may also be experienced and freight rates may rise to higher levels. Additionally, if the regions where the risk arises consist of oil supplier countries, it increases oil prices. In this direction, in the time and frequency domain-based study by Khan et al. (2021), it was revealed that geopolitical risk is the determining factor in fuel prices and the dry bulk cargo freight index. A similar study was conducted by Michail and Melas (2021) for LNG and LPG tanker ships. According to the results obtained, the increase in risk increases the freight rates of tanker ships between 18% and 25%. Thus, geopolitical risk is important to the maritime sector and recent wars, economic crises, conflicts between countries, and trade wars have affected the financial situation of the maritime industry (Drobetz et al., 2021).

The literature considered discusses the effect of geopolitical risk on container traffic from two different dimensions; (i) economic impact, (ii) maritime impact. First, the derived demand structure of maritime transport makes it very sensitive to economic indicators. Factors such as a slowdown in economic growth, decrease in consumption, decrease in investment, decrease in employment, and decrease in the stock market occur when the risk increases. This will probably reduce maritime transport. It is expected that the increased risk will reduce the container traffic, or the decreasing risk will increase the traffic. Secondly, increased risk increases freight rates in maritime transport. As this affects the final prices of the products, the demand for the products may decrease and may cause a decrease in the container traffic. However, due to the increased risk, fewer ships may choose to continue their commercial activities in risky areas. Container traffic is expected to be negatively affected because of both dimensions. In this respect, an innovative approach complementary to the studies in the literature is presented by investigating the relationship between the geopolitical risk index and container traffic in the selected countries.

3. DATA AND METHODOLOGY

Our sample includes 15 of the 19 countries in the world for which the geopolitical risk index is calculated because some values of the excluded countries are missing. The included countries are Argentina, Brazil, China, Colombia, India, Indonesia, Korea, Malaysia, Mexico, Philippines, Russia, Saudi Arabia, South Africa, Thailand, and Türkyie in alphabetical order. The period covered consists of 21 observations annually covering the years between 2000 and 2020.

Descriptive statistics for container volumes by country are shown in Table 1. Considering the means of container throughput volumes, it is seen that the highest performance is shown by China (138 million TEU). This is quite reasonable given the economic size of the country. Korea (19.61 million TEU), which ranks second in the sample, has an average volume of almost one-seventh of China. The countries with the lowest volumes are Argentina (1.63 million TEU) and Colombia (2.51 million TEU). The gap between the highest and lowest

values in the sample is very large. When the coefficient variations of the mean value are examined, it is seen that the highest variability is in Turkey (53.6%). In addition, Colombia (52.7%), Russia (52.5%), India (51.6%), and Mexico (51.4%) have very high variability rates. The common feature of this group is that it mostly includes developing countries. This shows that the container volume values in these countries vary greatly. Great ups and downs can be seen from year to year.

Table 1. Descriptive statistics of container throughputs (Source: Worldbank, 2021)

	Mean	Median	Max.	Min.	Std. Dev.	Skew.	Kurt.	Obs.
Argentina	1637209.	1757990.	2172990.	554800.0	464056.4	-1.02	3.14	21
Brazil	7632321.	7256292.	11144167	2323801.	2969156.	-0.39	1.82	21
China	138000000	132000000	245000000	41000000	68647783	0.14	1.67	21
Colombia	2517410.	2447727.	4582712.	577041.0	1328338.	0.07	1.66	21
India	9111307.	8889576.	17053200	2450656.	4703485.	0.27	1.99	21
Indonesia	8890153.	9010442.	14763630	3797948.	3764778.	0.07	1.52	21
Korea	19614892	18520000	28867900	9030174.	6489823.	-0.02	1.73	21
Malaysia	17363114	16842920	26859094	4642428.	6793619.	-0.26	1.93	21
Mexico	3861373.	3697918.	7028903.	1315701.	1986863.	0.18	1.62	21
Philippines	5394419.	5314702.	8818028.	3031548.	1915905.	0.43	1.84	21
Russia	3129558.	3372105.	5252000.	316280.0	1645502.	-0.33	1.77	21
Saudi Arabia	5281074.	5313404.	9394100.	759769.0	2658487.	-0.12	1.82	21
South Africa	3700718.	3959192.	4892400.	1801610.	1007734.	-0.76	2.22	21
Thailand	7102483.	6818527.	10755780	3178779.	2482465.	-0.05	1.69	21
Türkyie	6135583.	5743455.	11626650	1526576.	3294130.	0.23	1.83	21
All	15932901	5574490.	245000000	316280.0	37370415	4.45	23.16	315

The geopolitical risk index was developed by Caldara and Iacoviello (2018). The methodology is based on counting statements about geopolitical tension in some of the major newspapers. These situations generally include factors such as wars and war probabilities, acts of terrorism, events that increase political tension. Descriptive statistics of the geopolitical risk index for all the countries are presented in Table 2. When the mean values of the geopolitical risk index are examined, it can be stated that the countries with the highest risk are Türkyie (117.7), Mexico (110.7), and Korea (110.5). Additionally, the risk value averages of a few other countries that follow are quite high. The common feature of these countries is that they experience geopolitical problems at their borders or within the country. When the variations of the mean values are examined, it is seen that the highest variability is in Indonesia (33.4%), Colombia (29.8%), Thailand (26.8%), and Türkyie (24%). However, the mean values of Indonesia and Colombia are also quite low compared to the others. This indicates that large increases or decreases in risks have been observed recently.

Table 2. Descriptive statistics of geopolitical risk index (Source: EPU, 2021)

	Mean	Median	Max	Min.	Std. Dev.	Skew.	Kurt.	Obs.
Argentina	97.71	94.94	124.83	77.47	14.63	0.24	1.91	21
Brazil	104.51	99.97	144.94	76.78	17.55	0.63	2.69	21
China	107.96	100.65	171.38	82.00	24.64	1.20	3.54	21
Colombia	81.52	76.54	135.95	35.75	24.36	0.27	2.89	21
India	91.22	83.51	145.30	69.94	18.47	1.45	4.72	21
Indonesia	77.59	73.62	124.66	44.69	25.95	0.42	1.94	21
Korea	110.54	107.75	172.36	82.50	25.02	1.05	3.21	21
Malaysia	94.17	89.23	133.11	59.47	20.36	0.43	2.42	21
Mexico	110.71	107.64	144.27	87.87	16.66	0.52	2.42	21
Philippines	104.70	102.88	151.90	70.45	23.70	0.35	1.91	21
Russia	107.79	104.04	153.76	75.37	20.65	0.45	2.52	21
Saudi Arabia	102.90	106.73	131.68	70.37	20.51	0.00	1.66	21
South Africa	89.08	85.51	114.55	65.25	16.07	0.25	1.80	21
Thailand	95.96	88.92	148.33	55.32	25.81	0.59	2.62	21
Türkyie	117.71	114.57	176.12	73.23	28.31	0.38	2.31	21
All	99.61	96.53	176.12	35.75	24.06	0.41	3.30	315

To examine the relationship between geopolitical risk and container traffic, we chose to apply the asymmetric causality test developed by Hatemi-J (2012). The logic of the test is based on the classical Granger (1969) causality test. It examines the causality relationship based on the current and past values of the shocks the variables contain rather than just the raw values of the variables. This method divides the shocks contained in the series into negative and positive and uses their cumulative sums (Tugcu and Topcu, 2018). It then examines the possible relationship between shocks in four different combinations by using bootstrap simulations to calculate critical values as ARCH effects should be considered (Hatemi-J and Uddin, 2012). This method provides an advantage as there are many factors affecting international trade and it may not be sufficient to explain trade only with risk factor. The effects of risk on trading can be asymmetrical.

When applying asymmetric causality analysis, the series does not have to be stationary. It is sufficient to determine the degree of integration of the series. This value can be determined by unit root or stationarity tests. For selecting the appropriate unit root or stationarity test in the panel data sets, it should be known whether there is a cross-sectional dependence in the series. If there is no cross-sectional dependence, the first-generation unit root tests should be used, but if there is a cross-sectional dependence, the second-generation unit root tests should be preferred. In addition, it is inappropriate to use the panel asymmetric test in cases where there is a cross-section dependence because of its estimator. The tests applied are the LM test (Breusch and Pagan, 1980), CD LM test (Pesaran, 2004), CD test (Pesaran, 2004) and LM adjusted test (PUY, 2008). Their usage preferences are related to the relative status of *n* and *t* numbers in the panel dataset. The null hypothesis of these tests is that there is no cross-section dependence in the series. Additionally, the homogeneity of the series should be tested for selecting the appropriate unit root test.

The order of integration value is determined by applying a unit root or stationarity analyses to the variables (Umar and Dahalan, 2016). Since the Toda and Yamamoto (1995) process is followed in asymmetric causality analysis, it is necessary to determine the maximum integration value. If a unit root is detected in the series, the extra lag/s is/are added to the unrestricted VAR model and the results are analyzed (Hatemi-J and Uddin, 2012). GAUSS codes were used in the implementation of the method.

4. RESULTS

To be able to determine which types of unit root or stationarity tests must be used, cross-sectional dependence tests were applied to both the container volume variable and the geopolitical risk index variable and the results are presented in Table 3. Since *t* is 20 and *n* is 15 in our dataset, the result of the test suitable for the *t*>*n* condition can be considered. CD, LM, and LM adjusted tests are suitable for this condition. Considering the results of these tests for container volume and geopolitical risk variables, the null of no cross-sectional dependence hypothesis is rejected for both the variables in the LM and CD LM tests. But in the CD and LM adjusted tests, the situation is different. For both of constant and constant & trend conditions, the null hypothesis for container throughput could not be rejected by the CD or LM adjusted tests. Additionally, for the geopolitical risk variable, the null of no cross-sectional dependence hypothesis could be rejected by the LM adjusted test in constant and constant & trend conditions. According to these results, if a cross-sectional dependence is assumed to exist, this shows that the shocks in container traffic in one country spread to other countries. Additionally, shocks related to geopolitical risks in one country also spread to other countries. The interdependence of the fragmented supply chain elements in different countries, which is a result of the globalized world, may be the main factor causing this spread. However, if it is assumed that there is no cross-sectional dependence, it is concluded that shocks do not spread between countries.

An asymmetric causality test can be performed using a series that does not have cross-sectional dependence since the VAR models in this method are estimated using the OLS estimator. Therefore, based on the CD tests showing that there is no cross-sectional dependence in the series, it was concluded that the null hypothesis could not be rejected, and analyses were applied. Additionally, the homogeneity of the series is also important for selecting the unit root test and the interpretation of the results. Therefore, we performed delta tests and added the results to Table 3. According to the results obtained, while the homogeneity null hypothesis is rejected for the container throughput, it could not be rejected for the geographical risk index. The technical result

obtained from the CD tests is the necessity of using the first-generation unit root and stationarity tests instead of the second-generation ones because the first-generation tests can be applied to a series that excludes cross-sectional dependence. In addition, due to the differences in homogeneity in the series, appropriate unit root tests should be selected considering the structures.

Table 3. Cross-sectional dependence test results

	Constant				Constant and trend			
	Container		Geopolitical risk		Container		Geopolitical risk	
	Stat	**Prob.**	**Stat**	**Prob.**	**Stat**	**Prob.**	**Stat**	**Prob.**
LM	224.34	0.000***	155.88	0.001***	254.819	0.000***	176.00	0.000***
CD LM	8.236	0.000***	3.512	0.000***	10.338	0.000***	4.945	0.000***
CD	1.091	0.138	-2.169	0.015**	-0.624	0.266	-2.008	0.022**
LM adj.	-1.807	0.964	0.722	0.235	-1.816	0.965	1.281	0.100
Delta	3.650	0.000***	0.477	0.317				
Delta adj.	3.943	0.000***	0.515	0.303				

*Note: Null hypothesis is rejected at ***1%, **5%, *10%*

We applied Im, Pesaran & Shin (IPS) (2003) unit root test to the container throughput variable since it is used in the heterogeneous series, and we applied the Levin, Lin & Chu (LLC) (2002) unit root test to the geopolitical risk index since it is used in the homogeneous series. The null hypothesis of both tests is that there is a unit root in the series. According to the results presented in Table 4, the null hypothesis is rejected at constant for container throughput, and at both constant and constant & trend for geopolitical risk index at the level. It can be stated that both series are stationary in level and that they are I (0). Here, the maximum integration degree used in the asymmetric causality test was determined as 0. These results indicate that the shocks to which these variables are exposed have temporary effects and the results of the policies implemented are temporary. These results also indicate that the container throughputs and geopolitical risks of the countries covered converge to each other in the long run. This situation shows that due to globalization, the difference between countries with low trade volume and countries with high trade volume is narrowed in the long run. Additionally, the geopolitical risk gap closes in the long run.

Table 4. Unit root test results

		Level		First difference	
		Constant	**Constant and trend**	**Constant**	**Constant and trend**
Cont.	IPS W-Stat	-2.591	-2.123	-4.871	-5.713
	P value	0.000***	0.526	0.000***	0.000***
Risk	LLC t	-9.128	-2.999	-6.664	-7.680
	P value	0.000***	0.001***	0.000***	0.000***

*Note: Null hypothesis is rejected at ***1%, **5%, *10%*

To apply the asymmetric causality test, we used the GAUSS code modified for panel analysis by Saban Nazlioglu. We set the maximum lag as 1 in the analysis because the frequency of our dataset is annual. We chose the AICc, which is a modified version of the Akaike Information Criterion for small samples, to determine the most appropriate lag. The maximum degree of integration is determined as 0. While applying the analyses, we could not obtain the causality result from negative shocks to negative shocks probably due to a situation related to the structure of the dataset. According to the results we obtained in our panel dataset for the other three combinations, we found significant causal relationships from positive shocks in the geopolitical risk index to negative shocks in container throughput. When we interpret the results individually based on the heterogeneity of the container throughput variable, it can be said that the increases in geopolitical risks decrease container volumes in Argentina, Brazil, Korea, Malaysia, Thailand, and Türkyie. On the other hand, decreases in the geopolitical risk index are leading to increases in container volumes in Brazil, Malaysia and Mexico. There is also a significant relationship between positive shocks in the geopolitical risk index and positive shocks in the container traffic for Türkyie. However, no relationship was found between positive shocks on a panel basis.

Table 5. Panel asymmetric causality test results

	Risk^{+} to Cont^{+}		Risk^{+} to Cont^{-}		Risk^{-} to Cont^{+}	
Country	**MWALD**	**p-value**	**MWALD**	**p-value**	**MWALD**	**p-value**
Argentina	0.056	0.813	38.287	0.000***	0.002	0.968
Brazil	0.952	0.329	4.953	0.026**	3.677	0.055*
China	0.254	0.614	0.341	0.559	0.000	0.984
Colombia	0.741	0.389	0.251	0.616	2.125	0.145
India	0.020	0.888	0.057	0.811	0.920	0.337
Indonesia	0.280	0.597	0.220	0.639	0.686	0.407
Korea	0.001	0.976	5.863	0.015**	0.773	0.379
Malaysia	2.020	0.155	4.507	0.034**	4.834	0.028**
Mexico	0.107	0.743	0.000	0.994	3.007	0.083*
Philippines	0.454	0.500	1.386	0.239	0.629	0.428
Russia	0.014	0.905	0.278	0.598	0.706	0.401
Saudi Arabia	0.437	0.509	0.474	0.491	1.150	0.284
South Africa	0.550	0.458	0.267	0.605	0.222	0.637
Thailand	0.286	0.593	4.100	0.043**	0.204	0.652
Türkyie	2.798	0.094*	3.424	0.064*	0.989	0.320
Panel Fisher	21.400	0.875	86.408	0.000***	37.886	0.153

*Note: Null hypothesis is rejected at ***1%, **5%, *10%*

5. DISCUSSION AND CONCLUSION

Today, the most important factors affecting world markets are geopolitical factors. As with all other goods and services, the main determinant of commodity prices is the balance between supply and demand. However, the world's most important commodities, such as crude oil, natural gas, and gold are very sensitive to geopolitical events. Any instability or conflict in the countries rich in oil and/or gas reserves can cause major problems in oil/gas shortage causing prices to rise too high. The increase in the price of oil, which is the most important raw material and energy source for the world economy, causes a crisis and inflationary situation worldwide. However, gold is seen as a safe haven for investment. Conflicts and war risks between major economies can affect the investor's demand for gold and cause its price to rise. All these events are some of the main important effects of geopolitical factors.

On the other hand, with the increasing globalization, the supply chain between production and consumption centers has evolved in many countries. The disruption at any point in this supply chain may cause disconnection and failure of the economic cycle from being completed on time. For this reason, especially international companies follow the risks and uncertainties in these countries while making their investments. Additionally, even if they do not invest, they consider the risk and uncertainty in the country when choosing their suppliers and making short- or long-term agreements with them. This situation has also been demonstrated in empirical studies in the literature and it has been determined that increases in geopolitical risk cause decreases in economic growth, investment, employment, and consumption, and cause increase in transportation costs. It is inevitable that all these factors, which are shaped by increased risk, will decrease the trade volume. In this direction, we revealed the effect of geopolitical risk on international container traffic of the selected countries by complementing the earlier studies.

The pre-tests that were carried out before the asymmetric causality test also provided some important findings. Unit root tests enable us to determine whether there is a convergence between the values of the countries and whether the implemented policies are effective. In the tests performed, both the geopolitical risk and the container quantities were determined as I (0). In terms of geopolitical risk, this situation shows that the risks among countries converge to each other. In other words, the gap between high-risk and low-risk countries

is closing in the long run. This shows that high risk in a country or region is not only its own problem but also spreads to other countries. The emergence of dependence in a few of the four cross-sectional dependences also supports this argument. Similarly, container volumes converge to each other. This can be caused by globalization and the distribution of the supply chain elements to different regions. As for the effectiveness of the policies, the stationary series shows that the effects of the implemented policies are temporary. Here, the policies to reduce the international geopolitical risk are not effective, and it seems that the risk will continue to be a problem in the world for some time. Similarly, the effect of policies that increase the container trade of countries is temporary. It shows the necessity of applying different policies apart from the existing ones to accelerate global development.

The results of asymmetric causality can be evaluated on a panel and individual basis. Considering the panel dataset, increases in geopolitical risk cause decreases in container traffic. The fact that the decrease in geopolitical risk on a panel basis does not reflect positively on container traffic may be due to the prudent behavior of companies or the sticky prices generated by the risk increase, or the effect may be delayed, but our methodology is not suitable for detecting this. It could be a good research question for further studies. In terms of individual results, increases in geopolitical risks decrease container volumes in Argentina, Brazil, Korea, Malaysia, Thailand and Türkyie, and the decreases in the geopolitical risk index lead to increases in container volumes in Brazil, Malaysia and Mexico. There were also periods when the increased risk of Türkyie increased container traffic. Türkyie is the country with the highest average geopolitical risk value. The increasing effect of increased risk may be a coincidental event or the delayed relationship between the data may have led to such a result because it is a country that is frequently exposed to risk. If the relationship between the variables is examined with a time varying approach, answers to such questions can be found. In our study, we analyzed the impact of geopolitical risk on the international economy through container handling quantities. We have obtained results in accordance with the general trend but have provided a new perspective of the literature. Examining the relationship between the variables with time domain approaches and finding them as short-, medium-, and long-term may be a good research question for future studies.

CONFLICT OF INTEREST: There is no Conflict of Interest.

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