Are Geopolitical Risks a Permanent Driver of Global Inflation? Evidence from 1985-2024

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Abstract: This study investigates the causal relationship between geopolitical risks and global inflation and examines whether this causal effect, if any, is persistent. To this end, the stationarity of the annual Geopolitical Risk Index (GPR) and global inflation series for the 1985–2024 period was first analyzed using the Lee and Strazicich (2003) two-break unit root test, which concluded that the series are stationary at levels. Subsequently, the data were analyzed using a stationary frequency domain causality approach, revealing a unidirectional causal relationship running from GPR to global inflation at both low and high frequencies. The causality identified at low frequencies indicates that this causal effect is permanent. The findings of the study suggest that mitigating geopolitical risks is of vital importance in the fight against global inflation.

Keywords: geopolitical risk; global inflation; frequency domain causality.

JEL Classification: C22; D80; E31.

Introduction

As geopolitical risks increase in the world, its economic, political and social effects are inevitable. Therefore, an increase in geopolitical risks is expected to affect macroeconomic indicators. So, what is geopolitical risk and how is it measured? Caldara and Iacoviello (2022) define geopolitical risk as a type of risk associated with factors that disrupt the normal and peaceful functioning of international relations, such as wars, acts of terrorism and inter-state tensions, and develop a monthly geopolitical risk indicator (GPR) based on newspaper articles covering geopolitical tensions. Caldara and Iacoviello (2022) emphasize that events such as the Gulf War, 9/11, the 2003 invasion of Iraq, the 2014 Russia-Ukraine crisis, and the Paris terrorist attacks increased the index.

Increasing geopolitical risks may negatively affect individual countries' macroeconomic and financial indicators, and may also significantly affect global indicators. These effects may be temporary or permanent. This study focuses on the effects of geopolitical risks, which have emerged globally and spread worldwide, on inflation, one of the main macroeconomic indicators. Is there a causal relationship between geopolitical risks and global inflation? This question constitutes the main motivation of this study. In this context, the study seeks to address two fundamental questions: Are geopolitical risks a driver of global inflation? If so, is this causal relationship transitory or permanent.

In addition to this introduction, the study consists of a literature review where a summary of the literature on the relevant topic is presented, data, methodology, and findings where the causality relationship between geopolitical risks and global inflation is analysed, and a conclusion where the findings are evaluated.

1. Literature Review

Although there are many studies analyzing the nexus between geopolitical risks and various macroeconomic variables, there are few that examine the relationship between geopolitical risks and inflation from different perspectives. While some of these studies examine the link between geopolitical risks and global inflation, others focus on the impact of geopolitical risks on prices in various countries. In this section, a few of the recent studies are discussed.

Bouri *et al.* (2023) find that lagged changes in the global geopolitical risk (GPR) index are positively correlated with changes in the total spillover index across the inflation rates for the period May 1963 - November 2022 in North American and European countries. Analyzing the effects of global geopolitical risks and global supply chain pressures on global inflation for the monthly period 1999M1-2022M12, Asadollah *et al.* (2024) conclude that disruptions in global supply chains are the main drivers of global inflation in the long run. Bolivar and Huanto (2024) examined the effects of geopolitical risks on key macroeconomic variables for Bolivia, Chile and Peru with the Bayesian Structural Vector Autoregressive (BSVAR) model. In the study, it is stated that geopolitical risks significantly increase inflation and interest rates in Chile and Peru, but Bolivia is more resilient. In a Türkiye-specific study, Soyu Yıldırım and Demirtaş (2025) analyze the impact of geopolitical risks originating from Russia and Israel on inflation. In the study covering the period January 2003 - January 2024, it is stated that the effect of geopolitical risks on inflation is more significant in the long run. Marangoz (2025) analyzes the impact of energy price shocks, monetary policy and geopolitical risks on inflation in Germany, France and Italy. While the study mainly emphasizes the changing effects of energy price shocks and monetary policy implementations on inflation, it is concluded that major geopolitical risks such as the Russian-Ukrainian war increase inflationary pressures. Caldara *et al.* (2026) analyzes the relationship between geopolitical risks and inflation in 44 countries for the period 1974-2022. Using the VAR model, the study emphasizes that global geopolitical risks increase inflation.

The literature also examines the relationship between geopolitical risks and the prices of certain products or product groups such as energy and food prices. For the period January 2002 - December 2020, Su *et al.* (2021) examined the relationship between geopolitical risks and renewable energy using the rolling window method. Yang *et al.* (2023) examined the relationship between geopolitical risks, oil prices and inflation for China, the US and 27 European countries for the period January 2000 - July 2024. In the study, it is stated that geopolitical risks do not lead to a continuous increase in oil prices, but the high inflation that emerged after the Covid-19 period is caused by the imbalance between industrial production and consumer demand that emerged as a result of decreasing oil supply, high oil prices and geopolitical risks. In another study, Ceylan (2024) analyzes the impact of geopolitical risks on global energy and food prices and argues that this effect changes over time and generally has a lower impact than expected. In another study, Sun and Su (2025), working with monthly data for the period April 1998 - July 2022, examined the relationship between geopolitical risks and food prices. The study concludes that there is a time-varying bidirectional causality between the variables.

Some studies focus on the relationship between geopolitical risks and financial markets. Examining the relationship between geopolitical risks and Bitcoin, Aysan *et al.* (2019) conclude that GPR has a predictive power on both the returns and volatility of Bitcoin for the period July 18, 2010 - May 31, 2018. Şahin and Arslan (2021) examine the causality between geopolitical risk and stock and exchange rate returns and volatility for 18 emerging economies. Using monthly data on geopolitical risk index, stock market index and exchange rate, they conclude that geopolitical risks affect stock market and exchange rate returns in about half of the countries, while geopolitical risks affect stock market and exchange rate volatility in all countries. Huang *et al.* (2023) examine the causal relationship between the gold market and geopolitical risks using a nonparametric causality approach. Covering the period January 4, 2000 - November 17, 2017, the study states that geopolitical risks affect volatility rather than returns in the gold market. The study also argues that the effects of geopolitical risks on realized volatility are asymmetric.

An extensive review of the literature reveals that, while numerous studies examine the nexus between geopolitical risks and inflation, the transience or persistence of this relationship has been largely overlooked. In this regard, this study distinguishes itself from existing literature and offers a significant degree of originality.

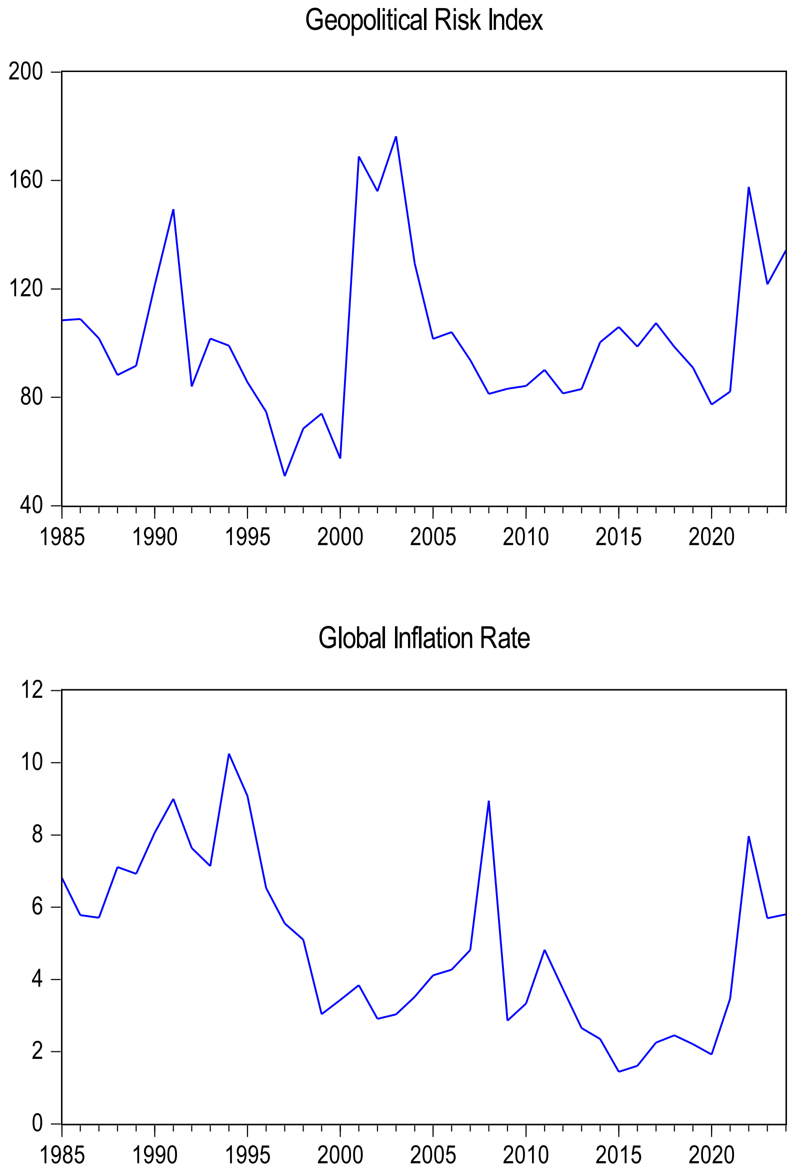
2. Data, Methodology & Findings

In this study, the causality relationship between geopolitical risks and global inflation is analyzed at different frequencies. The Geopolitical Risk Index[1] (GRP) is preferred as the geopolitical risk variable, while Global Inflation[2] data is used for the inflation variable. Annual data for the period 1985-2024 are used in the analyses. Figure 1 shows the geopolitical risk and global inflation series.

[1] The analysis uses the geopolitical risk index (GPR) developed by Dario Caldara and Matteo Iacoviello. GPR data was obtained from the website https://www.policyuncertainty.com/gpr.html

[2] Global inflation data are obtained from https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG. As 2024 global inflation data, the IMF's forecast is included in the data set.

Figure 1. Geopolitical Risk and Global Inflation Time Path Plots



Firstly, the stationarity of both series is investigated. Both geopolitical risk and global inflation are variables with a high probability of breakpoints due to various reasons. This can be easily understood from Figure 1. Therefore, taking breaks into account while investigating the stationarity of these two series may provide more reliable findings. For this purpose, Lee-Strazicich (2003) Unit Root Test, which also takes breaks into account, is preferred to test the stationarity of the series.

Lee and Strazicich (2003) developed the two-break Lagrange Multiplier (LM) unit root test as an alternative to the endogenous two-break unit root tests developed by Lumsdaine and Papell (1997), which are based on the assumption that structural breaks are not included in the null hypothesis. In this context, Model A is used for the test that allows a single structural break at the level, and Model AA is used for the test that allows two breaks at the level. On the other hand, Model C and Model CC represent unit root tests that take into account one and two structural breaks in the level and trend, respectively. The following model is used for the LM unit root test:

$$y_t = \delta Z_t + e_t \qquad e_t = \beta e_{t-1} + \varepsilon_t \tag{1}$$

In the equation, Z_t represents the vector of exogenous variables while ε_t represents the residuals with *iid* $N(0, \sigma^2)$. Model AA for the unit root test with two breaks can be accessed by replacing Z_t with $[1, t, D_t, DT_t]'$ to show the dummy variable, which takes the value 1 in the case of D_{jt}, $t \geq T_{BJ} + 1$ and 0 in other cases for $j=1, 2$. Model CC for the unit root test that allows two breaks in the level and trend is obtained by substituting $[1, t, D_{1t}, D_{2t}, DT_{1t},$

$DT_{2t}]'$ for Z_t to show the dummy variable that takes the value of $t - T_{BJ}$, when DT_{jt}, $t \geq T_{BJ} + 1$ and 0 in other cases for $j=1, 2$. (Yılancı, 2009, 330). The LM test statistic is obtained by the following regression:

$$\Delta yt = \delta '\Delta Z_t + \phi \tilde{S}_{t-1} + u_t \quad (2)$$

If the test statistic obtained is greater in absolute value than the critical value obtained from Lee and Strazicich (2003), the null hypothesis of unit root with structural break is rejected, which means that the series is stationary. Table 1 presents the results of the unit root test.

Table 1. Lee-Strazicich (2003) Unit Root Test with Two Structural Breaks

		tau stat.	%1	%5	%10	Breakpoints
GPR	Model AA	-3.775789	-4.073000	-3.563000	-3.296000	2006, 2020
	Model CC	-6.594015	-7.196000	-6.312000	-5.893000	1999, 2006
GINF	Model AA	-3.315996	-4.073000	-3.563000	-3.296000	1995, 1998
	Model CC	-7.694263	-7.032000	-6.375000	-6.011000	2002, 2016

The null hypothesis for the Lee-Strazicich (2003) Unit Root Test is that the series contains a unit root. H_0 is rejected if │tau statistic│> │critical value│. According to the results obtained from Table 1, under structural breaks, GINF is stationary at 10% significance for AA model and 1% significance level for CC model, while GPR is stationary at 5% significance level for AA and CC models. Accordingly, it is appropriate to use the level values of both series in the causality analysis based on the VAR model.

Following the assessment of the series' stationarity, the frequency domain causality method developed by Breitung & Candelon (2006) was applied to explore the causal relationships among the variables. Unlike traditional causality tests that provide a single test statistic over the time domain, earlier studies by Geweke (1982) and Hosoya (1991) introduced a method for evaluating causality by decomposing spectral density functions within specific frequency bands. Breitung & Candelon's (2006) test builds upon these foundational works. The causality metric introduced by Geweke (1982) and Hosoya (1991) is expressed as follows:

$$M_{X \to Y}(\omega) = log \left[1 + \frac{|\psi_{12}(e^{-i\omega})|^2}{|\psi_{11}(e^{-i\omega})|^2} \right] \quad (3)$$

At frequency ω, the null hypothesis posits that Y does not Granger-cause X, under conditions $\psi_{12}(e^{-i\omega})=0$, $M_{X \to Y}(\omega)=0$. According to the approach proposed by Breitung & Candelon (2006), this hypothesis is examined by applying linear parameter restrictions specific to each frequency within the VAR model. The relevance of these restrictions is then assessed using an F-test under the framework of linear restrictions:

$$\sum_{k=1}^{p} \theta_{12,k} \cos(k\omega) = 0, \qquad \sum_{k=1}^{p} \theta_{12,k} \sin(k\omega) = 0 \quad (4)$$

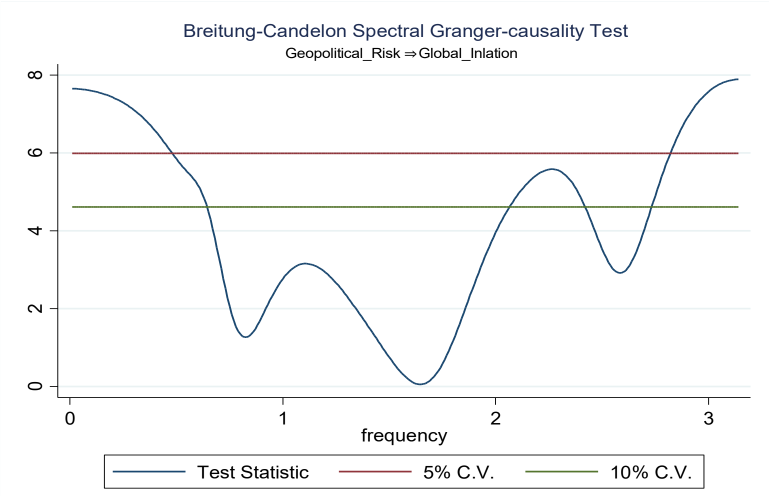
Using these restrictions, the conventional F-test can be employed to evaluate the null hypothesis that there is no Granger causality at the specified frequency ω.

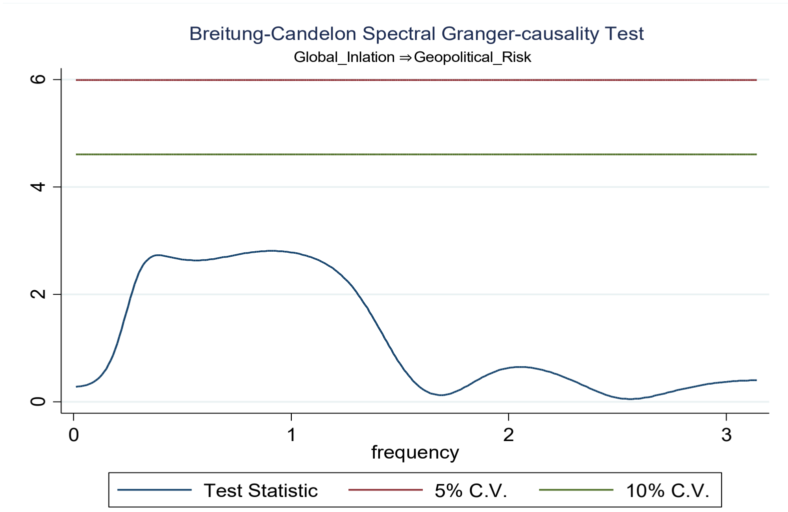
$$H_0 = R(\omega)\beta = 0 \;\; \to \;\; \beta = [\beta_1, \ldots, \beta_p]', \quad R(\omega) = \begin{bmatrix} \cos(\omega) & \cos(2\omega) & \ldots & \cos(p\omega) \\ \sin(\omega) & \sin(2\omega) & \ldots & \sin(p\omega) \end{bmatrix} \quad (5)$$

The F-statistic follows an F-distribution with degrees of freedom F(2, T - 2p) for $\omega \in (0, \pi)$. (2 = number of restrictions, T = number of observations, p = order of the VAR model). Figure 2 shows the results of Breitung & Candelon (2006).

In the Breitung & Candelon (2006) test, frequencies (ω) range between 0 – 3.14. Low frequencies represent long-run causality, while the period shortens as ω increases. The red lines shown in Figure 1 indicate the 5% significance level. The test statistic above this line indicates that there is a causality relationship between the variables at the specific frequency. When the results obtained from the Breitung & Candelon (2006) test are evaluated in this way, it implies that there is no causality relationship at any frequency from global inflation to geopolitical risk. However, it indicates that there is a causal relationship at low and high frequencies from geopolitical risk to global inflation. In other words, there is a unidirectional causality from geopolitical risk to global inflation in the short and long run.

Figure 2. Breitung & Candelon (2006) Spectral Granger-Causality Test





Ciner (2011) states that causality at a low frequency level such as 0.1 indicates permanent shocks. Thus, the causality from GPR to GINF at low frequencies implies that the effect of geopolitical risk on global inflation is permanent.

3. Discussion and Conclusion

Although events such as economic crises, terrorist incidents, migration movements and natural disasters are seen as regional or local problems, their effects can be carried to global dimensions. All these factors often appear as factors that increase geopolitical risks. Increased geopolitical risks may affect the economies of countries and may also lead to global macroeconomic problems.

When the events of the last few decades are evaluated, it is emphasised in most scientific studies that regional and global events such as the Gulf War, the 11 September attacks, the US invasion of Iraq, the Russia-Ukraine conflict have increased geopolitical risks. But do these increased geopolitical risks affect global indicators? If so, is this effect temporary or permanent? This study seeks answers to these questions in the context of global inflation. The study basically investigates whether there is a temporary or permanent causality relationship from geopolitical risks to global inflation. As a result of the analyses conducted within the framework of the frequency domain causality approach, it is concluded that there is a causality relationship from the geopolitical risk index to global inflation at low frequencies, in other words, in the long run. This result implies that the effects of geopolitical risks on global inflation are permanent.

Inflation is a macroeconomic problem that both adversely affects other economic indicators and has high social costs. In addition to its visible effects such as decreasing purchasing power, distorting income distribution and increasing the cost of living, it is also very difficult to measure the invisible costs of inflation with the uncertainty environment. Therefore, it is one of the macroeconomic problems that require urgent measures. The main findings of this study imply that the fight against global inflation also depends on the reduction of geopolitical risks. Accordingly, it is vital for countries to act in a coordinated manner and to avoid actions that increase geopolitical risks in order to overcome any kind of risk that destabilises the overall stability. The fact that the adverse effects of economic and political shocks on macroeconomic indicators are more pronounced, especially in relatively more fragile economies, also points to the need for these countries to take more stringent measures against actions that increase regional or global risks.

Declarations

Declaration of Competing Interest: The author declares no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Declaration of Use of Generative AI and AI-assisted Technologies: During the preparation of this manuscript, the author used Gemini for the purposes of academic translation and language editing. The author has reviewed and edited the output and takes full responsibility for the content of this publication.

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