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Monetary policy spillovers in a fragmented world: the role of geopolitical risk pre- and post-COVID-19 pandemic

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Abstract

Purpose – This paper investigates the influence of geopolitical risks on the dynamic spillover of monetary policies among the United States, Canada, Australia, New Zealand, Japan and Switzerland from 1995 to 2023.

Design/methodology/approach – The time-varying parameter vector autoregressive (TVP-VAR) method is used to investigate the dynamic interconnectedness of monetary policy across the six countries. In addition, ordinary least squares (OLS) regression is applied to assess the influence of geopolitical risk on the transmission of international monetary policies, particularly before and after the COVID-19 pandemic.

Findings – Our study shows a moderate interdependence between the monetary policies of the examined countries. In the network, the monetary policies of the United States, Japan and Australia are transmitters, while Canada, New Zealand and Switzerland are receivers. In addition, geopolitical risks positively impact monetary policy. However, these impacts have turned negative in the post-COVID-19 period.

Research limitations/implications – These results suggest that policymakers should account for the spillover of monetary policies from other economies during the policy implementation process.

Practical implications – These findings may guide monetary policymakers in considering rising geopolitical risks.

Originality/value – This study enhances the theoretical understanding of monetary policy spillovers by illustrating the transmitting roles of major economies within a global network. Moreover, while existing research often examines monetary policy as an isolated phenomenon, this study demonstrates how such risks influence cross-country monetary policy spillovers differently between the pre- and post-COVID-19 periods. Thus, this study improves our understanding of monetary policy adaptability in a globalized world.

Keywords COVID-19 pandemic, Geopolitical risk, Monetary policies, Spillover

Paper type Research paper

1. Introduction

In recent years, profound political changes and rising geopolitical risks have increasingly impacted global economic and financial markets, driving unpredictable shifts in monetary policy. Geopolitical risk is a critical factor influencing economic growth and financial market stability in numerous countries worldwide (Bouri *et al*., 2023). Heightened geopolitical concerns can lead to market instability, undermining investor confidence (He, 2023) and financial market stability (Elsayed and Helmi, 2021), especially with rapid advancements in economic cooperation and global integration. These impacts prompt countries to use monetary policy as a key tool to mitigate geopolitical risks, thereby maintaining macroeconomic stability, controlling inflation, fostering growth and ensuring economic equilibrium.

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Although understanding the international spillover of monetary policies is crucial for central banks in formulating effective monetary strategies and managing potential risks (Adámek and Jursa, 2023), extant research has revealed three research gaps.

Firstly, much of the existing research has primarily focused on the spillover of US monetary policy, particularly on emerging economies (Dedola *et al*., 2017; Hou *et al*., 2025; Lastauskas and Nguyen, 2024), assuming a largely unidirectional influence from a dominant economy to smaller ones. While Georgiadis (2016) demonstrated that monetary policy in economies characterized by high financial integration, low trade integration, rigid labor countries and less development tends to be influenced by external shocks that study largely concentrated on the US as the primary transmitter. However, the international monetary system is evolving toward a more multipolar configuration (Srouji, 2024), meaning that multiple countries, not just the US, can now transmit shocks to others and become sources of systemic risks. To date, limited attention has been given to the broader landscape of monetary policy spillovers. Consequently, there is a lack of evidence on the structure and directionality of monetary policy spillovers in a multi-country context. To address this gap, this study investigates the network of monetary policy spillover among several major economies, identifying significant transmitters and receivers within the global monetary system.

Second, while the literature has extensively examined the impact of geopolitical risks on stock markets (Demiralay and Kilincarslan, 2019; Segnon *et al*., 2023) and on domestic monetary policy reactions (Ginn and Saadaoui, 2024; Güntner and Henßler, 2021), limited research has explored how geopolitical tensions reshape the transmission of monetary policies across borders. Geopolitical risks can disrupt trade, capital flows and inflation dynamics (Bouri *et al*., 2023; Kalemli-Özcan, 2019), which are all key channels for monetary transmission. This study investigates how rising geopolitical uncertainty may alter the intensity or pattern of international monetary policy spillovers, which is a topic that remains underexplored despite its theoretical relevance in today's volatile global environment.

Finally, global crises, such as the COVID-19 pandemic, have profoundly reshaped the way monetary policies operate and spillover across borders. Similar to geopolitical shocks, pandemics represent large-scale disruptions that induce financial stress, alter economic interdependencies and trigger emergency policy responses. According to the financial accelerator model proposed by Bernanke *et al*. (1999), heightened financial stress can influence monetary policy spillover. During the pandemic, central banks shifted away from conventional interest rate adjustments and adopted a broader range of tools, including large-scale asset purchases, direct lending programs and fiscal-monetary coordination (Grasselli, 2022; Yilmazkuday, 2022). These extraordinary interventions mirrored policy responses often seen during geopolitical crises, where uncertainty and financial distress necessitate unconventional monetary actions. Given the heightened financial instability observed during both global health crises and geopolitical conflicts, a comparative examination of their respective impacts on monetary policy spillover is warranted. Understanding how monetary policies behave under different crisis conditions will provide insights into whether the lessons from COVID-19 can be applied to future geopolitical disruptions.

To address the gaps in understanding monetary policy spillovers across countries and the influence of geopolitical tensions on international monetary policy dynamics, this study examines the impact of geopolitical risks on the dynamic spillovers of monetary policy among the United States, Canada, Australia, New Zealand, Japan and Switzerland over the period 1995–2023. A time-varying parameter vector autoregressive (TVP-VAR) model was employed to analyze the evolving nature of these spillovers.

This study makes key theoretical contributions to monetary policy analysis amid geopolitical risk. First, it is the first to explore the interconnectedness of global monetary policies, highlighting the transmitting roles of major economies, such as Australia and Japan,

alongside the well-documented influence of the US. Second, it provides an understanding of the role of geopolitical tensions in shaping international monetary interactions. Third, by segmenting data into pre- and post-COVID-19 periods, it reveals a decline in monetary policy spillover in response to geopolitical risks after COVID-19. By focusing on both the structure and evolution of spillovers, this study offers a theoretically grounded account of how contemporary geopolitical risks reconfigure traditional patterns of monetary policy transmission.

The findings of this article also provide several practical implications for policymakers. Firstly, the analysis offers valuable insights into the ways in which geopolitical tensions can influence the international transmission of monetary policy. Such insights enable central banks and financial authorities to better anticipate and mitigate potential cross-border spillover effects, thereby enhancing policy coordination and reinforcing the effectiveness of monetary frameworks in sustaining global economic stability. Second, the segmentation of data into pre- and post-COVID-19 periods allows policymakers to appreciate how geopolitical risks affect monetary policy differently across distinct global contexts. They can develop more adaptable and context-specific strategies for responding to geopolitical risks, ensuring that their monetary policies remain resilient and effective under varying global pressures.

2. Theoretical framework and hypothesis development

2.1 Geopolitical risk

According to Caldara and Iacoviell (2022), geopolitical risks encompass the threats, occurrences and escalations of adverse events related to war, terrorism, interstate tensions and political factors influencing international relations' stability. Geopolitical risks can significantly influence the stock markets (Lee, 2023; Segnon *et al*., 2023; Zhang *et al*., 2022), technology and foreign direct investment (FDI) inflows (Nguyen *et al*., 2022), oil markets (Smales, 2021), economic policy uncertainty (Shen and Hong, 2023), inflation (Bouri *et al*., 2023) and many other aspects of the economy. Additionally, such events often trigger adjustments and changes in government policies to mitigate political risks and attract foreign investment (Kher and Chun, 2020). This body of evidence underscores the necessity for designing robust economic and monetary policies to mitigate the adverse effects of geopolitical shocks on the economy and society (Botzen *et al*., 2019).

2.2 Spillover of monetary policy

Monetary policy refers to the actions undertaken by a country's monetary authority to influence financial conditions in order to achieve broader economic objectives, such as economic stability, high employment and price stability. According to Kearns *et al*. (2023), monetary policy adjustments by a significant central bank tend to be disseminated to other countries.

International spillover of monetary policy occurs when a country's monetary policy shocks influence other economies. This interconnectedness depends on financial market development, trade and financial integration, exchange rate regimes and global value chains (Georgiadis, 2016). According to Georgiadis (2016), countries with rigid labor markets and weak financial systems can amplify policy effects, while those highly integrated into global trade and finance are more exposed. Additionally, less flexible exchange rate regimes heighten vulnerability, as currency appreciation may disrupt trade. Finally, economies deeply embedded in global value chains, especially those reliant on manufactured exports, are particularly susceptible to international monetary policy fluctuations.

Cui *et al*. (2024) also show two channels to explain the mechanisms of monetary policy spillover. The first channel is price transmission, which includes effects through exchange

rates, asset prices and government bond yields. In this channel, a decrease in the interest rates of an advanced economy can lead to higher exchange rates in trading partner countries. This adjustment affects the trade balance, influencing domestic imports and exports, and ultimately impacting macroeconomic indicators in both domestic and foreign countries. Additionally, changes in government bond yields in one country may alter bond prices and future rate expectations in others. The second channel is quantity transmission with changes in capital flows and credit availability. Lower interest rates in one country can encourage capital inflows into other countries with higher rates, which subsequently impact credit conditions in these recipient economies. This mechanism can alter economic activity by easing or constraining access to credit and by influencing asset prices due to shifts in foreign currency-denominated assets and liabilities.

2.3 The impact of geopolitical risks on monetary policy

In the context of globalization, evidence of the relationship between geopolitical risks, inflation and capital flow spillover can be found in the literature (Bouri *et al*., 2023; Kalemli-Özcan, 2019). Geopolitical risks can create financial instability by increasing inflation and triggering capital flows across borders. Besides, the international spillover of monetary policy refers to the extent to which monetary policy changes in one country influence economic and financial conditions in other countries. This transmission typically occurs through interest rate channels, capital flows, exchange rate adjustments and trade linkages. Therefore, since a primary objective of monetary policy is to stabilize financial conditions, geopolitical risks may serve as an external force that amplifies the transmission of monetary policy across economies.

Regarding the uncertainty literature, the financial accelerator model proposed by Bernanke *et al*. (1999) suggests that the effects of monetary policy can be magnified when financial conditions are weak, as borrowing constraints tighten and investment declines more than proportionally. Thus, as geopolitical risks heighten uncertainty and financial constraints, they may interact with the financial accelerator mechanism, making monetary policy spillover more pronounced across economies. In the same vein, Bouri *et al*. (2023) examined spillover across inflation rates in different economies, finding that the overall spillover index rose significantly during the Russo–Ukrainian conflict. Similarly, Kalemli-Özcan (2019) argues that when global risk perceptions increase, capital outflows from emerging countries lead to higher borrowing costs and greater challenges in maintaining economic stability. Therefore, an increase in global geopolitical risk tends to simultaneously raise inflation and capital outflows across countries. If countries also implement monetary policies simultaneously to mitigate these negative effects, there will be a spillover in monetary policies. In other words, rising geopolitical risks contribute to an increase in the spillover of monetary policies.

In the context of geopolitical risks, spillover of monetary policies is likely to be asymmetric. The spillover comes from major economies to small open economies due to the dominant role of these central banks in global financial markets (Hou *et al*., 2025; Lastauskas and Nguyen, 2024). When major central banks respond to geopolitical uncertainty with expansionary or contractionary measures, financial conditions in emerging economies adjust accordingly, affecting exchange rates, capital flows and borrowing costs. As geopolitical risks intensify, more countries may simultaneously adopt policy measures to counteract financial instability, increasing the likelihood of synchronized monetary policy actions across economies. This suggests that rising geopolitical risks contribute to greater monetary policy spillover worldwide.

H1. An increase in geopolitical risks leads to a greater spillover of monetary policy, particularly from larger economies to smaller economies.

2.4 The COVID-19 pandemic and monetary policy spillover

While geopolitical risks generally amplify international monetary policy spillover, their impact may have changed in the post-COVID-19 period due to structural shifts in global crises. The COVID-19 pandemic led to significant disruptions in global financial integration, as prolonged economic shutdowns, supply chain disruptions and heightened uncertainty forced governments to prioritize domestic economic stability over cross-border financial interdependence (Bertasiute *et al*., 2020). This shift toward deglobalization altered the way monetary policy decisions are transmitted internationally, as governments adjusted their strategies to balance economic recovery with financial stability (Sarker, 2020).

Before the pandemic, geopolitical risks primarily influenced monetary spillover through traditional financial channels, including price transmission and capital flow dynamics. However, in the post-pandemic environment, this spillover effects may have weakened due to several key factors. First, monetary policy strategies have shifted, particularly in advanced economies where near-zero interest rates constrained the effectiveness of conventional monetary tools. In response, central banks adopted unconventional measures such as large-scale asset purchases and direct credit interventions (Grasselli, 2022; Yilmazkuday, 2022). These non-traditional approaches altered monetary transmission mechanisms, thereby reducing the extent to which domestic policy changes affect other economies.

Second, the effectiveness of traditional spillover channels has diminished. The price transmission channel, as described by Cui *et al*. (2024), which typically facilitates monetary spillover through inflation expectations and interest rate movements, has been weakened due to shifts in global trade structures and ongoing supply-side disruptions. Similarly, the quantity transmission channel, which operates through capital flows and liquidity shifts, has been impaired by economic shutdown policies and continued geopolitical tensions, reducing the responsiveness of economies to external monetary shocks.

Third, there has been a growing divergence in national monetary policies. Governments in economies have responded to post-pandemic uncertainties by implementing structural reforms aimed at strengthening domestic economic resilience (Bouri *et al*., 2023). This shift toward domestic stabilization has reduced the degree of connectedness in monetary policy responses across countries. Additionally, empirical evidence suggests that the effects of geopolitical risk on economies have become increasingly asymmetric. For example, Bossman *et al*. (2023) highlight how geopolitical risks have had differential impacts on major currencies following the COVID-19 pandemic, particularly due to geopolitical events such as the Russia–Ukraine conflict, further complicating the transmission of monetary policies across borders.

Given these structural changes, we hypothesize that:

H2. The positive impact of geopolitical risks on international monetary policy spillovers weakens in the post-COVID-19 period.

3. Research methodology

The research is structured in two phases: In phase 1, we analyze the interconnectedness of the monetary policies of six countries: the United States, Japan, Switzerland, Canada, Australia and New Zealand. Phase 2 focuses on determining whether global political risks affect the interconnectedness among the monetary policies of these countries, which is taken from the first phase.

3.1 Data collection

This study uses daily data from the geopolitical risk (GPR) Index website [1]. The GPR Index offers a comprehensive assessment of adverse geopolitical occurrences and associated risks by analyzing newspaper articles spanning geopolitical tensions since 1900. This index encompasses a spectrum of risks stemming from geopolitical events, including but not

limited to armed conflicts, electoral processes, governmental transitions, political instabilities, civil unrest, warfare and terrorist activities.

To gauge the monetary policy stances of select nations, following Krippner (2020), we employ the shadow short rate as a proxy to measure monetary policy. The shadow short rate reflects an interest rate approximation that aligns closely with the primary interest rates of advanced economies, particularly in contexts where nominal futures do not encounter a zero lower bound. This metric is derived from consolidated information embedded within the term structure of interest rates. Daily data from Krippner's website are collected from six countries, including the United States, Japan, Switzerland, Canada, Australia and New Zealand, from 1995 to 2023, providing a substantial amount of data to accurately estimate the time-varying parameters. The choice of six countries primarily relies on data availability.

Furthermore, following Baker *et al.* (n.d.) and Wang *et al.* (2022), this study incorporates the Infectious Disease Equity Market Volatility Index [2] as the control variable to assess stock market volatility associated with infectious diseases. This index furnishes both contemporaneous and prospective insights into market uncertainty, encompassing fluctuations in stock market performance, economic unpredictability derived from news sources and subjective assessments of uncertainty within business expectation surveys.

3.2 The TVP-VAR-based dynamic connectedness approach

To examine dynamic connectedness in a time-varying framework, this research employs the TVP-VAR approach developed by Antonakakis and Gabauer (2017). The TVP-VAR methodology integrates the connectedness framework established by Diebold and Yilmaz (2009, 2012, 2014) and Koop and Korobilis (2014). This model is well-suited for analyzing geopolitical risk's impact on monetary policy spillover, as it captures evolving cross-country effects over time. Additionally, its impulse response functions quantify directional influences, making it an effective tool for examining monetary policy interconnectedness in globally integrated economy.

This framework allows the variances to vary over time via a Kalman filter estimation with forgetting factors. The TVP-VAR(p) model can be expressed as

$$y_t = \beta_t z_{t-1} + \epsilon_t \quad \epsilon_t | F_{t-1} \sim N(0, S_t) \tag{1}$$

$$vec(\beta_t) = vec(\beta_{t-1}) + v_t \quad v_t | F_{t-1} \sim N(0, R_t) \tag{2}$$

where y_t and $z_t - 1 = [y_t - 1, \ldots, y_t - p]'$, respectively, represent $N \times 1$ and $Np \times 1$ dimensional vectors. β_t is an $N \times Np$ dimensional time-varying coefficient matrix and εt is an $N \times 1$ dimensional vector of error disturbance with an $N \times N$ time-varying variance-covariance matrix. S_t $vec(\beta_t)$, $vec(_{\beta t-1})$ and v_t are $N^2p \times 1$-dimensional vectors and R_t is an $N^2p \times N^2p$ dimensional matrix.

To calculate the generalized impulse response functions (GIRF) and generalized error variance decomposition (GFEVD) (Koop *et al.*, 1996; Pesaran and Shin, 1998), we need to transform the TVP-VAR to a TVP-VMA using the Wold representation theorem:

$$y_t = \sum_{j=0}^{\infty} L' W_t^j L \varepsilon_{t-j} \tag{3}$$

$$y_t = \sum_{j=0}^{\infty} A_{it} \varepsilon_{t-j} \tag{4}$$

where $L = [I_N, \ldots, 0_p]'$ is an $Np \times N$ dimensional matrix and $W = [\beta t; I_{N(p-1)}, 0_{N(p-1)\times N}]$ is an $Np \times Np$ dimensional matrix. The GIRFs represent the responses of all variables following

a shock in variable *i*. We compute the differences between a J-step-ahead forecast where once variable *i* is shocked and once where variable i is not shocked. The difference can be accounted for by the shock in variable *i*, which is given by

$$GIRF_t\left(J,\delta_{j,t},F_{t-1}\right)=E\left(Y_{t+J}\middle|\epsilon_{j,t}=\delta_{j,t},F_{t-1}\right)-E(Y_{t+J}|F_{t-1}) \tag{5}$$

$$\varphi^g_{j,t}(J)=\frac{A_{J,t}S_t\epsilon_{j,t}}{\sqrt{S_{ij,t}}}\frac{\delta_{j,t}}{\sqrt{S_{ij,t}}},\delta_{j,t}=\sqrt{S_{ij,t}} \tag{6}$$

$$\varphi^g_{j,t}(J)=S^{-1}_{jj,t}{}^{/2}A_{J,t}S_t\epsilon_{j,t} \tag{7}$$

where $\varphi^g{}_{j,t}(J)$ is the GIRFs of variable *j*, *J* represents the forecast horizon, $\delta j,t$ is the selection vector with a value of one on the *j*-th position and zero otherwise and F_{t-1} is the information set until $t-1$. Then, we compute the GFEVD that can be interpreted as the variance share one variable has on others. The calculation is as follows:

$$\widetilde{\varphi}^g_{ij,t}(J)=\frac{\Sigma^{J-1}_{t=1}\varphi^{2g}_{ij,t}}{\Sigma^N_{j=1}\Sigma^{J-1}_{t=1}\varphi^{2g}_{ij,t}} \tag{8}$$

with $\Sigma^N_{j=1}\widetilde{\varphi}^g_{ij,t}(J)=1$ and $\Sigma^N_{j=1}\widetilde{\varphi}^N_{ij,t}(J)=N$. Based on the GFEVD, we can build the total connectedness index (TCI) as follows:

$$C^g_t(J)=\frac{\Sigma^N_{i,j=1,i\neq j}\widetilde{\varphi}^g_{ij,t}(J)}{\Sigma^N_{i,j=1}\widetilde{\varphi}^g_{ij,t}(J)}\times 100=\frac{\Sigma^N_{i,j=1,i\neq j}\widetilde{\varphi}^g_{ij,t}(J)}{N}\times 100 \tag{9}$$

The connected approach allows us to examine how a shock in one variable spills over to other variables. First, the shock transmitted from variable *i* to all other variables *j, i.e.* the *total directional connectedness TO others*, can be defined as

$$C^g_{\mathrm{i}\rightarrow\mathrm{j},t}(J)=\frac{\Sigma^N_{i,j=1,i\neq j}\widetilde{\varphi}^g_{ij,t}(J)}{\Sigma^N_{j=1}\widetilde{\varphi}^g_{ij,t}(J)}\times 100 \tag{10}$$

Second, the shock that variable *i* receives from all other variables *j*, i.e. the *total directional connectedness FROM others*, can be defined as

$$C^g_{\mathrm{i}\leftarrow\mathrm{j},t}(J)=\frac{\Sigma^N_{i,j=1,i\neq j}\widetilde{\varphi}^g_{ij,t}(J)}{\Sigma^N_{j=1}\widetilde{\varphi}^g_{ij,t}(J)}\times 100 \tag{11}$$

Finally, the *net total directional connectedness* can be given by subtracting the total directional connectedness TO others from the total directional connectedness FROM others:

$$C^g_{i,t}(J)=C^g_{\mathrm{i}\rightarrow\mathrm{j},t}(J)-C^g_{\mathrm{i}\leftarrow\mathrm{j},t}(J) \tag{12}$$

This net total directional connectedness can be interpreted as the influence of variable *i* on the analyzed network. If the net total directional connectedness of variable *i* is positive, variable *i* influences the network more than it is being influenced by it. This also means that variable *i* is a shock transmitter. On the other hand, if the net total directional connectedness is negative, variable *i* is driven by the network, meaning that it is a shock receiver.

As the net total directional connectedness is an aggregated measure and sometimes masks important underlying dynamics, we want to calculate the net pairwise directional connectedness (NPDC), which informs about the bilateral transmission process between variables i and j:

$$NPDC_{ij}(J) = \widetilde{\varphi}_{ji,t}(J) - \widetilde{\varphi}_{ij,t}(J) \tag{13}$$

A positive (negative) value of NPDCij(J) indicates that variable i is driving (driven by) variable j.

3.3 OLS regression approach

This study begins by examining the inter-country spillover dynamics inherent in monetary phenomena. Subsequently, it employs ordinary least squares (OLS) regression models as the methodological framework to achieve the research objectives.

$$TCI_t = \alpha + \beta_1 \times GPR_t + \beta_2 \times IDEMV_t + \varepsilon_t \tag{14}$$

where TCI_t is the spillover of monetary policy, which is dependent at time t, α is the constant term. β_1, β_2 are the coefficients for GRP and IDEMV, respectively. GPR_t is the geopolitical risk, $IDEMV_t$ is Infectious Disease Equity Market Volatility and ε_t is the error term.

4. Results and discussion

4.1 The spillover of monetary policy

4.1.1 Descriptive statistics. Figure 1 illustrates the shadow short rate series evolution spanning 1995–2023 across six countries. Across all observed countries, a prevailing trend emerges where interest rates decline from 1995 until approximately 2020, followed by a notable surge. Peaks in the historical interest rate data are discernible, notably occurring in 2000, 2007–2008 and 2023. Remarkably, commonalities emerge between these periods of adverse shocks and pronounced economic downturns across all nations in 2020. Additionally, an inclination toward tightening monetary policy is anticipated across all governments from 2020 onward. Furthermore, a comparative analysis reveals nuanced disparities in policy approaches between paired nations, such as the US and Canada, Japan and Switzerland and Australia and New Zealand, notwithstanding shared episodes of high- and low-interest rate trends, albeit at differing magnitudes.

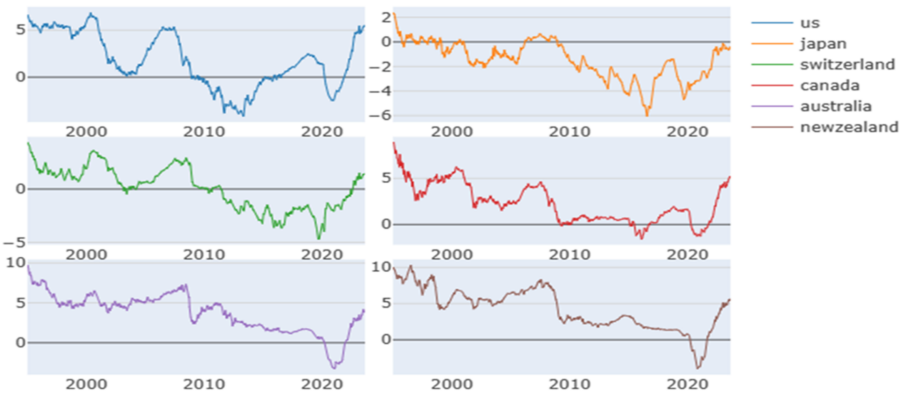

Figure 1. Time series plot of shadow short rates from 1995 to 2023. ***Source:*** *Authors' own work*

Supplementary Table I present the descriptive statistics of the transformed series. The negative mean values observed in the shadow short rate variables for the United States, Japan and Canada denote a pronounced deficit within the monetary policy framework of these countries over the period from 1995 to 2023. Variance reveals that Japan exhibits the highest degree of volatility among the variables considered, while New Zealand displays the lowest. Furthermore, skewness measures indicate a significant leftward skew for all series except New Zealand, with kurtosis measures indicating a significant left-skewed leptokurtic distribution across all variables. None of the variables exhibit typical distribution characteristics. Moreover, all variables demonstrate stationarity at a significance level of 1%. Finally, evidence suggests the presence of autocorrelation and ARCH errors within the series, justifying adopting a time-varying parameter vector autoregression model with evolving covariances.

4.1.2 The spillover of monetary policies. Table 2 presents the average dynamic connectedness results. Rows indicate each variable's contribution to the forecast error variance of others, while columns reflect the variance each variable receives from the rest. Diagonal elements capture their own effects, and off-diagonal elements represent cross-variable influences. As shown in Table 2, the total connectedness measures approximately 30.46%, indicating a moderate level of interdependence among the variables within the network. On average, the United States, Australia and Japan emerge as net transmitters of shocks, while Canada, New Zealand and Switzerland are identified as net recipients. These findings align with the results reported by Hou *et al*. (2025) and Lastauskas and Nguyen (2024), lending support to the first hypothesis that monetary policy shocks are typically transmitted from larger to smaller economies. The United States, Australia and Japan are likely to have substantial economic influence due to their large economic size, extensive trade relationships, significant capital flows and deep financial integration with other countries. Although Canada is also considered a large economy, its geographic proximity and close economic ties to the United States may contribute to its role as a net recipient of shocks. Moreover, Table 2 reveals that Canada's average net spillover is slightly negative but approximately zero, suggesting a relatively balanced position in the transmission-reception dynamic. Overall, these results indicate that monetary policy decisions or economic shocks originating from major economies are diffused throughout the global network.

On the other hand, Canada, New Zealand and Switzerland are identified as net recipients of shocks, meaning that their monetary policy decisions and economic conditions are more

Table 2. Averaged dynamic connectedness table

	The US	Japan	Switzerland	Canada	Australia	New Zealand	Contribution from others
The US	68.61	7.21	4.76	9.44	5.95	4.03	31.39
Japan	3.92	82.75	4.43	3.46	2.66	2.77	17.25
Switzerland	5.29	4.80	71.69	6.52	6.15	5.56	28.31
Canada	15.11	3.45	4.80	66.39	6.34	3.91	33.61
Australia	7.53	2.49	5.68	8.07	64.80	11.42	35.20
New Zealand	5.72	3.80	5.90	6.05	15.52	63.00	37.00
Contribution to others	37.57	21.75	25.57	33.56	36.62	27.68	182.75
Inc. own	106.18	104.50	97.27	99.95	101.42	90.68	cTCI/TCI
NET directional connectedness	6.18	4.50	−2.73	−0.05	1.42	−9.32	36.55/30.46

Note(s): Values reported are variance decompositions for estimated TVP-VAR(2) model. A lag length of order 2 was selected by the Bayesian information criterion. Variance decompositions are based on 10-step-ahead forecast

Source(s): Authors' own work

influenced by external factors than they can influence others. These countries, while economically significant, may be smaller or more open economies that rely heavily on the global economic environment. Consequently, their own economic variables, including monetary policy, are more likely to be affected by the policy actions of larger economies like the US, Japan and Australia, rather than driving changes in others.

This distinction between transmitters and recipients highlights the interconnectedness of global monetary policy and suggests that the economic stability and policy effectiveness in smaller economies (net recipients) can be significantly impacted by policy shifts in larger economies (net transmitters). Therefore, these countries may need to adjust their monetary policies in response to external shocks to maintain stability, especially when traditional policy measures may not be sufficient to counteract the spillover effects from more dominant economies.

These roles underscore whether these countries' policies reinforce or diverge from their intended monetary objectives, especially given the pressures of external shocks. This analysis suggests that "receivers" need to reconsider aspects of their monetary stance in response to increased spillover, mainly when traditional policy measures are insufficient.

Table 2 highlights the average interdependence of monetary policies across countries. However, using averages may obscure key economic and geopolitical events, leading to deviations from the reported TCI values. To address this, we adopt a dynamic approach to identify specific episodes that shape monetary policy connectivity over time.

Figure 2 illustrates changes in monetary policy connectivity over time, with fluctuations occurring every five years. The total connection ranges from 5 to 80%, indicating that monetary policy interdependence varies over time. Notably, connectivity spikes during economic instability, geopolitical crises and epidemics highlight the influence of specific events on monetary policy shocks.

The first peak (1990–1991) coincided with the Gulf War, as emerging economies eased monetary policies to attract capital. By 1998, countries like Japan and Australia experienced the effects of withdrawing from capital competition, leading to policy adjustments. Before 2000, monetary policy connectivity declined. The second peak (2001) aligned with major global events, including the September 11 attacks, the Iraq War and hurricanes Rita and Katrina. Spillover analysis also captures heightened geopolitical risks linked to the 2007–2008 financial crisis. Between 2000 and 2010, monetary policy alignment decreased slightly despite ongoing global uncertainties. From 2010 to 2014, connectivity declined due to economic difficulties. The fourth peak (2014–2015) saw a resurgence in policy linkages, driven by low demand, eurozone debt issues and geopolitical instability. In response, countries like the US, Canada and Japan have loosened their monetary policies to address economic and public sector concerns.

Post-2020, during the COVID-19 pandemic, most economies adjusted their monetary policies by lowering interest rates. Countries such as Japan, Australia, Brazil, Canada and the

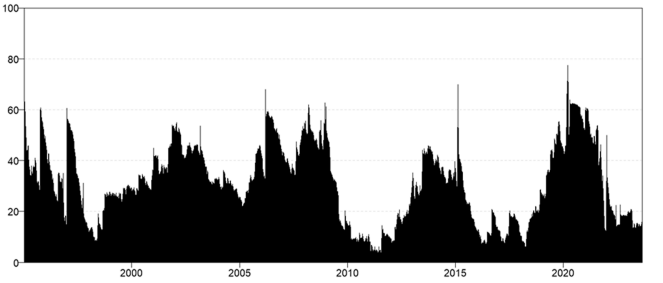

Figure 2. Dynamic total connectedness. ***Source:*** *Authors' own work*

US implemented liquidity-easing measures to restore economic stability and reduce corporate bankruptcy risks (Benmelech and Tzur-Ilan, 2020; Bhar *et al.*, 2021). Following 2022, significant political events such as the US–China trade war and the Russia–Ukraine conflict strongly impacted the global economy and financial markets. However, during this period, the total policy connectivity index declined, potentially due to varying economic dependencies on political events.

Next, we visualized our analysis using the network graphs presented in the previous sections. Supplementary Figure 3 displays network connectedness graphs across countries. Blue (yellow) nodes represent net shock transmitters (receivers), with node size reflecting weighted average net total directional connectedness. Edge thickness indicates connection strength, while arrows show direction. Vertices are weighted using averaged net pairwise directional connectedness measures. In contrast to previous analyses that focused on the relationship in the entire system, network analyses focus on the directional relationships between each pair of countries' monetary policies. It can be seen that the monetary policies of the United States and Canada will have a close relationship. It has happened similarly to the situation in Australia and New Zealand. Geographically, two countries in each pair mentioned above are on the same continent. Moreover, it is worth noting that neighboring countries often have strong economic ties and similar economic conditions, which could lead to similarities in their monetary policies (Brunnermeier, 2023). Besides, interestingly, Japan's policy affects the United States, while Canada's policy affects Switzerland.

The bilateral relationship between the United States and Canada is underpinned by geographical proximity, fostering a nexus beyond mere adjacency. Economically intertwined, these nations exhibit a robust interconnection, with Canada displaying a heightened reliance on its transborder ties with the United States. Notably, Canada's geographic proximity to the United States engenders a scenario wherein fluctuations in the New York money market precipitate corresponding adjustments in Canadian interest rates, thereby circumscribing the Bank of Canada's latitude in effectuating autonomous interest rate management. The financial market dynamics reflect a confluence of structural interdependencies and the responsive maneuvers of monetary authorities in reaction to the reverberations originating from the integrated economies of the United States and Canada. The distinctive symbiosis between Japan and the United States is of particular salience, distinguished as two formidable economic juggernauts. This economic preeminence positions both nations as influential arbiters within the global economic landscape, thereby exerting palpable influence on the policy deliberations of economic stakeholders.

Crucially, the bond between Japan and the United States is further fortified by robust capital flows, with Japan emerging as a significant wellspring of foreign private portfolios and direct investments in the United States, reciprocated by substantial American investments in Japan. Consequently, adjustments in Japanese policy, notably through mechanisms such as interest rate modulation, carry ramifications for various facets of the American economy, encompassing public debt and cross-border investment capital flows, particularly in instances where fluctuations in the value of the Yen come to bear. Moreover, Japan's susceptibility to recurrent natural calamities engender volatility in policy planning. It necessitates adroit policy support frameworks, fostering a climate in which the United States may face the ripple effects of sudden shifts in Japanese policy stances. Additionally, Switzerland and Canada enjoy a robust bilateral rapport, characterized by close collaboration within multilateral fora and a thriving trade partnership. Anchored by interwoven tax and investment frameworks, Canada wields significant influence over Switzerland, thereby precipitating a scenario wherein the latter is compelled to align with alterations in Canadian monetary policy dynamics. Therefore, it can be seen that Figure 3 quite accurately reflects the interaction between monetary policies between countries through economic geography and political relations.

4.2 The impact of geopolitical risk on the spillover of monetary policy

Supplementary Table III illustrates the statistical summary of GPR and TCI of monetary policies. The GRP variable's average value is approximately 98.65, with a standard deviation of about 62.26. Regarding the TCI variable, the mean value is approximately 30.51, with a standard deviation of about 15.03. All variables are stationarity at a significance level of 1%.

To examine the dynamic impact of geopolitical risk on monetary policy spillover before and after the onset of the COVID-19 pandemic, we divided the data into two subsamples.

4.2.1 Full sample. Table 4 shows the results of a regression analysis in the full sample situation. All independent variables were put into the model and have statistical significance as their p-value = 0.0000 < 0.05.

Results from Table 4 confirm the first hypothesis that an increase in geopolitical risk is associated with a rise in monetary policy spillover, *ceteris paribus*. The heightened interconnectedness of monetary policies during turbulent periods can be explained by price transmission and quantity transmission (Cui *et al*., 2024). Another explanation is that an increase in geopolitical risk contributes to inflation spillover (Bouri *et al*., 2023) and capital flow (Kalemli-Özcan, 2019), prompting simultaneous adjustments in monetary policies to mitigate its impact on economies.

This result is also consistent with previous research by Long and Guo (2022) and Yuni *et al*. (2024), who supposed that GPR is interrelated and has significant impacts on monetary policy, asset prices and commodity returns around the world, especially during epidemic outbreaks. However, the effects of these factors may vary depending on the type, severity, and duration of the epidemics as well as the characteristics of the commodities (Guo *et al.*, 2024; Yuni *et al.*, 2024).

4.2.2 Pre-COVID sub-sample. Table 5 presents the outcomes of a regression analysis conducted on the pre-COVID sub-sample. Consistent with the preceding model, all included independent variables exhibit statistical significance, evidenced by their p-values of 0.0000 below the 0.05 threshold. Moreover, each of these variables positively influences monetary policy spillover.

The model indicates that an increase in geopolitical risk is associated with a corresponding increase in monetary policy spillover, ceteris paribus. Notably, the impact of geopolitical risk on the interconnectedness of monetary policies is significantly more pronounced during this specific period compared to the entire sample period.

4.2.3 Post-COVID sub-sample. Table 6 presents the estimated impact of geopolitical risk (GPR) on the spillover effects of monetary policy within the post-COVID sub-sample. The results indicate that *ceteris paribus*, an increase in GPR is associated with a reduction in monetary policy spillovers. These findings support the second hypothesis, suggesting that the previously positive influence of geopolitical risks on monetary policy spillovers diminishes in the post-pandemic period and, in fact, turns negative.

The results indicate that during this period, geopolitical risks are associated with a reduction in monetary policy spillovers, contrasting with the pre-pandemic tendency where rising geopolitical tensions amplified spillover effects. This shift may be attributed to the influence of additional macroeconomic and structural factors that became more salient during

Table 4. Regression result of the full sample model

TCI	Coef	*T*-value	*p*-value	95% conf. interval		VIF
GPR	0.015	7.820	<0.001	0.011	0.019	1.00
IDEMV	0.540	21.550	<0.001	0.491	0.589	1.00
Cons	27.732	112.360	<0.001	27.248	28.216	

Source(s): Authors' own work

Table 5. Regression result of the pre-COVID sub-sample model

TCI	Coef	*T*-value	*p*-value	95% conf. interval		VIF
GPR	0.032	13.620	<0.001	0.029	0.036	1.00
IDEMV	0.539	4.000	<0.001	0.312	0.766	1.00
Cons	26.326	92.260	<0.001	25.833	26.819	

Source(s): Authors' own work

Table 6. Regression result of the post-COVID sub-sample model

TCI	Coef	*T*-value	*p*-value	95% conf. interval		VIF
GPR	−0.087	−11.830	<0.001	−0.102	−0.073	1.05
IDEMV	0.598	15.140	<0.001	0.520	0.675	1.05
Cons	35.906	30.840	<0.001	33.622	38.130	

Source(s): Authors' own work

the pandemic, including public health challenges and economic recovery efforts (Xing, 2022), pre-existing economic vulnerabilities (Zhang, 2023) and the changing nature of global financial integration (Bertasiute *et al*., 2020). Furthermore, the asymmetric effects of geopolitical risks, such as those arising from the Russia–Ukraine conflict, may have differentially influenced major currencies and led to diverging monetary policy responses across countries (Bossman *et al*., 2023). This finding suggests that geopolitical risks do not always enhance interconnectedness among monetary policies, and it raises important questions about the stability of monetary spillover mechanisms in the context of disrupted globalization. In other words, it underscores the importance of context-specific dynamics in shaping the transmission of monetary policy across borders, particularly under conditions of global uncertainty and structural transformation.

4.3 Robustness tests

In this section, we conduct several robustness tests. First, we examine whether the total connectedness of monetary policies is sensitive to the choice of forecast horizon by varying it between 5- and 40-step-ahead in the TCI calculation. As shown in supplementary Figure 4, while some differences are observed around 1997, 2008 and 2020, these discrepancies appear to diminish during the remaining periods. The differences in certain periods can be attributed to the impacts of the Global Financial Crisis and the COVID-19 pandemic.

Next, we examine whether the impact of geopolitical risk on the spillover of monetary policies remains robust when a lag of the independent variable is included in the model. Supplementary Table VII highlights differences in the effects of geopolitical risk on the connectedness of monetary policies before and after the COVID-19 pandemic. Specifically, before the pandemic, an increase in geopolitical risk contributed to the spillover of monetary policy. However, after the pandemic, this impact turned negative. These results further confirm the shift in the influence of geopolitical risks on the spillover of monetary policies following the COVID-19 pandemic.

5. Conclusion

This study examines the influence of geopolitical risk on the international spillover of monetary policy among the United States, Canada, Australia, New Zealand, Japan and

Switzerland from 1995 to 2023. Our research extends the existing literature on monetary policy spillover by offering a nuanced perspective on the transmission dynamics between economies. While prior studies have primarily emphasized the dominant role of the United States in shaping global monetary conditions, our findings reveal that Australia and Japan also play significant transmitting roles, challenging the conventional assumption of US centrality in spillover networks. Moreover, by integrating geopolitical risks into the discussion of monetary policy spillover, this study offers fresh insights into the evolving nature of global monetary transmission. These contributions provide a foundation for future research exploring how emerging geopolitical and economic challenges reshape the spillover of monetary policies in an increasingly uncertain world in the multipolar configuration era.

Theoretically, this study contributes to the growing literature on the intersection of geopolitical risk and monetary policy by providing empirical evidence that geopolitical uncertainty can amplify monetary policy spillover through both price and quantity transmission channels (Cui *et al*., 2024). While existing frameworks largely focus on financial market integration and trade linkages as the primary drivers of monetary policy interdependence, our research highlights geopolitical risk as a crucial yet underexplored factor influencing policy transmission. This insight advances theoretical discussions on the role of external uncertainty in shaping central bank decisions and the cross-border propagation of monetary shocks. Additionally, our study enhances our understanding of how systemic risks evolve under shifting global conditions. We provide evidence that while geopolitical risk strengthens monetary spillover during crises, its influence diminishes in the post-COVID-19 period. This finding aligns with emerging discussions on economic nationalism and policy divergence, suggesting that monetary interdependence is not static but instead evolves in response to structural changes in the global economy. This study demonstrates that monetary policy transmission depends on broader macroeconomic and geopolitical contexts; thus, our research contributes to theoretical debates on the adaptability of spillover mechanisms over time.

From a policy perspective, identifying key "transmitter" and "receiver" countries in the spillover network underscores the need for policymakers to account for external influences when designing monetary policies. Countries that are primarily receivers of monetary spillover may benefit from adopting more flexible policy frameworks to mitigate vulnerabilities to external shocks. Moreover, the increase in total monetary policy connectedness during periods of heightened geopolitical risk suggests that systemic risks become more pronounced under uncertainty, reinforcing the importance of international policy coordination. However, as the total connectedness index declines in the post-COVID-19 period, our findings suggest that new variables, such as inflation risks and economic growth concerns, have begun to play a more dominant role in shaping monetary interdependencies.

Our study has several limitations. First, the dataset covers only six countries, which may not fully capture global policy diffusion in response to geopolitical risks. Second, the three-month research period may have limited our ability to gather comprehensive evidence. Third, continuous daily data collection and updates could introduce a margin of error. Despite these limitations, this study lays a foundation for future research. Subsequent studies could address these gaps and further examine the impact of geopolitical risks on monetary policy. The insights gained may help economists refine policy planning, mitigate spillover shocks and enhance policy effectiveness.

Notes

1. The Geopolitical Risk Index website: https://www.matteoiacoviello.com/gpr.htm
2. Data of Infectious Disease Equity Market Volatility Index is collected from the website: https://www.policyuncertainty.com/

References

Adámek, E. and Jursa, L. (2023), "Deep dive into beggar-thy-neighbour effects of monetary policy spillover", *Acta Oeconomica*, Vol. 73 No. 1, pp. 61-83, doi: 10.1556/032.2023.00005.

Antonakakis, N. and Gabauer, D. (2017), "Refined measures of dynamic connectedness based on TVP-VAR", No. 78282, Munich.

Baker, S.R., Bloom, N. and Davis, S.J. (n.d.), "Equity market volatility: infectious disease tracker (INFECTDISEMVTRACKD) | FRED | St. Louis fed", available at: https://fred.stlouisfed.org/series/INFECTDISEMVTRACKD (accessed 5 June 2024).

Benmelech, E. and Tzur-Ilan, N. (2020), "The determinants of fiscal and monetary policies during the Covid-19 crisis", NBER Working Paper No. 27461, doi: 10.3386/W27461.

Bernanke, B.S., Gertler, M. and Gilchrist, S. (1999), "The financial accelerator in a quantitative business cycle framework", in *Handbook of Macroeconomics*, Vol. 1, Elsevier, pp. 1341-1393.

Bertasiute, A., Massaro, D. and Weber, M. (2020), "Deglobalisation post COVID-19 could spell trouble for the European Monetary Union", *SSRN Electronic Journal*. doi: 10.2139/ssrn.3640306.

Bhar, R., Malliaris, A.G. and Malliaris, M. (2021), "Modeling U.S. monetary policy during the global financial crisis and lessons for Covid-19", *Journal of Policy Modeling*, Vol. 43 No. 1, pp. 15-33, doi: 10.1016/j.jpolmod.2020.07.001.

Bossman, A., Gubareva, M. and Teplova, T. (2023), "Asymmetric effects of geopolitical risk on major currencies: Russia-Ukraine tensions", *Finance Research Letters*, Vol. 51, 103440, doi: 10.1016/j.frl.2022.103440.

Botzen, W.J.W., Deschenes, O. and Sanders, M. (2019), "The economic impacts of natural disasters: a review of models and empirical studies", *Review of Environmental Economics and Policy*, Vol. 13 No. 2, pp. 167-188, doi: 10.1093/reep/rez004.

Bouri, E., Gabauer, D., Gupta, R. and Kinateder, H. (2023), "Global geopolitical risk and inflation spillover across European and North American economies", *Research in International Business and Finance*, Vol. 66, 102048, doi: 10.1016/j.ribaf.2023.102048.

Brunnermeier, M. (2023), "Rethinking monetary policy in a changing world", Finance and Development Magazine, International Monetary Fund, March.

Caldara, D. and Iacoviell, M. (2022), "Measuring geopolitical risk", *The American Economic Review*, Vol. 112 No. 4, pp. 1194-1225, doi: 10.1257/aer.20191823.

Cui, B., Li, J. and Zhang, Y. (2024), "Asymmetries in the international spillover effects of monetary policy: based on TGVAR model", *The North American Journal of Economics and Finance*, Vol. 69, 102029, doi: 10.1016/j.najef.2023.102029.

Dedola, L., Rivolta, G. and Stracca, L. (2017), "If the fed sneezes, who catches a cold?", *Journal of International Economics*, Vol. 108, pp. S23-S41, doi: 10.1016/j.jinteco.2017.01.002.

Demiralay, S. and Kilincarslan, E. (2019), "The impact of geopolitical risks on travel and leisure stocks", *Tourism Management*, Vol. 75, pp. 460-476, doi: 10.1016/j.tourman.2019.06.013.

Diebold, F.X. and Yilmaz, K. (2009), "Measuring financial asset return and volatility spillover, with application to global equity markets", *The Economic Journal*, Vol. 119 No. 534, pp. 158-171, doi: 10.1111/j.1468-0297.2008.02208.x.

Diebold, F.X. and Yilmaz, K. (2012), "Better to give than to receive: predictive directional measurement of volatility spillover", *International Journal of Forecasting*, Vol. 28 No. 1, pp. 57-66, doi: 10.1016/j.ijforecast.2011.02.006.

Diebold, F.X. and Yilmaz, K. (2014), "On the network topology of variance decompositions: measuring the connectedness of financial firms", *Journal of Econometrics*, Vol. 182 No. 1, pp. 119-134, doi: 10.1016/j.jeconom.2014.04.012.

Elsayed, A.H. and Helmi, M.H. (2021), "Volatility transmission and spillover dynamics across financial markets: the role of geopolitical risk", *Annals of Operations Research*, Vol. 305 Nos 1-2, pp. 1-22, doi: 10.1007/s10479-021-04081-5.

Georgiadis, G. (2016), "Determinants of global spillover from U.S. monetary policy", *Journal of International Money and Finance*, Vol. 67, pp. 41-61, doi: 10.1016/j.jimonfin.2015.06.010.

Ginn, W. and Saadaoui, J. (2024), "Monetary policy reaction to geopolitical risks: some nonlinear evidence".

Grasselli, M.R. (2022), "Monetary policy responses to Covid-19: a comparison with the 2008 crisis and implications for the future of central banking", *Review of Political Economy*, Vol. 34 No. 3, pp. 420-445, doi: 10.1080/09538259.2021.1908778.

Güntner, J. and Henßler, J. (2021), "Ease on the cannons, tighten on the trumpets: geopolitical risk and the transmission of monetary policy shocks", Working Paper No. 2109, Department of Economics, Johannes Kepler University of Linz, Linz.

Guo, C., Zhang, X., Raza, S.A. and Masood, A. (2024), "Asymmetrical connectedness between infectious diseases-related equity market volatility and prices of precious metals", *Resources Policy*, Vol. 88, 104470, doi: 10.1016/j.resourpol.2023.104470.

He, Z. (2023), "Geopolitical risks and investor sentiment: causality and TVP-VAR analysis", *The North American Journal of Economics and Finance*, Vol. 67, 101947, doi: 10.1016/j.najef.2023.101947.

Hou, Y., Li, W., Wu, D., Zang, Y. and Quach, L. (2025), "The spillover effect of U.S. monetary policy on the international financial market: evidence from network analysis", *Journal of Management Science and Engineering*, Vol. 10 No. 1, pp. 111-125, doi: 10.1016/j.jmse.2024.12.001.

Kalemli-Özcan, Ş. (2019), "U.S. monetary policy and international risk spillover", Cambridge, MA.

Kearns, J., Schrimpf, A. and Xia, F.D. (2023), "Explaining monetary spillover: the matrix reloaded", *Journal of Money, Credit, and Banking*, Vol. 55 No. 6, pp. 1535-1568, doi: 10.1111/jmcb.12996.

Kher, P. and Chun, D. (2020), "Policy options to mitigate political risk and attract FDI", Finance, Competitiveness and Innovation in Focus, World Bank, Washington, DC.

Koop, G. and Korobilis, D. (2014), "A new index of financial conditions", *European Economic Review*, Vol. 71, pp. 101-116, doi: 10.1016/j.euroecorev.2014.07.002.

Koop, G., Pesaran, M.H. and Potter, S.M. (1996), "Impulse response analysis in nonlinear multivariate models", *Journal of Econometrics*, Vol. 74 No. 1, pp. 119-147, doi: 10.1016/0304-4076(95)01753-4.

Krippner, L. (2020), "A note of caution on shadow rate estimates", *Journal of Money, Credit, and Banking*, Vol. 52 No. 4, pp. 951-962, doi: 10.1111/jmcb.12613.

Lastauskas, P. and Nguyen, A.D.M. (2024), "Spillover effects of U.S. monetary policy on emerging markets amidst uncertainty", *Journal of International Financial Markets, Institutions and Money*, Vol. 92, 101956, doi: 10.1016/j.intfin.2024.101956.

Lee, K. (2023), "Geopolitical risk and household stock market participation", *Finance Research Letters*, Vol. 51, 103328, doi: 10.1016/j.frl.2022.103328.

Long, S. and Guo, J. (2022), "Infectious disease equity market volatility, geopolitical risk, speculation, and commodity returns: comparative analysis of five epidemic outbreaks", *Research in International Business and Finance*, Vol. 62, 101689, doi: 10.1016/j.ribaf.2022.101689.

Nguyen, T.T.T., Pham, B.T. and Sala, H. (2022), "Being an emerging economy: to what extent do geopolitical risks hamper technology and FDI inflows?", *Economic Analysis and Policy*, Vol. 74, pp. 728-746, doi: 10.1016/j.eap.2022.04.005.

Pesaran, H.H. and Shin, Y. (1998), "Generalized impulse response analysis in linear multivariate models", *Economics Letters*, Vol. 58 No. 1, pp. 17-29, doi: 10.1016/s0165-1765(97)00214-0.

Sarker, K.P. (2020), "Covid crisis: fiscal, monetary and macro-financial policy responses", *Theoretical and Applied Economics*, Vol. XXVII No. 3, pp. 41-54.

Segnon, M., Gupta, R. and Wilfling, B. (2023), "Forecasting stock market volatility with regime-switching GARCH-MIDAS: the role of geopolitical risks", *International Journal of Forecasting*, Vol. 40 No. 1, pp. 29-43, doi: 10.1016/j.ijforecast.2022.11.007.

Shen, L. and Hong, Y. (2023), "Can geopolitical risks excite Germany economic policy uncertainty: rethinking in the context of the Russia-Ukraine conflict", *Finance Research Letters*, Vol. 51, 103420, doi: 10.1016/j.frl.2022.103420.

Smales, L.A. (2021), "Geopolitical risk and volatility spillover in oil and stock markets", *The Quarterly Review of Economics and Finance*, Vol. 80, pp. 358-366, doi: 10.1016/j.qref.2021.03.008.

Srouji, J. (2024), "The international monetary system: toward a more multipolar configuration?", in *Reference Module in Social Sciences*, Elsevier.

Wang, Y., Bouri, E., Fareed, Z. and Dai, Y. (2022), "Geopolitical risk and the systemic risk in the commodity markets under the war in Ukraine", *Finance Research Letters*, Vol. 49, 103066, doi: 10.1016/j.frl.2022.103066.

Xing, V. (2022), "Geopolitical shock: regime change in inflation and monetary policy".

Yilmazkuday, H. (2022), "COVID-19 and Monetary policy with zero bounds: a cross-country investigation", *Finance Research Letters*, Vol. 44, 102103, doi: 10.1016/j.frl.2021.102103.

Yuni, D.N., Enwo-Irem, I.N. and Urom, C. (2024), "Dynamic effects of geopolitical risks and infectious diseases on real estate markets", *International Journal of Housing Markets and Analysis*, Vol. 17 No. 1, pp. 170-191, doi: 10.1108/ijhma-09-2022-0130.

Zhang, Y. (2023), "An analysis of monetary policies and effects of major developed economies in the face of COVID-19", *Advances in Economics, Management and Political Sciences*, Vol. 54 No. 1, pp. 210-216, doi: 10.54254/2754-1169/54/20230927.

Zhang, Y., He, J., He, M. and Li, S. (2022), "Geopolitical risk and stock market volatility: a global perspective", *Finance Research Letters*, Vol. 53, 103620, doi: 10.1016/j.frl.2022.103620.

Supplementary material
The supplementary material for this article can be found online.

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