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Geopolitical Risks and Their Impact on Global Macro-Financial Stability: Literature and Measurements

Martin Hodula, Jan Janků, Simona Malovaná, and Ngoc Anh Ngo *

Abstract

In our paper, we provide a review of the literature to identify the main transmission channels through which geopolitical risks (GPR) influence macro-financial stability. We begin by analyzing the existing measures of geopolitical tensions and uncertainty, showing that GPR impacts economic and financial uncertainty episodically, with significant but transient spikes during major geopolitical events. The review then identifies the two principal channels through which GPR affects macro-financial stability: the financial channel, operating through increased uncertainty and heightened risk aversion, leading to shifts in investment portfolio allocations and cross-border capital flows; and the real economy channel, impacting global trade, supply chains, and commodity markets. Using data from the past two to three decades, we provide graphical analyses that confirm the findings in the literature, highlighting the episodic nature of the impact of GPR. These insights underscore the need for policymakers and financial institutions to adopt event-specific approaches to effectively mitigate the adverse effects of geopolitical risks on economic and financial systems.

Abstrakt

V našem článku poskytujeme přehled literatury s cílem identifikovat hlavní kanály, kterými geopolitická rizika (GPR) ovlivňují makrofinanční stabilitu. Začínáme analýzou existujících ukazatelů geopolitického napětí a nejistoty, přičemž ukazujeme, že GPR epizodicky ovlivňuje ekonomickou a finanční nejistotu s výraznými, ale přechodnými nárůsty během významných geopolitických událostí. Dále identifikujeme dva hlavní kanály, kterými GPR ovlivňuje makrofinanční stabilitu: finanční kanál, který působí skrze zvýšenou nejistotu a zvýšenou averzi k riziku, vedoucí ke změnám v alokaci investičních portfolií a přeshraničních kapitálových toků, a kanál reálné ekonomiky, který ovlivňuje globální obchod, dodavatelské řetězce a trhy s komoditami. Pomocí dat z posledních dvou až tří dekád poskytujeme grafické analýzy, které potvrzují závěry z literatury, přičemž zdůrazňujeme epizodický charakter dopadu GPR. Tyto poznatky zdůrazňují potřebu, aby tvůrci politik a finanční instituce přijímali přístupy specifické pro jednotlivé události, jimiž by účinně zmírňovali nepříznivé účinky geopolitických rizik na ekonomické a finanční systémy.

JEL Codes: D80, E32, F44, F51, G2, G15, H56.
Keywords: Financial stability, geopolitical risk, global economy, macro-financial impact, uncertainty shocks.

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1. Introduction

In recent years, major central banks and international organizations have acknowledged the economic risks posed by increasing geopolitical tensions. During the last decade, the world has faced multiple challenges arising from the China-United States trade war starting in 2018, the Covid-19 pandemic from early-2020, Russia's invasion of Ukraine in February 2022, and the recent escalation of the Israeli-Hamas conflict. These tensions have strained international relations and highlighted the potential threats of geopolitical risks (GPR) to economic growth and financial stability. GPRs, arising from instability in various domains, have become more impactful due to global interconnectedness. The conflict in Ukraine, for example, has led to global uncertainty, disrupting commodity prices, causing major supply chain issues, and affecting consumer sentiment and stock markets.

GPR shocks, often regarded as exogenous to the economic models typically used by central banks and policymakers, pose a significant challenge due to their unpredictability and their potential to trigger widespread economic disruption. These shocks can arise from various sources, including international conflicts, political instability, and global crises, making them particularly dangerous for policymakers tasked with safeguarding economic and financial stability. Unlike endogenous factors, which can be somewhat anticipated and managed through conventional monetary and fiscal policy tools, GPR shocks escape standard predictive models, leaving economies vulnerable to sudden and severe impacts. In this context, it is crucial to understand how GPR influences the real economy and financial markets.

In our paper, we provide an extensive review of the transmission channels through which geopolitical risks can influence macro-financial stability. Initially, we compile and analyze existing measures of geopolitical tensions and uncertainty, focusing on their interrelationship. Our findings indicate that uncertainty spikes around major geopolitical events, suggesting that, at least partially, a geopolitical shock functions as an uncertainty shock. However, our results demonstrate that measures of economic and financial uncertainty are not consistently affected by geopolitical risks from a time series perspective. Instead, the impact of GPR on uncertainty is episodic, characterized by significant but transient spikes corresponding to major geopolitical events. This suggests that while GPR can cause sharp increases in uncertainty during crises, these effects do not persistently alter the overall trajectory of economic and financial uncertainty.

Next, we explore the broader effects of heightened uncertainty on the economy and financial sector, as documented in the existing literature. The literature is abundant yet fragmented across multiple topics and lacks a cohesive conceptual framework. By reviewing this body of work, we identify two key channels through which escalating GPR can affect macro-financial stability: the financial channel and the real economy channel. The financial channel primarily operates through increased uncertainty, leading to heightened risk aversion and significant shifts in investment portfolio allocations and cross-border capital flows. The real economy channel indirectly affects global trade, supply chains, and commodity markets. Throughout the paper, we employ various country samples and international databases to examine the functionality of these transmission channels. Our data spans the past two to three decades, focusing on both the cyclical perspective of transmission and the episodic nature of GPR shocks. It is crucial to note that our analyses primarily serve to provide visual corroboration of the conclusions derived from the literature review, thereby reinforcing the episodic nature of the relationship between geopolitical risks and economic and financial uncertainty.

The rest of the paper is organized as follows. Section 2 discusses the existing data sources on measuring GPR and analyzes its relationship with market uncertainty. Section 3 reviews the existing literature on topics related to uncertainty shocks, trade disputes and commodity shocks. It then derives a conceptual framework which describes the transmission channels of GPR on financial and real economic stability. Section 4 concludes and discusses the policy implications stemming from the paper.

2. Geopolitical Risks and Financial, Economic, and Political Uncertainty: How Closely Interconnected?

The literature measuring the risks and uncertainty stemming from geopolitical events is still scarce. Recently, Caldara and Iacoviello (2022) constructed a GPR index by computing the share of articles mentioning adverse geopolitical events in 10 leading US and international newspapers to capture events that have a global dimension and global repercussions.[1] Figure 1 displays the development of GPR indexes together with main events which explain the spikes over time. The figure hints at the significant impact of wars and terrorist attacks on the volatility of GPR. While the GPR index inherently represents the US point of view on global GPR events, the graph shows that using country-specific indexes can help generalize this view. For instance, the US GPR index peaks during the 9/11 attacks while averaging indexes for other countries identifies a historical peak during Russia's invasion of Ukraine.

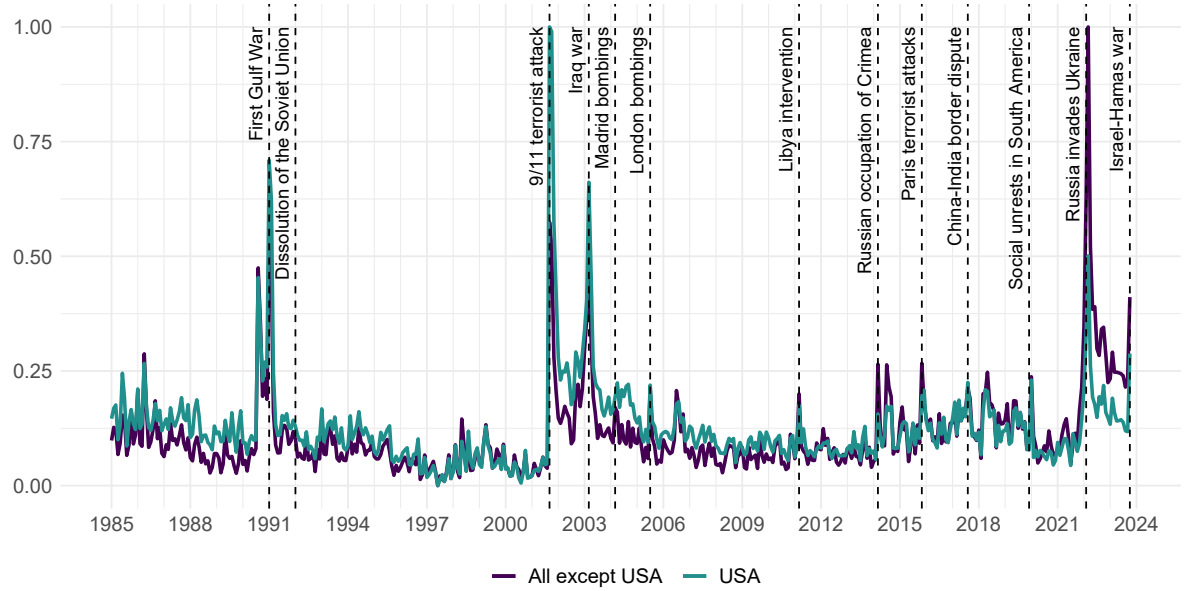
The GPR index shares some of its spikes with the military spending news variable of Ramey (2011), who reports the present discounted value of expected changes in defense expenditure. Alternative approaches to measuring geopolitical tensions rely on information about economic sanctions. Studies have used this information to measure its impact on economic growth (Neuenkirch and Neumeier, 2015), trade (Felbermayr et al., 2020), and the composition of central bank reserves (Arslanalp et al., 2023). Additionally, Dreher et al. (2021) use data on United Nations votes as a proxy for political alignment to study the impact of geopolitical tensions on the portfolio of aid and debt-financed projects.

In a subsequent work, Caldara and Iacoviello (2022) developed country-specific GPR indexes for 44 advanced and emerging countries. These indexes, in addition to the criteria used for inclusion in the general GPR index, also consider mentions of the name of the country or its major cities. Country-specific GPR indexes vary significantly across countries, with advanced economies facing different geopolitical risks compared to emerging markets (see section A.1 in the appendix). Our analysis shows that countries cluster into a few distinct groups. European countries show notable differences, particularly in Eastern Europe, which experienced high GPR index standard deviations during key historical events like the dissolution of the USSR, 9/11, and Russia's invasion of Ukraine in 2022. Emerging markets with current or imminent conflicts form a unique cluster, while advanced economies, especially G7 members, show correlated geopolitical risks due to interconnected trade, investments, and alliances like NATO.

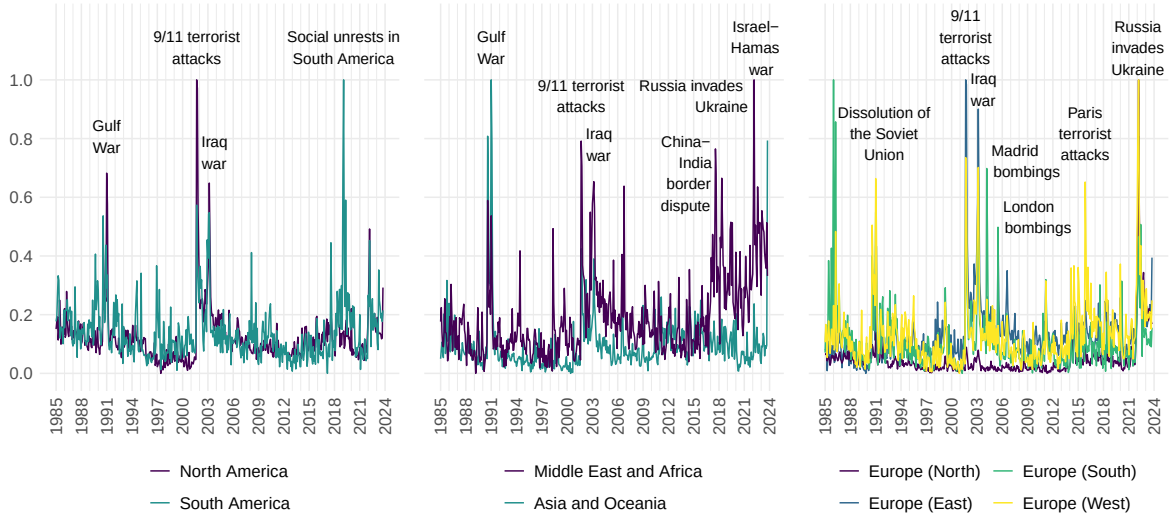
[1] Caldara and Iacoviello (2022) define geopolitical risk as "the threat, realization, and escalation of adverse events associated with wars, terrorism, and any tensions among states and political actors that affect the peaceful course of international relations." The GPR index is then constructed by counting, for each month, the share of articles discussing adverse geopolitical events and associated threats (i.e., searching for textual combinations associated with topic words such as "war," "nuclear," or "terrorism").

Figure 1: Geopolitical Risk Index by Caldara and Iacoviello (2022)

(A) Main Events



(B) Events Breakdown by Region



Note: The country-specific GPR indexes reflect the automated text-search results from the electronic archives of newspaper articles. The resulting indexes capture the US perspective on risks posed by, or involving, the country in question. The data were normalized using min-max scaling. The *GPR* index was normalized using min-max scaling.

2.1 Uncertainty Indexes: Review and Categorization

Geopolitical events and conflicts can have profound effects on global financial markets, leading to heightened uncertainty among investors, businesses, and policymakers. To better understand these influences, we complement the GPR index examination with a diverse set of uncertainty measures derived from the literature. Although the empirical literature lacks a unified theoretical framework, it offers numerous proxy variables for uncertainty. Cascaldi-Garcia et al. (2023) extensively review these measures, classifying them by methodology into text-based, survey-based, econometric-based, and market-based categories. Our approach, however, focuses on categorizing uncertainty measures by the source of the shocks, outlined in Table 1. We specifically address uncertainty arising from: (i) financial sector developments, (ii) changes in the real economy and policy, and (iii) environmental and health-related events.

Financial uncertainty indexes differ based on their data sources. Some rely predominantly on market data, like the VIX index, while others rely on a collection of different financial variables, like the financial uncertainty index by Ludvigson et al. (2021). Many financial uncertainty indexes focus on data volatility and are US-centric. Another set of indexes uses aggregate data, emphasizing overall financial market conditions and stress. Examples include the Chicago Fed's Financial Conditions Index, the St. Louis Fed's Financial Stress Index, and the Composite Indicator of Systemic Stress maintained by the ECB. The evolution of the key financial sector uncertainty indexes can be observed in Figure A5, highlighting events such as the DotCom crash, the Global Financial Crisis, the European debt crisis, the Covid-19 crisis and the Russian invasion of Ukraine. As is apparent, while some events have been triggered in the financial sector, others were more geopolitical in nature.

Real economy and policy uncertainty indexes are all based on aggregated input data. Indexes such as the macroeconomic uncertainty index of Jurado et al. (2015) and real uncertainty index of Ludvigson et al. (2021) consider the conditional volatility of US economic variables. Another subset of indexes is based on information from newspapers about uncertainty related to economic and political events (e.g., the Economic Policy or World Uncertainty Indexes) and uncertainty stemming from trade policies (Trade World Uncertainty Index). Similarly to financial uncertainty, there are indexes measuring the significance of trade policy and broader national economic policies on US stock market volatility (Baker et al., 2019). The innovative Twitter-based Economic Uncertainty Index from (Baker et al., 2021) extracts data from Twitter messages associated with uncertainty. Figure A6 maps major real economy and policy events derived from the main real economy and policy uncertainty indexes.

The increasing focus on environmental and health issues has led to the creation of specialized uncertainty indexes. For instance, Gavriilidis (2021) introduced the Climate Policy Uncertainty Index that highlights key events related to climate policy and the EMV tracker by Baker et al. (2019) newly considers the effect of diseases on US stock market volatility. The Economic Policy Uncertainty index by Baker et al. (2016) has also expanded and now covers migration policy uncertainty and related fears. An area for improvement in this category is to expand the geographical scope, much like the GPR index which is, by definition, US-centric. This is particularly relevant as some indexes, such as those focusing on migration, currently provide data only for the US. Figure A7 displays the CPU index by Gavriilidis (2021) alongside the EMV disease tracker by Baker et al. (2019), detailing the main events in each area.

Table 1: Uncertainty Indexes: Breakdown by the Source of the Shocks

Index	Abbr.	Description	Coverage	Source	Freq.
The Geopolitical Risk Index	*GPR*	Threat, realization, and escalation of wars, terrorism, and any tensions among states and political actors	World, 44 Countries	Caldara and Iacoviello (2022)	daily, monthly
Financial Uncertainty indexes					
Volatility Index	*VIX*	Inferred market expected volatility based on S&P 500 index options	USA	CBOE	daily
Conditional Variance of Stock Returns	*CV_BH*	Physical variance of the squared VIX index, derived from US S&P 500 options prices.	USA	Bekaert and Hoerova (2014)	daily
Equity Variance Premium	*VP_BH*	Decomposition of the squared VIX index, derived from US S&P 500 options prices.	USA	Bekaert and Hoerova (2014)	daily
Financial Uncertainty	*FU_JLN*	Aggregate of the conditional volatility of the unforecastable component of a set of US financial variables.	USA	Ludvigson et al. (2021)	monthly
Chicago Fed National Financial Conditions Index	*NCFI_USA*	US financial conditions in money markets, debt and equity markets and the traditional and "shadow" banking systems (positive values = tighter than average)	USA	Federal Reserve Board of Chicago	weekly
St. Louis Fed Financial Stress Index	*FSI_ST_LOUIS*	Measures the degree of financial stress in the markets and is constructed from seven interest rate series, six yield spreads and five other indicators.	USA	Federal Reserve Board of St. Louis	weekly
OFR Financial Stress Index	*OFR_FSI*	Market-based snapshot of stress in global financial markets, constructed from 33 financial market variables.	World, USA, AEs	OFR	daily
OFR Financial Stress Emerging Markets	*OFR_emerging*	Market-based measure of stress in financial markets of emerging economies.	EMEs	OFR or JP Morgan	daily
Composite Indicator of Systemic Stress	*CISS_EA*	Indicator of systemic stress, derived from 15 mainly market-based financial stress measures.	Euro area, EA countries	ECB	daily
Financial Crises EMV Tracker	*EMV_FINCRISES*	It quantifies the importance of this category in the level of US stock market volatility and its movements over time (based on newspapers).	USA	Baker et al. (2019)	monthly

Table continues on the next page.

Table 1 continued.

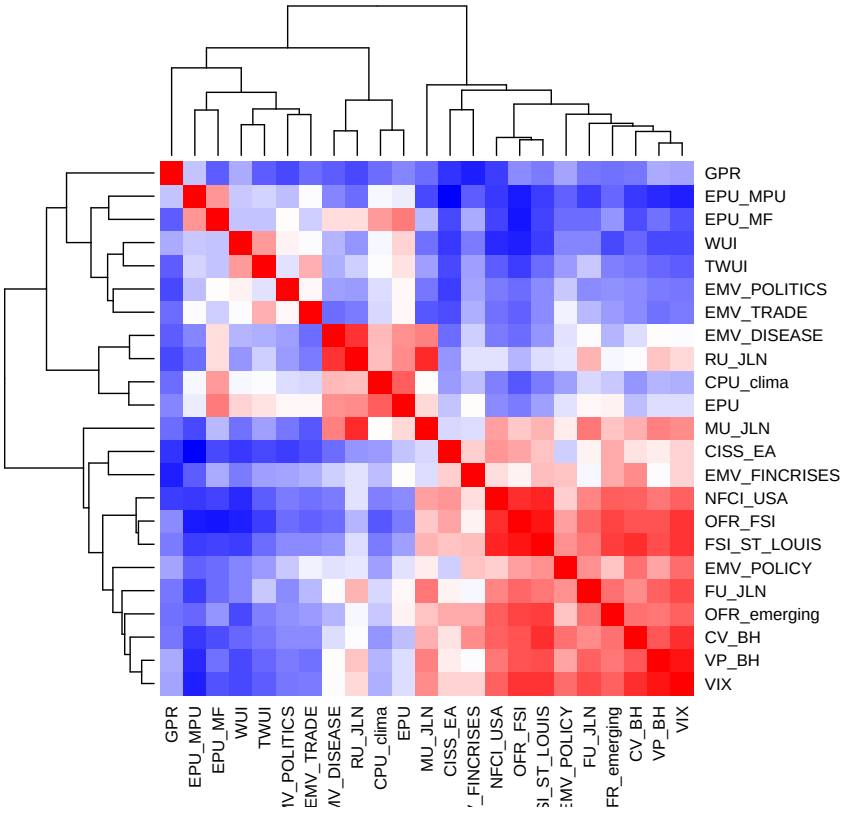
Index	Abbr.	Description	Coverage	Source	Freq.
Real Economy and Policy Uncertainty Indexes					
Macroeconomic Uncertainty	*MU_JLN*	Aggregate of the conditional volatility of the unforecastable component of a set of US economic variables	USA	Jurado et al. (2015)	monthly
Real Uncertainty	*RU_JLN*	Aggregate of the conditional volatility of the unforecastable component of a set of US real economic variables.	USA	Ludvigson et al. (2021)	monthly
Economic Policy Uncertainty	*EPU*	Newspaper-based index focusing on policy-related economic uncertainty.	World, 22 Countries	Baker et al. (2016)	monthly
World Uncertainty Index	*WUI*	Uncertainty related to economic and political events, regarding both near-term and long-term	World, 143 Countries	Ahir et al. (2022)	quarterly
Trade Policy EMV Tracker	*EMV_TRADE*	Derived from EMV, it quantifies the importance of this category in the level of US stock market volatility and its movements over time.	USA	Baker et al. (2019)	monthly
Trade World Uncertainty Index	*TWUI*	This index measures trade uncertainty across the globe. Based on WUI.	World, 143 Countries	Ahir et al. (2022)	quarterly
Policy-Related EMV Tracker	*EMV_POLICY*	Derived from EMV, it quantifies the importance of this category in the level of US stock market volatility and its movements over time.	USA	Baker et al. (2019)	monthly
Twitter-based Economic Uncertainty	*TEU*	The index extracts all messages (tweets) sent on Twitter in since June 2011 that contain keywords related to Uncertainty and keywords related to the Economy.	World, USA	Baker et al. (2021)	daily
Environment and Health Uncertainty indexes					
Climate Policy Uncertainty	*CPU_clima*	The Climate Policy Uncertainty (CPU) index contains important events related to climate policy.	USA	Gavriilidis (2021)	monthly
Infectious Disease EMV Tracker	*EMV_DISEASE*	Derived from EMV, it quantifies the importance of this category in the level of US stock market volatility and its movements over time (based on newpapers)	USA	Baker et al. (2019)	monthly
EPU Migration Policy Uncertainty	*EPU_MPU*	Newspaper-based index covering uncertainty related to migration policies.	USA, UK, FR, DE	Baker et al. (2016)	quarterly
EPU Migration Fear Index	*EPU_MF*	Newspaper-based index covering migration and fear.	USA, UK, FR, DE	Baker et al. (2016)	quarterly

Note: The table lists indexes across four categories that measure risks in the global economy: Geopolitical Risks, Financial Risks and Uncertainty, Real Economy and Policy Risks, and broad Environmental Risks. We use these categories following Caldara and Iacoviello (2022) who note that geopolitical events can, at times, correlate with other global happenings, be they financial or related to the real economy/policy. Drawing inspiration also from Ludvigson et al. (2021), who categorizes global uncertainty into financial, macroeconomic, and policy domains, we incorporated broad environmental risks, including areas not covered by these indexes like disease, climate, and migration. We based our index selection on the comprehensive review by Cascaldi-Garcia et al. (2023), which focuses on diverse uncertainty indexes and encompasses an expanded literature search. Additionally, we considered materials from the Economic Policy Uncertainty team, especially from their "Research on Economic Policy Uncertainty" section at https://www.policyuncertainty.com/research.html, including central bank addresses and congressional reports.
Index coverage in the table: *"World"* means there is also a global version of the index that encompasses the entire world.

2.2 Geopolitical Risks and Uncertainty Overlaps

To investigate potential overlaps between the GPR index and existing uncertainty indexes, we conduct a cluster analysis, the results of which are depicted in a heat map in Figure 2. Adjacent to the heat map, the dendrograms employ hierarchical clustering to group variables based on their correlation patterns. The indexes tend to group into three logical clusters. The first cluster (the top one) contains the GPR index alongside the uncertainty indexes related to trade disputes and politics and the EPU subindexes related to migration policy and fears. The second cluster (the middle one) contains the various uncertainty indexes related to the financial sector. The third cluster (the bottom one) then consists of the general macroeconomic uncertainty indexes, such as *EPU* and *RU_JLN*, and two distinct uncertainty indexes related to climate (*CPU_clima*) and disease (*EMV_DISEASE*). The dendrogram shows that the indexes in the top Trade and Policy Cluster are most distant from those in the bottom Financial Cluster, as evidenced by the highest branch of the dendrogram. Some indexes from the middle one, the General Macroeconomy Cluster, share characteristics with the Trade and Policy Cluster, while others align more with the Financial Cluster.

Figure 2: The Uncertainty Indexes Naturally Group into Three Clusters



Note: The heat map visually clusters the listed indexes. The intensity and shade of the color indicate the degree of similarity between the indexes. A red color signifies a positive correlation, while a blue color denotes a negative correlation. Adjacent to the heat map, dendrograms use hierarchical clustering to group variables based on their correlation patterns. Variables positioned closer together in the dendrogram demonstrate more similar correlation behaviors. It uses an agglomerative (bottom-up) approach where each observation starts in its own cluster, and pairs of clusters are merged as one moves up the hierarchy. The distance between pairs of observations is based on Euclidean distance. Three main color clusters emerge: a predominantly blue cluster (GPR, EPU_MPU, EPU_MF, and WUI appear to be closely related based on their proximal clustering, indicating that these variables might share similar correlation patterns), a predominantly white cluster (mostly CPU_clima, RU_JLN, EMV_DISEASE) and a predominantly red cluster (mostly financial indexes such as FU_JLN, VIX or VP_BH and CV_BH).

The relationships within the clusters, especially within the Trade and Policy Cluster, are intuitive. Geopolitical risks, manifested through terrorist attacks and armed conflicts, are often linked to disruptions to trade and concerns about migration. Castles (2003) highlights the inherent relationship between geopolitical tensions (wars and terrorist attacks) and migration patterns. He emphasizes that this connection has become more pronounced due to the emergence of new forms of conflict and attacks that intentionally target civilian populations. Also, Caldara and Iacoviello (2022) suggest that geopolitical risks elevate trade costs and diminish the insurance coverage of trade flows, attributed to the heightened perception of such risks. Gupta et al. (2019) corroborates this, empirically demonstrating that geopolitical risks and tensions exert significant negative impacts on global trade flows. Drawing inspiration from this body of literature, we delve deeper into the relationship between global events, trade, and financial flows in subsection 3.2.1. We explore how global events – geopolitical, financial, policy-driven, and environmental – affect portfolio flows (financial flows) and the current account balance (trade).

Given the close link between the GPR index and the Trade and Policy Cluster, we explore their relationship across various lags and leads. Specifically, we calculate the cross-correlation between the uncertainty indexes in this cluster and the GPR indexes at time t, and also for three-period leads and lags. Figure A8 illustrates the cross-correlation between the regional GPR indexes and the two EPU indexes, which are focused on migration policy uncertainty and migration fear, constructed for both the US and Germany. The cross-correlation between the indexes for migration policy and fear, and the GPR indexes appears to be relatively weak when considering a time series of major global geopolitical events or those predominantly related to the US. However, the relationship is significantly stronger once we shift our focus to the rest of the world, as shown in Panel A of Figure A8. This can be observed for migration uncertainty in both the US and Europe (specifically Germany), suggesting that geopolitical events outside the US trigger migration policy uncertainty and fears in these regions. This logic aligns with the typical direction of migration flows towards the US and advanced European countries. Zooming in on the geopolitical risks in different parts of the world, we observe a high cross-correlation with events in certain regions of Europe and Asia (as depicted in Panels B and C of Figure A8). Concerning migration fears in the US, there is a notable cross-correlation with geopolitical risks in South America as well.

When examining the cross-correlation between the GPR indexes and the other uncertainty indexes within the Trade and Policy Cluster, we do not observe such a consistent pattern. For some indexes and regions, the correlation is strong and significant, whereas for others, it is not. Notably, there is a significant relationship between the *EMV_TRADE*, *TWUI*, and *WUI* and the GPRs of South America and certain parts of Asia. This may reflect the heavy dependence of global trade on manufacturing and exports from these regions, suggesting that an increase in geopolitical risks and tensions in these areas can significantly affect trade uncertainty worldwide.[2]

We do not observe a significant correlation with the GPR index for the indexes from the financial and real economy clusters. It is likely that the GPR index aligns with other indexes primarily during significant GPR events and not necessarily consistently over time.[3] Conversely, the correlation between the financial and real economy indexes is quite strong, as evident from a simple visual comparison of the first principal components for each group in Figure A9. This observation aligns with the extensive literature on macro-financial linkages and a mutually reinforcing relationship between financial and real economy uncertainty. Given that higher GPRs

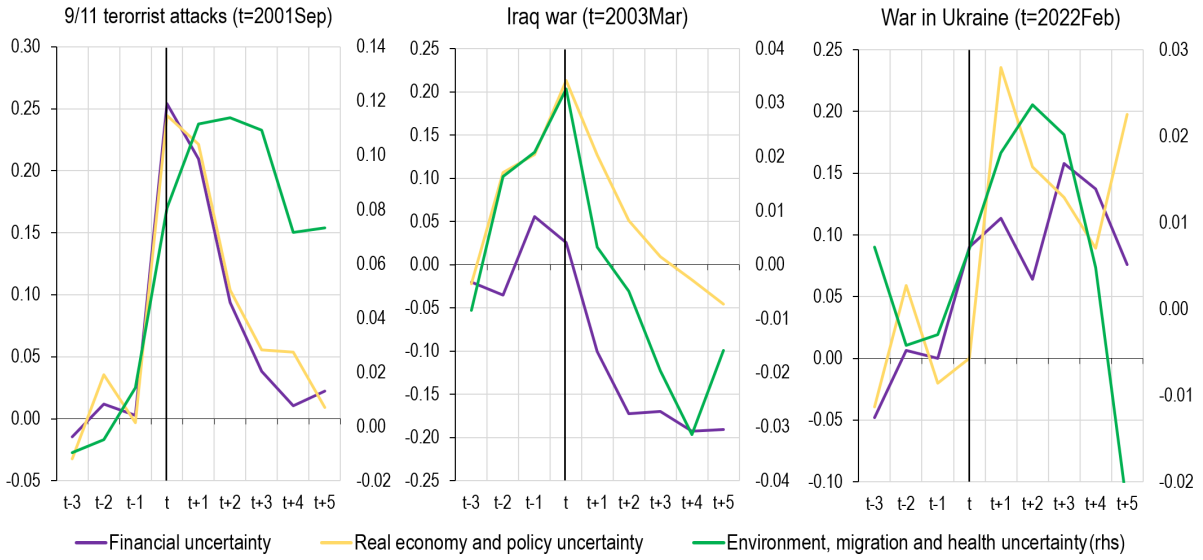
[2] These results are not reported but are available upon request.

[3] For instance, the cross-correlations between the GPR and the financial index (VIX) are positive and most pronounced at time t, although the correlation magnitude remains relatively modest.

can trigger higher uncertainties in migration policies and trade, they can subsequently increase the downside risks to the global economy, further intensified through global macro-financial linkages.

Figure 3 shows that uncertainty spikes after major GPR events, specifically the 9/11 terrorist attacks in 2001, the beginning of the Iraq war in 2003, and Russia's invasion of Ukraine in 2022. The 9/11 attacks and the invasion of Ukraine can be reasonably thought of as unexpected shocks, while the Iraq war was long debated before it officially started. As is apparent, all three GPR events generated powerful hikes in uncertainty across various categories, including the financial sector, the real economy, policy, and environmental and migration concerns.

Figure 3: Geopolitical Risk and Uncertainty Indexes over Time



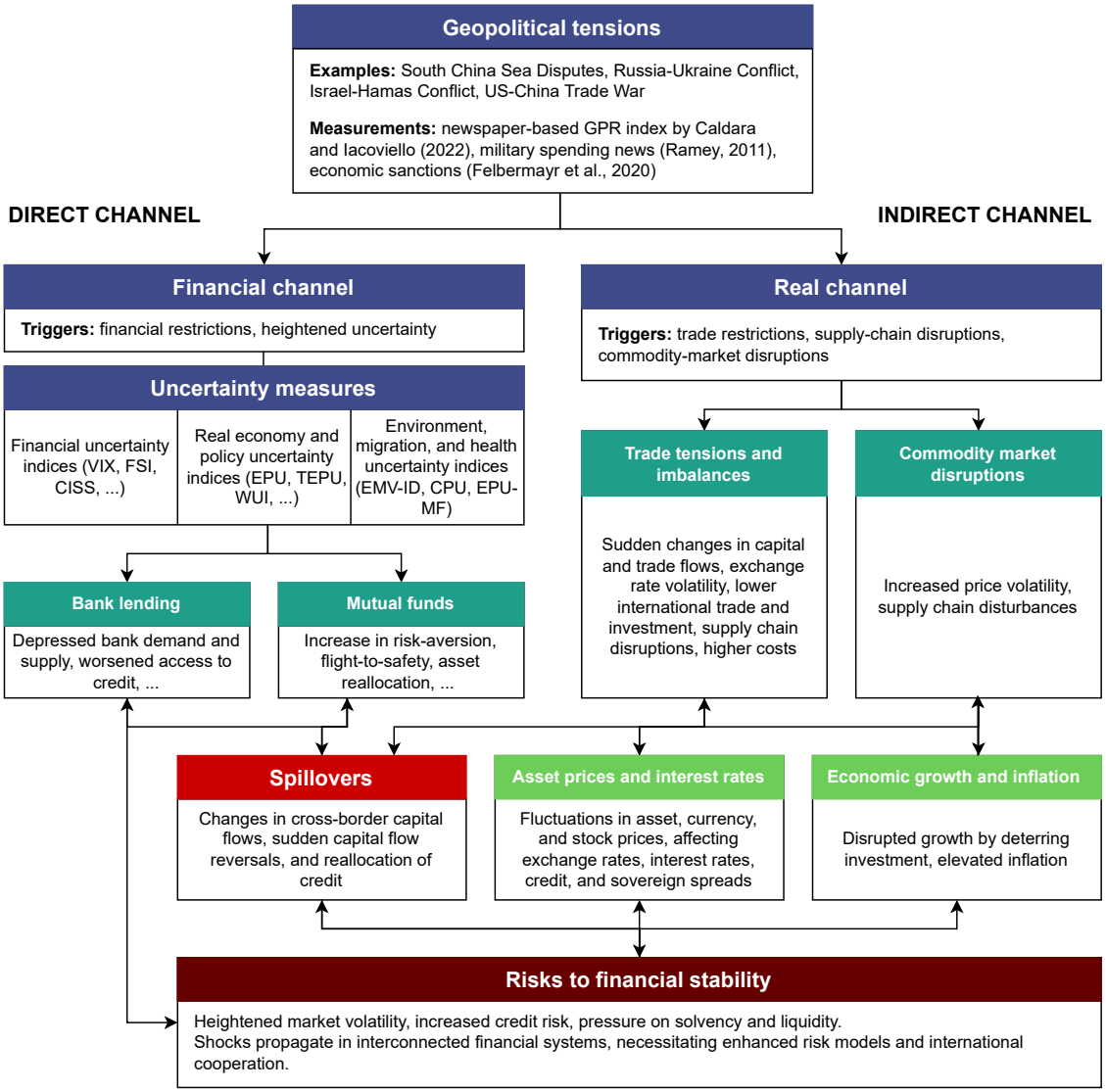
Note: The figure shows the evolution of the uncertainty index averaged across respective categories. Financial uncertainty is represented by the VIX index. The real economy and policy uncertainty are represented by the global EPU index, and environmental, migration and health uncertainty are represented by a simple average of the Climate Policy Uncertainty index, the EPU migration policy uncertainty index, and the EMV Infectious Disease tracker. The pre-event mean value was subtracted from the time series.

Overall, geopolitical tensions are found to be associated with important spikes in uncertainty. The manifestation of these tensions, the GPR, is found to be linked to all kinds of uncertainty indexes, ranging from financial uncertainty to migration fears. As such, it opens up important questions down the line. For instance, do geopolitical tensions impact the price of risky assets, the flow of capital across countries, and ultimately financial stability? Do they affect trade flows and global supply chains and compromise economic growth? To what extent can geopolitical events impact commodity prices and endanger price stability? While a definitive answer to these questions is beyond the scope of this paper, in what follows, we describe the potential channels of transmission through which GPR can impact real economic and financial stability and review the existing literature that can be reasonably linked to the topic.

3. Key Transmission Channels: A Conceptual Framework and Empirical Literature

Geopolitical tensions can affect financial stability through two key channels (IMF, 2023). First, by directly limiting capital flows and payments and/or by increasing uncertainty and investors' risk aversion (*the financial channel*). Second, by indirectly impacting global trade, technology transfers, supply chains, and commodity markets, which can slow down economic growth and increase inflation. This can hurt business profitability and pose risks for banks, affecting overall macro-financial stability (*the real channel*). Figure 4 presents a conceptual framework describing how increased GPR can lead to reduced macro-financial stability.

Figure 4: Geopolitical Risk and Macro-Financial Stability: Key Transmission Channels



Note: The diagram was prepared based on the literature review and categorization by the IMF (2023).

Financial and real channels can amplify each other. For instance, if trade restrictions lower the economy's performance, it might reduce cross-border investments and further harm the economy and trade. The literature indicates that sudden changes in cross-border capital flows often lead to financial crises, especially in emerging and developing economies (Reinhart and Rogoff, 2009; Ghosh et al., 2017). Also, if geopolitical tensions disrupt the commodity market, it could lead to higher inflation, to which central banks may react by tightening monetary policy. This, in turn, can decrease asset prices and increase borrowing costs for non-financial firms, creating risks to financial stability (Gilchrist and Leahy, 2002; Borio and Lowe, 2002).

In this chapter, we gradually describe the two aforementioned channels of transmission and review the existing literature. Despite the recent surge in interest in the topic, there is a scarcity of studies that would directly estimate the impact of geopolitical events on real economic and financial stability. Thus, we search for literature that can be linked to our identified channels of transmission.

3.1 Financial Channel: Uncertainty Shocks and Market Volatility

Geopolitical tensions can lead to increased volatility in financial markets, which can result in a flight to safe-haven assets, such as government bonds or gold. This flight can lead to reduced asset prices and diminishing liquidity in financial markets, which can in turn lead to increased borrowing costs for companies and households, thereby affecting economic growth and financial stability.[4] These actions may in turn further decrease the value of assets, leading to a "loss spiral" as described by Brunnermeier and Pedersen (2009). Loss spirals may be fueled by fire sales, in which market liquidity quickly dries up (see e.g. Coval and Stafford, 2007). While traditional financial multipliers can greatly increase the real impact of fundamental shocks, it is only after they are amplified by widespread panic and confusion that a deep crisis is likely to set in (Caballero, 2010).

Financial frictions amplify the effects of GPR (uncertainty) shocks.[5] Greater uncertainty or risk can lower collateral values and increase credit spreads in the presence of financial frictions, limiting the supply of credit to entrepreneurs and consumers, and slowing economic activity (Christiano et al., 2014). Gilchrist et al. (2014) show the importance of credit conditions in channeling the impact of uncertainty shocks. Alfaro et al. (2018) show, both theoretically and empirically, that real and financial frictions amplify the impact of jumps in uncertainty on firms' investment, employment, debt and cash holdings. Similarly, Alessandri and Mumtaz (2019), Choi et al. (2018) and Caldara et al. (2016) show that uncertainty shocks have an especially negative economic impact in situations where they trigger a simultaneous tightening of financial conditions. Ludvigson et al. (2021) show that sharply higher macroeconomic uncertainty in recessions is often an endogenous response to output shocks, while uncertainty about financial markets is a likely source of output fluctuations. These findings call into question the economic significance of the traditional "wait-and-see" effect of uncertainty shocks as proposed by Bloom (2009, 2014). Instead, the literature points to financial distortions as the main mechanism through which uncertainty shocks affect macroeconomic outcomes.

[4] Classic contributions, such as Bernanke and Gertler (1989); Kiyotaki and Moore (1997), illustrate the powerful feedback channels between asset markets and the macroeconomy.

[5] Financial frictions can be thought of as financial constraints that prevent economic agents from funding all desirable investments from external resources (Christiano et al., 2014).

3.1.1 Mutual Fund Flows

The mutual fund industry is particularly susceptible to uncertainty (GPR) shocks, which may have a substantial impact on their performance, and increase investor anxiety and market volatility. Russia's invasion of Ukraine in February 2022 is an example of a GPR shock that has dramatically affected global financial markets. As investors' risk perceptions change, they are likely to adjust their investment strategies, leading to increased volatility in the mutual fund industry.

To examine the market dynamics amid prevailing uncertainties, Table 2 analyzes the correlation between euro area fund flows - categorized by their investment strategies - and various sources of uncertainty. There are notable differences across individual types of funds and varying sources of uncertainty that could extend well beyond mere correlation.

Table 2: What Type of Risks do Mutual Fund Flows Respond to?

	Financial uncertainty	Real economy and policy uncertainty	Environmental and health uncertainty
Equity	-0.44***	-0.15*	0.12
Real Estate	-0.22**	0.19**	0.17*
Hedge	-0.37***	-0.33***	-0.25***
Bond	-0.32***	-0.22**	-0.23**

Note: The table shows pairwise correlation coefficients between monthly flows of euro area domiciled funds and different types of uncertainty indicators in the period from January 2009 to June 2023. Flows are calculated as the month-to-month change in investment fund shares/units issued by funds domiciled in the EA, divided by total assets. *Financial* is the average of the VIX index and the euro area CISS index. *Real economy and policy averages* averages the Economic policy uncertainty index for the euro area and the US. *Environmental and health* averages the Climate policy uncertainty index, the EPU migration policy uncertainty index, and the EMV Infectious Disease tracker. The statistical significance is denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

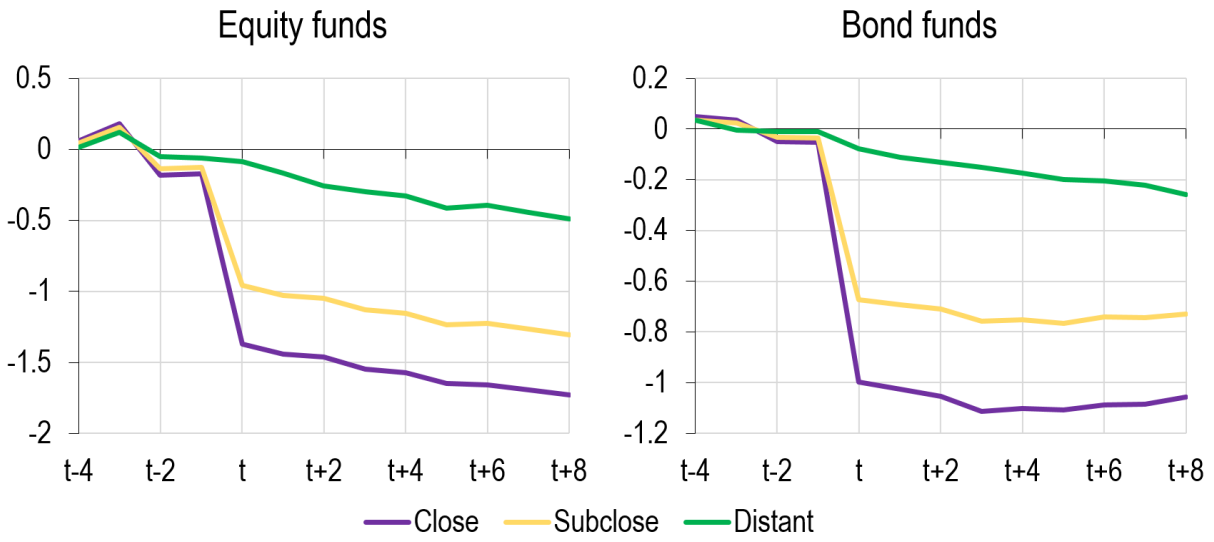
Table 2 shows that mutual fund flows strongly correlate to financial uncertainty. The literature largely agrees that rising uncertainty in the financial sector often results in increased investor anxiety and a tendency towards "flight-to-safety" behavior. This shift leads investors away from higher-risk investments and can result in large outflows from the mutual fund industry as a whole or re-allocations across asset classes. This pattern has been well-documented; for example, Adrian et al. (2019) highlights a strong nonlinear dependence of US stock and bond returns on past equity market volatility using the VIX. Similarly, Baele et al. (2020) shows that during "flight-to-safety" episodes, there are significant outflows from equity funds to government bond and money market funds. These empirical facts are well-nested in the theoretical literature. Traditional consumption-based asset pricing models, such as Barsky (1989) and Bekaert et al. (2009), define a "flight to safety" as the simultaneous occurrence of greater economic uncertainty (considered exogenous), lower equity prices (via the cash flow and/or risk premium channels) and low real interest rates (via the precautionary savings channel) (Baele et al., 2020). Additionally, Caballero and Krishnamurthy (2008) suggest that uncertainty can lead agents to favor safer assets over riskier ones during periods of low aggregate liquidity. Lastly, Brunnermeier and Pedersen (2009) discuss the impact of increasing margin requirements on asset price volatility, suggesting that it can contribute to both liquidity spirals and flights to quality.

The correlations in Table 2 further signal that real economy and policy uncertainty may also inspire changes to investor flows. Policy uncertainty is known to diminish stock prices (Pastor and Veronesi, 2012) and is associated with many adverse real economic effects (Bloom, 2014). A large number of empirical studies have found that economic uncertainty and economic policy uncertainty are positively associated with asset volatility (Conrad and Loch, 2015; Yao and Sun, 2018; Liu and Zhang, 2015; Amengual and Xiu, 2018). Investment flows often serve as a gauge of investor sentiment regarding prevailing and future economic conditions (Ben-Rephael et al., 2012; Frazzini and Lamont, 2008). When real economy and policy conditions become uncertain, investors may seek safer assets and reduce their exposure to riskier investments. The literature has largely neglected the role of real economic and policy uncertainty in influencing fund flows. This is primarily because such uncertainties often go hand in hand with financial instabilities, which are more directly linked to fund flows. Recent evidence suggests, however, that certain aspects of the mutual fund industry, such as investor learning about managerial skills, may become weaker with policy uncertainty, thus resulting in an inefficient allocation of funds (Jiang et al., 2016). French and Li (2022) empirically establish a novel information channel linking aggregate equity fund flows to policy uncertainty.

Finally, environmental and health uncertainty exhibit a strong negative correlation with hedge and bond funds. Falato et al. (2021) document major outflows in bond funds during the Covid-19 crisis, far greater than in past events. Inspecting the sources of fragility, both the illiquidity of fund assets and their vulnerability to fire sales were important factors in explaining the outflows during the Covid-19 fear shock. The strong negative correlation with hedge funds is interesting as the literature to date generally associates outflows from hedge funds with stock market liquidity factors (Acharya and Pedersen, 2005), but not with measures of aggregate uncertainty (VIX index) or pure market crashes Ben-David et al. (2010). However, Ben Khelife et al. (2022) show that hedge funds did not show any sign of market return-timing ability during the pandemic.

Figure 5 looks at the evolution of the growth rates of the total assets of euro area mutual funds preceding and following Russia's invasion of Ukraine. While fund flows, which were used in earlier analyses, inform us about the net movement of cash into and out of the industry, a change in total assets reflects both investment performance and fund flows. From the figure, we observe a rather strong and persistent decline in both equity and bond funds but, interestingly enough, the decline is more pronounced in those countries that are geographically closer to Ukraine.

Figure 5: Evolution of Mutual Fund Flows Around the Onset of the Ukraine War



Note: Annual growth rates of total fund assets with the pre-event mean subtracted from the time series. Close, subclose, and distance are country averages. Close includes: Estonia, Finland, Hungary, Lithuania, Latvia, Poland, Romania, and Slovakia. Subclose comprises the countries in the Close category and adds Austria, the Czech Republic, Germany, and Slovenia. Distant countries are Belgium, Cyprus, Spain, France, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, and Portugal.

Overall, uncertainty of any kind can cause a spike in investor risk-aversion. While the identification of a pure uncertainty shock might be tricky, we turn to the literature exploiting shocks to the investor fear level. Wang and Young (2020) find strong evidence that the level of terrorist activity in the United States correlates with aggregate investor risk aversion and causes significant drops in investor demand for risky funds. In a lab experiment with a sample of financial professionals, Cohn et al. (2015) show that those "treated" with a stock market crash scenario become more risk averse and report an increase in fear, even though they do not experience any direct financial loss. Huber et al. (2021) ran controlled experiments with finance professionals in December 2019 and March 2020 and observe that their investments were substantially lower after the outbreak of the pandemic although their price expectations had not changed and they considered the experimental asset less risky during the crash than before. Weber et al. (2013) survey online customers with brokerage accounts in England between September 2008 and June 2009, asking them how they would allocate £100,000 between a risk-free asset and the UK stock market index, along with a few measures of risk attitudes. They find that risk-taking decreased between September 2008 and March 2009, despite the global financial crisis events. Guiso et al. (2018) find that, after the Global Financial Crisis, both qualitative and quantitative measures of risk aversion increased substantially, with affected individuals divesting more stock. This effect was found to be driven by changes in wealth and expected income.

3.1.2 Bank Lending Dynamics

When facing uncertainty, economic agents can decrease their demand for certain bank products, such as loans or investments.[6] On the other hand, a bank can also withhold its operations when facing heightened uncertainty. Consider a situation where a bank is evaluating the prospect of

[6] This links to the literature studying the impact of uncertainty fluctuations on business cycle dynamics within the framework of irreversible investment (Bernanke, 1983; Eberly, 1994; Bloom, 2009; Bachmann and Bayer, 2013). This approach treats future investment opportunities as "real options," emphasizing the flexibility to delay decisions. Bloom (2009) demonstrates that firms may postpone investments or hiring due to uncertainty

investing in a new market segment, say mortgage lending. If the bank becomes uncertain about the future – for example, because it is unsure if a local housing development will go ahead – it may prefer to wait. If the housing development proceeds, the bank will start to offer mortgages at more attractive conditions, and if not, it may continue to wait and avoid (for now) a costly mistake. In addition, uncertainty also heightens the likelihood of default, thus increasing risk aversion.

Table 3 shows the correlation between new lending dynamics and different sources of uncertainty. As in the previous chapters, we gradually consider uncertainty stemming from the financial sector, real economy and policy events, and environment and health related events.[7] The analysis is run on a sample of 27 EU countries spanning January 2003 to December 2022.[8]

Table 3: New Loans Growth Responds to All Types of Risks

	Financial uncertainty	Real economy and policy uncertainty	Environmental and health uncertainty
A) Contemporaneous			
Consumer loans	-0.56***	-0.11	0.23**
Mortgage loans	-0.46***	-0.08	0.01
NFC loans	0.04	0.04	0.10
B) Uncertainty lagged by one quarter			
Consumer loans	-0.61***	-0.13	0.20**
Mortgage loans	0.16	-0.22**	-0.20**
NFC loans	-0.10	-0.35***	0.22**
C) Uncertainty lagged by two quarters			
Consumer loans	-0.59***	-0.02	0.22**
Mortgage loans	0.24***	-0.17*	-0.18*
NFC loans	-0.30***	-0.43***	0.22**

Note: The table shows pairwise correlation coefficients between the average annual growth rate of new loans granted in EU27 countries and different types of uncertainty indicators. *Financial* is the average of the VIX index and euro area CISS index. *Real economy and policy averages* averages the Economic policy uncertainty index for the euro area and the US. *Environmental and health* averages the Climate policy uncertainty index, the EPU migration policy uncertainty index, and the EMV Infectious Disease tracker. The statistical significance is denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

First, financial uncertainty demonstrates a significant negative contemporaneous correlation with consumer and mortgage loans and a lagged correlation with consumer and corporate loans. This may reflect both a contraction in credit demand, as households and firms delay their decisions when facing uncertainty (Bloom, 2009; Eberly, 1994), and in credit supply, as lending institutions tighten credit standards (Puri et al., 2011). The negative correlation with financial uncertainty lagged by one and two quarters suggests that economic agents remain cautious even after the initial shock, affecting borrowing and lending behavior.

about future developments. Similarly, households might delay consumption decisions when faced with increased uncertainty (Eberly, 1994).

[7] Given the focus on new lending in the EU, we take a simple average of the global uncertainty indexes and EU/EA specific uncertainty indexes, where available.

[8] The sample was selected based on data availability. We require information on new loans, while most of the publicly available cross-country databases track the stock of loans. The focus on EU countries also comes with the advantage of data harmonization across countries, limiting data pollution due to different reporting frameworks.

Second, real economy and policy uncertainty is negatively correlated with mortgage loan growth and NFC loans. Mortgage loans exhibit stronger correlation (compared to consumer loans) likely due to their size, collateralization, and borrower behavior patterns (Chen et al., 2020). Firms' loans respond strongly to policy uncertainty, as it might affect their investment choices (Kang et al., 2014) and even their borrowing costs (Kaviani et al., 2020).

Third, environment and health related uncertainty shows significant positive correlation with consumer and firms' loans but negative correlation with mortgages. Households tend to respond to health uncertainties with caution, prioritizing savings and reducing non-essential borrowing, leading to a negative correlation with mortgage loans (Yannelis and Amato, 2022). In contrast, businesses often seek financing for environmental and health-related initiatives, adapting to regulations, and building supply chain resilience during uncertain times, resulting in a positive correlation with NFC loans as they require funding to support these efforts (Beck and Keil, 2022). These distinct associations reflect the varying priorities and financial behaviors of households and businesses in the face of environmental and health-related uncertainties.

The empirical literature consistently demonstrates that heightened uncertainty leads banks to reduce their loan supply.[9] For example, a study covering banks in 48 countries from 1998–2012 by Buch et al. (2015) shows a contraction in loan supply during uncertain times. Interestingly, better-capitalized banks with larger liquidity buffers are less impacted. Similarly, an events study by Raunig et al. (2017) on US banks reveals that those with higher liquidity-to-asset ratios before an uncertainty spike experience more robust loan growth afterwards, especially among smaller banks. This can be attributed to smaller banks' deeper knowledge of client creditworthiness, stable funding, and focus on relationship banking.

Further, using extensive loan application data from Italian banks between 2004 and 2012, Alessandri and Bottero (2020) find that an increase in aggregate uncertainty makes successful loan applications less likely and delays disbursement, particularly affecting banks with low capital and geographically distant firms. In a related study, Delis et al. (2014) examine US bank lending during "anxious periods" marked by deteriorating expectations. While not exclusively focused on uncertainty, the study does suggest that such periods could overlap with greater uncertainty. Using survey measures of consumer and business confidence, they find lending is negatively influenced by increased anxiety. Lastly, Gric et al. (2022) study the relationship between new loans and household sentiment in EU countries and differentiate between rational (driven by fundamentals) and irrational (excessive) sentiment. They add that negative sentiment brings down loan growth only when backed-up by a worsening of economic fundamentals.

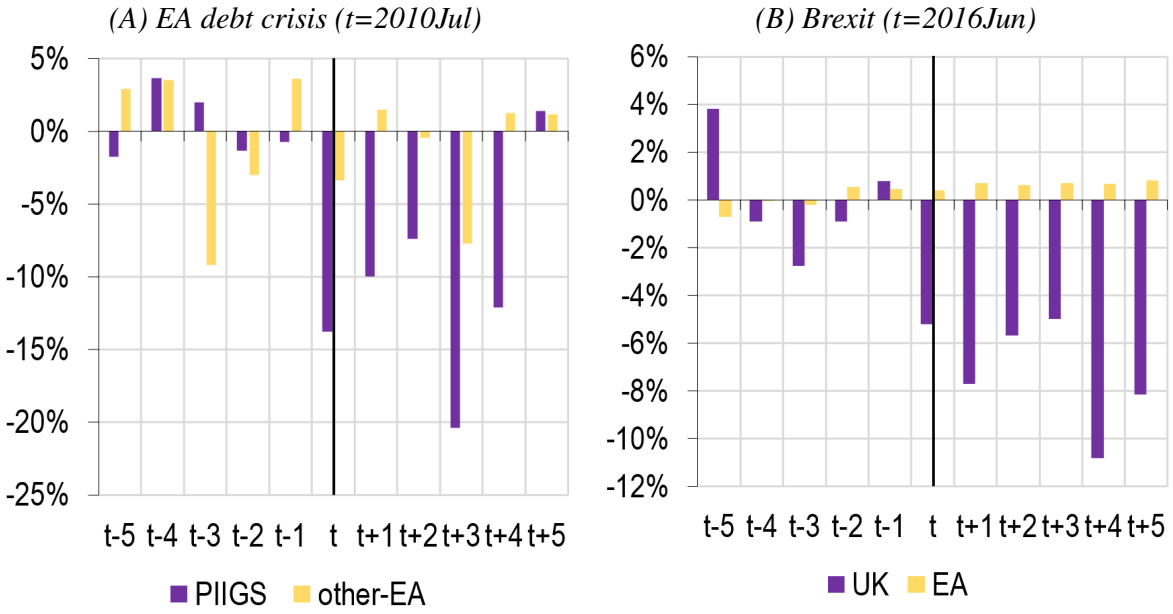
According to the existing literature, a rise of economic policy uncertainty (EPU) also generates a negative response in bank lending. From a sample of 350 US banks, Barraza and Civelli (2020) show that an exogenous increase in US EPU causes a contraction in the supply of business loans. Similarly, Valencia (2016) finds that EPU has a significant negative effect on bank credit growth in the US. EPU effects are more pronounced in larger, lower-capitalized, and less liquid banks. Berger

[9] To identify the supply-side effects of uncertainty on bank lending, studies usually exploit variations in banks' level of capital, arguing that a differential response in bank lending to uncertainty shocks would be supply-driven if the solvency of borrowers was not systematically correlated with the bank capital-to-assets ratio of their lenders. For example, Valencia (2017) develops a dynamic bank model in which a self-insurance mechanism induces the bank to accumulate capital when uncertainty increases. In the process of increasing capital buffers, the bank reduces the supply of credit. Bordo et al. (2016) empirically verifies the self-insurance hypothesis and finds that a decline in uncertainty to its lowest level generates an average reduction in bank capital ratios of up to 2 percentage points.

et al. (2022) show that EPU also increases US banks liquidity hoarding. This behavior is found to be more pronounced for banks with less liquidity, more peer-bank spillover effects, and greater EPU exposure. Using a measure of banks' perception of regulatory uncertainty (during the 2011–2013 rule-making process for the regulation of qualified mortgages), Gissler et al. (2016) provide suggestive evidence that US banks that perceived higher regulatory uncertainty (or that were more adverse to it) reduced lending more severely.[10]

Figure 6 plots consumer loan dynamics around two uncertainty hikes in Europe. Specifically, we consider the outbreak of the euro area debt crisis in mid-2010 and the 2016 Brexit vote. As is apparent, new bank lending dramatically decreases on the event date in the affected countries. Figure A10 explores lending in the period around the terrorist attacks in Spain and Paris, showing a strong decrease in new loan dynamics in the months of the attacks.

Figure 6: Loan Dynamics Around Economic Policy Uncertainty Triggers



Note: The graphs depict the annual growth rate of new consumer loans around the selected event dates (t). The individual sample means (three months before the event) were subtracted from the respective time series.

[10] Few studies examine the relationship between uncertainty and banks' profit behavior, loan pricing, or profit components. For instance, Tran et al. (2021) find that during uncertain times, banks shift towards nontraditional activities for generating non-interest income. Similarly, Dang and Nguyen (2022) shows that banks improve income sources from fees, commissions, and other segments. Research by Danisman et al. (2021) and Ng et al. (2020) highlights the role of loan loss provisions during high policy uncertainty. Additionally, Ashraf and Shen (2019) find that economic policy uncertainty correlates positively with interest rates on bank loans.

3.2 Real Channel: Trade and Commodity Markets Disruptions

Geopolitical risks, such as conflicts, sanctions, trade wars, and policy uncertainties, can disrupt international trade, investment, and capital or commodity flows, impacting the global economy. Within the real channel, we distinguish between the impact of trade tensions and imbalances on financial stability and the effects of commodity market disruptions, even though these two can sometimes coincide.

3.2.1 Trade Tensions and Imbalances

Trade tensions and imbalances frequently stem from international political disputes and rank among the primary geopolitical risks, often culminating in the imposition of tariffs or other mutual trade barriers. Such actions precipitate a decline in international trade and escalate costs for businesses. Trade tensions generally increase uncertainty in the global (real) economy (Bloom, 2009), a topic explored in section 3.1.

Trade imbalances and tensions impact the real economy, leading to adverse effects such as reduced economic growth, recession, and higher inflation (Frankel and Rose, 1998; Alcalá and Ciccone, 2004). Weaker growth prospects can increase unemployment and reduce income, leading to higher household and corporate debt defaults. This indirectly weakens financial institutions, deteriorates financial stability, and raises the risk of systemic crises (ECB, 2022; Ductor and Grechyna, 2015).

The most visible and immediate macroeconomic consequence of trade tensions is slower growth, raising the prospects of financial instability (Ductor and Grechyna, 2015). In the long run, the impacts are notably felt on the supply side because reduced international trade translates to missed opportunities in specialization, productivity enhancement, and competition dynamics. On the demand side, increased protectionism results in higher prices and limited consumer choice, (Rose, 2020). The works of Frankel and Romer (1999), Alcalá and Ciccone (2004), and Hall and Jones (1999) estimate that the effects of well-functioning international trade on real economic growth and the standard of living are substantial.

Small open economies are particularly vulnerable to trade tensions, as they are often heavily dependent on imports and exports, and vulnerable to external shocks (Yun, 2019). Trade tensions can lead to a decrease in demand for their exports, leading to lower growth and heightened financial vulnerability. This channel suggests that financial stability is indirectly affected by trade tensions through the real economy. Moreover, exchange rate fluctuations exacerbated by trade tensions can pose additional challenges for small open economies (Casas et al., 2017). Such fluctuations can distort trade balances, affect debt servicing for countries with foreign-denominated debt, and create uncertainties in financial markets.

Trade tensions have also emerged as a key factor in driving inflation, pushing up the prices of goods and services through various channels. The introduction of tariffs and other trade barriers can directly lead to higher costs of imported goods, resulting in increased consumer prices, an effect empirically supported by Amiti et al. (2019) and Fajgelbaum et al. (2020). Moreover, disruptions to supply chains, often a byproduct of trade tensions, can further exacerbate inflationary pressures. Such disruptions can cause delays in shipments and create bottlenecks, leading to scarcities of goods and higher prices. These disruptions can be particularly damaging in industries that are reliant on just-in-time delivery, as even minor disturbances can cause significant delays and increase costs. LaBelle and Santacreu (2022) found that supply chain disruptions resulting from trade tensions can lead to inflation in both the short and long run. Additionally, prolonged trade tensions can hinder investment and productivity growth, as uncertainty dampens firms' willingness to invest in long-

term projects, and barriers to trade disrupt optimal production processes (Bloom et al., 2007). This, in turn, can contribute to inflation in the long run.

Trade tensions are closely related to trade imbalances. Trade imbalances can lead to protectionist actions and increase tensions, as recent years have shown, especially in the US. Such trade tensions are found to have tangible economic and financial impacts on specific economies (Tam, 2020). The impact of these tensions on prices and welfare has been explored by Amiti et al. (2019) and Fajgelbaum et al. (2020). In a neo-Keynesian model, Erceg et al. (2018) examine the consequences of such measures. Protectionist policies negatively affect economic growth, income and welfare and, indirectly, financial stability. While Furceri et al. (2018) empirically show that increases in tariffs have adverse effects on domestic macroeconomic conditions and income distribution, the anticipated improvement in the trade balance does not materialize after tariffs rise. This outcome may be due to the tendency of the real exchange rate to appreciate following higher tariffs. This viewpoint is supported by a small open economy model proposed by Barattieri et al. (2021).

Tam (2020) empirically shows that a restrictive US trade policy is counter-productive for the US economy as it worsens its trade imbalances. Delpeuch et al. (2021) results highlight the causal impact of trade imbalances on protectionism, showing that country pairs with significant differences in fiscal policies are more prone to protectionist tensions. The study's findings suggest that the fiscal policy differences between the US and Germany (and more generally, the EU) may partly explain the protectionist actions of the US. Delpeuch et al. (2021) investigated the causes of the recent rise in protectionism and analyzed the role of bilateral and multilateral trade imbalances. The authors found that both types of imbalances are strong predictors of protectionist measures, not just in the US but in other countries as well. This relationship existed before the Trump presidency and is expected to continue post-Trump.

Trade tensions are likely to reduce financial integration, impacting the flow of international goods and financial services (Rose, 2020). In a less financially integrated world, this diminished financial integration means savings might not be directed to the most efficient investments and risks are less diversified internationally. While some argue that reduced financial integration can be advantageous for financial stability due to a lower risk of cross-border contagion or less synchronized financial cycles (Frankel and Rose, 1998; Baxter and Kouparitsas, 2005), others highlight its benefits, such as bolstering financial systems through increased access to capital (Kaminsky and Schmukler, 2008). Yet, the overall consensus on this matter remains divided. Notably, during the 2007–2009 global financial crisis, countries that were less financially integrated experienced milder downturns (Rose, 2020). Additionally, there is evidence suggesting that financial liberalization in developing economies can lead to instability, particularly where institutions are weak and liberalization boosts competition and risk-taking (Corsetti et al., 1999b; Daniel and Jones, 2007). The cost of lower trade may thus be partially offset by lower contagion and fewer spillovers from foreign shocks (Corsetti et al., 1999a).

Trade tensions, similarly to trade imbalances, can lead to heightened exchange rate volatility, depreciating a country's currency, diminishing foreign investment values, and influencing the financial account, particularly in small open economies (Yun, 2019). When major economies engage in trade wars, emerging markets often suffer collateral damage (negative externalities), typically experiencing currency depreciation. The US-China trade war is a good example. Ferrari Minesso et al. (2022) demonstrate that trade war announcements (via the media) can lead to an appreciation of the US dollar and a depreciation of emerging market currencies, while safe haven currencies remain stable. In bond markets, evidence of safe haven flows to the US is lacking, but signs of portfolio shifts between stocks and bonds are apparent in emerging markets. The

research indicates that escalating trade tensions are responsible for a 10-15% increase in stock index volatility in China and emerging markets, whereas US stocks are mostly unaffected, except those with substantial trade connections to China.

In recent years, current account surpluses, particularly in emerging market economies, have exerted significant downward pressure on global interest rates. This has, in turn, fueled credit booms and risk-taking in major advanced economies running current account deficits (Borio and Disyatat, 2010; Bernanke, 2005).[11] However, it is crucial to note that emerging markets are not the sole contributors to this global pressure. Excess savings from "surplus countries" like China and Germany have also played a significant role. These dynamics not only fuel credit booms in deficit countries but also pose numerous risks to financial stability and reduce the monetary policy space available to key central banks (Borio and Disyatat, 2010; Obstfeld, 2012; Blanchard et al., 2005).[12]

3.2.2 Commodity Markets Disruptions

Commodity market disruptions also impact the real economy and financial stability. Commodities like oil, metals, and agricultural products influence production costs, consumer prices, and trade balances. Price fluctuations can affect inflation, sector profitability, and the terms of trade, leading to financial market volatility as investors reassess risks and adjust portfolios.

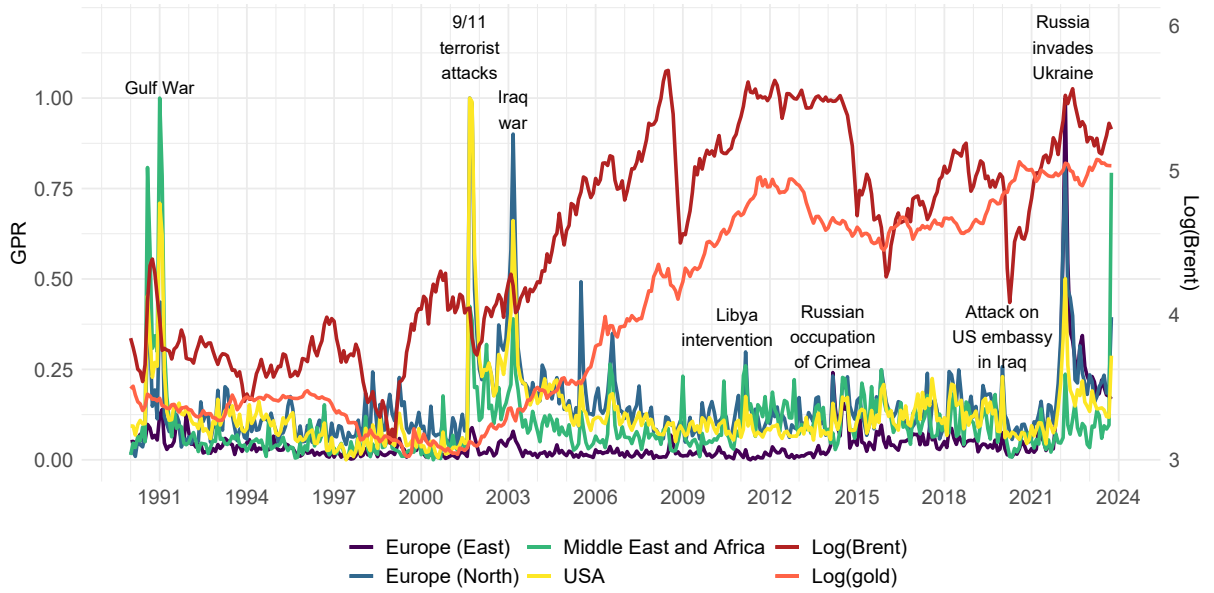
Geopolitical risks significantly influence commodity markets, often intensifying in regions with rich oil and mineral resources (Caldara and Iacoviello, 2022). Recent events like the war in Ukraine and the Covid-19 pandemic have escalated commodity prices, exposing complex connections between commodity markets and the financial system (Wang et al., 2022; FSB, 2023). Figure 7 shows how the main commodity prices evolve around geopolitical events, focusing on Brent crude oil due to its market importance (Demirer et al., 2020) and gold, a safe haven in times of crisis (Triki and Maatoug, 2021). For example, the 9/11 attacks and the Iraq war initially caused fluctuations in oil and gold prices due to supply concerns (Kilian, 2009; Looney, 2003; Fan and Xu, 2011). The Russian invasion of Ukraine caused rapid rises in energy and agriculture prices due to the countries' significant market roles (Abay et al., 2023; Liadze et al., 2023). These examples highlight the interconnectedness of geopolitical events and commodity markets in global economic dynamics.

The impact of commodity price shocks on the financial sector and the economy varies with a country's reliance on commodities and its role in the commodity market. For example, all EU Member States are net energy importers, and their energy security has decreased dramatically due to the war in Ukraine. In 2021, the EU imported 40% of its natural gas and 25% of its oil from Russia (IEA, 2022). Research then shows that oil-importing and oil-exporting countries respond differently to oil price shocks, depending on whether the shocks are demand- or supply-driven (Demirer et al., 2020; Wang et al., 2013). Commodity prices impact financial stability through various channels, affecting stock markets, bank performance, production costs, earnings, consumer behavior, inflation, and central bank policies (Hamilton, 1983, 2009). We will explore these impacts, emphasizing the role of geopolitics.

[11] Borio and Disyatat (2010) show that these global imbalances have been a key driver of financial instability, particularly when surplus countries invest their savings in the financial markets of deficit countries, leading to excess liquidity and asset price inflation. Bernanke (2005) highlights the role of global savings gluts in driving these dynamics, pointing out the significant contributions from countries like China.

[12] Obstfeld (2012) finds that global imbalances can lead to an unsustainable build-up of financial vulnerabilities, creating conditions ripe for financial crises. Blanchard et al. (2005) delve into the macroeconomic effects of global imbalances, providing a broader perspective on how these trends can influence economies worldwide and underscoring the importance of policy adjustments in mitigating potential adverse impacts.

Figure 7: Oil Prices and Regional Geopolitical Risk Indexes over Time

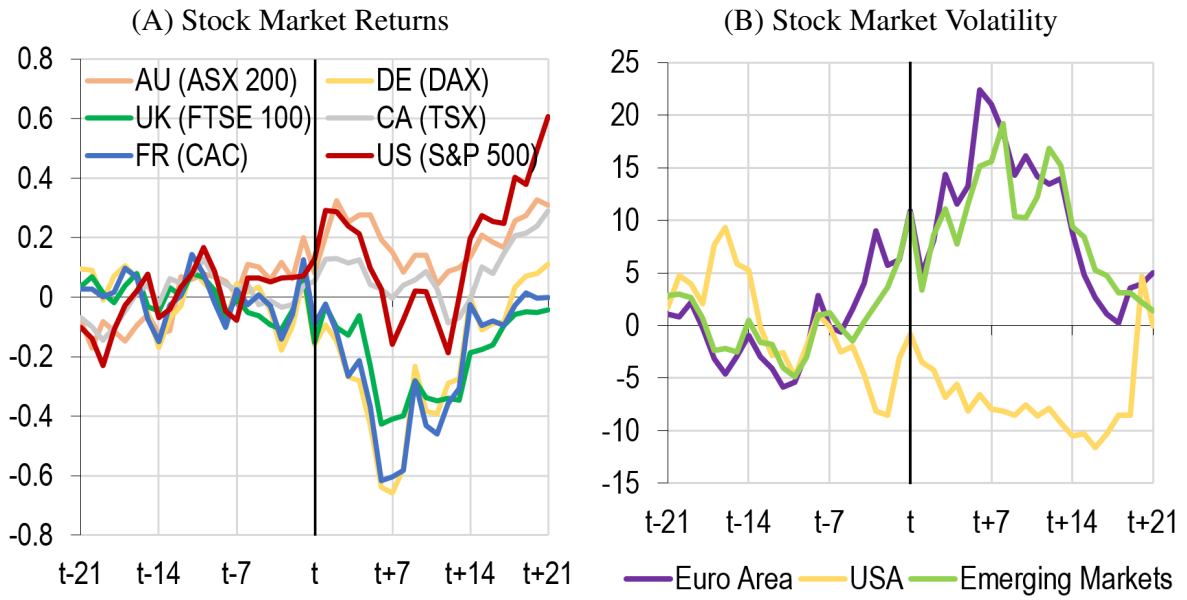


Note: The figure shows the evolution of Brent crude oil and gold prices (right axis, logarithmic scale) alongside regional geopolitical risk indexes (left axis). Key geopolitical events like the Gulf War, 9/11 attacks, Iraq War, and Russia's invasion of Ukraine highlight the strong impact of geopolitical instability on commodity prices.

Research, including studies by Demirer et al. (2020), Wang et al. (2013), Kilian and Park (2009), Kang and Ratti (2013), and Basher et al. (2018), shows that energy price volatility impacts stock and bond markets. Oil demand shocks consistently boost stock market returns across countries, regardless of their economic status or oil trade balance. Kilian and Park (2009) highlighted this impact on the US stock market, emphasizing its sensitivity to oil price fluctuations. However, the effects of supply shocks are more varied: They generally negatively impact stock returns, but in oil-importing countries, they can paradoxically raise stock prices due to lower oil prices and reduced industry costs, boosting firm profits (Wang et al., 2013). In oil-exporting countries, stock market responses to supply shocks typically show a two-stage reaction: an initial price increase followed by a decrease, influenced by differences in short-term and long-term oil demand elasticity (Hamilton, 2009; Basher et al., 2018). Additionally, Kang and Ratti (2013) linked oil shocks with policy uncertainty, indicating that stock market reactions to oil price volatility depend not only on the nature of the shock but also on the broader economic and policy context.

Existing literature, including studies by Olson et al. (2014) and Lombardi and Ravazzolo (2016), shows that commodity prices, particularly oil and precious metals, are closely linked not only to the returns of individual stocks but also to stock market volatility. These commodities are key indicators of the economy's health. Changes in commodity prices, as highlighted by Rossi (2012), can signal wider economic changes, affecting corporate profits, inflation expectations, and monetary policies, which in turn lead to greater stock market volatility. A relationship between geopolitical risk, commodity (oil) prices and stock market volatility was recently described by Smales (2021) who show that an increase in geopolitical risk leads to higher oil prices and greater stock market volatility. This is attributed to geopolitical risk being more closely associated with supply-side disruptions. Additionally, Kang et al. (2020) found that shocks to global commodity prices have a significant and lasting positive impact on global stock market volatility, indicating a strong interconnection between these markets.

Figure 8: Stock Market Returns and Volatility Around the Russian Invasion of Ukraine



Note: The graphs display the development of stock market returns (calculated from daily closes as $return_t = \frac{close_t - close_{t-1}}{close_{t-1}} \cdot 100$). To remove seasonal and cyclical patterns, we use 21-day rolling averages. The individual sample means (21 days, i.e., one trading month before the event date) were subtracted from the respective time series. The vertical line highlights the day t on which an event occurred.

Figure 8 shows how stock market returns and volatility responded to Russia's invasion of Ukraine, using a 21-day window around February 22, 2022. Stock market returns in European countries declined sharply, with increased volatility, while the US, Australia, and Canada saw growth in returns and decreased volatility. Federle et al. (2022) describes this as a "proximity penalty," where market returns decrease more with closer proximity to the conflict.

Research on oil price shocks' impact on bond markets is limited compared to stock markets, as bond markets are influenced by factors like interest rates and inflation expectations. High commodity prices in exporting countries can increase bank lending and capital inflows, but poorly managed increases can lead to financial crises, such as the Latin American debt crisis of the 1980s (Eberhardt and Presbitero, 2021; Kose et al., 2021; Reinhart et al., 2016). The impact on bond markets in net-importing countries is less discussed, highlighting the need for more research on bond market dynamics in different economic contexts.

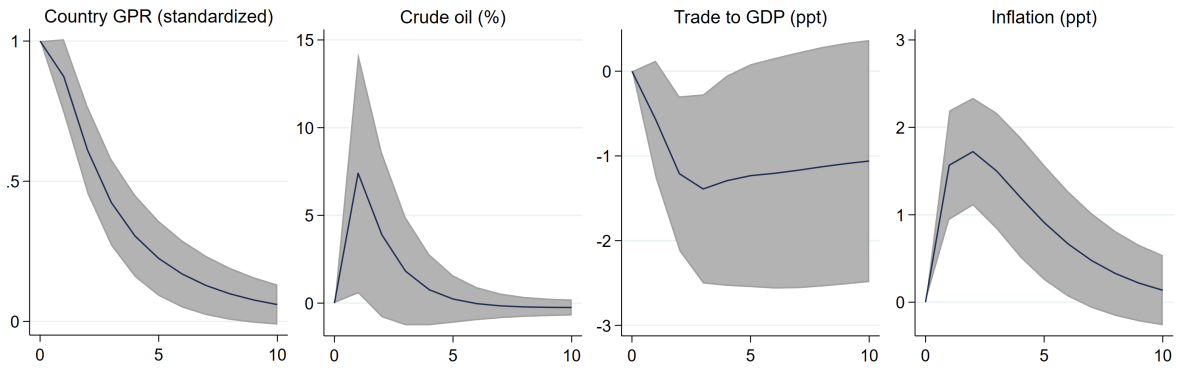
More recently, a growing literature has focused on the relationship between oil and energy prices and the banking sector, showing that oil and energy price fluctuations have asymmetric effects on the banking sector's performance and risk. Positive oil price changes increase bank risk and profitability in oil-exporting countries, while negative changes primarily impact credit growth (Ibrahim, 2019). Negative oil price shocks have a stronger effect on non-performing loans than positive shocks, especially in larger banks (Al-Khazali and Mirzaei, 2017). Lee and Lee (2019) and Ma et al. (2021) found that higher oil prices ultimately increase bank risk and decrease performance in China. Similarly, Nasim and Downing (2023) observed a negative impact of energy prices on bank performance in G7 economies. While most of the papers do not mention the role of geopolitical risk, Saif-Alyousfi et al. (2021) suggests that these relationships are influenced by global geopolitical shocks.

Commodity price volatility significantly affects the financialized segments of the commodities market, like futures and options, which are dominated by a few large traders (Avalos and Huang, 2022). These traders often fall under less regulatory scrutiny (FSB, 2023). The FSB (2023) report highlights risks associated with market concentration, the leveraged nature of traders, less standardized margining practices, and the opacity of the OTC market, potentially amplifying and propagating losses.

A large body of literature investigates the impact of energy price fluctuations on economic activity and consumer prices, which in turn may have consequences for financial stability. Rising commodity prices lead to increased inflation and affect output and income with varying impacts, depending on whether a country imports or exports commodities (De Gregorio, 2012). The effect is more significant in economies with larger shares of food and energy in their consumption baskets, like emerging markets, or where price shocks are severe, such as in the euro area (Avalos et al., 2022). Additionally, there are second-round effects, which refer to the indirect impact on other prices, through cost-push or demand-pull pressures. Strong supply chain linkages cause high spillovers from food and energy to other sectors (Avalos et al., 2022). Core inflation rises due to higher commodity prices but less so than headline inflation, particularly in commodity-importing countries, unlike in exporting countries where the effect is milder and often statistically insignificant due to appreciating exchange rates (Igan et al., 2022).

Developments in inflation dynamics can affect the stability of financial markets and institutions significantly. Moderate inflation may stimulate economic activity by promoting spending and investment. In contrast, high or unpredictable inflation can diminish purchasing power, hinder long-term planning, and introduce uncertainty into financial decision-making, as explored by (Huybens and Smith, 1999; Boyd et al., 2001).

Figure 9: Effects of Geopolitical Risks on Inflation: Panel VAR from 1900 to 2020



Note: The figure presents impulse responses to a one-standard-deviation surge in country-specific geopolitical risk, as determined through a panel vector autoregression (PVAR) model. This model utilizes annual data spanning from 1900 to 2020 and is based on the following Cholesky ordering of variables (using two lags of variables set according to information criteria tests): country GPR (standardized), a log of crude oil prices (West Texas Intermediate), trade-to-GDP ratio, and the inflation rate. Data on inflation were winsorized from the top (2.5% cut-off) to filter out hyperinflation periods. The solid lines in the figure represent the primary estimates, while the shaded regions are the bootstrapped 90 percent confidence intervals. The data are from Caldara and Iacoviello (2022), FRED and the Jorda-Schularick-Taylor Macrohistory Database.

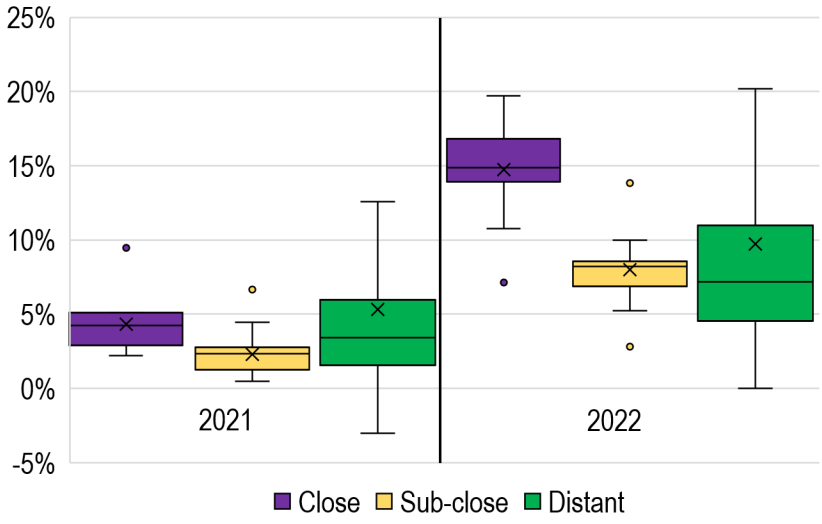
Figure 9 estimates a panel VAR using country-specific GPR indexes, crude oil prices, trade to GDP, and inflation data, covering 1946 to 2020 for most countries. The impulse responses show that a one-standard-deviation GPR shock induces inflationary pressures, peaking at nearly 1.5% within

two years. The model indicates that geopolitical risk-induced inflation is accompanied by increases in crude oil prices and trade disruptions.

Commodity price shocks impact firms and households distinctly. For firms, particularly in energy sectors, price changes influence production costs, capital investment, and the push towards efficient technologies, impacting business performance across regions and time (Zha and Ding, 2015; Koetse et al., 2008; Acemoglu et al., 2012; Popp, 2002; Calí et al., 2022). Energy-intensive sectors may respond by importing cheaper inputs, affecting domestic production Chiacchio et al. (2023). For households, rising energy prices increase fuel bills and costs for goods and services, causing financial strain and affecting consumer spending and financial planning, with broader implications for economic and financial stability (Guan et al., 2023; Celasun et al., 2022; Anderloni et al., 2012).

Figure 10 examines the inflation dynamics in 171 countries following Russia's invasion of Ukraine. It plots the surges in inflation between 2021 and 2022 for three groups of countries categorized by their geographical proximity to the conflict zone. Although inflation surged globally, the analysis reveals a significantly greater increase in the countries closer to Ukraine compared to others.

Figure 10: Inflation Dynamics Following the War in Ukraine



Note: The close group includes countries that are direct neighbors to Ukraine and their second-degree neighbors (12 countries in total). The sub-close group consists of the remaining European countries (19 countries in total). The distant group is the rest of the world countries (140 countries in total).

3.3 Spillover Effects Through Changes in Cross-Border Capital Flows

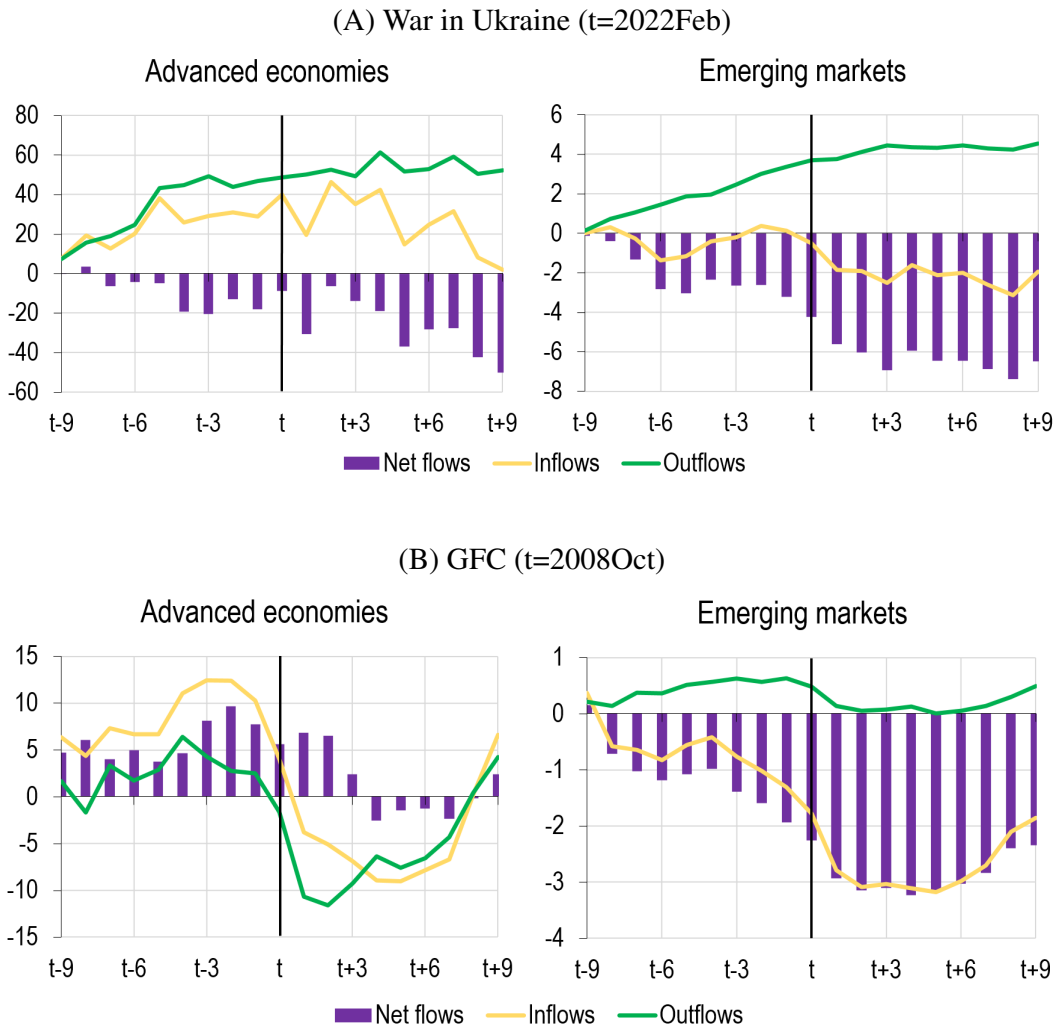
Uncertainty in the global economy, arising from factors like geopolitical tensions and economic instability, significantly impacts cross-border capital flows. A hike in uncertainty can prompt investors to withdraw their capital, leading to abrupt outflows, changes in investor risk appetite, and reallocations to safer assets (Acemoglu and Zilibotti, 1997; Fogli and Perri, 2015; Dicks and Fulghieri, 2021; Akinci et al., 2022). This behavior depletes foreign reserves and can trigger currency devaluation and liquidity crises (Goldfajn and Valdes, 1997; Aguiar and Gopinath, 2005).

During expansions, foreigners invest more domestically and domestic agents invest more abroad. However, during crises, total cross-border flows collapse as investors typically allocate funds predominately in domestic assets Broner et al. (2013).[13] For example, before the GFC, increased risk typically led to capital flows from AEs to EMEs, but this reversed during the GFC, causing a substantial reallocation of capital from many EMEs into a few AEs (Fratzscher, 2012). An increase in uncertainty induces a substantial and persistent decrease in bank credit, portfolio debt inflows, and equity inflows, especially for developing economies and those with more open capital markets (Choi et al., 2023).

Figure 11 illustrates cross-border equity flows during two significant events: the Russia invasion of Ukraine and the Lehman Brothers collapse, showing major net outflows from emerging markets. These patterns align with literature findings on capital flows during crises. In the case of Russia's invasion of Ukraine, the drop in net flows for EMEs resulted primarily from negative inflows, i.e., a retrenchment of foreign investors from EMEs, while outflows (investment by domestic agents abroad) remained positive, intensifying the net outflow from EMEs. After the Lehman Brothers collapse, both AEs and EMEs experienced negative inflows and outflows. However, AEs maintained a balanced net flow because domestic investors shifted from foreign to local investments to the same extent as foreign investors pulled out. In contrast, EMEs, with historically few claims in foreign countries, saw deeply negative net flows over the course of the GFC.

[13] The literature generally explains this asymmetry through informational advantages and familiarity considerations for domestic investors (Seasholes and Zhu, 2010).

Figure 11: Cross-Border Equity Flows Around Selected Global Uncertainty Triggers (USD bn)



Note: The figure shows the evolution of monthly equity cross-border cumulative flows in a sample of advanced and emerging market economies. Inflows denote the money flow from foreign investors (+/- money flowing in/out of the domestic country). Outflows denotes the money flow from domestic investors (+/- money flowing in/out of the foreign countries). Net flows are inflows minus outflows; a positive value indicates positive money inflows into the domestic country. The data are from the OECD Monthly Capital Flow Dataset (de Crescenzio and Lepers, 2021).

Uncertainty shocks play an important role in driving bilateral capital flows, not just global ones. Table 4 shows a negative correlation between cross-border banking claims and various uncertainty indexes. For EMEs, uncertainties from economic and policy developments, as well as environmental and health uncertainties, correlate negatively with cross-border claims. For AEs, the strongest negative correlation is with real economy and policy uncertainties. The analysis is performed from the perspective of receiving country; for example, a decrease in EMEs' cross-border claims would signal a retrenchment of foreign investors from EMEs (a decrease in cross-border lending to EMEs).

Table 4: Cross-Border Bank Positions and Uncertainty Risks

	Financial uncertainty	Real economy and policy uncertainty	Environmental and health uncertainty
	Cross-border claims		
Advanced countries			
Total	-0.15*	-0.31***	-0.12
Loans	-0.20**	-0.31***	-0.13
Debt securities	-0.12	-0.37***	-0.22**
Emerging markets			
Total	-0.26***	-0.56***	-0.46***
Loans	-0.26***	-0.51***	-0.28***
Debt securities	-0.20**	-0.12	-0.12

Note: The table shows pairwise correlation coefficients between annual changes in cross-border bank positions and various uncertainty indicators. The data derived from the BIS Locational Banking Statistics are of quarterly frequency and span the period from 2000 Q1 to 2022 Q4. *Financial* is the VIX index. *Real economy and policy averages* is represented by the Economic Policy Uncertainty index. *Environmental and health* averages the Climate Policy Uncertainty index, the EPU Migration Policy Uncertainty index, and the EMV Infectious Disease tracker. The statistical significance is denoted as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

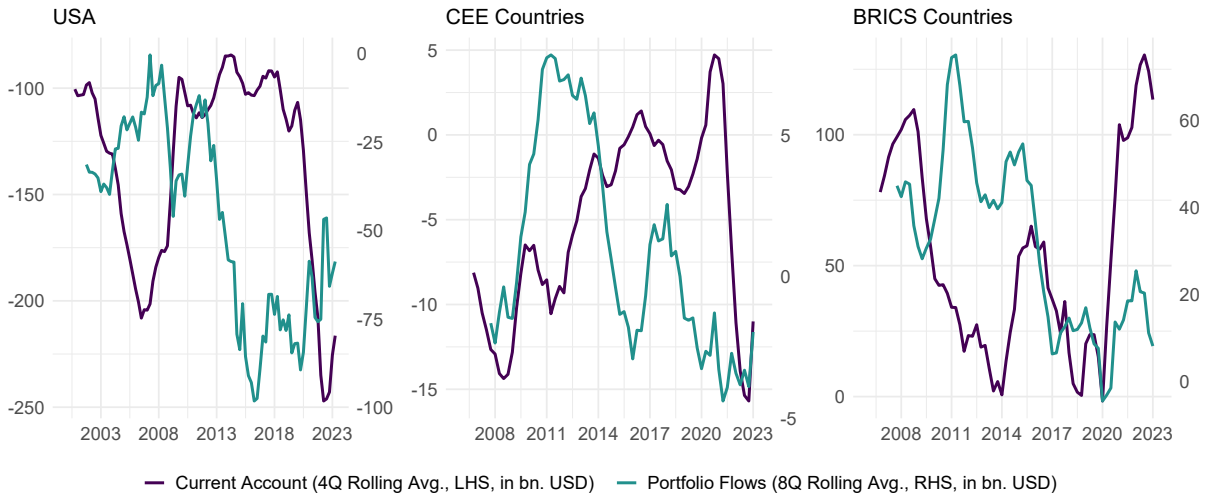
Capital flows, however, can be significantly influenced by the real factors mentioned in the previous chapter, such as trade tensions and imbalances. Sudden changes in capital flows then pose a risk to financial stability. Tariffs and trade barriers influence the current account balance, which typically shows an inverse relationship with capital flows. This dynamic is depicted in Figure 12 for the USA and selected emerging markets.[14]

The impact of trade imbalances on the financial account is complex, as different components respond in different ways. More volatile components, like portfolio debt and equity inflows, pose higher risks (Sula and Willett, 2009; Wei, 2001; Albuquerque, 2003). In contrast, foreign direct investment (FDI) is typically more stable due to its longer-term nature and lower susceptibility to short-term fluctuations (Levchenko and Mauro, 2007; Sula and Willett, 2009).[15]

[14] A current account surplus or deficit must be offset by an equal and opposite movement in the financial account, a fundamental principle of the balance of payments. In theory, a current account deficit (when a country imports more than it exports) should be financed by capital inflows (foreign investments in a country), while a current account surplus (when a country exports more than it imports) should result in capital outflows (investments abroad). However, the relationship between current account balances and capital flows can deviate from the typical inverse pattern for various reasons, including government interventions (Aizenman and Pasricha, 2013), valuation changes (Lane and Milesi-Ferretti, 2007), and data discrepancies. Additionally, the presence of financial centers (Avdjiev et al., 2022), speculative capital movements, and global or regional crises (Obstfeld et al., 2005) can further distort this relationship, leading to complexities in understanding the financial dynamics.

[15] While portfolio and banking flows can be destabilizing, they can contribute to stability if coupled with sound macroeconomic policies (Pruski et al., 2008). FDI can also bring risks, especially if it creates sector dependency or involves heavy leveraging. Over-reliance on short-term capital flows can leave an economy vulnerable to global financial shocks (Milesi-Ferretti and Razin, 2008; Forbes and Warnock, 2014).

Figure 12: Current Account and Capital Portfolio Flows



Note: The graphs show the current account (purple line) and portfolio (debt + equity) capital flows (green line) in bn USD. The emerging countries are divided into two groups: Central and Eastern Europe (CEE) including the Czech Republic, Hungary, Poland, and Slovakia; and the BRICS group (Brazil, Russia, India, China, and South Africa). The graphs depict an inverse relationship between the development of the current account and capital flows. The data are from the Balance of Payments (BOP6), the Current Account Balance by the OECD (2023) and the OECD Monthly Capital Flow Dataset by de Crescenzio and Lepers (2021).

Significant global events, especially geopolitical ones, critically influence trade and capital flows. Historically, political events have triggered balance of payments crises, such as the mid-1990s Mexican crisis. A political uprising post-presidential elections sparked uncertainty, leading investors to demand higher returns for Mexican assets, creating financial turbulence Kaminsky and Reinhart (1999). This period is known as the 1994–1995 Balance of Payments crisis.

The Asian financial crises of 1997–1998 mirrored the Mexican crisis, with significant foreign disinvestment and a reduction in new foreign investment (Janus and Riera-Crichton, 2013). The Mexican crisis was tied to the country's fixed exchange rate policy, large current account deficits, and reliance on short-term foreign borrowing, making the economy vulnerable to shifts in investor sentiment. The abrupt devaluation of the peso further eroded investor confidence, leading to rapid capital outflow (Edwards, 1998).[16]

Another example, the Covid-19 crisis, led to sudden capital outflows and sharp currency depreciations in many emerging markets and developing economies. This financial stress, exacerbated by new trade barriers, increased the risk of external crises for economies with large current account deficits. In 2019, about 40% of global current account deficits and surpluses were deemed excessive, with significant imbalances in the euro area and lower-than-warranted balances in Canada, the UK, and the US (Kaufman and Leigh, 2020). Persistent global imbalances, fueled by protectionist sentiments and trade tensions, pose risks for both deficit and surplus economies. Excessive borrowing or investing abroad increases vulnerabilities, especially given the historic highs in external assets and liabilities. Managing these imbalances is crucial for financial stability.

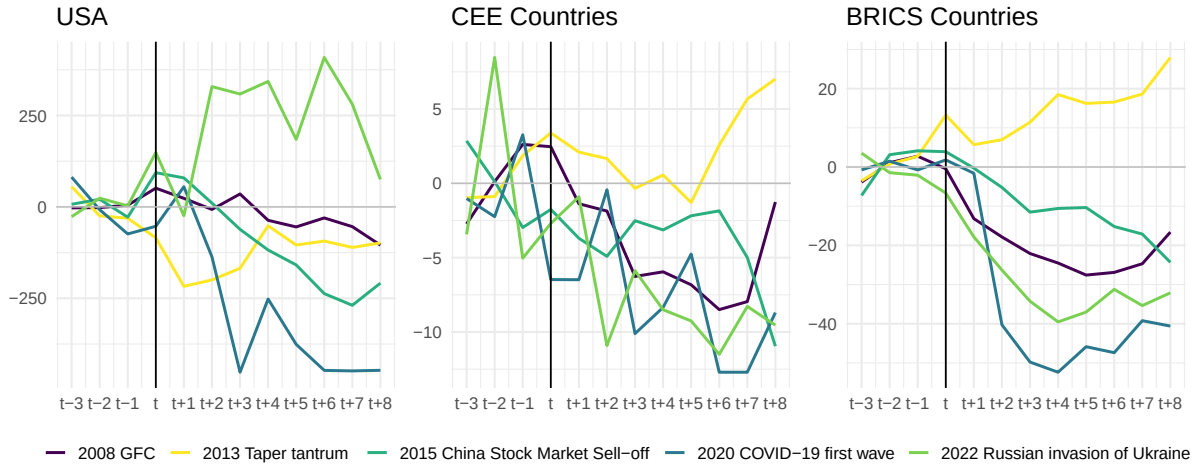
To illustrate the impact of global risks on international trade and capital flows, we examine several events: financial (2008 Global Financial Crisis, 2015 China Stock Market Sell-off), policy (2013

[16] This crisis underscored the need for adequate foreign exchange reserves and flexible exchange rate regimes, leading to significant economic reforms in Mexico (Edwards, 1996).

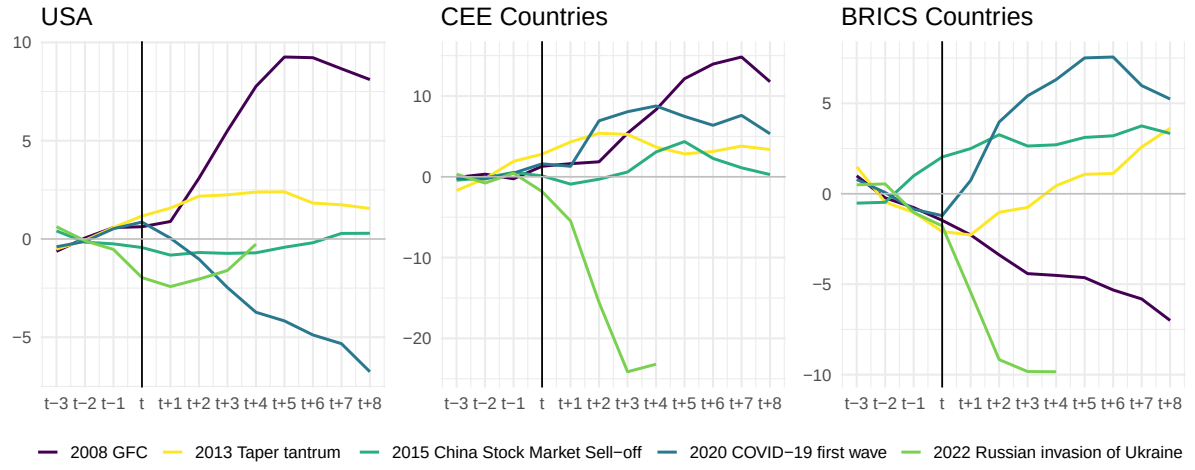
Taper Tantrum), environmental (2020 Covid-19), and geopolitical (2022 Russian Invasion of Ukraine). Figure 13 tracks the monthly portfolio flows following these events, showing sudden stops in capital flows into EMEs and safe havens like the USA. The Russian invasion of Ukraine represents the latest in a series of significant capital flow disruptions.

Figure 13: Net Portfolio Flows and Current Account in the USA, CEE and BRICS

(A) Net Portfolio Flows



(B) Current Account



Note: The figure shows the evolution of cumulative capital flows (net portfolio flows) and the current account to GDP ratio from the OECD and IMF databases (de Crescenzio and Lepers, 2021; Koepke and Paetzold, 2024; OECD, 2023). Time t represents the moment when a particular event occurred. The time series are demeaned to the average from t-3 to t-1. Time t for each event is as follows: 2008 GFC – Sept. 2008; 2013 Taper Tantrum – May 2013; 2015 China stock market sell-off – July 2015; Covid-19 – Jan. 2022; 2022 Russian Invasion of Ukraine – Feb. 2022. Central and Eastern Europe (CEE) includes the Czech Republic, Hungary, Poland, and Slovakia; and the BRICS group includes Brazil, Russia, India, China, and South Africa. The data are from the OECD Monthly Capital Flow Dataset by (de Crescenzio and Lepers, 2021) and the Capital Flow Dataset published with the IMF Working Paper by (Koepke and Paetzold, 2024).

Figure 13, Panel A shows that most events led to declines in net portfolio flows in BRICS countries, except for the 2013 Taper Tantrum, which had a minimal impact. The 2022 Russian invasion of Ukraine caused a prolonged decline in BRICS but only a brief decline in the USA, likely due to the flight-to-safety hypothesis. The USA's response to the Covid-19 pandemic was delayed compared to BRICS, as the pandemic affected the USA later. The emerging economies of CEE displayed

similar but more volatile capital movements due to their lower volume. Appendix A11 confirms this trend in a larger panel of 33 EME countries.[17]

Figure 13, Panel B, tracks the cumulative quarterly change in the current account to GDP ratio following global events.[18] Movements in the current account often mirror opposite capital flow movements. For most events, this pattern holds true. The Russian-Ukraine war, however, caused a brief decline in the current account balance for the USA and all other countries. The 2008 GFC led to decreased imports in developed countries, improving the USA's current account but destabilizing BRICS. Conversely, Covid-19 prompted opposite reactions in current accounts due to stricter restrictions in BRICS countries. The 2013 Taper Tantrum improved the current account in the USA and briefly worsened it in BRICS.

Previous event studies suggest movements in capital and trade flows in response to various types of geopolitical events, with variations between emerging markets and countries perceived as safe havens (such as the USA). These abrupt changes in capital and trade flows can represent additional potential risks to financial stability.

Fluctuations in capital flows, often driven by uncertainty around geopolitical events, can lead to asset price bubbles and exacerbate financial risks (Ventura, 2012). This is particularly evident in smaller, emerging economies, where sudden reversals in capital flows and asset price bubbles are more common. Larger, developed economies like Australia and Japan tend to be less affected (Sarno and Taylor, 1999).

Additionally, fluctuating capital flows can lead to exchange rate volatility (Rose, 2020), exacerbating the impact of cross-border capital flows on financial stability by affecting the value of foreign assets and liabilities, potentially resulting in losses for investors and financial institutions (Avdjiev et al., 2019). Exchange rate movements influence asset prices, profitability, exports, imports, and foreign currency-denominated assets and liabilities (Bénétrix et al., 2015). The financial channel's increasing importance, with heightened integration, can sometimes counteract the trade channel through a country's external balance sheet liabilities (Bruno and Shin, 2015; Hofmann et al., 2016; Avdjiev et al., 2019). In high foreign currency exposure contexts, domestic currency appreciation can have an expansionary effect in small open economies, decreasing the value of liabilities relative to assets and easing financial conditions (Longaric, 2022).

The degree of integration through debt and banking is crucial. Highly integrated countries with substantial net liabilities in debt instruments are more vulnerable, experiencing sharper declines in capital inflows during trade and financial disruptions (Milesi-Ferretti and Tille, 2011). Contagion through trade and banking system exposures plays a significant role in extreme capital flow events, particularly during stops and retrenchment (Forbes and Warnock, 2012; Baum et al., 2017).[19] Moreover, many episodes of credit and asset price booms have been accompanied by current account deterioration amid strong private capital inflows (Dell'Ariccia et al., 2016). Free capital flows have pros and cons for EMDEs; they provide crucial foreign capital, boosting growth and resilience, but also make these economies more sensitive to global financial fluctuations (Kim and

[17] In contrast, Figure A12 shows a consistent increase in FDI flows into CEE, BRICS, and a sample of all EME countries, unaffected by financial, environmental, economic policy, or geopolitical events, thus supporting the literature on the stability of FDI (Levchenko and Mauro, 2007; Sula and Willett, 2009).

[18] Current account to GDP ratio data are available only quarterly. For some countries, we found monthly data on the current account, but not as a ratio to GDP, since GDP data is released only quarterly.

[19] Stops and retrenchment refer to sudden reductions in capital inflows and outflows, respectively, while surges and flights refer to substantial increases in inflows and outflows, respectively.

Singal, 2000). The impact on financial stability is debated, with no clear consensus on whether these movements lead to stability or vulnerability (Kose et al., 2009; Broner et al., 2013). Small open economies are particularly vulnerable to sudden capital flow changes as investors become more risk-averse (Aghion et al., 2004).

To restrict the free movement of capital, governments may implement capital controls or regulatory measures. Following the GFC, many emerging markets deployed capital controls to manage excessive capital flows (Eichengreen and Rose, 2014). Historically, capital controls have been viewed skeptically, with empirical findings suggesting they only influence the composition of flows, not their volume, and can lead to corruption (Montiel and Reinhart, 1999; Edwards, 1999; Glick et al., 2006; Magud et al., 2018).[20] Recently, capital controls have been reconsidered as prudential policy tools to reduce financial fragility and bolster economic resilience (Rebucci and Ma, 2019). For example, capital controls and FX-related prudential measures can lead to less FX lending in domestic bank credit and a smaller proportion of portfolio debt in external liabilities (Ostry et al., 2012; Bruno et al., 2017; Forbes et al., 2015). Bacchetta et al. (2023) find that EME firms commonly issued bonds in foreign currency during periods of low US interest rates, but capital controls on bond inflows have notably reduced this tendency.

4. Conclusions

In this review, we investigated how geopolitical risks affect macro-financial stability, focusing on their impact on financial markets and the economy. Geopolitical tensions, such as conflicts and economic sanctions, can directly influence market volatility and raise uncertainty in the financial sector. This increased uncertainty can lead to heightened risk aversion, trigger flight-to-safety episodes, and cause asset reallocation. The banking sector is particularly susceptible to these uncertainty-induced shocks, which depress both credit demand and bank credit supply.

Indirectly, geopolitical risks can instigate trade restrictions and cause disruptions to supply chains and commodity markets, leading to trade imbalances, increased price volatility in commodity markets, and broader economic disruptions. Additionally, our review shows that geopolitical tensions have a strong link to migration fears, further underscoring the socio-economic impact of these risks.

The literature on this topic is abundant yet fragmented across multiple topics and lacks a cohesive conceptual framework, given that geopolitical risk as a source of uncertainty is a relatively new area of study. To address this gap, we conducted simple analyses to visually support the findings from the literature. These analyses show that the impact of geopolitical tensions on economic and financial uncertainty is characterized by significant but short-lived spikes during major geopolitical events, rather than a consistent influence over time. This reinforces the importance of adopting a more event-specific approach to monitoring and managing the effects of geopolitical risks.

[20] Magud et al. (2018) summarize the main limitations of the pre-GFC literature on capital controls: (i) the absence of a unified theoretical framework, (ii) significant variation in control measures implemented across countries and over time, (iii) multiple criteria defining a "successful" implementation, and (iv) empirical studies that are disproportionately influenced by a few country cases. On the other hand, Rebucci and Ma (2019) review the more recent literature on capital controls, identifying three primary theoretical motives for using capital controls: (i) financial stability concerns arising from pecuniary externalities in models of financial crises, (ii) aggregate demand externalities in new Keynesian models of the business cycle, and (iii) terms of trade manipulation in open economy models with pricing power.

By recognizing the episodic nature of these impacts, policymakers and financial institutions can better prepare for sudden spikes in uncertainty, ensuring more resilient economic and financial systems. Future research should continue to explore the episodic nature of these relationships to further enhance our understanding and preparedness for geopolitical disruptions. Recognizing these episodic impacts is essential for developing targeted and timely policy responses that can mitigate the adverse effects on economic growth, financial market functioning, and overall macro-financial stability.

Future research should focus more on the spillover effects and feedback loops of geopolitical risks across regions, and on understanding the role of asymmetries and nonlinearities in the transmission of these shocks. Additionally, we need a simple, unified theoretical framework to better understand the mechanics of geopolitical risk propagation and its impacts on financial stability. Such a framework would improve our understanding of both direct and indirect channels of transmission, and shed light on the varying intensities and duration of these effects across different economies and financial markets, and over various horizons. Studies on the performance of different policy measures in various geopolitical situations could also provide insights into how to better mitigate the systemic impact of these shocks.

References

ABAY, K. A., C. BREISINGER, J. GLAUBER, S. KURDI, D. LABORDE, AND K. SIDDIG (2023): "The Russia-Ukraine War: Implications for Global and Regional Food Security and Potential Policy Responses." *Global Food Security,* 36:100675.

ACEMOGLU, D. AND F. ZILIBOTTI (1997): "Was Prometheus Unbound by Chance? Risk, Diversification, and Growth." *Journal of Political Economy,* 105(4):709–751.

ACEMOGLU, D., P. AGHION, L. BURSZTYN, AND D. HEMOUS (2012): "The Environment and Directed Technical Change." *American Economic Review,* 102(1):131–166.

ACHARYA, V. V. AND L. H. PEDERSEN (2005): "Asset Pricing with Liquidity Risk." *Journal of Financial Economics,* 77(2):375–410.

ADRIAN, T., R. K. CRUMP, AND E. VOGT (2019): "Nonlinearity and Flight-to-Safety in the Risk-Return Trade-Off for Stocks and Bonds." *The Journal of Finance,* 74(4):1931–1973.

AGHION, P., P. BACCHETTA, AND A. BANERJEE (2004): "Financial Development and the Instability of Open Economies." *Journal of Monetary Economics,* 51(6):1077–1106.

AGUIAR, M. AND G. GOPINATH (2005): "Fire-Sale Foreign Direct Investment and Liquidity Crises." *Review of Economics and Statistics,* 87(3):439–452.

AHIR, H., N. BLOOM, AND D. FURCERI (2022): "The World Uncertainty Index." NBER Working Paper 29763, National Bureau of Economic Research.

AIZENMAN, J. AND G. K. PASRICHA (2013): "Why Do Emerging Markets Liberalize Capital Outflow Controls? Fiscal Versus Net Capital Flow Concerns." *Journal of International Money and Finance,* 39:28–64.

AKINCI, O., S. KALEMLI-ÖZCAN, AND A. QUERALTO (2022): "Uncertainty Shocks, Capital Flows, and International Risk Spillovers." NBER Working Paper 30026, National Bureau of Economic Research.

AL-KHAZALI, O. M. AND A. MIRZAEI (2017): "The Impact of Oil Price Movements on Bank Non-Performing Loans: Global Evidence from Oil-Exporting Countries." *Emerging Markets Review,* 31:193–208.

ALBUQUERQUE, R. (2003): "The Composition of International Capital Flows: Risk Sharing Through Foreign Direct Investment." *Journal of International Economics,* 61(2):353–383.

ALCALÁ, F. AND A. CICCONE (2004): "Trade and Productivity." *The Quarterly Journal of Economics,* 119(2):613–646.

ALESSANDRI, P. AND M. BOTTERO (2020): "Bank Lending in Uncertain Times." *European Economic Review,* 128:103503.

ALESSANDRI, P. AND H. MUMTAZ (2019): "Financial Regimes and Uncertainty Shocks." *Journal of Monetary Economics,* 101:31–46.

ALFARO, I., N. BLOOM, AND X. LIN (2018): "The Finance Uncertainty Multiplier." NBER Working Paper 24571, National Bureau of Economic Research.

AMENGUAL, D. AND D. XIU (2018): "Resolution of Policy Uncertainty and Sudden Declines in Volatility." *Journal of Econometrics,* 203(2):297–315.

AMITI, M., S. J. REDDING, AND D. E. WEINSTEIN (2019): "The Impact of the 2018 Tariffs on Prices and Welfare." *Journal of Economic Perspectives,* 33(4):187–210.

ANDERLONI, L., E. BACCHIOCCHI, AND D. VANDONE (2012): "Household Financial Vulnerability: An Empirical Analysis." *Research in Economics,* 66(3):284–296.

ARSLANALP, S., B. EICHENGREEN, AND C. SIMPSON-BELL (2023): "Gold as International Reserves: A Barbarous Relic No More?" *Journal of International Economics,* 145:103822.

ASHRAF, B. N. AND Y. SHEN (2019): "Economic Policy Uncertainty and Banks' Loan Pricing." *Journal of Financial Stability,* 44:100695.

AVALOS, F. AND W. HUANG (2022): "The Financial Implications of Volatile Commodity Markets." BIS Quarterly Review September 2022, Bank for International Settlements.

AVALOS, F., A. CAP, D. IGAN, E. KHARROUBI, AND G. NODARI (2022): "Energy Markets: Shock, Economic Fallout and Policy Response." *BIS Bulletin,* 64.

AVDJIEV, S., V. BRUNO, C. KOCH, AND H. S. SHIN (2019): "The Dollar Exchange Rate as a Global Risk Factor: Evidence from Investment." *IMF Economic Review,* 67:151–173.

AVDJIEV, S., B. HARDY, Ş. KALEMLI-ÖZCAN, AND L. SERVÉN (2022): "Gross Capital Flows by Banks, Corporates, and Sovereigns." *Journal of the European Economic Association,* 20 (5):2098–2135.

BACCHETTA, P., R. CORDONIER, AND O. MERROUCHE (2023): "The Rise in Foreign Currency Bonds: The Role of US Monetary Policy and Capital Controls." *Journal of International Economics,* 140:103709.

BACHMANN, R. AND C. BAYER (2013): "Wait-and-See Business Cycles?" *Journal of Monetary Economics,* 60(6):704–719.

BAELE, L., G. BEKAERT, K. INGHELBRECHT, AND M. WEI (2020): "Flights to Safety." *The Review of Financial Studies,* 33(2):689–746.

BAKER, S. R., N. BLOOM, AND S. J. DAVIS (2016): "Measuring Economic Policy Uncertainty." *The Quarterly Journal of Economics,* 131(4):1593–1636.

BAKER, S. R., N. BLOOM, S. J. DAVIS, AND K. J. KOST (2019): "Policy News and Stock Market Volatility." NBER Working Paper 25720, National Bureau of Economic Research.

BAKER, S. R., N. BLOOM, S. DAVIS, AND T. RENAULT (2021): "Twitter-Derived Measures of Economic Uncertainty." Mimeo.

BARATTIERI, A., M. CACCIATORE, AND F. GHIRONI (2021): "Protectionism and the Business Cycle." *Journal of International Economics,* 129:103417.

BARRAZA, S. AND A. CIVELLI (2020): "Economic Policy Uncertainty and the Supply of Business Loans." *Journal of Banking & Finance,* 121:105983.

BARSKY, R. B. (1989): "Why Don't the Prices of Stocks and Bonds Move Together?" *The American Economic Review,* 79(5):1132–1145.

BASHER, S. A., A. A. HAUG, AND P. SADORSKY (2018): "The Impact of Oil-Market Shocks on Stock Returns in Major Oil-Exporting Countries." *Journal of International Money and Finance,* 86:264–280.

BAUM, C. F., M. PUNDIT, AND A. RAMAYANDI (2017): "Capital Flows and Financial Stability in Emerging Economies." ADBI Working Paper 522, Asian Development Bank.

BAXTER, M. AND M. A. KOUPARITSAS (2005): "Determinants of Business Cycle Comovement: A Robust Analysis." *Journal of Monetary Economics,* 52(1):113–157.

BECK, T. AND J. KEIL (2022): "Have Banks Caught Corona? Effects of COVID on Lending in the US." *Journal of Corporate Finance,* 72:102160.

BEKAERT, G. AND M. HOEROVA (2014): "The VIX, the Variance Premium and Stock Market Volatility." *Journal of Econometrics,* 183(2):181–192.

BEKAERT, G., E. ENGSTROM, AND Y. XING (2009): "Risk, Uncertainty, and Asset Prices." *Journal of Financial Economics,* 91(1):59–82.

BEN-DAVID, I., F. FRANZONI, AND R. MOUSSAWI (2010): "The Behavior of Hedge Funds During Liquidity Crises." Mimeo.

BEN KHELIFE, S., C. UROM, K. GUESMI, AND R. BENKRAIEM (2022): "American Hedge Funds Industry, Market Timing and COVID-19 Crisis." *Journal of Asset Management,* 23 (5):390–399.

BEN-REPHAEL, A., S. KANDEL, AND A. WOHL (2012): "Measuring Investor Sentiment with Mutual Fund Flows." *Journal of Financial Economics,* 104(2):363–382.

BÉNÉTRIX, A. S., P. R. LANE, AND J. C. SHAMBAUGH (2015): "International Currency Exposures, Valuation Effects and the Global Financial Crisis." *Journal of International Economics,* 96:98–109.

BERGER, A. N., O. GUEDHAMI, H. H. KIM, AND X. LI (2022): "Economic Policy Uncertainty and Bank Liquidity Hoarding." *Journal of Financial Intermediation,* 49:100893.

BERNANKE, B. AND M. GERTLER (1989): "Agency Costs, Net Worth, and Business Fluctuations." *American Economic Review,* 79(1):14–31.

BERNANKE, B. S. (1983): "Irreversibility, Uncertainty, and Cyclical Investment." *The Quarterly Journal of Economics,* 98(1):85–106.

BERNANKE, B. S. (2005): "The Global Saving Glut And The U.S. Current Account Deficit." *Remarks At The Sandridge Lecture, Virginia Association Of Economics, Richmond, Virginia,* 10.

BLANCHARD, O. J., F. GIAVAZZI, AND F. SA (2005): "Current Account Deficits In The Euro Area: The End Of The Feldstein-Horioka Puzzle?" *Brookings Papers On Economic Activity,* 2005(2):147–209.

BLOOM, N. (2009): "The Impact of Uncertainty Shocks." *Econometrica,* 77(3):623–685.

BLOOM, N. (2014): "Fluctuations in Uncertainty." *Journal of Economic Perspectives,* 28(2): 153–176.

BLOOM, N., S. BOND, AND J. VAN REENEN (2007): "Uncertainty and Investment Dynamics." *The Review of Economic Studies,* 74(2):391–415.

BORDO, M. D., J. V. DUCA, AND C. KOCH (2016): "Economic Policy Uncertainty and the Credit Channel: Aggregate and Bank Level US Evidence Over Several Decades." *Journal of Financial Stability,* 26:90–106.

BORIO, C. AND P. DISYATAT (2010): "Global Imbalances and the Financial Crisis: Reassessing the Role of International Finance." *Asian Economic Policy Review,* 5(2):198–216.

BORIO, C. E. AND P. W. LOWE (2002): "Asset Prices, Financial and Monetary Stability: Exploring the Nexus." BIS Working Paper 114, Bank for International Settlements.

BOYD, J. H., R. LEVINE, AND B. D. SMITH (2001): "The Impact of Inflation on Financial Sector Performance." *Journal of Monetary Economics,* 47(2):221–248.

BRONER, F., T. DIDIER, A. ERCE, AND S. L. SCHMUKLER (2013): "Gross Capital Flows: Dynamics and Crises." *Journal of Monetary Economics,* 60(1):113–133.

BRUNNERMEIER, M. K. AND L. H. PEDERSEN (2009): "Market Liquidity and Funding Liquidity." *The Review of Financial Studies,* 22(6):2201–2238.

BRUNO, V. AND H. S. SHIN (2015): "Cross-Border Banking and Global Liquidity." *The Review of Economic Studies,* 82(2):535–564.

BRUNO, V., I. SHIM, AND H. S. SHIN (2017): "Comparative Assessment of Macroprudential Policies." *Journal of Financial Stability,* 28:183–202.

BUCH, C. M., M. BUCHHOLZ, AND L. TONZER (2015): "Uncertainty, Bank Lending, and Bank-Level Heterogeneity." *IMF Economic Review,* 63(4):919–954.

CABALLERO, R. J. (2010): "Sudden Financial Arrest." *IMF Economic Review,* 58(1):6–36.

CABALLERO, R. J. AND A. KRISHNAMURTHY (2008): "Collective Risk Management in a Flight to Quality Episode." *The Journal of Finance,* 63(5):2195–2230.

CALDARA, D. AND M. IACOVIELLO (2022): "Measuring Geopolitical Risk." *American Economic Review,* 112(4):1194–1225.

CALDARA, D., C. FUENTES-ALBERO, S. GILCHRIST, AND E. ZAKRAJŠEK (2016): "The Macroeconomic Impact of Financial and Uncertainty Shocks." *European Economic Review,* 88:185–207.

CALÍ, M., N. CANTORE, L. IACOVONE, M. PEREIRA-LÓPEZ, AND G. PRESIDENTE (2022): "Too Much Energy: The Perverse Effect of Low Fuel Prices on Firms." *Journal of Environmental Economics and Management,* 111:102587.

CASAS, C., F. J. DÍEZ, G. GOPINATH, AND P.-O. GOURINCHAS (2017): "Dominant Currency Paradigm: A New Model For Small Open Economies." IMF Working Paper WP/17/264, International Monetary Fund.

CASCALDI-GARCIA, D., C. SARISOY, J. M. LONDONO, B. SUN, D. D. DATTA, T. FERREIRA, O. GRISHCHENKO, M. R. JAHAN-PARVAR, F. LORIA, AND S. MA (2023): "What Is Certain About Uncertainty?" *Journal of Economic Literature,* 61(2):624–654.

CASTLES, S. (2003): "The International Politics of Forced Migration." *Development,* 46:11–20.

CELASUN, O., M. A. MINESHIMA, M. N. ARREGUI, M. V. MYLONAS, M. A. ARI, I. TEODORU, M. S. BLACK, K. ZHUNUSSOVA, M. D. M. IAKOVA, AND I. W. PARRY (2022): "Surging Energy Prices in Europe in the Aftermath of the War: How to Support the Vulnerable and Speed up the Transition Away from Fossil Fuels." *IMF Working Papers,* 152.

CHEN, H., M. MICHAUX, AND N. ROUSSANOV (2020): "Houses as ATMs: Mortgage Refinancing and Macroeconomic Uncertainty." *The Journal of Finance,* 75(1):323–375.

CHIACCHIO, F., R. A. DE SANTIS, V. GUNNELLA, AND L. LEBASTARD (2023): "How Have Higher Energy Prices Affected Industrial Production and Imports?" Economic Bulletin 1/2023, European Central Bank.

CHOI, S., D. FURCERI, Y. HUANG, AND P. LOUNGANI (2018): "Aggregate Uncertainty and Sectoral Productivity Growth: The Role of Credit Constraints." *Journal of International Money and Finance,* 88:314–330.

CHOI, S., G. CIMINELLI, AND D. FURCERI (2023): "Is Domestic Uncertainty a Local Pull Factor Driving Foreign Capital Inflows? New Cross-Country Evidence." *Journal of International Money and Finance,* 130:102764.

CHRISTIANO, L. J., R. MOTTO, AND M. ROSTAGNO (2014): "Risk Shocks." *American Economic Review,* 104(1):27–65.

COHN, A., J. ENGELMANN, E. FEHR, AND M. A. MAR'ECHAL (2015): "Evidence for Countercyclical Risk Aversion: An Experiment with Financial Professionals." *American Economic Review,* 105(2):860–885.

CONRAD, C. AND K. LOCH (2015): "Anticipating Long-Term Stock Market Volatility." *Journal of Applied Econometrics,* 30(7):1090–1114.

CORSETTI, G., P. PESENTI, AND N. ROUBINI (1999): "What Caused the Asian Currency and Financial Crisis?" *Japan and the World Economy,* 11(3):305–373.

CORSETTI, G., P. PESENTI, AND N. ROUBINI (1999): "Paper Tigers? A Model of the Asian Crisis." *European Economic Review,* 43(7):1211–1236.

COVAL, J. AND E. STAFFORD (2007): "Asset Fire Sales (and Purchases) in Equity Markets." *Journal of Financial Economics,* 86(2):479–512.

DANG, V. D. AND H. C. NGUYEN (2022): "Bank Profitability Under Uncertainty." *The Quarterly Review of Economics and Finance,* 83:119–134.

DANIEL, B. C. AND J. B. JONES (2007): "Financial Liberalization and Banking Crises in Emerging Economies." *Journal of International Economics,* 72(1):202–221.

DANISMAN, G. O., E. DEMIR, AND P. OZILI (2021): "Loan Loss Provisioning of US Banks: Economic Policy Uncertainty and Discretionary Behavior." *International Review of Economics & Finance,* 71:923–935.

DE CRESCENZIO, A. AND E. LEPERS (2021): "Extreme Capital Flow Episodes from the Global Financial Crisis to COVID-19: An Exploration with Monthly Data." OECD Working Papers on International Investment 2021/05, Organisation for Economic Cooperation and Development.

DE GREGORIO, J. (2012): "Commodity Prices, Monetary Policy, and Inflation." *IMF Economic Review,* 60(4):600–633.

DELIS, M. D., G. P. KOURETAS, AND C. TSOUMAS (2014): "Anxious Periods and Bank Lending." *Journal of Banking & Finance,* 38:1–13.

DELL'ARICCIA, G., D. IGAN, L. LAEVEN, AND H. TONG (2016): "Credit Booms and Macrofinancial Stability." *Economic Policy,* 31(86):299–355.

DELPEUCH, S., E. FIZE, AND P. MARTIN (2021): "Trade Imbalances and the Rise of Protectionism." CEPR Discussion Paper DP15742, Centre for Economic Policy Research.

DEMIRER, R., R. FERRER, AND S. J. H. SHAHZAD (2020): "Oil Price Shocks, Global Financial Markets and Their Connectedness." *Energy Economics,* 88:104771.

DICKS, D. AND P. FULGHIERI (2021): "Uncertainty, Investor Sentiment, and Innovation." *The Review of Financial Studies,* 34(3):1236–1279.

DREHER, A., A. FUCHS, B. PARKS, A. STRANGE, AND M. J. TIERNEY (2021): "Aid, China, and Growth: Evidence from a New Global Development Finance Dataset." *American Economic Journal: Economic Policy,* 13(2):135–174.

DUCTOR, L. AND D. GRECHYNA (2015): "Financial Development, Real Sector, and Economic Growth." *International Review of Economics & Finance,* 37:393–405.

EBERHARDT, M. AND A. F. PRESBITERO (2021): "Commodity Prices and Banking Crises." *Journal of International Economics,* 131:103474.

EBERLY, J. C. (1994): "Adjustment of Consumers' Durables Stocks: Evidence from Automobile Purchases." *Journal of Political Economy,* 102(3):403–436.

ECB (2022): "Financial Stability Review, November 2022." Technical report, European Central Bank.

EDWARDS, S. (1996): "The Mexican Peso Crisis? How Much Did We Know? When Did We Know It?" *The World Economy,* 19(7):515–538.

EDWARDS, S. (1998): "Capital Flows, Real Exchange Rates, And Capital Controls: Some Latin American Experiences." *Journal of Law and Economics,* 41(S2):S31–S61.

EDWARDS, S. (1999): "How Effective Are Capital Controls?" *Journal of Economic Perspectives,* 13(4):65–84.

EICHENGREEN, B. AND A. ROSE (2014): "Capital Controls in the 21st Century." *Journal of International Money and Finance,* 48:1–16.

ERCEG, C. J., A. PRESTIPINO, AND A. RAFFO (2018): "The Macroeconomic Effects of Trade Policy." International Finance Discussion Paper 1242, Board of Governors of the Federal Reserve System.

FAJGELBAUM, P. D., P. K. GOLDBERG, P. J. KENNEDY, AND A. K. KHANDELWAL (2020): "The Return to Protectionism." *The Quarterly Journal of Economics,* 135(1):1–55.

FALATO, A., I. GOLDSTEIN, AND A. HORTAÇSU (2021): "Financial Fragility in the COVID-19 Crisis: The Case of Investment Funds in Corporate Bond Markets." *Journal of Monetary Economics,* 123:35–52.

FAN, Y. AND J.-H. XU (2011): "What Has Driven Oil Prices Since 2000? A Structural Change Perspective." *Energy Economics,* 33(6):1082–1094.

FEDERLE, J., G. J. MÜLLER, A. MEIER, AND V. SEHN (2022): "Proximity to War: The Stock Market Response to the Russian Invasion of Ukraine." CEPR Discussion Paper DP17185, Centre for Economic Policy Research,

FELBERMAYR, G., A. KIRILAKHA, C. SYROPOULOS, E. YALCIN, AND Y. V. YOTOV (2020): "The Global Sanctions Data Base." *European Economic Review,* 129:103561.

FERRARI MINESSO, M., F. KURCZ, AND M. S. PAGLIARI (2022): "Do Words Hurt More Than Actions? The Impact of Trade Tensions on Financial Markets." *Journal of Applied Econometrics,* 37(6):1138–1159.

FOGLI, A. AND F. PERRI (2015): "Macroeconomic Volatility and External Imbalances." *Journal of Monetary Economics,* 69:1–15.

FORBES, K., M. FRATZSCHER, AND R. STRAUB (2015): "Capital-Flow Management Measures: What Are They Good For?" *Journal of International Economics,* 96:S76–S97.

FORBES, K. J. AND F. E. WARNOCK (2012): "Capital Flow Waves: Surges, Stops, Flight, and Retrenchment." *Journal of International Economics,* 88(2):235–251.

FORBES, K. J. AND F. E. WARNOCK (2014): "Capital Flow Waves: Surges, Stops, Flight, And Retrenchment." *Journal of International Economics,* 88(2):235–251.

FRANKEL, J. A. AND D. ROMER (1999): "Does Trade Cause Growth?" *American Economic Review,* 89(3):379–399.

FRANKEL, J. A. AND A. K. ROSE (1998): "The Endogenity of the Optimum Currency Area Criteria." *The Economic Journal,* 108(449):1009–1025.

FRATZSCHER, M. (2012): "Capital Flows, Push Versus Pull Factors and the Global Financial Crisis." *Journal of International Economics,* 88(2):341–356.

FRAZZINI, A. AND O. A. LAMONT (2008): "Dumb Money: Mutual Fund Flows and the Cross-Section of Stock Returns." *Journal of Financial Economics,* 88(2):299–322.

FRENCH, J. J. AND W.-X. LI (2022): "Economic Policy Uncertainty and Fund Flows to the United States." *Finance Research Letters,* 45:102126.

FSB (2023): "The Financial Stability Aspects of Commodities Markets." Technical report, Financial Stability Board.

FURCERI, D., S. A. HANNAN, J. D. OSTRY, AND A. K. ROSE (2018): "Macroeconomic Consequences of Tariffs." NBER Working Paper 25402, National Bureau of Economic Research.

GAVRIILIDIS, K. (2021): "Measuring Climate Policy Uncertainty." Mimeo.

GHOSH, A. R., J. D. OSTRY, AND M. S. QURESHI (2017): *Taming the Tide of Capital Flows: A Policy Guide.* MIT Press, Cambridge, MA.

GILCHRIST, S. AND J. V. LEAHY (2002): "Monetary Policy and Asset Prices." *Journal of Monetary Economics,* 49(1):75–97.

GILCHRIST, S., J. W. SIM, AND E. ZAKRAJŠEK (2014): "Uncertainty, Financial Frictions, and Investment Dynamics." NBER Working Paper 20038, National Bureau of Economic Research.

GISSLER, S., J. OLDFATHER, AND D. RUFFINO (2016): "Lending on Hold: Regulatory Uncertainty and Bank Lending Standards." *Journal of Monetary Economics,* 81:89–101.

GLICK, R., X. GUO, AND M. HUTCHISON (2006): "Currency Crises, Capital-Account Liberalization, and Selection Bias." *The Review of Economics and Statistics,* 88(4):698–714.

GOLDFAJN, I. AND R. O. VALDES (1997): "Capital Flows and the Twin Crises: The Role of Liquidity." IMF Working Paper 97/87, International Monetary Fund.

GRIC, Z., D. EHRENBERGEROVA, AND M. HODULA (2022): "The Power of Sentiment: Irrational Beliefs of Households and Consumer Loan Dynamics." *Journal of Financial Stability,* 59: 100973.

GUAN, Y., J. YAN, Y. SHAN, Y. ZHOU, Y. HANG, R. LI, Y. LIU, B. LIU, Q. NIE, B. BRUCKNER, K. FENG, AND K. HUBACEK (2023): "Burden of the Global Energy Price Crisis on Households." *Nature Energy,* 8(3):304–316.

GUISO, L., P. SAPIENZA, AND L. ZINGALES (2018): "Time Varying Risk Aversion." *Journal of Financial Economics,* 128(3):403–421.

GUPTA, R., G. GOZGOR, H. KAYA, AND E. DEMIR (2019): "Effects of Geopolitical Risks on Trade Flows: Evidence from the Gravity Model." *Eurasian Economic Review,* 9:515–530.

HALL, R. E. AND C. I. JONES (1999): "Why Do Some Countries Produce So Much More Output Per Worker Than Others?" *The Quarterly Journal of Economics,* 114(1):83–116.

HAMILTON, J. D. (1983): "Oil and the Macroeconomy since World War II." *Journal of Political Economy,* 91(2):228–248.

HAMILTON, J. D. (2009): "Understanding Crude Oil Prices." *The Energy Journal,* 30(2):179–206.

HOFMANN, B., I. SHIM, AND H. S. SHIN (2016): "Sovereign Yields and the Risk-Taking Channel of Currency Appreciation." BIS Working Paper 538, Bank for International Settlements.

HUBER, C., J. HUBER, AND M. KIRCHLER (2021): "Market Shocks and Professionals' Investment Behavior–Evidence from the COVID-19 Crash." *Journal of Banking Finance,* 133:106247.

HUYBENS, E. AND B. D. SMITH (1999): "Inflation, Financial Markets and Long-Run Real Activity." *Journal of Monetary Economics,* 43(2):283–315.

IBRAHIM, M. H. (2019): "Oil and Macro-Financial Linkages: Evidence from the GCC Countries." *The Quarterly Review of Economics and Finance,* 72:1–13.

IEA (2022): "A 10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas.".

IGAN, D., E. KOHLSCHEEN, G. NODARI, AND D. REES (2022): "Commodity Market Disruptions, Growth and Inflation." *BIS Bulletin,* 54.

IMF (2023): *Global Financial Stability Report: Safeguarding Financial Stability amid High Inflation and Geopolitical Risks.*, Washington, DC. International Monetary Fund.

JANUS, T. AND D. RIERA-CRICHTON (2013): "International Gross Capital Flows: New Uses of Balance of Payments Data and Application to Financial Crises." *Journal of Policy Modeling,* 35(1):16–28.

JIANG, E., L. T. STARKS, AND S. Y. SUN (2016): "Economic Policy Uncertainty, Learning and Incentives: Theory and Evidence on Mutual Funds." Mimeo.

JURADO, K., S. C. LUDVIGSON, AND S. NG (2015): "Measuring Uncertainty." *American Economic Review,* 105(3):1177–1216.

KAMINSKY, G. L. AND C. M. REINHART (1999): "The Twin Crises: The Causes of Banking and Balance-of-Payments Problems." *American Economic Review,* 89(3):473–500.

KAMINSKY, G. L. AND S. L. SCHMUKLER (2008): "Short-Run Pain, Long-Run Gain: Financial Liberalization and Stock Market Cycles." *Review of Finance,* 12(2):253–292.

KANG, W. AND R. A. RATTI (2013): "Oil Shocks, Policy Uncertainty and Stock Market Return." *Journal of International Financial Markets, Institutions and Money,* 26(1):305–318.

KANG, W., K. LEE, AND R. A. RATTI (2014): "Economic Policy Uncertainty and Firm-Level Investment." *Journal of Macroeconomics,* 39:42–53.

KANG, W., R. A. RATTI, AND J. VESPIGNANI (2020): "Global Commodity Prices and Global Stock Market Volatility Shocks: Effects Across Countries." *Journal of Asian Economics,* 71:101249.

KAUFMAN, M. AND D. LEIGH (2020): "Global Imbalances and the COVID-19 Crisis." Accessed: 2024-06-06.

KAVIANI, M. S., L. KRYZANOWSKI, H. MALEKI, AND P. SAVOR (2020): "Policy Uncertainty and Corporate Credit Spreads." *Journal of Financial Economics,* 138(3):838–865.

KILIAN, L. (2009): "Not All Oil Price Shocks Are Alike: Disentangling Demand and Supply Shocks in the Crude Oil Market." *American Economic Review,* 99(3):1053–1069.

KILIAN, L. AND C. PARK (2009): "The Impact of Oil Price Shocks on the U.S. Stock Market." *International Economic Review,* 50(4):1267–1287.

KIM, E. H. AND V. SINGAL (2000): "The Fear of Globalizing Capital Markets." *Emerging Markets Review,* 1(3):183–198.

KIYOTAKI, N. AND J. MOORE (1997): "Credit Cycles." *Journal of Political Economy,* 105(2): 211–248.

KOEPKE, R. AND S. PAETZOLD (2024): "Capital Flow Data—A Guide for Empirical Analysis and Real-Time Tracking." *International Journal of Finance Economics,* 29(1):311–331.

KOETSE, M. J., H. L. DE GROOT, AND R. J. FLORAX (2008): "Capital-Energy Substitution and Shifts in Factor Demand: A Meta-Analysis." *Energy Economics,* 30(5):2236–2251.

KOSE, M. A., E. PRASAD, K. ROGOFF, AND S.-J. WEI (2009): "Financial Globalization: A Reappraisal." *IMF Staff Papers,* 56(1):8–62.

KOSE, M. A., P. NAGLE, F. OHNSORGE, AND N. SUGAWARA (2021): *Global Waves of Debt: Causes and Consequences.* Washington, DC: World Bank.

LABELLE, J. AND A. M. SANTACREU (2022): "Global Supply Chain Disruptions and Inflation During the COVID-19 Pandemic." *Federal Reserve Bank of St. Louis Review,* 104(2):78–91.

LANE, P. R. AND G. M. MILESI-FERRETTI (2007): "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004." *Journal of International Economics,* 73(2):223–250.

LEE, C. C. AND C. C. LEE (2019): "Oil Price Shocks and Chinese Banking Performance: Do Country Risks Matter?" *Energy Economics,* 77:46–53.

LEVCHENKO, A. A. AND P. MAURO (2007): "Do Some Forms of Financial Flows Help Protect Against Sudden Stops?" *The World Bank Economic Review,* 21(3):389–411.

LIADZE, I., C. MACCHIARELLI, P. MORTIMER-LEE, AND P. SANCHEZ JUANINO (2023): "Economic Costs of the Russia-Ukraine War." *The World Economy,* 46(4):874–886.

LIU, L. AND T. ZHANG (2015): "Economic Policy Uncertainty and Stock Market Volatility." *Finance Research Letters,* 15:99–105.

LOMBARDI, M. J. AND F. RAVAZZOLO (2016): "On the Correlation Between Commodity and Equity Returns: Implications for Portfolio Allocation." *Journal of Commodity Markets,* 2 (1):45–57.

LONGARIC, P. A. (2022): "Foreign Currency Exposure and the Financial Channel of Exchange Rates." ECB Working Paper 2739, European Central Bank.

LOONEY, R. E. (2003): "Oil Prices and the Iraq War: Market Interpretations of Military Developments." *Journal of Energy and Development,* 29:25–39.

LUDVIGSON, S. C., S. MA, AND S. NG (2021): "Uncertainty and Business Cycles: Exogenous Impulse or Endogenous Response?" *American Economic Journal: Macroeconomics,* 13(4): 369–410.

MA, Y., Y. ZHANG, AND Q. JI (2021): "Do Oil Shocks Affect Chinese Bank Risk?" *Energy Economics,* 96.

MAGUD, N. E., C. M. REINHART, AND K. S. ROGOFF (2018): "Capital Controls: Myth and Reality." *Annals of Economics and Finance,* 19(1):1–47.

MILESI-FERRETTI, G. M. AND A. RAZIN (2008): "Chronic And Sudden Stops: The Impact Of Sudden Stops On Potential Output." *IMF Working Papers,* 08(259):1–46.

MILESI-FERRETTI, G.-M. AND C. TILLE (2011): "The Great Retrenchment: International Capital Flows During the Global Financial Crisis." *Economic Policy,* 26(66):289–346.

MONTIEL, P. AND C. M. REINHART (1999): "Do Capital Controls and Macroeconomic Policies Influence the Volume and Composition of Capital Flows? Evidence from the 1990s." *Journal of International Money and Finance,* 18(4):619–635.

NASIM, A. AND G. DOWNING (2023): "Energy Shocks and Bank Performance in the Advanced Economies." *Energy Economics,* 118:106517.

NEUENKIRCH, M. AND F. NEUMEIER (2015): "The Impact of UN and US Economic Sanctions on GDP Growth." *European Journal of Political Economy,* 40:110–125.

NG, J., W. SAFFAR, AND J. J. ZHANG (2020): "Policy Uncertainty and Loan Loss Provisions in the Banking Industry." *Review of Accounting Studies,* 25:726–777.

OBSTFELD, M. (2012): "Does the Current Account Still Matter?" *American Economic Review,* 102(3):1–23.

OBSTFELD, M., J. C. SHAMBAUGH, AND A. M. TAYLOR (2005): "The Trilemma In History: Tradeoffs Among Exchange Rates, Monetary Policies, And Capital Mobility." *The Review of Economics and Statistics,* 87(3):423–438.

OECD (2023): "Balance of Payments (BOP6), Current Account Balance." OECD Database. Accessed: 02 Oct 2023 09:17

OLSON, E., A. VIVIAN, AND M. E. WOHAR (2014): "The Relationship Between Energy and Equity Markets: Evidence from Volatility Impulse Response Functions." *Energy Economics,* 43:297–305.

OSTRY, J. D., A. R. GHOSH, M. CHAMON, AND M. S. QURESHI (2012): "Tools for Managing Financial-Stability Risks from Capital Inflows." *Journal of International Economics,* 88(2): 407–421.

PASTOR, L. AND P. VERONESI (2012): "Uncertainty About Government Policy and Stock Prices." *The Journal of Finance,* 67(4):1219–1264.

POPP, D. (2002): "Induced Innovation and Energy Prices." *American Economic Review,* 92(1): 160–180.

PRUSKI, J., P. SZPUNAR, ET AL. (2008): "Capital Flows and Their Implications for Monetary and Financial Stability: The Experience of Poland." In *Financial Globalisation and Emerging Market Capital Flows, 403–84. BIS Papers No. 44.*

PURI, M., J. ROCHOLL, AND S. STEFFEN (2011): "Global Retail Lending in the Aftermath of the US Financial Crisis: Distinguishing Between Supply and Demand Effects." *Journal of Financial Economics,* 100(3):556–578.

RAMEY, V. A. (2011): "Identifying Government Spending Shocks: It's All in the Timing." *The Quarterly Journal of Economics,* 126(1):1–50.

RAUNIG, B., J. SCHARLER, AND F. SINDERMANN (2017): "Do Banks Lend Less in Uncertain Times?" *Economica,* 84(336):682–711.

REBUCCI, A. AND C. MA (2019): "Capital Controls: A Survey of the New Literature." NBER Working Paper 26558, National Bureau of Economic Research.

REINHART, C. M. AND K. S. ROGOFF (2009): *This Time Is Different: Eight Centuries of Financial Folly.* Princeton University Press, Princeton, NJ.

REINHART, C. M., V. REINHART, AND C. TREBESCH (2016): "Global Cycles: Capital Flows, Commodities, and Sovereign Defaults, 1815-2015." *American Economic Review,* 106(5): 574–80.

ROSE, A. K. (2020): "The Causes of Trade Tensions and Their Consequences for Financial Stability." *Seoul Journal of Economics,* 33(3).

ROSSI, B. (2012): "The Changing Relationship Between Commodity Prices and Equity Prices in Commodity Exporting Countries." *IMF Economic Review,* 60(4):533–569.

SAIF-ALYOUSFI, A. Y., A. SAHA, R. MD-RUS, AND K. N. TAUFIL-MOHD (2021): "Do Oil and Gas Price Shocks Have an Impact on Bank Performance?" *Journal of Commodity Markets,* 22:100147.

SARNO, L. AND M. P. TAYLOR (1999): "Moral Hazard, Asset Price Bubbles, Capital Flows, and the East Asian Crisis: The First Tests." *Journal of International Money and Finance,* 18(4): 637–657.

SEASHOLES, M. S. AND N. ZHU (2010): "Individual Investors and Local Bias." *The Journal of Finance,* 65(5):1987–2010.

SMALES, L. A. (2021): "Geopolitical Risk and Volatility Spillovers in Oil and Stock Markets." *The Quarterly Review of Economics and Finance,* 80:358–366.

SULA, O. AND T. D. WILLETT (2009): "The Reversibility of Different Types of Capital Flows to Emerging Markets." *Emerging Markets Review,* 10(4):296–310.

TAM, P. S. (2020): "Global Impacts of China–US Trade Tensions." *The Journal of International Trade & Economic Development,* 29(5):510–545.

TRAN, D. V., K. HOANG, AND C. NGUYEN (2021): "How Does Economic Policy Uncertainty Affect Bank Business Models?" *Finance Research Letters,* 39:101639.

TRIKI, M. B. AND A. B. MAATOUG (2021): "The Gold Market as a Safe Haven Against the Stock Market Uncertainty: Evidence from Geopolitical Risk." *Resources Policy,* 70:101872.

VALENCIA, F. (2016): "Bank Capital and Uncertainty." *Journal of Banking & Finance,* 69:S1–S9.

VALENCIA, F. (2017): "Aggregate Uncertainty and the Supply of Credit." *Journal of Banking & Finance,* 81:150–165.

VENTURA, J. (2012): "Bubbles and Capital Flows." *Journal of Economic Theory,* 147(2):738–758.

WANG, A. Y. AND M. YOUNG (2020): "Terrorist Attacks and Investor Risk Preference: Evidence from Mutual Fund Flows." *Journal of Financial Economics,* 137(2):491–514.

WANG, Y., C. WU, AND L. YANG (2013): "Oil Price Shocks and Stock Market Activities: Evidence from Oil-Importing and Oil-Exporting Countries." *Journal of Comparative Economics,* 41(4):1220–1239.

WANG, Y., E. BOURI, Z. FAREED, AND Y. DAI (2022): "Geopolitical Risk and the Systemic Risk in the Commodity Markets under the War in Ukraine." *Finance Research Letters,* 49.

WEBER, M., E. U. WEBER, AND A. NOSIĆ (2013): "Who Takes Risks When and Why: Determinants of Changes in Investor Risk Taking." *Review of Finance,* 17(3):847–883.

WEI, S.-J. (2001): "Domestic Crony Capitalism and International Fickle Capital: Is There a Connection?" *International Finance,* 4(1):15–45.

YANNELIS, C. AND L. AMATO (2022): "Household Behavior (Consumption, Credit, and Investments) During the COVID-19 Pandemic." *Annual Review of Financial Economics,* 15.

YAO, C.-Z. AND B.-Y. SUN (2018): "The Study on the Tail Dependence Structure Between the Economic Policy Uncertainty and Several Financial Markets." *The North American Journal of Economics and Finance,* 45:245–265.

YUN, J. (2019): "Bond Risk Premia in a Small Open Economy with Volatile Capital Flows: The Case of Korea." *Journal of International Money and Finance,* 93:223–243.

ZHA, D. AND N. DING (2015): "Threshold Characteristic of Energy Efficiency on Substitution Between Energy and Non-Energy Factors." *Economic Modelling,* 46:180–187.

Appendix A: Additional Information on Data

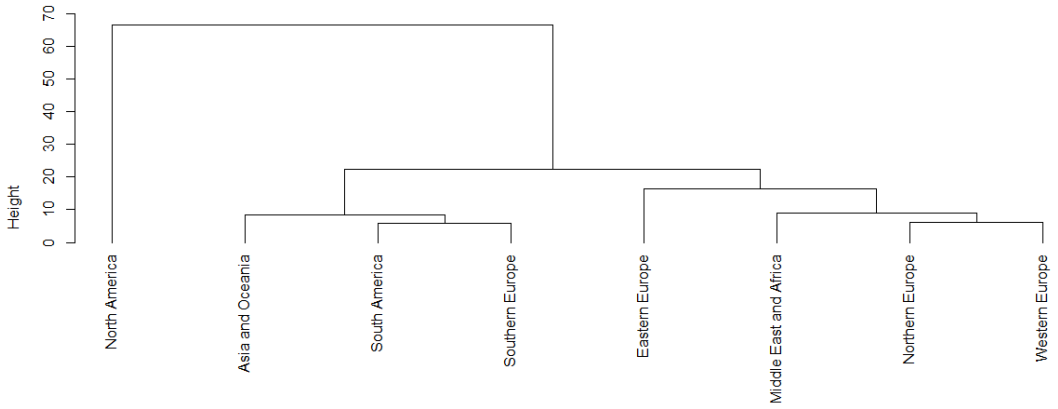
A.1 Country-Level Geopolitical Risks

Panel B of Figure 1 suggests that the GPR indexes may vary across countries, or at least across groups or clusters of countries. Advanced economies could face different geopolitical risks compared to emerging markets. Additionally, even relatively developed European countries may differ in the risks they face due to their development, geography, trade relations, and other factors. Figure A1 displays a tree-like structure that branches out at various heights, indicating the level of similarity in the GPR index between the clusters formed at each stage of the hierarchical clustering process. Higher connections represent greater dissimilarity. Surprisingly, Southern Europe and South America are closely related, as they are first to join at the lowest height. Similarly, Northern Europe and Western Europe are connected at a low branch, indicating that these regions have more in common with each other. From Figure A1, four main clusters arise: (i) North America, (ii) Asia and Oceania, South America, and Southern Europe, (iii) Eastern Europe, (iv) the Middle East and Africa, Northern Europe, and Western Europe.

Given that European countries are organized into several clusters, we examine them more closely in Figure A2. On the right side of the figure is a heat map (Part A), which uses color differentiation to distinguish European countries. It appears that the countries of Eastern Europe are most distinct from other European nations. An explanation is provided in Part B (the right portion of the figure), which shows the standard deviation in the GPR index across European countries over time. The standard deviation is highest, and the countries are most distinct, at the beginning of the 1990s, coinciding with the dissolution of the USSR and the emancipation of Eastern European countries from the Eastern Bloc. A significant difference (high standard deviation) is also observed at the onset of the millennium, marked by events such as 9/11 in 2001 and the Iraq War in 2003. These events primarily affected the developed countries of Western Europe and, to a lesser extent, those of Eastern Europe. In 2022, the standard deviation peaks due to the Russian invasion of Ukraine, which increases uncertainty in Eastern European countries but affects Western and Southern European countries to a lesser degree.

Figures A4 and A3 then present comparative charts for advanced economies and emerging markets, respectively. Among emerging markets, it is observed that countries currently engaged in warfare (Russia and Ukraine), those on the verge of conflict (Taiwan and China), or proximate to conflict zones (Poland and Hungary) form a distinct cluster within the emerging market economies. In contrast, within the advanced economies, a particular cluster has emerged amongst the larger economies, many of which are members of the G7. This clustering could indicate a higher degree of correlation in the geopolitical risks encountered by these nations. The connection of larger economies through trade, investments, and financial systems suggests that a geopolitical event impacting one nation is likely to have consequential effects on the others. Moreover, the presence of many G7 countries in identical geopolitical alliances, such as NATO, implies potential exposure to shared threats, thereby reflecting similar risk profiles. The G7 countries also often assume pivotal roles in global affairs. Their policies and interrelations can be intricately linked, potentially resulting in comparable geopolitical risks. For instance, should several G7 nations enforce sanctions against another country, they might all face similar retaliatory risks.

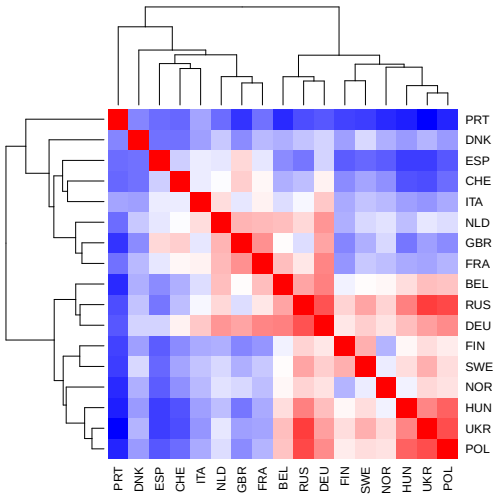
Figure A1: Dendogram–Aggregates



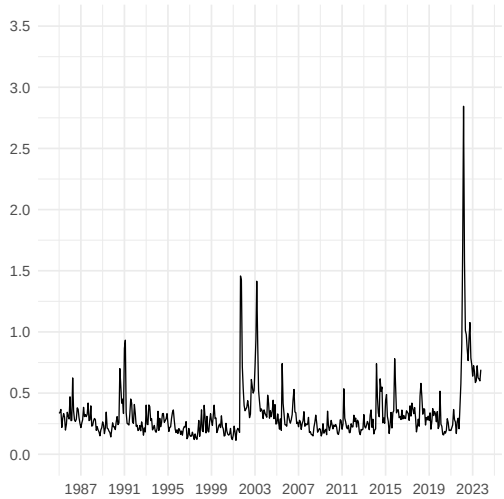
Note: Figure A1 displays a tree-like structure that branches out at various "heights", indicating the level of similarity in the GPR index between the clusters formed at each stage of the hierarchical clustering process. Higher connections represent greater dissimilarity.

Figure A2: Similarity Analysis of GPR Index: Europe

(A) Heat Map



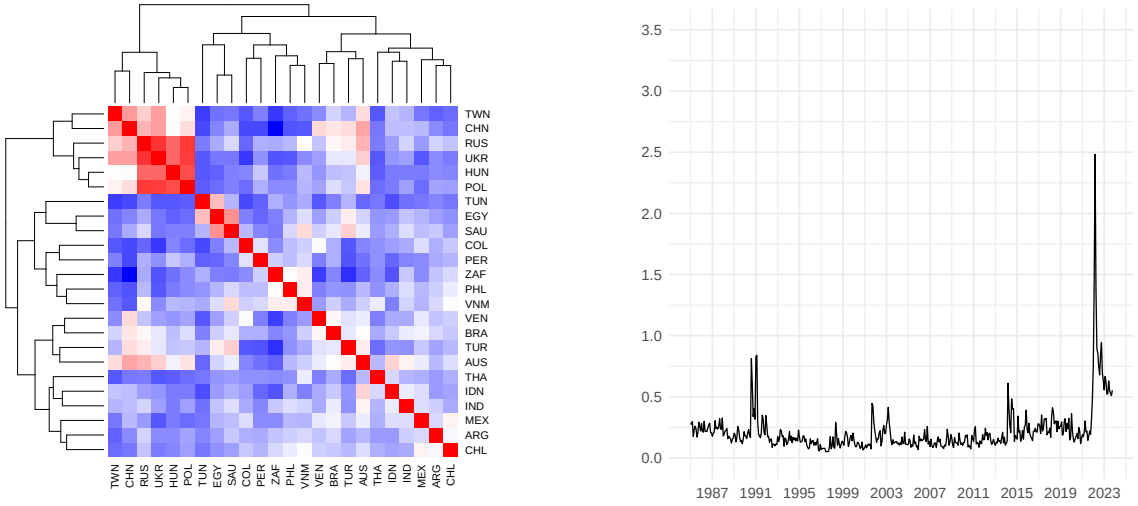
(B) Standard Deviations



Note: The figure presents an analysis of the GPR index by Caldara and Iacoviello (2022) among European countries. Part (A), the heat map, visually clusters countries based on the similarity of their GPR indexes. The intensity and shade of the color indicates a higher degree of similarity between the GPR indexes of the countries, suggesting they experience similar levels of geopolitical risk. A red color signifies a positive correlation, while a blue color denotes a negative correlation. Countries are grouped hierarchically based on the clustering dendrogram on the left, which represents the multidimensional scaling of GPR index similarities. Part (B), Standard Deviations, plots the temporal variation of the GPR index for European countries over time from 1987 to 2023. The vertical spikes represent increases in the standard deviation of a country-level GPR index, indicating periods of significant GPR divergence between countries.

Figure A3: Similarity Analysis of GPR Index: Emerging Market Economies

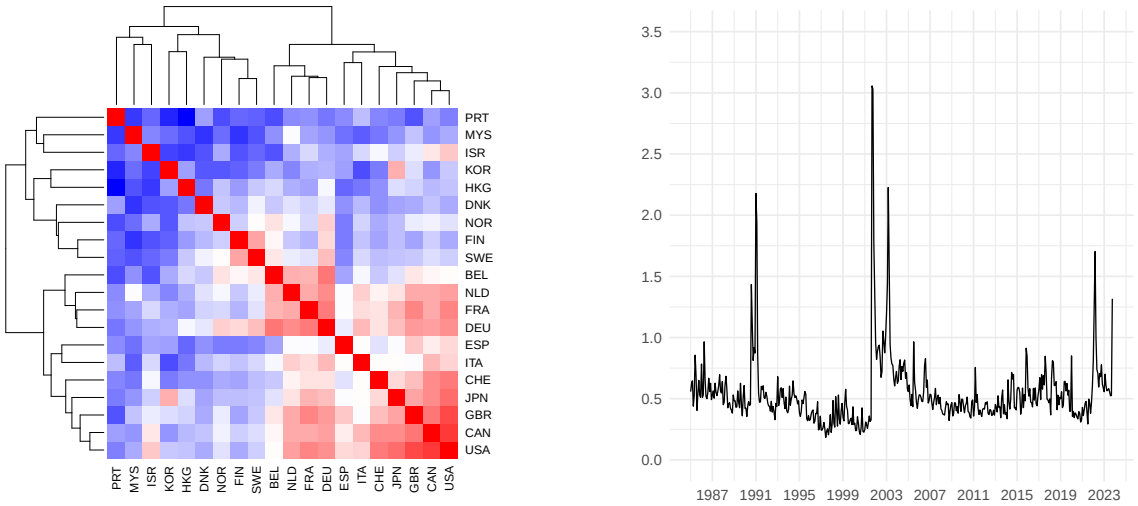
(A) Heat Map *(B) Standard Deviations*



Note: The figure shows an analysis of the GPR index by Caldara and Iacoviello (2022) among emerging market economies. Part (A), the heat map, visually clusters countries based on the similarity of their GPR indexes. Countries are grouped hierarchically based on the clustering dendrogram on the left, which represents the multidimensional scaling of GPR index similarities. Part (B), Standard Deviations, plots the temporal variation of the GPR index for EMEs countries over time from 1987 to 2023. The vertical spikes represent increases in the standard deviation of a country-level GPR index, indicating periods of significant GPR divergence between countries.

Figure A4: Similarity Analysis of GPR Index: Advanced Countries

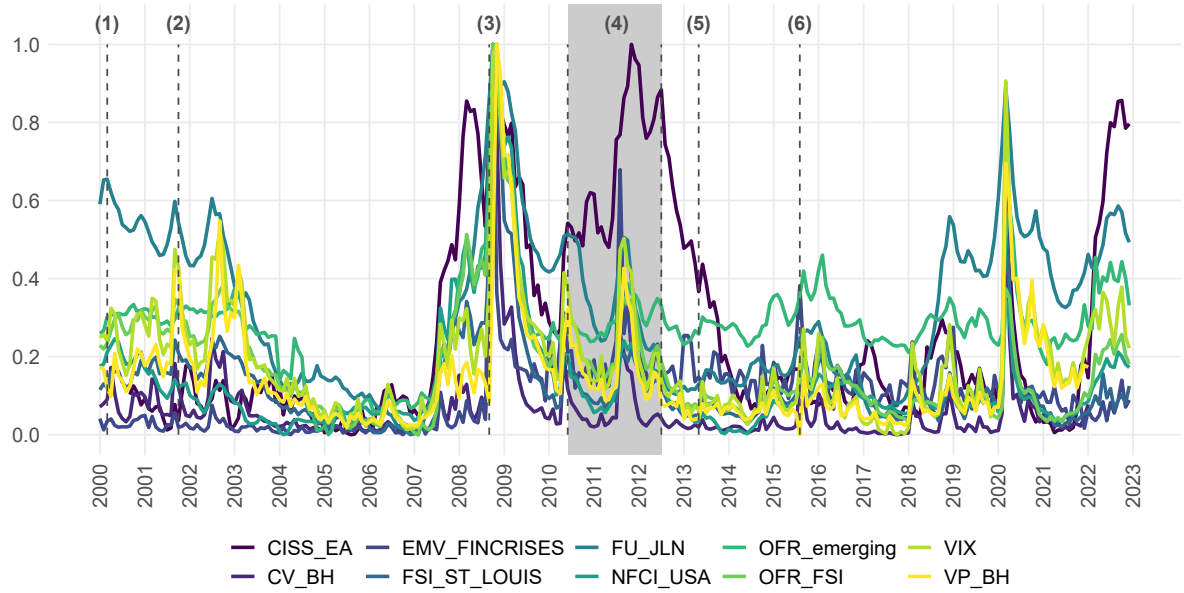
(A) Heat Map *(B) Standard Deviations*



Note: The figure shows an analysis of the GPR index by Caldara and Iacoviello (2022) among advanced economies. Part (A), the heat map, visually clusters countries based on the similarity of their GPR indexes. Countries are grouped hierarchically based on the clustering dendrogram on the left, which represents the multidimensional scaling of GPR index similarities. Part (B), Standard Deviations, plots the temporal variation of the GPR index for AEs over time from 1987 to 2023. The vertical spikes represent increases in the standard deviation of a country-level GPR index, indicating periods of significant GPR divergence between countries.

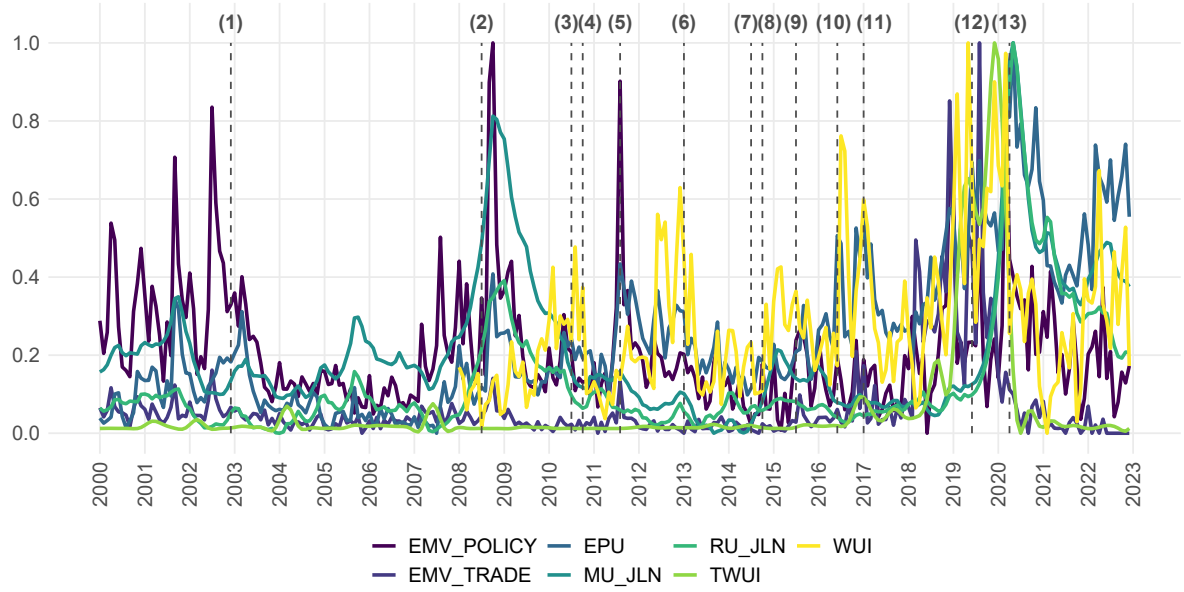
A.2 Geopolitical Risks and Uncertainty Indexes

Figure A5: Main Financial Events and Indexes



Note: All indexes are normalized using min-max scaling. Events: (1) DotCom crash, (2) Enron scandal, (3) Lehman Brothers collapse, (4) European debt crisis, (5) Taper Tantrum, (6) China's Stock Market Crisis.

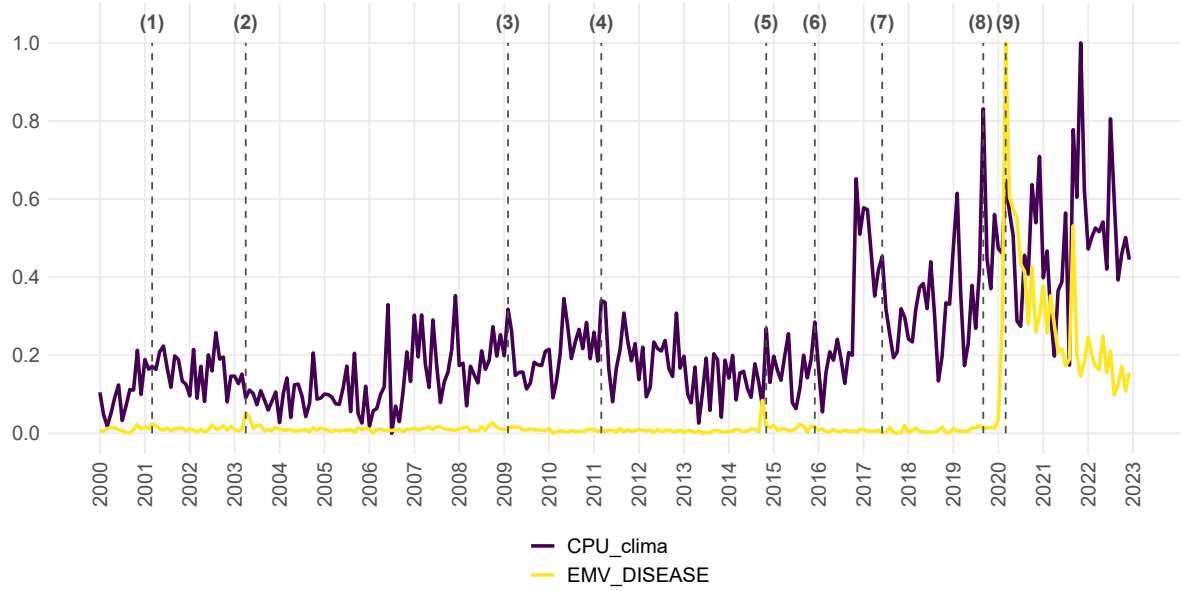
Figure A6: Main Real Economy and Policy Events and Indexes



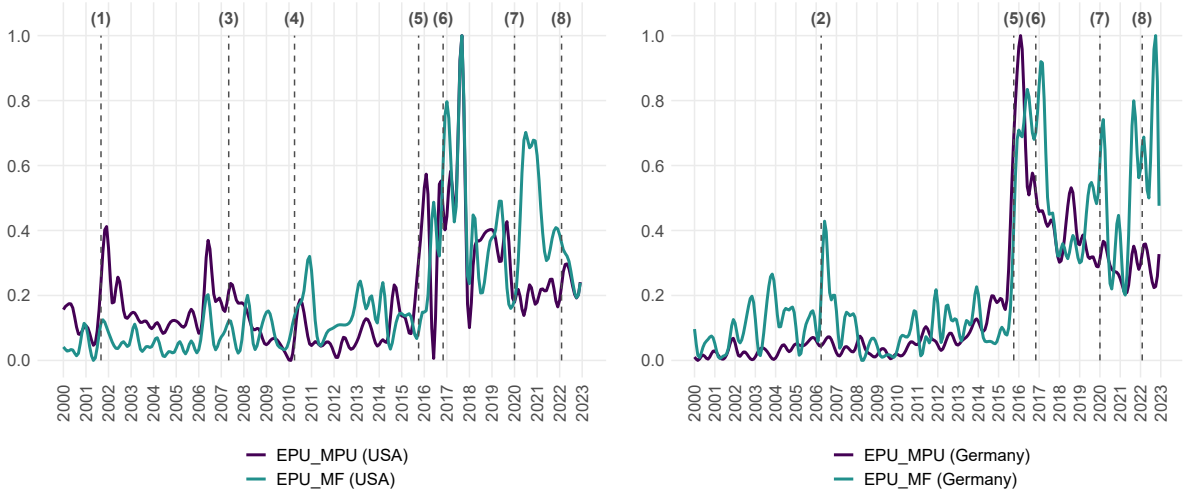
Note: All indexes are normalized using min-max scaling. Events: (1) Rise in oil prices (Venezuelan crisis and Iraq war), (2) Rise in oil prices (Global Financial Crisis), (3) Dodd-Frank Act, (4) Rise in oil prices (Arab Uprisings), (5) US debt-ceiling crisis, (6) US fiscal cliff crisis, (7) Decline in oil prices (excess capacity), (8) End of QE by Fed, (9) Greek bailout referendum, (10) Brexit referendum, (11) Trump inauguration, (12) US-Iran tensions, (13) Decline in oil prices (Covid-19).

Figure A7: Main Environment and Health Events and Indexes

(A) Environmental and Health Uncertainty Indexes



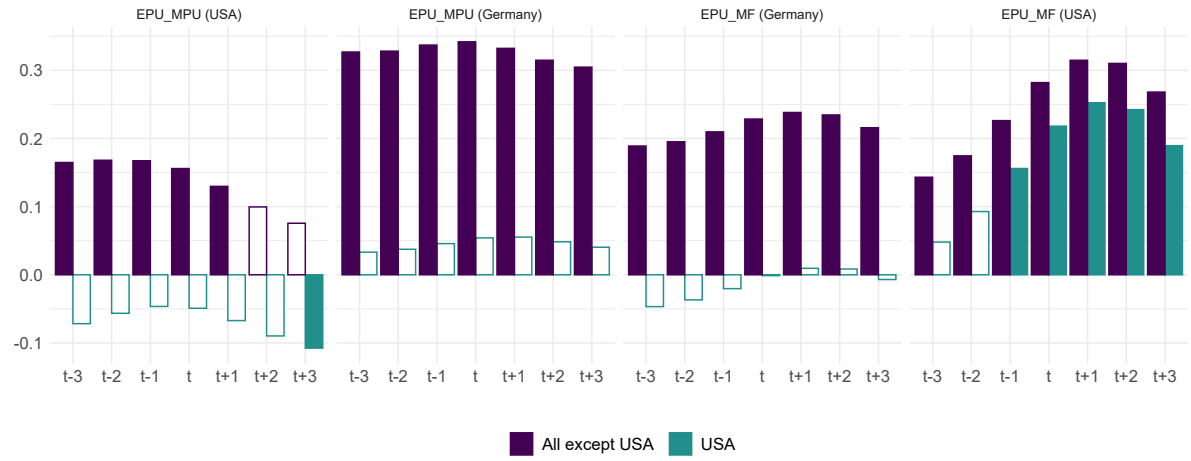
(B) Fear and Migration Uncertainty Indexes



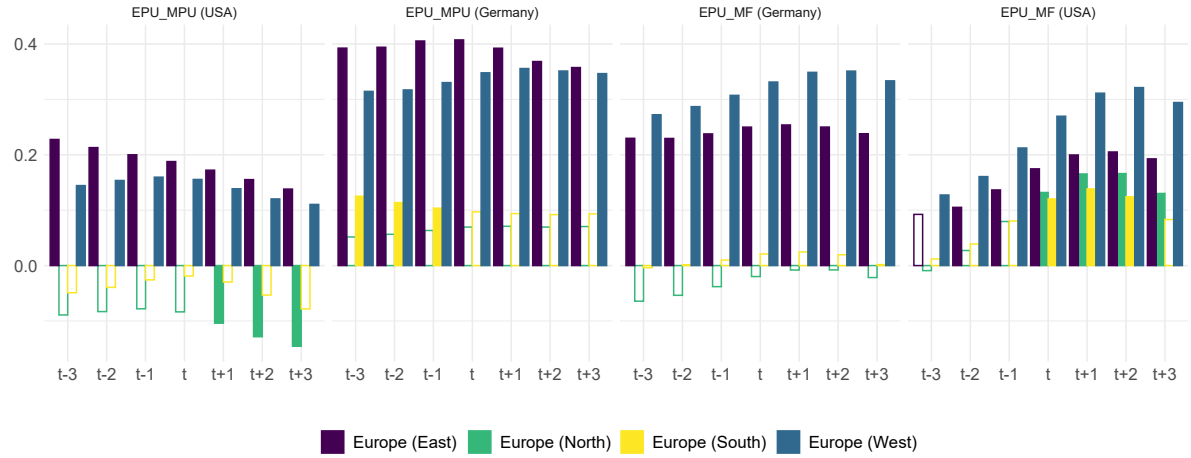
Note: All indexes were normalized using min-max scaling. *Panel A:* (1) US statement on Kyoto Protocol, (2) SARS outbreak, (3) Copenhagen Accords, (4) Fukushima earthquake, (5) US-China deal on climate change, (6) Paris Climate Agreement, (7) US withdraws from the Paris Climate Agreement, (8) UN Climate Action Summit, (9) Covid-19 outbreak. *Panel B:* (1) 9/11 terrorist attacks, (2) Increased North African Immigration, Reforms to 'Informal' Residency, and Immigration Limits, (3) Comprehensive Immigration Reform Act, (4) Arizona Law, Increased deportations, (5) European migrant crisis, (6) 2016 United States presidential election, (7) Covid-19 outbreak, (8) Russia invades Ukraine.

Figure A8: Cross-Correlations between the GPR and EPU Indexes for Migration and Fear

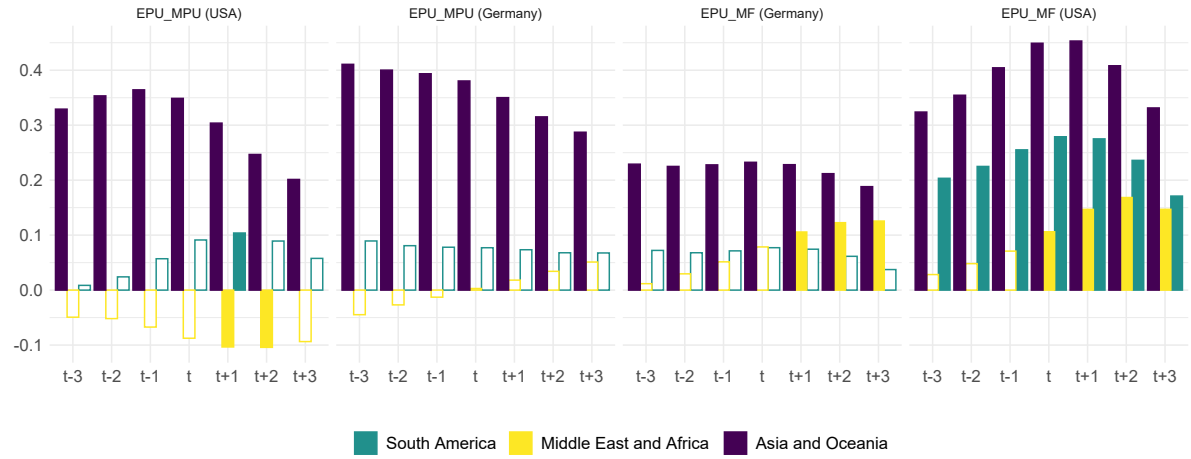
(A) GPR in USA vs. All Other Countries



(B) GPR in Europe

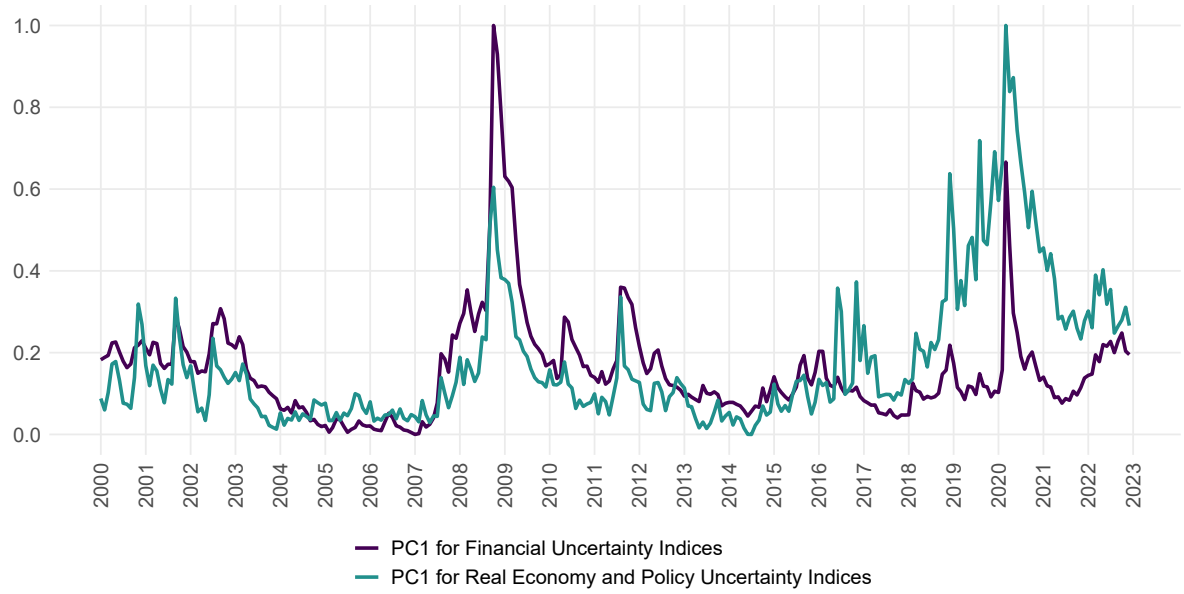


(C) GPR in South America, Asia, and Africa



Note: The figure shows the cross-correlation between the GPR indexes and the EPU indexes for migration policy uncertainty and fear. The country-specific GPR indexes are grouped into regions. The x-axis represents the lags, with negative values indicating that the GPR precedes the respective index, and positive values indicating that the GPR follows the respective index. The height of the bars indicates the strength of the correlation, with taller bars representing a stronger relationship. Fully colored bars indicate that the correlation is statistically significant at the 10% level.

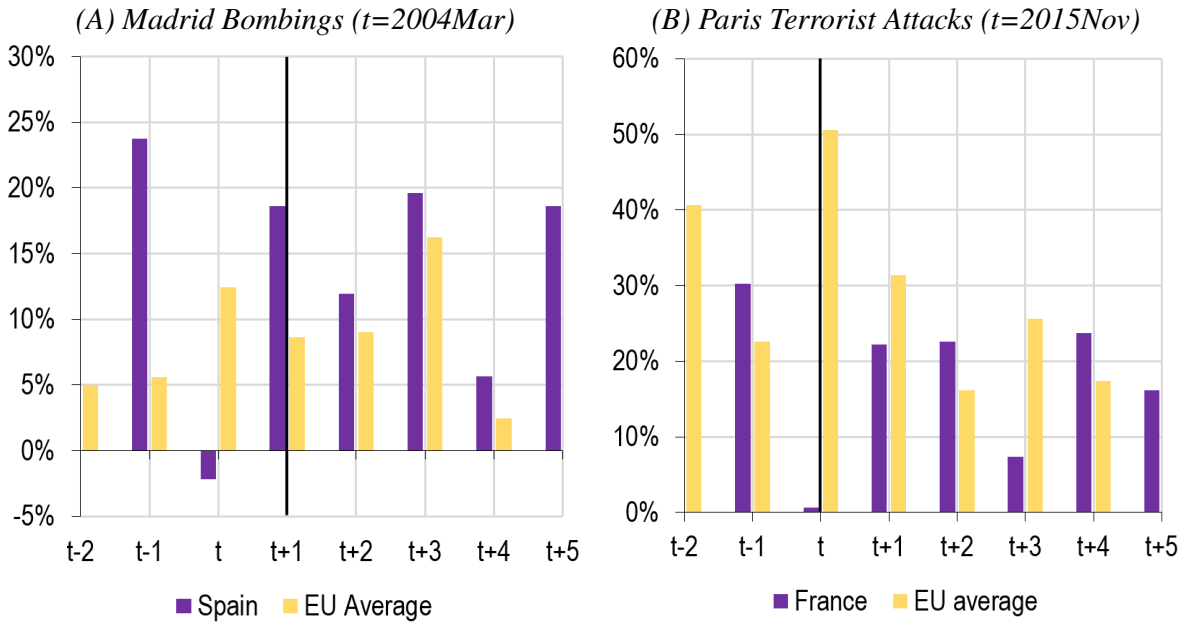
Figure A9: Financial and Real Economy Uncertainty Are Closely Connected



Note: The figure shows the evolution of the first principal component estimated for the group of financial uncertainty indexes and real economy and policy indexes (for the grouping of indexes, see Table 1). The first principal component for financial uncertainty indexes explains 71% of the variance, while that for real economy and policy uncertainty explains 41% of the variance.

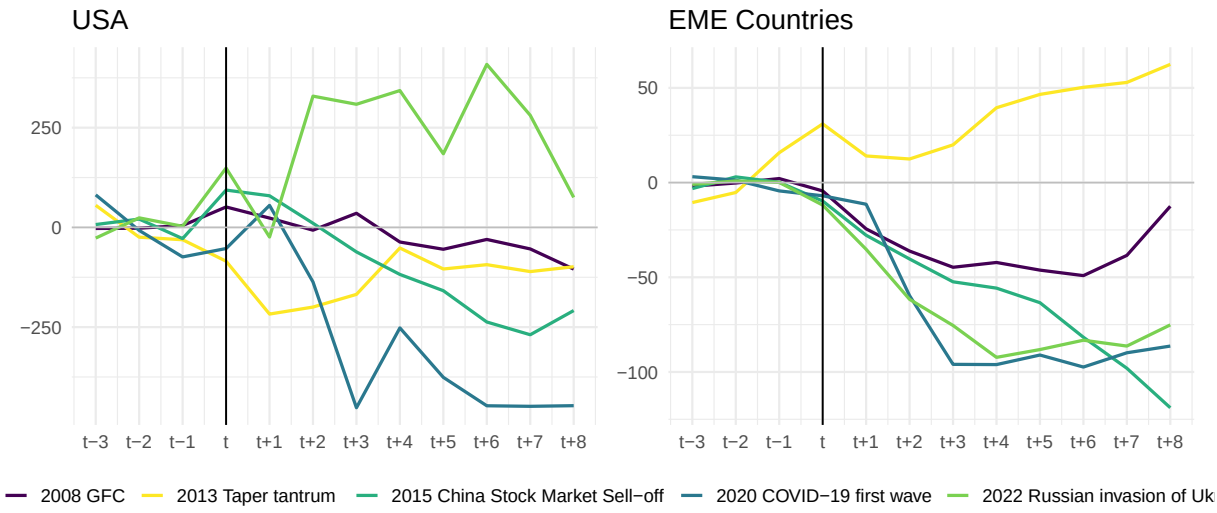
A.3 Financial and Real Channel: Additional Charts

Figure A10: Consumer Loan Growth Decreases Following a Fear Shock



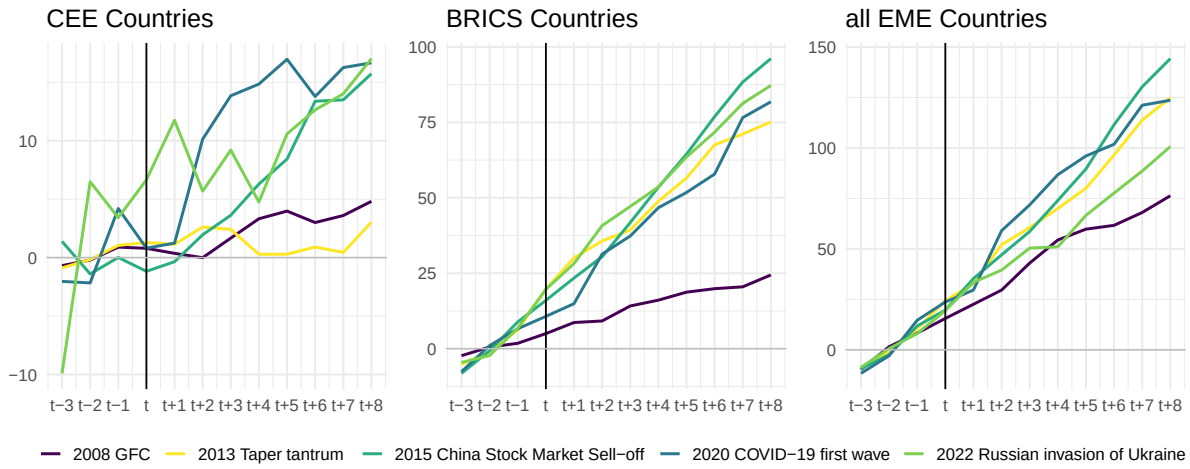
Note: The figure shows the annual growth rate of new consumer loans around selected event dates (t).

Figure A11: Net Portfolio Flows in EME and USA after Events



Note: The figure shows the development of cummulative capital flows (net portfolio flows) for the USA, CEE and BRICS countries, based on monthly data. Time t represents the moment when a particular event occurred. The capital flows are demeaned to the average from t-3 to t-1. Time t for each event is as follows: 2008 GFC – Sept. 2008; 2013 Taper Tantrum – May 2013; 2015 China stock market sell-off – July 2015; Covid-19 – Jan. 2022; 2022 Russian Invasion of Ukraine – Feb. 2022. The EME countries include all 33 emerging economies from the (de Crescenzio and Lepers, 2021) dataset.

Figure A12: FDI Flows in CEE, BRICS and All EME



Note: The figure shows the development of cumulative FDI flows for CEE, BRICS and all EME countries, based on monthly data. Time t represents the moment when a particular event occurred. The FDI flows are demeaned to the average from t-3 to t-1. Time t for each event is as follows: 2008 GFC – Sept. 2008; 2013 Taper Tantrum – May 2013; 2015 China stock market sell-off – July 2015; COVID-19 – Jan. 2022; 2022 Russian Invasion of Ukraine – Feb. 2022. Central and Eastern Europe (CEE) includes the Czech Republic, Hungary, Poland, and Slovakia; and the BRICS group includes Brazil, Russia, India, China, and South Africa. The data are from (de Crescenzio and Lepers, 2021) dataset.

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