



## BIS Working Papers No 1380

### Chasing El Dorado: gold under shifting geopolitical and financial conditions

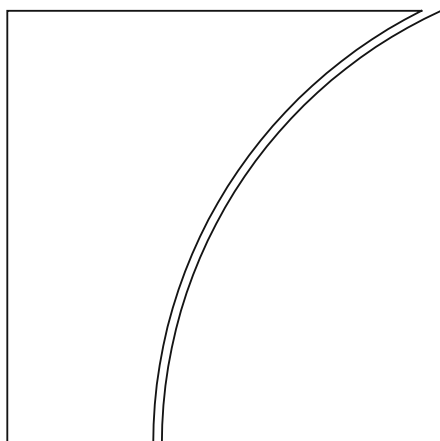
by Rafael Guerra and Gabriel Zelpo

Monetary and Economic Department

October 2026

JEL classification: G15, E44, F51, G12, Q02

Keywords: gold prices, geopolitical risk, financial  
conditions



BIS Working Papers are written by members of the Monetary and Economic Department of the Bank for International Settlements, and from time to time by other economists, and are published by the Bank. The papers are on subjects of topical interest and are technical in character. The views expressed in this publication are those of the authors and do not necessarily reflect the views of the BIS or its member central banks.

This publication is available on the BIS website ([www.bis.org](http://www.bis.org)).

© *Bank for International Settlements 2026. All rights reserved. Brief excerpts may be reproduced or translated provided the source is stated.*

ISSN 1020-0959 (print)  
ISSN 1682-7678 (online)

# Chasing El Dorado: gold under shifting geopolitical and financial conditions\*

Rafael Guerra<sup>1</sup> and Gabriel Zelpo<sup>1,2</sup>

<sup>1</sup>Bank for International Settlements (BIS)

<sup>2</sup>Central Bank of Chile

22 September 2026

## Abstract

This paper analyses the state-dependent effects of geopolitical risks on gold prices (i.e. the safe-haven role of gold), conditional on financial conditions. Geopolitical risks are often associated with tighter financial conditions. However, recent data reveal a decoupling between such shocks and more restrictive financial conditions, raising the question of how gold returns are affected by geopolitical shocks, conditional on the macro-financial environment. Using monthly data from 1990 to 2026, we find that increases in geopolitical risks – both geopolitical threats and realised events – increase gold returns, with stronger effects observed during periods of loose financial conditions. We decompose this relationship into two mechanisms: (i) the credit and liquidity risk channel and (ii) the opportunity cost channel. Our findings indicate that the relationship operates most clearly through the first channel, suggesting that the key factor is investors’ capacity to rebalance, while the evidence for the second channel is less conclusive. Finally, we also find that the largest impact occurs when periods of loose financial conditions are compounded with periods of geopolitical escalations, as seen in 2024–26. These insights highlight the relevance of understanding gold as a safe-haven asset amid complex macro-financial conditions.

**JEL Classification:** G15, E44, F51, G12, Q02.

**Keywords:** Gold prices; geopolitical risk; financial conditions.

---

\*Contact information: Rafael.Guerra@bis.org; Gabriel.Zelpo@bis.org. The views expressed in this publication are those of the authors and do not necessarily reflect the views of the BIS or its member central banks. We thank Ilhyock Shim, Nicole Scherrer, Denis Gorea, Christian Upper and participants in an internal BIS seminar for helpful comments and suggestions. The authors acknowledge the use of artificial intelligence in editorial refinement. Responsibility for all errors remains with the authors.

# 1 Introduction

Gold occupies a distinctive position within the international financial system, combining exceptional market scale with unique institutional attributes and informational value, which confer its status as a safe-haven asset during times of stress. Unlike most financial assets, it carries no counterparty or issuer risk: as a stateless asset not backed by any government, it cannot be frozen, sanctioned or devalued via redenomination – and it cannot be printed.<sup>1</sup> Compared with previous years, gold is now held primarily as a reserve and investment asset rather than for industrial use, and its price largely reflects its safe-haven characteristics, making it a highly sensitive barometer of systemic stress.<sup>2</sup> Recently, gold prices rose to unprecedented levels, regaining academic attention for their dynamics amid geopolitical fragmentation.

There is a well-documented empirical literature on gold’s safe-haven status with respect to economic uncertainty, mostly focused on financial risks (Baur and McDermott, 2010; Beckmann, Berger, and Czudaj, 2015; Huynh, 2020), and risks related to policy uncertainty (Balcilar, Gupta, and Pierdzioch, 2016; Raza et al., 2018; Bilgin et al., 2018; Beckmann, Berger, and Czudaj, 2019; Gozgor et al., 2019). However, there is limited analysis with respect to geopolitical events and geopolitical threats, a growing literature facilitated by the construction of the geopolitical risk (GPR) index proposed by Caldara and Iacoviello (2022).

In addition to this, it is difficult to consider in isolation the link between the effect of geopolitical risks on agents’ decisions to seek refuge in gold prices without accounting for the macro-financial landscape, which may serve as a catalyst for this mechanism – in this case, global financial conditions. Usually, geopolitical risks go hand in hand with tighter financial conditions (Caldara and Iacoviello, 2022; IMF, 2025); however, one exception to this rule is the recently observed period where there is a decoupling between geopolitical risks and tighter financial conditions, which may potentially benefit gold’s safe-haven status. As observed in Figure 1, the historical positive correlation between high geopolitical risks and tight financial conditions (dots in blue) has reversed in recent years (dots in red).

Between 2024 and 2026, gold prices surged to unprecedented levels (Figure 2). Prices rose by over 130% between January 2024 and April 2026, when gold peaked. Newspapers and financial experts attributed this surge to major geopolitical conflicts, including the ongoing Russian invasion of Ukraine and escalating tensions in the Middle East, which boosted demand for gold by some central banks and investors (ECB, 2025). However, such a sharp increase in gold prices had not been seen during earlier spikes in geopolitical risks (Figure 2a).

---

<sup>1</sup>Above-ground gold stocks are valued at roughly USD 30 trillion, a figure comparable to the market value of US Treasuries. At end-2025 gold accounted for more than 20% of global official reserves, making it the second-largest reserve asset after the US dollar and, in recent years, surpassing the euro.

<sup>2</sup>Beyond its safe-haven properties, gold has also been extensively documented as an effective hedge against inflation (Beckmann and Czudaj, 2013; Salisu, Raheem, and Ndako, 2020), a hedge against currency risk (Wang and Lee, 2022; Capie, Mills, and Wood, 2005; He, Guo, and Yu, 2020), and a portfolio diversifier given its low correlation with most other asset classes (Baur and McDermott, 2010; Akhtaruzzaman et al., 2021; Agyei-Ampomah, Gounopoulos, and Mazouz, 2014; Ciner, Gurdgiev, and Lucey, 2013).

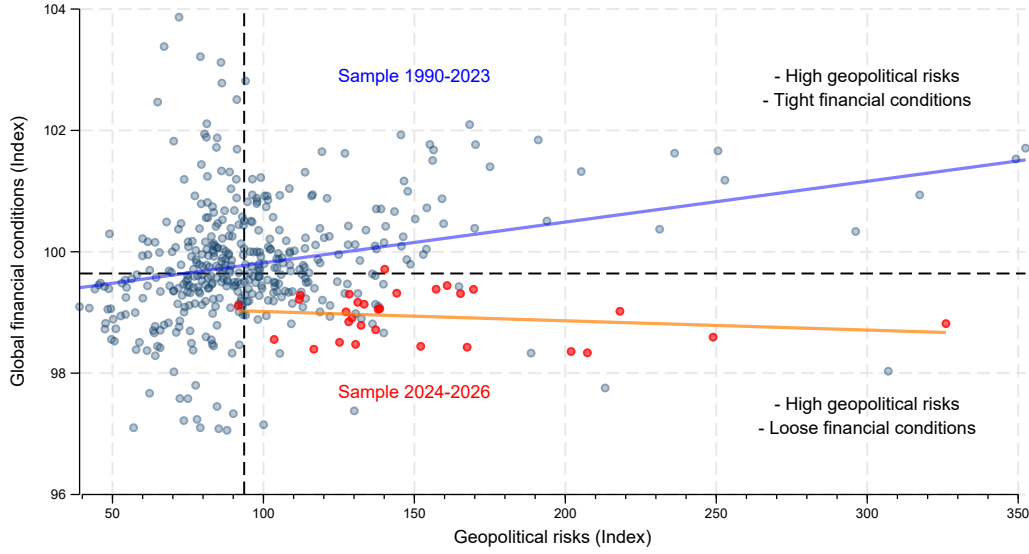
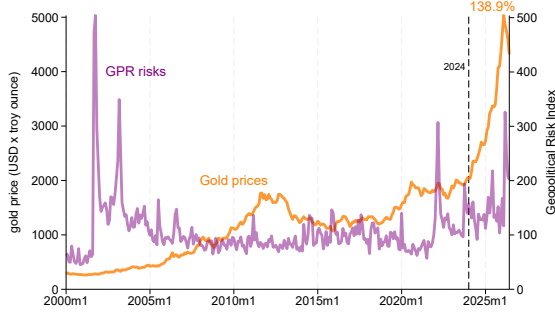


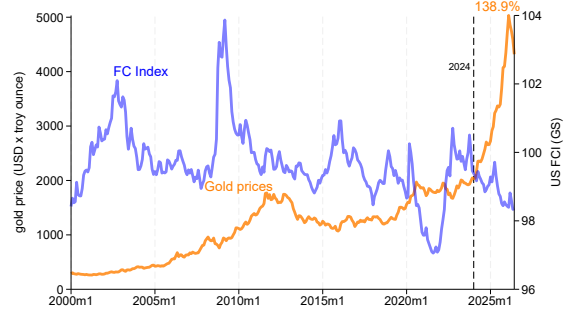
Figure 1: Historical link between global financial conditions and geopolitical risks. *Note: Data on global financial conditions from Goldman Sachs and data on geopolitical risks from Caldara and Iacoviello (2022).*

At the same time, an easing of the US monetary policy stance, a decline in liquidity and credit risk conditions, and a continuous weakening of the US dollar – three major factors identified as drivers of global financial conditions (Miranda-Agrippino and Rey, 2020; Hofmann, Shim, and Shin, 2022; Jiang, Krishnamurthy, and Lustig, 2023; Gelos, Patelli, and Shim, 2024) – favoured a loosening of these conditions during the same period of 2024-26 (Figure 2b). Since January 2024, a continuous easing of US monetary policy (cumulative cut in the federal funds rate by 175 basis points), a reduction of almost 100 basis points in the US BBB corporate spreads (proxy of credit and liquidity risk conditions), and the weakening of the US dollar by around 11.5% against other currencies have loosened global financial conditions. In this particular case, it is unavoidable to question whether this global loosening of financial conditions affected the safe-haven status of gold during major geopolitical events.

With this background, in this paper we study the state-dependent effects of geopolitical shocks on gold price returns conditional on global financial conditions, a research question not addressed before. Using an extended monthly sample spanning from 1990 to 2026 and performing several state-dependent econometric models, we find evidence of non-linear effects on the safe-haven status of gold, conditional on global financial conditions. Specifically, we find that, on average, a 1 standard deviation increase in threats (the subcomponent related to geopolitical threats) increases gold returns by 0.45% (at month = 0), while a 1 standard deviation increase in GPR events (the subcomponent related to geopolitical realised events) increases gold returns by 0.60% (at month = 4). During rising GPR risks (a regime defined by escalations in geopolitical risks), baseline results rise to 1.00% and 0.80%, respectively. During loose financial conditions, baseline results rise to 0.60% and 1.00%, respectively. When combining the regimes



(a) Gold prices and geopolitical risks.



(b) Gold prices and financial conditions.

Figure 2: Gold prices, geopolitical risks and financial conditions *Note: Data on gold prices from Bloomberg, data on global financial conditions from Goldman Sachs and data on geopolitical risks from Caldara and Iacoviello (2022).*

of rising GPR risks and loose financial conditions, we find the largest effects. The impact of GPR threats on gold returns increases to 1.3% (at month = 0), and the impact of GPR acts on gold returns increases to 1.2% (at month = 3).<sup>3</sup> We argue that the combination of rising geopolitical risks and loose financial conditions has helped to explaining recent unprecedented spikes in gold prices, among other factors.<sup>4</sup>

The literature directly addressing this question is scarce, leaving a clear gap for contribution. Few works have analysed the particular implications of geopolitical risks (both threats and geopolitical events) on gold price returns. Baur and Smales (2020) and Das, Kannadhasan, and Bhowmik (2019) are the two direct works analysing the linear impact of geopolitical risks on gold returns. Both find that the contemporaneous response of geopolitical threats positively influences gold price returns, and find no effect from geopolitical events. We find these latter results somewhat unconvincing, as major geopolitical events can indeed have the potential to force agents either to seek safe-havens or to liquidate their gold reserves to provide additional liquidity. We argue that these nuanced results may be a product of the contemporaneous analysis they performed and that a dynamic analysis with longer-horizon windows can provide a better understanding of these patterns.<sup>5</sup>

Finally, regarding the gold price return responses conditional on the state of the macroeconomy, one single work stands out. Chen, Miao, and Tee (2023) evaluate the effects of economic uncertainty shocks on gold prices in the zero lower bound (ZLB) regime, finding that the re-

<sup>3</sup>By placing these results in context, the historical average gold return from 1990 to 2023 was 0.5%, while the recent average gold return from 2024 onwards has been 2.6%, with a standard deviation of 4.2%.

<sup>4</sup>Further analysing the underlying financial mechanisms, we find that the lack of credit access and the liquidity risk channel explain why accommodative financial conditions facilitate gold's safe-haven role during periods of geopolitical shocks, in line with the literature on liquidity risk effects (Brunnermeier and Pedersen, 2009; Cheema, Faff, and Szulczyk, 2022).

<sup>5</sup>Two other papers in this strand, though not directly related, stand out. Ngo, Nguyen, and Hoang (2024) study the influence of geopolitical risks on national reserves, finding that geopolitical shocks can affect several types of reserves – financial and natural reserves – but reserves in gold tend to increase. In addition, Triki and Maatoug (2021) find that the S&P 500 correlates more (less) with gold during periods of high (low) geopolitical risks.

sponses of gold prices to increases in VIX and economic policy uncertainty (EPU) are stronger and more persistent during ZLB periods. They argue that setting policy rates, especially at the ZLB, could also alter investors' conditional expectations of underlying asset prices, thereby modifying forward-looking investors' perceptions and affecting fluctuations in gold prices.

All told, the contribution of this paper to the literature is mainly twofold. First, it builds on Baur and Smales (2020) and Das, Kannadhasan, and Bhowmik (2019) and further extends their contemporaneous analysis to a dynamic examination of geopolitical risk shocks on gold returns – an approach needed to better understand the link between geopolitical risk and fluctuations in gold prices. Second, it is the first work to analyse the non-linear effects of geopolitical risk shocks, conditional on the macro-financial state of the economy (in this case, global financial conditions) – a focus not explored before.

The remainder of this paper is structured as follows. Section 2 discusses the relationship between this work and the literature. Section 3 outlines the empirical strategy implemented. Section 4 describes the data. The main results are presented in Section 5, and an analysis of the underlying financial mechanisms is provided in Section 6. A robustness analysis is presented in Section 7. Finally, the last section presents conclusions.

## 2 Relation to the literature

In this first section, we situate our contribution within the three strands of literature most relevant to our analysis: research on gold as a hedge and safe-haven asset, the financial consequences of geopolitical risk, and the role of liquidity and macro-financial conditions in shaping gold responses. We connect these strands by studying the dynamic response of gold returns to geopolitical shocks and examining how this response varies with the prevailing geopolitical and financial environment.

Most empirical research on gold belongs to the portfolio allocation literature and evaluates whether gold is negatively or weakly correlated with other assets during periods of market stress (Agyei-Ampomah, Gounopoulos, and Mazouz, 2014; Beckmann, Berger, and Czudaj, 2015; Baur and McDermott, 2010; Reboredo, 2013; Ciner, Gurdgiev, and Lucey, 2013). Much of this literature relies on daily data and therefore concentrates on immediate flight-to-safety behaviour. At the opposite end of the frequency spectrum, studies using annual or historical data examine gold's long-run performance over several decades or centuries (Erb and Harvey, 2013; Boubaker et al., 2020; Barro and Misra, 2016). Comparatively less is known about the within-12-month response of gold prices to uncertainty shocks.<sup>6</sup>

Evidence from time-frequency methods nevertheless indicates that the horizon of analysis matters. Bredin, Conlon, and Potì (2015), for example, find that gold can retain its safe-haven properties for horizons of up to one year during financial crises. Related wavelet-based research

---

<sup>6</sup>See Annex Table 1 to see an extensive review of the literature on the safe-haven status of gold.

similarly shows that gold’s protective properties vary across frequencies (Bouri et al., 2020). These methods provide useful evidence on horizon dependence, but they primarily examine variation in comovement across frequencies rather than tracing the response to a particular shock. Our analysis complements this literature by using monthly local projections to estimate the response of gold returns to geopolitical shocks over a 12-month horizon.

A second strand of research examines the relationship between geopolitical risk and gold prices (Annex Table 2). The Geopolitical Risk Index developed by Caldara and Iacoviello (2022) distinguishes between geopolitical threats and realised geopolitical events and provides a systematic measure of their evolution over time. Using this framework, Baur and Smales (2020) and Das, Kannadhasan, and Bhowmik (2019) find that gold responds positively to geopolitical threats, while the response to realised events is generally not statistically different from zero.

These findings raise the question of whether realised geopolitical events have no effect on gold or whether their effects simply emerge with a delay. Threats can be incorporated into prices immediately because they alter investors’ expectations about future conflict. Realised events, by contrast, may propagate gradually through revisions to the expected duration and severity of the conflict, policy responses and international portfolio reallocation. By estimating horizon-specific responses, our analysis distinguishes an absence of contemporaneous effects from an absence of effects altogether.

An additional empirical challenge is that geopolitical events frequently coincide with changes in financial volatility and global risk appetite. Although the GPR index contains information distinct from standard measures of financial uncertainty (Baur and Smales, 2020; Caldara and Iacoviello, 2022), failing to account for their comovement could conflate the response to geopolitical developments with a broader flight-to-quality episode. In our baseline specification, we therefore calculate the residual of each GPR component with respect to the VIX and use the standardised residual as the geopolitical innovation.

A third strand of literature shows that gold’s safe-haven properties are not invariant across economic and financial environments. The paper most closely related to our analysis is Chen, Miao, and Tee (2023), who use a non-linear Interacted-VAR to examine whether gold prices respond differently to uncertainty shocks during normal monetary-policy periods and episodes in which the federal funds rate is constrained by the ZLB. They find that the response of gold prices to VIX and EPU shocks is substantially stronger and more persistent at the ZLB. Their counterfactual analysis further suggests that this state dependence is associated with the monetary-policy regime rather than simply with the business cycle. These findings demonstrate that the macro-financial environment can amplify gold’s response to uncertainty shocks. Our analysis extends this insight by studying geopolitical rather than general uncertainty shocks and by conditioning their effects on a broader measure of global financial conditions, rather than exclusively on the monetary-policy rate.

The market turmoil at the beginning of the COVID-19 pandemic illustrates the complementary role of funding liquidity in gold’s safe-haven property. During the initial liquidity shortage, investors reportedly liquidated profitable gold positions to raise cash and meet margin calls elsewhere (Lee, 2020; Grosskopf, 2020). Consistent with this mechanism, Echaust and Just (2022) and Cheema, Faff, and Szulczyk (2022) find that gold did not provide consistent protection against extreme downside risk during the pandemic shock. When funding constraints are binding, investors may be unable to reallocate towards gold even when demand for safe-assets is elevated.

State dependence also arises from portfolio characteristics affecting gold returns. Zulaica (2020) shows that gold’s effectiveness as a hedge or safe-haven in central bank reserve portfolios depends on factors such as portfolio duration and the volatility of the numeraire currency. More generally, this evidence implies that safe-haven properties depend not only on the adverse shock itself, but also on investors’ balance sheets, opportunity costs and the ability to adjust their portfolios. We extend this insight by using global financial conditions as a state variable that captures whether the broader environment facilitates or constrains reallocation towards gold following geopolitical shocks.

This paper makes three key contributions to the existing literature. First, it extends the predominantly contemporaneous analysis of geopolitical risk and gold by examining the dynamic responses of gold returns to both geopolitical threats and realised geopolitical events. Second, it demonstrates that these responses are state-dependent, systematically varying with geopolitical risk and global financial condition regimes. The central implication is that gold’s safe-haven behaviour cannot be captured by a single unconditional coefficient; rather, it depends on both the nature of the geopolitical shock and the macro-financial conditions under which investors react. Third, this paper contributes to the literature by being the first to distinguish between geopolitical risks and financial risks, effectively isolating flight-to-quality effects from safe-haven effects during periods of geopolitical tension.

### 3 Empirical strategy

To address these objectives, our empirical strategy examines how gold returns respond to geopolitical risks and how that response varies with the macro-financial environment. We proceed in three steps: we first construct a measure of geopolitical risks that is independent of financial risks, we then estimate its dynamic effect on gold returns, and we finally allow that effect to differ across macro-financial conditions.

#### 3.1 Identification of shocks orthogonal to financial risks

Geopolitical risks are often accompanied by financial risks, which can lead to an overestimation of our coefficient of interest when assessing the impact on gold returns, as the distinct market dynamics of geopolitical risks (safe-haven effect) and financial risks (flight-to-quality) may be

come conflated. To isolate the pure effect of geopolitical risks from the potential financial risks created by the same geopolitical event, we regress each GPR component ( $k \in \{G, T, A\}$  for overall, threats and acts, respectively) on the VIX index (taken as a proxy for global financial volatility):

$$GPR_t^k = \alpha + \beta VIX_t + \hat{\varepsilon}_t^k. \quad (1)$$

here  $\hat{\varepsilon}_t^k$  denotes the estimated residual, which we standardise and treat as identified geopolitical shocks. By construction,  $\hat{\varepsilon}_t^k$  is orthogonal to the VIX in-sample (i.e. financial risks). We henceforth denote the shocks as  $GPR_t^{k,\perp F} = \hat{\varepsilon}_t^k$ .

### 3.2 Estimating the impact of geopolitical risk shocks on gold price returns

Unlike previous analyses of gold returns that focus on contemporaneous responses, we employ linear local projections à la Jordà (2005) to estimate the cumulative dynamic response of gold returns to geopolitical risk shocks. Specifically, for each forecast horizon  $h$  we estimate:

$$\sum_{s=0}^H y_{t+s} = \alpha_H + \beta_H GPR_t^{k,\perp F} + \sum_{i=1}^p \gamma_{H,i} y_{t-i} + \mathbf{\Gamma}'_H \mathbf{X}_t + \varepsilon_{t+H}, \quad k \in \{G, T, A\}. \quad (2)$$

here, the dependent variable is the difference in the logarithm of the spot gold price (USD per troy ounce),  $returns_t = 100 \cdot \Delta \log P_t^{gold}$ .  $\beta_H$  represents the cumulative impact of geopolitical risk shocks on gold price returns through horizon  $H$  after the shock. The lag order  $p$  is selected using the Akaike Information Criterion and is held fixed across horizons. Inference relies on Newey–West (HAC) standard errors to account for serial autocorrelation induced by the  $H$ -step-ahead projection (the HAC bandwidth is set to at least  $H$ ).  $X$  denotes a vector of control variables, including macro-financial variables that could bias and lead to overestimation or underestimation of our coefficient of interest if omitted in the contemporaneous period.<sup>7</sup> These data are described in Section 4.

### 3.3 State-dependent responses of gold prices to geopolitical risk shocks

To assess whether the safe-haven response varies with macro-financial conditions, we use the following specifications. First, to evaluate whether an escalation in geopolitical risks generates non-linear responses in gold prices, as suggested by the literature, we augment Equation (2) with a dummy interaction term. Second, in a separate exercise, we examine whether the degree of tightness in financial conditions generates non-linear responses of gold prices to geopolitical shocks. Specifically, our specification is as follows:

$$\sum_{s=0}^H y_{t+s} = \alpha_H + \beta_H GPR_t^{k,\perp F} + \delta_h D_t + \theta_H (GPR_t^{k,\perp F} \times D_t) + \sum_{i=1}^p \gamma_{H,i} y_{t-i} + \mathbf{\Gamma}'_H \mathbf{X}_t + \varepsilon_{t+H}, \quad (3)$$

---

<sup>7</sup>Even when lagging the control vector by one period, our baseline findings remain robust.

where

$$D_t = \begin{cases} 1 & \text{if } S_{t-1} = \text{High state,} \\ 0 & \text{otherwise.} \end{cases} \quad S_t \in \{D_t^G, D_t^F\}. \quad (4)$$

here,  $\beta_H$  captures the response of gold returns in the low state ( $D_t = 0$ ), while  $\beta_H + \theta_H$  captures the response in the high state ( $D_t = 1$ ). We explicitly define our state variables  $D_t$  as follows:

- **Escalation of geopolitical risk state:**  $D_t^G = 1$  if  $\Delta GPR_{t-1} \geq 0$ . This classifies periods when geopolitical risk is growing (escalating);  $D_t = 0$  otherwise (i.e. de-escalation of geopolitical risks).
- **Tight financial conditions state:**  $D_t^F = 1$  if  $FCI_{t-1} \geq \overline{FCI}$ , indicating tighter-than-average (i.e. deteriorated) financial conditions;  $D_t = 0$  otherwise (i.e. loose financial conditions).

We lag the state variable by one period to mitigate contemporaneous feedback between the shock and the state ( $S_{t-1}$ ). Intuitively, the first state splits the sample into lagged periods of rising versus non-rising geopolitical risk, while the second splits it into lagged tighter versus looser financial conditions. Intuitively, the sign of the coefficient  $\theta_H$  will reveal whether the gold-return response to a GPR shock is amplified after periods of increasing geopolitical tensions or tighter financial conditions.

Finally, we combine the two state variables to characterise the four regimes analysed in Section 5. Their interaction defines four mutually exclusive regimes:

$$\begin{aligned} R_t^1 &= D_t^F D_t^G && \text{(tight FCI, rising GPR),} \\ R_t^2 &= D_t^F (1 - D_t^G) && \text{(tight FCI, non-rising GPR),} \\ R_t^3 &= (1 - D_t^F)(1 - D_t^G) && \text{(loose FCI, non-rising GPR),} \\ R_t^4 &= (1 - D_t^F) D_t^G && \text{(loose FCI, rising GPR).} \end{aligned} \quad (5)$$

for each horizon  $h$  and shock  $k \in \{G, T, A\}$  and regime  $j \in \{1, 2, 3, 4\}$ , we estimate the following local projection:

$$\sum_{s=0}^H y_{t+s} = \alpha_H + \beta_H^j GPR_t^{k, \perp F} + \delta_H^j R_t^j + \theta_H^j (R_t^j \times GPR_t^{k, \perp F}) + \sum_{i=1}^p \gamma_{H,i} y_{t-i} + \mathbf{\Gamma}'_H \mathbf{X}_t + \varepsilon_{t+H} \quad (6)$$

the cumulative impulse response in regime  $j$  is

$$CIRF^j(H) = \beta_H^j + \theta_H^j \quad (7)$$

the coefficients  $\beta_H^j + \theta_H^j$  measure the response of gold returns at horizon  $h$  to a one-standard-deviation geopolitical-risk shock occurring in regime  $j$ .

Our central hypothesis is that the response of gold price returns to the GPR variable is strongest when rising geopolitical risk coincides with loose financial conditions. We therefore test whether

$$(\beta_H^4 + \theta_H^4) > \max_{q \in \{1,2,3\}} (\beta_H^q + \theta_H^q) \quad (8)$$

for each type of geopolitical shock (threats and events). We will focus on distinguishing the effects in the regime of interest from the baseline effects, to avoid saturated models that report the combination of interactions across the four regimes simultaneously.

In all specifications, causal inference is supported by the narrative short-run restriction imposed on the link between geopolitical shocks and gold prices. Given the nature of the shocks considered – geopolitical threats and geopolitical acts – it is implausible that monthly gold returns could causally drive either type of geopolitical disturbance within the 12-month horizon of our analysis, over the sample period (1990–2026). Moreover, the use of state-dependent models introduces predetermined variation in the transmission mechanism, effectively treating shifts across regimes as external to the baseline contemporaneous relationship. By exploiting this variation, we capture non-linearities in the response of gold price returns to geopolitical shocks while preserving the causal interpretation of our estimates.

## 4 Data

The sample consists of monthly data and covers January 1990 to March 2026. The choice of the monthly frequency reflects the objective of the paper. Most studies of gold as a safe-haven asset use daily data and focus on immediate market reactions. Monthly data allow us instead to study whether the effects of geopolitical developments persist or emerge gradually over subsequent months, while remaining sufficiently frequent to capture considerable changes in financial conditions and geopolitical risks.

The independent variables and controls are:

- **Geopolitical risks:** We measure geopolitical risks using the newspaper-based Geopolitical Risk Index developed by Caldara and Iacoviello (2022). They define geopolitical risks as the threats, realisations, 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. They construct the GPR index with an algorithm that computes the share of articles mentioning adverse geopolitical events in leading newspapers published in the United States, the United Kingdom, and Canada. We use the three available series:
  - the aggregate *Geopolitical Risk Index* ( $GPR_t$ );
  - the *Geopolitical Threats sub-index* ( $GPRT_t$ ), which captures references to war threats, peace threats, military buildup, nuclear threats, and terrorist threats; and
  - the *Geopolitical Acts sub-index* ( $GPRA_t$ ), which captures realised events (beginning of wars, escalation of wars, or terrorist acts).

- **Financial conditions:** The *Goldman Sachs US Financial Conditions Index (GS US FCI)* is a composite indicator developed by Goldman Sachs Research to measure the overall ease or tightness of financial conditions in the US economy – essentially capturing how the current state of financial markets either supports or restrains economic growth in that country. A higher reading signals tighter financial conditions – meaning credit is more expensive, the dollar is stronger, and equities are weaker – which tends to restrain economic activity, while a lower reading signals easier conditions that are more supportive of growth (Goldman Sachs Research, 2017). Given its large historical sample, we will use this series as a proxy for global financial conditions.
- **Uncertainty indicators:** The *VIX Index*, obtained from Bloomberg, measures option-implied volatility in the US equity market, derived from a weighted average of S&P 500 option prices over a 30-day horizon. Even though the VIX is used in the construction of the residualised GPR innovations to ensure that our geopolitical shocks are orthogonal to risk-aversion shocks, it is useful to include this variable as a control. It captures investors’ forward-looking uncertainty about equity market conditions and serves as a broad proxy for financial market stress.
- **Macro-financial controls:**
  - The logarithm of the *Nominal Broad US Dollar Index* – a trade-weighted index of the US dollar against a basket of major currencies – is included because gold is globally priced in US dollars, creating a mechanical inverse relationship between dollar strength and gold returns: appreciation of the dollar raises the effective cost of gold for non-US investors, compressing demand. Controlling for the dollar index therefore isolates movements in gold prices attributable to shifts in risk sentiment or geopolitical uncertainty from those driven purely by currency valuation.
  - The *10-year US Treasury yield* captures the competition of other safe-haven assets. As nominal yields rise – whether reflecting tighter monetary policy expectations, improved growth prospects, higher fiscal concerns, or rising inflation compensation – the relative attractiveness of gold could be affected.
  - The logarithm of *US industrial production (IP)* proxies for the state of the global business cycle and aggregate economic activity. Beyond its role as a financial asset, gold retains significant industrial and jewelry demand, both of which are sensitive to cyclical conditions; moreover, broad economic expansions tend to increase risk appetite and reduce precautionary demand for safe-havens, while downturns can have the opposite effect. Controlling for global IP therefore accounts for the demand-side macroeconomic fundamentals that independently influence gold prices.
  - The logarithm of the *oil price* is included as a joint control for commodity-market co-movement and inflationary pressures. Gold and oil share exposure to common commodity factors – including dollar denomination and global supply and demand cycles – and oil price increases historically signal rising inflation expectations, which in turn boost gold’s appeal as an inflation hedge. By conditioning on the oil price,

the estimates isolate safe-haven and geopolitical channels from broader commodity-market dynamics and inflation shocks.

It is worth noting that, in all cases presented in Section 5 on results, where the dependent variable is one of the subindices (GPR threats or events), the other subindex is included as a control. This approach ensures a more robust identification of each subindex’s distinct effect on gold prices.

## 5 Results

### 5.1 Baseline effects

Figure 3 shows the impact of GPR, GPR threat, and GPR event shocks on gold price returns, generating overall positive statistical impacts but at different magnitudes and horizons. We find that the dynamics of the overall impact of GPR on gold price returns is a combination of the impacts of its two subcomponents: threats and events (first panel). First, there is a short-lived response of GPR threats of 0.45% (second panel) at month  $h = 0$ , with 90% confidence, indicating that the impact is contemporaneous and short-lived. Second, a medium-term response of 0.60% emerges from GPR event shocks (third panel), with 99% confidence, reflecting a longer and lagged response from this subcomponent. At the contemporaneous horizon ( $h = 0$ ), our results are consistent with Baur and Smales (2020): threats have a significant effect on gold returns, whereas geopolitical events do not. However, a lagged effect is observed from this second factor.

These initial results suggest that, contrary to the existing literature, a dynamic analysis is needed to better understand the differing effects of geopolitical risks on gold price returns. While gold price returns respond swiftly to surges in geopolitical threats, they generally take a few months on average to react to geopolitical events, potentially depending on the escalation of these events.

The horizon at which each subcomponent operates requires explanations on why we expect realised events to act with a delay. Geopolitical threats are news about the distribution of future conflict: they arrive as headlines and are incorporated into prices essentially on impact.

Realised events differ in two key respects. First, a substantial part of their content has typically been priced already at the threat stage – *the invasion follows the mobilisation; the strike follows the ultimatum* – so what moves prices on the day of the event is only its unanticipated component, which can be small even when the event itself is large. Second, the information that events do carry is revealed progressively: markets learn about the expected duration, severity and geographic containment of a conflict, whether the geopolitical event in question will trigger chain disruptions, the sanctions and policy responses it prompts, and the reallocation of official reserves it induces, over weeks and months rather than hours. Under this interpretation, the

coefficient at  $h = 0$  for geopolitical event shocks on gold returns understates the total effect of an event. The response is expected to build over the subsequent quarter, as observed in the third panel of Figure 3, peaking four months after the shock.

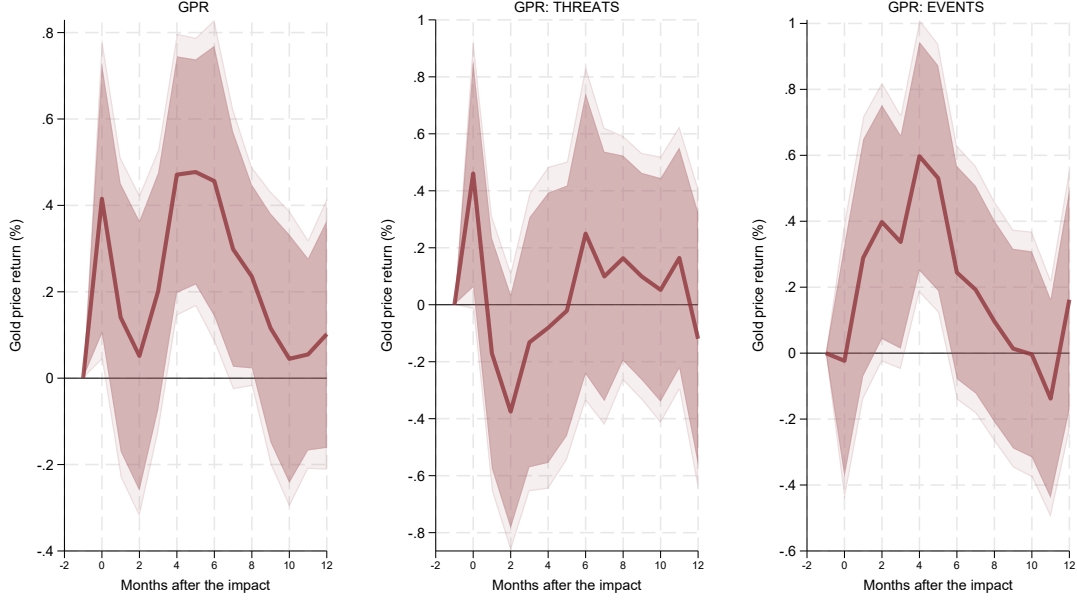


Figure 3: Cumulative IRF of GPR shocks on gold price returns. *Note: Shocks are orthogonal and uncorrelated with financial sources of uncertainty (VIX index). Estimated via Local Projections (Jordà, 2005). Confidence intervals are at 90% and 95%. HAC (Newey-West) std errors are used.*

## 5.2 Rising versus non-rising geopolitical risk environments

As established in the literature, stronger geopolitical shocks tend to have a greater impact on gold prices than weaker shocks – a pattern that has been well documented (Baur and Smales, 2020; Das, Kannadhasan, and Bhowmik, 2019). To align this paper with the existing body of research, we first test this pattern by analysing geopolitical shocks followed by periods of escalation in geopolitical tensions (i.e. rising GPR risks) in this subsection. Our findings confirm the strong safe-haven property of gold when there is a geopolitical shock after experiencing escalations in GPR risks.

Allowing the response to differ across rising and non-rising states (Figure 4), we find differentiated effects when geopolitical stress is rising. In the rising-GPR state, the response of gold returns to threats is about 1.0% on impact ( $h = 0$ ), followed by a reversal effect in the third month, after which the impact dissipates. In contrast, when examining the impact of geopolitical threats on gold price returns during non-rising GPR risks, we observe no statistical evidence across the 12-month horizon of the shock.

For geopolitical event shocks, the cumulative response peaks at around 0.8% in the second month ( $h = 2$ ) after the shock, while the same impact during the decreasing GPR risk state shows a lower magnitude and a lagged effect at  $h = 4$ . Considering these differences, we argue that the safe-haven property of gold is state-dependent. It becomes particularly salient when geopolitical risk is already increasing; that is, an escalation of a geopolitical event tends to amplify gold's safe-haven behaviour. Finally, tests for statistical evidence of non-linearities confirm that our results are statistically different across regimes (Figure 19, in the Annex).

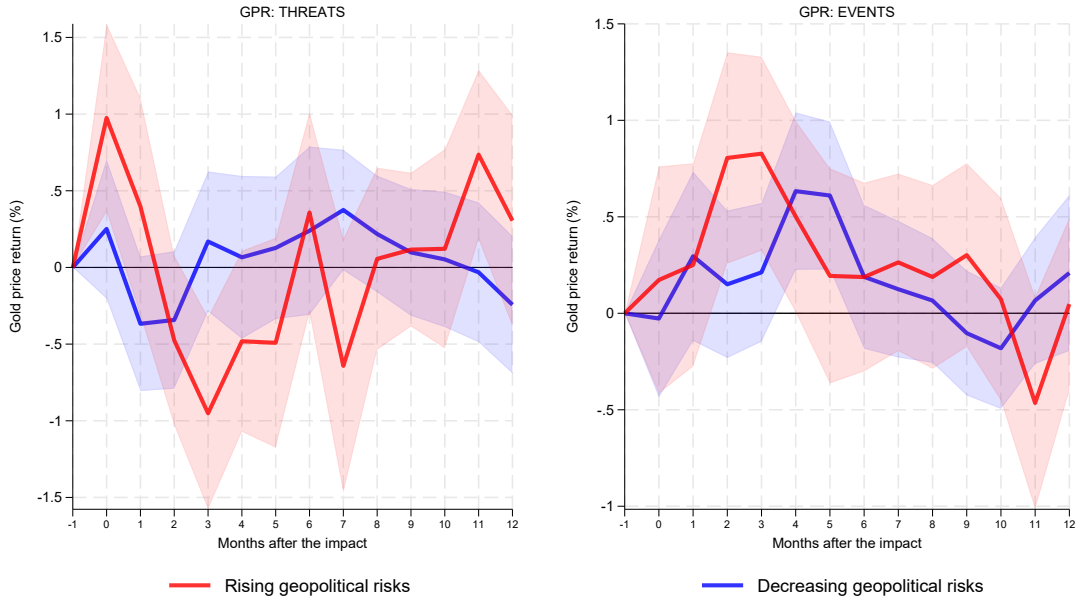


Figure 4: Cumulative IRF of GPR shocks on gold price returns conditional on geopolitical state. *Note: Shocks are orthogonal and uncorrelated with financial sources of uncertainty (VIX index). Growing geopolitical-risk state occurs when  $\Delta GPR_{t-1} \geq 0$ ; low state otherwise. The red line represents the response under growing geopolitical risk, and the blue line under decreasing. Estimated via Local Projections (Jordà, 2005). Confidence intervals are at 90%. HAC (Newey-West) std errors are used.*

### 5.3 Tight versus loose financial conditions

Addressing our principal research question, we also find non-linear patterns when conditioning on global financial conditions (Figure 5). Under tight conditions, the responses of gold returns to both GPR threats and events are not statistically significant for most of the horizons. There is even a negative response of gold prices to geopolitical threats in the second month after the shock. Under loose conditions, by contrast, the threats shock elicits a positive response of about 0.6% on impact ( $h = 0$ ), while the cumulative geopolitical event impact peaks at roughly 1.0% around the six-month horizon ( $h = 6$ ), a pattern consistent with fewer frictions when investors rebalance their portfolios.

These results support our main hypothesis: when a geopolitical shock occurs in an environment characterised by low financing costs, reduced transaction frictions, and fewer liquidity constraints, these conditions amplify the safe-haven role of gold prices in the aftermath of such shocks. This is likely because investors can borrow at lower costs to purchase gold, making it easier to utilise leverage. Tests for statistical evidence of non-linearities confirm that our results are statistically different across regimes in most months, particularly in the case of geopolitical event shocks (Figure 20, in the Annex). Section 6 explores which of these factors plays the most significant role, with the findings pointing most clearly to the relaxation of credit and liquidity constraints.

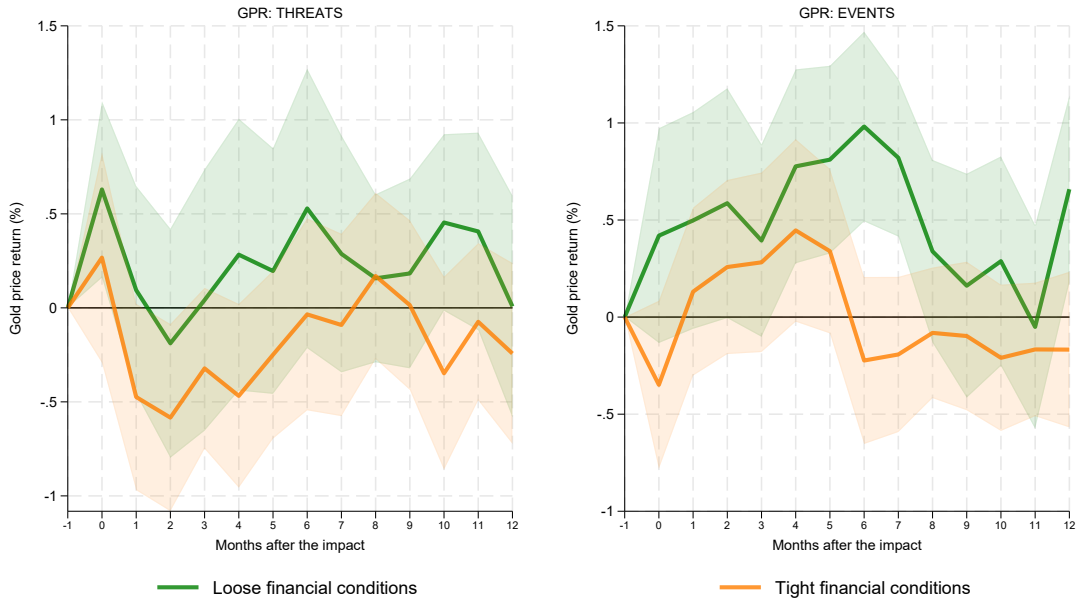


Figure 5: Cumulative IRF of GPR shocks on gold price returns conditional on financial conditions. *Note: Shocks are orthogonal and uncorrelated with financial sources of uncertainty (VIX index). Tight financial-conditions state occurs when  $FCI_{t-1} \geq \overline{FCI}$ ; low (loose) state otherwise. The green line represents the response under loose financial conditions, and the orange line under tight conditions. Estimated via Local Projections (Jordà, 2005). Confidence intervals are at 90%. HAC (Newey-West) std errors are used.*

#### 5.4 Mixing the four regimes: rising and non-rising GPR risks versus tight and loose financial conditions.

To assess whether the two non-linearities tested earlier feedback into each other, we split the sample into the four regimes defined by rising and non-rising GPR risks, combined with the states of tight and loose financial conditions. We then re-estimate the dynamic response of the impact of geopolitical threats and events on gold price returns, as shown in Figures 6 and 7, respectively. Our hypothesis in combining these four states is that these regimes do not move in tandem mechanically, leaving room for them to interact with each other exogenously. In this

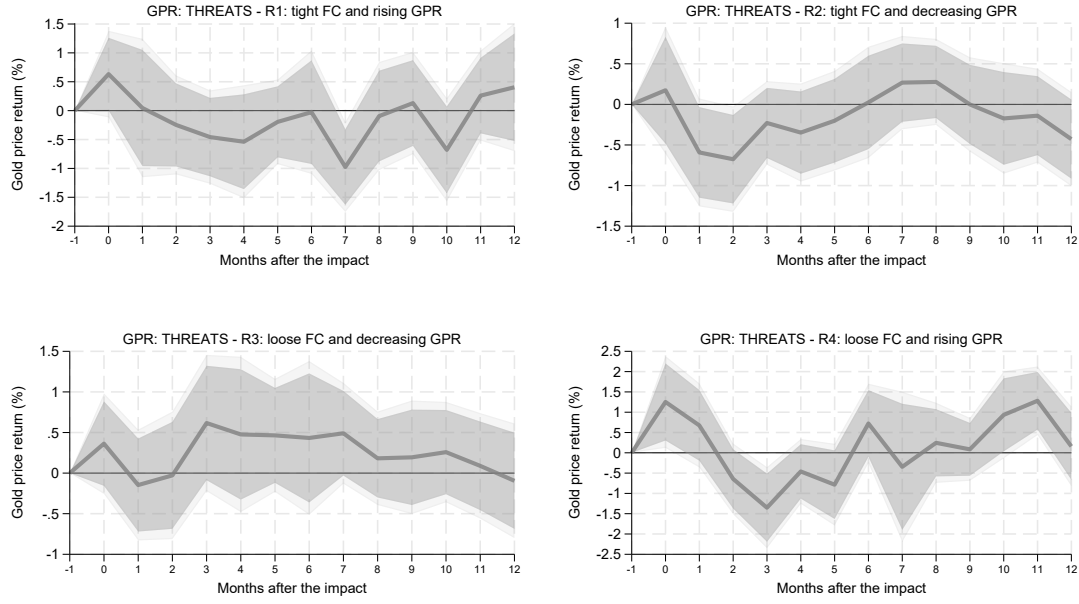


Figure 6: Cumulative IRF of GPR threats shocks on gold price returns conditional on financial conditions and escalation of geopolitical states. *Note: Shocks are orthogonal and uncorrelated with financial sources of uncertainty (VIX index). Regime 1 = tight FC and rising GPR threats; regime 2 = tight FC and decreasing GPR threats; regime 3 = loose FC and decreasing GPR threats and regime 4 = loose FC and rising GPR threats. Estimated via Local Projections (Jordà, 2005). Confidence intervals are at 90% and 95%. HAC (Newey-West) std errors are used.*

context, the implications for safe-haven assets can either reinforce or offset each other across the combination of regimes.

- Results for the impact of **geopolitical threats** on gold price returns under the four regimes are summarised as follows, and shown in Figure 6:
  - **Regime 1 (Tight FCI and rising GPR threats):** We find a short positive response of 0.5% at month = 0. After that, most of the quarters following the shock remain statistically not different from zero.
  - **Regime 2 (Tight FCI and decreasing GPR threats):** In this regime, we find a response that is initially insignificant and then becomes negative, with an effect of −0.6% for the first and second months after the shock.
  - **Regime 3 (Loose FCI and decreasing GPR threats):** In this regime, we find that the response is statistically insignificant throughout the 12-month horizon.
  - **Regime 4 (Loose FCI and rising GPR threats):** This regime combines the two states that, separately, amplify the safe-haven role of gold the most. Here, we find the largest positive and significant response, reaching close to 1.3% on impact ( $h = 0$ ) for geopolitical threat shocks.

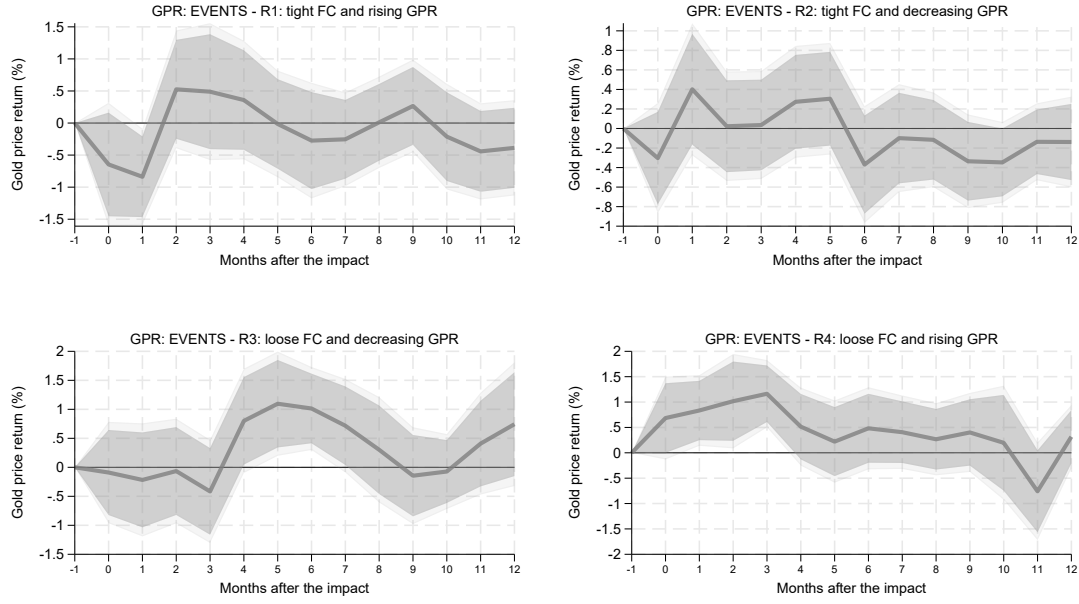


Figure 7: Cumulative IRF of GPR acts shocks on gold price returns conditional on financial and geopolitical state. *Note: Shocks are orthogonal and uncorrelated with financial sources of uncertainty (VIX index). Regime 1 = tight FC and rising GPR acts; regime 2 = tight FC and decreasing GPR acts; regime 3 = loose FC and decreasing GPR acts and regime 4 = loose FC and increasing GPR acts. Estimated via Local Projections (Jordà, 2005). Confidence intervals are at 90% and 95%. HAC (Newey-West) std errors are used.*

- Results for the impact of **geopolitical events** on gold price returns under the four regimes are summarised as follow (Figure 7):
  - **Regime 1 (Tight FCI and rising GPR acts):** In the short term, a cumulative negative response of  $-0.8\%$  is observed at month = 1. After that, there is no statistical significance of the impact on gold returns.
  - **Regime 2 (Tight FCI and decreasing GPR acts):** There are no responses statistically different from zero throughout the 12-month analysis.
  - **Regime 3 (Loose FCI and decreasing GPR acts):** The cumulative response is positive after the fourth month of the impact, reaching values of a  $1.0\%$  increase in gold price returns.
  - **Regime 4 (Loose FCI and rising GPR acts):** A large positive and significant cumulative response is observed, reaching close to  $0.7\%$  on impact ( $h = 0$ ) and continuing over the next three months peaking at  $1.2\%$ . That is, there is a quick response of gold price returns to geopolitical event shocks under this regime.

Regime 4 corresponds to the configuration highlighted earlier: the combination of rising geopolitical risks and loose financial conditions amplifies and accelerates the safe-haven role of gold far beyond the other combinations of regimes (i.e. regimes 1, 2 and 3). Most notably, while gold price returns typically exhibit a lagged response to geopolitical event shocks in our previous

analysis, this particular regime leads to a much faster effect. The impact on gold price returns is observed within the same month of the shock and remains significant for three additional months. Statistical tests confirm the presence of non-linearities in regime 4 compared with the others, highlighting both the highest impact of geopolitical event shocks on gold prices and the statistically significant differences across regimes (Figure 21, in the Annex).

These results could contrast with previous findings in the literature. However, when the link between geopolitical events and gold returns is placed within a framework where the macro-financial context is considered, our results can be better understood. In this context, gold could become an even more attractive refuge under the macro-financial conditions observed over the past two years, serving as a modern-day *El Dorado*.

Finally, for geopolitical threats, these results suggest that such shocks amid loose financial conditions can have nearly double the impact on gold returns compared with the linear average effect estimated in the baseline scenarios.

## 5.5 Summary of Magnitudes

Table 1 summarises the cumulative peak responses of gold prices to a one-standard-deviation orthogonal GPR threat and event shocks across specifications. Overall, we find statistical evidence suggesting that rising geopolitical events, loose global financial conditions, and the combination of these two states amplify the impact of geopolitical risks on gold price returns compared with the baseline impact. A phenomenon not tested before in the literature.

Table 1: Cumulative peak responses of gold returns to GPR shocks.

| Specification                                        | Cumulative peak response (%) |               |
|------------------------------------------------------|------------------------------|---------------|
|                                                      | Events                       | Threats       |
| Linear (baseline)                                    | $\approx 0.6$                | $\approx 0.5$ |
| Rising geopolitical risk regime                      | $\approx 0.8$                | $\approx 1.0$ |
| Loose global financial conditions                    | $\approx 1.0$                | $\approx 0.6$ |
| Rising GPR and loose financial conditions (Regime 4) | $\approx 1.2$                | $\approx 1.3$ |

Having documented the state-dependent magnitudes, we now examine the financial mechanisms that explain why financial conditions influence the safe-haven response in the first place.

## 6 Which financial channels affect the relationship?

In this section, we examine the mechanisms through which financial conditions influence the relationship between geopolitical risks and gold prices, separating the relationship into the two channels most commonly analysed in the literature: (i) the credit and liquidity risk channel, and (ii) the opportunity cost channel. We analyse each in turn and find that our results operate

most clearly through the first channel, while the evidence for the second is less conclusive.

The two channels are:

1. ***Credit and liquidity risk channel:*** During periods of heightened market stress, such as geopolitical shocks, credit and liquidity risks can significantly constrain investors' ability to allocate capital to safe-haven assets like gold. When credit risk is high – marked by tighter credit conditions and elevated borrowing costs – or when liquidity risk is elevated – characterised by margin calls and forced asset liquidations – investors are often compelled to prioritise meeting short-term obligations rather than reallocating to gold as a safe haven. For instance, margin calls during such periods can trigger asset sales to cover collateral requirements (e.g., Brunnermeier and Pedersen, 2009), leaving little room for portfolio adjustments towards gold. This dynamic was evident during the Covid-19 episode (e.g., Akhtaruzzaman et al., 2021). The same logic applies on the credit side: widening credit spreads are not merely a symptom of stress but a tightening of financial conditions in their own right, operating through the risk-bearing capacity of the financial sector (Gilchrist and Zakrajšek, 2012). When intermediary balance sheets are impaired, risk premia rise across assets because constrained intermediaries cannot take positions, rather than because fundamentals have changed (He and Krishnamurthy, 2013). In contrast, when credit and liquidity risks are low, agents face fewer balance sheet frictions and are better positioned to reallocate to gold in response to geopolitical shocks.
  - To capture these dynamics, we use as a state-dependent threshold the *subcomponent of the GS US FCI related to corporate credit spreads*, which represents the part of the broad GS US FCI measuring the share related to credit risks associated with investment-grade US corporate spreads over equivalent-duration government bond yields. In Figure 8a, we observe the link between gold prices and credit-liquidity risk conditions, showing that gold prices tend to rise more significantly during geopolitical shocks when credit and liquidity risks are low, as agents can easily move into gold under such conditions.
  - For robustness checks, we also use as a threshold in a separate exercise the *US BBB corporate spread*, as a proxy for global credit and liquidity risks. Wider spreads signal elevated perceived risks, reflecting both tighter liquidity conditions and increased credit concerns in the corporate sector. Conversely, narrower spreads indicate improved credit availability and market liquidity, facilitating smoother reallocations to gold.
2. ***Opportunity cost channel:*** Low interest rates can reduce the yield sacrifice of holding gold relative to interest-bearing alternatives (e.g. Erb and Harvey, 2013; Chen, Miao, and Tee, 2023). This reduction in opportunity cost makes gold a more attractive investment, particularly during periods of heightened geopolitical uncertainty. However, it is important to note that low interest rates can also introduce opposing effects in this channel. While low rates reduce the opportunity cost of holding gold, they often coincide with

periods of economic weakness or recessions, reflecting the business cycle position. In such scenarios, agents may face immediate financial pressures, such as the need to consume or invest in productive or liquid assets to address short-term economic challenges. These financial constraints can dampen the demand for gold as a safe-haven, as agents prioritise meeting immediate consumption needs or maintaining liquidity over reallocating to gold. Thus, while the opportunity cost mechanism generally supports higher gold demand during periods of low interest rates, the broader economic context may complicate this relationship, introducing opposing forces that can limit the extent of gold's safe-haven appeal during geopolitical shocks, as stated in Chen, Miao, and Tee, 2023.

- To capture these dynamics, we use as a state-dependent threshold the *GS US FCI subcomponent related to the risk-free yield of short-term interest rates*. In Figure 8b, we observe the link between gold prices and short- and long-interest rates in the US.
- For robustness checks, we also use as a threshold in a separate exercise the *GS US FCI subcomponent related to long-term interest rates*. The performance of long-term yields provides further insights into whether this mechanism matters when agents seek refuge in gold or other safe-haven asset competitors (e.g., US Treasuries).

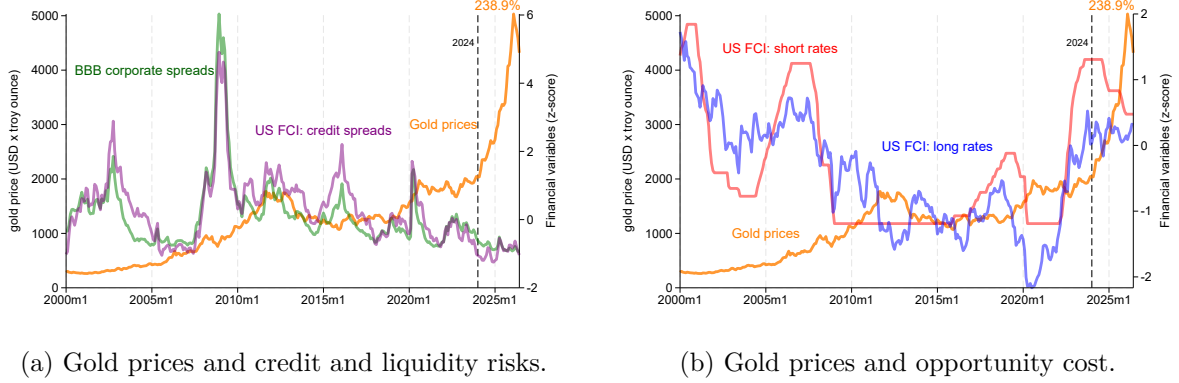


Figure 8: Gold prices, credit and liquidity conditions, and interest rates. *Note: Data sourced from Bloomberg.*

We will adjust Equation (3) to consider these two variables as thresholds separately and compare the results. Specifically:

$$D_t = \begin{cases} 1 & \text{if } S_{t-1} = \text{High state,} \\ 0 & \text{otherwise.} \end{cases} \quad S_t \in \{\text{LiquidityRisk}_t, \text{OpportunityCost}_t\}.$$

- **Credit and liquidity risk channel ( $CR_t$ ):** the high state identifies periods of above-average credit and liquidity risk, in which balance-sheet and funding constraints are binding. We measure  $CR_t$  with the credit-spread subcomponent of the GS US FCI, and re-estimate using the BBB corporate spread.

- **Opportunity cost channel ( $OC_t$ ):** the high state identifies periods in which the yield available on interest-bearing alternatives to gold is above average, so that the yield sacrificed by holding a non-interest-bearing asset is large. We measure  $OC_t$  with the short-interest rate subcomponent of the GS FCI, and re-estimate using the long-term subcomponent.

As elsewhere in the paper, the state is lagged one period so that it is predetermined relative to the contemporaneous geopolitical-risk shock.

**Testing the credit and liquidity risk channel.** In Figure 9, we show that the impact of both geopolitical threats and geopolitical events is greater during a low-credit-and-liquidity-risk regime than during a high-risk regime. For geopolitical threats, we find an impact of 0.7% on gold returns in the month of the shock when credit and liquidity risks are low, while there is no statistical evidence of an effect when they are high. For geopolitical events, we observe a positive cumulative impact from the first month after the shock, peaking at 0.9% four months after the shock, with no statistically significant effects in the high-risk regime.

Figure 10 re-estimates the same specification using the BBB corporate spreads variable and confirms the pattern. The impact of geopolitical threats on gold returns is 0.6% in the low-risk regime, compared with no statistical evidence of this effect in the high-risk regime. For the cumulative impact of geopolitical events, we find that it peaks at approximately 0.9% around the fourth month in the low-risk state, compared with no statistically significant evidence in the high-risk state.

These two analysis therefore confirm the validation of this mechanism as set out above: when there is a lack of credit and liquidity risks, the reallocation towards gold triggered by a geopolitical shock can be significantly higher.

**Testing the opportunity cost channel.** The evidence on the second channel is less clear-cut. In Figure 11, the response of gold returns to geopolitical shocks is larger in the high-opportunity-cost state – the opposite of what a yield-sacrifice mechanism predicts. When the yield on interest-bearing alternatives is high, the impact of geopolitical threats is 0.6%, and the cumulative impact of geopolitical events peaks at 1.4% four months after the shock. In contrast, in the low short-term interest rate regime, the impacts are not statistically distinguishable from zero throughout. Figure 12 re-estimates the specification using alternative long-term interest rates and yields the same results. These results suggest that the opportunity cost channel, with thresholds measured in levels, is not an amplifier of the link between geopolitical shocks and gold returns.

As a final exercise, and recognising the results of Chen, Miao, and Tee, 2023 regarding the stance of US monetary policy (a subcomponent in the opportunity cost channel), we re-estimate the threshold analysis in Figure 13, this time considering the easing and tightening cycles of US monetary policy. To do this, we use as a threshold whether US monetary policy is tightening or

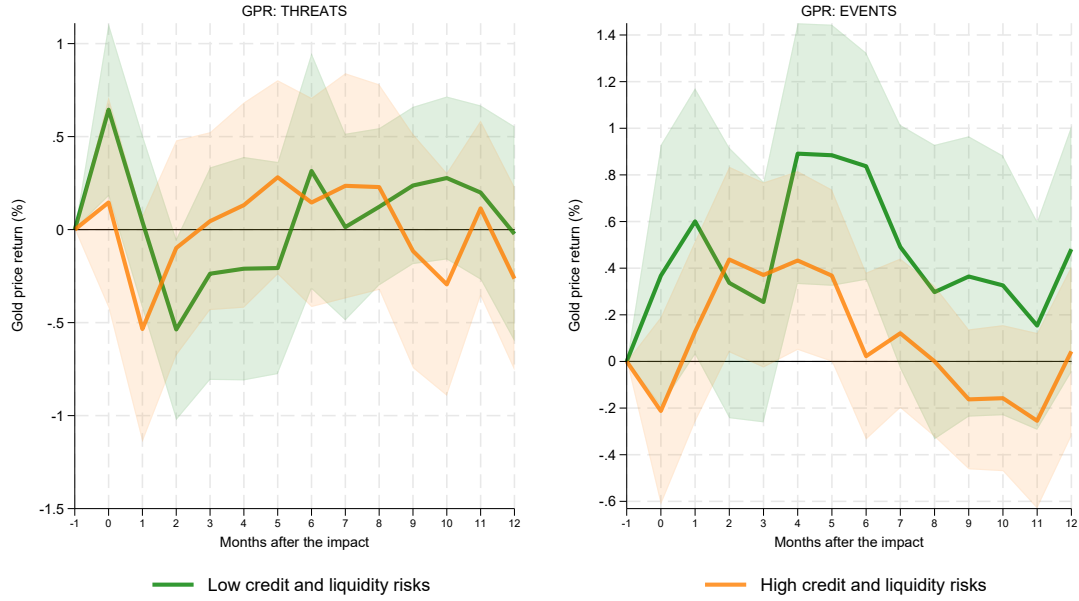


Figure 9: Cumulative IRF of GPR shocks on gold price returns conditional on credit and liquidity risk conditions. *Note: Shocks are orthogonal and uncorrelated with financial sources of uncertainty (VIX index). High credit and liquidity risk conditions occur when the credit-spread subcomponent of the GS FCI satisfies  $CL_{t-1} \geq \overline{CL}$  (in orange); low credit and liquidity risk conditions otherwise (in green). Estimated via Local Projections (Jordà, 2005). Confidence intervals are at 90%. HAC (Newey-West) std errors are used.*

easing, testing whether the signalling of relaxed global monetary conditions plays a role in gold prices during geopolitical shocks. We find that in this last exercise, the state-dependent local projections tell a different story. During the easing cycle of US monetary policy, the impact of geopolitical threats on gold returns is 0.6% on impact, while the cumulative impact of geopolitical events peaks at 0.8% at month  $h = 4$ . In contrast, there is no statistical evidence to suggest that geopolitical shocks affect gold returns during the US tightening cycle. This latter analysis therefore provides some evidence for the opportunity cost channel, but linked explicitly to the stance of US monetary policy – a key driver of global financial conditions and consistent with Chen, Miao, and Tee, 2023.

Taken together, these analyses suggest that the state dependence documented in Section 5 operates most clearly through the credit and liquidity risk channel and is less conclusive for the opportunity cost channel. Loose financial conditions appear to amplify gold’s safe-haven response to geopolitical shocks by easing frictions that would otherwise prevent or hinder investors’ reallocation towards gold. This interpretation is also consistent with the horizon results in Section 5: the response to realised events is fastest in Regime 4, where these constraints are at their slackest.

We would not, however, interpret these results as ruling out the opportunity cost channel. The two mechanisms are not mutually exclusive, and it is equally plausible that the two channels

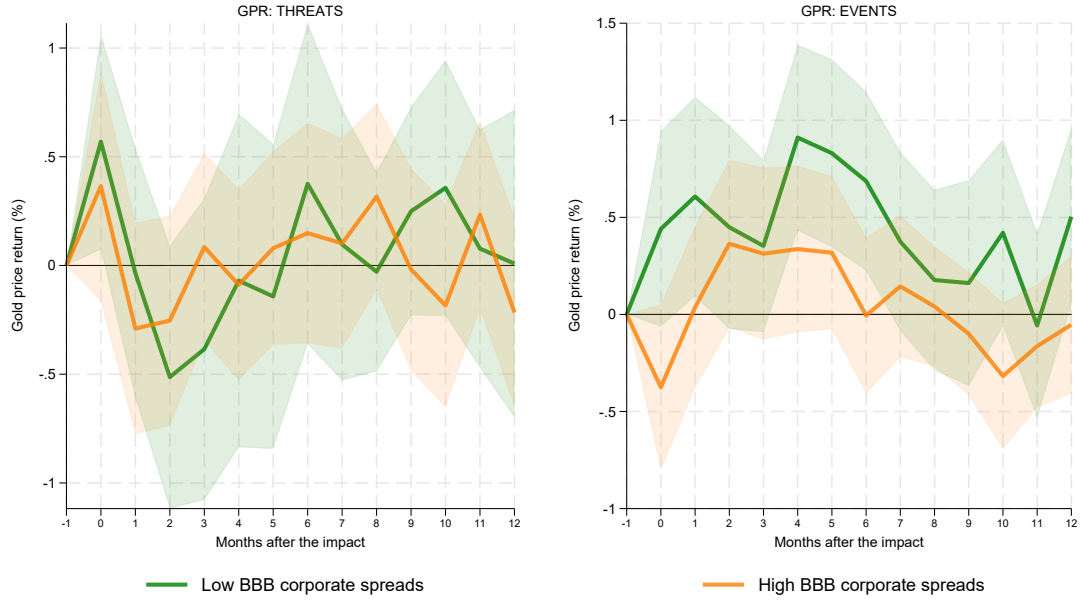


Figure 10: Cumulative IRF of GPR shocks on gold price returns conditional on the BBB corporate spread. *Note: Shocks are orthogonal and uncorrelated with financial sources of uncertainty (VIX index). High spread conditions occur when  $BBB_{t-1} \geq \overline{BBB}$  (in orange); low spread conditions otherwise (in green). Estimated via Local Projections (Jordà, 2005). Confidence intervals are at 90%. HAC (Newey-West) std errors are used.*

interact: a low yield sacrifice raises the incentive to hold gold, but that incentive can only be acted upon when funding conditions permit investors to take positions. Thus, the second channel may amplify the first without being separately identified in a univariate split of the sample. Disentangling the interaction between the two channels, rather than testing them in isolation, is a natural direction for further research.



Figure 11: Cumulative IRF of GPR shocks on gold price returns conditional on short-term interest rates. *Note: Shocks are orthogonal and uncorrelated with financial sources of uncertainty (VIX index). High short-rate conditions occur when the short-term interest rate subcomponent of the GS FCI satisfies  $i_{t-1}^s \geq \bar{i}^s$  (in orange); low short-rate conditions otherwise (in green). Estimated via Local Projections (Jordà, 2005). Confidence intervals are at 90%. HAC (Newey-West) std errors are used.*

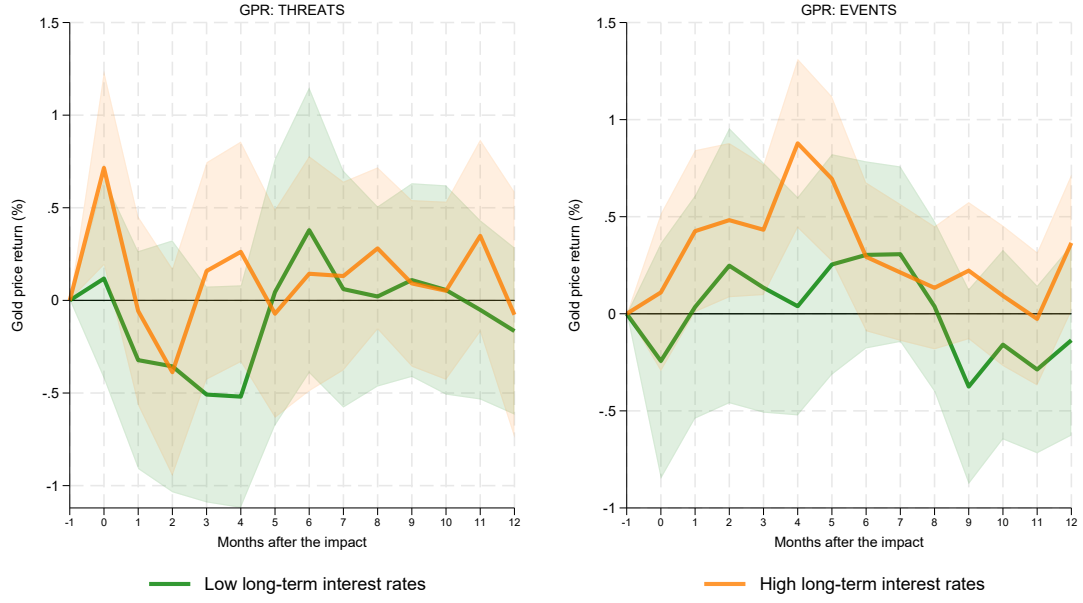


Figure 12: Cumulative IRF of GPR shocks on gold price returns conditional on long-term interest rates. *Note: Shocks are orthogonal and uncorrelated with financial sources of uncertainty (VIX index). High long-rate conditions occur when the long-term interest rate subcomponent of the GS FCI satisfies  $i_{t-1}^l \geq \bar{i}^l$  (in orange); low long-rate conditions otherwise (in green). Estimated via Local Projections (Jordà, 2005). Confidence intervals are at 90%. HAC (Newey-West) std errors are used.*

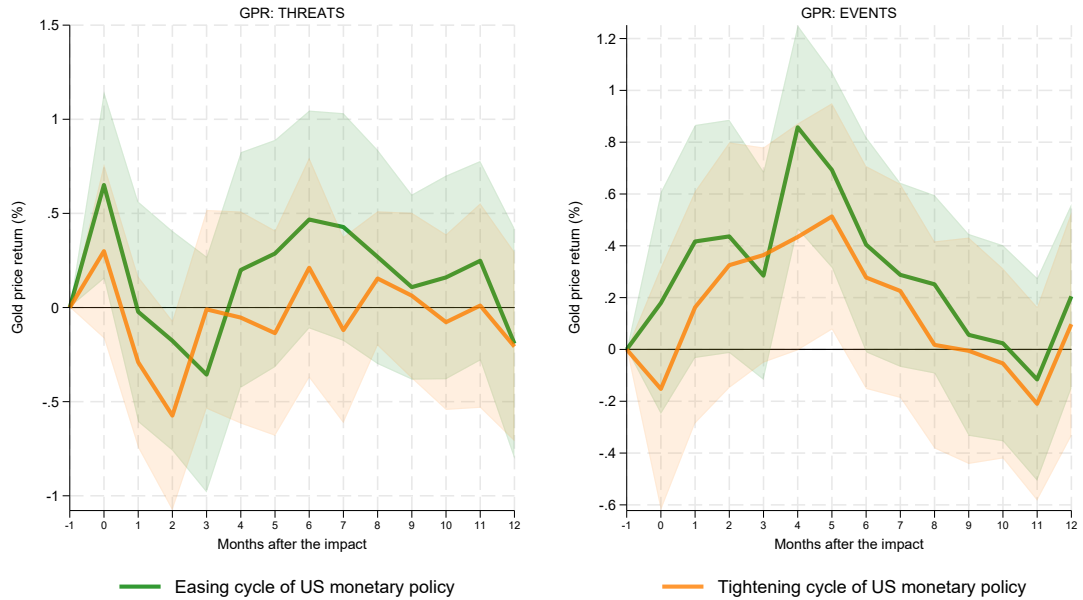


Figure 13: Cumulative IRF of GPR shocks on gold price returns conditional on the US monetary policy cycle. *Note: Shocks are orthogonal and uncorrelated with financial sources of uncertainty (VIX index). Tightening cycle occur change of the US policy rate is positive (in orange); easing cycle conditions otherwise (in green). Estimated via Local Projections (Jordà, 2005). Confidence intervals are at 90%. HAC (Newey-West) std errors are used.*

## 7 Robustness tests: analysing potential biases

In this section, we present several robustness checks for this paper, addressing potential omitted variable biases or mediation factors in the analysis. Specifically, we consider four factors that could influence our baseline results and the paper’s motivation concerning the recent decoupling observed in the data: the demand for gold by central banks, the trade momentum of gold prices during major rally events, the US government yield convenience, and fiscal policy uncertainty in the United States.

First, we examine the role of major participants in the gold market, with a particular emphasis on central banks. Figure 14a shows that the share of gold demand accounted for by central banks rose over 2022–2024, while the investment share rose in 2025, and Figure 14b shows total gold net purchases, which fell sharply during the COVID-19 pandemic—when economies faced heightened liquidity constraints—and has recovered strongly since. ECB (2025) notes that while gold prices reached historical highs in 2024, central bank gold reserves also rose to their highest levels since the Bretton Woods era. If central banks and private investors were the primary drivers of the gold price increases observed during geopolitical episodes, we would expect geopolitical shocks to raise their purchases. Official and investor demand would then mediate the relationship we estimate: the response of gold returns would run through a shift in the demand of these particular participants, rather than reflecting a broader repricing of gold as a safe-haven asset. We therefore examine how central bank purchases respond to identified geopolitical shocks.

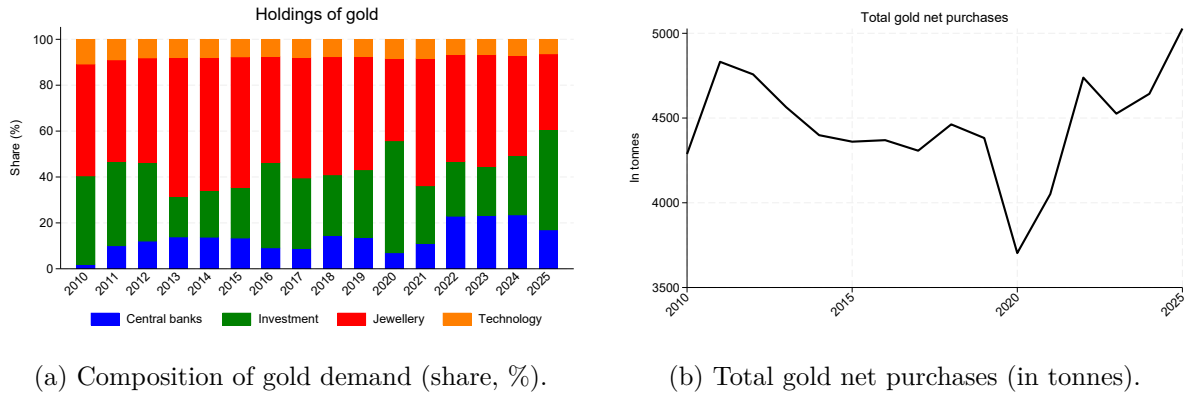


Figure 14: Central bank gold purchases and the composition of gold demand. *Note: Data from World Gold Council.*

In Figure 15, we present the results of the impact of geopolitical shocks on the monthly data series of global net gold purchases by central banks. This analysis focuses exclusively on central bank demand, leveraging the data availability for this variable, which is measured in tonnes and aggregated for all central banks included in the World Gold Council dataset.<sup>8</sup> The analysis is

<sup>8</sup>Our analysis focuses on central bank purchases, as the World Gold Council provides monthly data for this category. The higher frequency of this dataset enables a more timely examination of geopolitical shocks compared to the lower-frequency data available for other buyer groups (eg quarterly data).

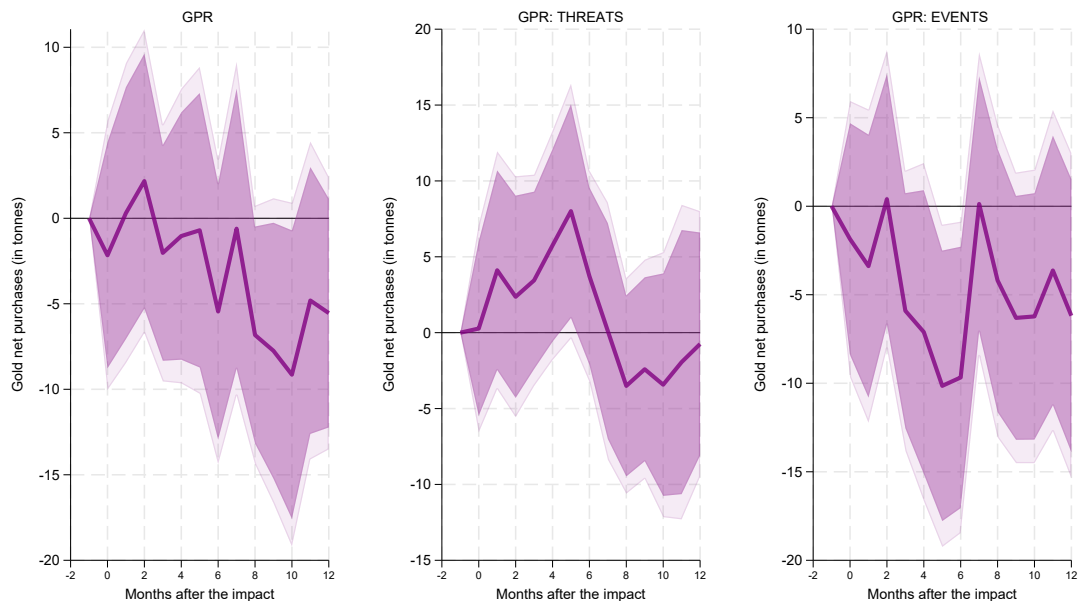


Figure 15: Cumulative IRF of GPR shocks on a global central bank gold net purchases. *Note: Shocks are orthogonal and uncorrelated with financial sources of uncertainty (VIX index). Estimated via Local Projections (Jordà, 2005). Confidence intervals are at 90% and 95%. HAC (Newey-West) standard errors are used.*

conducted using local projections, following Equation (2). In this case, the dependent variable is total gold net purchases by central banks at month  $h = 0$ , measured in tonnes. On the right-hand side, similar control variables are included, and the impact of geopolitical shocks on central bank gold purchases is traced.

We observe that, following a geopolitical threat shock, there is a positive association with central bank purchases five months after the shock. This suggests that, in the aftermath of a geopolitical threat, precautionary behaviour could lead to an increase in gold reserves. However, during geopolitical event shocks, the impact on net gold purchases is negative, indicating global selling of gold by central banks in the fifth and sixth months after the shock. This suggests a partial liquidation of gold reserves to meet country needs during realised geopolitical episodes.

At first glance, this analysis suggests that the timing of geopolitical threats affecting central bank gold purchases does not condition the contemporaneous responses observed in gold price returns in our baseline analysis. For geopolitical event shocks, we find that they tend to reduce central bank gold purchases on average, weakening the argument that central bank purchases were the sole driver of our results.<sup>9</sup>

<sup>9</sup>While this exercise is conducted as a robustness check, geopolitical threats and events could trigger opposite effects on certain central banks' gold purchases, conditional on specific domestic factors. However, a separate paper would be required to analyse more precisely the impact of geopolitical shocks on central bank demand for gold. For further analysis linking geopolitical risks, international investors' portfolio choices and gold reserve management, see Arvai, Coimbra, and Pinchetti (2026) and Aizenman et al. (2026).

Second, we assess whether trade momentum influences gold price increases after geopolitical shocks begin to affect gold prices (Figure 16). Moskowitz, Ooi, and Pederse (2012) argue that there is significant trade momentum in liquid financial variables, with persistence lasting from one to 12 months. In this context, if trade momentum plays a role, it could explain an additional impact on gold prices following a geopolitical shock. We therefore add three-month gold-price momentum, defined as  $m_{t-1} = 100 \times (\log P_{t-1}^{gold} - \log P_{t-4}^{gold})$ , as a control in Equations (2) and (3). The window ends in  $t - 1$ , so that the control is predetermined with respect to the shock in  $t$  and does not overlap with the dependent variable at  $h = 0$ . When including this variable as a control, it leaves our baseline results statistically and economically unchanged (see Annex figures).

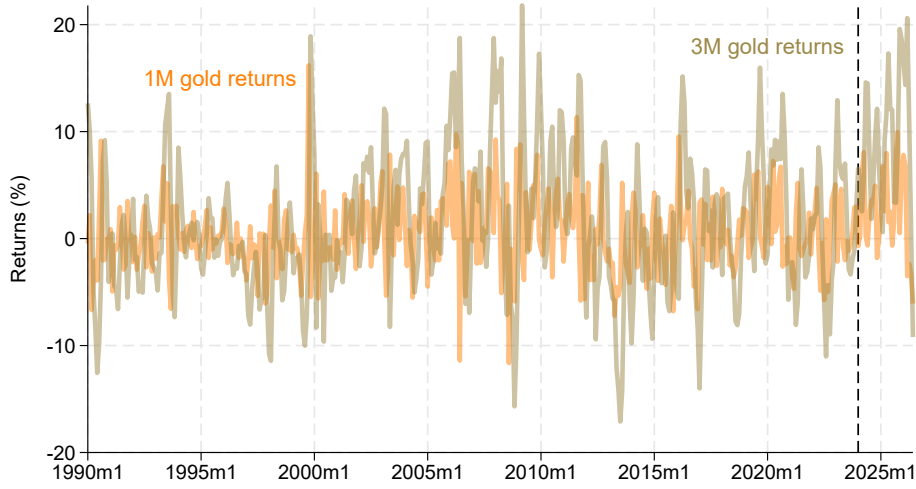


Figure 16: Gold price returns. *Note: Data from Bloomberg.*

Third, we consider whether a change in the perceived safety of US treasury bonds, rather than geopolitical risk as such, accounts for the recent behaviour of gold prices (Figure 17). Gold and US treasury bonds compete directly as reserve and safe-haven assets, so the premium investors pay for dollar bonds safety is a natural omitted variable: an erosion of that premium would raise the relative attractiveness of gold at the same time as it loosened measured financial conditions, generating our pattern without any role for geopolitical risk. Du, Keerati, and Schreger (2026) show that the US bond convenience yield has declined substantially over the past decade, and Figure 17 reproduces their series for advanced economies: after peaking close to 1 percentage points in 2011, it has trended down and turned negative from 2019 onwards — the same window in which gold prices rose most sharply. We therefore re-estimate Equations (2) and (3), adding the US government bond convenience yield as an additional control. Once included, the estimated linear effects of geopolitical shocks on gold prices become smaller and lose statistical power, whereas the non-linear effect—the paper’s main contribution—remains statistically significant (see Annex figures). This highlights both the importance of the declining US bond convenience yield—given the role of the attractiveness of the major safe-haven asset

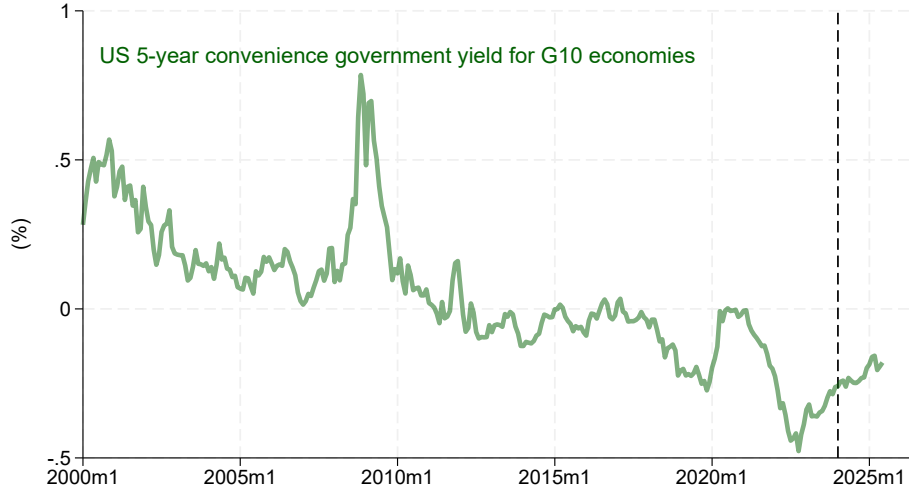


Figure 17: US 5-year convenience government yield for G10 economies. *Note: Data from Du, Keerati, and Schreger, 2026.*

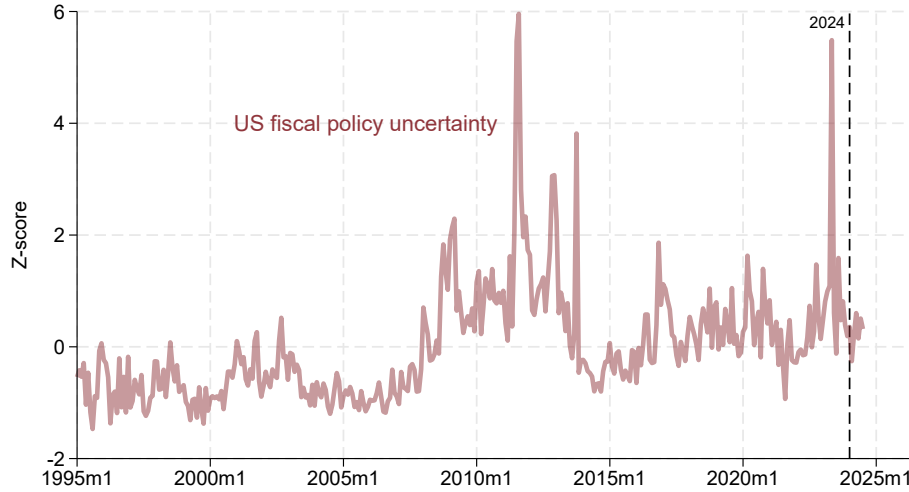


Figure 18: US Fiscal policy uncertainty Index. *Note: Data from Hong, Ke, and Nguyen, 2024.*

competitor to gold—and the robustness of our state-dependent results for gold prices.

Fourth, we examine whether uncertainty about US fiscal policy is driving our results (Figure 18). Fiscal uncertainty is a plausible confounder on two counts: it raises sovereign risk premia and concerns around US fiscal policy management, which can therefore increase precautionary demand for gold through a channel unrelated to geopolitics, and episodes of fiscal brinkmanship are frequently contemporaneous with the geopolitical events our index captures. Figure 18 plots the US fiscal policy uncertainty index of Hong, Ke, and Nguyen (2024). The series is dominated by a small number of discrete spikes – the 2011 debt-ceiling episode, the 2013 shutdown and a further spike in 2024 – rather than by persistent variation, which already

limits its scope to explain a sustained repricing of gold. However, the 2024 spike falls inside our period of interest. Including the index as an additional control in Equations (2) and (3) leaves our estimates essentially unchanged (see Annex graphs). Finally, this measure serves as a good proxy for sovereign risks in the US, another relevant factor to control for in the relationship between geopolitical shocks and gold prices.

Based on these results, we argue that the roles of central banks, gold price momentum, perceived dollar risk, and uncertainty surrounding US fiscal policy decisions do not necessarily explain the relationship between geopolitical shocks, gold price returns, and financial conditions, in the context of our baseline econometric results.

## 8 Conclusion

This paper investigates the state-dependent effects of geopolitical risks on gold prices, conditional on the escalation of GPR risks and the tightness of global financial conditions, providing new insights into the dynamics of gold’s safe-haven properties. The findings indicate that geopolitical risks – encompassing both threats and realised events – significantly elevate gold returns, with the effects being more pronounced during periods of loose financial conditions and rising GPR risks. The largest impacts are observed when rising geopolitical risk indicators coincide with loose financial conditions, a scenario that has become increasingly prominent in recent years. Tests for non-linearities corroborate the asymmetric effects documented in this analysis.

We further ask *why* financial conditions shape the safe-haven response, separating the relationship into the two channels most often invoked in the literature: (i) the credit and liquidity risk channel and (ii) the opportunity cost channel. Our results operate most clearly through the first channel. When credit and liquidity risks are low, the response of gold returns to geopolitical shocks is large and significant; when they are high, it is statistically indistinguishable from zero. This holds across alternative measures of the channel. The evidence on the second channel is less conclusive and is sensitive to how the yield sacrifice is measured. We therefore interpret our findings as suggesting that loose financial conditions amplify gold’s safe-haven role primarily by relaxing the constraints that limit portfolio reallocation.

Finally, we perform a series of robustness checks to ensure that the link reported in this paper is not spurious but rather robust to a set of major events potentially affecting gold prices simultaneously with recent geopolitical shocks. We report that our results remain robust when considering the role of central bank demand for gold purchases, trade momentum in the gold market, the evolution of the US government bond convenience yield, and the uncertainty surrounding US fiscal policy.

This study makes three key contributions to the literature. First, it advances prior research by replacing a contemporaneous analysis with a dynamic and recursive framework, offering a

more comprehensive understanding of the relationship between geopolitical risks and gold price fluctuations. Second, it is the first to examine the non-linear effects of geopolitical shocks on gold returns, conditional on global financial conditions – a novel approach that addresses a significant gap in existing research. Third, it distinguishes between geopolitical risks and financial risks, isolating flight-to-quality effects from safe-haven effects during periods of geopolitical tension.

Looking ahead, future research could delve deeper into how geopolitical fragmentation and financial innovation are reshaping the global financial system and influencing patterns in gold prices. These areas of inquiry are essential for understanding the evolving role of gold as a safe-haven asset in an increasingly complex and interconnected world.

## References

- Agyei-Ampomah, Sam, Dimitrios Gounopoulos, and Khelifa Mazouz (2014). “Does gold offer a better protection against losses in sovereign debt bonds than other metals?” In: *Journal of Banking & Finance* 40, pp. 507–521. DOI: [10.1016/j.jbankfin.2013.11.014](https://doi.org/10.1016/j.jbankfin.2013.11.014).
- Aizenman, Joshua, Jamel Saadaoui, Gazi Salah Uddin, and Naoki Yago (2026). *US Monetary Spillovers, Foreign Exchange, and Gold Reserves at Times of Geopolitical Fragmentation*. Tech. rep. National Bureau of Economic Research.
- Akhtaruzzaman, Md, Sabri Boubaker, Brian M Lucey, and Ahmet Sensoy (2021). “Is gold a hedge or a safe-haven asset in the COVID–19 crisis?” In: *Economic Modelling* 102, p. 105588.
- Arvai, Kai, Nuno Coimbra, and Marco Pinchetti (2026). *Fool’s Gold? How the USD lost its Shine*. Tech. rep. National Bureau of Economic Research.
- Balcilar, Mehmet, Rangan Gupta, and Christian Pierdzioch (2016). “Does uncertainty move the gold price? New evidence from a nonparametric causality-in-quantiles test”. In: *Resources Policy* 49, pp. 74–80. DOI: [10.1016/j.resourpol.2016.04.004](https://doi.org/10.1016/j.resourpol.2016.04.004). URL: <https://doi.org/10.1016/j.resourpol.2016.04.004>.
- Barro, Robert J and Sanjay Misra (2016). “Gold returns”. In: *The Economic Journal* 126.594, pp. 1293–1317.
- Baur, Dirk G and Brian M Lucey (2010). “Is gold a hedge or a safe haven? An analysis of stocks, bonds and gold”. In: *Financial review* 45.2, pp. 217–229.
- Baur, Dirk G. and Thomas K. McDermott (2010). “Is gold a safe haven? International evidence”. In: *Journal of Banking & Finance* 34.8, pp. 1886–1898. DOI: [10.1016/j.jbankfin.2009.12.008](https://doi.org/10.1016/j.jbankfin.2009.12.008).
- Baur, Dirk G. and Lee A. Smales (2020). “Hedging geopolitical risk with precious metals”. In: *Journal of Banking & Finance* 117, p. 105823. DOI: [10.1016/j.jbankfin.2020.105823](https://doi.org/10.1016/j.jbankfin.2020.105823).
- Beckmann, Joscha, Theo Berger, and Robert Czudaj (2015). “Does gold act as a hedge or a safe haven for stocks? A smooth transition approach”. In: *Economic Modelling* 48, pp. 16–24.
- (2019). “Gold price dynamics and the role of uncertainty”. In: *Quantitative Finance* 19.4, pp. 663–681. DOI: [10.1080/14697688.2018.1508879](https://doi.org/10.1080/14697688.2018.1508879). URL: <https://doi.org/10.1080/14697688.2018.1508879>.
- Beckmann, Joscha and Robert Czudaj (2013). “Gold as an inflation hedge in a time-varying coefficient framework”. In: *The North American Journal of Economics and Finance* 24, pp. 208–222. DOI: [10.1016/j.najef.2012.10.007](https://doi.org/10.1016/j.najef.2012.10.007).
- Bilgin, Mehmet Huseyin, Giray Gozgor, Chi Keung Marco Lau, and Xin Sheng (2018). “The effects of uncertainty measures on the price of gold”. In: *International Review of Financial Analysis* 58, pp. 1–7.
- Boubaker, Heni, Juncal Cunado, Luis A Gil-Alana, and Rangan Gupta (2020). “Global crises and gold as a safe haven: Evidence from over seven and a half centuries of data”. In: *Physica A: Statistical Mechanics and its Applications* 540, p. 123093.
- Bouri, Elie, Syed Jawad Hussain Shahzad, David Roubaud, Ladislav Kristoufek, and Brian Lucey (2020). “Bitcoin, gold, and commodities as safe havens for stocks: New insight through wavelet analysis”. In: *The Quarterly Review of Economics and Finance* 77, pp. 156–164.

- Bredin, Don, Thomas Conlon, and Valerio Potì (2015). “Does gold glitter in the long-run? Gold as a hedge and safe haven across time and investment horizon”. In: *International Review of Financial Analysis* 41, pp. 320–328.
- Brunnermeier, Markus K and Lasse Heje Pedersen (2009). “Market liquidity and funding liquidity”. In: *The Review of Financial Studies* 22.6, pp. 2201–2238.
- Caldara, Dario and Matteo Iacoviello (2022). “Measuring Geopolitical Risk”. In: *American Economic Review* 112.4, pp. 1194–1225. DOI: [10.1257/aer.20191823](https://doi.org/10.1257/aer.20191823).
- Capie, Forrest, Terence C. Mills, and Geoffrey Wood (2005). “Gold as a hedge against the dollar”. In: *Journal of International Financial Markets, Institutions and Money* 15.4, pp. 343–352. DOI: [10.1016/j.intfin.2004.07.002](https://doi.org/10.1016/j.intfin.2004.07.002).
- Cheema, Muhammad A, Robert Faff, and Kenneth R Szulczyk (2022). “The 2008 global financial crisis and COVID-19 pandemic: How safe are the safe haven assets?” In: *International Review of Financial Analysis* 83, p. 102316.
- Chen, Peng, Xinru Miao, and Kai-Hong Tee (2023). “Do gold prices respond more to uncertainty shocks at the zero lower bound?” In: *Resources Policy* 86, p. 104057.
- Ciner, Cetin, Constantin Gurdgiev, and Brian M Lucey (2013). “Hedges and safe havens: An examination of stocks, bonds, gold, oil and exchange rates”. In: *International Review of Financial Analysis* 29, pp. 202–211.
- Das, Debojyoti, M Kannadhasan, and Puja Bhowmik (2019). “Geopolitical risk and precious metals”. In: *Journal of Economic Research* 24, pp. 49–66.
- Du, Wenxin, Ritt Keerati, and Jesse Schreger (2026). “Decoupling dollar and treasury privilege”. In: *NBER Working paper series* 35000.
- ECB (2025). “Gold demand: the role of the official sector and geopolitics”. In: *International Role of the Euro*.
- Echaust, Krzysztof and Małgorzata Just (2022). “Is gold still a safe haven for stock markets? New insights through the tail thickness of portfolio return distributions”. In: *Research in International Business and Finance* 63, p. 101788. DOI: [10.1016/j.ribaf.2022.101788](https://doi.org/10.1016/j.ribaf.2022.101788).
- Erb, Claude B. and Campbell R. Harvey (2013). “The Golden Dilemma”. In: *Financial Analysts Journal* 69.4, pp. 10–42. DOI: [10.2469/faj.v69.n4.1](https://doi.org/10.2469/faj.v69.n4.1).
- Gelos, Gaston, Pietro Patelli, and Ilhyock Shim (2024). “The US dollar and capital flows to EMEs”. In: *BIS Quarterly Review*, pp. 51–67.
- Gilchrist, Simon and Egon Zakrajšek (2012). “Credit spreads and business cycle fluctuations”. In: *American economic review* 102.4, pp. 1692–1720.
- Goldman Sachs Research (2017). “Our New G10 Financial Conditions Indices”. In.
- Gozgor, Giray, Chi Keung Marco Lau, Xin Sheng, and Larisa Yarovaya (2019). “The role of uncertainty measures on the returns of gold”. In: *Economics Letters* 185, p. 108680.
- Grosskopf, Peter (Mar. 2020). *Keep the Faith: A Message from the CEO*. CEO Letter. Corporate communication. Sprout Inc., pp. 1–7.
- He, Q., Y. Guo, and J. Yu (2020). “Nonlinear dynamics of gold and the dollar”. In: *The North American Journal of Economics and Finance* 52, p. 101160.
- He, Zhiguo and Arvind Krishnamurthy (2013). “Intermediary asset pricing”. In: *American Economic Review* 103.2, pp. 732–770.

- Hofmann, Boris, Ilhyock Shim, and Hyun Song Shin (2022). “Risk capacity, portfolio choice and exchange rates”. In: *Available at SSRN 4028446*.
- Hong, Gee Hee, Shikun Ke, and Anh D.M Nguyen (2024). “the economic impact of fiscal policy uncertainty: evidence from a new cross-country database”. In: *IMF Working papers* 2024.209.
- Huynh, Toan Luu Duc (2020). “The effect of uncertainty on the precious metals market: New insights from Transfer Entropy and Neural Network VAR”. In: *Resources Policy* 66, p. 101623. DOI: [10.1016/j.resourpol.2020.101623](https://doi.org/10.1016/j.resourpol.2020.101623). URL: <https://doi.org/10.1016/j.resourpol.2020.101623>.
- IMF (2025). “Global financial stability report: enhancing resilience amid uncertainty”. In.
- Jiang, Zhengyang, Arvind Krishnamurthy, and Hanno Lustig (2023). “Dollar Safety and the Global Financial Cycle”. In: *NBER WORKING PAPER SERIES* 27682.
- Jordà, Òscar (2005). “Estimation and Inference of Impulse Responses by Local Projections”. In: *American Economic Review* 95.1, pp. 161–182. DOI: [10.1257/0002828053423622](https://doi.org/10.1257/0002828053423622).
- Lee, Howie (Mar. 2020). *Covid-19 demonstrates why a return to the Gold Standard is unlikely*. Treasury Research: Gold. Research note. OCBC Bank, Treasury Research & Strategy, pp. 1–3.
- Miranda-Agrippino, Silvia and Hélène Rey (2020). “US monetary policy and the global financial cycle”. In: *The Review of Economic Studies* 87, issue 6, pp. 2754–2776.
- Moskowitz, Tobias J, Yao Hua Ooi, and Lasse Heje Pederse (2012). “Time series momentum”. In: *Journal of Financial Economics* 104.2, pp. 228–250.
- Ngo, Vu Minh, Phuc Van Nguyen, and Yen Hai Hoang (2024). “The impacts of geopolitical risks on gold, oil and financial reserve management”. In: *Resources Policy* 90.104688.
- Raza, Naveed, Sajid Ali, Syed Jawad Hussain Shahzad, and Syed Ali Raza (2018). “Do commodities effectively hedge real estate risk? A multi-scale asymmetric DCC approach”. In: *Resources Policy* 57, pp. 10–29.
- Reboredo, Juan C (2013). “Is gold a safe haven or a hedge for the US dollar? Implications for risk management”. In: *Journal of Banking & Finance* 37.8, pp. 2665–2676.
- Salisu, Afees A., Ibrahim D. Raheem, and Umar B. Ndako (2020). “The inflation hedging properties of gold, stocks and real estate: A comparative analysis”. In: *Resources Policy* 66, p. 101605. DOI: [10.1016/j.resourpol.2020.101605](https://doi.org/10.1016/j.resourpol.2020.101605). URL: <https://doi.org/10.1016/j.resourpol.2020.101605>.
- Triki, Mohamed Bilel and Abderrazek Ben Maatoug (2021). “The GOLD market as a safe haven against the stock market uncertainty: Evidence from geopolitical risk”. In: *Resources Policy* 70.101872.
- Wang, Kuan-Min and Yuan-Ming Lee (2022). “Is gold a safe haven for exchange rate risks? An empirical study of major currency countries”. In: *Journal of Multinational Financial Management* 63, p. 100705.
- Zulaica, Omar (2020). *What share for gold? On the interaction of gold and foreign exchange reserve returns*. Tech. rep. Bank for International Settlements.

## Appendix

### Appendix - Literature review

Table 2: Literature Review on Hedge and Safe-Haven Assets

| Author(s) (Year)                             | Key Findings                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Agyei-Ampomah, Gounopoulos, and Mazouz, 2014 | Industrial metals (like copper) and other precious metals (like palladium) offer better safe-haven protection against sovereign bond losses than gold.                                                                                                                                                                    |
| Barro and Misra, 2016                        | Gold's real expected return is close to the risk-free. Gold has not been a reliable hedge against macroeconomic disasters, and its price volatility has been highly regime-dependent, rising markedly once the gold standard ended.                                                                                       |
| Baur and Lucey, 2010                         | This paper explicitly defines the concepts of a hedge and a safe-haven, analyzing gold's role against stocks and bonds in the US, UK, and Germany. It concludes that gold acts as a hedge and a safe-haven for stocks, but not for bonds, and notes that its safe-haven property is short-lived (around 15 trading days). |
| Baur and McDermott, 2010                     | Gold acts as a strong safe-haven for most developed stock markets (e.g., US, UK, Germany) but not for Australia, Canada, Japan, or large emerging markets.                                                                                                                                                                |
| Baur and Smales, 2020                        | Precious metals, particularly gold, serve as an effective hedge against geopolitical risk, with pronounced effectiveness in the face of geopolitical threats as opposed to actualized events.                                                                                                                             |
| Beckmann, Berger, and Czudaj, 2015           | Gold often acts as both a hedge and a safe haven, though its performance varies markedly between calm markets and episodes of stress or turmoil.                                                                                                                                                                          |
| Boubaker et al., 2020                        | Analyzing over seven centuries of data, gold serves as a strong hedge against global crises, particularly during bullish phases of the gold market.                                                                                                                                                                       |
| Bredin, Conlon, and Potì, 2015               | Gold acts as a short- and long-run hedge (up to one year) and a safe-haven during financial crises, but it failed to act as a safe-haven during the economic contractions in early 1980s.                                                                                                                                 |
| Continued on next page...                    |                                                                                                                                                                                                                                                                                                                           |

| <b>Table 2 – Continued from previous page</b>    |                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Author(s) (Year)</b>                          | <b>Key Findings</b>                                                                                                                                                                                                                                                                                               |
| Cheema, Faff, and Szulczyk, <a href="#">2022</a> | While gold acted as a safe-haven during the 2008 Global Financial Crisis, it failed to protect investor wealth during the COVID-19 pandemic.                                                                                                                                                                      |
| Ciner, Gurdgiev, and Lucey, <a href="#">2013</a> | Gold acts as a safe-haven against extreme movements in exchange rates in the US and UK, underscoring its role as a monetary asset.                                                                                                                                                                                |
| Echaust and Just, <a href="#">2022</a>           | Utilizing Extreme Value Theory, gold successfully reduced extreme downside risk (fat tails) during the GFC, but failed to do so during the COVID-19 pandemic.                                                                                                                                                     |
| Erb and Harvey, <a href="#">2013</a>             | Over typical investment horizons, gold's returns are driven much more by changes in its real price than by realized inflation, and gold is not a reliably effective safe-haven asset during periods of financial stress.                                                                                          |
| Grosskopf, <a href="#">2020</a>                  | Gold provided necessary liquidity during the COVID-19 crisis margin calls, and long-term investors not subject to margin pressures are rewarded by holding it as portfolio insurance.                                                                                                                             |
| Reboredo, <a href="#">2013</a>                   | Gold can act as a safe-haven asset against extreme US dollar (USD) rate movements.                                                                                                                                                                                                                                |
| Zulaica, <a href="#">2020</a>                    | This paper shows a portfolio analysis for central banks. It shows that gold's substantial market risk keeps baseline allocations low. However, gold can serve as an effective hedge in portfolios with higher interest rate sensitivity (longer duration) or when returns are measured in non-reserve numeraires. |

## Appendix - Additional graphs

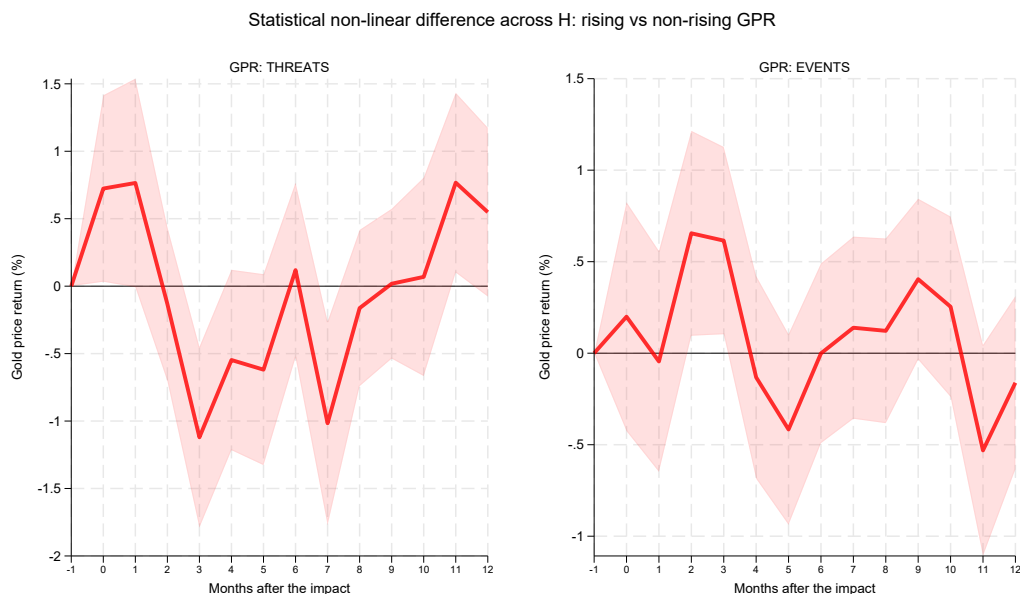


Figure 19: Dynamic coefficients for each period  $h$  of non-linear tests across regimes: rising vs non-rising GPR risks. *Note: Tests were performed by tracing the dynamics of the coefficient  $\theta$  from the interaction term in Equation (3). Statistical significance indicates that the state variable interaction adds information beyond the baseline effect.*

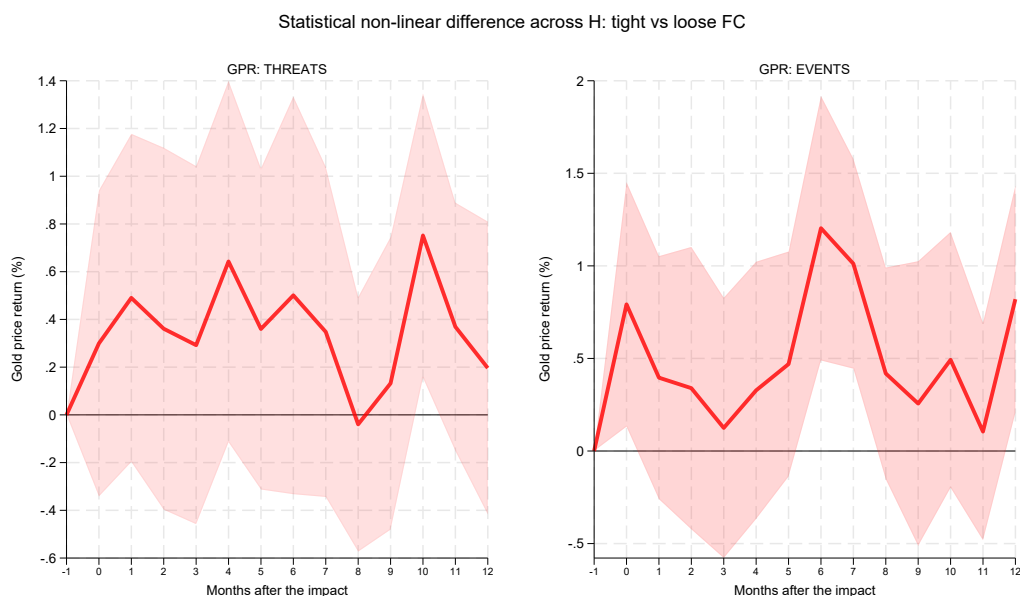


Figure 20: Dynamic coefficients for each period  $h$  of non-linear tests across regimes: tight vs loose financial conditions. *Note: Tests were performed by tracing the dynamics of the coefficient  $\theta$  from the interaction term in Equation (3). Statistical significance indicates that the state variable interaction adds information beyond the baseline effect.*

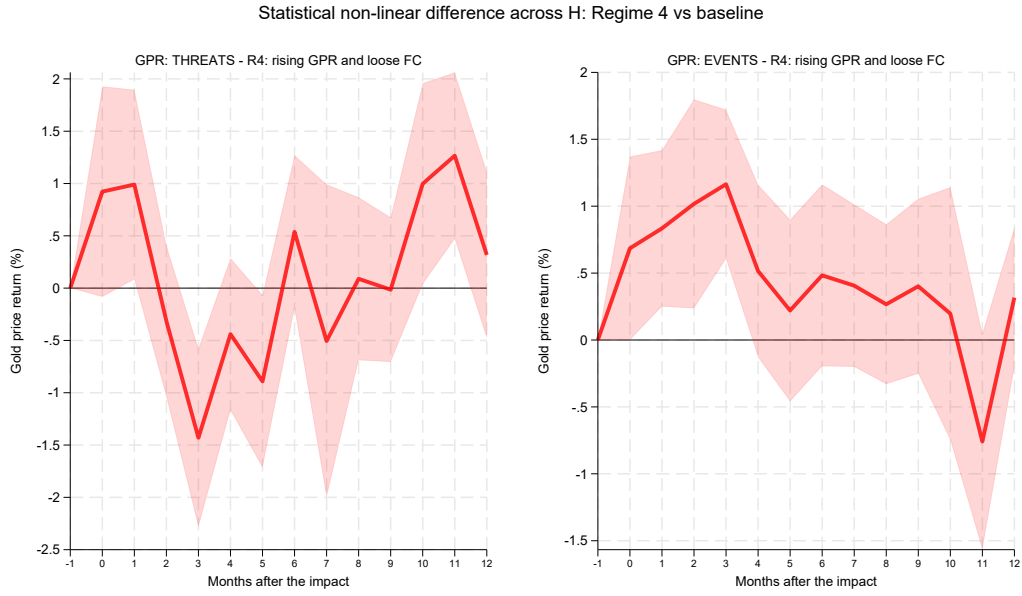


Figure 21: Dynamic coefficients for each period  $h$  of non-linear tests across regimes: Regime 4 (rising GPR and loose FC) vs other regimes. *Note: Tests were performed by tracing the dynamics of the coefficient  $\theta$  from the interaction term in Equation (3). Statistical significance indicates that the state variable interaction adds information beyond the baseline effect.*

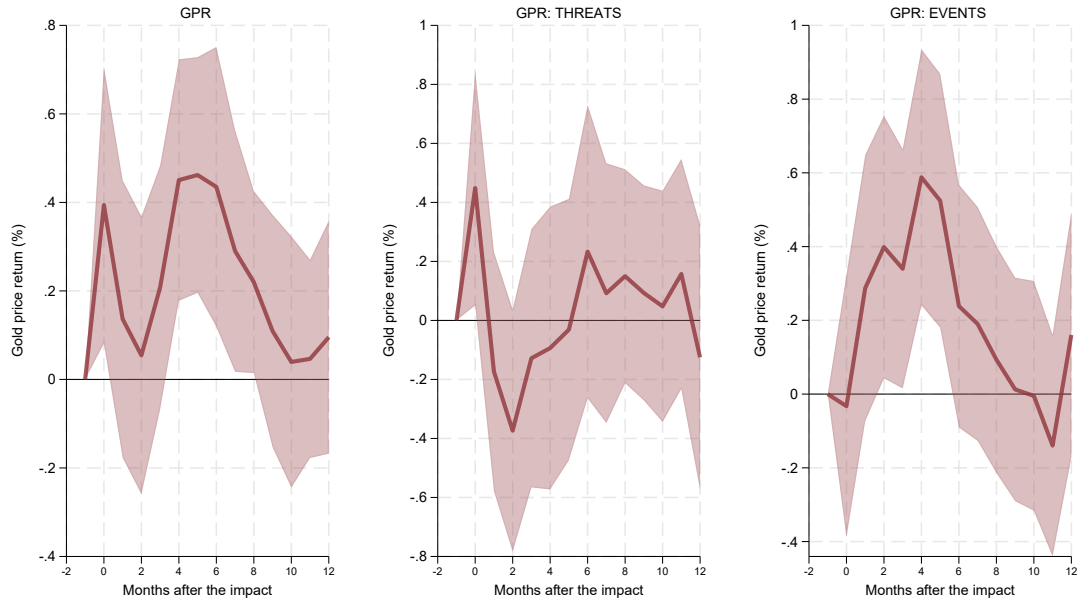


Figure 22: Cumulative impact of geopolitical shocks on gold price returns, controlling for the three-month gold price momentum. *Note: Estimations for robustness check.*

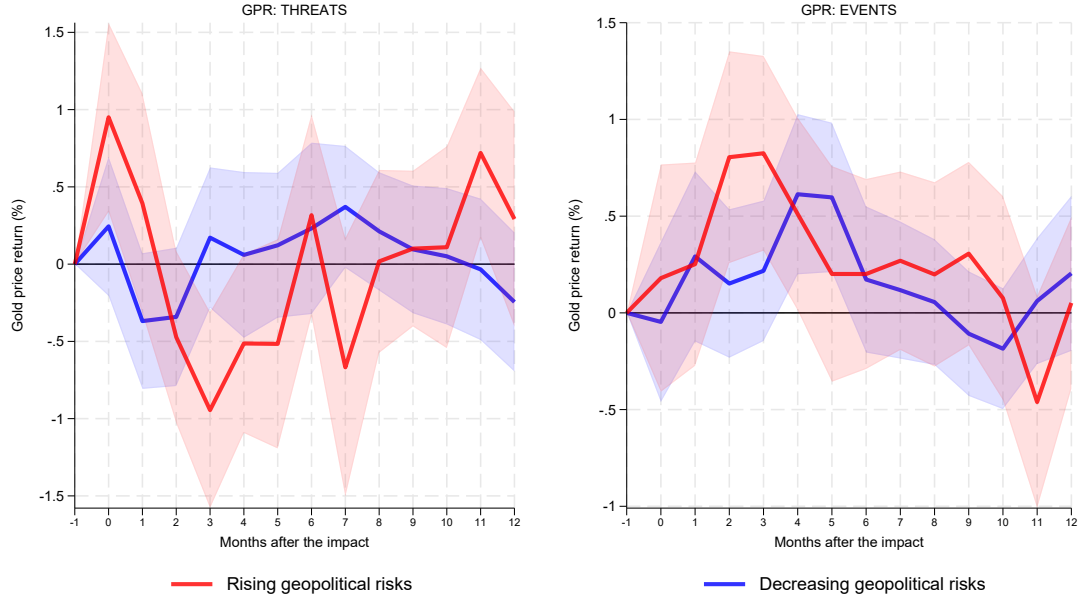


Figure 23: State-dependent cumulative impact of geopolitical shocks on gold price returns, conditional on rising geopolitical events and controlling for the three-month gold price momentum.  
*Note: Estimations for robustness check.*

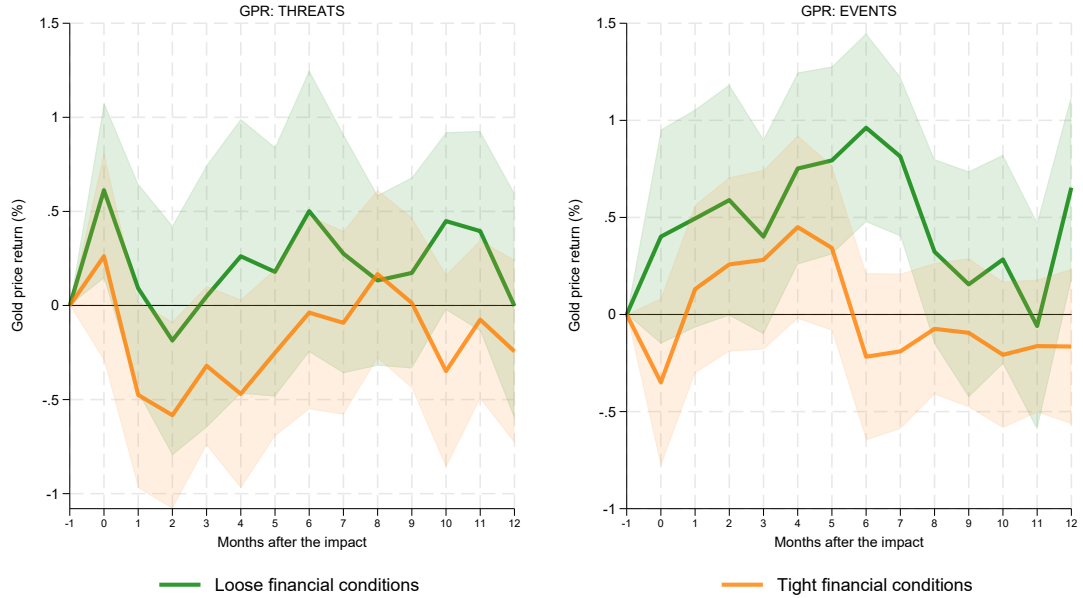


Figure 24: State-dependent cumulative impact of geopolitical shocks on gold price returns, conditional on financial conditions and controlling for the three-month gold price momentum.  
*Note: Estimations for robustness check.*

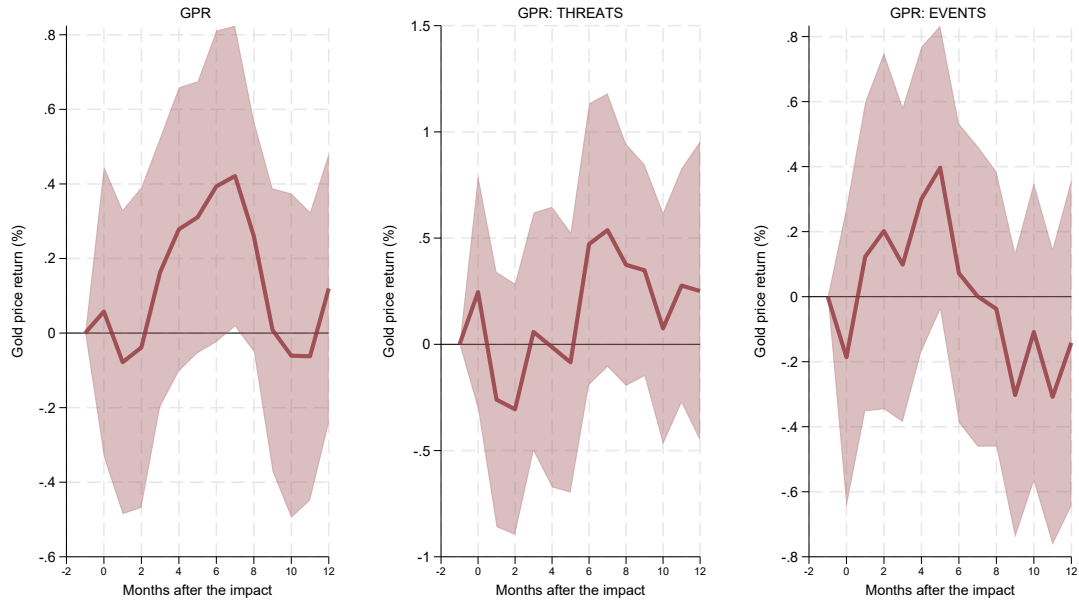


Figure 25: Cumulative impact of geopolitical shocks on gold price returns, controlling for the US 5-year convenience government yield for G10 economies from Du, Keerati, and Schreger, 2026. *Note: Estimations for robustness check.*

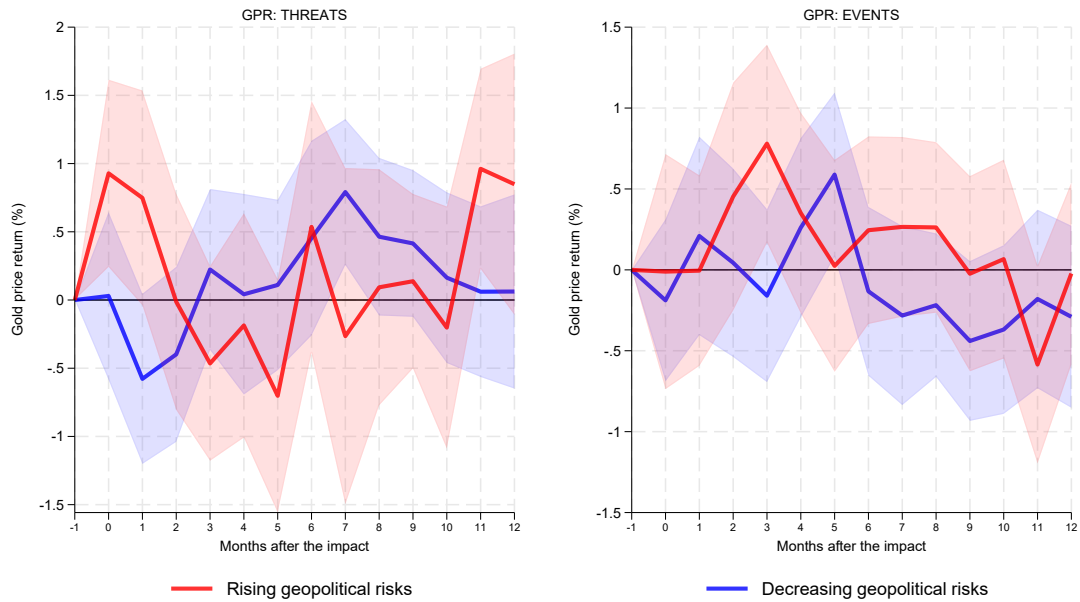


Figure 26: State-dependent cumulative impact of geopolitical shocks on gold price returns, conditional on rising geopolitical events and controlling for the US 5-year convenience government yield for G10 economies from Du, Keerati, and Schreger, 2026. *Note: Estimations for robustness check.*

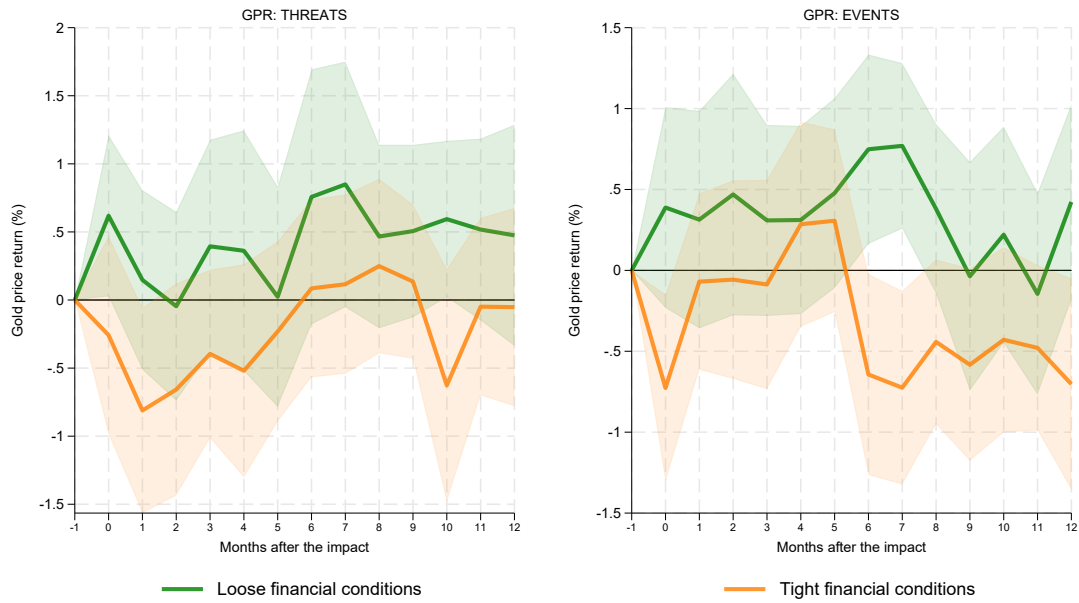


Figure 27: State-dependent cumulative impact of geopolitical shocks on gold price returns, conditional on financial conditions and controlling for the US 5-year convenience government yield for G10 economies from Du, Keerati, and Schreger, 2026. *Note: Estimations for robustness check.*

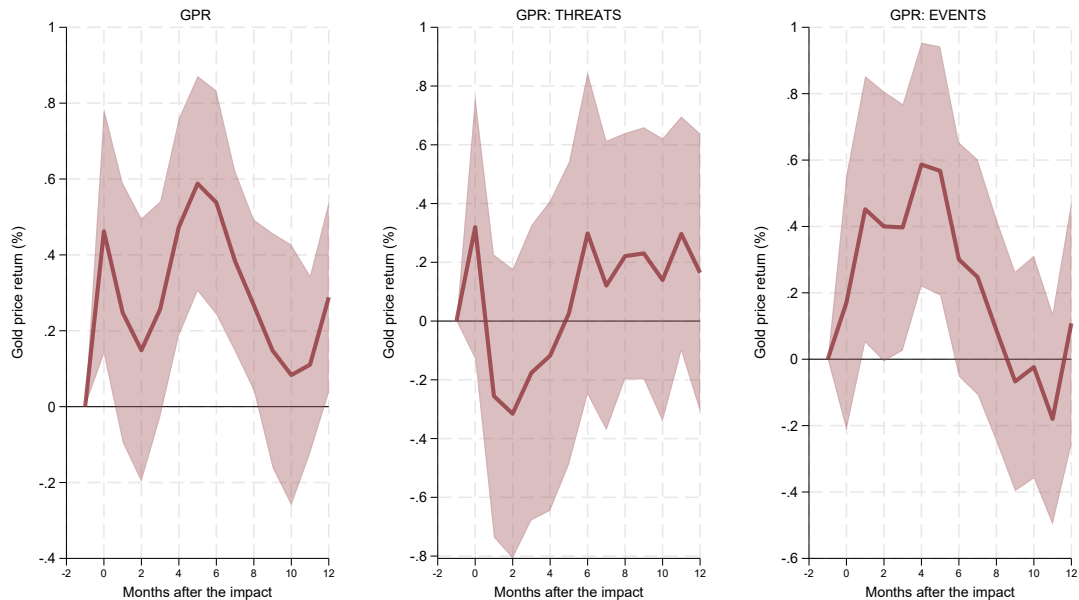


Figure 28: Cumulative impact of geopolitical shocks on gold price returns, controlling for the US fiscal policy uncertainty from Hong, Ke, and Nguyen, 2024. *Note: Estimations for robustness check.*

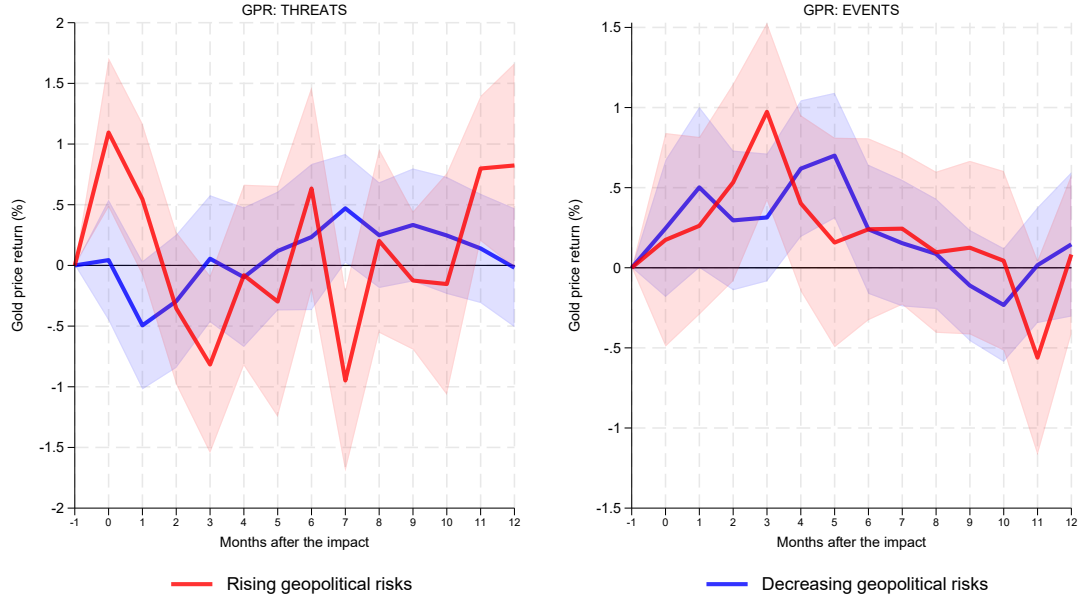


Figure 29: State-dependent cumulative impact of geopolitical shocks on gold price returns, conditional on rising geopolitical events and controlling for the US fiscal policy uncertainty from Hong, Ke, and Nguyen, 2024. *Note: Estimations for robustness check.*

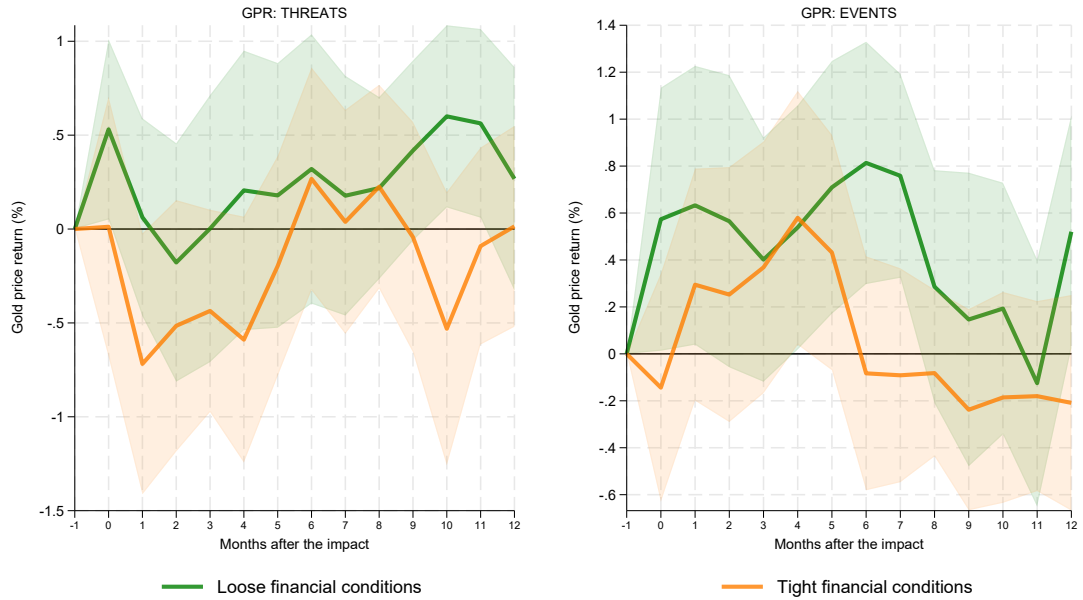


Figure 30: State-dependent cumulative impact of geopolitical shocks on gold price returns, conditional on financial conditions and controlling for the US fiscal policy uncertainty from Hong, Ke, and Nguyen, 2024. *Note: Estimations for robustness check.*