Monetary Policy under the Shadow of Geopolitical Uncertainty

Thiago R.T. Ferreira Adriana D. Kugler

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Abstract

In the recent past, central bankers have had to increasingly set policy under the shadow of geopolitical uncertainty like they did during the 1970s and 1980s. We study its macroeconomic effects and show that the source of the uncertainty is what matters. Distinguishing economic-policy uncertainty (EPU) and geopolitical risk (GPR), we find that GPR has no effects overall, while EPU has no aggregate effect on inflation initially but turns inflationary after about a year. However, this masks off-setting sources: national-security EPU and GPR are initially disinflationary, but EPU eventually turns inflationary likely due to military spending. By contrast, trade-policy uncertainty is inflationary. Some of these effects run through import prices and are amplified by sentiment. We, then, quantify the effects of these different sources of uncertainty on the longer-run neutral real interest rates. We find that GPR and TPU have raised neutral rates since the global financial crisis, accounting for roughly half or more of the post-2020 increase across major advanced economies.

JEL Codes: D80, E31, E32, E52, F44, H56.

Keywords: Uncertainty, Inflation, Monetary Policy, Geopolitical Risk, Economic Policy Uncertainty, Neutral Rate of Interest, Transmission Channels.

Ferreira: Vanguard Investment Strategy Group. (Note that the material in this paper does not represent the views of Vanguard or any other person associated with Vanguard.) Kugler (corresponding author): Georgetown University, NBER, CEPR and Rockwool Foundation Berlin, ak659@georgetown.edu. We thank Gonzalo Guevara for outstanding research assistance. We also thank seminar participants at the London School of Economics for comments, as well as George Akerlof, Charlie Bean, Dario Caldara, David Laibson, Ricardo Reis, Brunello Rosa, and Silvana Tenreyro for helpful suggestions.

I. Introduction

Most central bankers are laser-focused on achieving their mandates—price and financial stability and, in the case of the United States, also maximum employment. Typically, monetary policy decisions rest on careful analysis of current and future domestic economic conditions: the trajectory of inflation, the tightness of labor markets, and signals of demand strength or weakness. Yet, like in the 1970s and 1980s, the past decade has faced the growing intrusion of geopolitical forces into the macroeconomic landscape. From trade wars and sanctions to outright military conflicts and pandemic disruptions, geopolitical events have increasingly shaped the decisions facing central banks worldwide.

The environment of the 2020s has been characterized by a form of uncertainty that is qualitatively different from ordinary business-cycle uncertainty, and can have more permanent impacts. In addition, the sources of uncertainty have been wide-ranging. Some come from outside the United States—international conflicts such as the Russian invasion of Ukraine, the Gaza war, and the Iran confrontation—while others stem from domestic policy decisions with international ramifications, such as the U.S. trade war and the confrontation with Venezuela and Greenland.

The impact of uncertainty on real economic activity has attracted substantial academic attention, largely following the seminal work of Bloom (2009). The consensus in that literature is that uncertainty is contractionary: it delays investment through an option-value channel, depresses consumption through precautionary savings motives, and raises borrowing costs through risk premiums. The effect of uncertainty on *inflation*, however, is less well understood, and the emerging empirical literature offers markedly mixed evidence. Leduc and Liu (2016) find that uncertainty shocks function as aggregate demand shocks—reducing inflation alongside employment. Caldara et al. (2026) find the opposite: geopolitical risks foreshadow inflation, with supply-side channels dominating. Beckmann and Czudaj (2026) find that uncertainty is broadly inflationary, though central bank credibility dampens this effect. Pinchetti (2025) reconciles some of this tension by showing that geopolitical shocks associated with energy market disruptions are inflationary, while those unrelated to energy are deflationary.

This paper contributes to the growing literature on the macroeconomic impacts of uncertainty in a number of ways. First, we reconsider the impact of geopolitical uncertainty on inflation at an unprecedented period of uncertainty—the 2020s—carefully distinguishing between different sources of uncertainty. Second, we examine the channels through which these different sources affect prices. Third, and novel relative to this literature, we estimate the long-run implications of uncertainty for the neutral rate of interest. To our knowledge, this is the first paper to include formally uncertainty as a determinant of the neutral rate.

The analysis proceeds in several steps. First, we use Jordà (2005) local projections to trace

the dynamic impulse responses of inflation to uncertainty measures over a 12-month horizon. We use the Economic Policy Uncertainty (EPU) indices of Baker et al. (2016) and the Geopolitical Risk (GPR) indices of Caldara and Iacoviello (2022). We disaggregate EPU into national security (EPU NS) and trade policy uncertainty (TPU) components, and GPR into oil-related and non-oil components.[1,2] Second, we examine channels of transmission, focusing on import prices and on the moderating role of business sentiment. Third, we estimate the effects of uncertainty on the neutral rate of interest.

The main findings can be summarized as follows. Overall GPR is disinflationary but mostly has no statistically significant effect on inflation, while aggregate EPU has no impact initially but has an inflationary impact after about 12 months. This aggregate result, however, conceals important heterogeneity across sources. EPU from national security initially has significant disinflationary effects, consistent with demand-dampening channels, but eventually has inflationary effects likely due to increases in military spending. Trade policy uncertainty, by contrast, is inflationary.[3] Among geopolitical risk components, GPR from oil-related conflicts raises inflation significantly in the first several months but then has disinflationary effects later, while GPR from non-oil factors has mainly disinflationary effects.

Examining transmission channels, import prices play a central mediating role: controlling for import price growth eliminates the inflationary effect of oil-related GPR initially. Business sentiment amplifies effects: lower business sentiment amplifies the inflationary effect of trade policy uncertainty.

Given that uncertainty can have both inflationary and disinflationary effects depending on the source, it is important to determine how permanent the uncertainty effects are and what their long-run implications are for monetary policy. We find that both geopolitical risk and trade policy uncertainty have raised neutral rates since the global financial crisis, accounting for roughly half or more of the post-2020 increase across major advanced economies.

These results carry important implications for monetary policy. Uncertainty should not induce inaction. When geopolitical fog descends, the appropriate response is not to pull over to the side of the road. Rather, identifying the *source* of the uncertainty allows monetary policymakers to anticipate the direction and persistence of its effects on inflation and growth, and to calibrate their response accordingly. Moreover, geopolitical shocks are unlikely to have one-time effects—retaliation dynamics, sentiment feedback loops, and supply-chain spillovers create persistence.

The remainder of the paper is organized as follows. Section II reviews the literature and

[1]This decomposition is explained in Caldara and Iacoviello (2022).

[2]This explores the possibility that oil and non-oil components have differential effects on macroeconomic variables as found by Pinchetti (2025).

[3]See Kugler (2025) for an early account of how trade policy could generate more persistent effects than initially envisioned.

describes the potential effects of geopolitical uncertainty on inflation. Section III describes the data. Section IV presents the local projections results and examines transmission channels. Section V analyzes the implications for the neutral rate of interest. Section VI concludes.

II. Literature Review and Expected Effects

II.A. Review of the Literature

The literature on the macroeconomic effects of uncertainty has grown substantially since Bloom (2009) foundational analysis. Bloom (2009) showed that uncertainty shocks generate temporary but sharp contractions in investment and output, consistent with an option-value mechanism. Fernández-Villaverde et al. (2015) show that volatility in fiscal instruments generates recessionary dynamics, and Born and Pfeifer (2014) provide evidence that policy uncertainty has discernible real effects. Basu and Bundick (2017) demonstrate through a New Keynesian model that uncertainty can slow economic activity through countercyclical markups.

By contrast to the unambiguously negative impact of uncertainty on economic activity, the evidence on uncertainty and inflation is more contested.

Several strands of the literature find that uncertainty is disinflationary. Leduc and Liu (2016) present perhaps the most influential argument. Using a DSGE model with search frictions in the labor market and nominal rigidities, they show that uncertainty shocks function as aggregate demand shocks, simultaneously raising unemployment and reducing inflation. The key mechanism is an option-value channel specific to labor search: when uncertainty rises, the option value of waiting to hire increases, reducing vacancies, raising unemployment, and—through aggregate demand—lowering inflation.

Several subsequent studies find disinflationary effects, but some qualify these results. Houari (2022) documents deflationary effects of uncertainty using a time-varying parameter VAR. Haque and Magnusson (2022) find that uncertainty shocks have no impact on inflation until the mid-1990s but negative inflation effects thereafter. Alessandri and Mumtaz (2019) find regime-dependent effects: uncertainty shocks are inflationary during normal times but deflationary during financial crises. Meinen and Roehe (2017) find ambiguous effects across European countries.

Other studies find positive effects of uncertainty on inflation, pointing to supply-side mechanisms. Fasani and Rossi (2018) show that adding Taylor-rule-type interest rate inertia to a VAR similar to Leduc and Liu's reverses the sign of the inflation response. Castelnuovo et al. (2024) find using a nonlinear stochastic volatility-in-mean VAR that uncertainty has larger positive effects on inflation and more negative real activity effects when trend inflation is elevated.

The most directly relevant recent contributions focus on geopolitical risk specifically. Caldara

et al. (2026) provide perhaps the most comprehensive cross-country study of geopolitical risk and inflation, using data since 1900 for 44 economies. Their central finding is that geopolitical risks foreshadow higher inflation, with supply-side channels—disruptions to trade, shortages, and increases in military spending—playing a dominant role.

Beckmann and Czudaj (2026) examine the uncertainty-inflation relationship across 82 advanced, emerging, and developing economies. Using the World Uncertainty Index, they find that higher uncertainty is associated with higher inflation. However, this effect is significantly reduced when central bank credibility is high and inflation expectations are well anchored.

Pinchetti (2025) offers an important refinement by distinguishing between geopolitical shocks that operate through energy markets and those that do not. Energy-related geopolitical shocks are inflationary and contractionary. Non-energy geopolitical shocks are deflationary and contractionary.

This paper builds on and extends this literature in three ways. First, we examine a broader set of uncertainty sources, including domestic EPU components analyzed jointly with geopolitical risk decompositions. Second, we provide an analysis of transmission channels that goes beyond the energy/non-energy distinction. Third, we examine the implications of geopolitical uncertainty for the neutral rate of interest.

II.B. Potential Effects of Uncertainty on Inflation

Uncertainty can affect inflation through both demand-side and supply-side channels, and the net effect on inflation depends on which forces dominate.

Demand-side channels. Three mechanisms operate through the demand side, all pointing toward lower inflation and growth. First, the *option-value channel* (Bloom, 2009; Leduc and Liu, 2016) captures firms' incentive to postpone irreversible investments when uncertainty is high. Second, the *precautionary savings channel* (Basu and Bundick, 2017) captures households' response to uncertainty—greater uncertainty leads to higher precautionary saving and reduced consumption. Third, the *risk premium channel* reflects the increase in required returns associated with greater uncertainty, raising borrowing costs and reducing investment.

Supply-side channels. Two supply-side mechanisms work in the opposite direction. First, *shipping costs and import price disruptions* arise when geopolitical uncertainty disrupts global supply chains. Second, *strategic pricing and markup adjustment* reflects firms' upward pricing bias under uncertainty (Fernández-Villaverde et al., 2015; Castelnuovo et al., 2024).

The net effect depends on the *source* of the shock. National security-related uncertainty primarily operates through demand channels. Trade policy uncertainty operates more through supply channels—raising import costs and disrupting established supply chains. Geopolitical risks linked to oil-producing regions disrupt energy markets directly, generating cost-push inflation.

Sentiment plays an amplifying role in both directions. When business confidence is low, firms facing cost pressures from trade policy uncertainty have reduced capacity to absorb those costs and are more likely to pass them through to consumers.

II.C. Uncertainty as a Potential Determinant of the Neutral Rate of Interest

Uncertainty can have an impact on the neutral rate of interest, and not only on inflation, when its effects are sufficiently persistent. Some geopolitical shocks are short-lived and leave longer-run rates largely undisturbed. Others—such as the COVID-19 pandemic, the Russian invasion of Ukraine, or an all-out trade war marked by continuous changes in strategy and reversals in the courts—may have longer lasting consequences. Uncertainty that is persistently inflationary would raise the neutral rate and impart a tightening bias to monetary policy, while uncertainty that is persistently disinflationary would lower it and impart an easing bias.

A large literature studies the determinants of the neutral rate, but it has largely set uncertainty aside. Ferreira and Shousha (2023) (FS) estimate a cross-country model in which the neutral rates of advanced economies respond to observable global and country-specific factors—trend productivity, demographics, the supply of and demand for safe assets, and the convenience yield. Correa et al. (2022) run a horse race between the net supply of safe assets and demographic factors and find that population ageing and the convenience yield account for most of the decline in neutral rates since the 1980s. Auclert et al. (2025), instead, embed these forces in an asset-supply and asset-demand framework and conclude that ageing, productivity growth and government debt are the main drivers, with neutral rates projected to rise as demographics shift. None of these studies, however, includes uncertainty among the determinants of the neutral rate.

A separate literature does connect uncertainty to the neutral rate, but it establishes the link through calibrated theory or narrative arguments rather than by estimating how the neutral rate responds to observed measures of uncertainty, and it does not settle on a sign. In a calibrated model, Kozlowski et al. (2018) show that when agents revise upwards their assessment of tail risk after observing a rare adverse event, their precautionary demand for safe assets increases and persistently depresses the riskless rate. Obstfeld (2023) argues, more informally, that the effect need not go in one direction: higher uncertainty may raise precautionary savings and the demand for safe assets, pushing rates down, but it may also erode the set of assets that investors regard as safe and, together with higher military spending increase the public debt, pushing up the neutral rate. Schnabel (2024) points to this upward channel, emphasizing that geopolitical tensions and the increase in defense spending they require can raise the neutral rate as public debt climbs. Importantly, the precautionary savings and safe-asset channel that would lower the neutral rate already operates through the demand for safe assets and the convenience yield, both of which are determinants in the FS framework. Our

uncertainty measures are, thus, meant to capture effects on the neutral rate beyond these channels.

We contribute to this literature on the neutral rate in two ways. First, whereas the literature focusing on the determinants of the neutral rate leaves uncertainty out and the uncertainty literature works through calibrated theory or narrative reasoning, we bring geopolitical-risk, economic-policy-uncertainty, and trade-policy-uncertainty measures directly into a structural cross-country model of the neutral rate and estimate their effects alongside the traditional determinants. To our knowledge, this is the first paper to do this. Second, our local projections point to effects that depend on the source of the uncertainty: trade-policy uncertainty is inflationary and should raise the neutral rate, while EPU related to national-security and geopolitical risk are disinflationary on impact, but may still raise the neutral rate if the associated military spending becomes inflationary at longer horizons and makes the effects persistent.

III. Description of the Data

The local projections analysis uses monthly time-series data for the United States, covering the period from the early 1990s through 2026. The analysis for the neutral rate of interest relies on a panel of 10 countries and the Euro Zone covering the period from 1960 to 2026.

III.A. U.S. Time-Series Data for Local Projections

The main outcome variables are the consumer price index (CPI) inflation rate and the GDP growth rate; the primary explanatory variables are several indices of economic policy uncertainty and geopolitical risk, as described below.

Macroeconomic Variables. CPI and import prices are obtained from the Bureau of Labor Statistics (BLS). Import price growth serves as a control variable to examine the import price channel of transmission. GDP is obtained from the Bureau of Economic Analysis (BEA). Unemployment is measured using the Current Population Survey (CPS), and the unemployment gap is defined as the difference between the unemployment rate and the CBO's estimate of the NAIRU or non-cyclical rate of unemployment.

Business Sentiment (BSI). Business sentiment is measured by the Business Sentiment Index (BSI) from the OECD, which aggregates survey responses from firms on expected production, order books, and business conditions.

Economic Policy Uncertainty (EPU) Indices. Economic Policy Uncertainty indices are drawn from Iacoviello's EPU database. The overall EPU index is constructed from frecuency counts in the

top 10 U.S. newspapers on coverage of economic policy uncertainty.[4] To account for the rise in the number of articles published, Iacovello divides the raw count of policy uncertainty articles by the total number of articles in the same paper/month and, then, normalizes the resulting series for each paper to have a unit standard deviation from 1985-2009. In addition to the overall EPU index, we use Iacovello's monthly disaggregated EPU indices: National Security EPU (EPU NS), which captures uncertainty related to national defense and security policy; and Trade Policy Uncertainty (TPU), which captures uncertainty about tariffs, trade agreements, and international commerce.[5] We also normalize the EPU indices by substracting the mean and dividing by the standard deviation, in order to make the magnitudes of our estimates comparable when we estimate our local projections specifications.

Geopolitical Risk (GPR) Indices. Geopolitical risk indices are drawn from the Caldara and Iacoviello (2022) GPR database. The overall GPR index measures the frequency in coverage of adverse geopolitical events in major news outlets. We also use two disaggregated components: GPR Oil, which captures geopolitical tensions related to oil-producing regions and energy market disruptions, and GPR Non-Oil, which captures geopolitical conflicts unrelated to energy markets.[6] Like with the EPU indices, we also normalize the GPR indices for ease of interpretation of the magnitudes of the impulse response effects.

Figure 1 shows the EPU index and Figure 2 shows its key components over time, while Figure 3 shows the overall GPR index and its oil and non-oil decomposition. Figure 1 illustrates the episodic but persistent nature of economic policy uncertainty, with notable spikes around the 9/11 attacks, the Global Financial Crisis, the debt ceiling debates, Brexit, the COVID-19 pandemic, and the current period of trade tensions. Figure 3 shows overall geopolitical risk in the first panel, oil-related geopoloitical risk in the second panel, and non-oil geopolitical risk in the third panel. All three panels show geopolitical risk rising sharply in recent years. The top panel also shows sharp increases in the GPR overall index around the Gulf War, September 11, the Iraq War, and most dramatically around Russia's invasion of Ukraine in 2022. However, the second and third panels show some big differences in the indices. For example, the non-oil component rises sharply in the early 2000's for the non-oil component (but not the oil component), while the oil component rises sharply in the recent period of the Iran war (but not the non-oil component).

[4]These 10 newspapers include: USA Today, the Miami Herald, the Chicago Tribune, the Washington Post, the Los Angeles Times, the Boston Globe, the San Francisco Chronicle, the Dallas Morning News, the Houston Chronicle, and the WSJ.

[5]Specifically, the EPU national security index captures newspaper-based references to policy uncertainty related to national security, defense, and military matters. The trade policy uncertainty index captures references to tariffs, trade agreements, and trade-related policy changes. See https://www.policyuncertainty.com/us$_{m}onthly.html$

[6]The GPR oil index is constructed as the component of geopolitical risk correlated with movements in oil-related geopolitical events, while the GPR non-oil index captures geopolitical tensions unrelated to oil market disruptions. See Pinchetti (2025) for a related decomposition.

Figure 1: Economic Policy Uncertainty (EPU) Overall

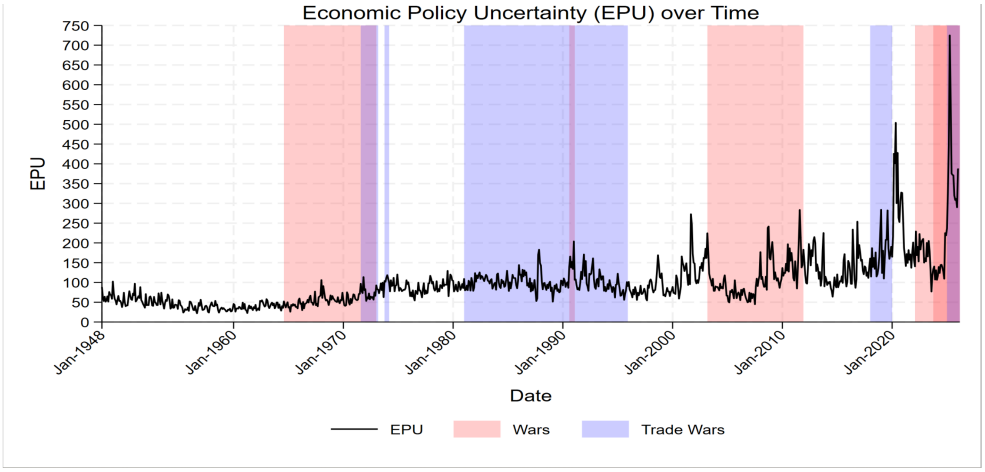


Figure 2: National Security, Trade Policy Uncertainty, Fiscal and the Regulatory Subcomponents of EPU

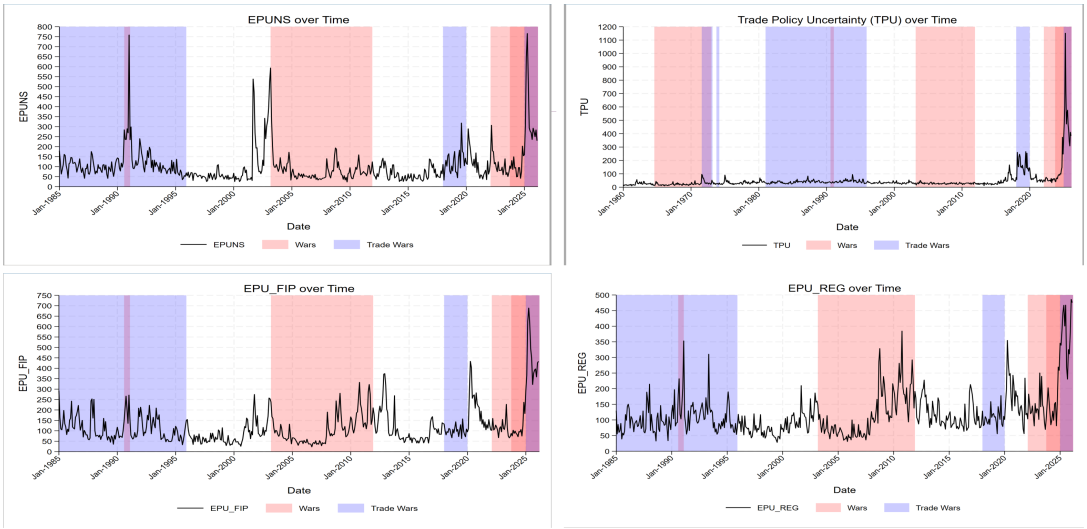
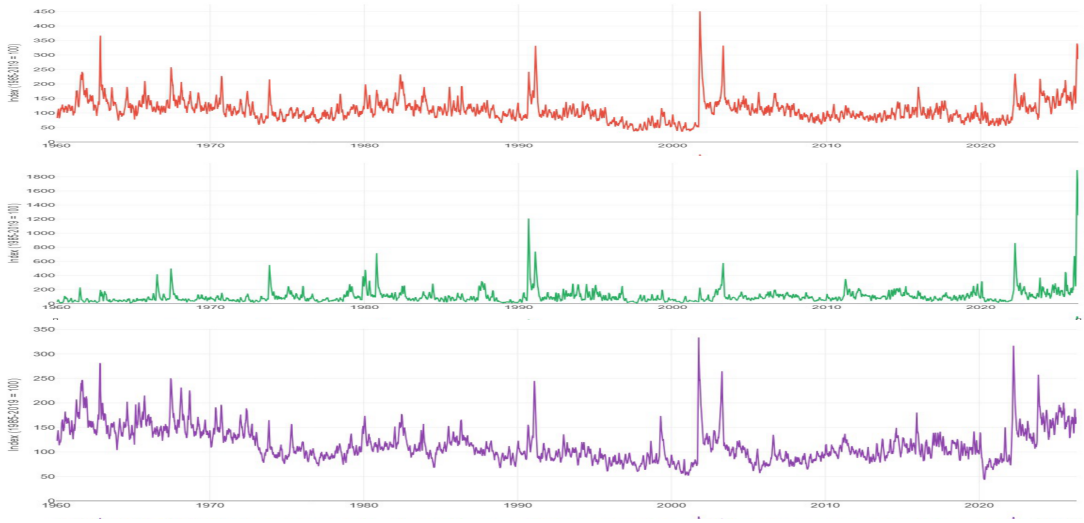


Figure 3: GPR Overall, Oil, and Non-Oil Components



III.B. Panel Data of the Determinants of the Neutral Rate

The data to estimate the determinants of the neutral rate is a panel of 10 countries and the Euro Zone covering the period from 1960 to 2026. The data includes the global safe-asset supply, the policy-driven demand for safe assets, the convenience yield, and country-specific productivity trends, working-age population shares, and uncertainty measures.

Trend Extraction. Several determinants enter the analysis as low-frequency trends rather than as raw series, so as to bypass cyclical fluctuations and isolate the longer-run movements relevant for neutral rate dynamics. To limit the sensitivity of the trend estimate to observations at the very end of the sample, we extend each series by forecasting it forward and extract the trend on the extended series, retaining only the in-sample portion of the estimated trend. We use the Hodrick-Prescott (HP) filter with a large smoothing parameter calibrated to the semiannual frequency of the panel model.

The remaining determinants are used without trend extraction: the safe-asset supply and the policy-driven demand proxy enter as levels (normalized by world GDP), and the convenience yield enters in levels as well.

Supply of Safe Assets. Following Ferreira and Shousha (2023) (FS), we adopt a narrow definition of a safe asset: a simple debt instrument expected to preserve its value in any state of the world. Under this definition, U.S. Treasury securities are the primary safe asset. The relevant quantity is the supply of safe assets available to price-sensitive private buyers. Gross federal debt overstates the supply; we subtract holdings by the Federal Reserve and debt held by government trust funds.

FS also construct a broader measure that adds German, French, and British government bonds

to U.S. Treasuries. Because that broader series behaves very similarly to the U.S.-only measure, we use only the U.S.-only measure for parsimony.

Policy-driven Demand for Safe Assets. FS build a proxy for the holdings of U.S. Treasury securities driven by policy rather than by ordinary portfolio choice. The first component is foreign official demand: the build-up of foreign-exchange reserves held in U.S. Treasuries by foreign governments. The second component captures the additional demand created by post-crisis financial regulation, consisting of commercial banks' increased Treasury holdings and money-market fund Treasury holdings due to regulatory reform.

The total demand proxy is the sum of the foreign official and regulatory components. FS note that a comparable proxy could be built using analogous data from other economies, but for comparability we use only U.S.-based components.

Convenience Yield. The convenience yield measures the value investors place on the liquidity and safety of U.S. Treasury securities. Following an approach similar to Gilchrist and Zakrajšek (2012), FS measure the convenience yield as the yield differential between on-the-run and off-the-run Treasury securities of the same maturity.

Trend Productivity Growth. Productivity enters country by country. For each economy, the productivity input is an average of four annual measures, which are combined and then trend-filtered to remove cyclical variation.

Working-Age Population Share. Demographics enter through the working-age population share, defined for each economy as the ratio of the population aged between 20 and 60 to the total population.

Uncertainty Measures. The uncertainty determinants are the trends of the geopolitical-risk, economic-policy uncertainty, and trade-policy uncertainty indices, forecast forward and trend-extracted using the same HP-filter procedure described above.

IV. Impacts of Uncertainty on Inflation

IV.A. Local Projections

To estimate the dynamic impulse responses of inflation to uncertainty shocks, we employ the local projections (LP) method introduced by Jordà (2005). Unlike impulse responses derived from a VAR model, local projections estimate the response at each horizon directly by regressing the outcome variable at horizon h on the shock variable and controls at time t. This approach is attractive because it does not require specifying a complete structural model, is robust to misspecification, and allows straightforward construction of confidence bands.

Formally, the local projection for horizon h is:

$$\pi_{t+h} - \pi_{t-k} = \alpha_h + \gamma_h U_t + \beta_h' \mathbf{X}_t + \varepsilon_{t+h}, \tag{1}$$

where π_{t+h} is the inflation rate at horizon h months ahead, U_t is the uncertainty measure at time t, $\mathbf{X}_t$ is a vector of controls (lagged inflation, the unemployment gap, month effects, and a time trend), and γ_h captures the cumulative impulse response at horizon h. We estimate this equation for $h = 1, 2, \ldots, 12$. Confidence bands at the 68 and 90 percent levels are constructed using Newey-West standard errors.

As indicated above, the local projections approach has the advantage of allowing for flexible specifications. This allows us to include EPU NS, TPU, GPR Oil, and GPR Non-Oil simultaneously, so that different sources have differential effects.

In addition, we also introduce specifications with interaction terms in Section IV.C.2. to allow for the possibility that geopolitical uncertainty may be amplified or mitigated by business sentiment.

IV.B. Responses of Inflation to Uncertainty Shocks

Using local projections, we start by examining the aggregate effects of Economic Policy Uncertainty and Geopolitical Risk. The effects of the aggregate EPU shocks are negative but insignificant for the first 2 months, but then turn positive and significant after about 10 months. The effects of the aggregate GPR shocks are negative and mostly insignificant throughout the horizon.

Figure 4: Overall Economic Policy Uncertainty: Impulse Response of Inflation

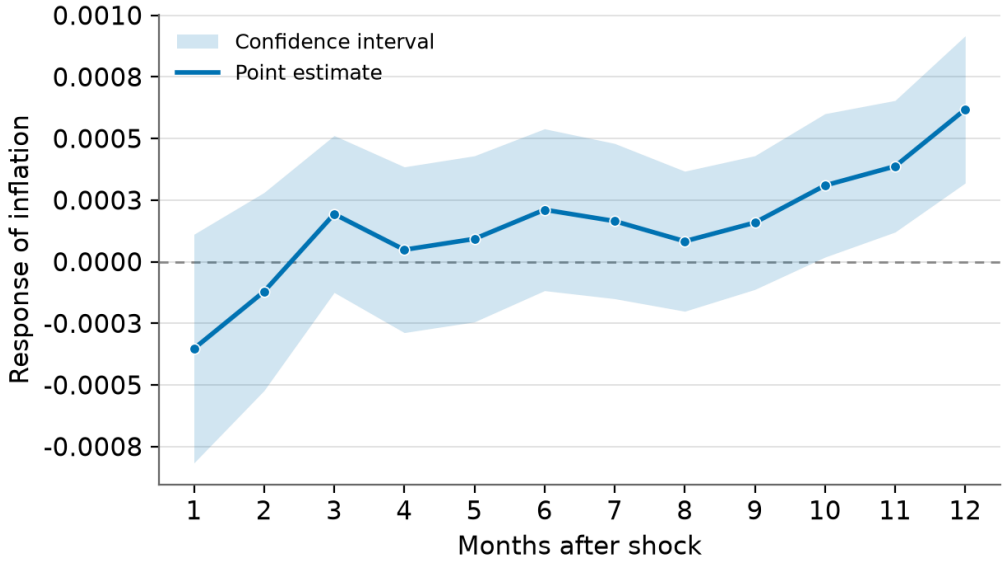
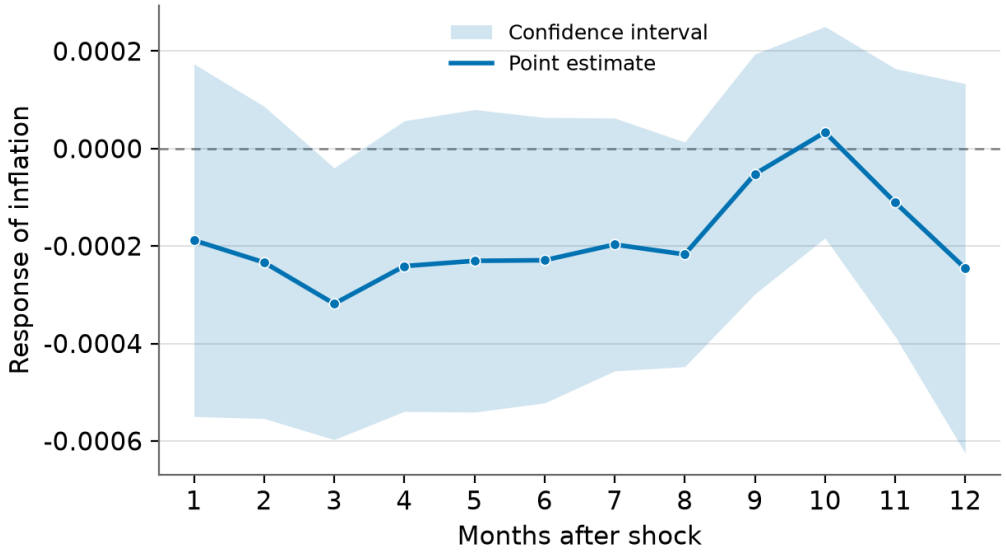


Figure 5: Overall Geopolitical Risk: Impulse Response of Inflation



Figures 6–9 show results of the EPU and GPR shocks when these are disaggregated according to the source of the shock. We focus on the geopolitical components of the economic policy uncertainty measures (EPU NS and TPU) and the oil and non-oil components of the GPR measure.

Interestingly, Figures 6 and 7 show that the differential impacts of the overall EPU measure may, indeed, be capturing differential impacts of EPU NS and TPU. Figure 6 shows a negative and significant disinflationary effect of EPU NS at impact, but a positive inflationary impact by the end of the horizon, likely associated with the increase in defense spending that would be prompted by national security emergencies. By contrast, Figure 7 shows positive and significant inflationary effects of TPU throughout most of the horizon.

Figure 6: Economic Policy Uncertainty, National Security: Impulse Response of Inflation

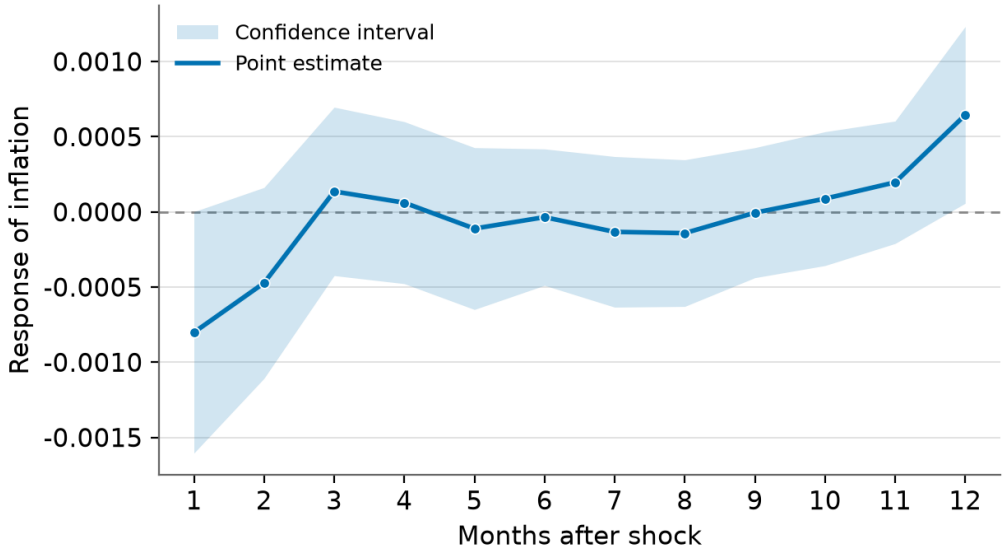
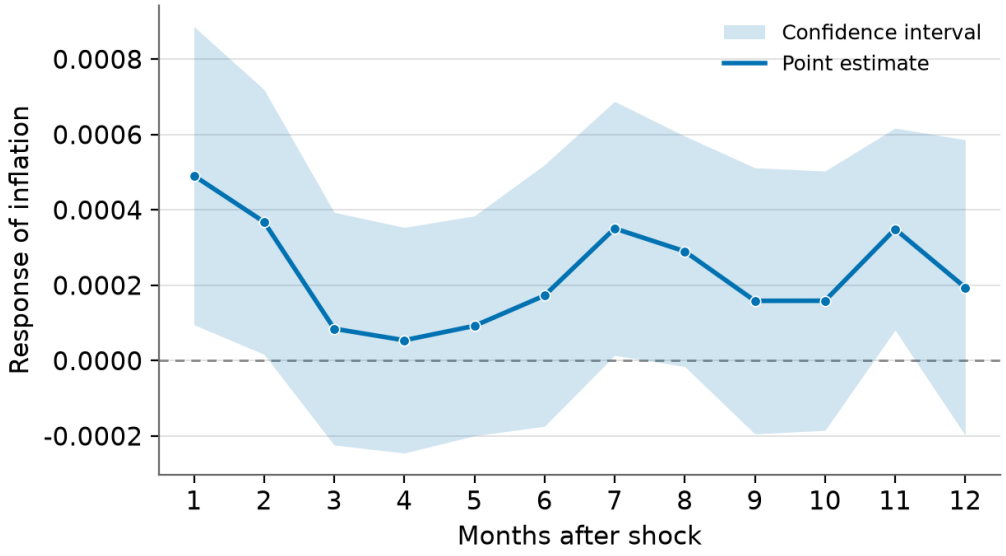


Figure 7: Trade Policy Uncertainty: Impulse Response of Inflation



Figures 8 and 9 show the effects of geopolitical risks associated with oil and not associated with oil, rather than with more broadly defined military and geopolitical threats. Figure 8 shows the effects of oil-related geopolitical shocks on inflation: these are initially positive, though insignificant, at impact, but then turn negative and mostly significant thereafter. These negative impacts may be related to the contractionary effects that follow periods with higher prices. Figure 9 shows the effects of GPR Non-Oil shocks on inflation: these are negative and mostly significant throughout, consistent with demand-side channels.

Figure 8: Geopolitical Risk Oil: Impulse Response of Inflation

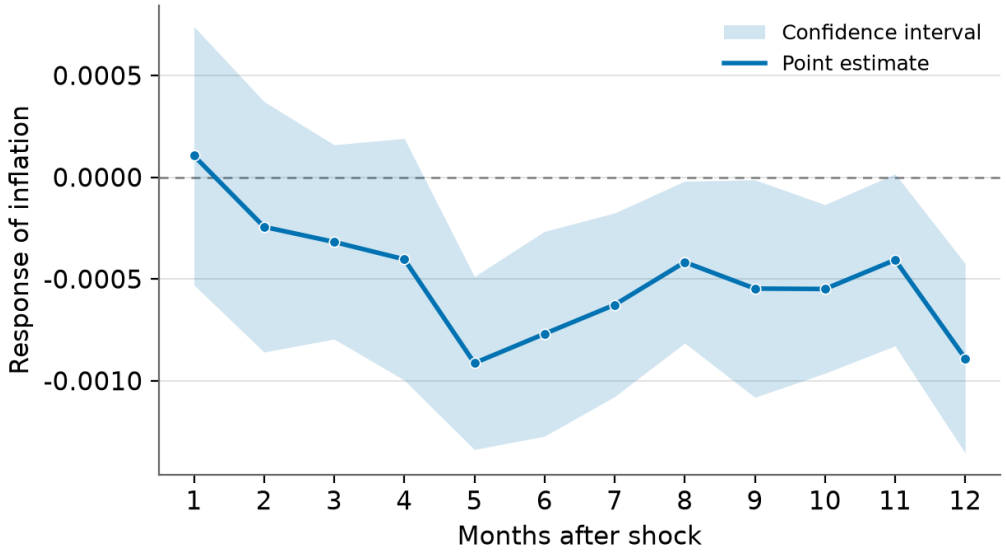
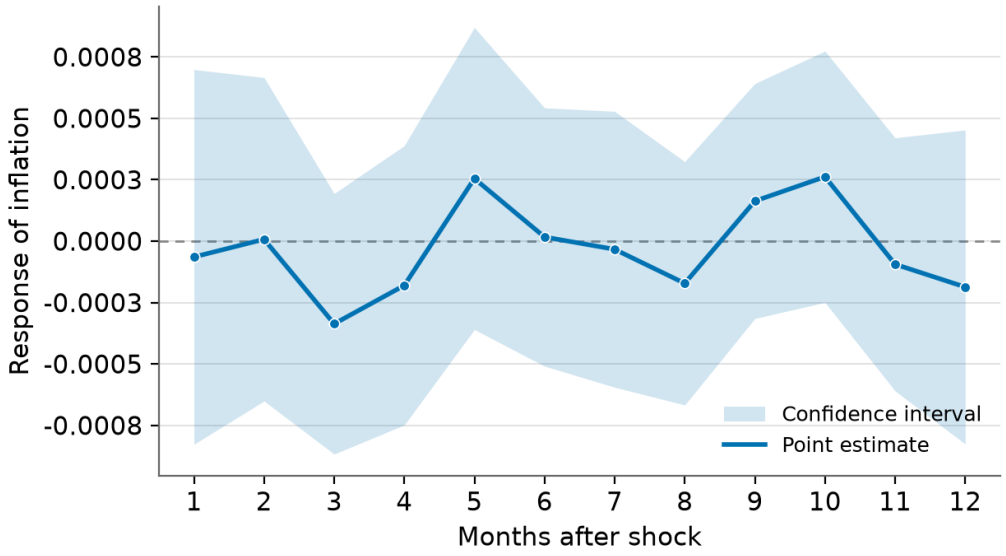


Figure 9: Geopolitical Risk Non-Oil: Impulse Response of Inflation



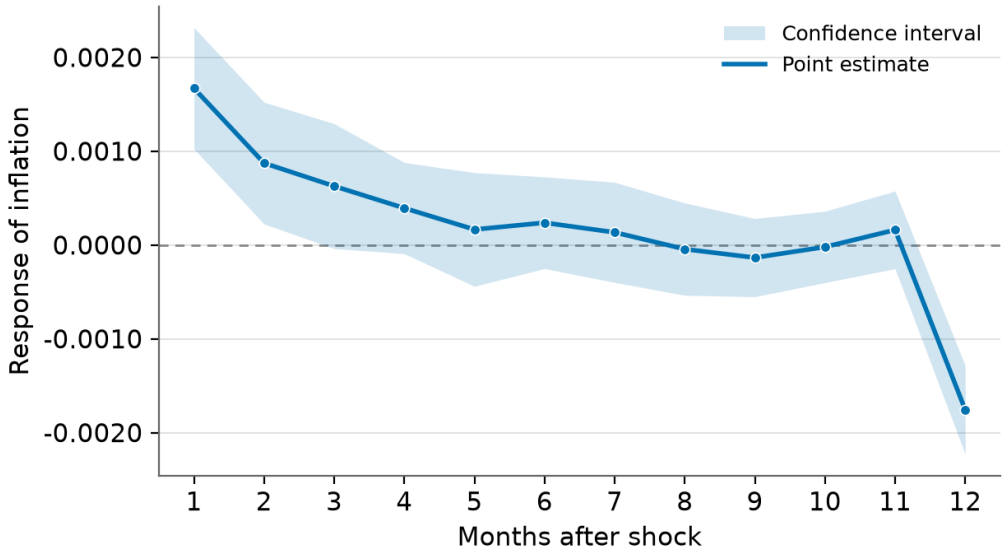
In the next section, we explore some of the channels through which these shocks from different sources may be affecting inflation.

IV.C. Channels of Effects of Uncertainty

IV.C.1. Import Prices

The results from the local projections provide suggestive evidence of import price mediation: the coefficient on GPR Oil falls substantially when import price growth is added as a control, consistent with oil-related geopolitical risk operating primarily through its effect on import prices, which then pass through to consumer prices. Figure 10 shows the impulse response of inflation to import prices. Import prices have an inflationary effect for about four months and the effect dissipates after that and turns significantly negative at the end of the horizon, probably because of the contractionary effect of high prices on consumption and investment.

Figure 10: Change in Import Prices: Impulse Response of Inflation



The trade policy uncertainty channel likely operates differently. TPU raises inflation significantly even when import prices are included, suggesting that TPU's inflationary effect is not fully explained by import price movements. This residual effect may reflect strategic pricing adjustments by domestic firms anticipating cost increases—under uncertainty about future tariff levels, risk-averse firms may raise prices preemptively.

The post-pandemic amplification of import price pass-through has important implications for the future. If firms have learned from the COVID-era experience that supply disruptions are more persistent than previously believed, they may be more willing to pass cost increases through to prices rather than absorbing them in margins.[7]

[7]Another mediating factor we would like to explore in the future is defense spending, which is likely to create inflationary forces in relation to national security and geopolitical risks.

IV.C.2. Business Sentiment

Uncertainty can work by holding back both businesses from making investments and opening up vacancies, as described in section II, and the business sentiment index can capture these effects. We estimate models with interactions of the the uncertainty measures and business sentiment. Figure 11 shows the results of models with interactions between business sentiment and TPU, when business sentiment is at the 10th and 90th percentile of the distribution of sentiment. The results show that business sentiment amplifies the inflationary effect of trade policy uncertainty: when BSI is at the 10th percentile (low confidence), the inflationary effect of TPU is larger. The interaction terms are largest and also significant in the first few months of the horizon.

Figure 11: Trade Policy Uncertainty Effects on Inflation when BSI is at 10th and 90th Percentile

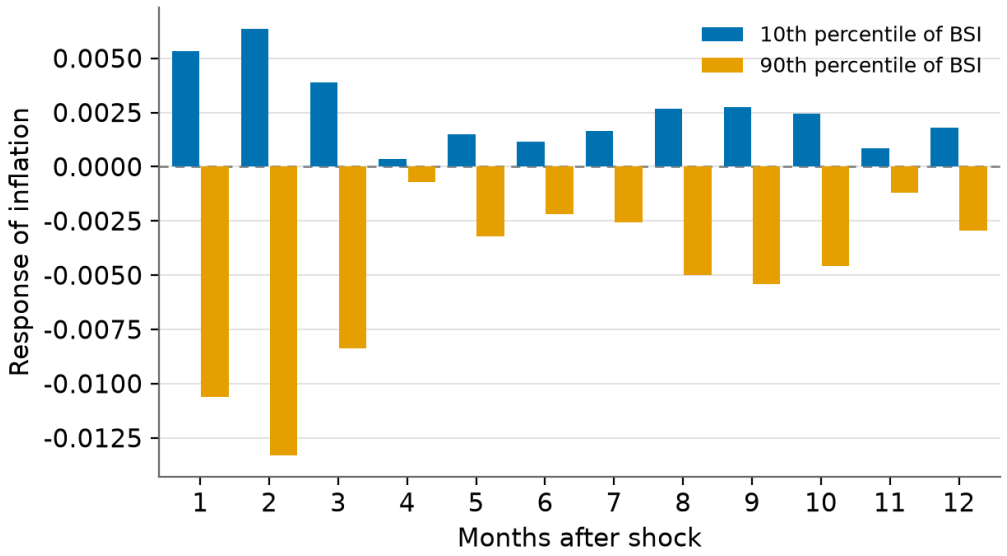
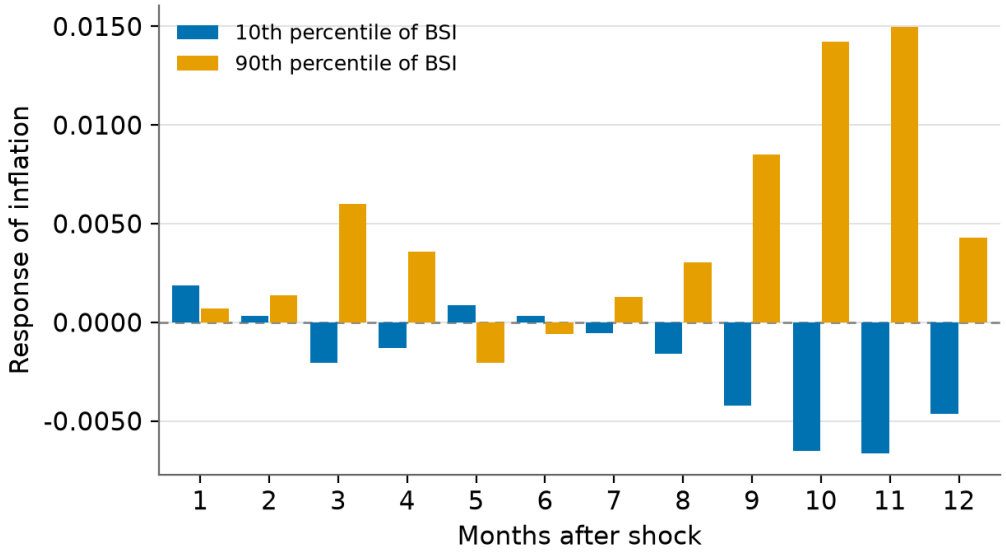


Figure 12 shows the results from models with another important interaction between the Business Sentiment Index (BSI) and import prices. As in the previous figure, Figure 12 also shows the impacts at the 10th and 90th percentile of the business distribution. The interaction is also negative and significant in the last few months of the horizon. This is consistent with the view that when businesses are more confident, cost increases from import prices are more easily absorbed in margins rather than passed through to consumers. By contrast, when business confidence is low, businesses will pass on the higher import cost to consumers as they are unable to cover the price increases from their profits.

Figure 12: Import Price Effects on Inflation when BSI is at 10th and 90th Percentile



The divergence between high- and low-confidence responses is substantial. At low levels of business confidence (10th percentile), the inflationary effects of both trade policy uncertainty and import price shocks are significantly amplified compared to high-confidence environments (90th percentile). These findings suggest that monitoring business sentiment is important for monetary policymakers seeking to anticipate the macroeconomic implications of uncertainty shocks.[8]

V. Impacts of Uncertainty on the Neutral Rate of Interest

The analysis so far has focused on the short- and medium-run effects of uncertainty on inflation. But geopolitical uncertainty may also affect longer-run macroeconomic conditions by altering the neutral rate of interest.

To examine the longer-run implications of geopolitical uncertainty for monetary policy, we estimate a model of the determinants of the neutral rate across advanced economies. The neutral rate—the real short-term interest rate consistent with output at potential and inflation at target—is a key benchmark for assessing the stance of monetary policy.

The neutral rate is unobservable and must be estimated. We follow the approach of using cross-country variation to estimate neutral rates for a panel of 11 advanced economies using a set of structural determinants including savings and investment factors, productivity growth, the convenience yield on safe assets, working-age population shares, and uncertainty measures.

[8]Inflation expectations and the extent to which they are well anchored could act as another mitigating factor of uncertainty on inflation. We plan to explore this additional mitigating factor in the future by interacting a measure of the extent to which inflation expectations are anchored with various uncertainty measures.

V.A. State-Space Model

We build on the baseline cross-country state-space model of Ferreira and Shousha (2023) (hereafter FS), estimated at a semiannual frequency for eleven advanced economies.[9] For each country j, we decompose the unemployment rate $u_{j,t}$, inflation rate $\pi_{j,t}$, and policy rate $i_{j,t}$ into cyclical and trend components:

$$\begin{bmatrix} u_{j,t} \\ \pi_{j,t} \\ i_{j,t} \end{bmatrix} = \begin{bmatrix} \widehat{u}_{j,t} \\ \widehat{\pi}_{j,t} \\ \widehat{i}_{j,t} \end{bmatrix} + \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} X^u_{j,t} \\ X^m_{j,t} \\ X^r_{j,t} \end{bmatrix}, \tag{2}$$

where $\widehat{u}_{j,t}$, $\widehat{\pi}_{j,t}$, and $\widehat{i}_{j,t}$ are cyclical deviations; $X^u_{j,t}$ is trend unemployment; $X^m_{j,t}$ is the monetary (inflation) trend; and $X^r_{j,t}$ is the longer-run neutral real interest rate. These trends follow random walk processes:

$$X^s_{j,t} = X^s_{j,t-1} + x^s_{j,t}, \qquad s \in \{u, m, r\}, \tag{3}$$

where the shocks to trend unemployment and the monetary trend, $x^u_{j,t}$ and $x^m_{j,t}$, are i.i.d. innovations.

The change in the neutral rate, $x^r_{j,t}$, is modeled as a linear function of country-specific and global *observed* determinants. This is the crucial equation of the model—the central departure from treating the neutral rate as a purely statistical trend. Relative to the FS model, we add the uncertainty measures $\Delta U_{j,t}$:

$$\begin{aligned} x^r_{j,t} = {} & \beta^u \Delta U_{j,t} + \beta^{sa} \Delta sa_t + \beta^{sd} \Delta sd_t + \beta^{rs} \Delta rs_t \\ & + \beta^{pt} \Delta pt_{j,t} + \beta^{ws} \Delta ws_{j,t} + \beta^{row} g^r_{j,t-1} + \varepsilon^r_{j,t}, \end{aligned} \tag{4}$$

where $\Delta U_{j,t}$ encompasses the uncertainty measures (either country-specific or global variables); Δsa_t, Δsd_t, and Δrs_t are the global supply of safe assets, the convenience yield, and safe-asset demand; $\Delta pt_{j,t}$ and $\Delta ws_{j,t}$ are country j's trend productivity growth and working-age population share. The global spillover term

$$g^r_{j,t-1} = \sum_i \omega^j_i \left(\beta^{pt} \Delta pt_{i,t-1} + \beta^{ws} \Delta ws_{i,t-1} \right) \tag{5}$$

is the trade-weighted sum of country-specific determinants from country j's trading partners, with weights ω^j_i, therefore letting a change in neutral rates from abroad feed into country j's neutral

[9] Australia, Canada, Denmark, the euro area, Japan, Norway, New Zealand, Sweden, Switzerland, the United Kingdom, and the United States.

rate through trade linkages, even absent any movement in j's own fundamentals. Finally, $\varepsilon^r_{j,t}$ is a structural disturbance to the neutral rate.

Finally, cyclical unemployment, inflation, and the policy rate follow a VAR(1) subject to structural shocks:

$$\widehat{Y}_{j,t} \;=\; B \cdot \widehat{Y}_{j,t-1} + C \cdot Z_{j,t}, \qquad \widehat{Y}_{j,t} \equiv \left[\widehat{u}_{j,t} \;\; \widehat{\pi}_{j,t} \;\; \widehat{i}_{j,t}\right]', \tag{6}$$

where $Z_{j,t} = \left[x^m_{j,t}\; z^m_{j,t}\; x^u_{j,t}\; z^d_{j,t}\; x^r_{j,t}\; z^s_{j,t}\right]'$ collects six structural shocks: the permanent monetary shock ($x^m_{j,t}$, from Equation 3); a temporary monetary shock ($z^m_{j,t}$); a permanent shock to trend unemployment ($x^u_{j,t}$, from Equation 3); a temporary demand shock following an AR(1) process ($z^d_{j,t}$); the neutral-rate innovation $x^r_{j,t}$ from Equation (4); and a temporary supply shock ($z^s_{j,t}$). The shocks are identified through sign and zero restrictions on the 3×6 loading matrix C; we leave this part of FS's model unchanged and refer the reader to the original paper for its full derivation and identification scheme.

Uncertainty measures and data. The uncertainty determinant $\Delta U_{j,t}$ comprises geopolitical risk (GPR), economic-policy uncertainty (EPU), and trade-policy uncertainty (TPU). GPR enters in either a global form (a single series common to all countries) or a country-specific form, with a distinct series for each country j; EPU and TPU enter only in global form. For each measure we use its trend, rather than the raw index, and we standardize that trend prior to estimation, demeaning it and rescaling it to unit standard deviation, so that all uncertainty elasticities are expressed in comparable units. The country-specific GPR is standardized with a single mean and standard deviation pooled across all countries, so that its elasticity remains comparable across the panel. All remaining determinants are constructed exactly as in FS.

Advantages. As argued by FS, this state-space framework has several advantages over reduced-form or two-step estimates of neutral rates. First, it estimates the trend and cyclical components jointly with the determinant equation (4) by full-information Bayesian methods, thus avoiding the generated-regressor problem inherent in two-step approaches. Second, it pools information across eleven countries and allows changes in neutral rates abroad to propagate to globally even absent any change in country j's own fundamentals. Third, it decomposes both the level and the change in neutral rates into an economically interpretable set of determinants.

Specifications. Because entering multiple uncertainty measures jointly risks collinearity and dilutes the signal in any one measure, we estimate one specification per measure of uncertainty, adding a single uncertainty determinant to the baseline FS determinant set at a time, before

Table 1: WHICH UNCERTAINTY MEASURES MATTER FOR r^*?

Uncertainty Measure	Posterior β: Median (Std)	ΔMgLike
Geopolitical Risk (GPR)	0.034 (0.017)	3.34
GPR — Non-Oil Episodes	0.037 (0.017)	2.67
GPR — Oil Episodes	0.018 (0.018)	0.02
GPR — Country-Specific	0.023 (0.014)	0.84
Economic Policy Uncertainty (EPU)	−0.002 (0.017)	0.28
Trade Policy Uncertainty (TPU)	0.021 (0.017)	1.17

NOTE: Each row is a separate one-measure specification (baseline determinants plus the named uncertainty measure); GPR variants are estimated in place of, not alongside, headline GPR. All uncertainty measures are standardized trends with prior $\mathcal{N}(0, 0.02)$. ΔMgLike is the posterior log data density (modified harmonic mean) of the unrestricted specification minus that of the corresponding specification with the uncertainty elasticity restricted to zero; positive values favor including the measure.

combining the measures found to matter.

Estimation and prior distributions. We estimate the model by full-information Bayesian methods, matching, for each of the eleven economies, four observable variables: the unemployment rate, the inflation rate, the policy interest rate, and long-term inflation expectations. All uncertainty elasticities receive a $\mathcal{N}(0, 0.02)$ prior, uninformative about sign and centered at FS's baseline of no effect. Because each uncertainty trend is standardized, a coefficient of 0.02 implies that a one-standard-deviation increase in the measure moves neutral rates by two basis points per period. For all remaining parameters, we adopt the same prior distributions as FS. Our sample spans the first half of 1960 to the second half of 2026. For each specification, we simulate the posterior distribution with 1.5 million of draws.

V.B. Geopolitical Risk and Trade Policy Uncertainty Matter for Neutral Rates

For each uncertainty measure, Table 1 reports the posterior median and standard deviation of its elasticity β, together with the change in the model's log marginal likelihood (ΔMgLike) relative to a specification that fixes the same elasticity at zero, a Bayes-factor test of whether the data prefer including that determinant at all.[10]

Headline geopolitical risk shows the strongest evidence. Its posterior elasticity moves to 0.03 from a zero-centered prior, and including it raises the log marginal likelihood by 3.34 relative to the restricted model (ΔMgLike = 3.34), a Bayes factor of roughly 28 in favor of including GPR

[10]We use the modified harmonic mean measure for the marginal likelihood.

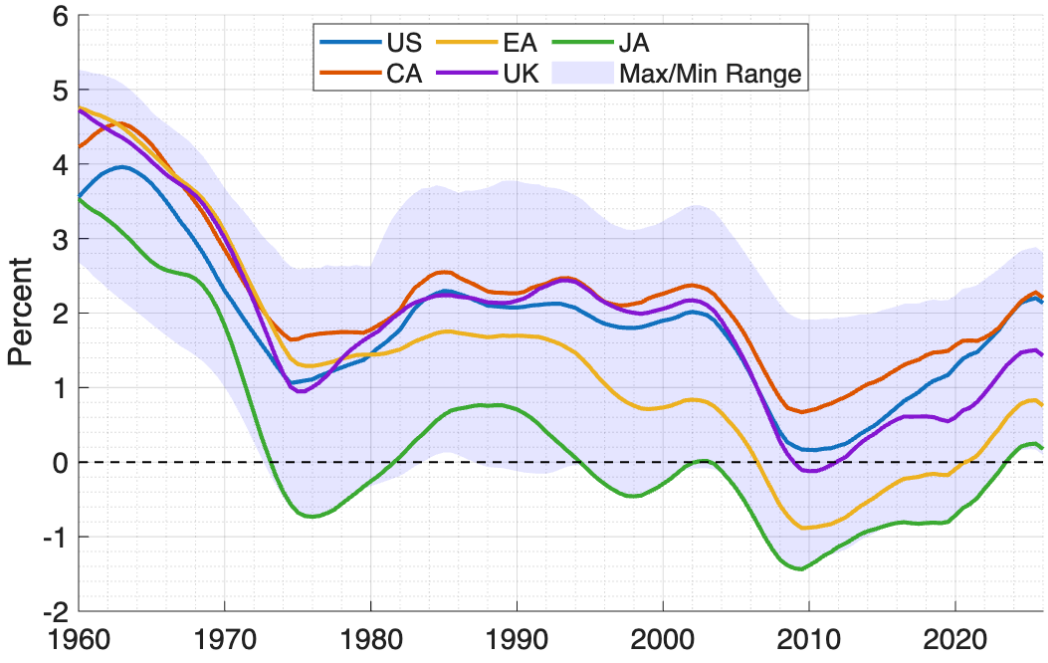
and thus "strong" evidence on the Kass–Raftery scale. Decomposing GPR by types, we find that this signal is driven mostly by non-oil geopolitical risk ($\beta = 0.04$, $\Delta\text{MgLike} = 2.67$) rather than oil-related ones ($\beta = 0.02$, $\Delta\text{MgLike} \approx 0$), and that the aggregate headline index outperforms the country-specific GPR variant ($\Delta\text{MgLike} = 0.84$). Trade-policy uncertainty is the next most informative measure ($\beta = 0.02$, $\Delta\text{MgLike} = 1.17$). Economic-policy uncertainty, by contrast, shows essentially no relationship with neutral rates: its posterior elasticity is indistinguishable from zero, and the marginal-likelihood gain from including it is negligible ($\Delta\text{MgLike} = 0.28$).

Taken together, these results indicate that geopolitical risk and trade-policy uncertainty are the two global uncertainty measures with a meaningful, data-supported relationship with neutral rates, whereas economic-policy uncertainty is not. In the remainder of the paper, we therefore use the specification that includes both headline GPR and TPU jointly.

V.C. Longer-run Neutral Rates Across Advanced Economies

Figure 13 plots the estimated neutral rates from the joint GPR-TPU specification for the five largest economies in our sample (the United States, Canada, the euro area, the United Kingdom, and Japan), together with the cross-country maximum-minimum range across all eleven economies.

Figure 13: LONGER-RUN REAL NEUTRAL RATES ACROSS MAJOR ADVANCED ECONOMIES.



NOTE: Joint GPR-TPU specification.

As in FS, neutral rates decline in two broad waves, in the 1970s and again from the early 2000s,

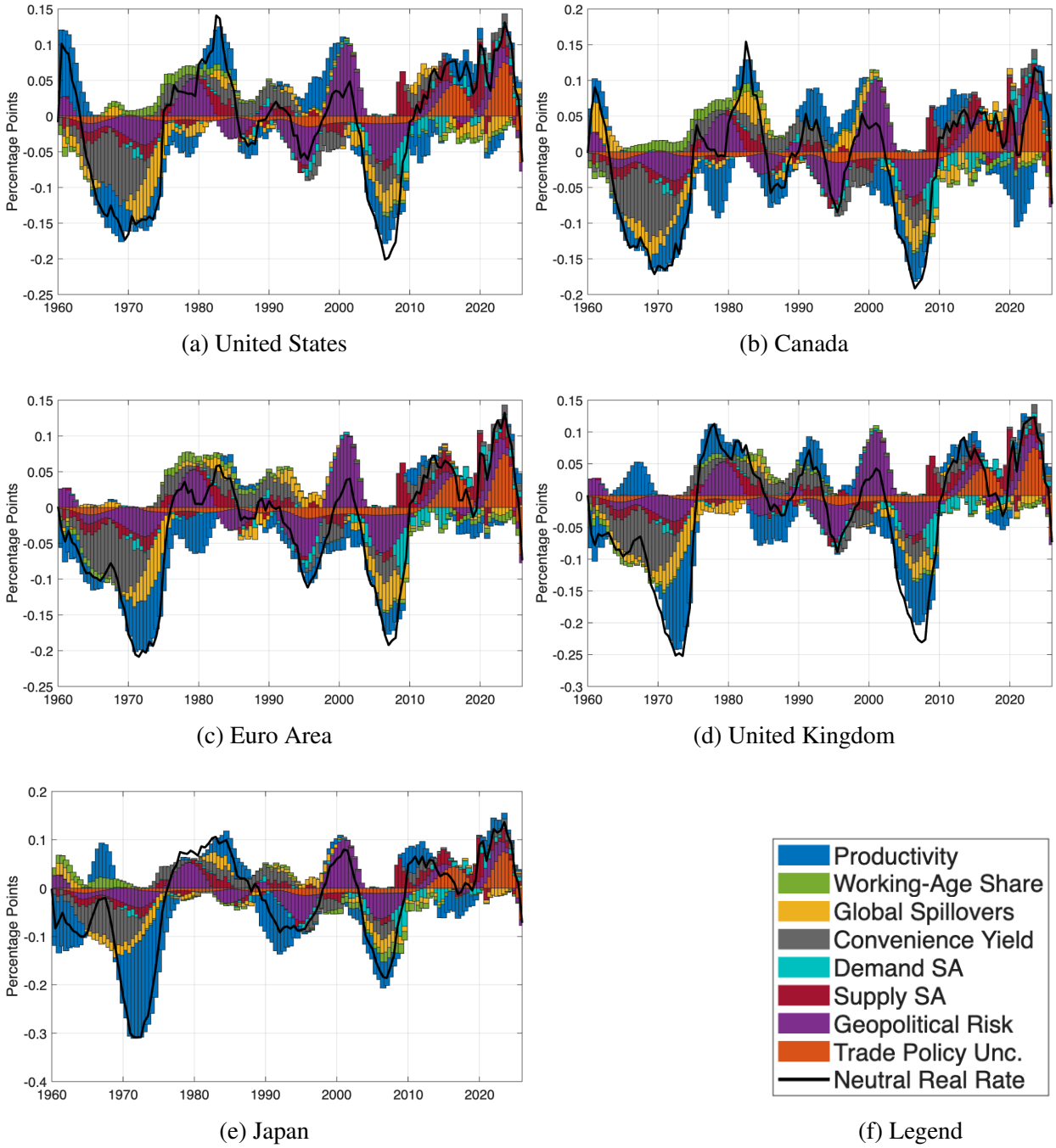
troughing across all five economies between roughly 2009 and 2015. Since then neutral rates have risen steadily in every economy, and the increase becomes more pronounced from 2020 onward. U.S. and Canadian neutral rates rise the most, to just above 2% by the end of the sample, while the euro area and the United Kingdom rise by less, to roughly 0.8–1.5%. Japan's neutral rates are the lowest of the five for most of the sample and ends near zero.

This post-2020 increase coincides with the period over which our uncertainty determinants switch from contributing negatively to neutral rates to pushing them up, a link we quantify directly in the next section.

V.D. Determinants of Neutral Rates Over Different Periods

Figure 14 decomposes the semiannual change in neutral rates into determinant contributions for the five major economies from the joint GPR-TPU specification.

Figure 14: HISTORICAL DECOMPOSITION OF CHANGES IN NEUTRAL REAL RATES.



(a) United States (b) Canada

(c) Euro Area (d) United Kingdom

(e) Japan (f) Legend

The shifting mix of colors across periods is itself the main takeaway of the figure: every determinant contributes materially to neutral rates at some point in the sample, yet these contributions frequently offset one another. The role of geopolitical risk (purple) and trade-policy uncertainty (orange) changes character over the sample. Before the mid-2000s these measures move in opposite directions; from around 2008 onward, however, both become persistent positive contributors in

every economy, and their combined contribution to neutral rates is most visible from 2020.

Table 2 reports the same decomposition cumulated over five sub-periods. GPR and TPU contribute identically to every economy in percentage-point terms: -0.4 and -0.1 percentage points, respectively, over 1960–1974, fading to roughly zero by the 1990s, then turning positive and adding a combined 0.3 percentage points over 2008–2019 and 0.5 percentage points from 2020 onward. This post-2020 contribution accounts for roughly half or more of the total rise in neutral rates in every one of the five economies.

Table 2: DETERMINANTS OF CHANGES IN LONGER-RUN NEUTRAL RATES, BY ERA

	1960–1974	1975–1994	1995–2007	2008–2019	2020–LastObs
GLOBAL DETERMINANTS *(common to all economies)*					
SA Supply	-0.3	0.2	-0.1	0.4	0.2
SA Demand	0	0	-0.1	-0.3	0.1
Convenience Yield	-1.2	0.7	-0.4	0.2	0.1
hlrow Geopolitical Risk	-0.4	0	0.2	0	0.2
hlrow Trade Policy Unc.	-0.1	-0.2	-0.3	0.3	0.3
COUNTRY-SPECIFIC DETERMINANTS					
United States					
Productivity	-0.1	0	0	0	0
Working Age Share	0.1	0.3	0	-0.1	-0.1
Global Spillovers	-0.5	-0.1	-0.3	-0.1	-0.1
Other Factors	0.1	0.1	-0.4	0.2	0.2
Total Change	**-2.6**	**1**	**-1.4**	**0.5**	**0.9**
Canada					
Productivity	-0.4	-0.2	-0.4	0.1	-0.3
Working Age Share	0.2	0.3	0	-0.2	-0.1
Global Spillovers	-0.1	0.1	0	-0.2	0
Other Factors	-0.1	-0.2	-0.3	0	0.1
Total Change	**-2.6**	**0.8**	**-1.3**	**0.4**	**0.7**
Euro Area					
Productivity	-1	-0.6	-0.5	0	0
Working Age Share	-0.1	0.3	0	-0.1	-0.1
Global Spillovers	-0.3	0	-0.2	-0.1	-0.1
Other Factors	0.1	-0.3	-0.3	-0.1	0.1
Total Change	**-3.5**	**0.1**	**-1.7**	**0.2**	**0.9**
United Kingdom					
Productivity	-0.7	0.1	-0.6	-0.1	0.1
Working Age Share	-0.2	0.2	0	-0.1	-0.1
Global Spillovers	-0.5	-0.2	-0.2	-0.1	-0.1
Other Factors	-0.3	0.4	-0.3	-0.2	0
Total Change	**-3.8**	**1.3**	**-1.8**	**0**	**0.9**
Japan					
Productivity	-2.2	-0.8	-0.5	-0.1	0.2
Working Age Share	0.3	0	-0.2	-0.2	0
Global Spillovers	-0.2	0.1	-0.1	-0.1	-0.1
Other Factors	0.1	0.7	0.3	0.2	-0.1
Total Change	**-4.1**	**0.6**	**-1.2**	**0.3**	**1**

Note: Cumulative contributions (percentage points) to the change in neutral rates over each sub-period, at the posterior median. Global determinants (top block) take a common value and elasticity across economies and are shown once; shaded rows are the two uncertainty measures, geopolitical risk (GPR) and trade-policy uncertainty (TPU). Negative contributions are printed in red.

VI. Conclusion

This paper has examined how geopolitical uncertainty affects inflation, distinguishing between domestic economic policy uncertainty and geopolitical risk, and between supply-side and demand-side transmission channels. The central message is that uncertainty is not a monolith: its macroeconomic effects depend critically on its source, and a policy response calibrated to one type of uncertainty shock may be inappropriate for another.

At the aggregate level, economic policy uncertainty is disinflationary while overall geopolitical risk has no significant effect on inflation. But this aggregate picture obscures important heterogeneity. EPU from national security reduces inflation, consistent with risk premium channels that depress investment and consumption without disrupting supply chains. Trade policy uncertainty, by contrast, raises inflation, consistent with the cost-push effects of import tariffs, strategic pricing, and supply chain disruptions. Among geopolitical risk sources, oil-related conflicts raise inflation initially but then have disinflationary effects, while non-oil-related geopolitical tensions have modest disinflationary effects.

The analysis of transmission channels confirms the central role of import prices in mediating geopolitical energy shocks, and reveals that business sentiment amplifies these effects in economically significant ways.

A novel contribution of our paper is the analysis of the impacts of uncertainty on the neutral rate of interest, which adds an important longer-run dimension and allows us to offer conclusions for monetary policy making. We find that both geopolitical risk and trade policy uncertainty have raised neutral rates since the global financial crisis, accounting for roughly half or more of the post-2020 increase across major advanced economies.

What do these findings imply for monetary policy? Three lessons stand out. First, geopolitical uncertainty should not induce inaction. When geopolitical fog descends, the appropriate response is not to idle at the side of the road; the direction in which to move can be identified by understanding the dominant transmission channel of the shock. National security uncertainty calls for accommodative policy to counter demand weakness; oil-price geopolitical shocks call for vigilance against second-round inflationary effects; trade policy uncertainty requires careful balancing of supply-side inflationary pressure against demand effects that may lag.

Second, geopolitical shocks are unlikely to have one-time effects. Retaliation dynamics can amplify and extend the initial shock; sentiment feedback loops mean that initial price responses may be amplified over time as confidence deteriorates; supply-chain spillovers spread the initial disruption to sectors beyond those directly affected.

Third, the source of the shock matters for credibility and expectations anchoring. Beckmann and Czudaj (2026) show that central bank credibility is the key buffer against the inflationary

consequences of uncertainty. This suggests that in periods of elevated geopolitical risk, maintaining clear communication about the inflation target and demonstrating a willingness to act is especially important.

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