Macrofinancial Stability Amid High Global Economic Uncertainty

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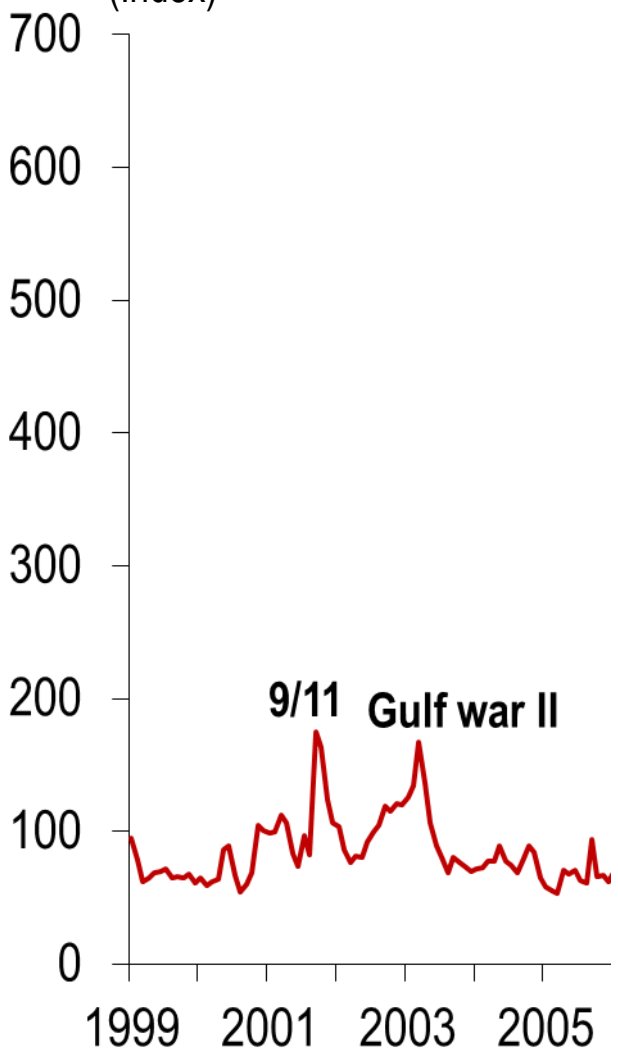
Disclaimer: This presentation draws on Chapter 2 of the IMF's October 2024 Global Financial Stability Report. The views presented here are of the presenter and do not necessarily reflect the official views of the International Monetary Fund, its executive board, or its management.

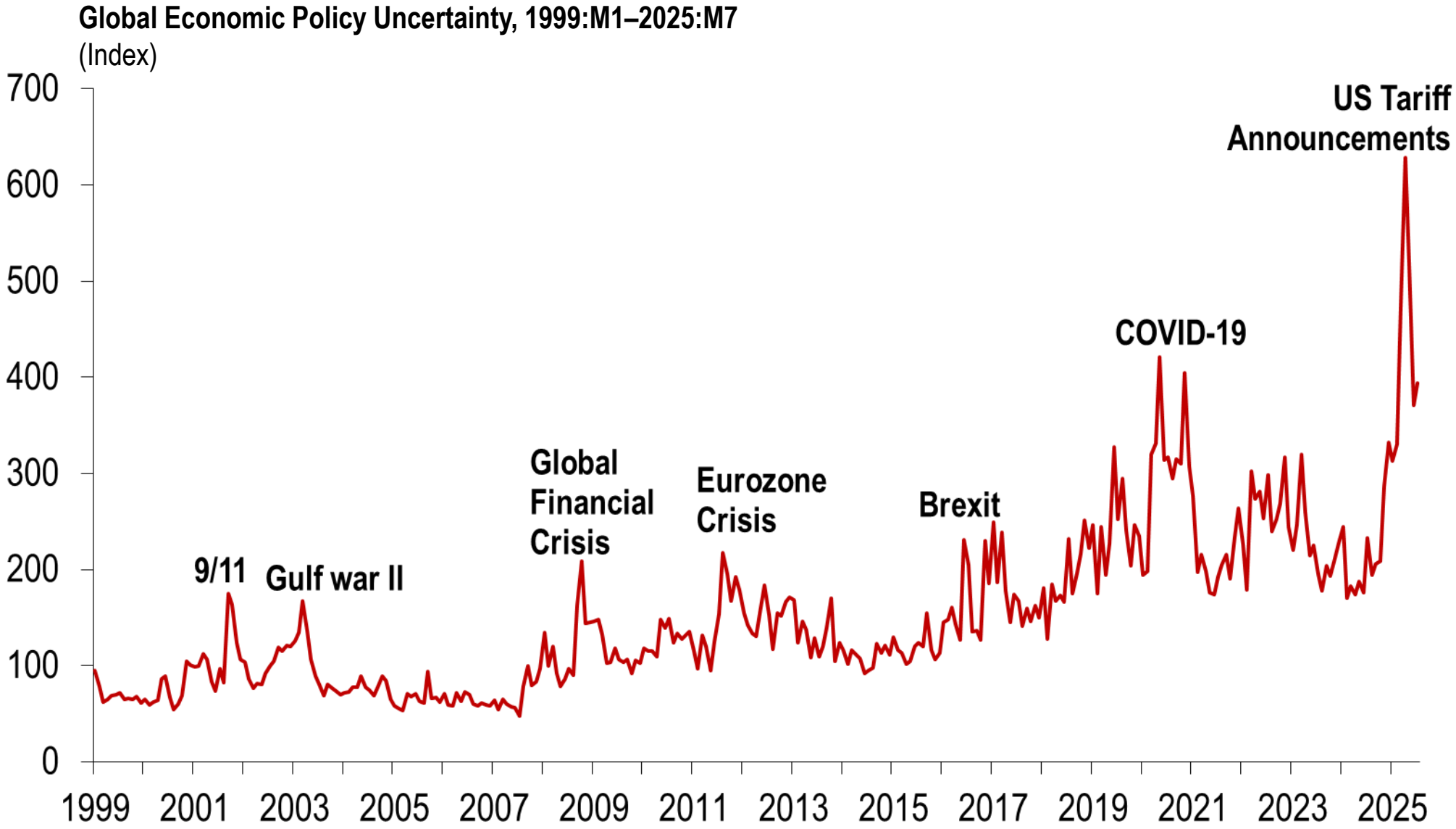
Global economic uncertainty has increased…

Global Economic Policy Uncertainty, 1999:M1–2005:M12



Source: Baker et al. (2016).

Global economic uncertainty has increased…

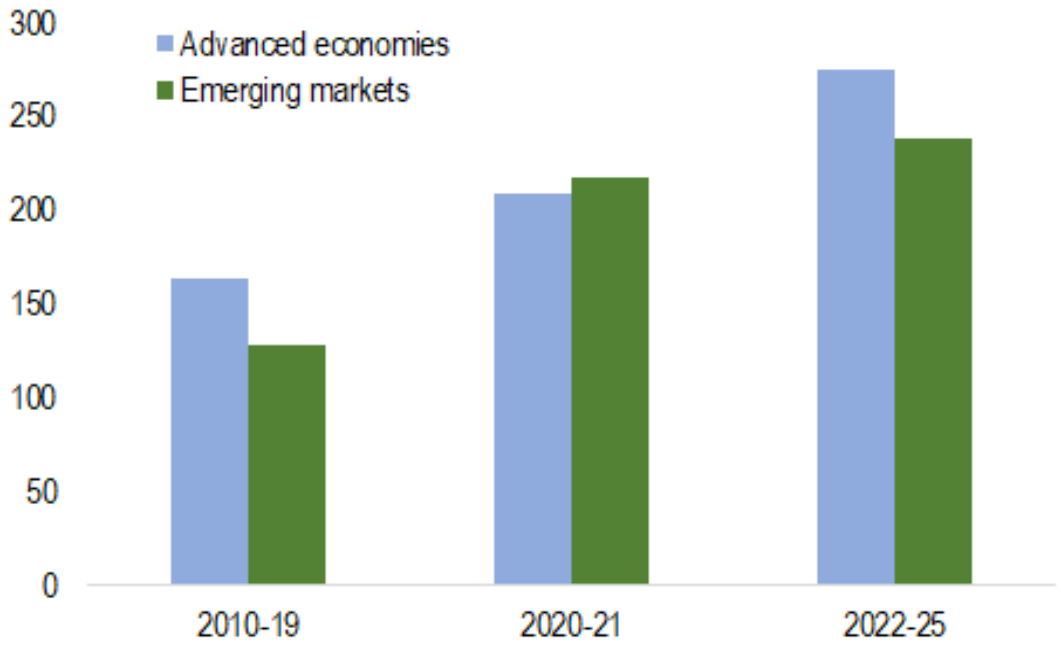


Source: Baker et al. (2016).

…and remains elevated across countries

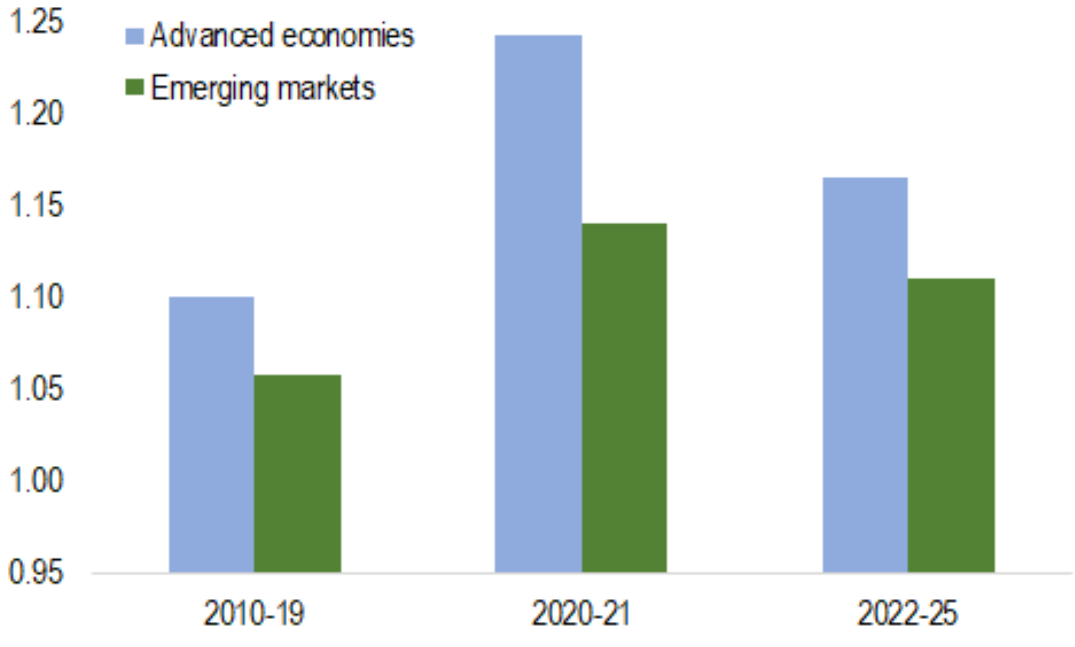
Policy uncertainty has increased in both advanced and emerging markets . . .

Global Economic Policy Uncertainty, 2010:M1–2025:M7
(Index)



. . . along with uncertainty around the macroeconomic outlook.

Real Economic Uncertainty Index, 2010:M1–2025:M7
(Index)



Sources: Baker et al. (2016); IMF staff calculations for 12-month ahead economic uncertainty based on Jurado et al. (2013), "Measuring Uncertainty."

High economic uncertainty can affect macro-financial stability…

- **… through three main channels**:
  - **Market channel**: Amplify the impact of adverse shocks on investor sentiment, exacerbating downside market tail risks.
  - **Real channel**: Delay private sector consumption and investment, slowing economic activity and raising credit risk for financial institutions that can in turn trigger an adverse macrofinancial feedback loop.
  - **Credit channel**: Reduce the supply of domestic credit by financial institutions by exacerbating challenges in determining the creditworthiness of new borrowers.

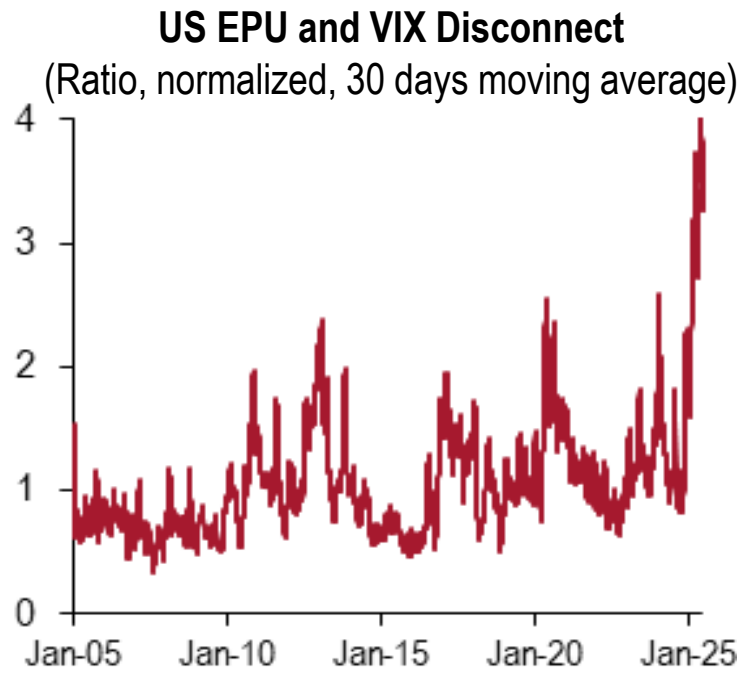
- **Macroeconomic uncertainty can also:**
  - Interact with vulnerabilities in the real and financial sectors to magnify the effect of adverse shocks
  - Spill over across borders.

Financial variables may not fully span macroeconomic uncertainty

- Existing approaches to assess systemic risk typically consider selected financial indicators, including of financial market uncertainty (e.g., the VIX index)...
- …however, financial indicators may not fully span macroeconomic uncertainty (Valkanov & Zhang 2018, Dew-Becker & Giglio 2023)

⇒ measures of macroeconomic uncertainty could help predict tails risks to markets and economic activity

- This may be particularly relevant:
  - For countries with less developed financial markets.
  - In episodes of "macro-market disconnect"—when macro uncertainty is high and financial market volatility (realized and implied) is low.



Key questions

1. Does macroeconomic uncertainty help **predict downside risks** to output?
   - ➢ What are the roles of market and credit channels in transmitting the effects of macroeconomic uncertainty on output?
2. How does macroeconomic uncertainty **interact with macrofinancial vulnerabilities** to affect downside risks to output?
3. Does the effect of macroeconomic uncertainty **spill over across borders** to affect downside risks to economic activity in a country's major financial and trading partners?

❖ Sample: 43 advanced and emerging markets from 1990 onwards.

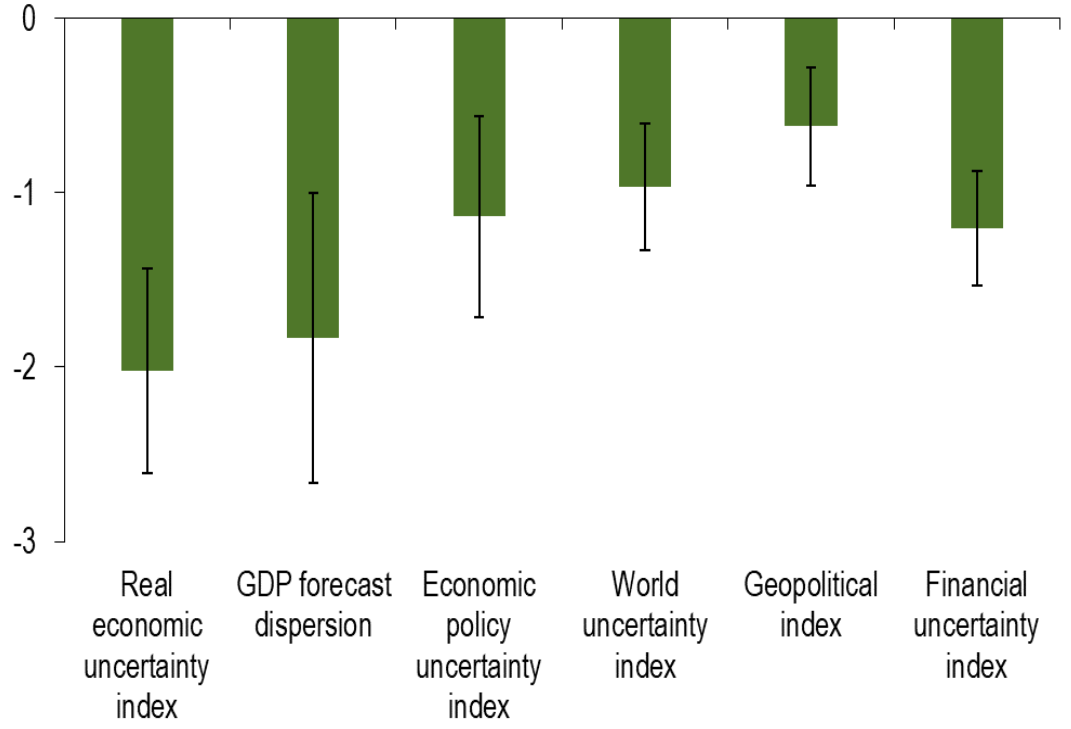
1. Does macroeconomic uncertainty help predict downside risks to output?

Macroeconomic uncertainty predicts downside tail risks to GDP growth

- **Forecast-based measures**
  - **Real economic uncertainty (REU) index**
    Accuracy of forecasts for several macroeconomic variables (Ludvigson et al. 2021)
  - **GDP forecast dispersion**
- **Text-based measures**
  - **Economic policy uncertainty (EPU) index**
    Baker et al. (2016)
  - **World uncertainty index (WUI)**
    Ahir et al. (2022)
  - **Geopolitical risk index**
    Caldara and Iacoviello (2022)
- **Financial uncertainty index**
  Ludvigson et al. (2021)

Measures of macroeconomic uncertainty have a strong impact on downside tail risk to output…

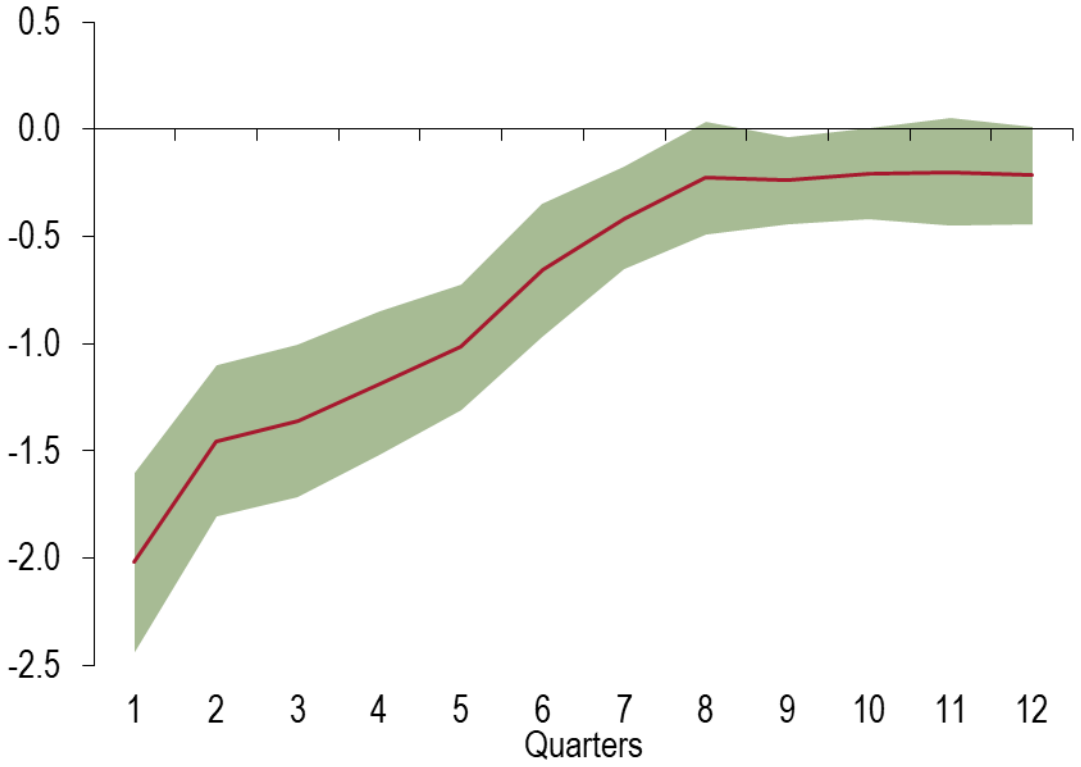
Effect of Measures of Uncertainty on Growth-at-Risk, One Quarter Ahead
(Percentage points, annualized)



The effect on future GDP growth is persistent and asymmetric

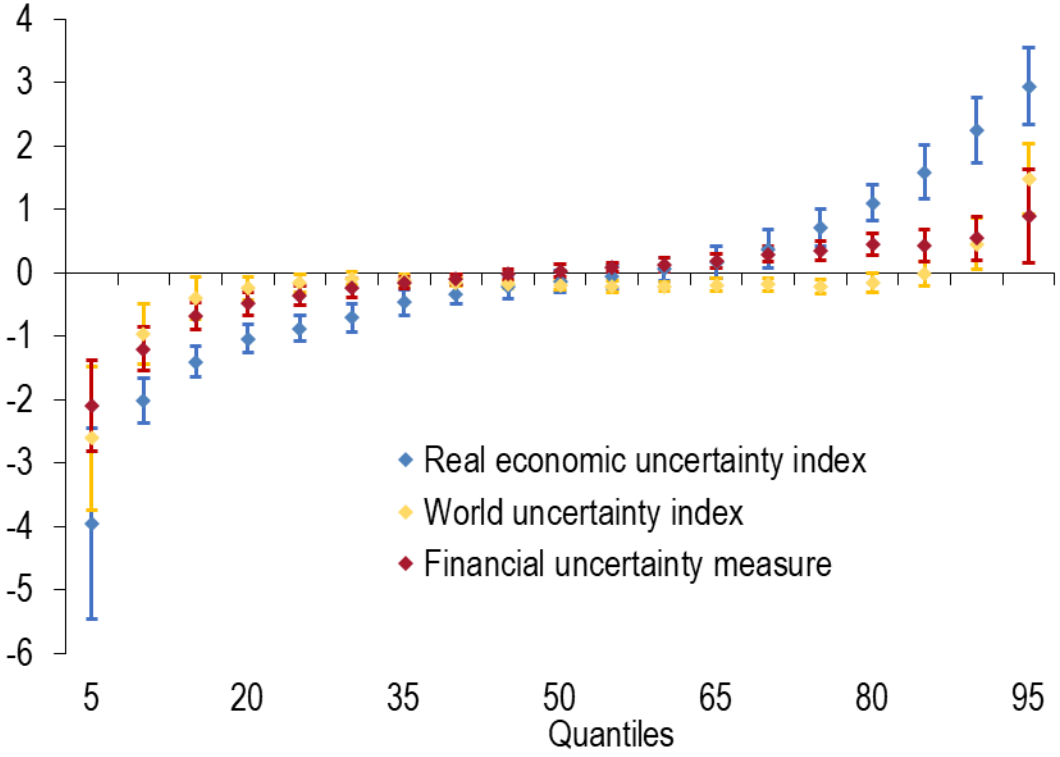
… and effects are persistent up to about seven quarters ahead.

Effect of Real Economic Uncertainty on Growth-at-Risk at Different Horizons
(Percentage points, annualized)



A rise in uncertainty has asymmetric effects on the distribution of future GDP growth.

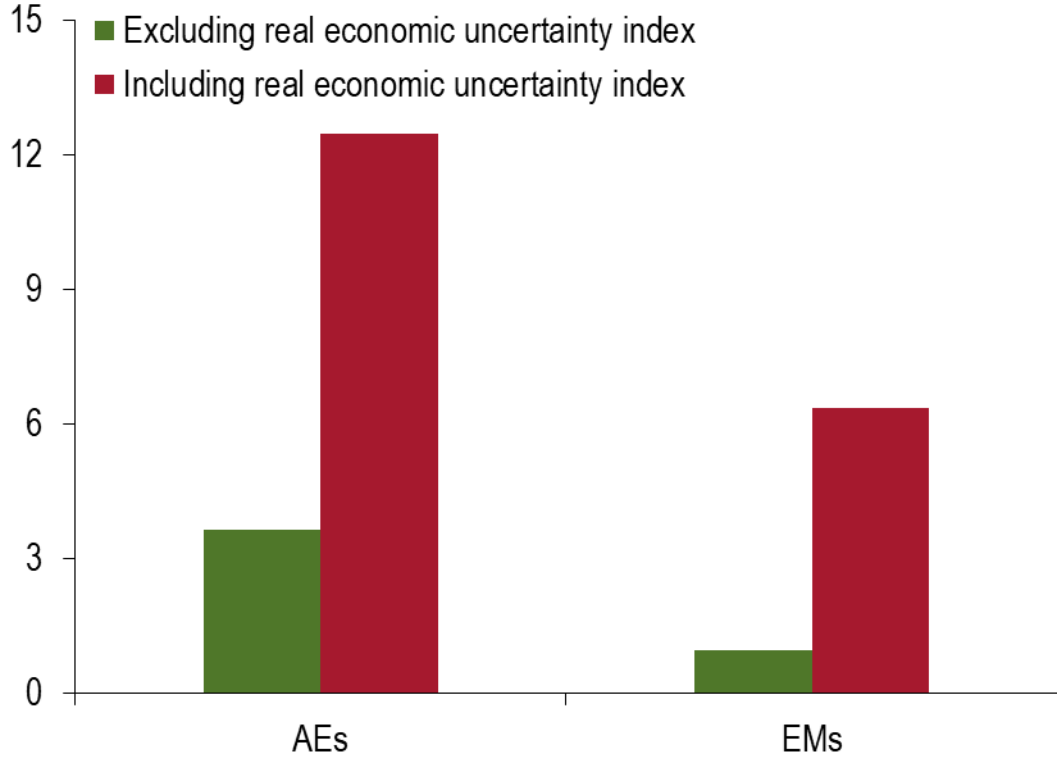
Effect of Uncertainty on Growth-at-Risk, One Quarter Ahead
(Percentage points, annualized)



Macroeconomic uncertainty improves systemic risk prediction

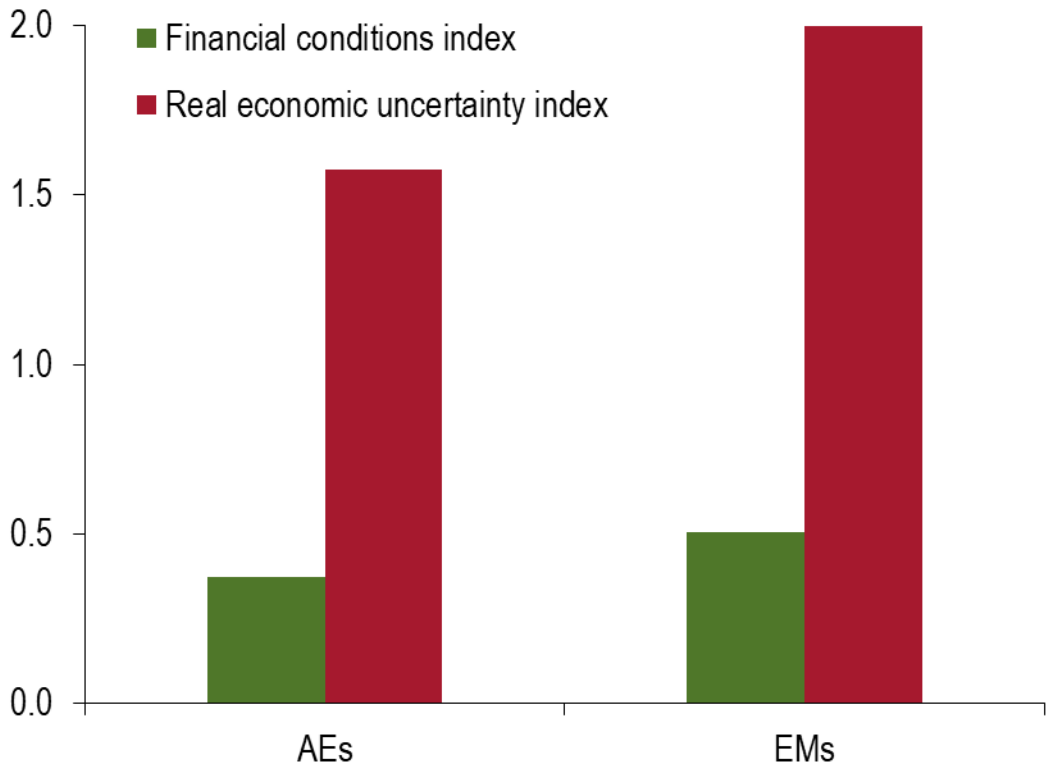
Machine learning tools increase the predictive power of growth-at-risk models, especially when macroeconomic uncertainty is considered…

Machine Learning GaR
(Accuracy change relative to benchmark model, percent)



…and contribute at least as much as the financial conditions index to growth-at-risk

Predictive Importance of Macroeconomic Uncertainty and Financial Conditions, (Average absolute Shapley value, percent)



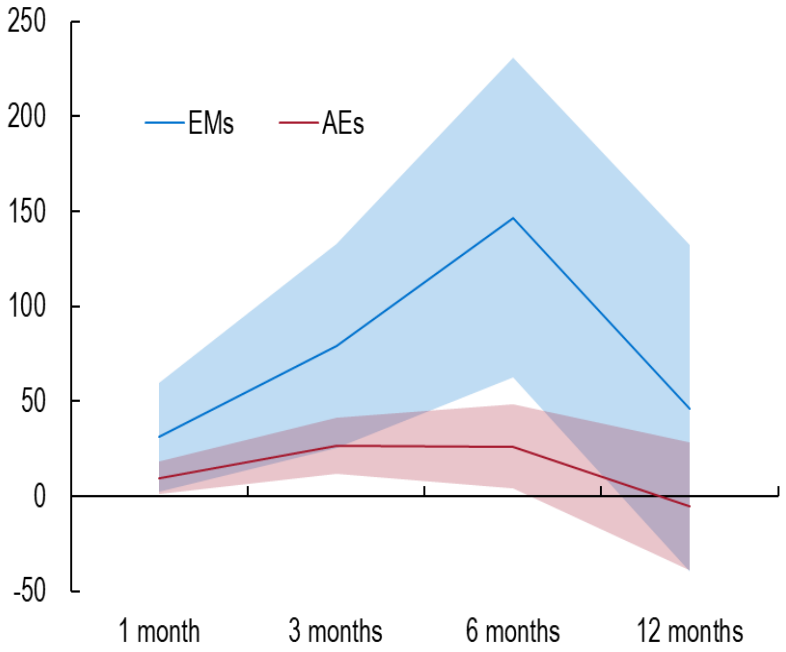
Notes: One-quarter-ahead out-of-sample growth-at-risk forecasts. The bars refer to the change in the forecast accuracy when switching from to the benchmark GaR model to ML-GaR (green) and when adding REU to ML-GaR (red). The results are based on quantile neural network model.

1. **Does macroeconomic uncertainty help predict downside risks to output?**
   - **What are the roles of market and credit channels?**

Macroeconomic uncertainty exacerbates financial market tail risks

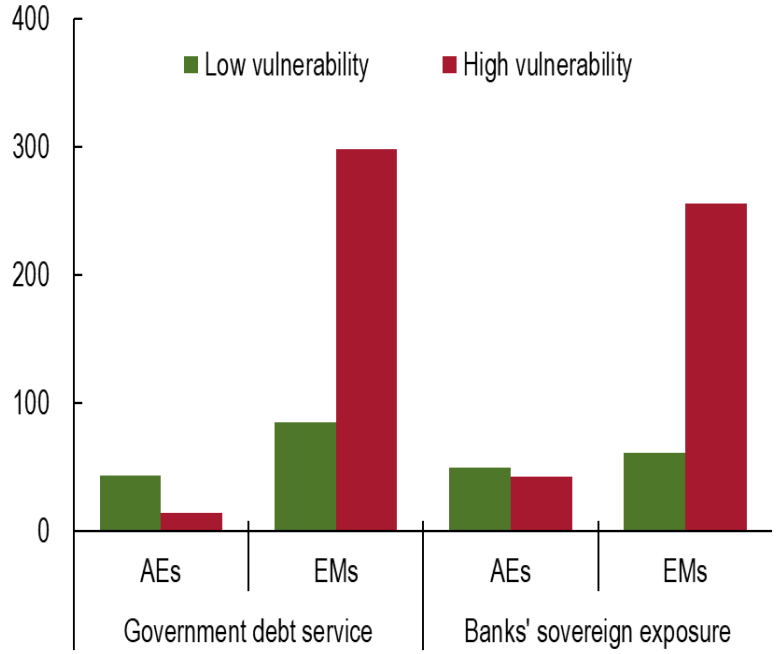
Macroeconomic uncertainty raises upside tail risks of sovereign bond spreads...

Real Economic Uncertainty and Upside Tail Risk to Sovereign Spreads
(Basis points)



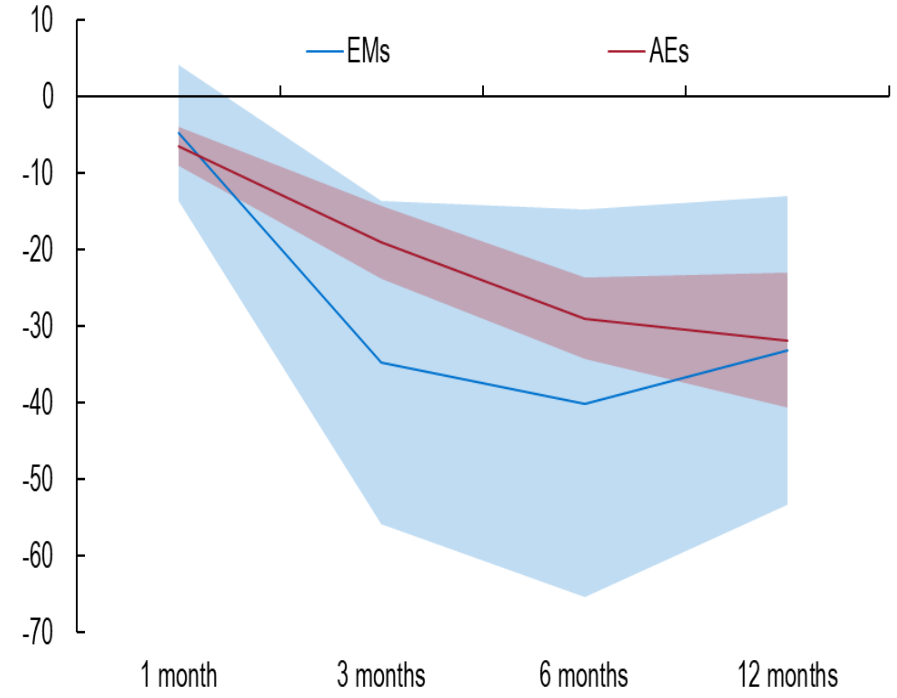
…particularly amid elevated fiscal vulnerabilities…

Real Economic Uncertainty, Fiscal Vulnerabilities, and Upside Tail Risk to Sovereign Spreads, Three Months Ahead
(Basis points)



…while raising downside tail risks to stock market returns.

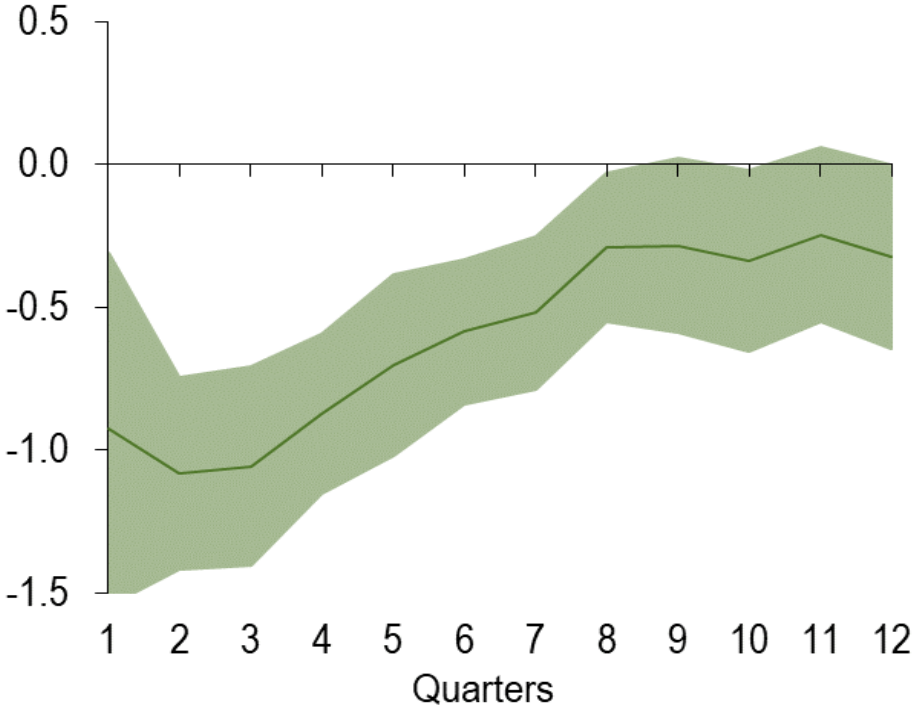
Real Economic Uncertainty and Downside Tail Risk to Stock Market Returns
(Percentage points)



Macroeconomic uncertainty raises downside risks to bank lending

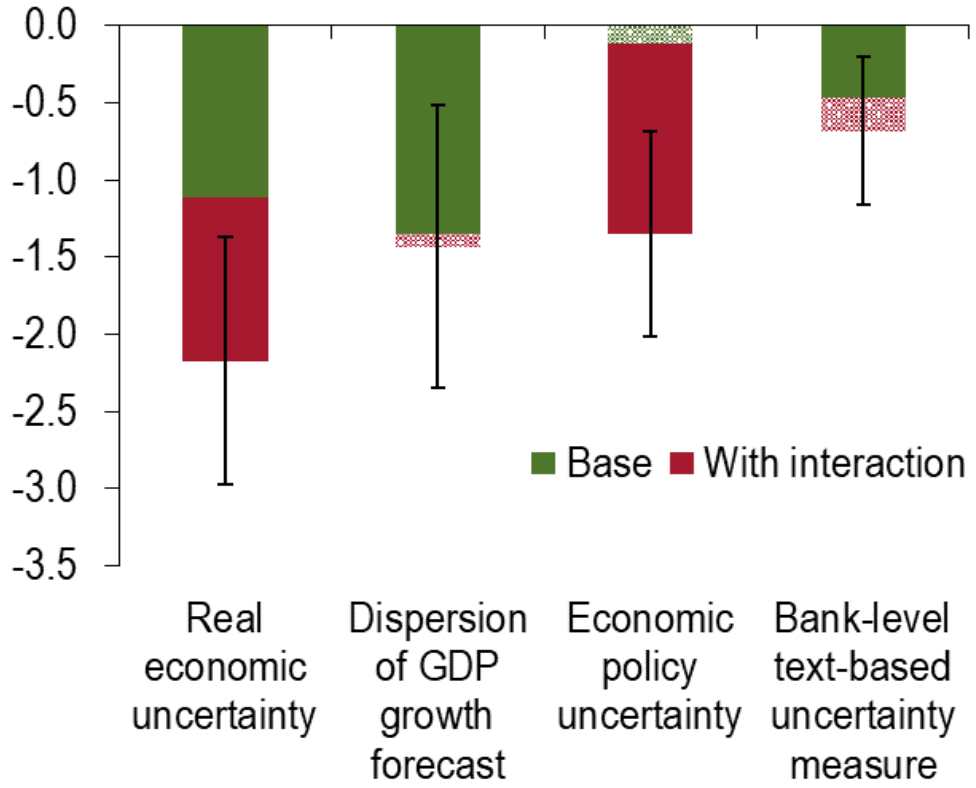
Higher macroeconomic uncertainty is associated with persistently greater downside risks to future credit growth

Real Economic Uncertainty Index and Downside Risks to Bank Lending
(Percentage points, annualized)



… and its effect increases when financial vulnerabilities are high.

Amplification Effect from Exposure to Sovereign Risk, One Year Ahead
(Percentage points, annualized)

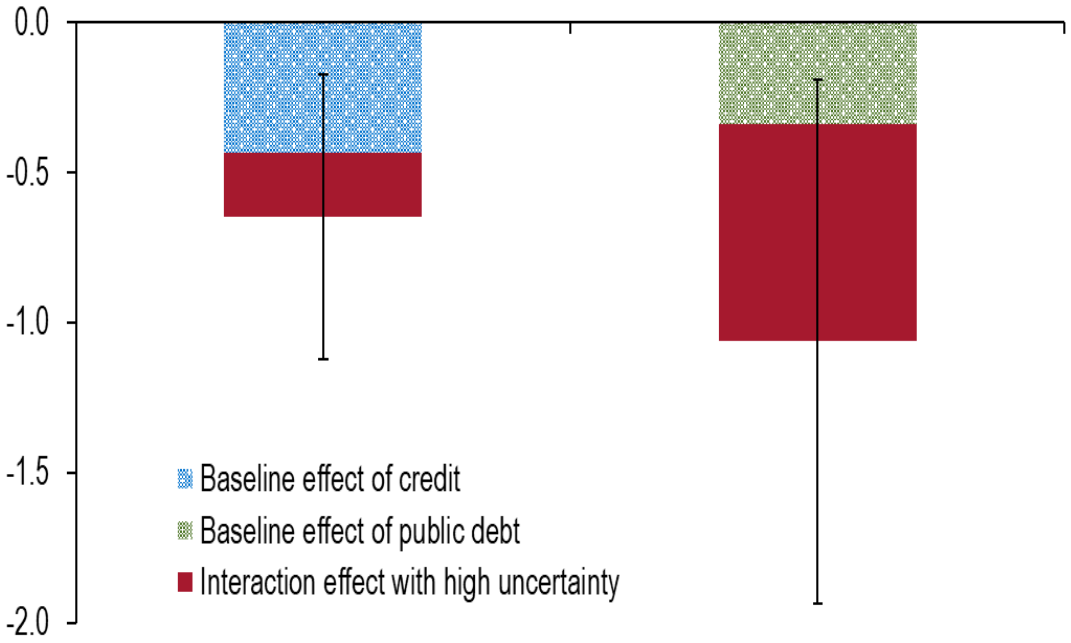


2. How does uncertainty interact with macro-financial vulnerabilities to affect downside risks to output?

Uncertainty amplifies the impact of macro-financial vulnerabilities

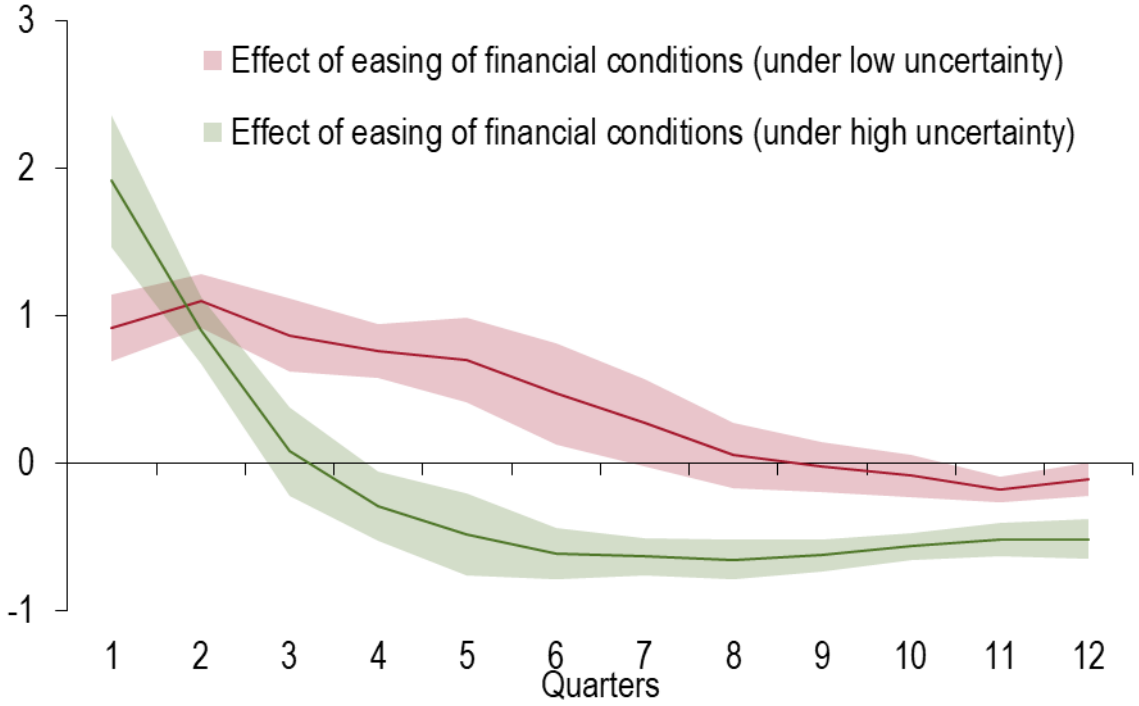
High macroeconomic uncertainty amplifies the effects of excessive credit growth and high public debt levels…

Effect on GaR of Interaction between Real Economic Uncertainty and Public and Private Sector Leverage
(Percentage points, one quarter ahead)



. . . as well as the intertemporal trade-off posed by easy financial conditions on growth-at-risk . . .

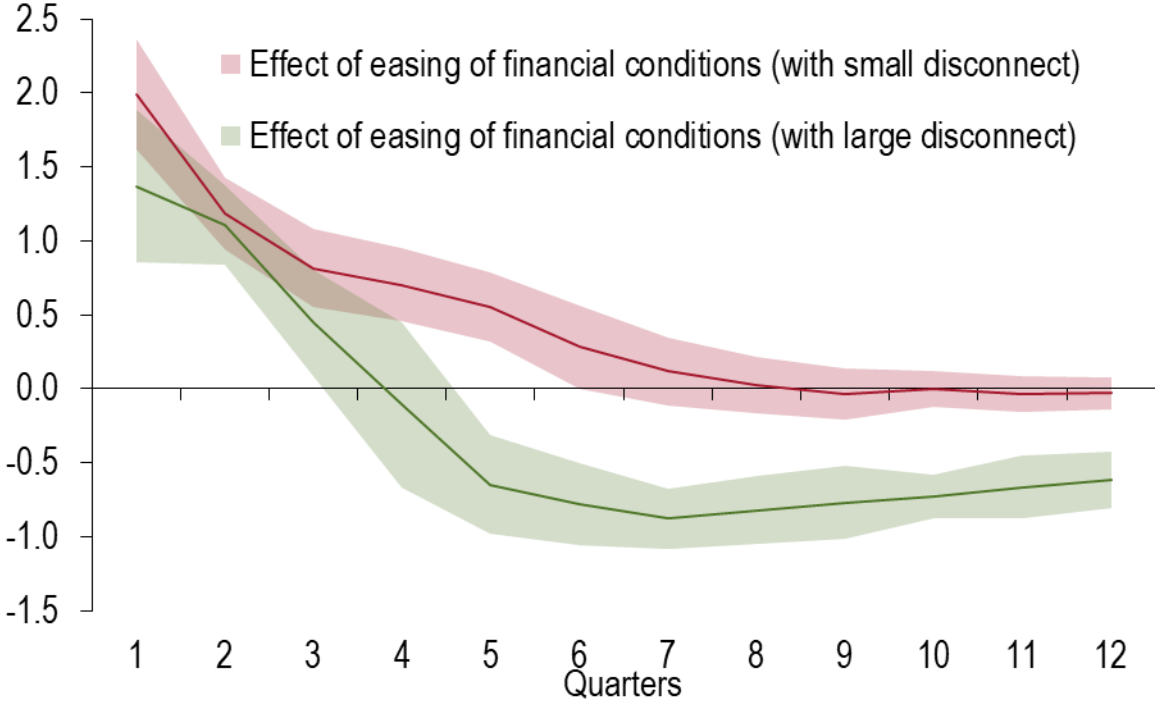
Effect of Easing in Financial Conditions on GaR amid High and Low Real Economic Uncertainty
(Percentage points)



Uncertainty amplifies the impact of macro-financial vulnerabilities

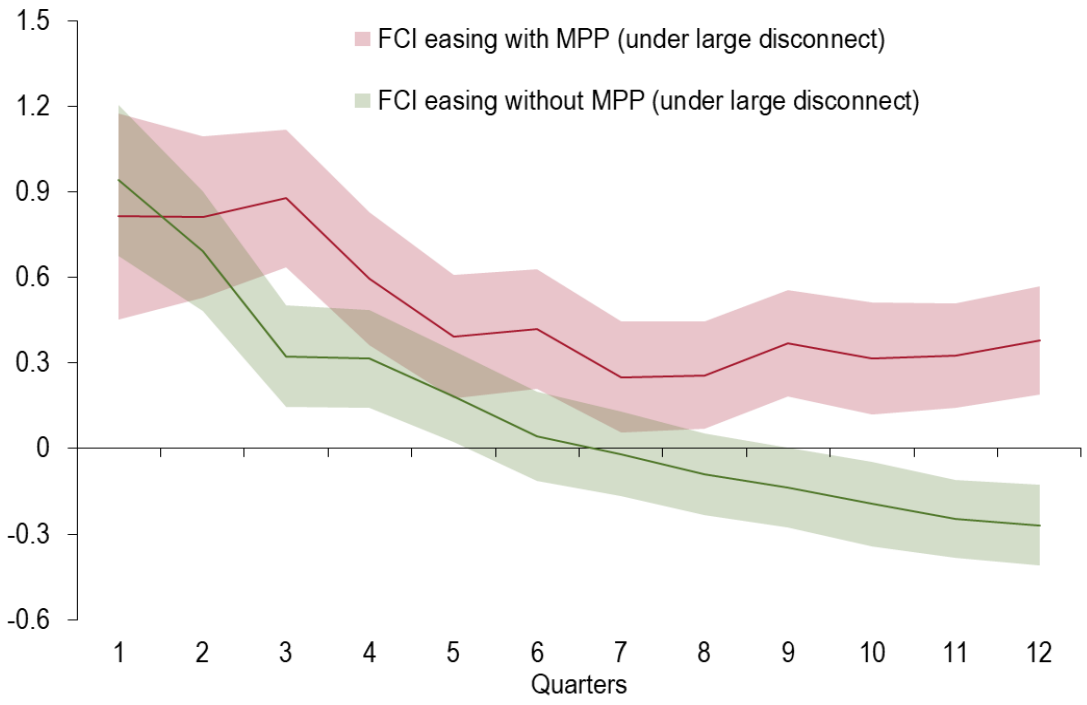
. . . particularly when uncertainty in macroeconomic markets becomes substantially disconnected from that in financial markets.

Effect of Easing in Financial Conditions on GaR amid High and Low Macro-Market Disconnect
(Percentage points)



Macroprudential policies can help mitigate the intertemporal trade-off and maintain financial stability.

Effect of Easing in Financial Conditions on GaR with and without Macroprudential Policies
(Percentage points)

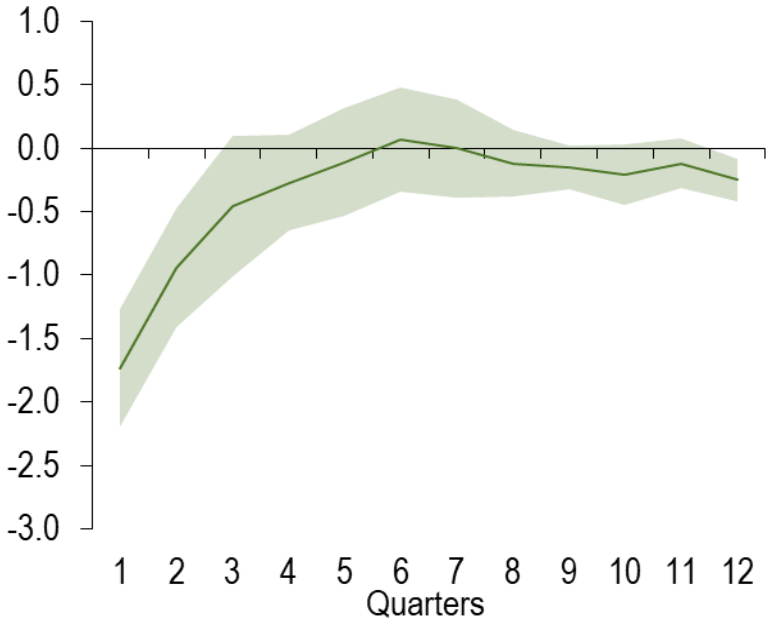


3. Does the impact of macroeconomic uncertainty spill over across borders?

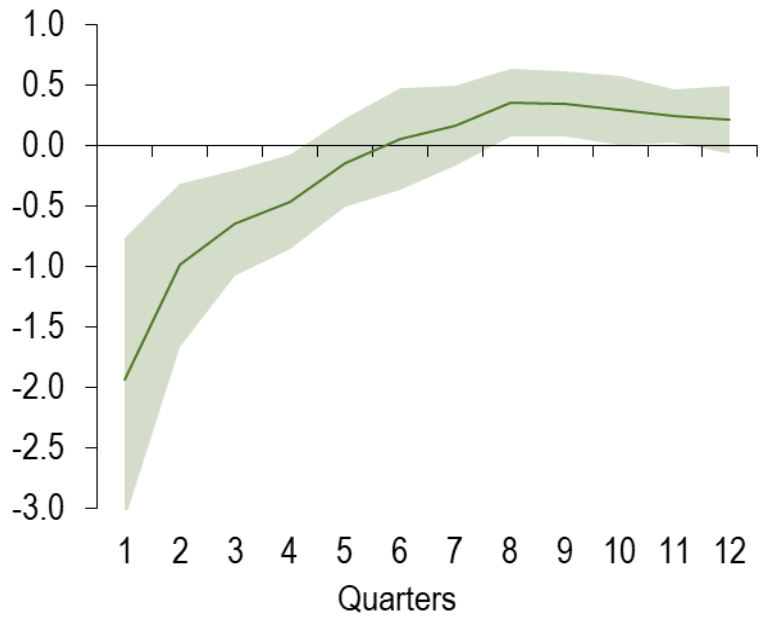
Downside risks of macroeconomic uncertainty could spill over across borders

An increase in real economic uncertainty in a country's major trade and financial partners can raise downside risks to domestic output.

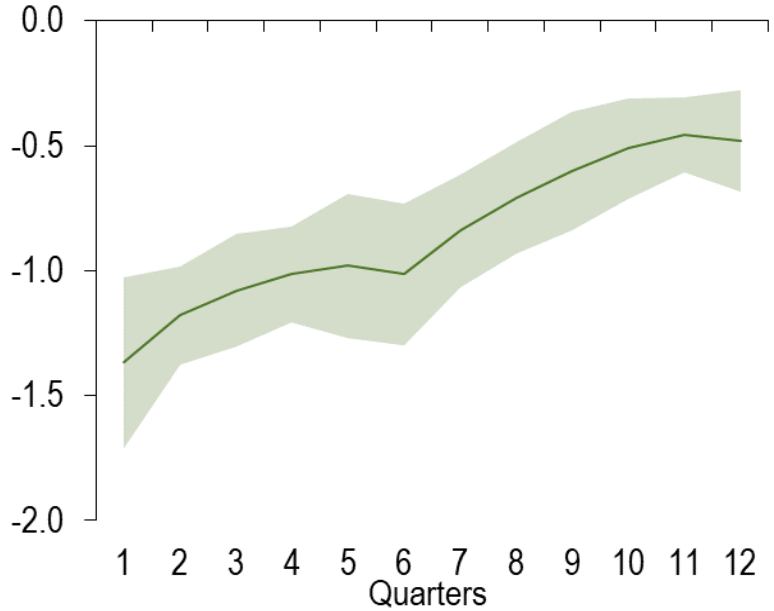
Effect of an Increase in Foreign Real Economic Uncertainty (Weighted by Trade) on GaR
(Percentage points, annualized)



Effect of an Increase in Foreign Real Economic Uncertainty (Weighted by Banking Exposures) on GaR (Percentage points, annualized)



Effect of an Increase in Foreign Real Economic Uncertainty (Weighted by Portfolio Exposures) on GaR (Percentage points, annualized)



- Evidence that these adverse effects could be mitigated by adequate international reserve buffers and greater exchange rate flexibility.

Key Takeaways

Main findings

- High uncertainty about economic fundamentals and policies **increases downside risks** to future real GDP growth, stock and bond market returns, and bank lending.
  - Macrofinancial vulnerabilities can interact with high macroeconomic uncertainty to amplify the effects of adverse shocks on future output growth.
  - An easing of financial conditions amid high macroeconomic uncertainty could exacerbate the intertemporal tradeoff.
- The impact of macroeconomic uncertainty tends to **spill over across borders** through trade and financial linkages, raising the risk of international contagion in the face of large adverse shocks.
- **Macroprudential policies, adequate international reserves, and exchange rate flexibility** can help mitigate the domestic and cross-border effects of macroeconomic uncertainty.

Policy recommendations

- **Reducing policy uncertainty**
  - Credible monetary and fiscal policy frameworks and improved communication can reduce macroeconomic uncertainty and its adverse effects on the economy.
  - A stable financial regulatory framework is important to help mitigate policy uncertainty.
- **Mitigating the financial stability risks associated with macroeconomic uncertainty**
  - Deploy adequate macroprudential and fiscal policies to contain financial stability risks arising from elevated macrofinancial vulnerabilities amid high macroeconomic uncertainty.
  - Ensure that bank and nonbank financial institutions assess their vulnerabilities to cross-border spillovers of spikes in foreign macroeconomic uncertainty.
- **Build adequate financial safety nets to mitigate macrofinancial stability risks**

Thank You!

Additional Slides

Key contributions

- Existing studies
  - mainly focus on the impact of financial factors on systemic risk.
  - examine the effects of macroeconomic uncertainty on mean GDP growth and asset returns (e.g., Caldara et al. 2016, Berger, Dew-Becker and Giglio 2019, Londono et al. 2023) but limited focus on tail risks.
- The chapter extends the existing growth-at-risk (GaR) framework by:
  - explicitly considering macroeconomic uncertainty and financial uncertainty measures beyond VIX.
  - applying machine learning (ML) to better capture nonlinearities and improve predictive accuracy.
  - analyzing cross-border spillovers of uncertainty and interactions with macro-financial vulnerabilities.
- It also examines two key channels through which macroeconomic uncertainty may affect downside risks to future GDP growth: tail risks for markets and bank lending.
- Considers several commonly used macroeconomic uncertainty measures and constructs a new indicator based on banks' earnings calls to assess the impact of banks' sentiment regarding economic uncertainty.

Measures of macroeconomic uncertainty

Uncertainty Measure	Type	Description	References/Source
Macroeconomic	Econometric based	Aggregate of the conditional volatility of the unforecastable component of a set of economic variables	Jurado and others (2015)
	Text based	Share of news articles discussing uncertainty about various aspects of economic policy	Baker and others (2016)
	Survey based	Deviations of macroeconomic data projections	Consensus projections
	Text based	Frequency of the word "uncertainty" in the quarterly Economist Intelligence Unit country reports	Ahir and others (2022)
	Text based	Frequency of words referring jointly to "economic" or "economy"; and "uncertain" or "uncertainty"	Banks' earnings calls transcripts.
	Geopolitical (text-based)	Share of news articles discussing risks from geopolitical events	Caldara and Iacoviello (2022)
Financial	Econometric based	Aggregate of the conditional volatility of the unforecastable component of a set of financial variables	Ludvigson and others (2021)

Growth-at-risk framework

- Benchmark GaR for the h-quarter ahead GDP growth (average), $y_{i,t+h}^{(\tau)}$:

$$y_{i,t+h}^{(\tau)} = f\left(FCI_{i,t}, y_{i,t}, \eta_i\right)$$

  - For main specifications, predict future 10th percentile ($\tau = 0.1$)
  - Estimate on a panel of countries, with country dummies η_i

- Extended model with an uncertainty measure:

$$y_{i,t+h}^{(\tau)} = f\left(FCI_{i,t}, y_{i,t}, \eta_i, \underbrace{Uncertainty_{i,t}}\right)$$

Macroeconomic (based on real outcomes, economic policy, geopolitical)

- Additional extensions:
  - Interaction effects with financial vulnerabilities
  - Cross-border spillover effects across countries

Testing predictive accuracy with Machine Learning-GaR

- **Test two machine learning methods (ML-GaR), on AE and EM panels:**
  1. Quantile random forest
  2. Quantile neural network

- **Compare the forecast accuracy of ML-GaR vs. the benchmark GaR:**

ML-GaR quantile loss

$$Change\ in\ Forecast\ Accuracy = \left(1 - \frac{\sum_{i \in I} \sum_{t=1}^{T(i)-h} \rho_\tau \left(y_{i,t+h} - \hat{y}_{i,t+h,ML}\right)}{\sum_{i \in I} \sum_{t=1}^{T(i)-h} \rho_\tau \left(y_{i,t+h} - \hat{y}_{i,t+h,QR}\right)}\right) * 100\%$$

Benchmark GaR quantile loss

Do financial uncertainty/risk measures fully reflect economic uncertainty?

Uncertainties are regressed on financial factors based on either PCA components of "**risk" variables in Chicago Financial Condition Index** from Brave and Butters (2018) (~92% explained variation) or **"risk" variables** based on data availability for countries besides the United States.

United States

Uncertainty measure	Financial spanning factors	R-squared
Economic policy uncertainty	PCA 1-10 CFCI (Risk factors)	0.38
Real economic uncertainty	PCA 1-10 CFCI (Risk factors)	0.53
Financial uncertainty	PCA 1-10 CFCI (Risk factors)	0.42
Uncertainty, bag-of-words	PCA 1-10 CFCI (Risk factors)	0.35
Dispersion GDP forecasts	PCA 1-10 CFCI (Risk factors)	0.27
Geopolitical uncertainty	PCA 1-10 CFCI (Risk factors)	0.19
Uncertainty, PCA	PCA 1-10 CFCI (Risk factors)	0.38
Uncertainty, PCA macro	PCA 1-10 CFCI (Risk factors)	0.38
Economic policy uncertainty	Risk variables in CFCI	0.78
Real economic uncertainty	Risk variables in CFCI	0.79
Financial uncertainty	Risk variables in CFCI	0.87
Uncertainty, bag-of-words	Risk variables in CFCI	0.59
Dispersion GDP forecasts	Risk variables in CFCI	0.49
Geopolitical uncertainty	Risk variables in CFCI	0.52
Uncertainty, PCA	Risk variables in CFCI	0.78
Uncertainty, PCA macro	Risk variables in CFCI	0.78

Note: CFCI= Chicago Financial Condition Index (Brave and Butters, 2018)

Brazil

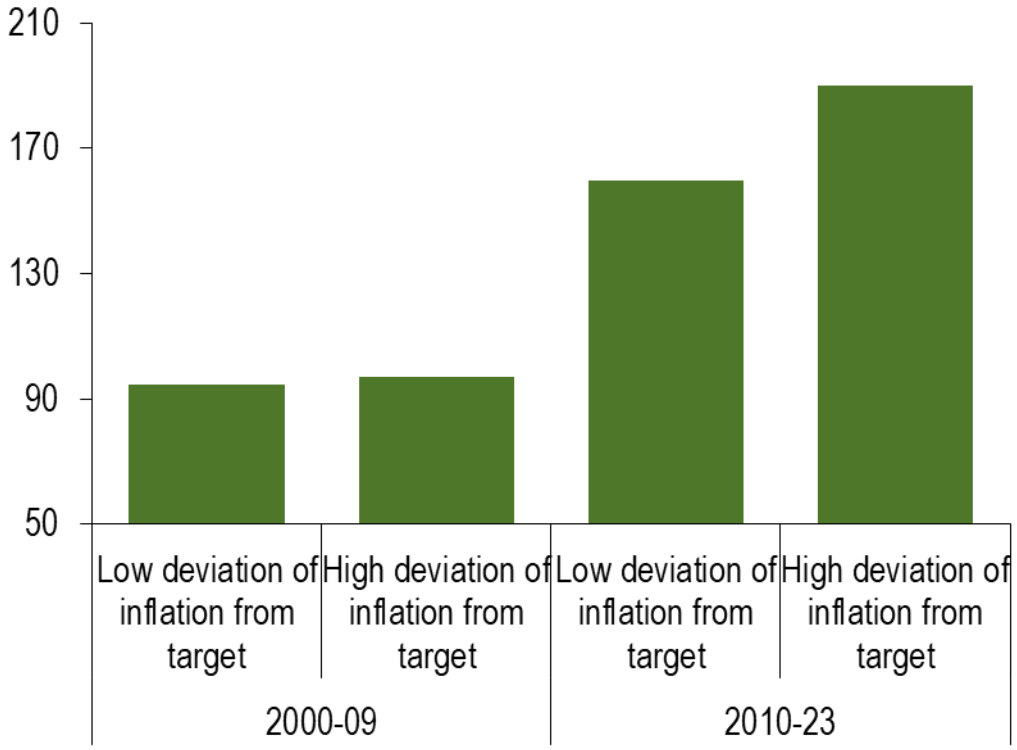
Uncertainty measure	Financial spanning factors	R-squared
Economic policy uncertainty	PCA 1-3 CFCI (Risk factors)	0.12
Real economic uncertainty	PCA 1-3 CFCI (Risk factors)	0.01
Uncertainty, bag-of-words	PCA 1-3 CFCI (Risk factors)	0.09
Dispersion GDP forecasts	PCA 1-3 CFCI (Risk factors)	0.22
Geopolitical uncertainty	PCA 1-3 CFCI (Risk factors)	0.05
Uncertainty, PCA	PCA 1-3 CFCI (Risk factors)	0.10
Uncertainty, PCA macro	PCA 1-3 CFCI (Risk factors)	0.10
Economic policy uncertainty	Risk variables in CFCI	0.54
Real economic uncertainty	Risk variables in CFCI	0.43
Uncertainty, bag-of-words	Risk variables in CFCI	0.34
Dispersion GDP forecasts	Risk variables in CFCI	0.72
Geopolitical uncertainty	Risk variables in CFCI	0.31
Uncertainty, PCA	Risk variables in CFCI	0.51
Uncertainty, PCA macro	Risk variables in CFCI	0.51

➢ Financial factors do not fully span macro and political uncertainty, especially in emerging markets.

- Results relative to real economic uncertainty and financial uncertainty for the US seem consistent with **Dew-Becker, Giglio and Kelly (2021)** using option prices.
- **Valkanov and Zhang (2018)** also highlight that unspanned Knightian uncertainty—uncertainty not explained by market volatility—in areas such as monetary policy, fiscal policy, regulation, national security, and currency can significantly impact stock returns.

Soundness of monetary policy framework helps to mitigate the effect

Average Economic Policy Uncertainty by Soundness of Monetary Policy Framework
(Index, normalized by base period)



Effect of Uncertainty on GaR Conditional on Soundness of Monetary Policy Framework
(Percentage points, annualized)