Discussion of *"Macroeconomic and Financial Risks: A Tale of Mean and Volatility"* *by* Dario Caldara, Chiara Scotti and Molin Zhong

Danilo Leiva-León

Banco de España and European Central Bank

June 12, 2023

12th European Central Bank Conference on Forecasting Techniques

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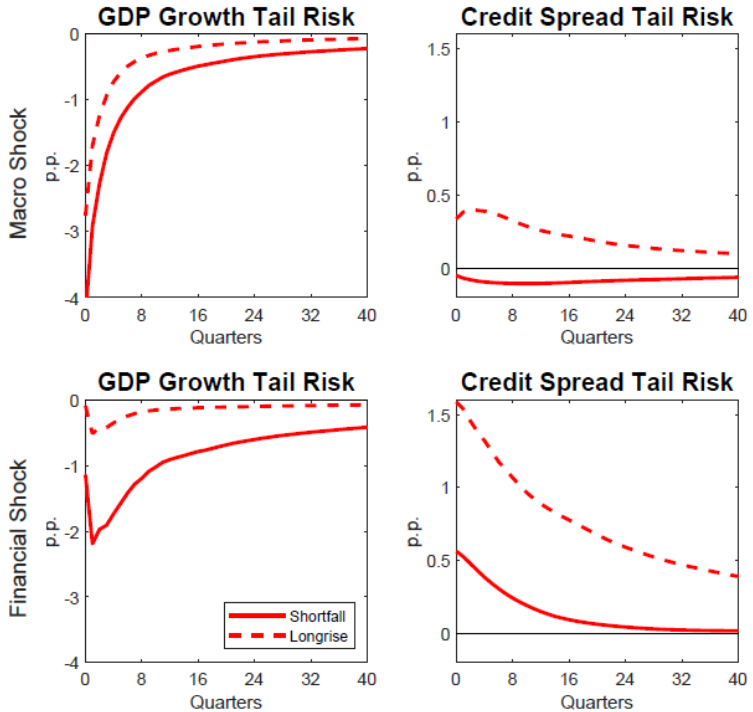
Overview

- **Goal**: Assessing drivers of uncertainty and tail risk of future GDP growth
- **Ingredients**:
  1. BVAR with stochastic volatility and feedback with level - Mumtaz (2018)
  2. Structural shocks - identification based on sign, exclusion and magnitude restrictions
  3. Effect of shocks on tails risks –"Shortfall" and "Longrise"– and uncertainty
- **Results**: Adverse (macro or financial) shocks lead to stronger effect in the left tail (shortfall) than in the right tail (longrise)
  - Timing of macro and financial effects are different

Key Result

THE RESPONSE OF UNCERTAINTY AND TAIL RISK TO SHOCKS



NOTE: The figure plots the responses of GDP growth and spread uncertainty and tail risk to a one standard deviation adverse macro (top row) and financial shock (bottom row) conditioning on 2008:Q4 data and volatility. GDP growth uncertainty and tail risk are computed from conditional densities of annualized average GDP growth between horizon 1 and f, where f denotes the forecast horizon.

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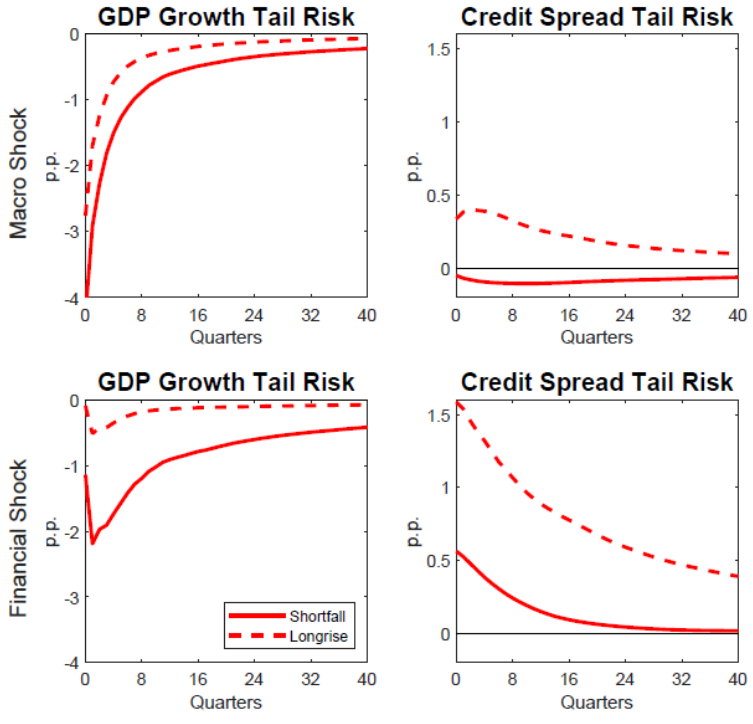

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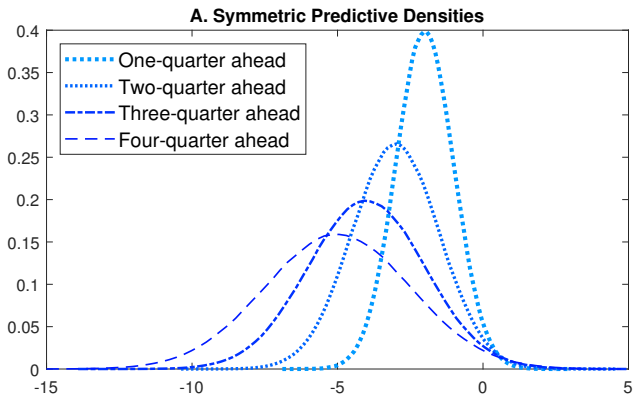
Effect of Shocks on Tail Risk

Figure: Predictive densities based on simulated data



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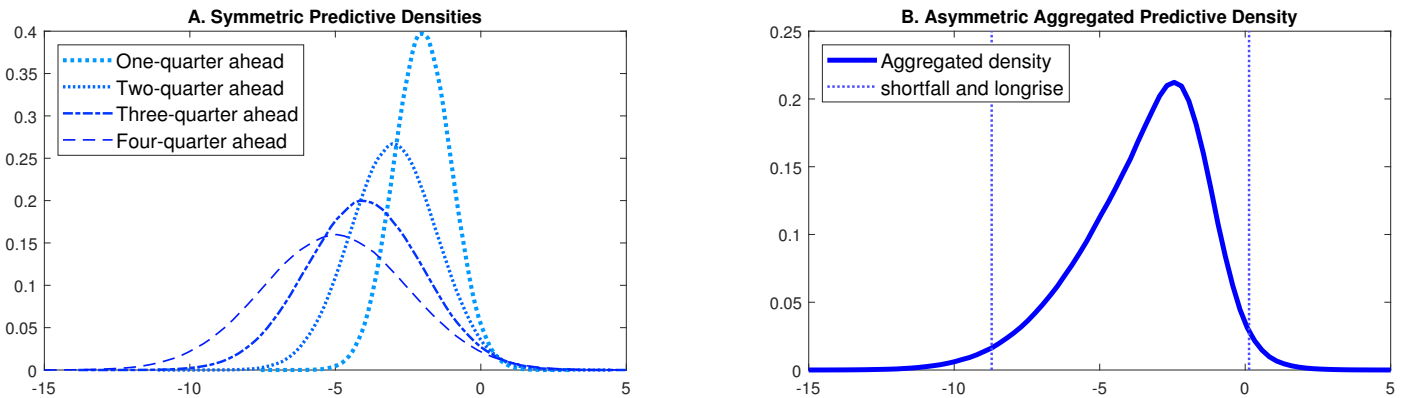

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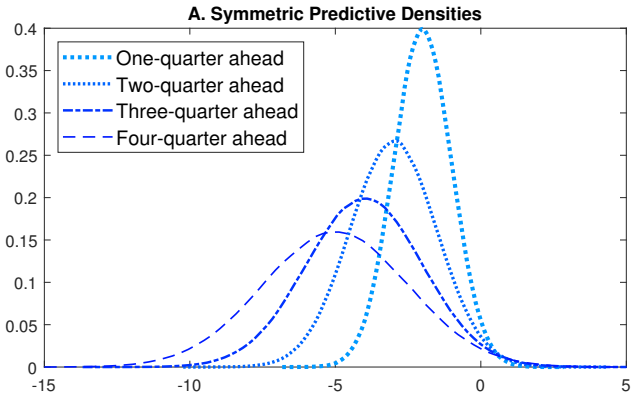

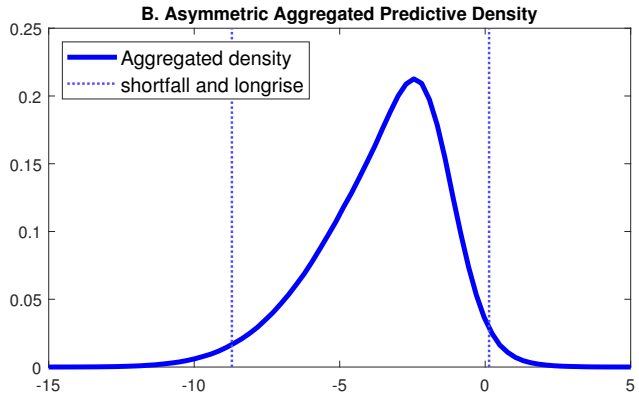

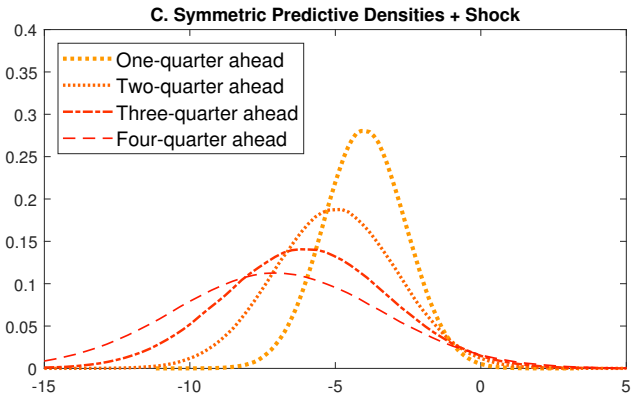

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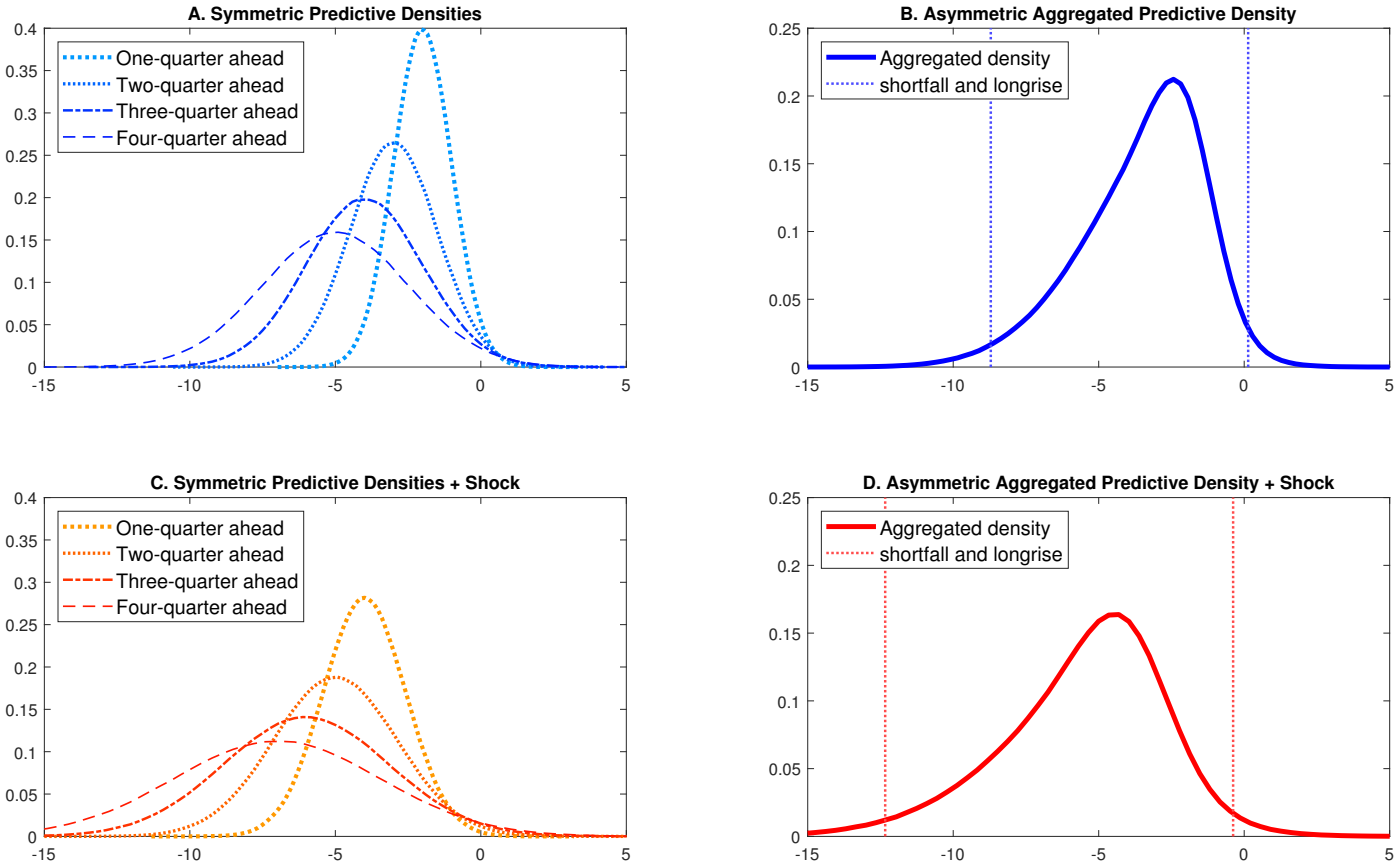

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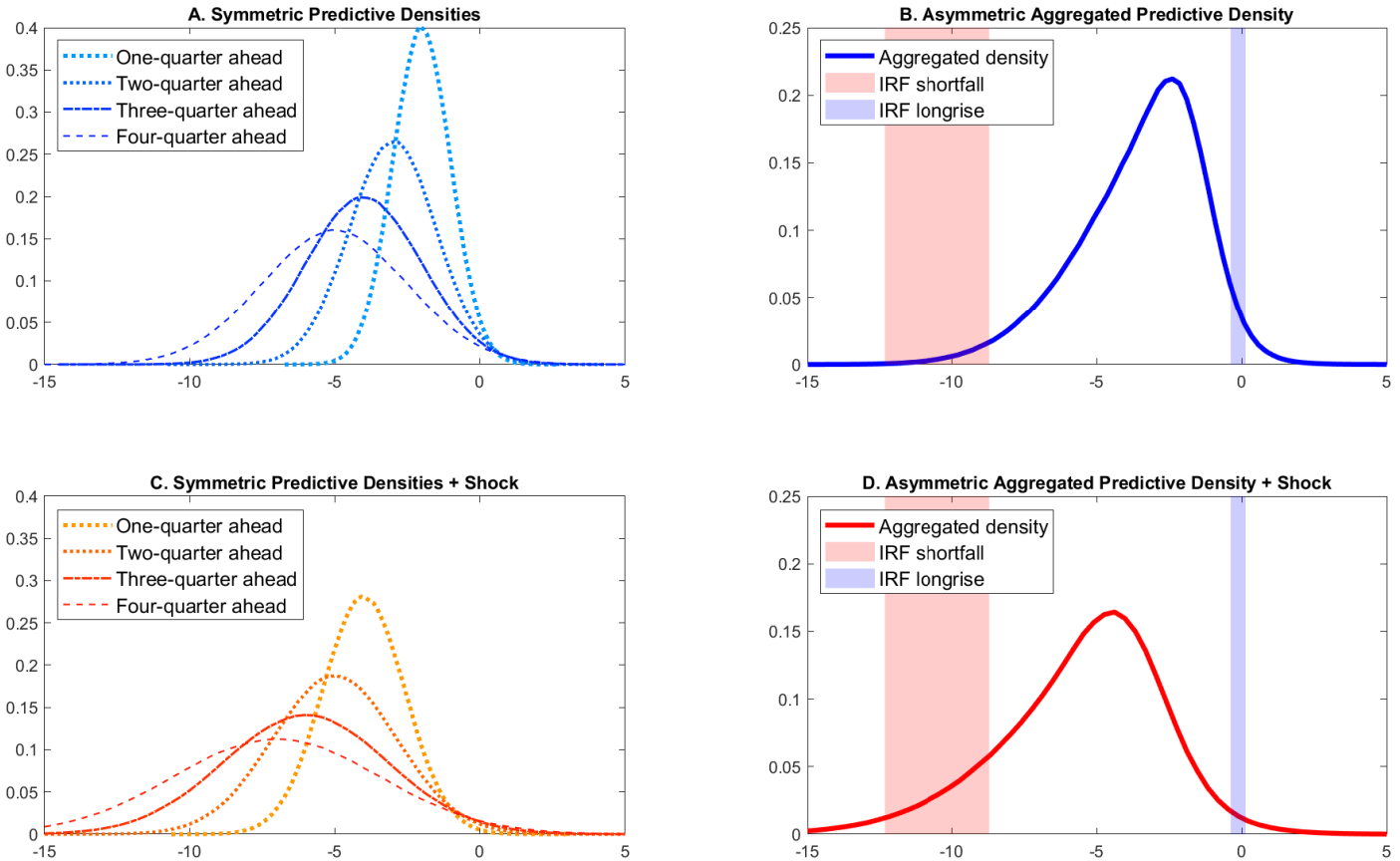
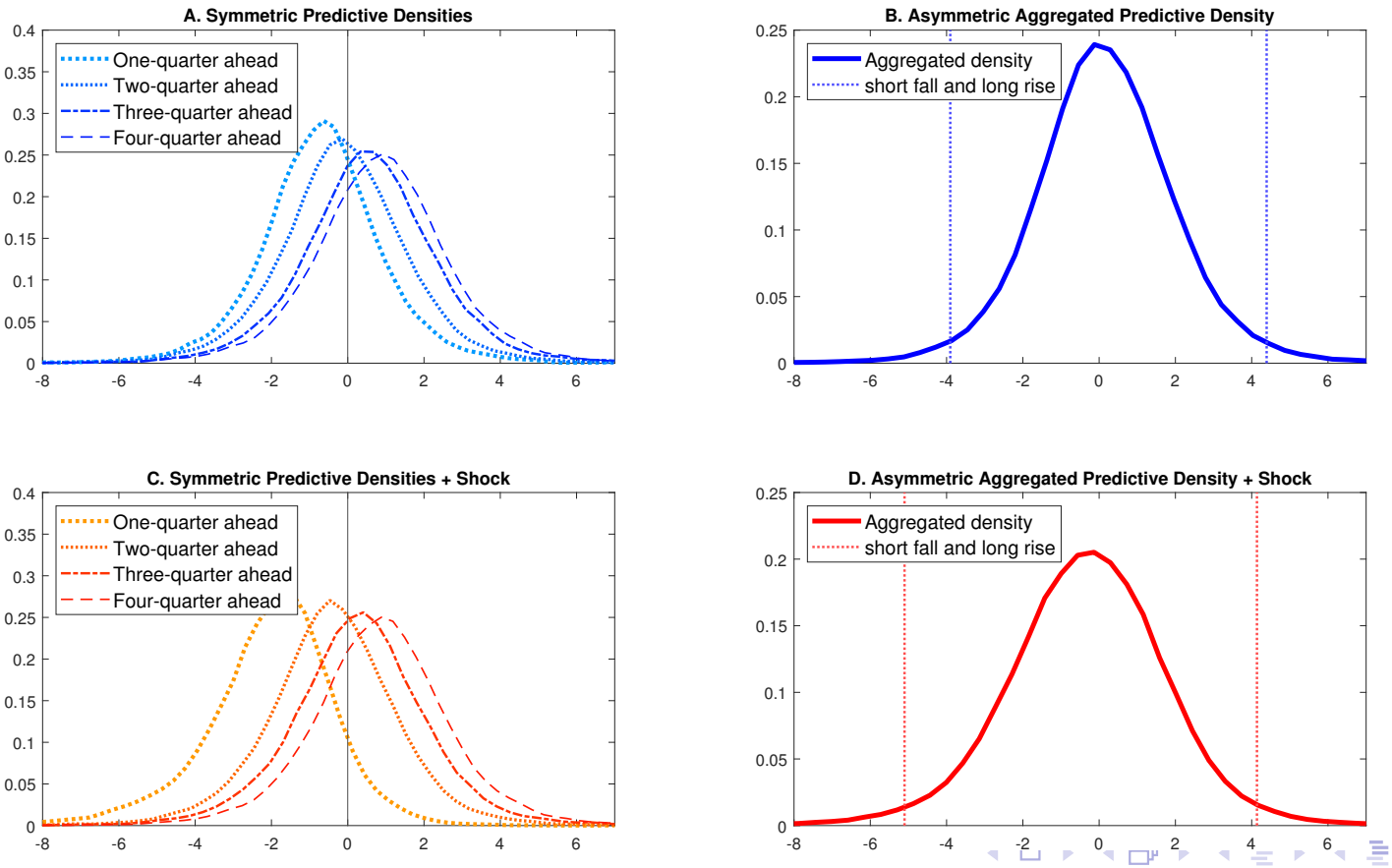


Remark 1: Where do asymmetries come from?

- What if we shutdown the level-volatility feedback?
  - SV-BVAR on GDP and spreads up to *2008:Q4*

Figure: Predictive densities based on Carriero et al. (2022)



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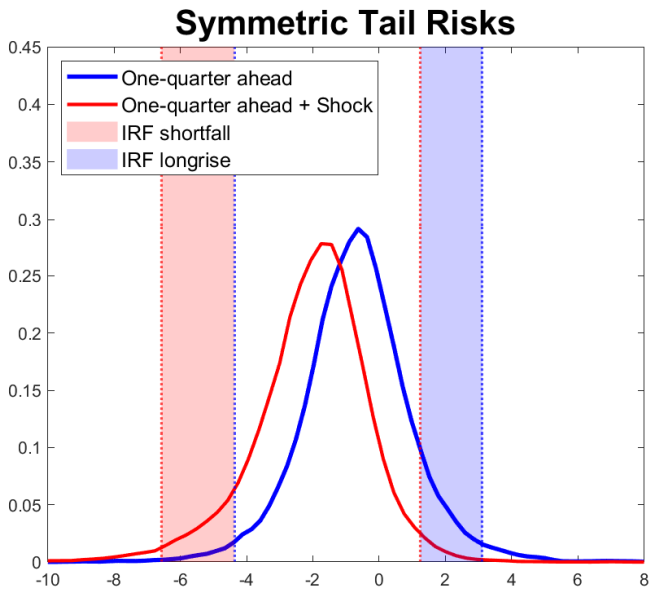

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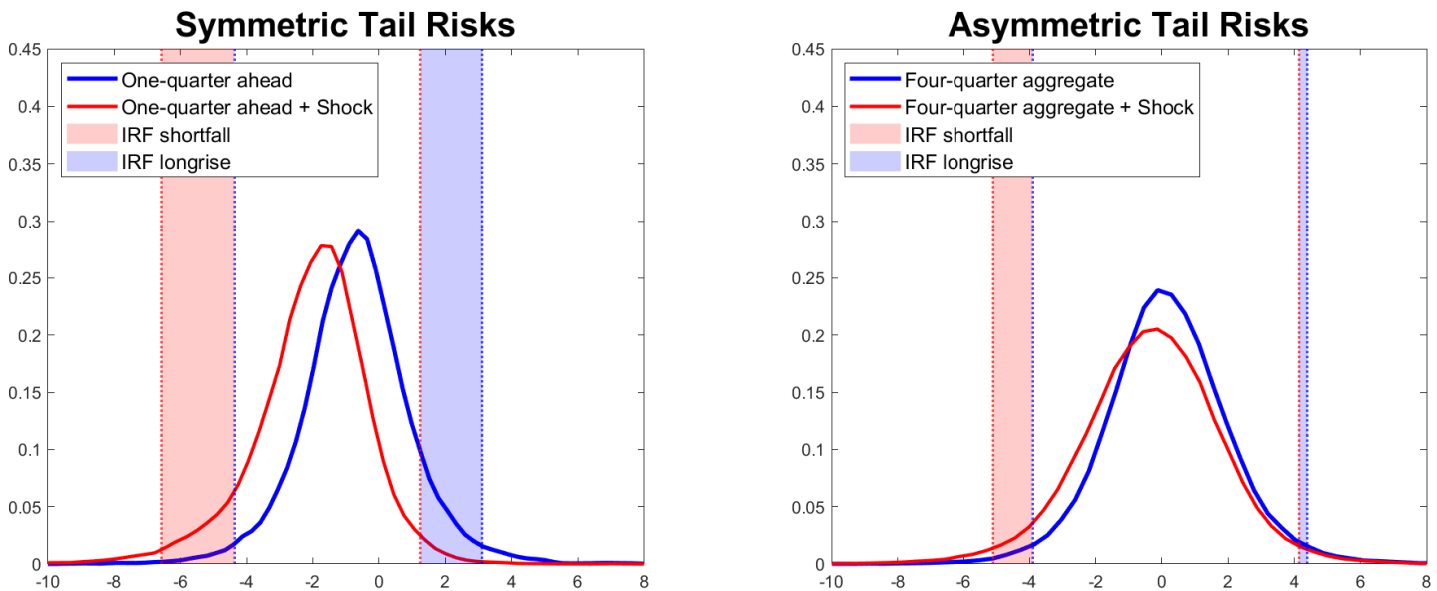

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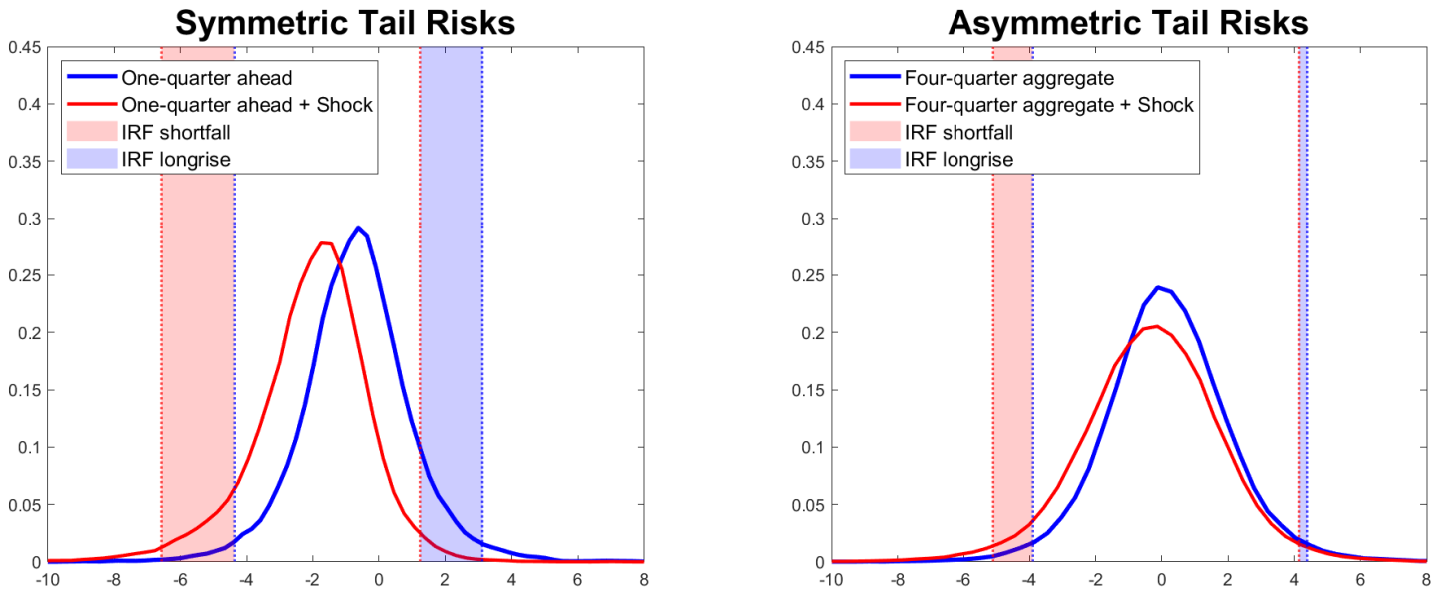

- Level-volatility feedback is crucial to general asymmetric tail risks... but also is the aggregating procedure

Remark 2: Evaluation Performance

- The model is evaluated in sample, that is, conditional on volatility and parameters inferred with the full sample

$$p(z_{t+1:t+f}|z^t) = \int_\Theta \int_{H_t} \left[\int_{H_{t+1:t+f}} p(z_{t+1:t+f}, H_{t+1:t+f}|z^t, H_t, \Theta) dH_{t+1:t+f} \right] p(H_t|z^T, \Theta) p(\Theta|z^T) dH_t d\Theta$$

- However, an out of sample (real-time) forecasting evaluation is crucial for policy makers to accurately infer risks

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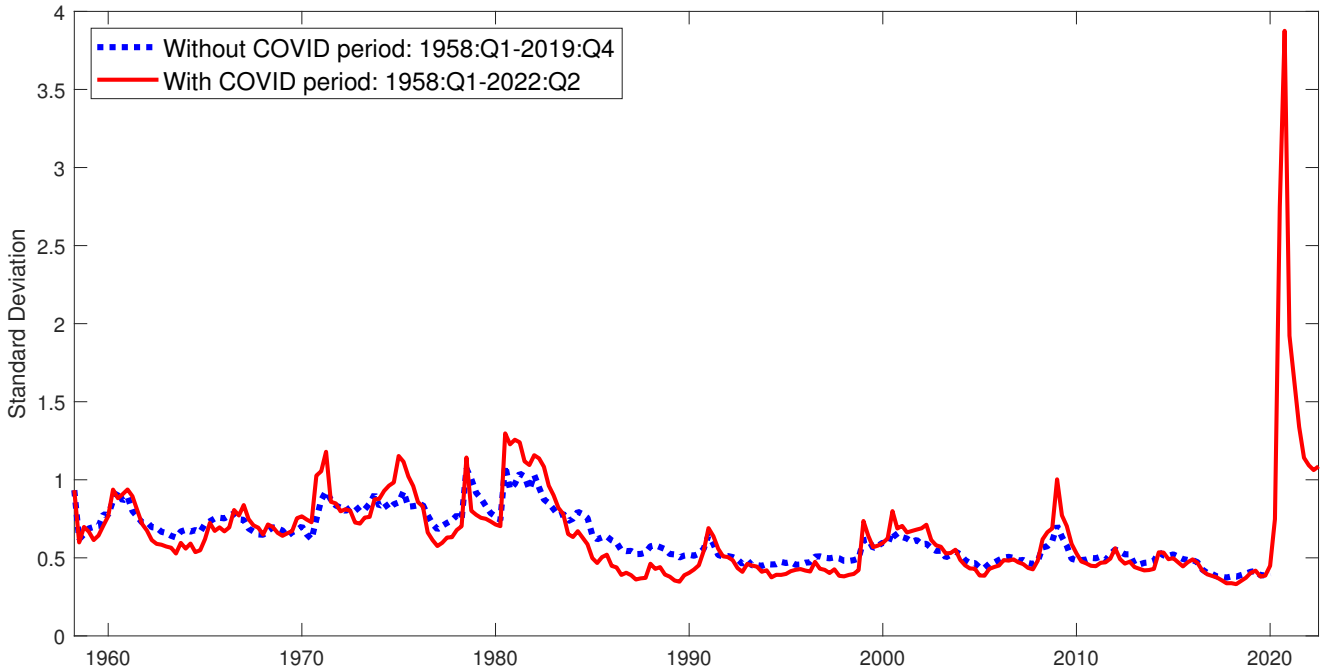
for $t = [\tau : T]$

Remark 3: What about COVID?

- The model produces reasonable revisions of GDP growth volatility once incorporating the COVID period
- In light of recent turbulence in financial markets, updated estimates might be of good use for policy makers

Figure: Estimates of GDP growth volatility based on Mumtaz (2018)



Other Remarks

- Macro (Financial) shocks affect at shorter (longer) horizons
  $\Rightarrow$ Induced by persistence in data or identifying restrictions?
- Macroeconomic and financial shocks lead to an increase in uncertainty $\Rightarrow$ How mechanical is that effect?
- The effects of shocks are stronger in periods of high volatility
  $\Rightarrow$ changes in transmission mechanism, shocks size or both?
- Would tail risk measures improve performance if based on reduced form rather than structural shocks?
- **Super interesting paper! and especially very useful for policy makers**