Financial stability considerations in the conduct of monetary policy

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Introduction – motivation

- Interplay of monetary policy, financial conditions and the real economy has been part of a long-standing macro-financial debate (Mishkin, 2007; European Central Bank, 2021)
- Theory suggests that accommodative monetary policy could create financial vulnerabilities by raising asset values, lowering risk premia, increasing leverage and increasing maturity and liquidity mismatches (Ajello et al., 2022)
- Empirical evidence on the general effect of monetary policy on financial vulnerabilities is mixed (Svensson, 2017; Kockerols and Kok, 2019; Schularick et al., 2021; Boyarchenko et al., 2022)
- Monetary policy considerations for financial stability likely entail trade-offs (Smets, 2014)

Introduction – this paper

- Analyze empirically the impact of monetary policy on financial stability and the real economy in the euro area over the period 2002–2019
- Employ quantile vector autoregressive models and two alternative estimation approaches: simulation and local projections (Ruzicka, 2021a,b)
- Identify monetary policy shocks from high-frequency event study data of Altavilla et al. (2019) using methods proposed by Gürkaynak et al. (2005), Jarociński and Karadi (2020) and Giuzio et al. (2021)
- Present impacts of conventional and unconventional monetary policy shocks on financial stability (financial vulnerabilities and systemic stress) and the real economy (growth and inflation)
- Show how to calibrate a policy mix of monetary and macro-prudential policies to achieve joint inflation and Growth-at-Risk targets based on our model results

Introduction – related literature

- Empirical papers on the causal relationship between monetary policy and financial stability (see Boyarchenko et al. (2022) for a recent survey)
- Multivariate applications of quantile regression methods (White et al., 2015; Chavleishvili and Manganelli, 2019; Montes-Rojas, 2022)
- Research on the stance of monetary and macroprudential policy using quantile regressions (Cecchetti, 2006; Kilian and Manganelli, 2008; Duprey and Ueberfeldt, 2018; Aikman et al., 2019; Carney, 2020)

Introduction – main findings

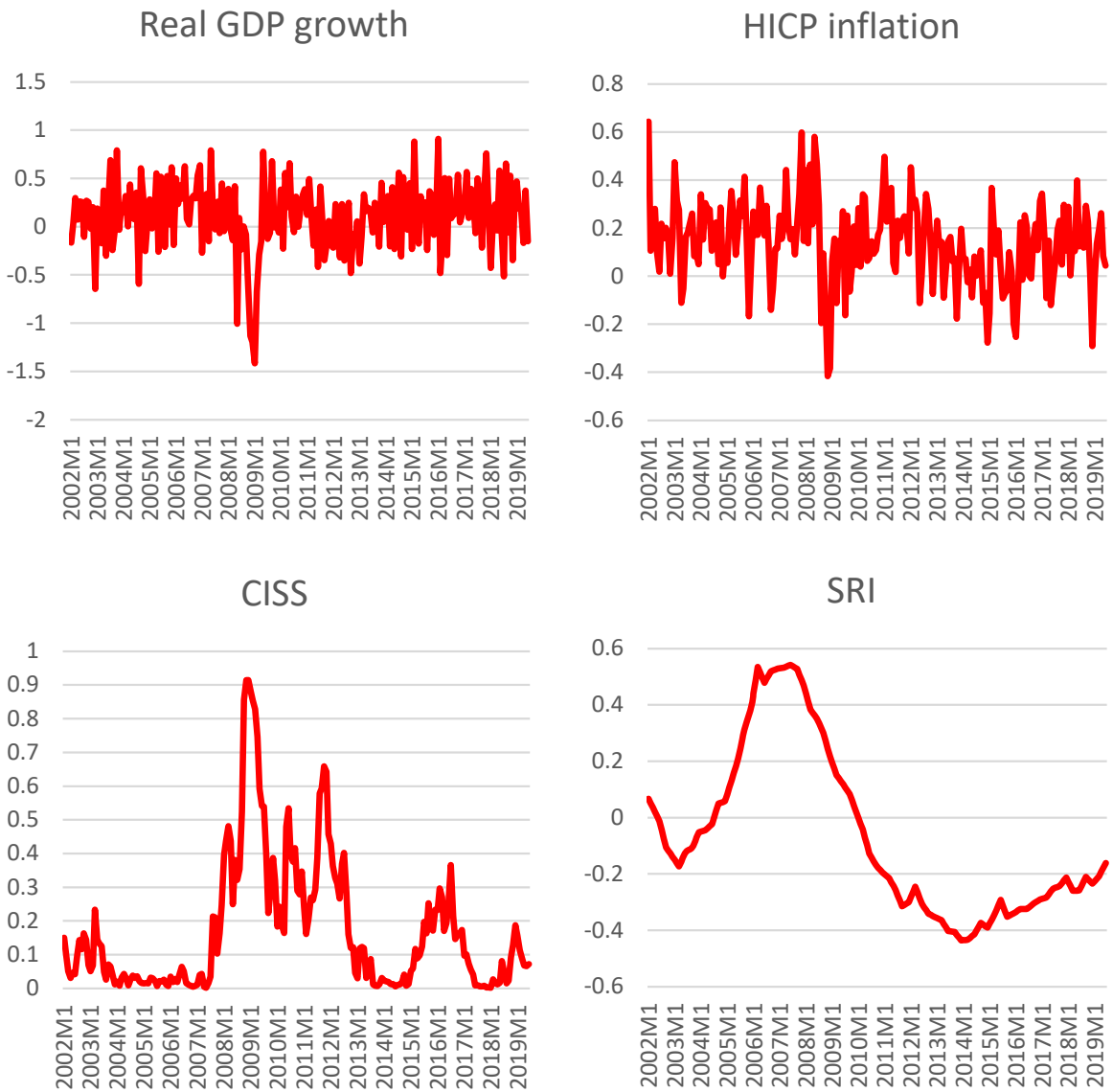
- Tightening **conventional** monetary policy reduces inflationary pressures and real GDP growth at the cost of **surging financial stress**
- Tightening **unconventional** monetary policies are found to be **similarly effective** in reducing inflation but have a **smaller impact** on growth and financial stress, while financial vulnerabilities mildly recede
- During the global financial crisis, **monetary policy** faced a **trade-off**: either tighten to stabilize inflation forecasts at 2% or loosen to curb stress and prevent tail risks to growth to increase
- Counterfactual policy simulation: **loosening macroprudential policy** would have been **effective in supporting tighter monetary policy** to meet joint inflation and growth targets during this period

Outline

Data – financial vulnerabilities and stress: SRI & CISS

- Systemic Risk Indicator (SRI) (Lang et al., 2019)
  - **Barometer** of financial stability capturing medium-term vulnerabilities
  - Six sub-indicators: bank credit-to-GDP ratio change, real total credit growth, debt-service-ratio change, RRE price-to-income ratio change, real equity price growth, and current account-to-GDP ratio
  - Measure of crisis probability and severity with predictive power for tail risks to euro area growth three to four years ahead (Lang et al., 2019)
- Composite Indicator of Systemic Stress (CISS) (Hollo et al., 2012)
  - **Thermometer** of financial stability capturing acute systemic financial stress
  - Symptoms of stress (mostly volatilities and spreads) across the financial system covering financial intermediaries, bond markets, equity markets, foreign exchange markets, and money markets, plus cross-correlation component
  - Measure of crisis severity that has predictive power for tail risks to euro area growth up to one year ahead (Figueres and Jarociński, 2020; Chavleishvili and Kremer, 2021)

Data



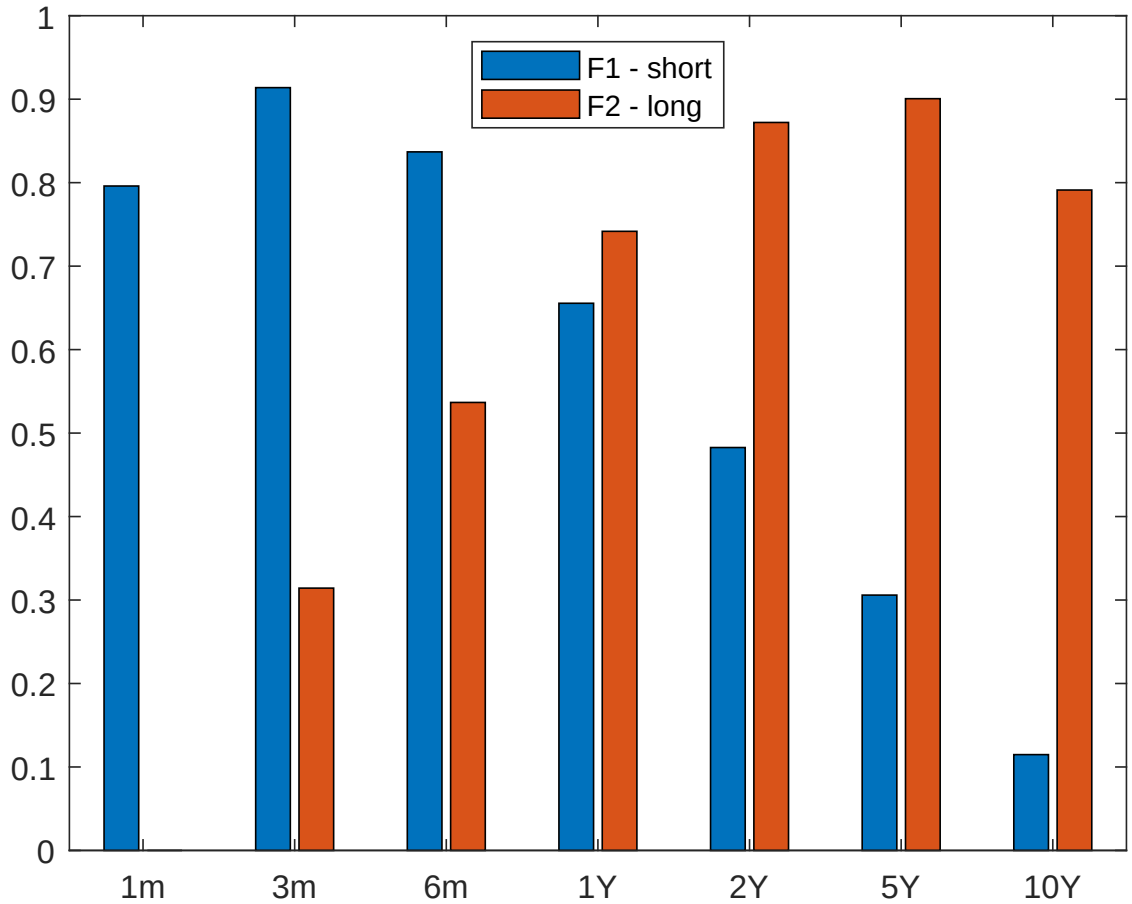
Notes: Monthly data 2002M1-2019M6. Variables are displayed as they enter our models: real GDP and HICP in first differences of logs (in %), CISS and SRI in levels.

Identification of monetary policy shocks – method

- Identify effects of monetary policy using **high-frequency intra-day financial market price changes** over short time windows covering central bank monetary policy announcements (Kuttner, 2001)
- Data from the "Euro Area Monetary Policy Event-Study Database" (Altavilla et al., 2019): intra-day OIS rate changes of seven maturities over narrow time windows around press release and press conference on ECB Governing Council monetary policy meeting dates
- Follow (Gürkaynak et al., 2005) and extract two factors using principal component analysis and rotate such that second factor does not load on the one month OIS surprise and scale to match variation in 3-month and 10-year OIS surprises

Identification of MP shocks – factor loadings

Figure: Monetary policy surprise factors - loadings



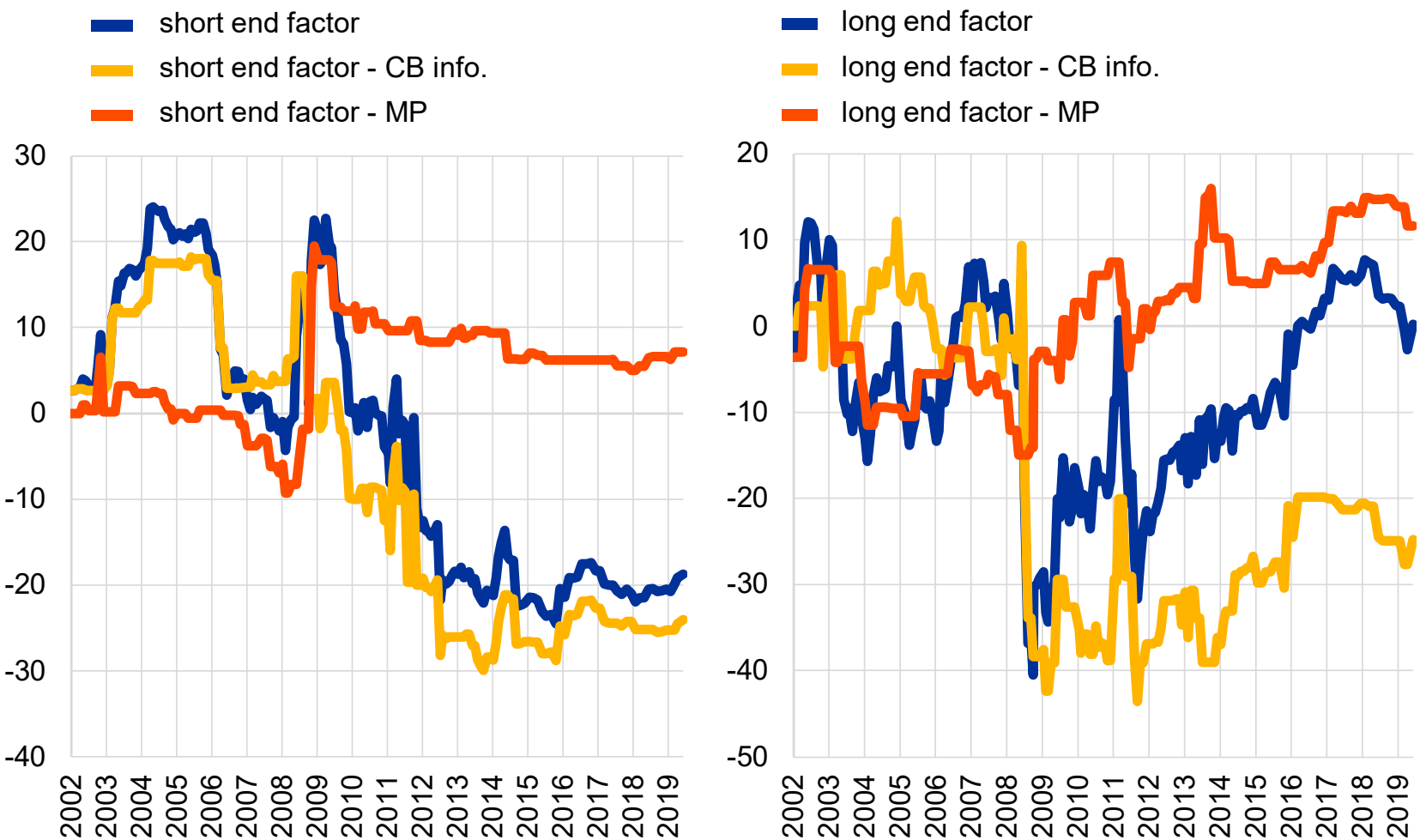
Note: The figure shows the estimated factor loadings after rotation in basis points.

Identification of MP shocks – method (continued)

- Interest rate surprises reveal information about i) the **monetary policy stance** and ii) private **central bank information** about the state of the economy
- Jarociński and Karadi (2020) separate monetary policy and central bank information shocks from co-movement of interest rate surprises with high-frequency stock price changes, but with implausible results for the euro area
- We follow Giuzio et al. (2021) and identify monetary policy shocks from positive co-movement of our interest rate factors with daily changes in 5-year BBB-rated euro-denominated NFC bond spreads

Identification of MP shocks – cumulated factors

Figure: Cumulated monetary policy factors 2002–2019

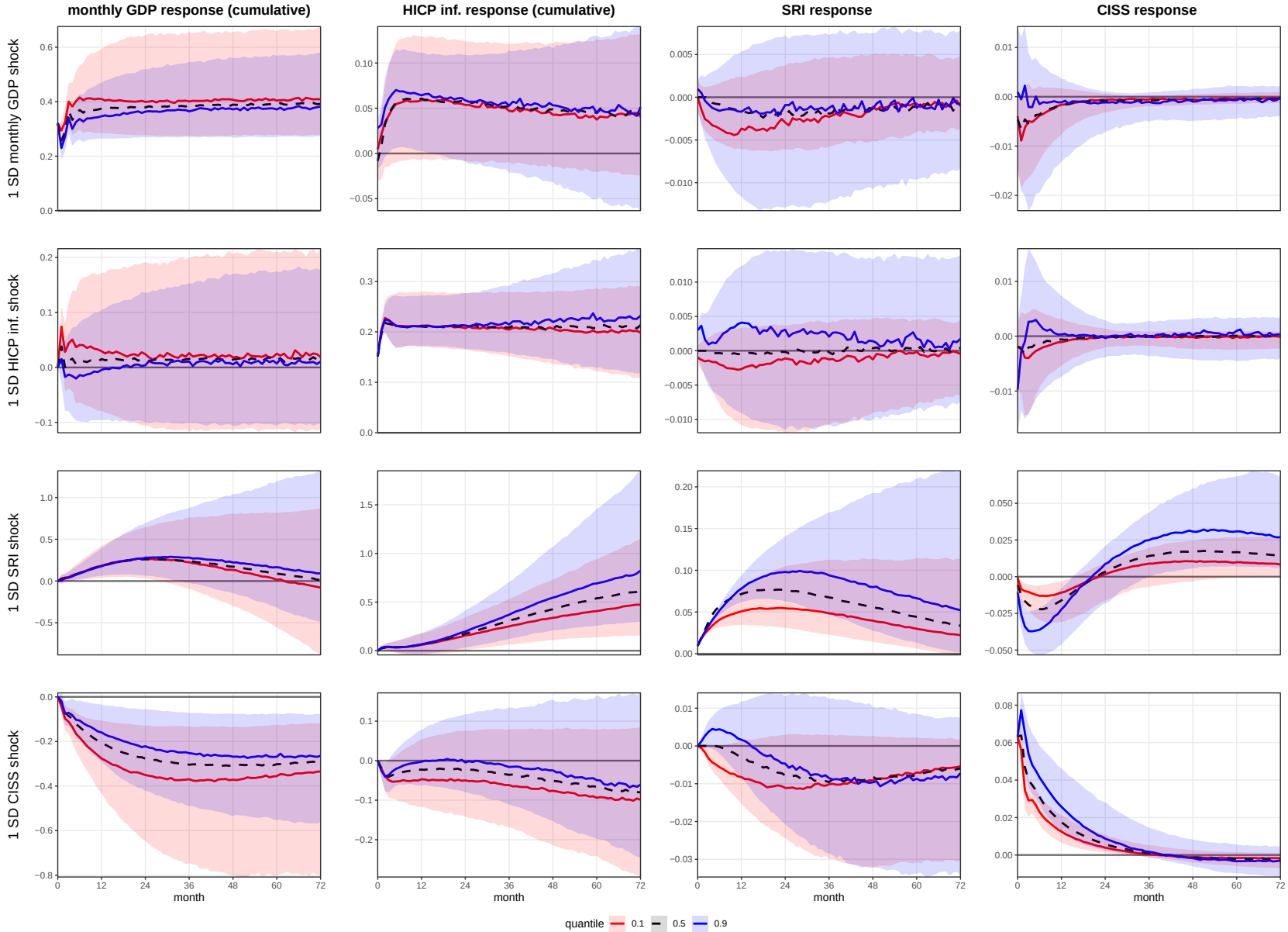


Note: The figure shows cumulated factors before and after identification with BBB-rated NFC bond spreads in basis points.

Quantile modelling – approach

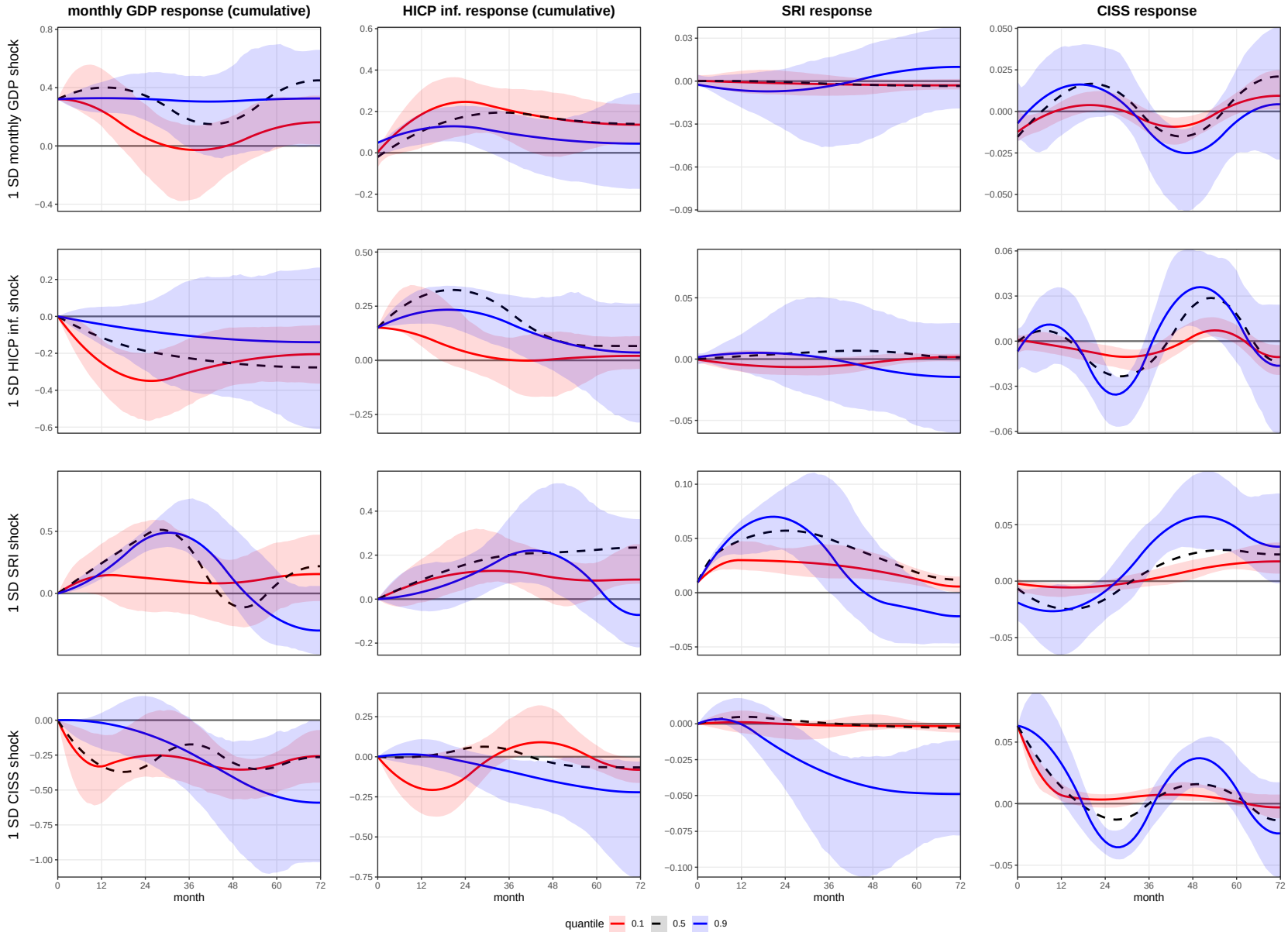
- Quantify the impact of exogenous shocks on the **distributions** of macro-financial response variables
- Estimate quantile impulse responses through two different methods:
  1. a simulation-based, two-step approach in form of a **quantile vector autoregressive model** (Ruzicka, 2021b), based on the estimation of the quantile regression process for a system of equations with subsequent simulation (Koenker and Xiao, 2006; Koenker et al., 2018), similar to Chavleishvili and Manganelli (2019) and Montes-Rojas (2022)
  2. direct estimation and regularization through **quantile local projections** (Ruzicka, 2021a)
- Identification through recursive short-run restrictions: mon. pol. shocks first, followed by GDP, Inflation, SRI, CISS

Results – simulation-based macro-financial IRFs



Note: Four-variable model, no monetary policy shocks. Horizon: 72 months, confidence bands at 90% level and excluded for the median response.

Results – local projections-based macro-financial IRFs



Note: Four-variable model, no monetary policy shocks. Horizon: 72 months, confidence bands at 90% level and excluded for the median response.

Results – impulse responses – short-end MP shock

Figure: simulation-based

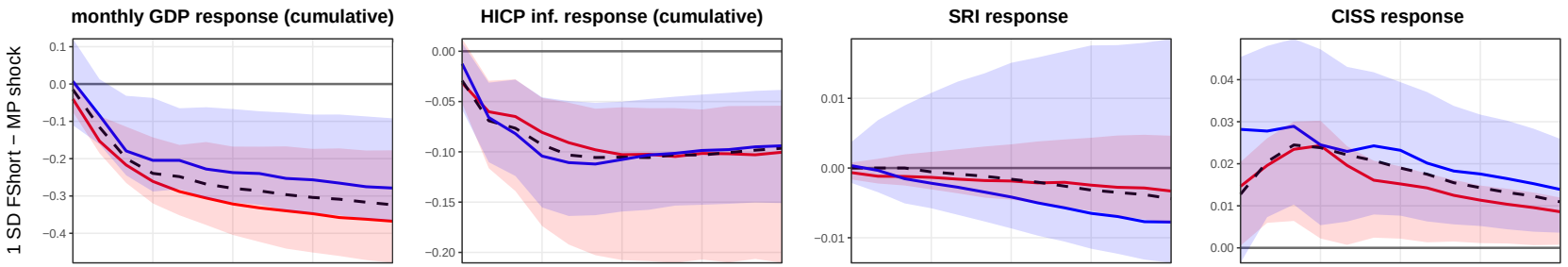
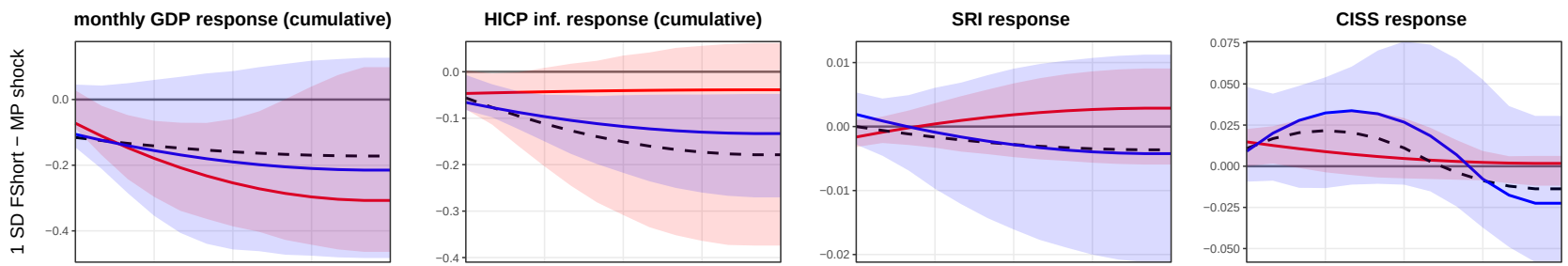


Figure: quantile local projections



Note: Horizon: 12 months, confidence bands at 90% level and excluded for the median response.

Results – impulse responses – long-end MP shock

Figure: simulation-based

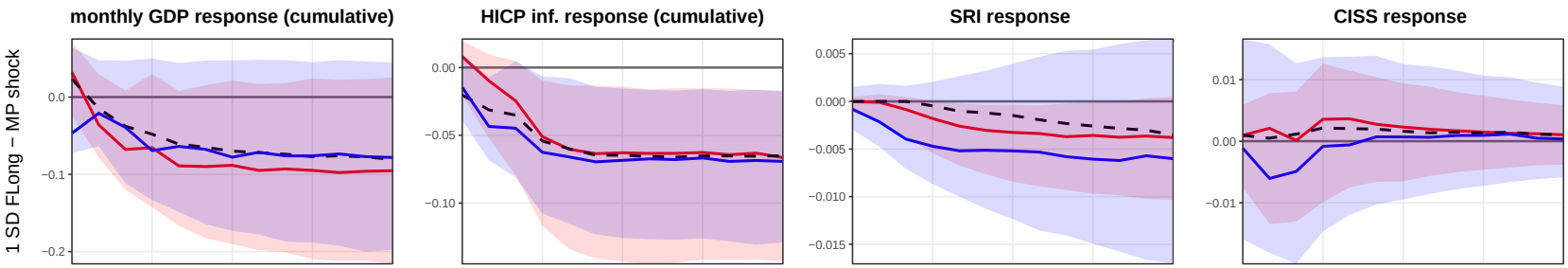
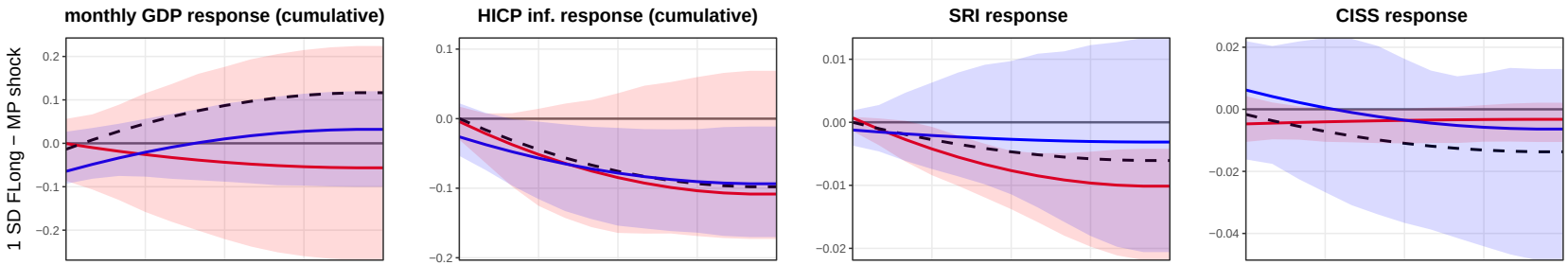


Figure: quantile local projections



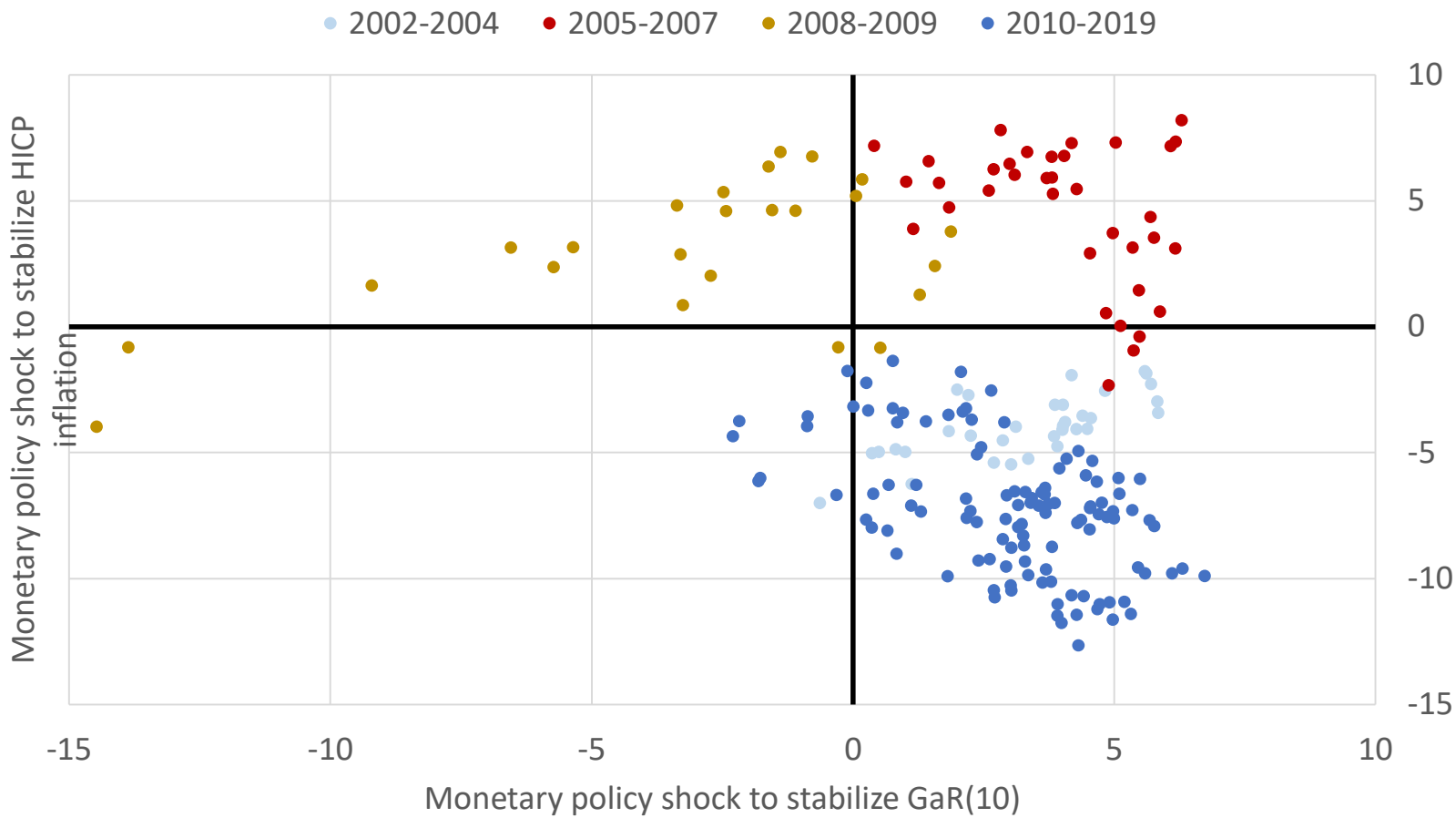
Note: Horizon: 12 months, confidence bands at 90% level and excluded for the median response.

Policy counterfactuals

- Estimated quantile models allow us to identify the role of monetary policy shocks in the forecasts of macro-financial variables
- Historical contributions of monetary policy shocks to one-year ahead forecasts of GDP at its 10th percentile (Growth-at-Risk, GaR(10)) and median inflation serve as a basis to assess monetary policy trade-offs while pursuing a price stability objective
- How could monetary policy **stabilize median inflation** forecasts at a price stability objective of 2% and how does this **compare** to a policy that would **stabilize Growth-at-Risk** at its long-run average of -1.08%

Policy counterfactuals – monetary policy contributions

Policy counterfactuals – GaR and inflation trade-offs

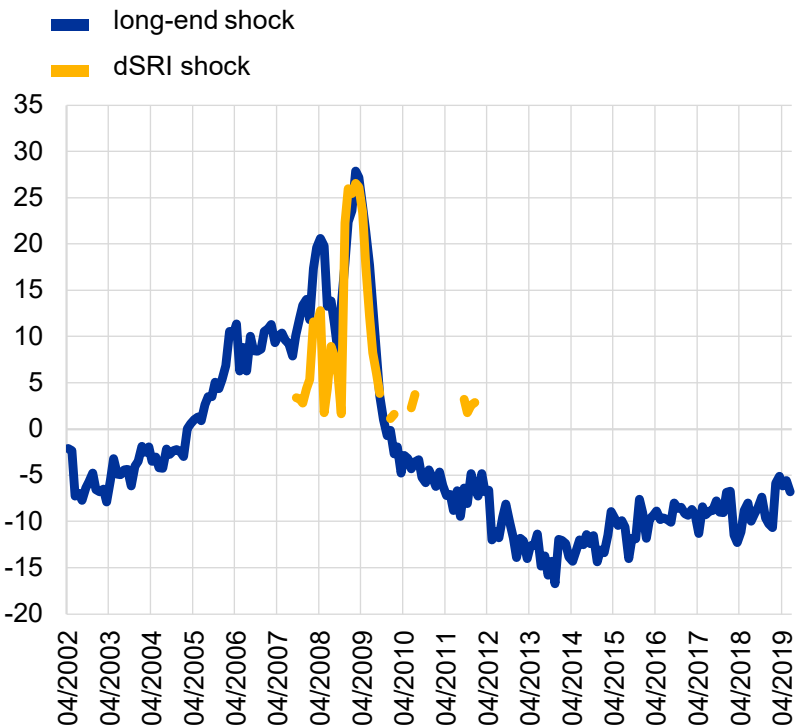


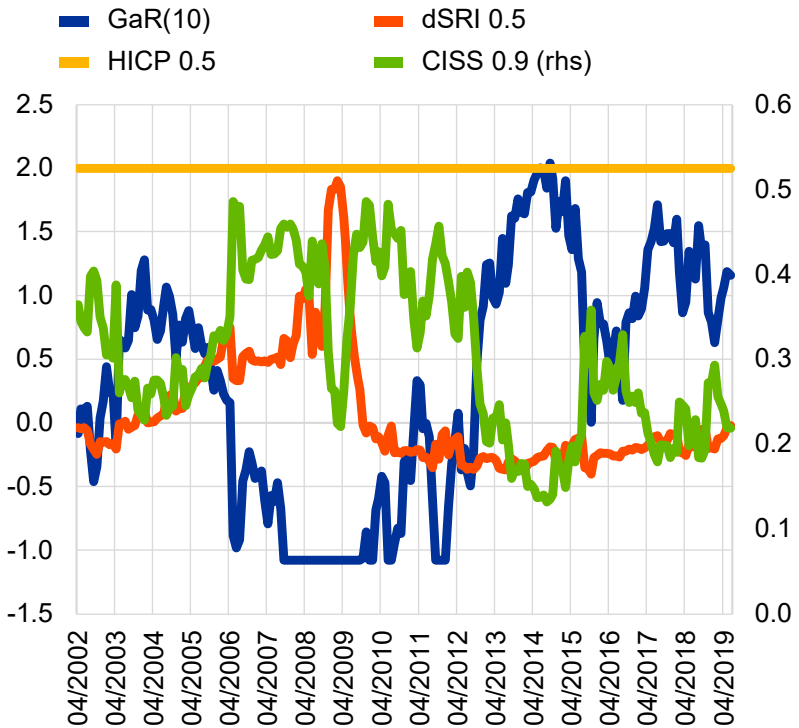
Note: Monetary policy shocks required are in standard deviations. Positive values imply a required tightening and negative values a required loosening of short-term rates.

Policy counterfactuals – monetary and macroprudential policy

- **Monetary policy** could be **constrained** by a trade-off between stabilizing inflation and Growth-at-Risk, such as during the Global Financial Crisis
- Our framework captures **important role for macroprudential policy** (through impacting financial vulnerabilities) in complementing monetary policy in its efforts to stabilize the macroeconomy
- How could our results have informed a **policy mix for joint inflation and Growth-at-Risk targets** over the sample period?

Policy counterfactuals – policy mix for joint inflation and Growth-at-Risk targets





Note: Left: policy shocks required (in standard deviations). Positive shocks indicate tightening for monetary policy but loosening for macroprudential policy.
Right: One-year ahead forecasts conditional on policy shocks.

Summary and conclusions

- Empirical analysis focused on the interaction of monetary policy, financial stability and the real economy in the euro area based on quantile vector autoregressions
- Tightening conventional monetary policy reduces inflation and growth at the cost of rising financial stress
- Unconventional monetary policies are equally effective in reducing inflation, but have relatively smaller impact on growth and financial stress while financial vulnerabilities mildly recede
- During the global financial crisis monetary policy faced a trade-off, requiring tightening to achieve inflation targets at the cost of heightened financial stress and tail risks to growth
- A monetary-macroprudential policy mix to achieve joint inflation and Growth-at-Risk targets can be calibrated based on estimated impulse responses and forecasts

Thank you!

Questions?

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