Quantifying Financial Stability Trade-offs for Monetary Policy

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Abstract

This paper presents a novel approach to quantifying the costs and benefits of alternative policy actions when monetary policy faces trade-offs between financial and macroeconomic stability.

We estimate a quantile VAR model that captures the interdependent dynamics of inflation, real GDP growth, a monetary policy rate and two composite indicators measuring systemic risk ex ante and ex post.

Policy implications are derived from scenario analyses, where specific (tail) risks to financial stability can be represented by certain assumptions about the future paths of one, or both, of the systemic risk indicators. The short- to medium-term costs and benefits of different policy responses to such risks are quantified in terms of the projected paths of the conditional, potentially asymmetric, distributions of inflation and economic growth.

We use the framework to analyse (i) the intertemporal trade-off involved in a classical financial boom-bust cycle and the associated "leaning against the wind" policy, and (ii) the short-run trade-off involved in different speeds of monetary tightening to counter recent inflationary pressures, where larger rate hikes tend to be associated with greater financial stress.

Quantile VAR and scenario analyses

Risks to financial stability are closely related to tail risks to the macroeconomy (**Adrian, Boyarchenko and Giannone, 2019**). Quantifying financial stability trade-offs for monetary policy requires estimating three-way interaction b/w monetary policy, financial stability conditions and tail risks to the macroeconomy.

We measure financial stability conditions by the Systemic Risk Indicator (SRI, **Lang et al., 2019**) and the Composite Indicator of Systemic Stress (CISS, **Chavleishvili and Kremer, 2023**) (*Chart 1*). SRI is a composite measure of financial imbalances or systemic risk ex ante (risk of a future financial crisis); CISS measures systemic risk ex post (materialised systemic risk, crisis severity).

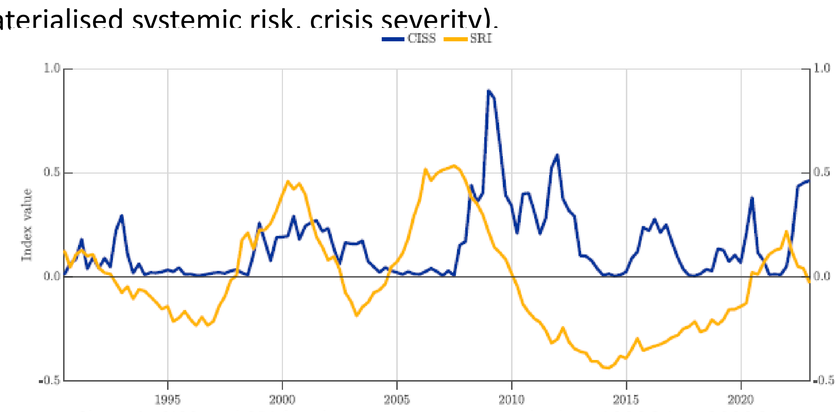

Chart 1. CISS and SRI for the euro area; quarterly data 1990Q1 to 2022Q4.

We estimate a Quantile VAR (**Chavleishvili and Manganelli, forthcoming**) with 5 endogenous variables (CISS, SRI, real GDP growth, consumer price inflation, short-term interest rate changes) and one exogenous variable (global commodity price index, growth rate) for quarterly euro area data, 1990 to 2022.

The QVAR flexibly captures asymmetries in the (joint) conditional tail behaviour of the variables of interest (*Chart 2*).

Financial stability trade-offs are quantified through scenario analysis. Different financial stability risks are modelled as scenarios based on certain assumptions about the future paths of one, or both, of the systemic risk measures. 1) intertemporal trade-off ("credit bites back"; **Schularick and Taylor, 2012**): risk of a boom-bust cycle with a high SRI today and a high CISS (crisis) in the medium term. 2) Short-run (intratemporal) trade-off: front-loading monetary tightening implies greater short-run risk of financial stress, which can be amplified by additional adverse CISS shocks to replicate a "taper tantrum"-like scenario (**Kashyap and Stein, 2023**; **Stein and Sunderam, 2018**). [Second case is not covered in this poster].

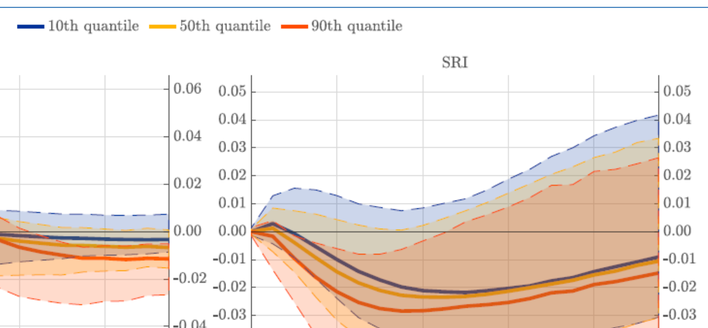

Chart 2. Quantile impulse response function for CISS and SRI to an interest rate shock based on 10^6 forward simulations. Shaded areas represent 90% confidence intervals.

Intertemporal trade-off: "credit bites back"

Aim: This policy counterfactual studies how growth and inflation would have changed a few years before and after the GFC if monetary policy had leaned against the wind (LAW), i.e., if it increased policy rates in response to escalating financial imbalances and lowered them more in response to the surge in financial stress.

Assumptions:

- Forecast period: 2004:Q4 – 2014:Q4
- Baseline scenario imposes quantile restrictions on SRI and CISS to mimic GFC (build-up of vulnerabilities followed by spike in systemic stress); policy rate assumed to follow actual path
- Counterfactual scenario raises policy rate by an additional 25 bps each quarter from 2004:Q4 to 2005:Q3, and lowers rates by 25 bps each quarter from 2008:Q1 to 2008:Q4 ("modest policy intervention" to mitigate Lucas critique)

Results:

- *Chart 3* plots median, 10th and 90th percentiles (shaded areas) of conditional distributions of baseline and counterfactual scenarios.
- Leaning reduces financial vulnerability (SRI) in the build-up phase and contains systemic stress in the crisis.
- Cost-benefit analysis of LAW: Comparing the counterfactual to the baseline scenario, median growth is somewhat lower in the boom period but markedly higher in the crisis; downside risks are even more contained. Results for inflation are less visible.
- Applying a risk management policy loss function to weigh the intertemporal costs and benefits finds clear support in favor of LAW.

Caveat:

- Our counterfactual analysis is ex-post, taking the GFC as a given. A real-time ex-ante cost-benefit analysis must also consider a scenario in which a financial boom does not end in a financial crisis, even in the absence of a leaning policy. In calculating the expected net policy losses, each scenario must be weighted by its assumed probability of occurrence.

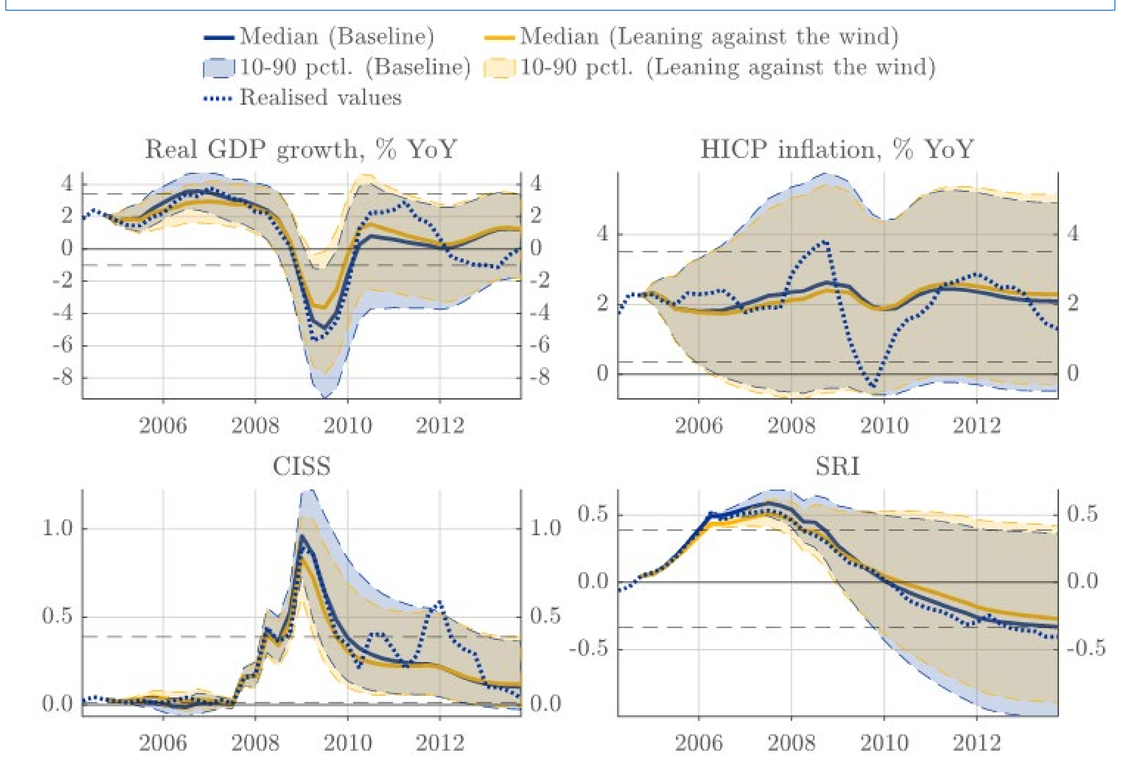

Chart 3. Conditional quantile forecasts in the baseline and counterfactual QVAR scenarios.

Conclusions

This paper presents a novel empirical approach to quantify the intertemporal macroeconomic costs and benefits of monetary policies which take financial stability considerations explicitly into account.

The approach has the distinct advantage that financial stability considerations are not introduced ad hoc or as pure "side effects" of monetary policy but enter the policy calculus directly through their potentially nonlinear first-order effects on future inflation and economic activity.

Scenario analyses provide the costs and benefits of different policies in terms of the projected paths of the conditional distributions of the main variables of interest. This fact supports a risk management perspective (**Kilian and Manganelli, 2008**) when monetary policy is faced with elevated macroeconomic tail risks associated with certain risks to financial stability.

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