Central bank balance sheet and systemic risk

Maëlle Vaille - University of Bordeaux

maelle.vaille@u-bordeaux.fr

Motivation

- Global financial crisis ➔ New monetary policy tools leading to the **expansion of central bank balance sheet size and substantial modification of its composition**.
- COVID-19 crisis ➔ Further expansion in asset purchasing and lending programmes in order to address market strains and providing policy stimulus.
- Balance sheet policies (BSP) seem to have been integrated into the standard central bank toolkit. Emerging debate on the **potential side effects of BSP on financial stability in the medium and long term**.
  ➔ Excessive risk-taking from financial institutions?
  ➔ Risk of feeding an asset price bubble?
- Research question: ***What are the effects of BSP on systemic risk in the post global financial crisis period in the euro area, the United States and Japan?***

Focus on the SRISK indicator

- Combines an economic analysis of Acharya and al. (2010) and an econometric model developed by Brownlees and Engle (2012).
- Increasingly used as a proxy for aggregate systemic risk at the macro level in the financial system (Engle and al. 2015; Colletaz, Levieuge and Popescu 2018).
- Definition: "The expected capital shortfall of a given financial institution, conditional on a crisis affecting the whole financial system" (Benoit et al., 2017).

SRISK = k [D + (1-LRMES) E] - (1-LRMES) E

where k is the capital requirement, LRMES is the Long-Run Marginal Expected Shortfall, E is the current market capitalisation of this firm and D is the book value of debt which is calculated as the book value of assets minus the book value of equity.

➔ Allows our **two-level analysis** (main contribution of the paper).

Bibliography

- Acharya V., Pedersen L., Philippon T., and Richardson M. (2010), Measuring Systemic Risk, NYU Working Paper
- Brownlees C., Engle R. F. (2016), SRISK: A Conditional Capital Shortfall Measure of Systemic Risk, The Review of FinancialStudies 30.(1), 48–79
- Benoit S., Colliard J.-E., Hurlin C. and Perignon C. (2017), Where the risks lie : A survey on systemic risk, Review of Finance 21.1, 109–152
- Colletaz G., Levieuge G., and Popescu A. (2018), Monetary policy and long-run systemic risk-taking, Journal of Economic Dynamics and Control, 86:165–184
- Engle R., Jondeau E., and Rockinger M. (2015), Systemic Risk in Europe, Review of Finance 19.1, 145–190

Identification of structural shocks

Table 1: sign and zero restrictions values

Variables/Shocks	ump	supply	demand	cmp
srisk	-			
total assets	+			0
cpi	+	-	+	+
production index	+	+	+	+
short-term interbank rate	0			-

Table 2: sign and zero restrictions periods

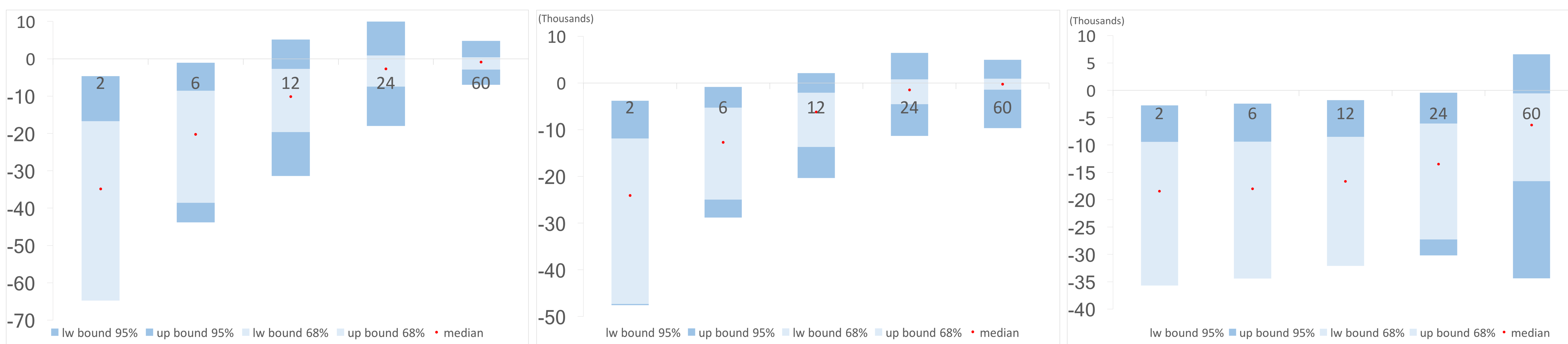
Variables/Shocks	ump	supply	demand	cmp
srisk	0 1			
total assets	0 1			0 1
cpi	1 2	0 1	0 1	0 1
production index	1 2	0 1	0 1	0 1
short-term interbank rate	0 1			0 1

Empirical strategy

1. Evaluate the effects of BSP on the aggregate systemic risk
- Monthly data 2008M1-2018M12 for the euro area and the United States and 2000M1-2018M3 for Japan
- Structural bayesian VAR model
- Variables: CPI, industrial production index and short-term interest rate, completed with CB total assets growth and the aggregate SRISK measure

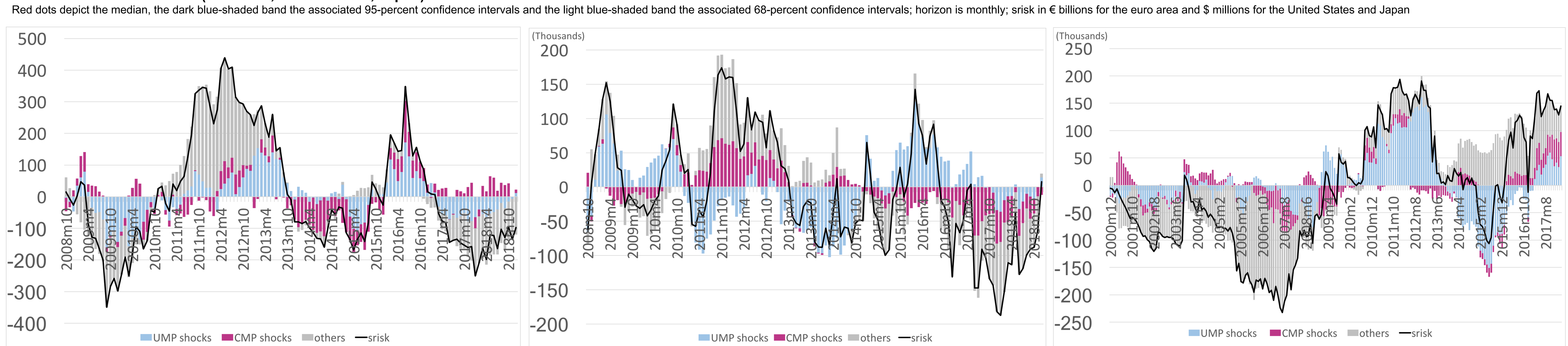
2. Evaluate the effects of BSP at financial institutions level according to their leverage
- Panel VAR
- Dataset enriched with institution-level data (SRISK, LRMES, leverage, market capitalisation)
- Sample of financial firms (depositories, broker-dealers, insurance, non-depository institutions and real estate) from V-LAB website
- Two samples with high-leveraged and low-leveraged firms

Key findings



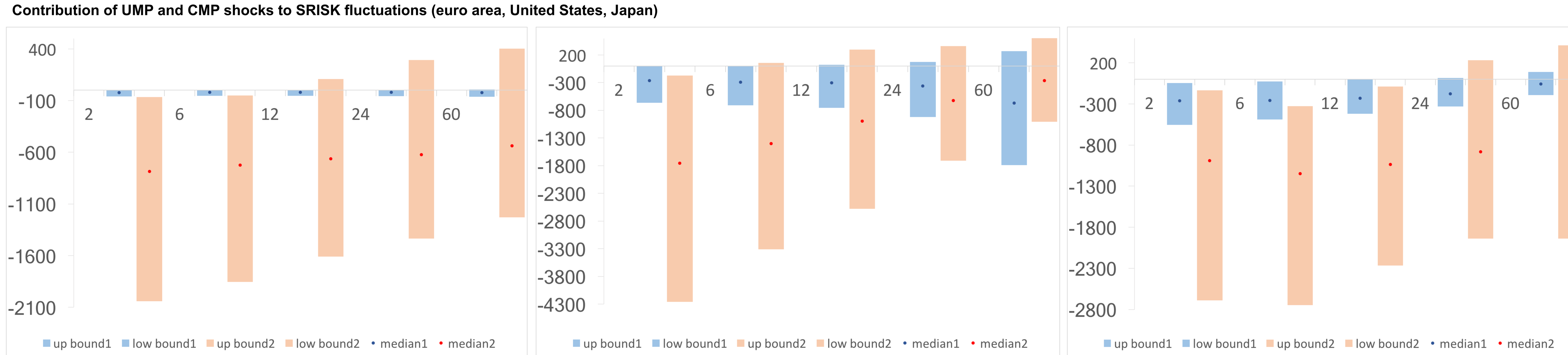
IRF of SRISK to BSP shock (euro area, United States, Japan)
Red dots depict the median, the dark blue-shaded band the associated 95-percent confidence intervals and the light blue-shaded band the associated 68-percent confidence intervals; horizon is monthly; srisk in € billions for the euro area and $ millions for the United States and Japan

- **BSP lead to the decrease of the SRISK in the short term and medium term, and even in the long term for Japan.**
- Conversely, conventional monetary policy shocks lead in the short term to an increase in systemic risk in the euro area and have no effect in the United States and Japan.
- Replacing the SRISK indicator with an asset price bubble indicator does not change the results.



Contribution of UMP and CMP shocks to SRISK fluctuations (euro area, United States, Japan)

- For the three areas, **conventional monetary policy shocks make a much smaller contribution than BSP shocks to SRISK fluctuations** ⇒ Consistent with the view that since the global financial crisis, central banks respond more to financial stability objectives.
- These graphs show the **complexity of concluding on the link between BSP and systemic risk**.



IRF of SRISK to BSP shock (euro area, United States, Japan)
Dots depict the median and the shaded areas the associated 95-percent confidence interval from the PVAR; horizon is monthly; srisk is in $ millions; the 12 firms with the lowest leverage in blue and the 12 firms with the highest leverage in red)

- BSP have a heterogeneous effect on financial institutions: the effect is **stronger for those with the highest leverage**.
- One possible explanation: highly indebted financial institutions benefit from the increase in asset prices generated by asset purchase programmes with the strenghtening of their balance sheet.

Policy implications and research extensions

- My results suggest that BSP do not have negative spillovers on systemic risk but contribute to financial stability in the short and medium term (even in the long term for Japan). Financial stability could become an explicit objective of central banks in the same way as price stability.
- Need to capture the effects of each monetary policy instrument / for the APP, which types of assets effectively reduce systemic risk?