Monetary Policy and Systemic Risk

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Host of papers has shown risk-taking channel based on bank individual risk


Relevant for policy only to the extent that it affects the macroeconomy and systemic risk
Macro evidence: Rey and Miranda-Agrippino (2016); macro theory: Bruno and Shin (2015 a,b)

Faia and Karau (2017):
1. Impact of monetary policy (identified at high frequency; conventional and unconventional) on systemic risk
2. Systemic risk measured with: CoVaR (both equity and CDS), LMRES
2. Find evidence for leverage channel and US monetary policy
Figure 2: Panel VAR in pre-crisis sample

Note. Impulse responses in the panel VAR(12) to a one-standard deviation shock to Krippner’s shadow rate. Countries included: US, Japan, UK, China, euro area (Germany, France, Spain, Netherlands, Italy). Model includes a constant and time trend. Time sample: 1992:06-2007:08. Remaining details as in Figure 1.

of monetary policy only after the financial crisis, we estimate the model under the reduced time sample from the end of 2007 onward. Figure 3 shows the results. After small initial declines, an expansion in the central banks balance sheet induces positive output and price effects, although these are not always statistically significant. All four risk measures increase following the monetary expansion with realized volatility again exhibiting an immediate but short-lived reaction, while the systemic measures show again more delayed responses. It is noteworthy that the effects onto both macroeconomic controls as well as risk metrics are relatively similar to the ones of roughly 20 basis point shocks in conventional monetary policy instruments considered earlier. As our balance sheet measure is indexed to 100 in 2007, the model suggests that a doubling of the central bank balance sheet from the level before the crisis has effects roughly equivalent in size to that of a 80 basis point cut in the policy rate. However, the model also suggests that conventional and unconventional monetary policies introduce similar trade-offs between stimulating the real economy on the one,

\footnote{Notably, the results remain almost unchanged when we run the model using the full time sample, with even higher levels of statistical significance.}
and systemic risk on the other hand.

**Figure 3: Panel VAR with central bank total assets in (post-)crisis sample**

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**Note.** Impulse responses in the panel VAR(12) to a one-standard deviation shock to central bank total assets. Variable ordering: GDP growth rate, CPI growth rate, first-differenced central bank total assets, risk measure. Time sample: 2007:09-2016:12. Remaining details as in Figure 1.

### 3.1.3 Robustness of fixed-effects panel VAR

We consider various robustness tests of our benchmark fixed-effects panel VAR, and start with a discussion of those reported in Appendix E. Figure 17 shows the benchmark model estimated with three instead of twelve lags, as suggested by the SBC. As expected, the impulse responses look overall much smoother. In particular, the sudden delayed decline in both ∆CoVaR is not captured by the model and also the quantitative impact is smaller. However, qualitatively the risk-taking channel is preserved and the main results are therefore unaffected.\(^{22}\) Figure 18 shows

\(^{22}\)Notably, the risk-taking channel remains intact when we estimate a model using four to eleven lags as well.
the spirit of Jordà (43) employing not only the surprise shocks but also an updated narrative shock series originally computed by Romer and Romer (56).

3.3.1 US Hybrid FAVAR

In the spirit of Barakchian and Crowe (16) we reestimate our US FAVAR model where we replace the interest rate with the accumulated Gürkaynak et al. (39) surprise series, and then apply the same recursive identification scheme as before, based on the contemporaneous response of the set of fast-moving variables. Results are depicted in Figure 6, again for the full (top) and pre-crisis sample (bottom panel). All risk measures continue to decline mostly significantly following a monetary tightening. In the full sample, the responses (dashed) are somewhat more sluggish than the when using the policy rate (solid), but in the pre-crisis sample the dynamics are very similar.

**Figure 6: US hybrid FAVAR with Gürkaynak et al. (2005) surprise series**

![Graph showing impulse responses in the FAVAR(3) (full sample, top panel) and FAVAR(2) (pre-crisis, bottom panel) model with three factors to a one-standard deviation shock to the policy rate (solid) and cumulated Gürkaynak et al. surprise shock series (dashed). Each model includes a large set of macroeconomic variables (see Table A.2) and all depicted risk measures. Dotted lines and shaded areas indicate 90% confidence bands.](image)

**Note.** Impulse responses in the FAVAR(3) (full sample, top panel) and FAVAR(2) (pre-crisis, bottom panel) model with three factors to a one-standard deviation shock to the policy rate (solid) and cumulated Gürkaynak et al. surprise shock series (dashed). Each model includes a large set of macroeconomic variables (see Table A.2) and all depicted risk measures. Dotted lines and shaded areas indicate 90% confidence bands.

3.3.2 US proxy VAR

While including the accumulated monetary surprise series as a variable into the system is a simple way of incorporating external information on monetary policy shocks into a VAR framework, an alternative is to make use of the information in an instrumental variable framework as in Gertler and Karadi (38). This framework is useful not only in addressing endogeneity concerns in general but is especially suitable for our analysis which includes financial market variables. Since
controls in the model, the interest rate measure used as well as the time sample.\footnote{The result is confirmed also under a different methodology for computing the counterfactual, namely by restricting to zero all the VAR coefficients that govern the responses of market leverage to monetary policy shocks.}

**Figure 10: Panel VAR with market leverage: monetary policy shocks**

To complete the assessment we repeat the above experiments using book liabilities as measure of size and exposure (see Figures 27 and 28 in Appendix E). In this case, results are weakened further. Indeed, Figure 27 shows that the $\Delta$CoVaR measures decline following an increase in liabilities, while the other two measures do not significantly respond. Furthermore, Figure 28 shows that book liabilities do not fall for more than two years following a contractionary monetary policy shock and initially even increase. All in all, the above results show that the responses of banks’ balance sheet variables and systemic risk are mostly in line with the traditional risk-taking.
Figure 12: Panel VAR with US monetary policy as 5th variable

Note. Impulse responses in the panel VAR(12) (without US economy) to a one-standard deviation shock to the national (solid) and US (dashed) monetary policy measure. Shocks are identified by the variable ordering: log GDP, log CPI, US monetary policy measure, national policy rate, risk measure. Top panel uses the US policy rate, bottom panel the cumulated surprise shock series of Gürkaynak et al. (2005). Remaining details as in Figure 1.

4 Conclusions

We test whether a risk-taking channel of monetary policy, namely the notion that the stance of monetary policy affects the risk-taking behavior of banks, holds at an aggregate and systemic level. This has important implications as the channel would be relevant for the setting of monetary policy only to the extent that it affects the real economy and the financial system as a whole. We address this question using time series evidence, which allows us to account for the endogenous response of

\[46\] We may note that disentangling national from US shocks makes price and output puzzles largely disappear and national prices seem to respond to both national shocks and those from abroad, see Figure 30 in Appendix 2.

\[47\] Notably, we found that ordering national rates before their US equivalents hardly changes risk responses.
Conclusions

- Risk-taking channel confirmed on many fronts
- Calls for setting optimal exit time
- Calls for optimal combination policy
- Macro-prudential shall internalize macro externalities