Global implications of multi-dimensional US monetary policy normalization

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Work in progress

The views stated herein are those of the authors and not of the ECB.

Starting point

Fed has entered tightening cycle

Especially pertinent at this juncture: Tightening along multiple dimensions

- Current policy rate, forward guidance, asset holdings
- Communication/perceptions: Endogenous tightening vs. revelation of bullish Fed outlook?

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Effects on RoW?

- Large body of empirical work predicts large spillovers
- **But only little work on spillovers across the different dimensions of Fed's toolkit**

Research questions

What are implications of Fed tightening for the RoW

- across dimensions of Fed's toolkit?
- in terms of transmission channels and MP trade-offs?
- across degrees of vulnerability and policy responses?
- at the current juncture (still?) expecting further tightening in a Fed tightening cycle?

Findings

US MP spillovers to RoW

- Large for FG and LSAP, very small for shocks to current Fed funds rate
- FG and LSAP entail output vs. price and macro vs. financial stability trade-offs in EMEs

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- Odyssean/Delphic FG: Key role for risk-on/off, especially for EMEs
- LSAP: Key role for risk-on/off, limited role—if any at all—for term premia

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Non-linearities

- Economies with macro-financial vulnerabilities or in recessions exhibit greater spillovers
- Spillovers from Fed tightenings in Fed tightening cycle relatively benign

Jarociński (2021)'s MP shocks

Identification through 'Independent Components Analysis'

- Start from high-frequency surprises around FOMC meetings
- Exploit that interest rate surprises are highly non-Gaussian Example
- Postulate N unobserved thick-tailed and mutually independent structural shocks Intuition
- No recursiveness, sign or magnitude restrictions needed

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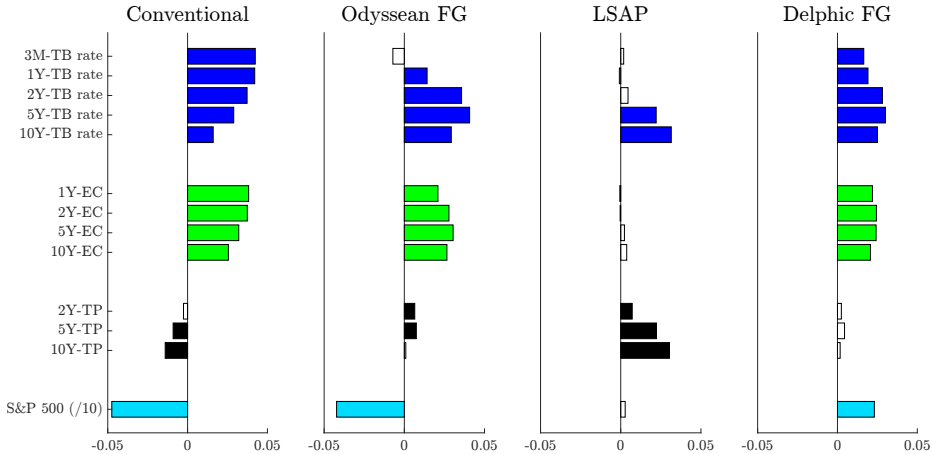
Structural interpretation of shocks

- *Ex post* based on patterns in financial market effects
  Rigobon (2003)
- Approach unique, as it turns out to simultaneously ▸ Time series
  - capture separately US conventional and unconventional (FG and LSAP) MP shocks
    Gürkaynak et al. (2005a,b); Swanson (2021)
  - distinguish between 'pure' MP shocks and Fed information effect
    Campbell et al. (2012); Nakamura and Steinsson (2018); Jarociński and Karadi (2020); Miranda-Agrippino and Ricco (2021)

Impact-day effects of Jarociński (2021)'s shocks



Note: Each bar depicts the daily impact response of a US monetary policy shock estimated from local projections. The sample period spans 1991m1 to 2019m6. Filled bars indicate estimates that are statistically significant at the 90% confidence level. Standard errors are robust to heteroskedasticity and serial correlation. 'TB' denotes Treasury bond, 'EC' the Treasury yield curve expectations component, 'TP' the Treasury yield term premia. Filling indicates effects statistically significant at the 90% level.

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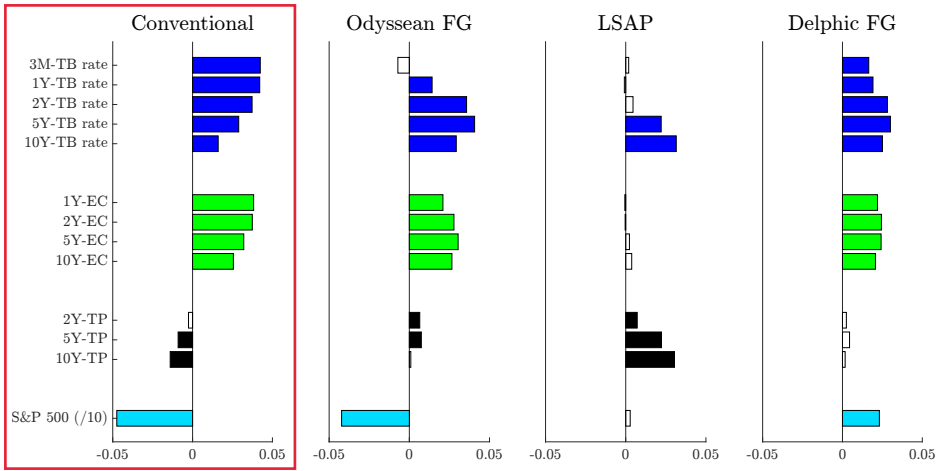

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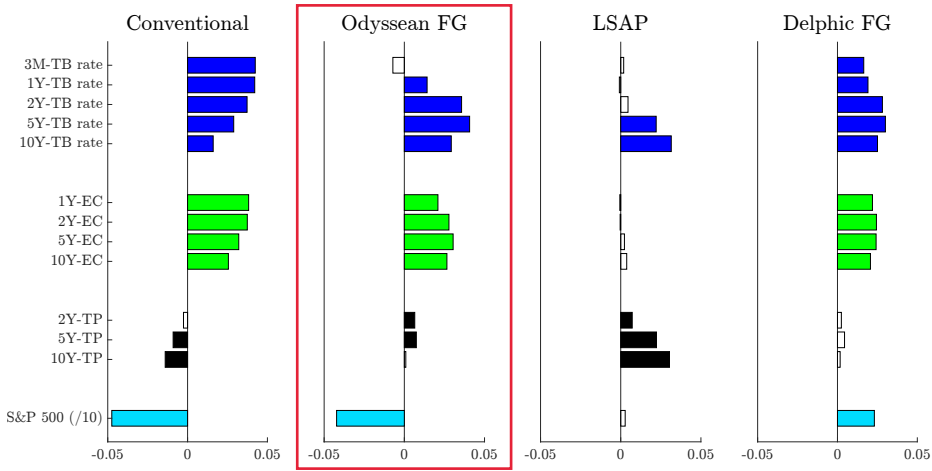

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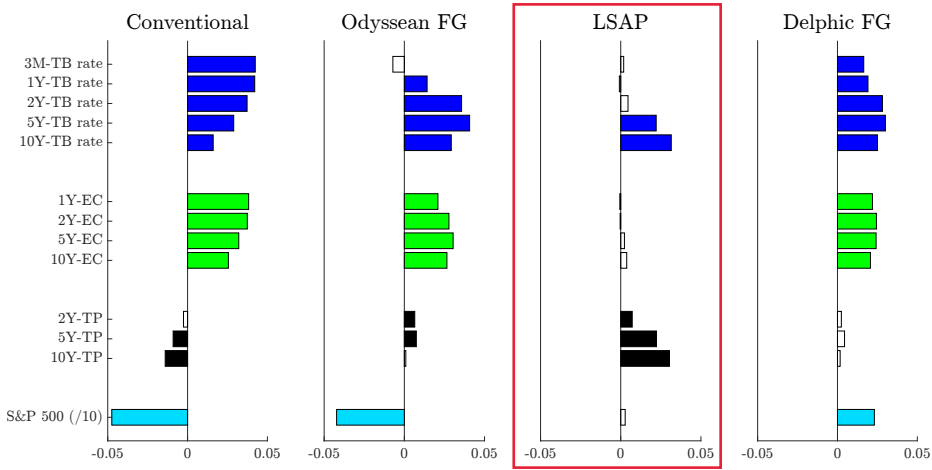

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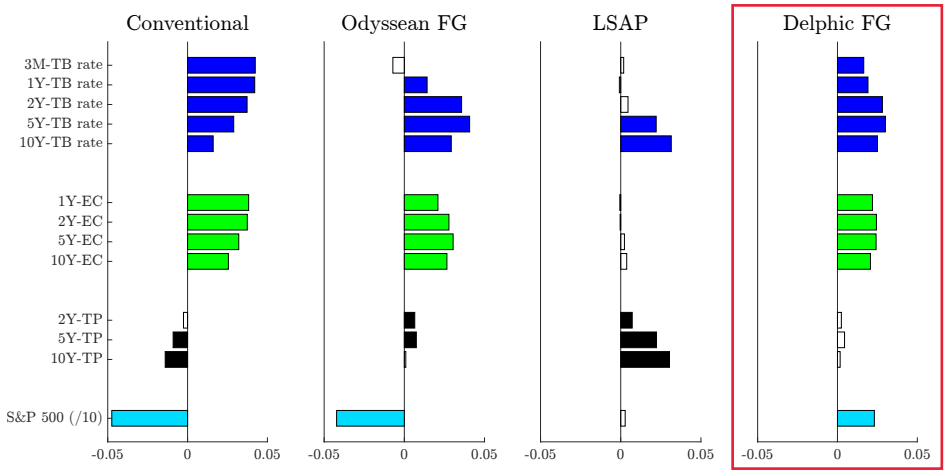

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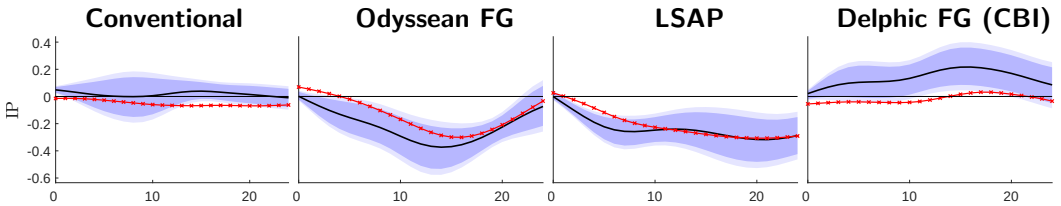
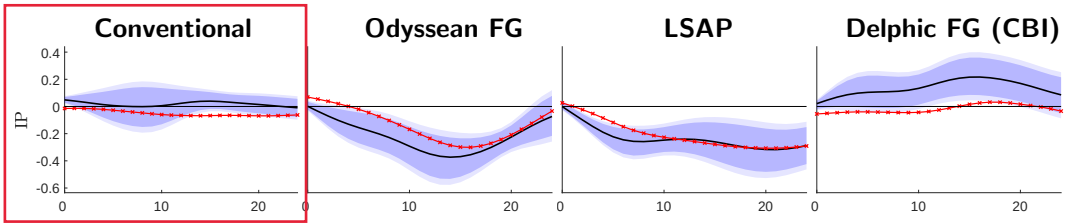
Real activity spillovers to RoW and domestic effects in US



Note: The black solid lines indicate the impulse responses of RoW variables to the US monetary policy shocks of Jarociński (2021) estimated from SLPs of Barnichon and Brownlees (2019). The shocks are included simultaneously in the regressions. The sample period spans 1991m1 to 2019m6. Shaded areas indicate 68% and 90% confidence bands. The red cross lines represent the estimates for the corresponding US variables. Panels in a given row feature the same limits on the vertical axis.

▸ Impact day spillovers ▸ CPI effects ▸ Other real activity measures ▸ Panel LPs and country-specific SLPs ▸ Global factors ▸ Oil and trade

No meaningful spillovers from conventional MP shocks



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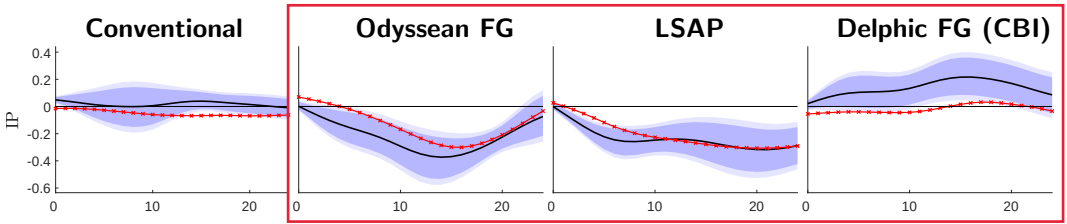
Spillovers from FG and LSAP shocks as large as domestic effects in US



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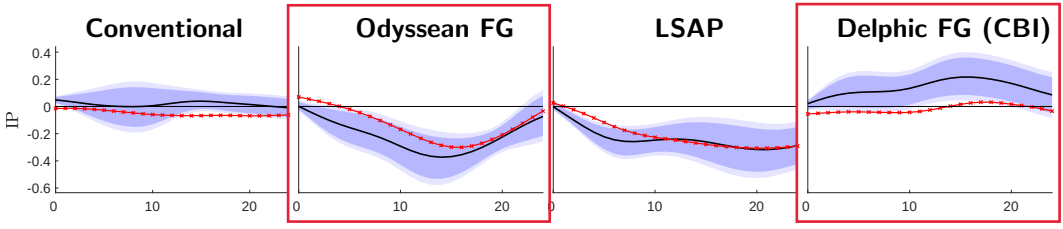
Odyssean and Delphic FG shocks have opposite effects



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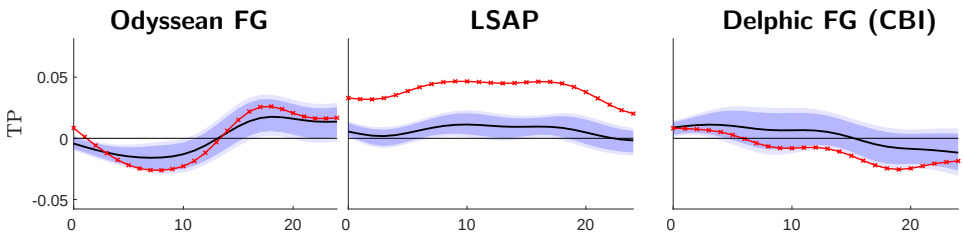
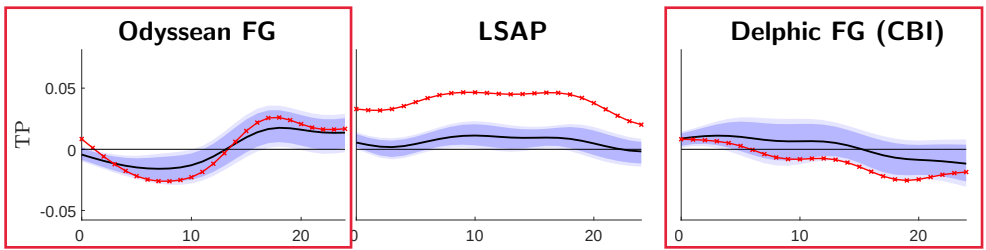
Transmission through term premia?



Note: Red crossed lines depict effects on US variables. The term premia are taken from D'Amico et al. (2018, DKW) and Diebold et al. (2006, DNS). The term premium is calculated as an unweighted average across Japan, Germany, Switzerland, the UK, Australia, Sweden, Canada and New Zealand.

Odyssean/Delphic FG: No role for term premia, move in wrong direction



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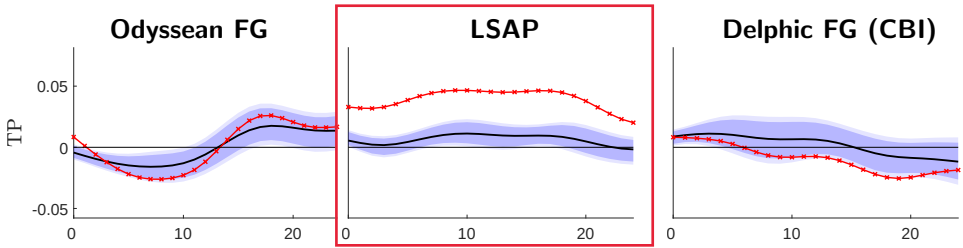
LSAP: Limited—if any at all—role for term premia



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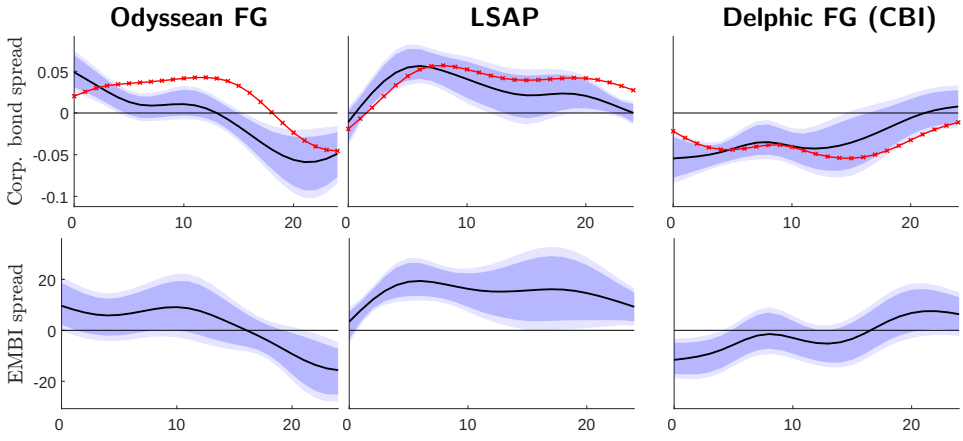
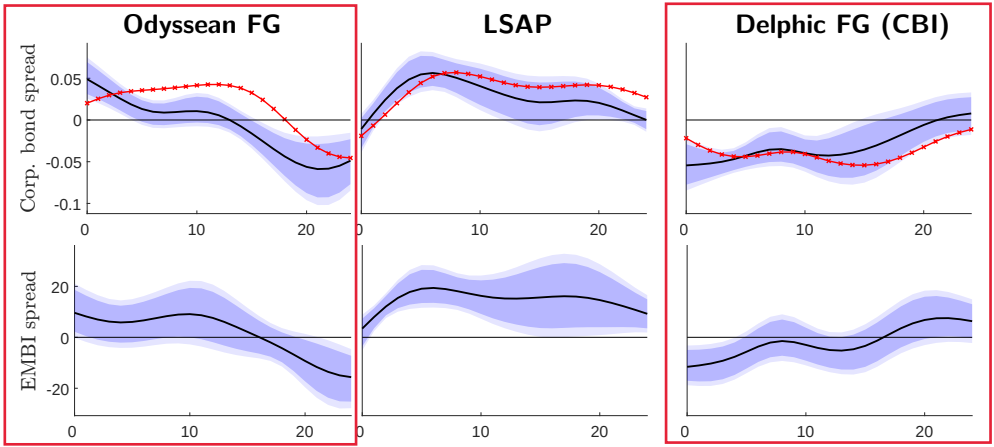
Transmission through risk channel?



Note: Top row shows effects on the euro area corporate bond spread. EMBI spread: J.P. Morgan Emerging Markets Sovereign Bond Index over US Treasury securities. Red crossed lines depict effects on US variables.

▸ Risk aversion and equity prices

Odyssean/Delphic FG: Key role for risk



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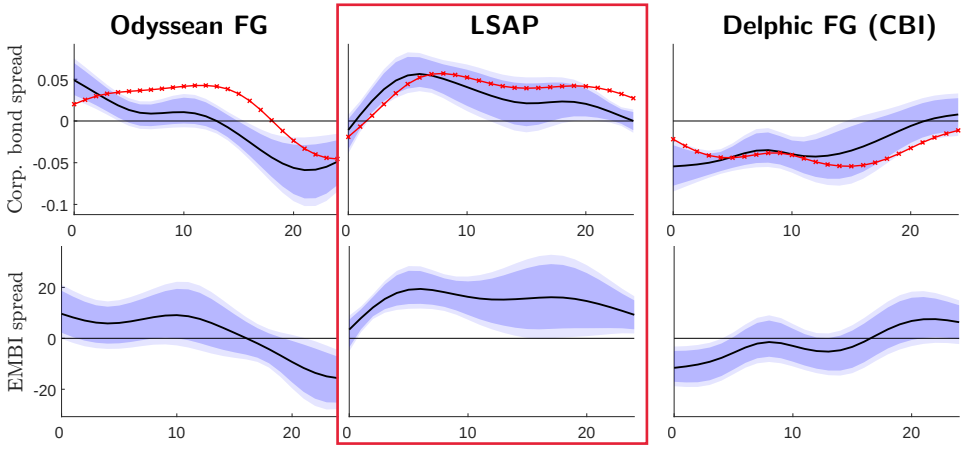
LSAP: Risk aversion does not seem key, at least initially



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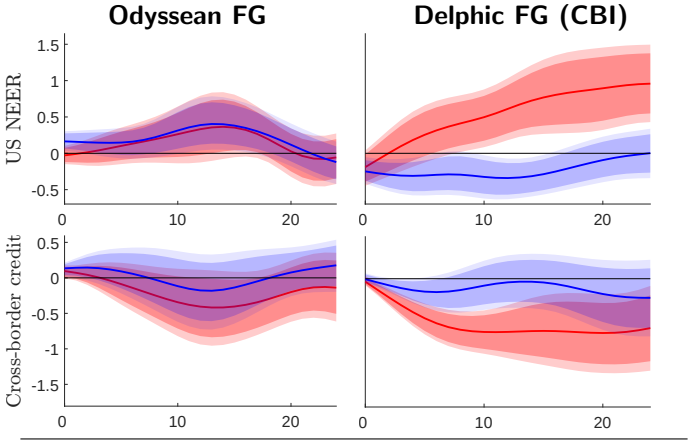
Special role for risk through the dollar in EMEs (AEs, EMEs)

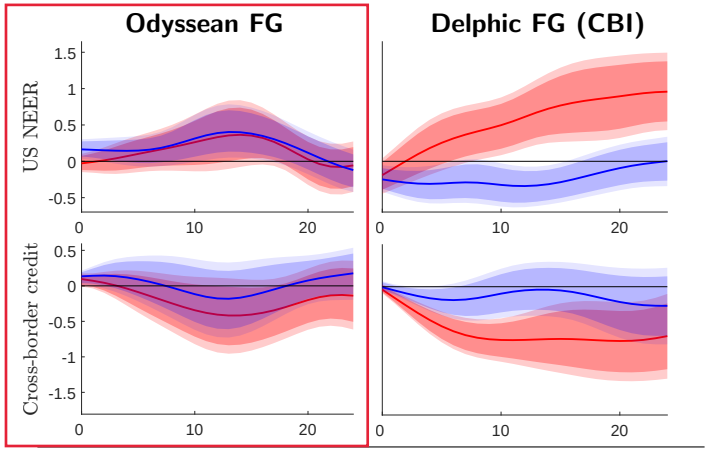


Note: Impulse responses for AEs in red and for EMEs in blue.

- **'Triangular' relation between US$, risk aversion and cross-border credit**
  Bruno and Shin (2015); Avdjiev et al. (2019)

▸ Output and CPI/individual countries

Odyssean FG: Effects on AEs and EMEs symmetric



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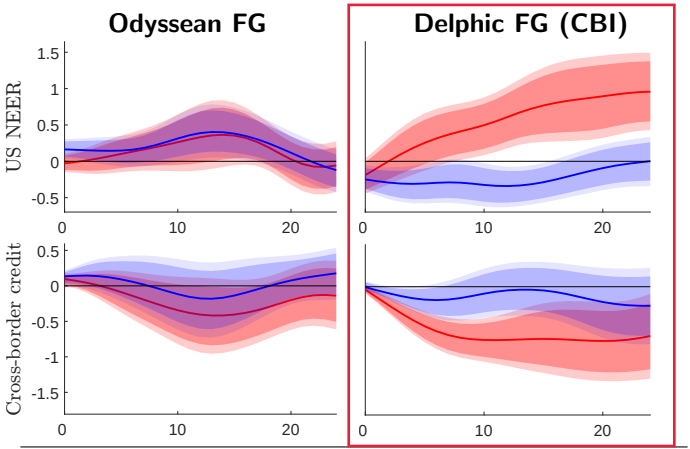
Delphic FG: Risk on drives down the dollar only vis-à-vis EMEs



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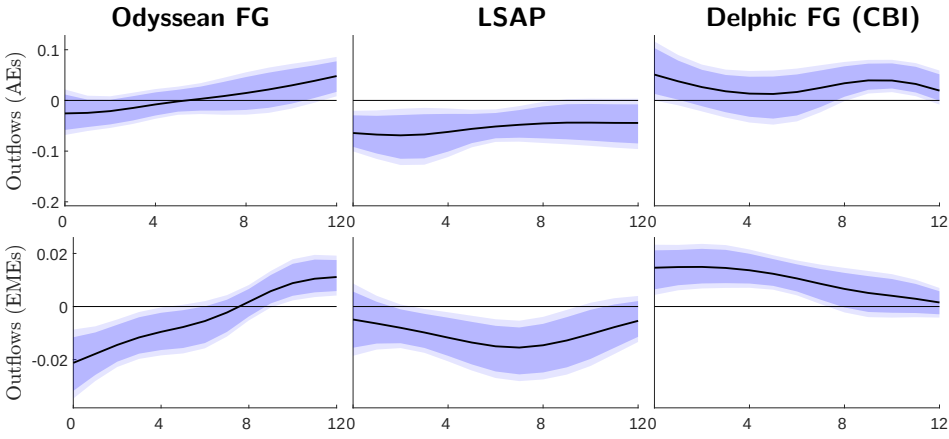
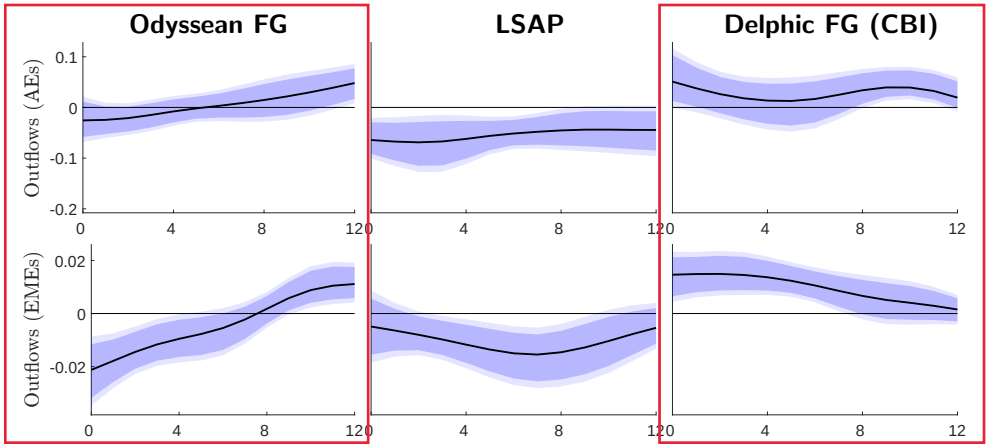
Capital flows (here: US portfolio outflows to AEs and EMEs)



Note: The figure presents the effects of US monetary policy shocks on inflows of portfolio debt and equity scaled by US GDP taken from US TIC. Inflows are defined as net increase in US foreign financial liabilities (or net purchases of domestic assets by foreigners), and outflows as net increase in US foreign financial assets (or net purchases of foreign securities by US residents).

Odyssean/Delphic FG: Risk-off/on drives US outflows, especially to EMEs



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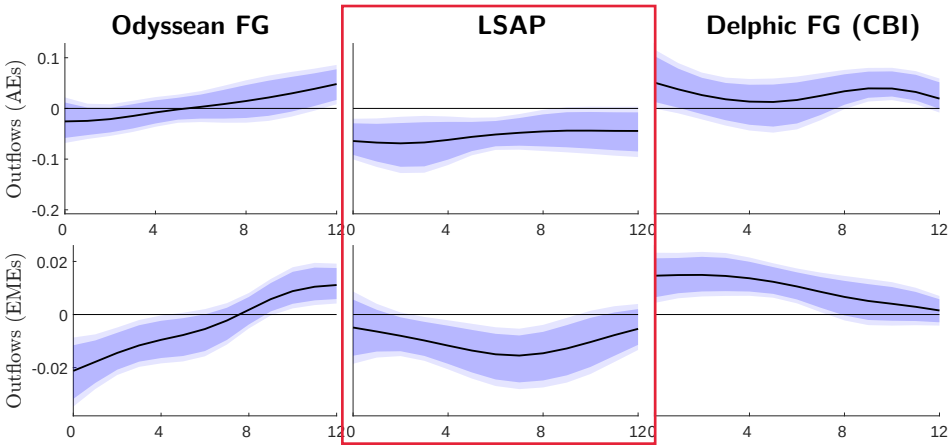
LSAP: Risk-off drives US outflows to both EMEs and AEs



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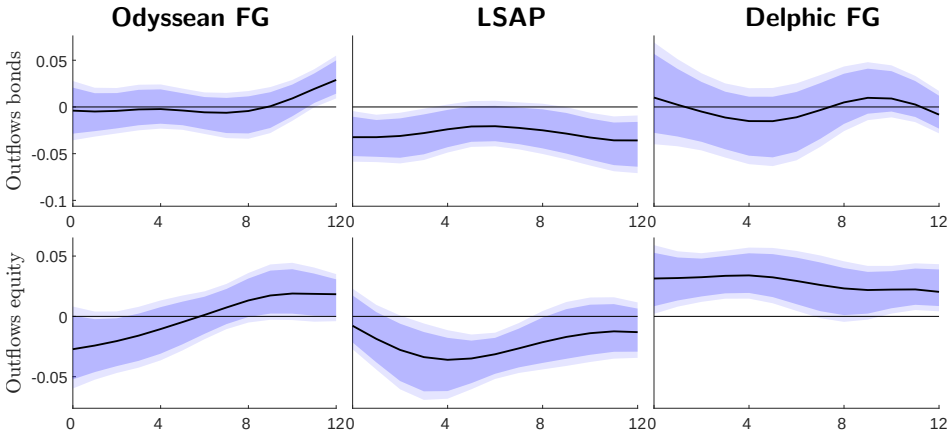
US outflows by instrument



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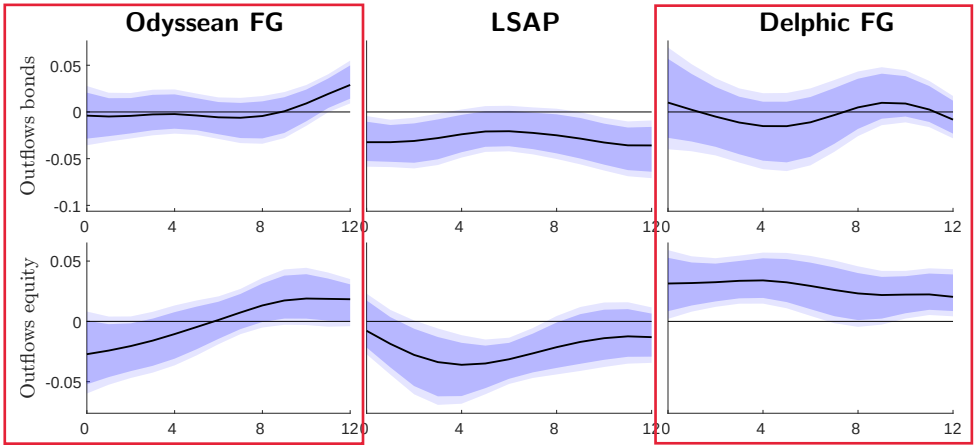
▸ US inflows and outflows ▸ Outflows by instrument & AEs/EMEs ▸ AE/EME IMF BoP inflows

Odyssean/Delphic FG: Primarily through equity



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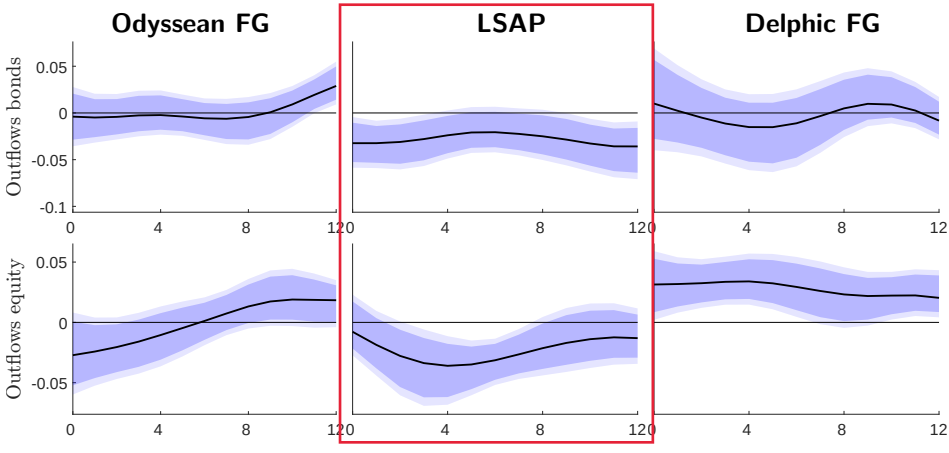
LSAP: Again through equity, but also bonds



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US MP spillovers and policy trade-offs in EMEs

EME policymakers complain about US MP spillovers

- 'Monetary tsunami' and calls for 'rules for the monetary game'
  Rajan (2013, 2016)

But are these complaints legitimate?

- US MP spillovers are externality only if they elicit trade-offs for EME MP

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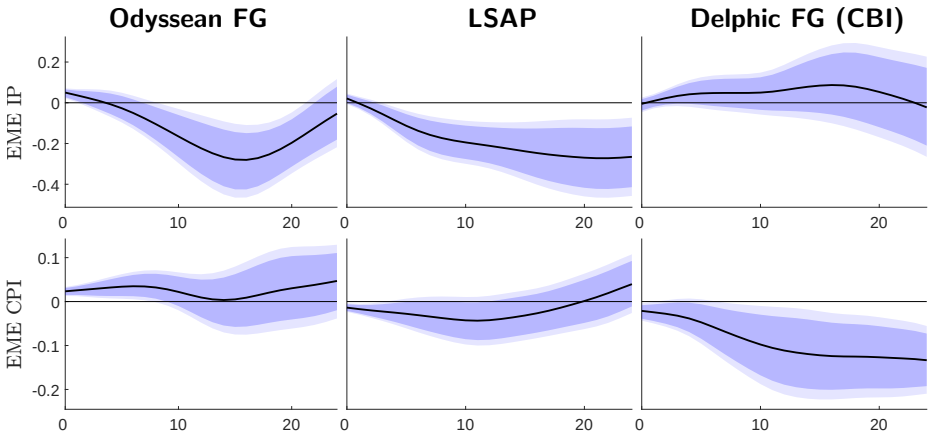
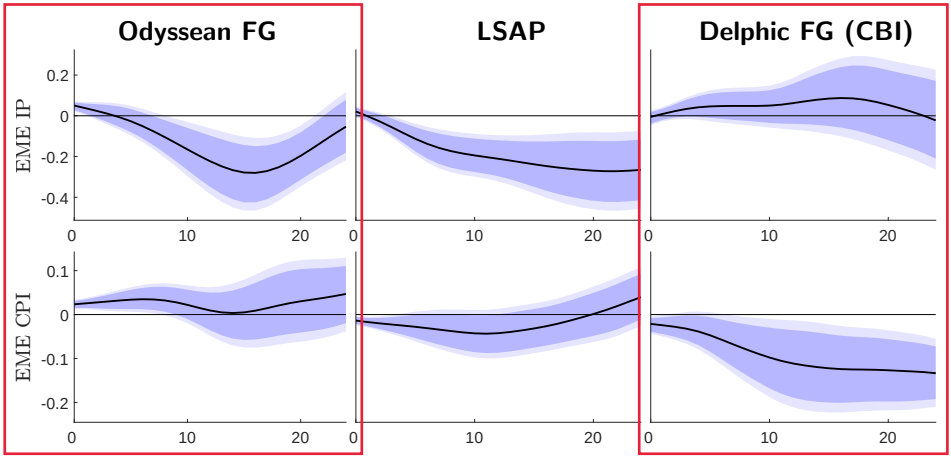
We explore trade-offs between

- output and price stabilization (=macroeconomic stability)
- macroeconomic stability and financial stability

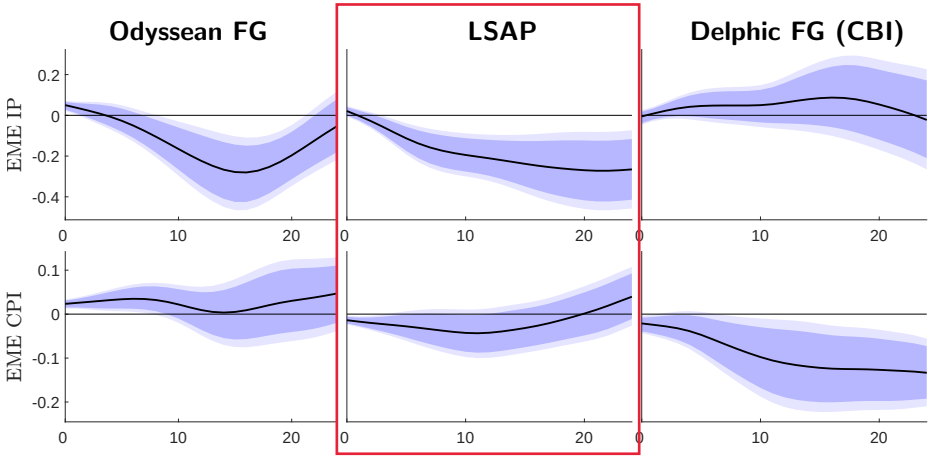
Trade-offs between output and prices



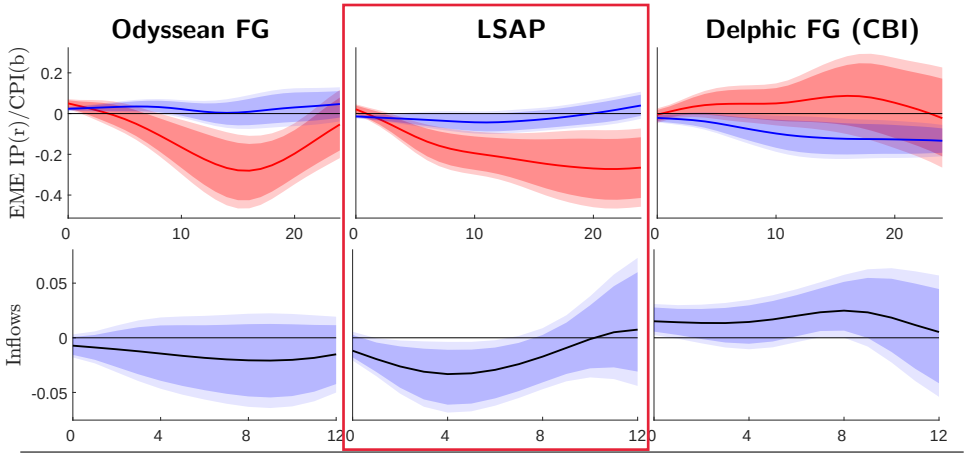
FG entails trade-offs between output and prices



...but not LSAP

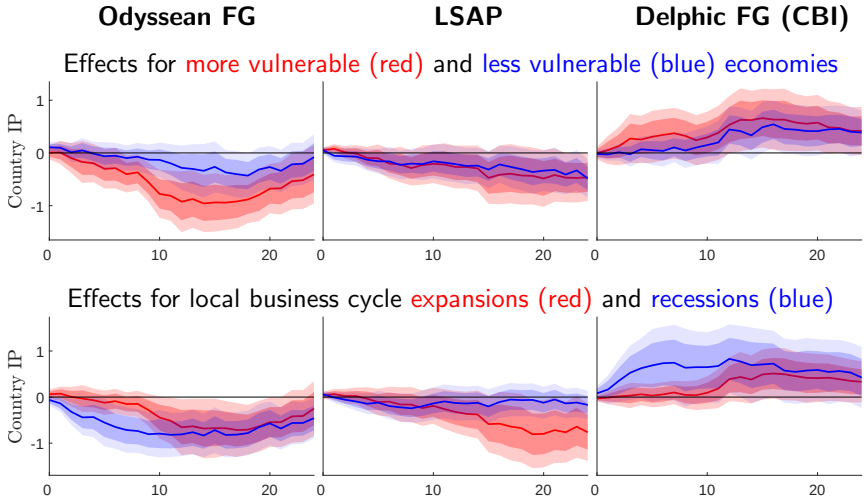

Odyssean FG
LSAP
Delphic FG (CBI)
EME IP
EME CPI
0.2
0
-0.2
-0.4
0.1
-0.1
0
10
20

But LSAP does entail trade-offs between macro and financial stability



Note: In the top panel the impulse responses for IP are depicted in red and those for consumer prices in blue.

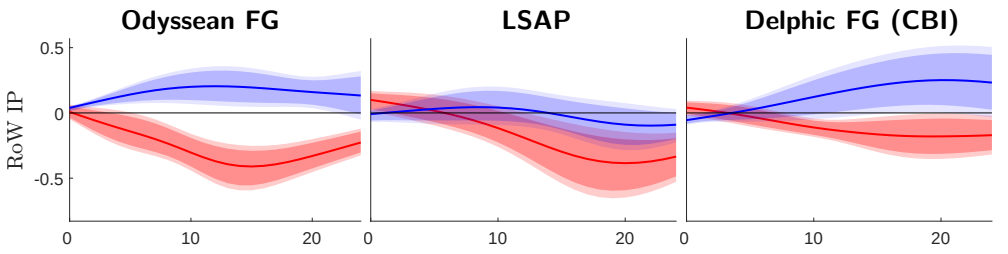
Greater spillovers to macro-financially vulnerable economies in recessions



- **Points to importance of 'keep your house in order' policies**

Smaller spillovers from Fed tightenings in tightening cycles

Effects of **contractionary** shocks in Fed loosening (red) and tightening (blue) cycles



Note: Impulse responses in red represent estimates for the effects during recessions and in blue during expansions. Only contractiuonary shocks are used in the estimation.

- **Spillovers from US MP normalization to overall RoW may be relatively benign**

Fed MP cycles | Non-linearities in domestic effects | AEs and EMEs

Summary and conclusion

What are the implications of Fed tightening for the RoW

- across dimensions of Fed toolkit?
  $\longrightarrow$ Especially FG and LSAP spillovers consequential
- in terms of transmission channels and foreign MP trade-offs?
  $\longrightarrow$ Risk channels key, trade-offs for EME MP
- across degrees of vulnerability and policy responses?
  $\longrightarrow$ Economies with vulnerabilities and in recessions ('keep your house in order')
- at the current juncture (still?) expecting further tightening in a Fed tightening cycle?
  $\longrightarrow$ Effects of tightenings in Fed tightening cycle more benign

Avdjiev, S., Bruno, V., Koch, C., Shin, H.-S., 2019. The Dollar Exchange Rate as a Global Risk Factor: Evidence from Investment. IMF Economic Review 67 (1), 151–173.

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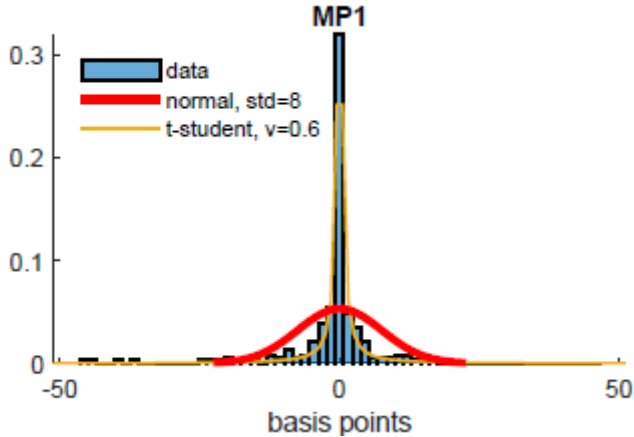
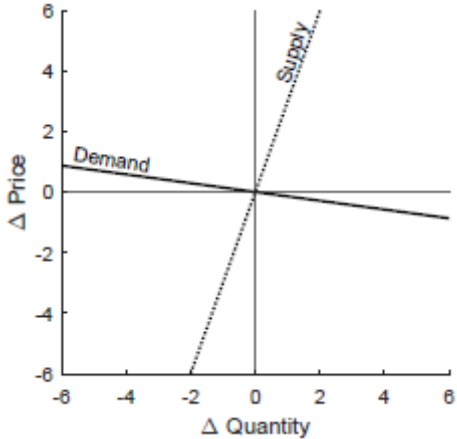
Jarociński (2021)'s MP shocks

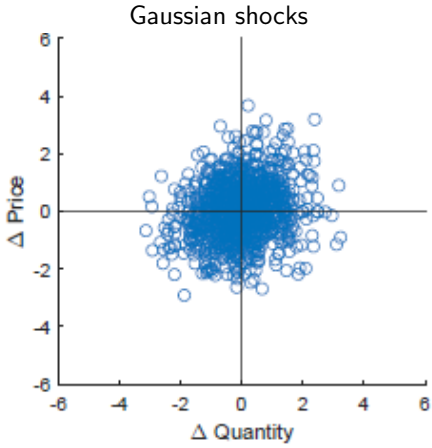


Return

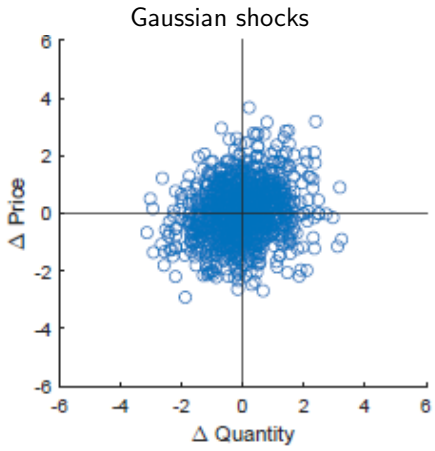
Intuition: Simple demand-supply example



What the econometrician observes



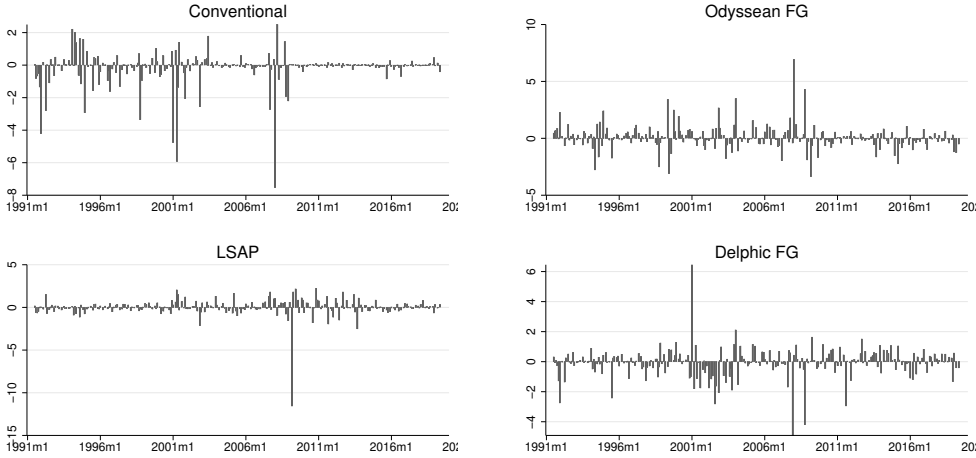
What the econometrician observes



- **Only one shock is large at a time!**

Return

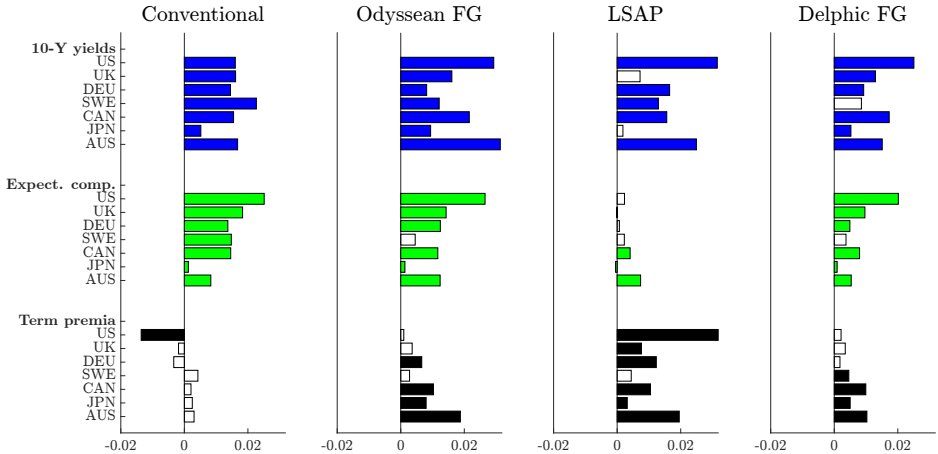
Time-series plots for Jarociński (2021)'s MP shocks



Note: The figure shows the incidence of the monetary policy shocks of Jarociński (2021) over time. Daily shocks are temporally aggregated by summing them up within a month.

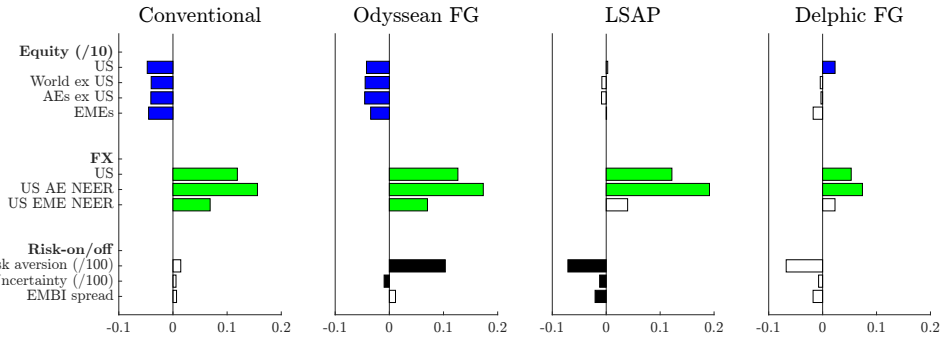
▸ Return

Impact-day spillovers to RoW interest rates...



Note: Each bar depicts the daily impact response of a US monetary policy shock estimated from the local projections. The shocks are taken from Jarociński (2021), and are included simultaneously in the regressions. Filled bars indicate estimates that are statistically significant at the 90% confidence level. Standard errors are robust to heteroskedasticity and serial correlation. The sample period spans 1991m1 to 2019m6.

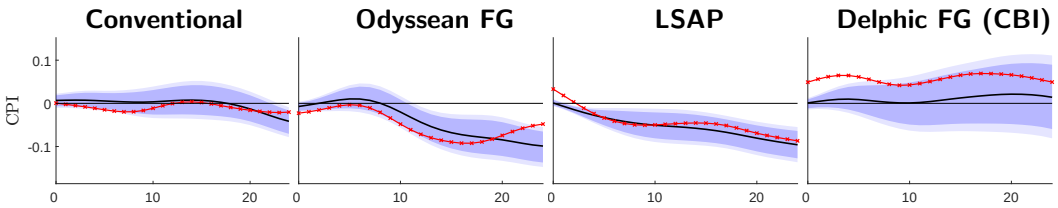
...and to equity prices, exchange rates, risk-on/off



Note: Each bar depicts the daily impact response of a US monetary policy shock estimated from the local projections. The shocks are taken from Jarociński (2021), and are included simultaneously in the regressions. Filled bars indicate estimates that are statistically significant at the 90% confidence level. Standard errors are robust to heteroskedasticity and serial correlation. The sample period spans 1991m1 to 2019m6.

▸ Return

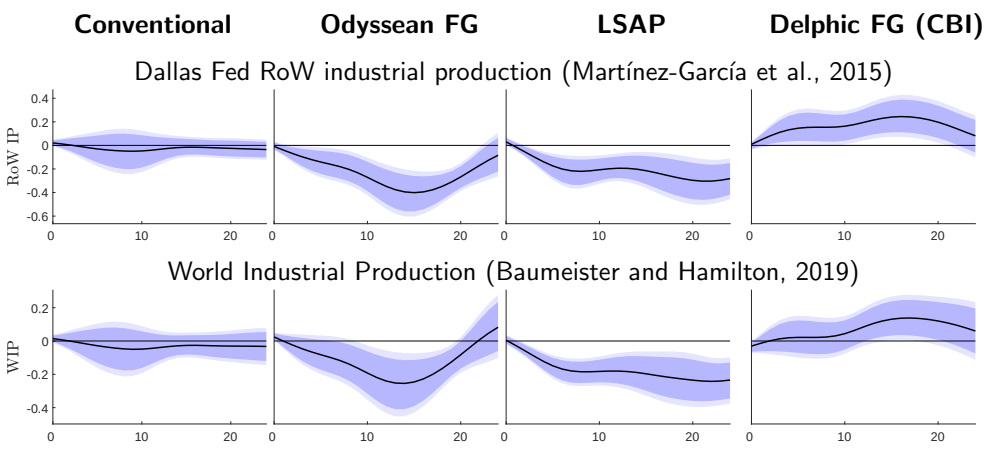
Large spillovers to RoW, similar to domestic effects in US



Note: The black solid lines indicate the impulse responses of RoW variables to the US monetary policy shocks of Jarociński (2021) estimated from SLPs of Barnichon and Brownlees (2019). The shocks are included simultaneously in the regressions. The sample period spans 1991m1 to 2019m6. Shaded areas indicate 68% and 90% confidence bands. The red cross lines represent the estimates for the corresponding US variables. Panels in a given row feature the same limits on the vertical axis.

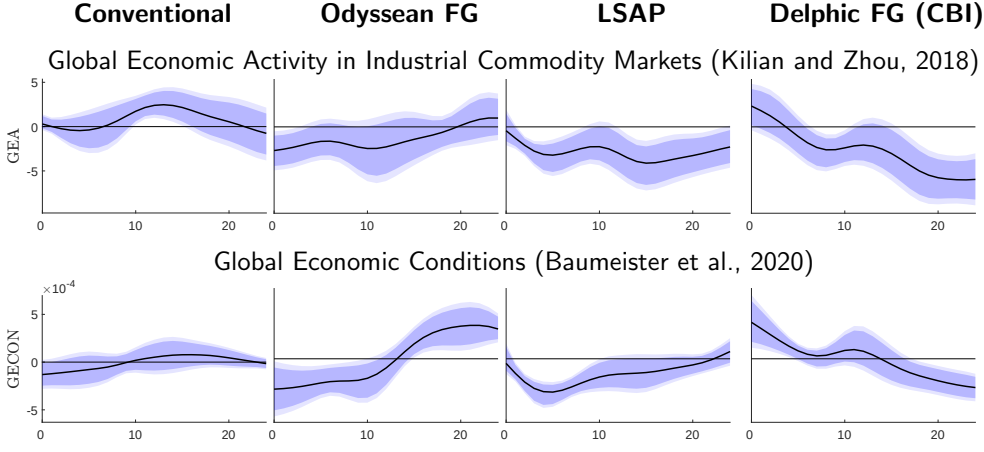
Return

US monetary policy spillovers to alternative real activity measures (I)



Note: The Dallas Fed RoW industrial production (Martínez-García et al., 2015) is an average of 40 non-US economies' industrial production indices calculated using US trade weights. The World Industrial Production index (WIP; Baumeister and Hamilton, 2019) is an extension of the OECD's index of monthly industrial production in OECD and six additional major other economies. The remaining indicators are all tied to predicting energy and/or commodity demand.

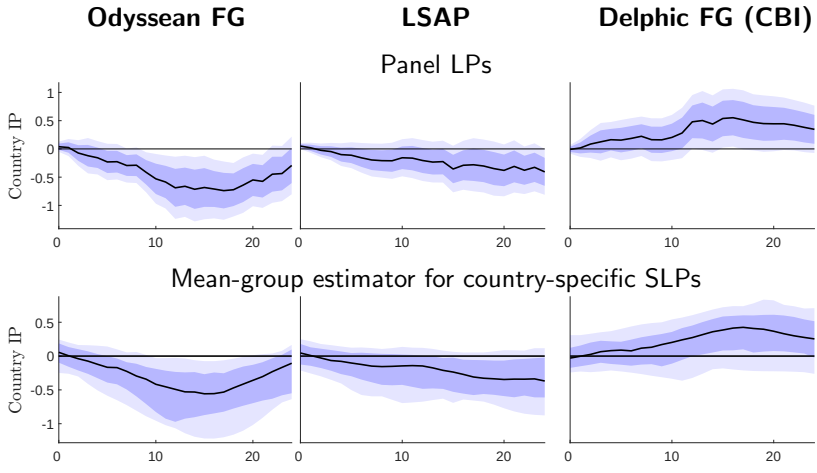
US monetary policy spillovers to alternative real activity measures (II)



Note: The Global Real Economic Activity Index in Industrial Commodity Markets (GEA; Kilian and Zhou, 2018) is derived from a panel of dollar-denominated global bulk dry cargo shipping rates and may be viewed as a proxy for the volume of shipping in global industrial commodity markets and is expressed in percent deviations from trend. Finally, the Global Economic Conditions indicator (GECON; Baumeister et al., 2020) is a combination of 16 indicators covering a broad range of variables including real economic activity, commodity prices, financial indicators, transportation, uncertainty, expectations, weather, and energy-related measures.

Return

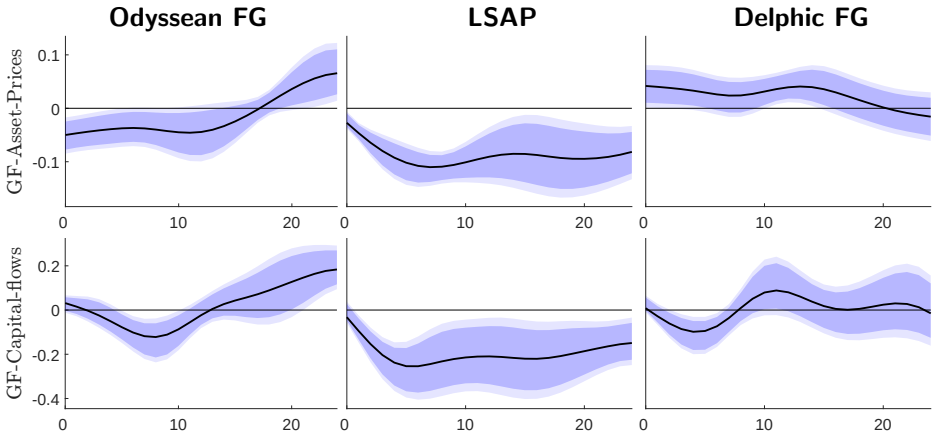
US monetary policy spillovers with panel LPs and country-specific SLPs



Note: The figure presents the results for the estimates of the spillovers from US monetary policy shocks obtained from the panel LPs in the top row and country-specific SLPs in the bottom row. For the panel LPs in the top row the shaded areas represent 90% and 68% confidence bands, based on Driscoll-Kraay robust standard errors. For the country-specific SLP in the bottom row the solid line represents the median and the shaded areas the 90% and 68% percentiles of the distribution of the country-specific estimates.

Return

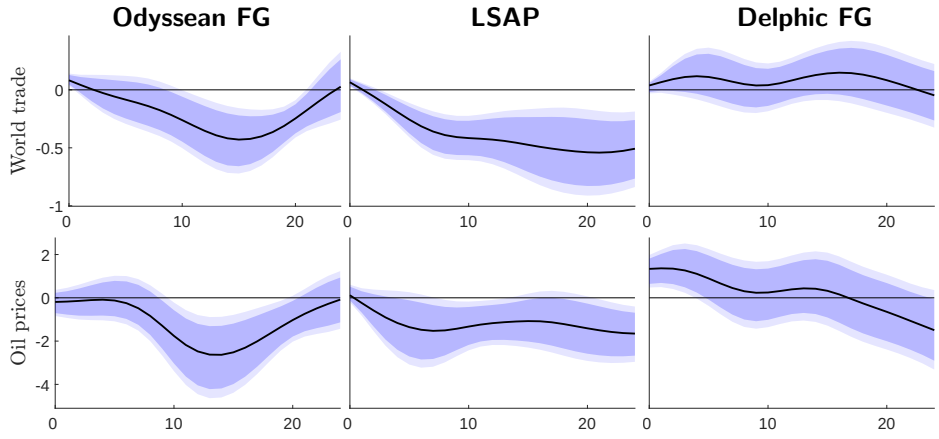
Effect of US MP on global factors



Note: The global factor ('GF') in risky asset prices were originally introduced by Miranda-Agrippino and Rey (2020) and extended in Miranda-Agrippino et al. (2020), and the global factor in capital flows is taken from Miranda-Agrippino et al. (2020).

Return

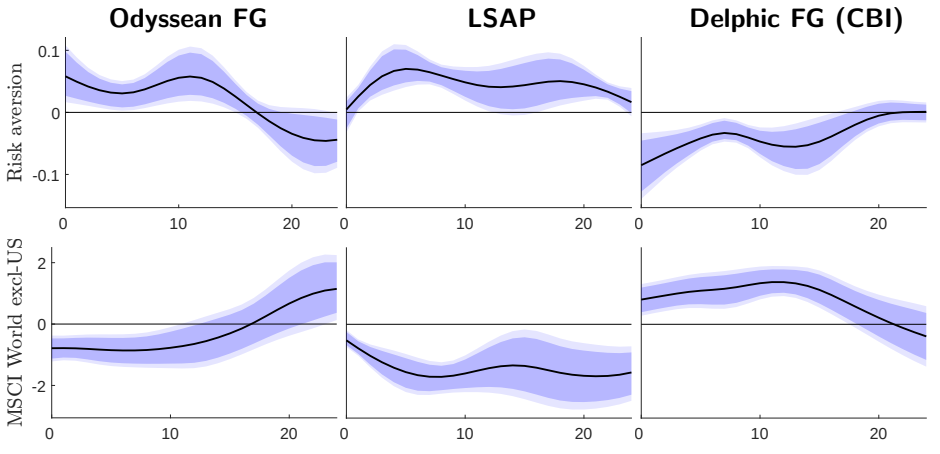
Effect of US MP on oil prices and world trade



Note: The black solid lines indicate the impulse responses of RoW variables to the US monetary policy shocks of Jarociński (2021) estimated from SLPs of Barnichon and Brownlees (2019). The shocks are included simultaneously in the regressions. The sample period spans 1991m1 to 2019m6. Shaded areas indicate 68% and 90% confidence bands. The red cross lines represent the estimates for the corresponding US variables.

▸ Return

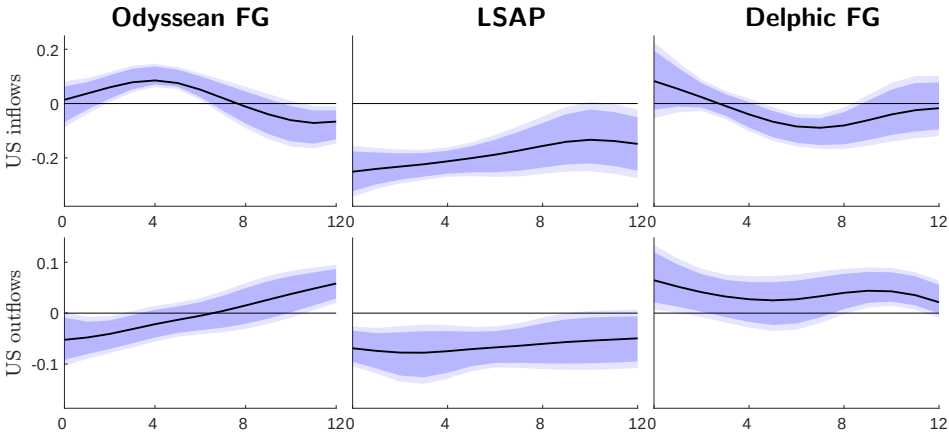
Transmission through risk channel



Note: Risk aversion is taken from Bekaert et al. (forthcoming).

Return

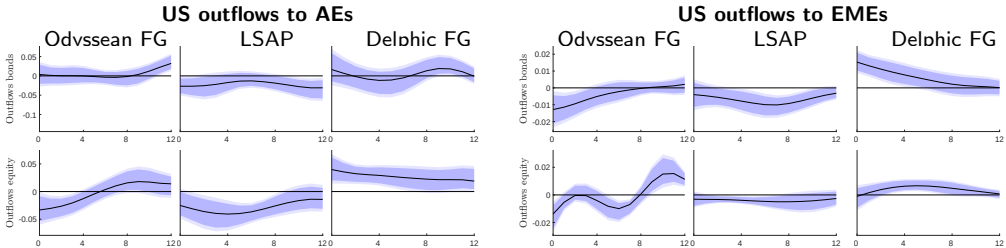
US inflows and outflows



Note: The figure presents the effects of US monetary policy shocks on inflows/outflows of portfolio debt and equity scaled by US GDP taken from US TIC. Inflows are defined as net increase in US foreign financial liabilities (or net purchases of domestic assets by foreigners), and outflows as net increase in US foreign financial assets (or net purchases of foreign securities by US residents).

Return

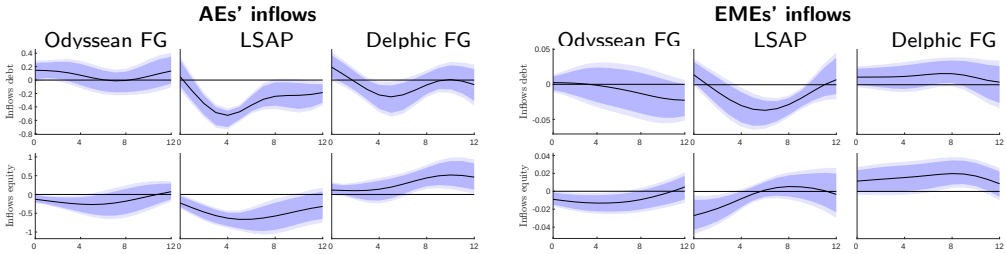
US outflows to AEs and EMEs by instrument



Note: The country classification for AEs and EMEs is taken from Miranda-Agrippino et al. (2020). See the notes to fig: IRFs RoW US flow vars slps main text.

▸ Return

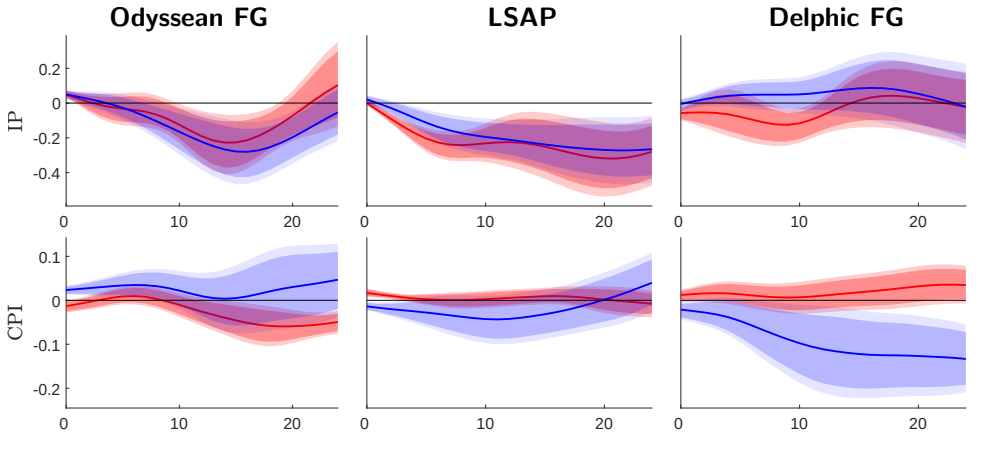
IMF BoP AE and EME inflows



Note: The data are taken from the IMF Balance of Payments Statistic, are interpolated from quarterly to monthly frequency, and span 1996 to 2019. We use the cross-country average of economies' ratio of outflows to recipient-country GDP.

▸ Return

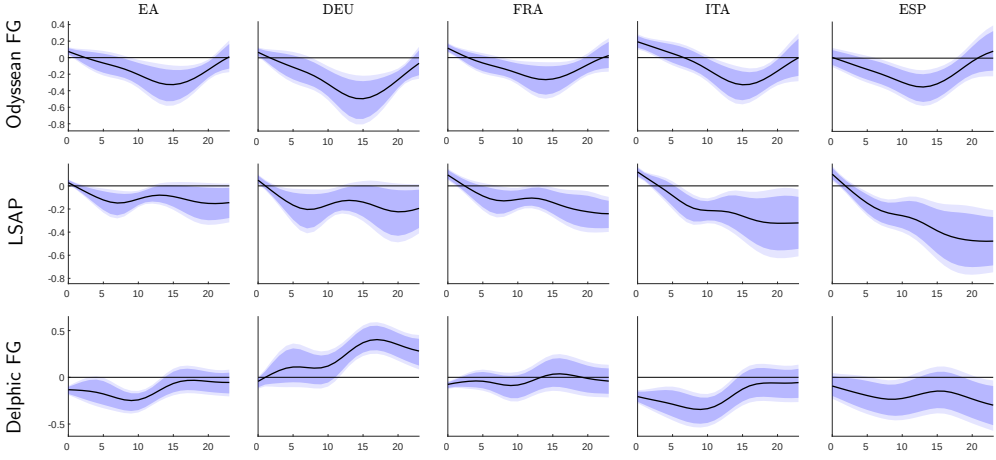
Asymmetries across AEs and EMEs



Note: Impulse responses for AEs in red and for EMEs in blue.

Return

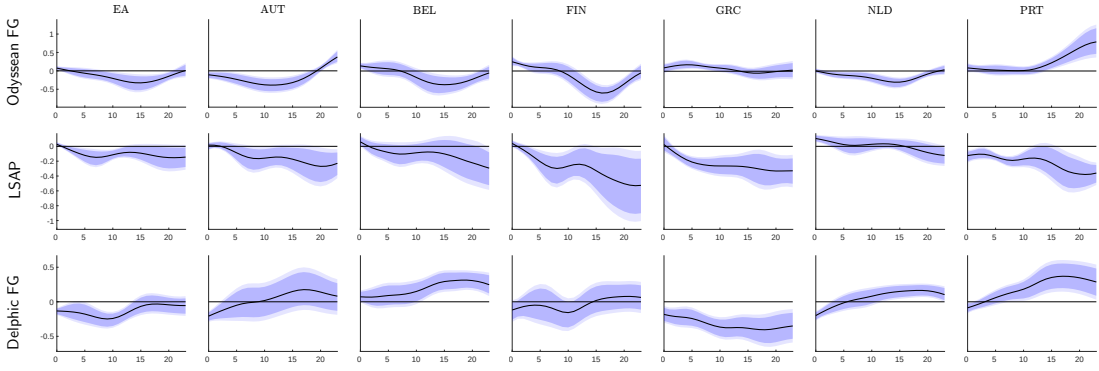
Output spillovers to large EA countries



Note: The black solid lines indicate the impulse responses of the unemployment rate to the monetary policy shocks of Jarociński (2021) estimated from the SLPs of Barnichon and Brownlees (2019). The shocks are included simultaneously in the regressions. The sample period spans 1991m1 to 2019m6. Shaded areas indicate 68% and 90% confidence bands. Panels in a given row feature the same limits on the vertical axis.

Return

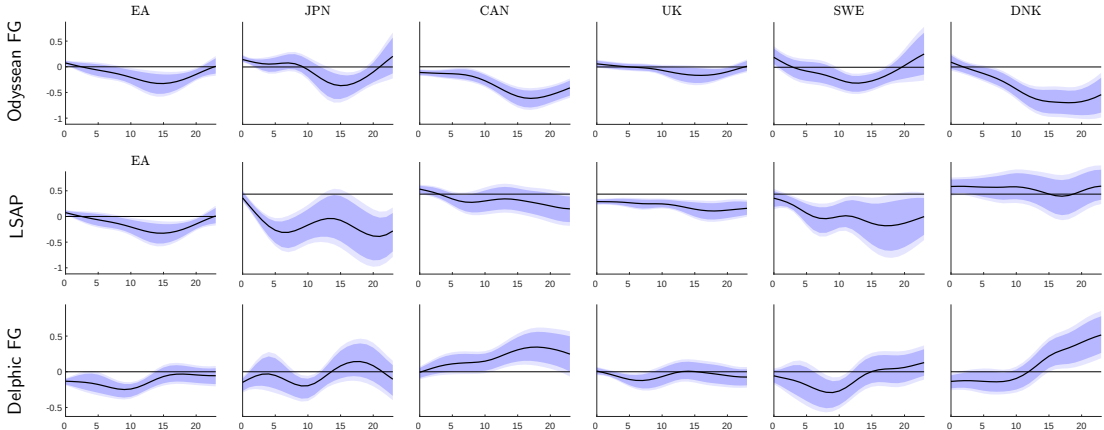
Output spillovers to small EA countries



Note: The black solid lines indicate the impulse responses of the unemployment rate to the monetary policy shocks of Jarociński (2021) estimated from the SLPs of Barnichon and Brownlees (2019). The shocks are included simultaneously in the regressions. The sample period spans 1991m1 to 2019m6. Shaded areas indicate 68% and 90% confidence bands. Panels in a given row feature the same limits on the vertical axis.

Return

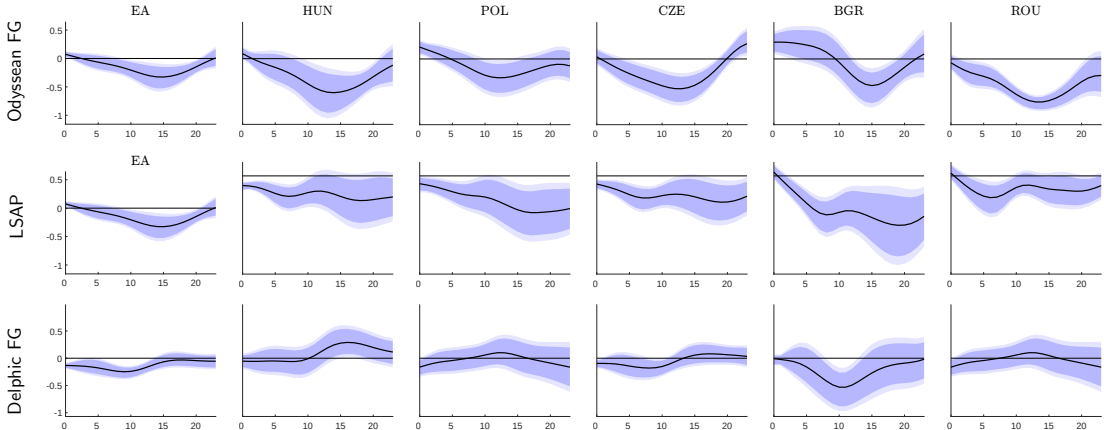
Output spillovers to non-EA AEs



Note: See the note to fig: IRFs individual EA AEs slps.

▸ Return

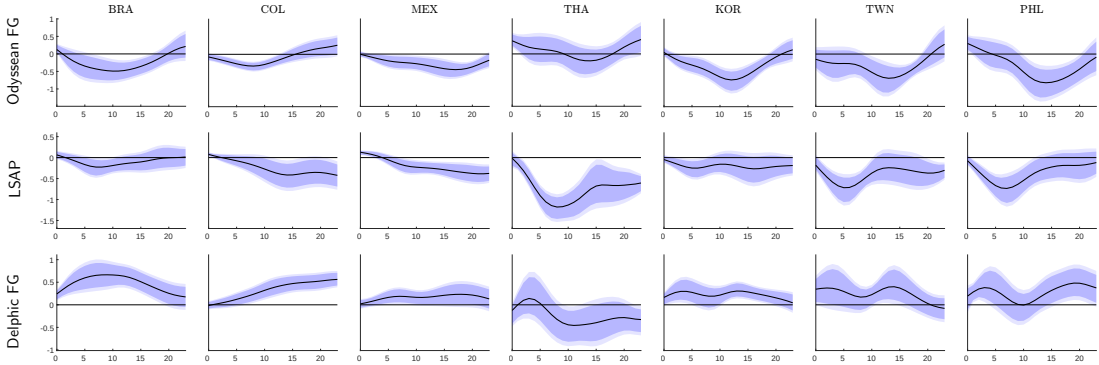
Output spillovers to Eastern Europe



Note: See the note to fig: IRFs individual EA AEs slps.

▸ Return

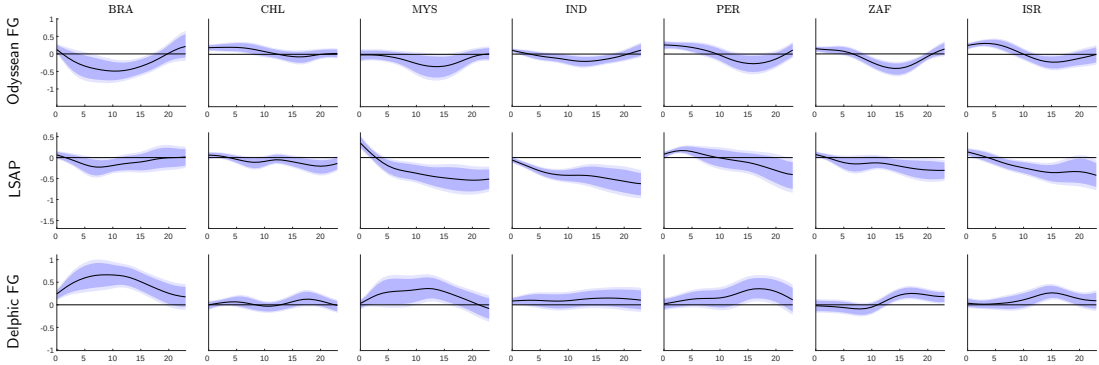
Output spillovers to individual EMEs I



Note: See the note to fig: IRFs individual EA AEs slps.

▶ Return

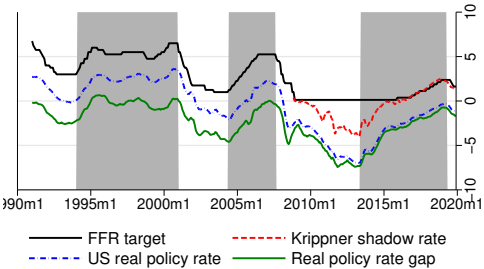
Output spillovers to individual EMEs II

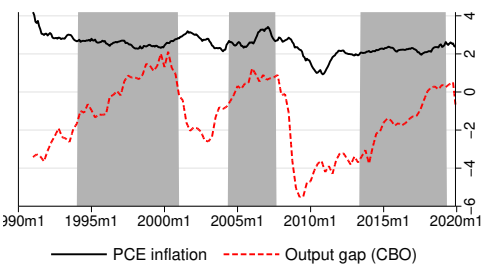


Note: See the note to fig: IRFs individual EA AEs slps.

▶ Return

US business/MP cycles



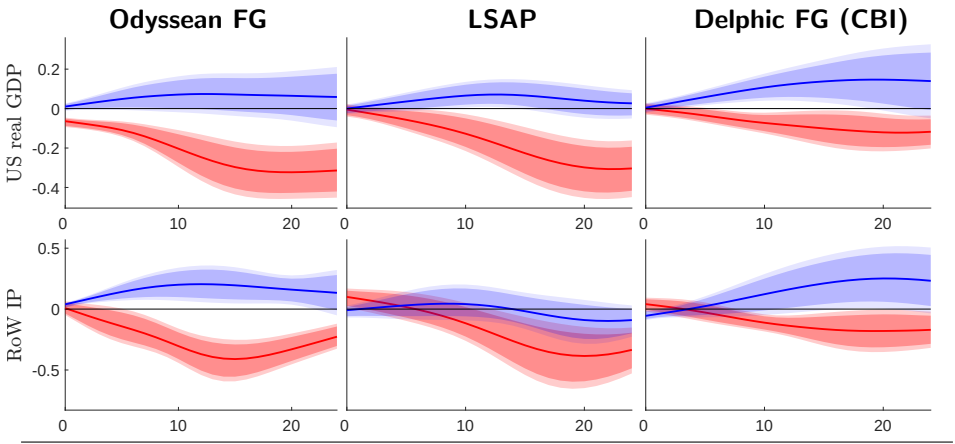


Note: In the left panel, the black solid line represents the Federal Funds target rate, the red dashed line the shadow short rate of Krippner (2013), the blue dashed-dotted line the implied ex ante real policy rate based on the University of Michigan inflation expectations, and the green solid line the real policy rate gap defined as the difference between the latter and the natural rate estimate of Holston et al. (2017) linearly interpolated from quarterly to monthly frequency. Grey shaded areas indicate narratively dated US tightening cycles. In the right panel, the black solid line depicts the Cleveland Fed median PCE inflation and the red dashed line the Congressional Budget Office's output gap.

▸ Return

Non-linearities in domestic effects

Effects of **contractionary** shocks in Fed loosening (red) and tightening (blue) cycles

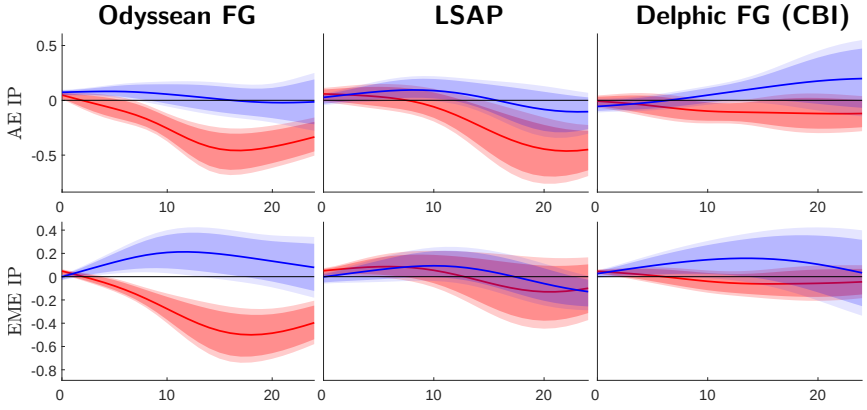


Note: Impulse responses in red (blue) represent estimates countries at the 90% (10%) percentile of the distribution of the vulnerability score in the sample.

Return

Spillovers from Fed tightenings in tightening cycles across AEs and EMEs

Effects of **contractionary** shocks in Fed loosening (red)
and tightening (blue) cycles



Note: See the notes to fig: IRFs US RoW real activity nonlin.

Return