China's footprint in global financial markets

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Outline

Motivation

Spillovers from China to global financial markets are relatively understudied...

- **Yet spillovers from China might have become increasingly relevant ...**
  - ▶ China accounted for 1/3 of global GDP growth in past decade
  - ▶ Monetary policy became more interest-rate based and renminbi is increasingly flexible
  - ▶ Gradual capital account liberalization and systemic position in global trade networks and commodity markets
- ... and anecdotal evidence suggests spillovers might be important, e.g. Evergrande

What we do?

Analyse how China financial market shocks ripple through global financial markets

- Challenge: global financial markets are simultaneously driven by multitude of shocks, most importantly US monetary policy (Rey 2015), and global risk sentiment (Georgiadis et al. 2021)

- Earlier studies on China spillovers rest on event studies, asset cross-correlations or simple VAR with no comprehensive identification of other key global shocks (N'Diaye et al. (2016), Arslanalp et al. (2016))

- Contributions:
  - ▶ New model framework that simultaneously identifies monetary policy and macro-risk shocks in China and the US, as well as global risk shocks
  - ▶ ... and this in a structural way (others have focussed on correlations/event studies)
  - ▶ Daily set up to capture high-frequency co-movements
  - ▶ Assessment of spillovers to wide set of global financial variables and commodity prices
  - ▶ Compare the impact of shocks in China with that of similar shocks in the United States

Empirical Approach

Two stages:

- **Stage 1:** A new US-China BVAR model that decomposes daily changes in Chinese and US financial variables into China, US and global risk shocks

- **Stage 2:** Panel local projections to examine high-frequency spillovers of China shocks to global financial and commodities markets
  - ▶ Quantify average spillovers from China shocks
  - ▶ Compare spillovers from China shocks to those from US shocks or global risk
  - ▶ Quantify if transmission of China shocks is non-linear
    - Are spillovers amplified when China shocks are large or global risk sentiment is fragile?

A new US-China BVAR model with financial data

- **6 variables**: 1-year CN interest rate swap, 10-years CN bonds yield, CN and US equities, CN-US 10-year yield spread and the CNY/USD

- **Sample**: January 2017 to September 2022

- **Identification**: via sign, narrative and relative restrictions, in spirit of Brandt. et al (2021)
    - ▶ Sign-restrictions: see table (next slide)
    - ▶ Relative magnitude restrictions: domestic variables react more strongly to domestic shock than to foreign equivalent shock
    - ▶ Narrative restrictions: Wuhan lockdown & September 2021 FOMC meeting

Stage 1. Identification through Sign Restrictions

Table: Identification assumptions via sign restrictions

Variable	Identified shock				
	China Monetary	China macro risk	US Monetary	US macro risk	Global risk
China short-term interest rate	−	+			
China long-term interest rate	−	+	−	+	
China equities	+	+(*)			
US equities			+(*)	+	+
China-US yield spread	−	+	+	−	−
Renminbi-dollar exchange rate	+	−	−	+	−

* denotes that additional magnitude and/or narrative restrictionsare imposed. Signs denote favourable macro/global risk shocks and accommodative monetary shocksâi.e. all the shocks would boost global equity prices. A â+âfor the Renminbi dollar exchange rate denotes an depreciation of the Renminbi against the US dollar.

Shock Validation

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Renminbi-dollar exchange rate	+	−	−	+	−

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Shock Validation

Justification of China assumptions

- **China's short-term & long-term rates**
  - Financing increasingly market-based (IMF, 2017)
  - Swap contracts increasingly liquid (Kamber and Mohanty, 2018)
  - Monetary policy transmitting to the entire yield term structure (Kamber and Mohanty, 2018; Jones and Bowman 2019)
- **China's exchange rate against the US dollar**
  - Managed float with increasing role for market forces
  - Greater volatility; CNY/USD central parity driven by market forces
  - De facto measures of RMB exchange rate flexibility improved
- **Timing assumptions**
  - China asset markets trade ahead of the US: all CN shocks can be incorporated in US asset prices in the same day
  - Use financial variables that are trading round-the-clock: US shocks will be incorporated in China's financial variable pricing and vice versa

Renminbi – US dollar exchange rate
(cumulative percentage change since Jan 2022)

- China MP
- China macro
- US MP
- US macro
- global risk
- Residual (summed)
- CNY/USD
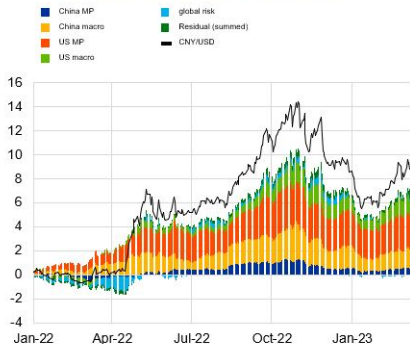
China equity prices
(cumulative percentage change since Jan 2022)

- China MP
- China macro
- US MP
- US macro
- global risk
- Residual (summed)
- China equity
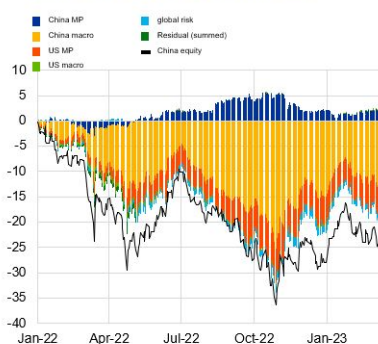
Sources: Haver, Refinitiv Datastream and ECB staff calculations.
Notes: Cumulative percentage changes in variables since 03/01/2022. The historical decomposition shows the contribution of structural shocks to the Renminbi – US exchange rate (increase is a depreciation of the Renminbi against the US dollar) and Chinese equity prices. The median shocks from the posterior distribution is used, which means that the sum of shock contribution can depart from actual changes in the explained variable if the posterior distributions is skewed. Latest observation is 05/12/2022.

Stage 2. Quantifying spillovers using Local Projection Method

Panel local projections (**Jorda (2005)**): for each horizon h and each structural shock :

$$\Delta y_{i,t+h/t} = \alpha_{ih} + \beta_{ih} * Shock_t + \sum_{j=1}^{3} \rho_{ijh} \Delta Y_{i,t-j/t-j-1} + Controls + \epsilon_{i,t+h}$$

- **Sample**: 30 economies (AE & EME small open economies)
- **Dependent Var.**: Equity prices, NEER, long-term interest rates and commodity prices (e.g. oil, metals)
- **Controls**.: VIX and US and Global Citigroup Economic Surprise Index (CESI)
- **Estimation**.: daily panel/daily time-series from Jan 2017 to Sept 2022

For identifying the importance of China shocks spillovers, controlling for other global shocks is key
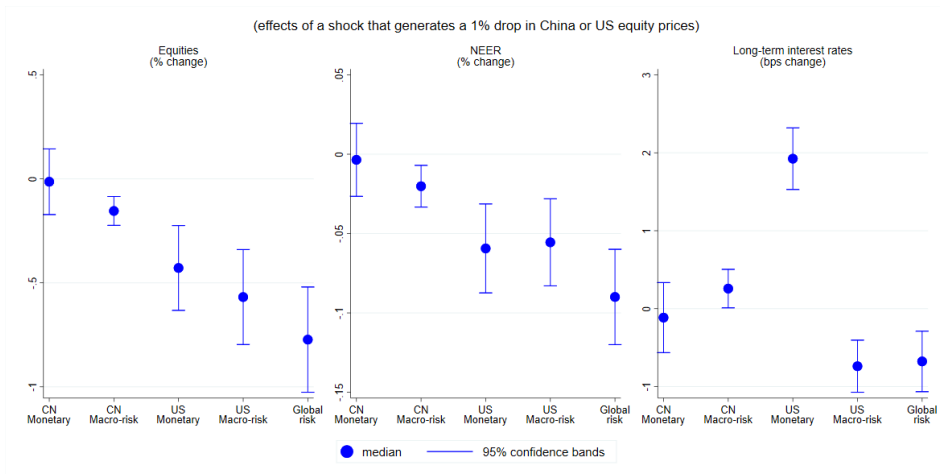
Figure: EQ IRF to CN macro-risk shocks & CN macro-risk shock contribution to EQ since news of CN re-opening
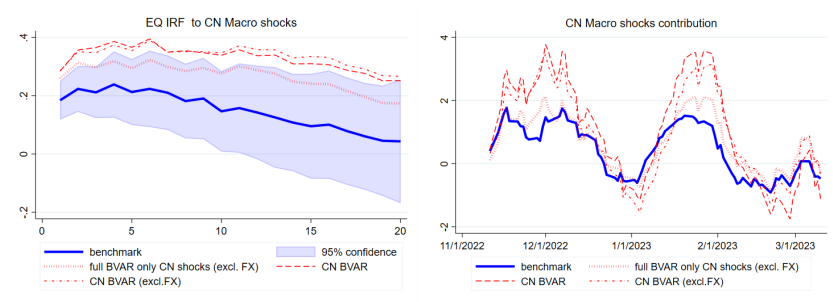

Alternative BVARs for CN shocks

China macro-risk spills over to global financial markets

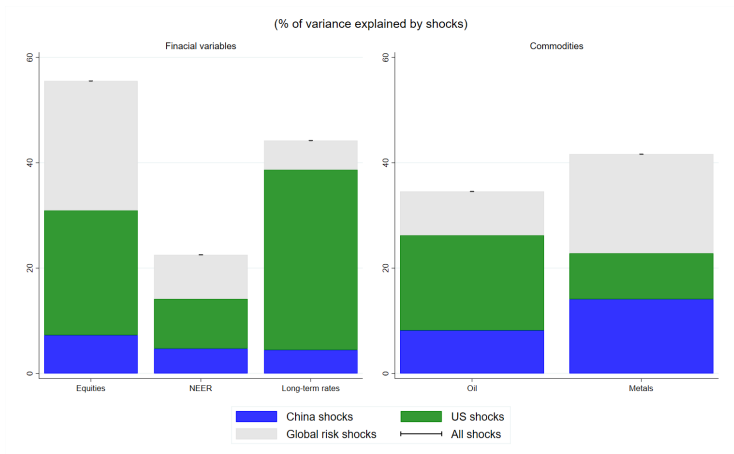Figure: The impact reaction of global financial variables to structural shocks

(effects of a shock that generates a 1% drop in China or US equity prices)

...and to commodities markets

Figure: The impact reaction of commodities prices to structural shocks

(effects of a shock that generates a 1% drop in China or US equity prices)
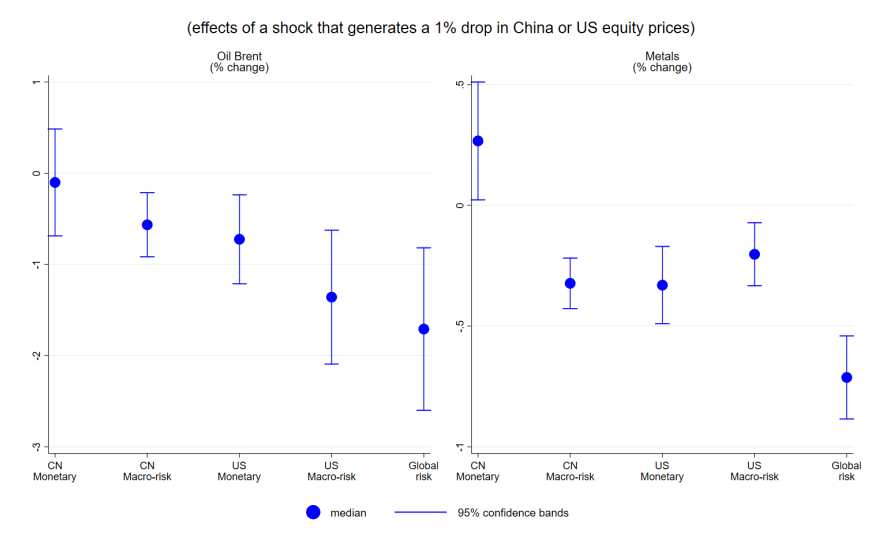
Variance decomp. confirms the marked effect on commodities

Figure: Variance explained by structural shocks after 20 days

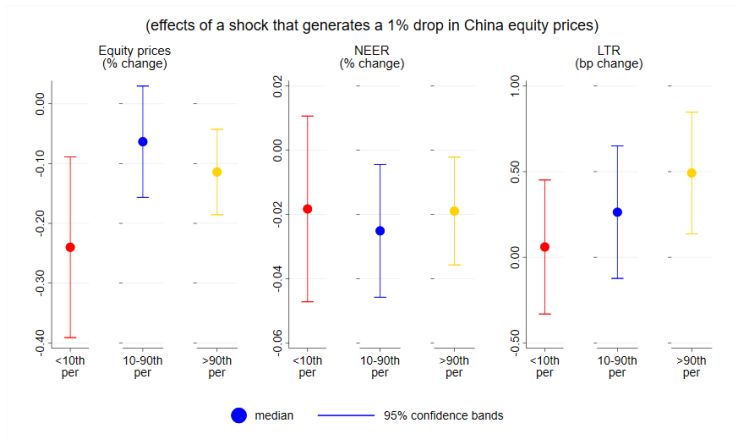(% of variance explained by shocks)

Variance Decomposition

The impact of out-sized China macro-risk shocks

Figure: China macro-risk shocks and the 10th and 90th percentile

China macro-risk shocks — 10th percentile — 90th percentile
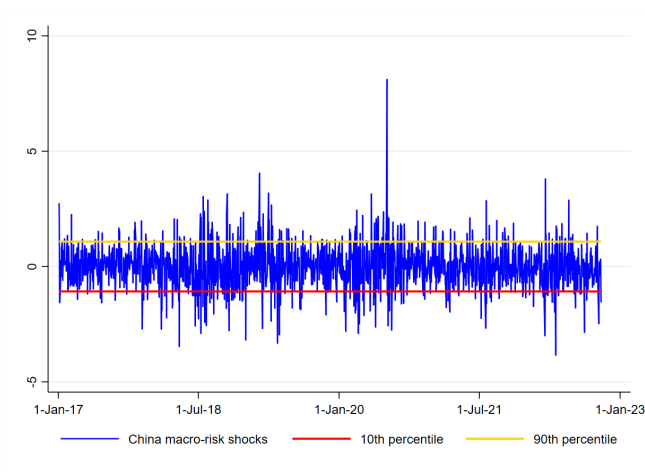
Larger negative China shocks spill over more...

Figure: The impact reaction of global financial variables depending on the magnitude of China macro risk shocks
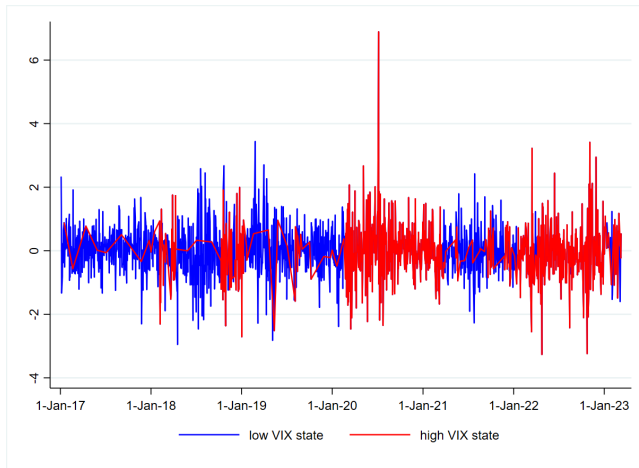

(effects of a shock that generates a 1% drop in China equity prices)

Non-linear Panel LP

Figure: The impact reaction of commodities prices depending on the magnitude of China macro risk shocks

(effects of a shock that generates a 1% drop in China equity prices)
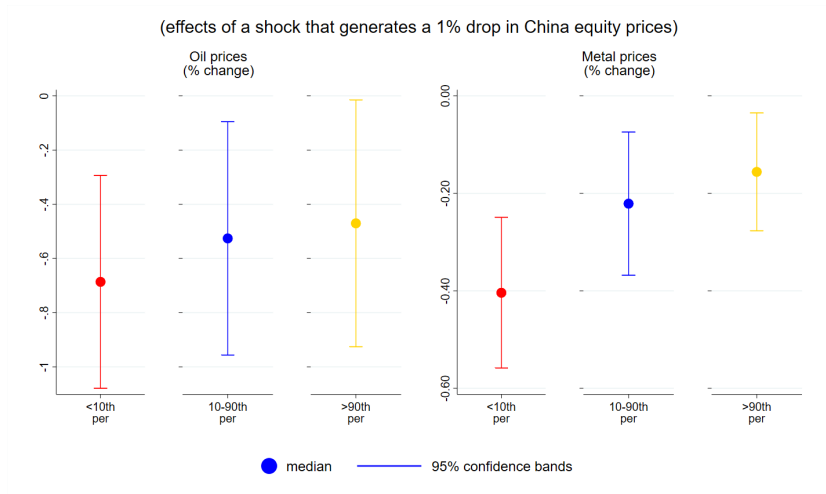
CN macro-risk shocks depending on the VIX state
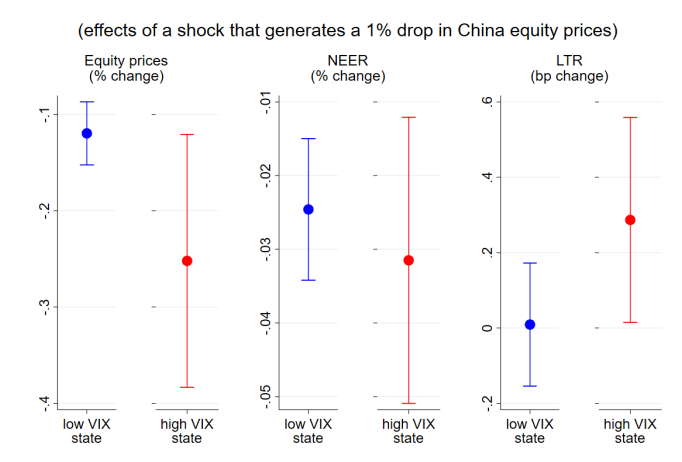
Figure: China macro-risk shocks in low and high VIX states

# The impact of CN macro-risk shocks is larger when global volatility is high

Figure: The impact reaction of global financial variables depending on the VIX state

(effects of a shock that generates a 1% drop in China equity prices)

...especially for commodities prices

Figure: The impact reaction of commodities prices depending on the VIX state

(effects of a shock that generates a 1% drop in China equity prices)

Conclusion
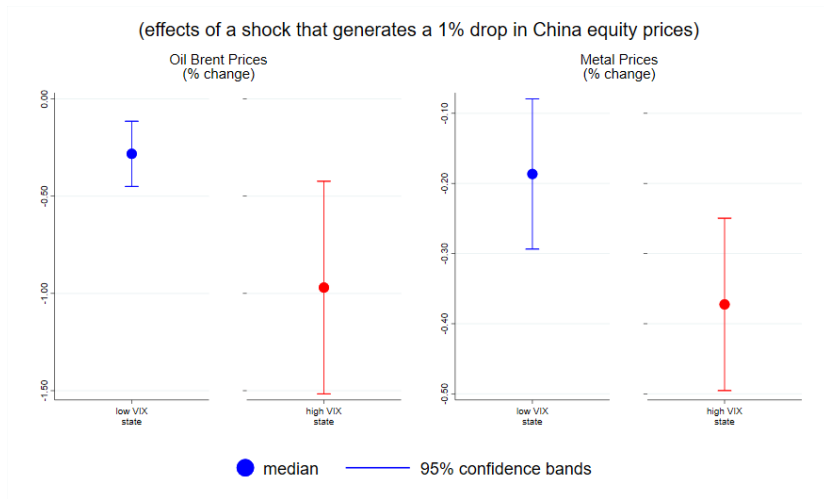
- Important to control for other global shocks in Stage 1 for not overestimating China's impact on global markets
- **Shocks to macro risk in China have material spillovers to global equity markets...**
- ... although they are smaller than those from US and global risk shocks
- **China matters notably for global commodity prices**, more on par with the US
- The impact of China macro-risk shocks are amplified when:
  - ► shocks are particularly large (and negative)
  - ► there is an environment of heightened global volatility
- Results underline importance of shifts in macro risk sentiment in China (e.g. COVID discussions) for global financial markets, certainly in current environment of elevated volatility

Thank you.