Global Footprints of Monetary Policies

Silvia Miranda-Agrippino[1,3,5]

Tsvetelina Nenova[2] & Hélène Rey[2,3,4]

[1]Bank of England
[2]London Business School
[3]CEPR
[4]NBER
[5]CfM(LSE)

FRB New York
November 7, 2022

▷ **Standard**
  ○ Countries trade in international goods market
  ○ Through FX Rates and CA Balances
  ○ Classic Mundellian Paradigm

▷ **Standard**
- ○ Countries trade in international goods market
- ○ Through FX Rates and CA Balances
- ○ Classic Mundellian Paradigm

▷ **Standard & Global Financial Cycle (GFC)**
- ○ Additional transmission from integrated fin'l markets
- ○ Through risk premia, leverage, capital flows, asset prices
- ○ FX only a <u>partial</u> shocks absorber

Avenues for International Monetary Policy Transmission

▷ **Standard**
- Countries trade in international goods market
- Through FX Rates and CA Balances
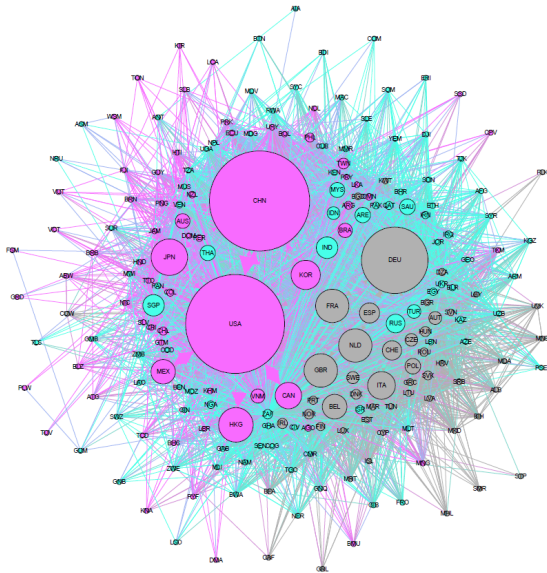- Classic Mundellian Paradigm

▷ **Standard & Global Financial Cycle (GFC)**
- Additional transmission from integrated fin'l markets
- Through risk premia, leverage, capital flows, asset prices
- FX only a <u>partial</u> shocks absorber

▷ **Standard & GFC & Global Value Chains (GVC)**
- Additional transmission from integrated production
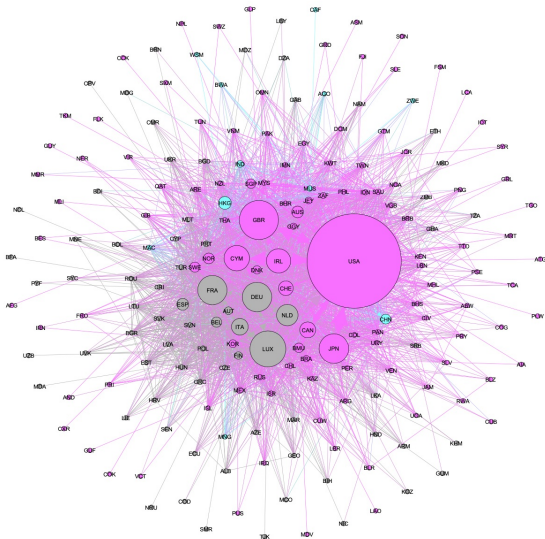- Through supply/production constraints

○ Merchandise trade, IMF's Direction of Trade Survey (DOTS)

- Cross-border inv't, IMF's Coordinated Portfolio Investment Survey (CPIS)

GLOBAL TRANSMISSION OF US MP SHOCKS: AMPLIFIERS

▷ **Dominance of USD**

- **Anchor currency**
  [Rey (2013), Gopinath (2015), Ilzetzki, Reinhart & Rogoff (2019, 2020)]
- **International financial transactions and trade invoicing**
  [Gopinath et al. (2019), Gopinath & Stein (2020), Maggiori, Neiman & Schreger (2020)]
- **Reserve currency**
  [Eichengreen & Mathieson (2000), Chinn & Frankel (2005), He, Krishnamurthy & Milbradt (2016), Farhi & Maggiori (2018)]

BANK OF ENGLAND

Global Transmission of US MP Shocks: Amplifiers

▷ **Dominance of USD**

- **Anchor currency**
  [Rey (2013), Gopinath (2015), Ilzetzki, Reinhart & Rogoff (2019, 2020)]
- **International financial transactions and trade invoicing**
  [Gopinath et al. (2019), Gopinath & Stein (2020), Maggiori, Neiman & Schreger (2020)]
- **Reserve currency**
  [Eichengreen & Mathieson (2000), Chinn & Frankel (2005), He, Krishnamurthy & Milbradt (2016), Farhi & Maggiori (2018)]

▷ **Global Financial Cycle**

- **Comovement of credit booms & busts**
  [Reinhart & Rogoff (2009)]
- **Global factors in risky asset prices**
  [Miranda-Agrippino & Rey (2020)]
- **Global factors in international capital flows**
 [Davis, Valente & Van Wincoop (2019); Barrot & Serven (2018); Miranda-Agrippino & Rey (2022)]

▷ **Empirical Evidence**

- ○ **Int'l Risk Taking Channel** ➔ US MP influences global financial conditions
  [Jorda, Schularick, Taylor & Ward (2018), Habib & Venditti (2019),
  Miranda-Agrippino & Rey (2020)]
- ○ **Large macroeconomic effects even with floating FX rates**
  [Georgiadis (2016), Dées & Galesi (2019), Miranda-Agrippino & Rey (2020),
  Degasperi, Hong & Ricco (2019), Bräuning & Sheremirov (2019), Monnet & Puy
  (2019), Corsetti, Keuster, Muller & Schmidt (2021)]
- ○ **Dilemma/Trilemma: effectiveness of macropru & MP**
  [Bergant, Grigoli, Hansen & Sandri (2020)]

Global Transmission of US MP Shocks: Empirics & Theories

▷ **Empirical Evidence**

  ○ **Int'l Risk Taking Channel** ➜ US MP influences global financial conditions
    [Jorda, Schularick, Taylor & Ward (2018), Habib & Venditti (2019),
    Miranda-Agrippino & Rey (2020)]

  ○ **Large macroeconomic effects even with floating FX rates**
    [Georgiadis (2016), Dées & Galesi (2019), Miranda-Agrippino & Rey (2020),
    Degasperi, Hong & Ricco (2019), Bräuning & Sheremirov (2019), Monnet & Puy
    (2019), Corsetti, Keuster, Muller & Schmidt (2021)]

  ○ **Dilemma/Trilemma: effectiveness of macropru & MP**
    [Bergant, Grigoli, Hansen & Sandri (2020)]

▷ **Theories: Risk buildups/leverage/asset prices**

  ○ **Heterogeneity of beliefs/risk taking**
    [Geanokoplos (2010)]

  ○ **Optimistic beliefs**
    [Gertler, Kiyotaki & Prestipino (2020)]

  ○ **Limited liability/heterogeneity in risk**
    [Coimbra & Rey (forth.)]
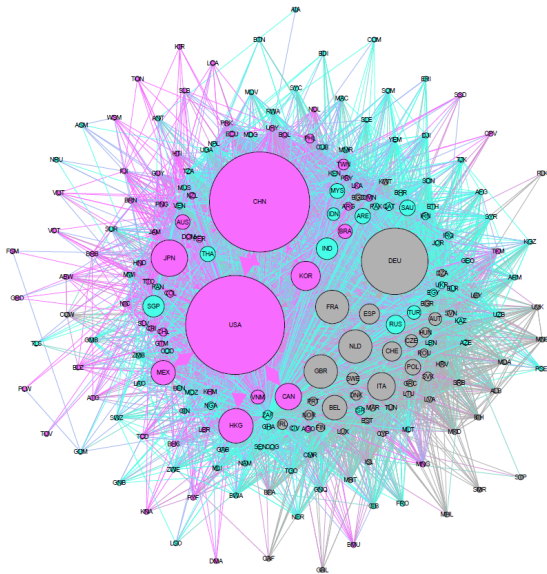
- Merchandise trade, IMF's Direction of Trade Survey (DOTS)

Global Footprints of Large Currency Areas' MP

○ Global Financial Cycle & Global Trade Cycle both at play

○ **Empirical** characterisation of international transmission

○ Analyse evolution of the networks' structure (not today)

Global Footprints of Large Currency Areas' MP

○ Global Financial Cycle & Global Trade Cycle both at play

○ **Empirical** characterisation of international transmission

○ Analyse evolution of the networks' structure (not today)

▷ Outline:

Global Footprints of Large Currency Areas' MP

- Global Financial Cycle & Global Trade Cycle both at play
- **Empirical** characterisation of international transmission
- Analyse evolution of the networks' structure (not today)

▷ Outline:

1. Characterisation of global factors

Global Footprints of Large Currency Areas' MP

○ Global Financial Cycle & Global Trade Cycle both at play

○ **Empirical** characterisation of international transmission

○ Analyse evolution of the networks' structure (not today)

▷ Outline:

1. Characterisation of global factors

2. Transmission through Financial Network
   ▷ Revisit empirical facts on US int'l MP: New Sample & Data

Global Footprints of Large Currency Areas' MP

○ Global Financial Cycle & Global Trade Cycle both at play

○ **Empirical** characterisation of international transmission

○ Analyse evolution of the networks' structure (not today)

▷ Outline:

1. Characterisation of global factors

2. Transmission through Financial Network
   ▷ Revisit empirical facts on US int'l MP: New Sample & Data

3. Transmission through Trade Network
   ▷ Int'l transmission of Chinese MP: New Indicator for PBoC MP

BANK OF ENGLAND

Global Factors

▷ **Common empirical framework**

[Doz, Giannone & Reichlin (2011), Bańbura, Giannone & Reichlin (2011)]

$$y_{j,t} = \nu_j + \lambda_j^G \, f_t^G + \lambda_j^R \, f_t^R + \xi_{j,t}$$

$y_{j,t}$ → risky asset prices & capital flows

f_t^G → GLOBAL FACTOR(s)

f_t^R → regional factors

▷ **Common empirical framework**

[Doz, Giannone & Reichlin (2011), Bańbura, Giannone & Reichlin (2011)]

$$y_{j,t} = \nu_j + \lambda_j^G\, f_t^G + \lambda_j^R\, f_t^R + \xi_{j,t}$$

risky asset prices
&
capital flows

GLOBAL
FACTOR(s)

regional
factors

1. **Asset Prices:**

[Miranda-Agrippino & Rey (2020)]

▷ Type: EOM risky asset prices: Eqy, Cmdy, Corp
▷ Panel: Monthly from 1980:1 to 2019:4; $n \simeq 1K$

▷ **Common empirical framework**

[Doz, Giannone & Reichlin (2011), Bańbura, Giannone & Reichlin (2011)]

$$y_{j,t} = \nu_j + \lambda_j^G \ f_t^G + \lambda_j^R \ f_t^R + \xi_{j,t}$$

$\downarrow$ risky asset prices & capital flows
$\downarrow$ GLOBAL FACTOR(s)
$\downarrow$ regional factors

1. **Asset Prices:**

[Miranda-Agrippino & Rey (2020)]

▷ <u>Type</u>: EOM risky asset prices: Eqy, Cmdy, Corp
▷ <u>Panel</u>: Monthly from 1980:1 to 2019:4; $n \simeq 1K$

2. **Capital Flows:**

▷ <u>Type</u>: IMF/IFS Inflows & Outflows: FDI, Pf Equity, Pf Debt, Other
▷ <u>Panel</u>: Quarterly from 1990-Q1 to 2019-Q2; $n = 82$ countries

BANK OF ENGLAND

	Variance	IC$_{p1}$	IC$_{p2}$	IC$_{p3}$	Onatski Test
Asset Prices (F1)	24.1%	-0.184	-0.183	-0.189	0.049
Capital Flows (F1)	20.7%	-0.042	-0.040	-0.049	0.041
Capital Flows (F2)	14.5%	-0.051	-0.047	-0.065	0.007
Capital Flows (F3)	12.0%	-0.055	-0.049	-0.076	0.988

Notes: The first column of the table reports the share of variance explained by the estimated factors. The following three columns report the value of the ICp criteria and the last shows the p-value for the test where the null of $r - 1$ common factors is tested against the alternative of r common factors.

▷ One global factor in asset prices

▷ Two in international capital flows
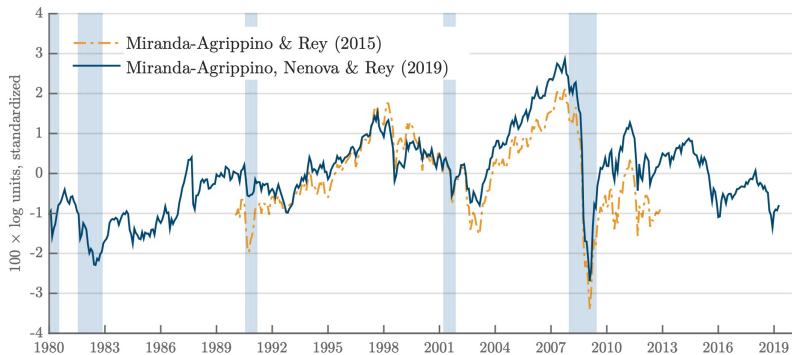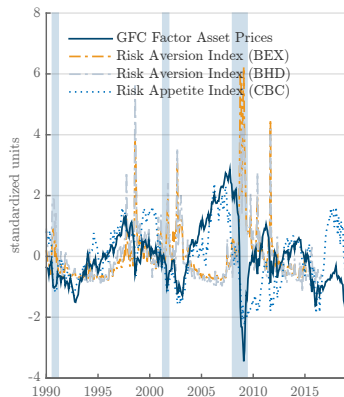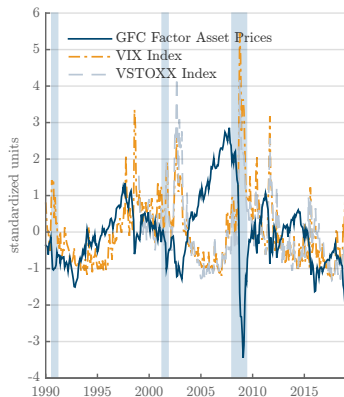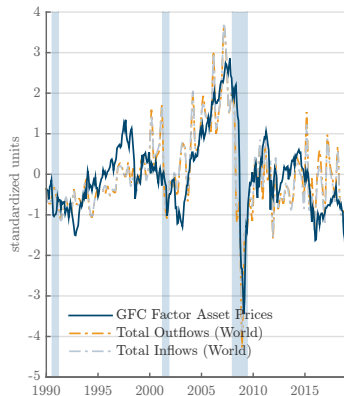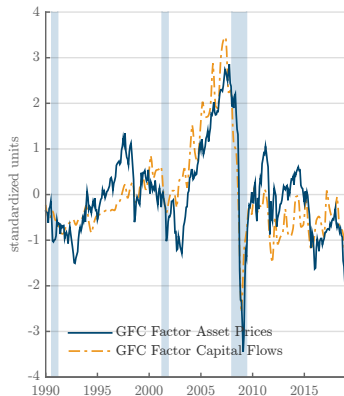
Taking Stock: First Set of Stylised Facts

1. *Global Financial Cycle:*
   - **One** global factor in risky asset prices ($\simeq 1/4$ variance)
   - Correlates with global risk appetite

2. *Global Factors in Risky asset prices and Flows co-move:*
   - **Two** global factors in capital flows ($\simeq 1/3$ variance)
   - Cap-flows F1 highly correlated with global factor in asset prices
   - Interpreted as reflecting ***Global Financial Cycle factors***

3. *Flow components co-move:*
   - Global factors in inflows and outflows are highly correlated
   - So are disaggregated ones: PF bond and equity flows and banking flows co-move & drive aggregate factors. FDI less so.
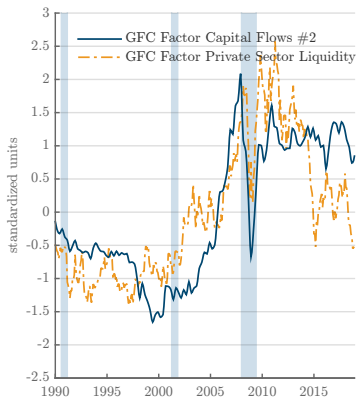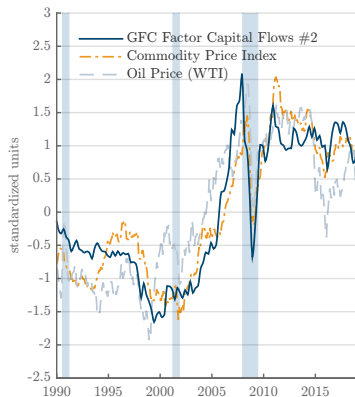
CORRELATION AMONG GLOBAL FACTORS

	Asset Prices	Capital Flows (F1)	Capital Flows (F2)	Private Liquidity	Credit (IMF)
Asset Prices (F)	1				
Capital Flows (F1)	0.815	1			
Capital Flows (F2)	0.410	0.020†	1		
Private Liquidity (F)	*0.142*	-0.225	0.844	1	
Total Credit (F IMF)	0.424	0.472	0.366	0.419	1
VIX Index	-0.649	-0.476	-0.261	-0.063†	-0.147
VSTOXX Index	-0.695	-0.496	-0.284	-0.052†	-0.158
Risk Aversion (BEX)	-0.653	-0.472	-0.189	-0.023†	-0.079†
Risk Aversion (BHD)	-0.645	-0.458	-0.226	-0.048†	-0.119†
Risk Appetite (CBC)	0.748	0.706	0.011†	-0.311	0.041†
USD Exchange Rate	-0.413	-0.019†	-0.826	-0.866	-0.398
EUR Exchange Rate	0.231	0.020†	0.727	0.788	0.553
RMB Exchange Rate	-0.400	-0.729	0.430	0.379	-0.447
Oil Price	0.335	-0.088	0.913	0.854	0.313
Commodity Price	0.240	-0.205	0.934	0.902	0.217
World Output (BH)	0.249	-0.174	0.944	0.818	0.186
World Output (NRB)	0.229	-0.201	0.922	0.779	0.122
World Trade	0.293	-0.104†	0.945	0.804	0.250
World FCI	-0.600	-0.523	-0.326	0.009†	-0.264
World Private Liq	0.116†	-0.268	0.909	0.890	0.267
US 1-Year Rate	0.456	0.681	-0.439	-0.654	0.020†
US 10-Year Rate	0.271	0.559	-0.650	-0.702	-0.010†
GER 1-Year Rate	0.376	0.606	-0.489	-0.577	0.139
GER 10-Year Rate	*0.125*	0.447	-0.686	-0.597	0.121

Notes: Pairwise correlations, overlapping samples from 1990:01-2018-12. Variables in levels. Italic figures denote significance at 10% level, † is for not-significant correlations, all remaining entries are significant at least at the 5% level.

4. *Commodity indices, Trade and Cap-Flows F2 co-move:*
   ○ Cap-flows F2 highly correlated with commodity indices
   ○ Cap-flows F2 highly correlated with trade & world output

5. *One Global liquidity factor which co-moves with Flow 2:*
   ○ **One** factor in global private liquidity ($\simeq 1/3$ variance)
   ○ Highly correlated with the Cap-flows F2
   ○ Interpreted as reflecting ***Global Trade & Commodity factors***

International Transmission of US Monetary Policy

1. Unrestricted Monthly VAR(12) in (log)levels: standard macroeconomic priors [Giannone, Lenza & Primiceri (2015)]

   ▷ **Estimation Sample:** 1991-2018

A 'Global' VAR for the US

1. Unrestricted Monthly VAR(12) in (log)levels: standard macroeconomic priors [Giannone, Lenza & Primiceri (2015)]

   ▷ **Estimation Sample:**   1991-2018

2. Identification with high-frequency IV [Gertler & Karadi (2015), Miranda-Agrippino & Ricco (2020)]

   ▷ **Identification Sample:**   1991-2016

A 'Global' VAR for the US

1. Unrestricted Monthly VAR(12) in (log)levels: standard macroeconomic priors [Giannone, Lenza & Primiceri (2015)]

   ▷ **Estimation Sample:** 1991-2018

2. Identification with high-frequency IV [Gertler & Karadi (2015), Miranda-Agrippino & Ricco (2020)]

   ▷ **Identification Sample:** 1991-2016

3. Variables

   ▷ **Local:** IP, CPI, 1Y-Rate, FX
   ▷ **Global #1:** Global Factors
   ▷ **Global #2:** Production, Trade, FCI, Liquidity
   ▷ **Global #3:** CRBPI, VIX
   ▷ **Global #4:** Inflows & Outflows
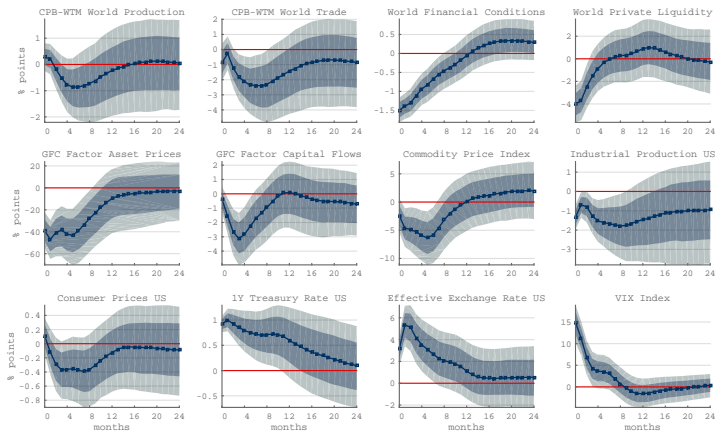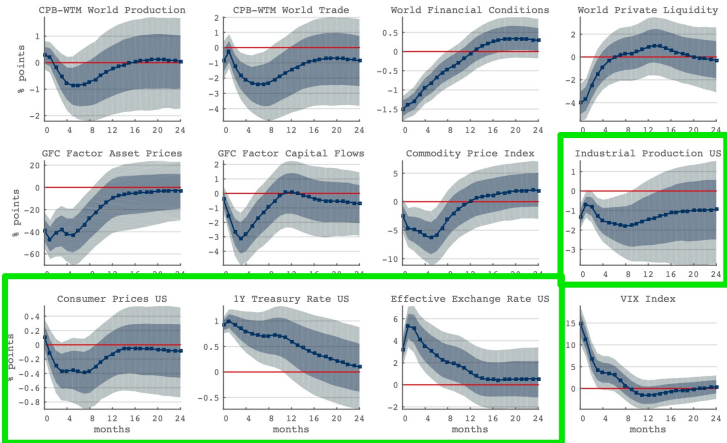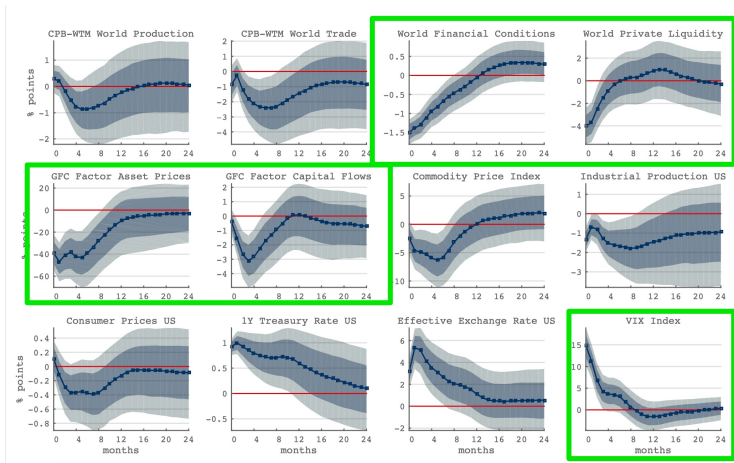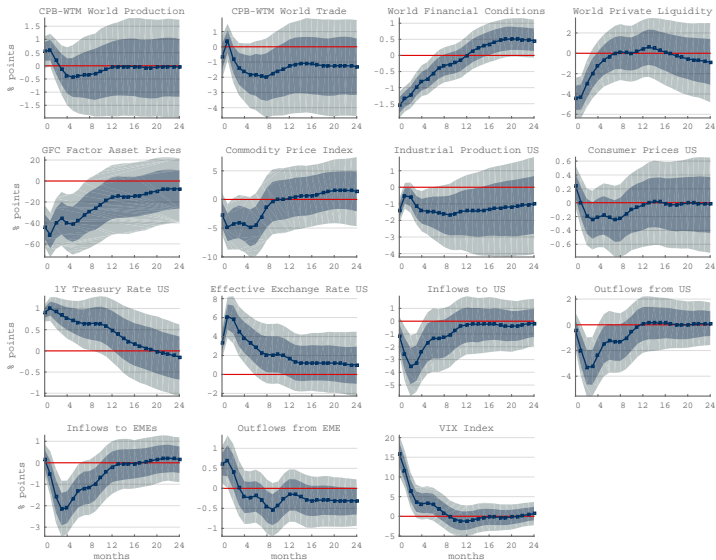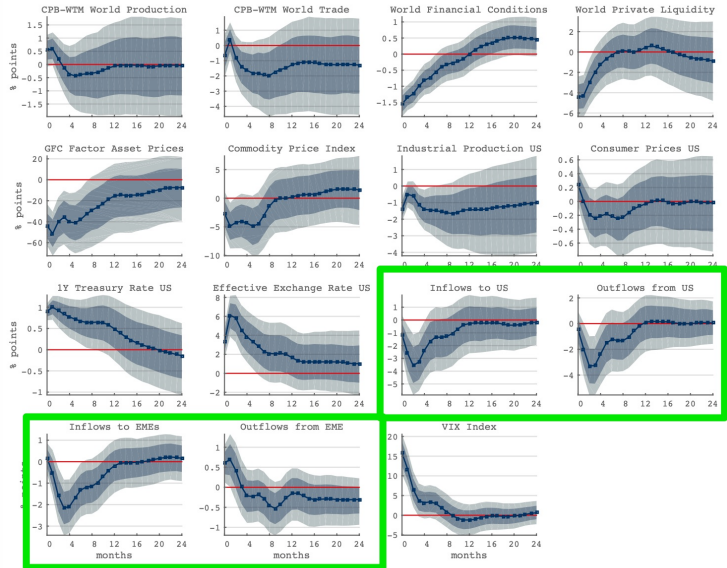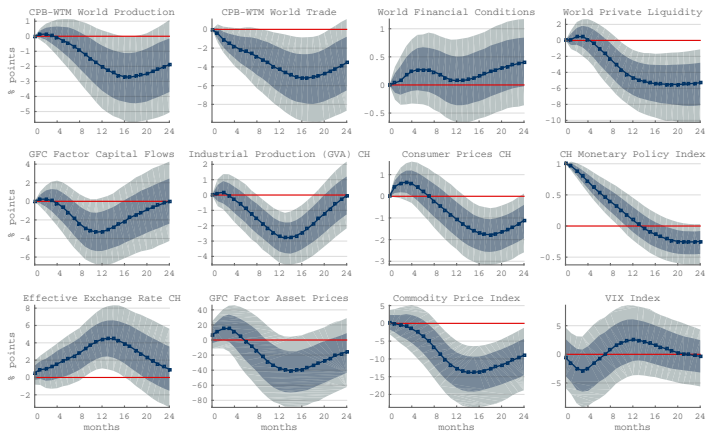
International Transmission of Chinese Monetary Policy

1. Unrestricted Monthly VAR(12) in (log)levels: standard macroeconomic priors [Giannone, Lenza & Primiceri (2015)]

   ▷ **Estimation Sample:** 1999-2018

1. Unrestricted Monthly VAR(12) in (log)levels: standard macroeconomic priors [Giannone, Lenza & Primiceri (2015)]

   ▷ **Estimation Sample:** 1999-2018

2. Identification with novel MP indicator (MPI) [Xu & Jia (2019)]

   ▷ **Identification Sample:** 1999-2018

A 'Global' VAR for China

1. Unrestricted Monthly VAR(12) in (log)levels: standard macroeconomic priors [Giannone, Lenza & Primiceri (2015)]

   ▷ **Estimation Sample:** 1999-2018

2. Identification with novel MP indicator (MPI) [Xu & Jia (2019)]

   ▷ **Identification Sample:** 1999-2018

3. Variables

   ▷ **Local:** IP, CPI, MPI, FX
   ▷ **Global #1:** Global Factors
   ▷ **Global #2:** Production, Trade, FCI, Liquidity
   ▷ **Global #3:** CRBPI, VIX
   ▷ **Global #4:** Inflows & Outflows

▷ **Combines prices and quantities** & shifts in MP conduct

▷ Reflects process of interest rate liberalisation [Huang, Ge & Wang (2020)]

  ○ Central planning prior to 2000. Bank loans quota, benchmark lending and deposit rates

  ○ Official shift to M2 growth in 2000

  ○ Market rates after the GF Crisis, SHIBOR and interbank repo rate [Fernald, Spiegel & Swanson (2014)]

  ○ PBoC's loan prime rates (LPR) from 2019

▷ **MP's Objectives:** stable inflation, growth, employment, balance of payment [Ma & He (2020), Wu & Li (2016)]
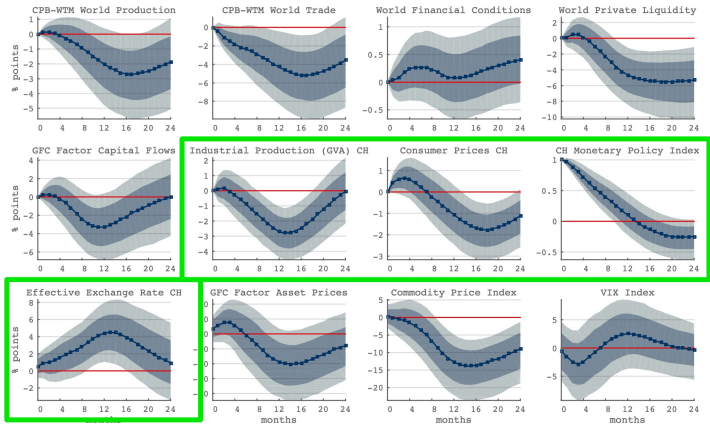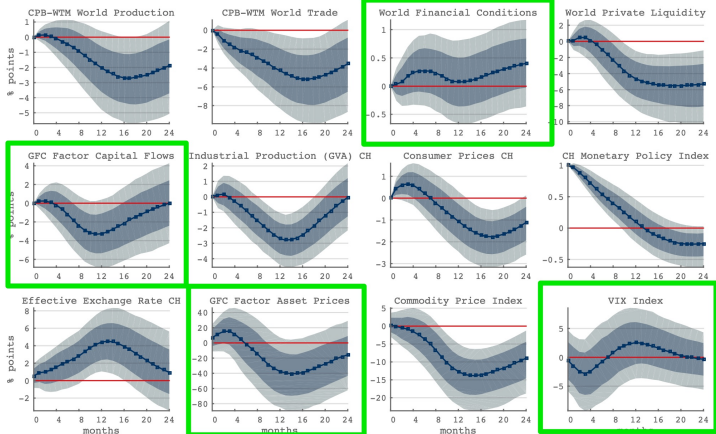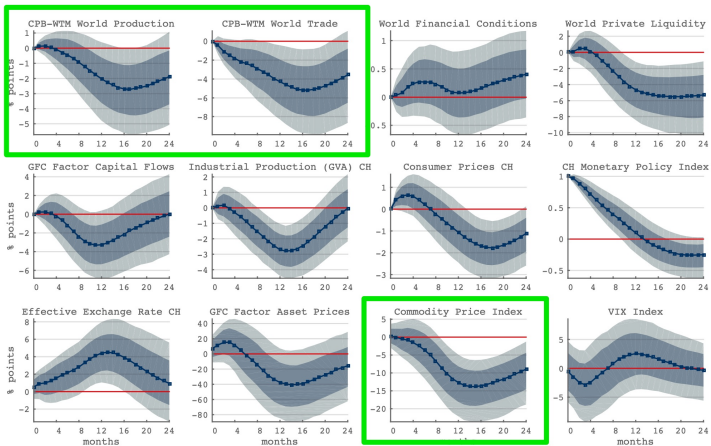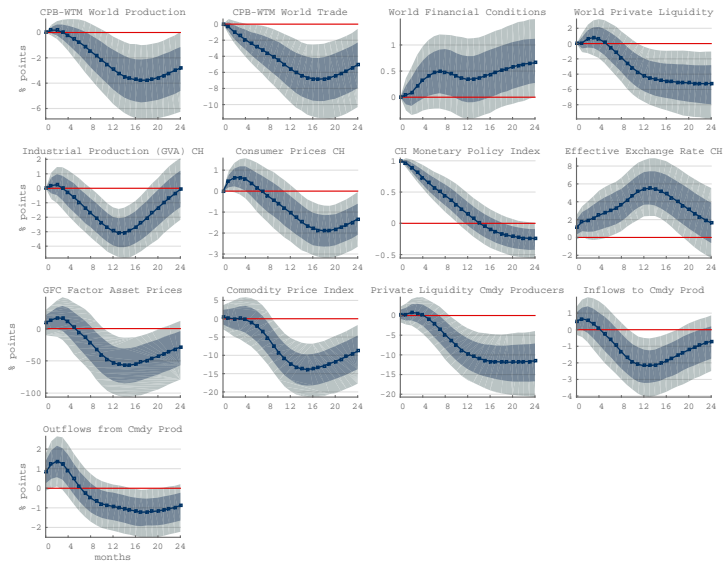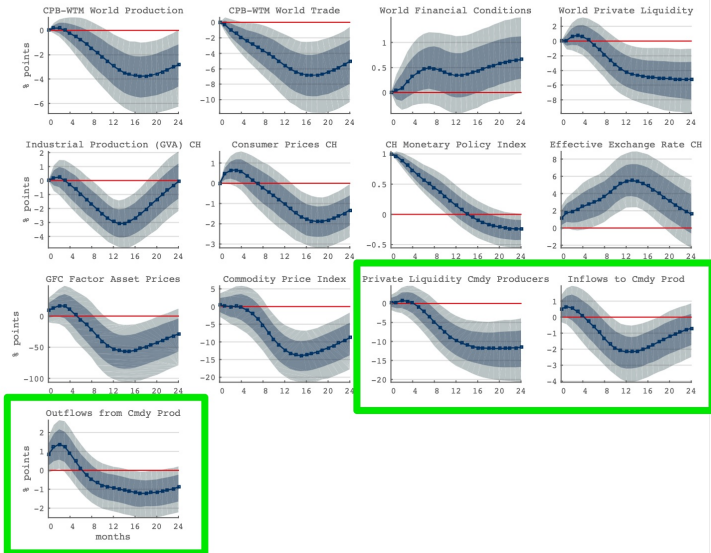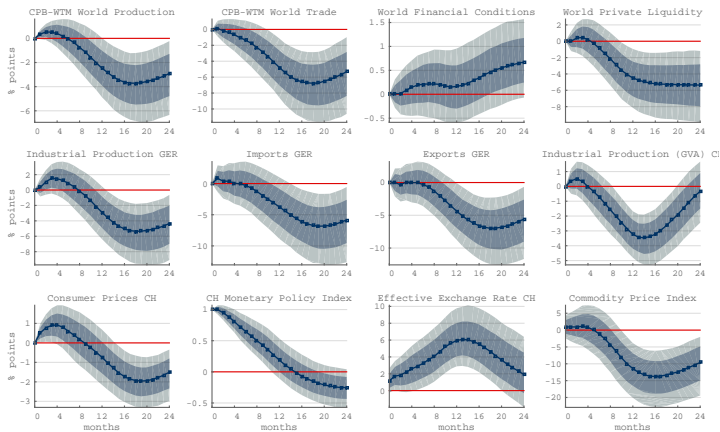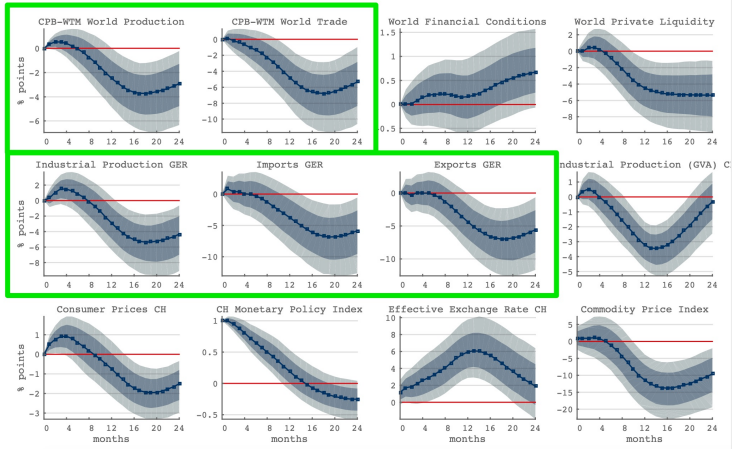
CONCLUSIONS

1. **MP of large currency areas ripples through in different ways**
   - ▷ **US MP**
     - ○ through trade and commodity markets
     - ○ **large amplification** through global fin'l markets & risk taking
   - ▷ **CH MP**
     - ○ mainly through trade and commodity markets
   - ▷ **EA MP**
     - ○ through trade and commodity markets
       [Ca' Zorzi, Dedola, Georgiadis, Jarociński, Stracca & Strasser (2020)]
     - ○ some amplification through global fin'l spillovers after the ELB
       [Miranda-Agrippino and Nenova (2022)]

2. **EMEs' & CMDY producers' net flows are most vulnerable**
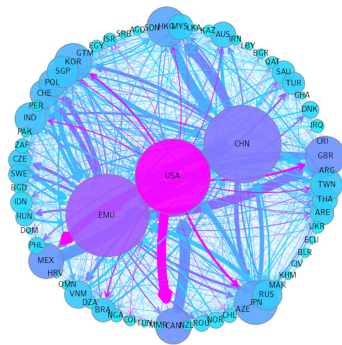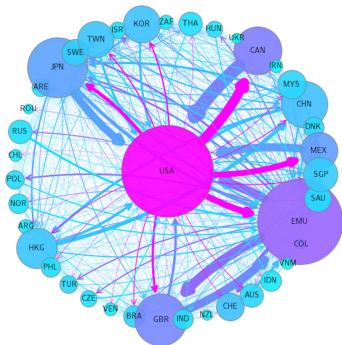   - ▷ But AEs also exposed

3. **Coming Next..**
   - ▷ Integrated empirical framework for joint dynamics: GVAR
     [Cesa-Bianchi, Pesaran & Rebucci (2012); Dees and Galesi (2019)]
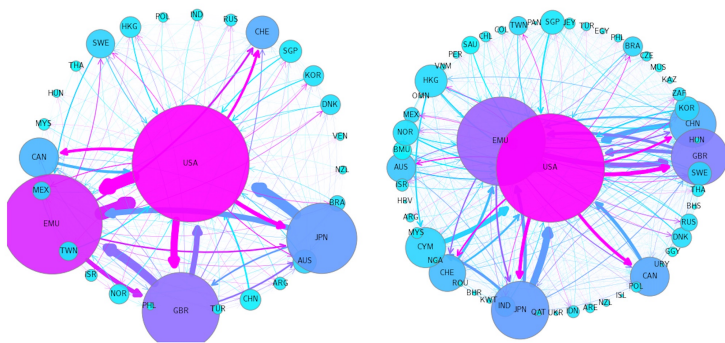   - ▷ **Account for evolution of network structures (geopolitics)**

- Merchandise trade, excludes services
- IMF's Direction of Trade Statistics (DOTS)

○ Includes private & official cross-border investment in Eqy + Debt securities

○ Coppola, Maggiori, Neiman and Schreger (2021) + IMF's Coordinated Portfolio Investment Survey (CPIS)

- Includes private & official cross-border investment in Eqy + Debt securities
- Coppola, Maggiori, Neiman and Schreger (2021) + IMF's Coordinated Portfolio Investment Survey (CPIS)