

The bank-lending channel of macroprudential policy: evidence from cross-border bank flows

Josefina Fabiani

European Commission JRC

Kyriakos C. Neanidis

University of Manchester

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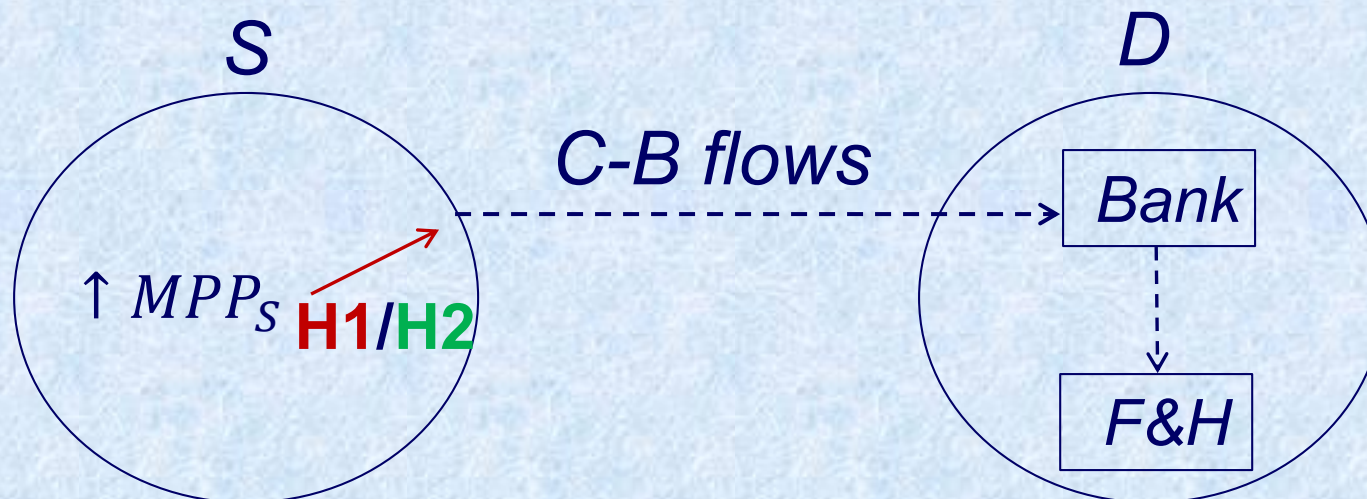
Motivation

- How does **macroprudential policy** set in a country **spill over** to the rest of the world?
- Increasing reliance of banks on **cross-border inflows** as source of funding to supply loans domestically
 - **Bank-lending channel of cross-border flows** (Baskaya et al, 2017)
- **Idea:** MPP changes in source countries of flows can transmit to host-country banks and change local loan supply
 - **Unintended consequences** of policies abroad

Research questions

- Sign of the MPP spillover mechanism:
- **H1 (Scaling Back):** MPP tightening in the source country of cross-border flows **by increasing the cost of lending reduces** the destination country banks' loan granting to non-banks
- **H2 (Regulatory Arbitrage):** MPP tightening in the source country of cross-border flows **increases** the destination country banks' loan granting to non-banks
- **Identification:** bilateral data, fixed effects, and heterogeneous response by constrained banks with low capital-to-assets ratio

Conceptual framework—2 countries



Bank-lending channel of cross-border flows: banks in the destination country **increase** credit supply to non-bank borrowers when faced with increased cross-border inflows

H1/H2: MPP change at source **spills over** via cross-border flows to the destination country's individual bank loan supply to the non-bank sector

Contribution

International spillovers of macroprudential policy

- Impact of a country's policy either **on its cross-border lending flows** or **on the loan supply of its bank affiliates located in a host country**
Ongena et al. (2013), Aiyar et al (2014), Buch and Goldberg (2017), Danisewicz et al. (2017), Takáts and Temesvary (2021)
- **Gap**: capture the spillover effect for the **entire** banking sector of the host economy, allowed to **vary across the full set of policy tools** introduced in the source

International spillovers via cross-border flows

- **Monetary policy** changes in advanced economies **spill over to other countries** through the cross-border supply of loans by global banks
Bräuning and Ivashina (2020), Takáts and Temesvary (2020), Ongena et al. (2021), Correa et al. (2022)
- **Gap**: regulatory spillovers stemming from **macroprudential** policies

Findings

Confirm the **bank-lending channel of cross-border flows** with bilateral cross-border bank data

H1: Scaling back effect of foreign MPP

- Banks in recipient countries **reduce** lending in response to tighter MPP in source countries via cross-border flows
- Operational only for a subset of macroprudential tools, targeting the **international exposure** and **capital requirements** of banks
- Not driven by **foreign affiliates** located in host countries or by **MPP in recipient countries**

Support **bank-lending channel of MPP in an international context**

Multi-country dataset on cross-border bank flows, MPP, and bank lending

- **Recipient countries:** 30 EMs in Central and Eastern Europe and Asia
 - Up to 99% of all firms classified as SMEs (Ongena et al., 2013)
 - Less developed capital markets and rudimentary corporate bond financing
 - Firms and HHs financing rely heavily on the banking system
- **Source countries:** 27 AEs (mostly) including 10 EA countries

[Country sample](#)

Dataset

- Annual frequency for the period 1998-2020
- Winsorize at 2.5 percentile to exclude outliers
- Hosts receive 100% of their total cross-border inflows from the source
- The universe of banks at destination

Data 2/3—Cross-border bank flows

BIS - Locational Banking Statistics

- Bilateral: country-pair-year
- Flows adjusted for XR fluctuations and breaks-in-series → **annual growth rate of claims**
- Decomposition by instrument (loan and debt securities) and sector (bank or nonbank)
- Include positions with subsidiaries and branches abroad
- 730 country pairs
- Key: **identify the supply-side effect** of cross-border bank flows
 - multiple source countries report claims from the same destination country in a given year → **supply-side effect** varies across source countries
 - **fixed effects** that control for demand-side factors, and historical lending relationships between country pairs and source country-destination bank pairs

Data 3/3—Host-country bank credit & MPP

S&P Capital IQ

- Expand sample using BankScope data
- Unit: bank-year
- Main variable: **annual growth rate of net loans to non-banks**
- Capitalization: equity-to-assets ratio
- Balance sheet characteristics
- 1,417 banks

IMF's Integrated Macprudential Policy (iMaPP)

- Monthly indicators of tightening and loosening actions (-1, 0, 1)
- 17 macroprudential policy instruments
 - supply-side
 - demand-side
 - foreign exposure
- Main variable: **MPP stance** (Forbes 2021, Chari et al., 2022)
 - **sum of all changes** in that policy instrument recorded annually since 1990 and up to the year of observation

Empirical framework 1/2

$$\begin{aligned}\Delta L_{bit} = & \alpha_b + \alpha_{it} + \alpha_{jt} + \alpha_{ji} + \alpha_{jb} \\ & + \beta_1 \Delta F_{jit} + \beta_2 BKR_{bit-1} + \beta_3 (\Delta F_{jit} \times BKR_{bit-1}) \\ & + e_{bit}\end{aligned}$$

- ΔL_{bit} : growth of loans granted by bank b in destination country i during year t
- ΔF_{jit} : growth of bank claims from a source country j to a destination country i during year t
- BKR_{bit-1} : (lagged) destination-country bank capitalization ratio
- **Bank-lending channel of cross-border flows:**

$$\beta_1 > 0; \beta_3 < 0$$

Empirical framework 2/2

$$\begin{aligned}\Delta L_{bit} = & \alpha_b + \alpha_{it} + \alpha_{jt} + \alpha_{ji} + \alpha_{jb} \\ & + \beta_1 \Delta F_{jit} + \beta_2 BKR_{bit-1} + \beta_3 (\Delta F_{jit} \times BKR_{bit-1}) \\ & + \gamma_1 (MPP_{jt} \times \Delta F_{jit}) + \gamma_2 (MPP_{jt} \times BKR_{bit-1}) \\ & + \gamma_3 (MPP_{jt} \times \Delta F_{jit} \times BKR_{bit-1}) + e_{bit}\end{aligned}$$

➤ MPP_{jt} : macroprudential policy stance in a source country j

➤ **International bank-lending channel of MPP:**

$$**H1:** \gamma_1 < 0; \gamma_3 > 0$$

$$**H2:** \gamma_1 > 0; \gamma_3 < 0$$

Baseline estimation results

<i>Dep.variable: growth of net loans to non-banks</i>	(1)	(2)
Flows_{jit}	0.0028*	0.0028*
BKR_{bit-1}	0.8504***	0.8505***
$\text{Flows}_{jit} \times \text{BKR}_{bit-1}$	-0.0159*	-0.0161*
$\text{MPP Stance}_{jt} \times \text{Flows}_{jit}$		
$\text{MPP Stance}_{jt} \times \text{BKR}_{bit-1}$		
$\text{MPP Stance}_{jt} \times \text{Flows}_{jit} \times \text{BKR}_{bit-1}$		
Adjusted R2	0.43	0.43
N	242,568	242,568
Bank FE	Yes	Yes
Destination country \times Time FE	Yes	Yes
Source country \times Time FE	Yes	Yes
Destination \times Source FE	No	Yes
Source country \times Bank FE	No	No
Destination \times Source \times Time FE	No	No
Differential effect:	8.50%	8.59%
Differential effect H1:		

Notes: Robust standard errors clustered at the bank level. ***, **, * denote significance at the 1%, 5%, 10% level, respectively.

Baseline estimation results

<i>Dep.variable: growth of net loans to non-banks</i>	(1)	(2)	(3)	(4)
Flows _{jit}	0.0028*	0.0028*	0.0050***	
BKR _{bit-1}	0.8504***	0.8505***	0.8441***	0.8440***
Flows _{jit} × BKR _{bit-1}	-0.0159*	-0.0161*	-0.0294***	-0.0325***
MPP Stance _{jt} × Flows _{jit}			-0.0004**	
MPP Stance _{jt} × BKR _{bit-1}			0.0052	0.0053
MPP Stance _{jt} × Flows _{jit} × BKR _{bit-1}			0.0021**	0.0023**
Adjusted R2	0.43	0.43	0.37	0.35
N	242,568	242,568	240,282	240,221
Bank FE	Yes	Yes	Yes	Yes
Destination country × Time FE	Yes	Yes	Yes	-
Source country × Time FE	Yes	Yes	Yes	-
Destination × Source FE	No	Yes	Yes	-
Source country × Bank FE	No	No	Yes	Yes
Destination × Source × Time FE	No	No	No	Yes
Differential effect:	8.50%	8.59%	15.58%	17.23%
Differential effect H1:			-1.11%	-1.23%

Notes: Robust standard errors clustered at the bank level. ***, **, * denote significance at the 1%, 5%, 10% level, respectively.

By group of MPP instrument

	MPP instrument:	Supply side	Demand side	FX exposure
<i>Dep.variable: growth of net loans to non-banks</i>		(1)	(2)	(3)
Flows _{jit}		0.0048***	0.0042**	0.0036**
BKR _{bit-1}		0.8545***	0.8592***	0.8567***
Flows _{jit} × BKR _{bit-1}		-0.0280***	-0.0238**	-0.0207**
MPP Stance _{jt} × Flows _{jit}		-0.0005**	-0.0010*	-0.0050**
MPP Stance _{jt} × BKR _{bit-1}		0.0060	0.0057	0.0315*
MPP Stance _{jt} × Flows _{jit} × BKR _{bit-1}		0.0031**	0.0058*	0.0263**
Adjusted R2		0.37	0.37	0.37
N		240,282	240,282	240,282
Bank FE		Yes	Yes	Yes
Destination country × Time FE		Yes	Yes	Yes
Source country × Time FE		Yes	Yes	Yes
Destination × Source FE		Yes	Yes	Yes
Source country × Bank FE		Yes	Yes	Yes
Differential effect:		14.82%	12.60%	10.95%
Differential effect H1:		-1.63%	-3.05%	-13.91%

Notes: Robust standard errors clustered at the bank level. ***, **, * denote significance at the 1%, 5%, 10% level, respectively.

By type of destination bank

	Bank characteristic:	
<i>Dep.variable: growth of net loans to non-banks</i>	Foreign (1)	Domestic (2)
Flows _{jit}	-0.0045	0.0122*
BKR _{bit-1}	1.4662***	0.9260*
Flows _{jit} × BKR _{bit-1}	0.0316	-0.0762*
MPP Stance _{jt} × Flows _{jit}	0.0001	-0.0011**
MPP Stance _{jt} × BKR _{bit-1}	0.0012	0.0261*
MPP Stance _{jt} × Flows _{jit} × BKR _{bit-1}	-0.0008	0.0067**
Adjusted R2	0.49	0.42
N	44,166	19,987
Bank FE	Yes	Yes
Destination country × Time FE	Yes	Yes
Source country × Time FE	Yes	Yes
Destination × Source FE	Yes	Yes
Source country × Bank FE	Yes	Yes
Differential effect:	0%	34.26%
Differential effect H1:	0%	-3.03%

Notes: Robust standard errors clustered at the bank level. ***, **, * denote significance at the 1%, 5%, 10% level, respectively.

Main takeaways

Banks provide more loans when having more access to credit from abroad

H1: Bank-lending channel of foreign macroprudential policy → **negative spillover** – supply-side and international exposure tools

Policy implication

- Host-country regulators should pay attention to macroprudential developments in source countries

Thank you!

Other exercises

More granular measures of the macroprudential stance and cross-border flows

- Cross-border flows by instrument type: loans
- Cross-border flows by sector: non-banking
- Macroprudential policy by tool

Other macroeconomic conditions and bank characteristics

- Other bank characteristics: size, profitability
- Other macroeconomic variables: monetary policy rate, GDP growth, inflation, exchange rates, financial openness
- Differential response by country groups: EMs, EU/non-EU, top-5 senders
- Global financial crisis 2008-09

Other exercises

Persistence of spillovers

- One more lag: banks may take time to adjust their lending behavior to the tighter MPP stance abroad
- Horserace current effects with lagged effects

Alternative measures of cross-border flows and banks' lending

- BIS-CBS: nationality based - consolidated data by bank group
- Cross-border flows and loans as a share of GDP

Accounting for host country MPP stance

- Replace foreign macroprudential policy with the domestic stance
- Include the macroprudential stance of both source and host countries

Country coverage

Destination country (<i>i</i>)	Source country (<i>j</i>)
Albania	Australia
Armenia	Austria
Azerbaijan	Belgium
Belarus	Brazil
Bosnia and Herzegovina	Canada
Bulgaria	Chile
Croatia	Chinese Taipei
Czechia	Denmark
Estonia	Finland
Georgia	France
Hungary	Germany
Kazakhstan	Greece
Kyrgyzstan	Hong Kong SAR
Latvia	Ireland
Lithuania	Italy
Moldova	Japan
Mongolia	Korea
Montenegro	Luxembourg
North Macedonia	Mexico
Poland	Netherlands
Romania	Philippines
Russia	South Africa
Serbia	Spain
Slovakia	Sweden
Slovenia	Switzerland
Tajikistan	United Kingdom
Turkey	United States
Turmenistan	
Ukraine	
Uzbekistan	

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