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Cross-border bank flows and monetary policy

"Capital Flows, Systemic Risk, and Policy Reponses",
April 28-29, 2016,
Iceland

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Motivation

- The impact of monetary policy on the supply of *domestic* credit (Bernanke and Blinder, 1992; Kashyap and Stein, 2000)

- The impact of monetary policy on the supply of *foreign* credit
  - Banks' internal capital markets (Cetorelli and Goldberg, 2012)
  - US banks' foreign affiliate lending abroad (Moraise, Peydro and Ruiz, 2015)
  - Monetary policy affects global banks' funding costs abroad through exchange rates (Bruno and Shin, 2015)

- Our focus is on the impact of monetary policy on the supply of cross-border bank flows, taking into account banks' supply of domestic credit

The research question

- How does domestic monetary policy affect *the supply* of cross-border banking flows in the context of international bank lending channel?
- Do banks supply foreign credit to a specific type of countries?

Mechanism (international bank lending channel + portfolio rebalancing)

- If domestic policy rates increase, domestic borrowers' net worth declines (balance sheet channel); banks may be more concerned to safeguard their capital base and as a result willing to lend to less risky borrowers with higher net worth abroad (den Haan et al. 2007)

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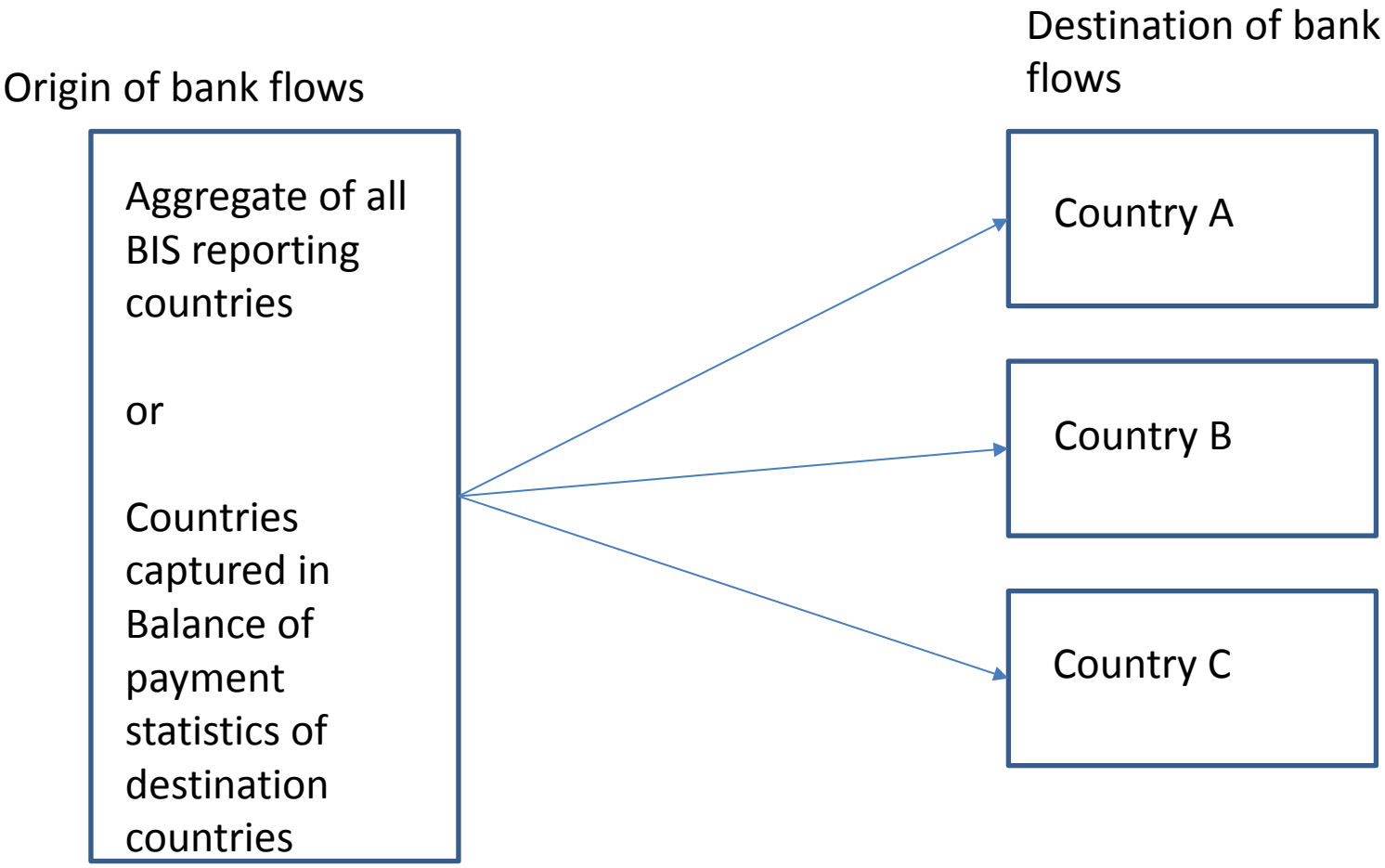
Identification of the Supply of Foreign Credit: Most studies



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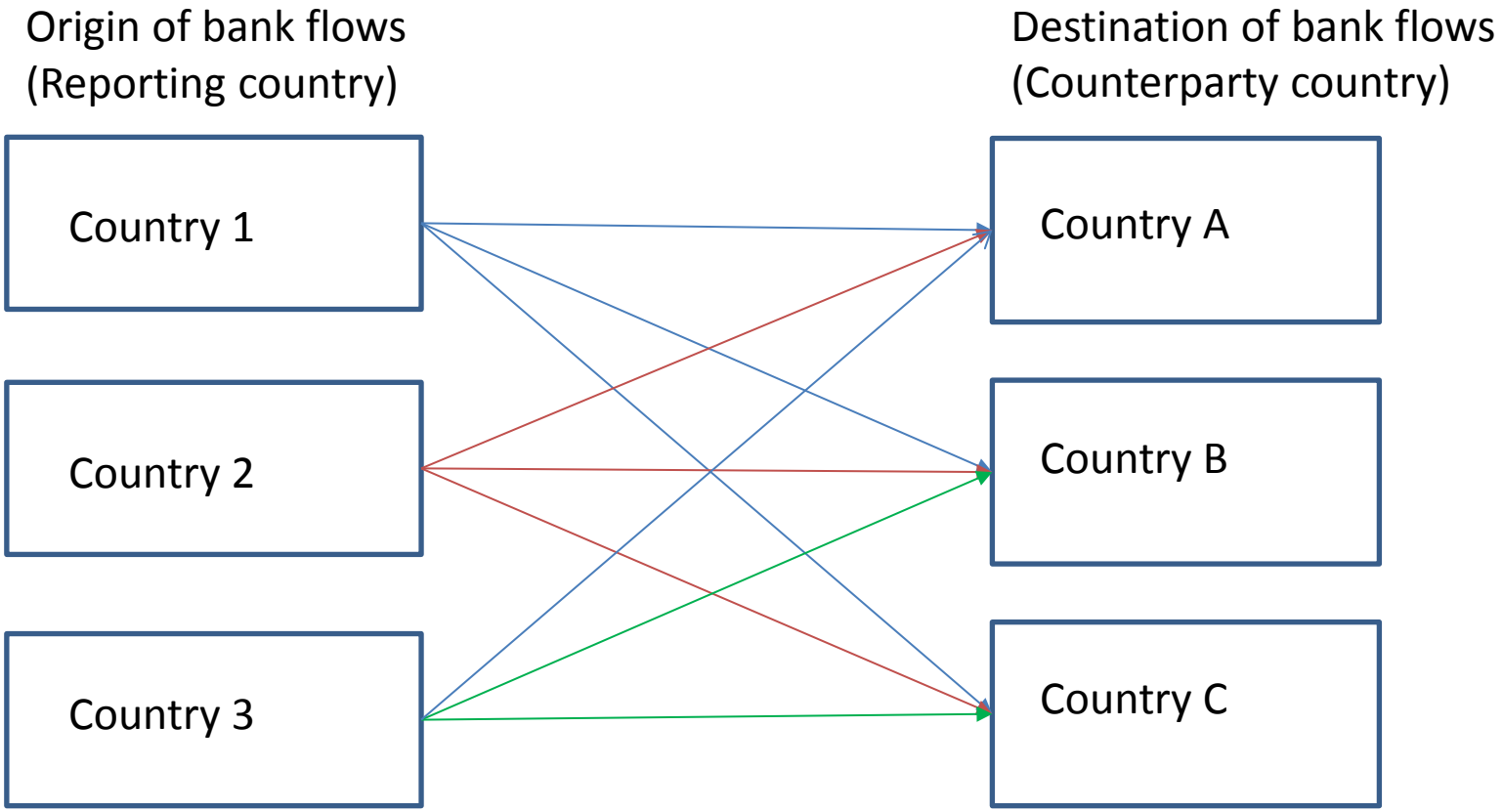
Identification of the Supply of Foreign Credit : This study



Dyadic Data

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Preview of the main results

- 1% increase in the monetary policy rate (compared to other countries) leads to:

  0.32 % quarterly growth of flows to banks (8.92% mean)

  0.44 % quarterly growth of flows to non-banks (4.79%)

- Evidence of a portfolio rebalancing effect (den Haan et al. (2007)):

➢ as monetary policy rates increase, banks' cross-border claims grow relative to domestic credit.

➢ cross-border bank flows are mainly directed to advanced economies and/or investment grade countries.

Contributions

- We identify banks' supply of cross-border credit due to monetary policy changes using dyadic data

- Evaluate the importance of country-specific monetary policy, as opposed to global factors, in determining changes in bank flows (Bruno and Shin, 2014; Cerutti and Claessens, 2014)

- Identify a novel channel of domestic monetary policy on foreign credit

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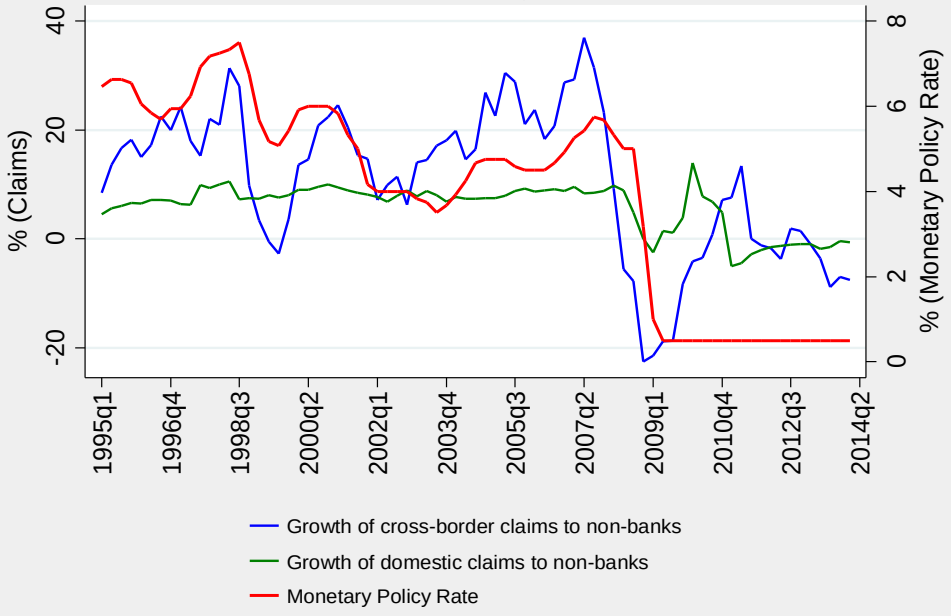
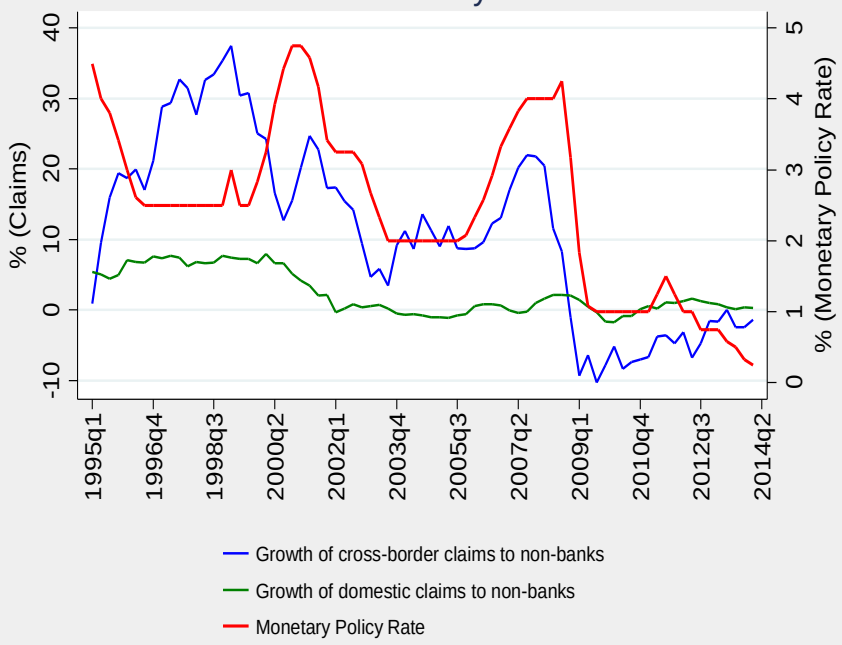
Data source: BIS Locational Banking Statistics (LBS)

- Cross-border bank flows (exchange rate adjusted)
- Relevant concept: geographic location (residence), not the nationality of either party involved in the operation; similar concept to balance of payments (BOP) data.
- Sample: 1995Q1 – 2014Q1
- Country coverage: exclude offshore centers
- Outliers: exclude country pairs if outstanding bilateral is below $5 million in any quarter
- Winsorize dependent variables 2.5 percentile
- 77 counterparties (53 EMEs) and 29 reporting countries (8 EMEs)

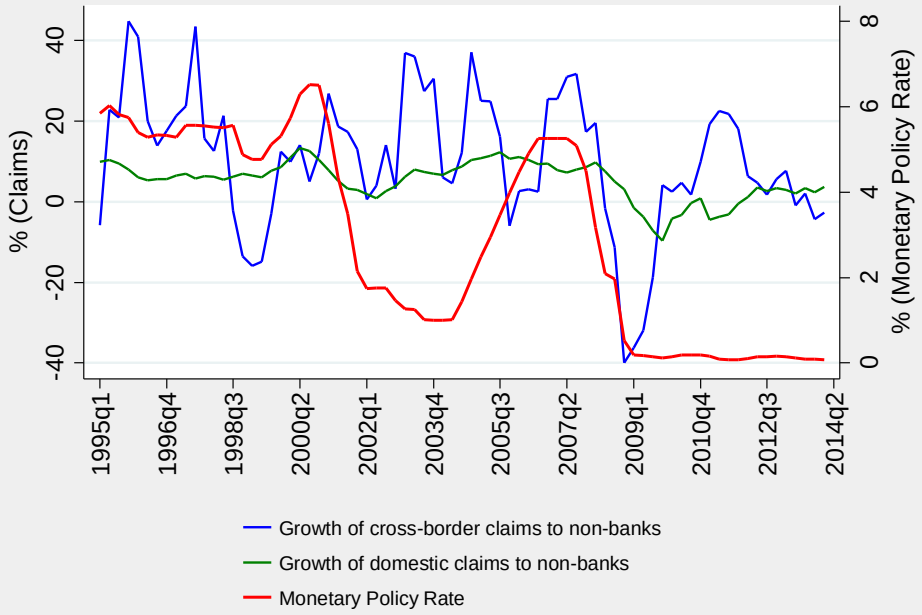
United Kingdom



Germany



US



Regression equation (fixed effects)

$$Y_{ijt} = \gamma_{jt} + \alpha r_{it-1} + \beta X_{it-1} + \varepsilon_{ijt}$$

- **Y** is the growth in cross-border bank flows (CBF) sent from country i (reporting) to country j (counterparty) in each quarter t;
- **Y** is calculated as the ratio of quarterly flow of claims adjusted for exchange rate changes to the previous quarter outstanding amount;
- three types of cross-border flows: bank, non-bank and all

- **r**: nominal monetary policy rate for the reporting country
- **X**: vector of control variables for the reporting country
- γ_{jt}: counterparty country x time fixed effects (controls for changes in the demand for bank flows);
- clustering at the reporting-counterparty level

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Results: road map

- Result 1: monetary policy and cross-border bank credit
- Result 2: the role of a global factor
- Result 3: monetary policy and domestic credit
- Result 4 & 5: where does cross-border credit goes?
- Results 6 and 6a: monetary policy and real activity in the reporting country
- Results 7: exclude financial centers, both as reporting or counterparty countries

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Result 1: Monetary policy and cross-border flows

VARIABLES	(1) Flows to all	(2) Flows to banks	(3) Flows to non-banks
Lag policy rate rep	0.276***	0.321***	0.443***
	[0.091]	[0.116]	[0.106]
Lag credit growth rep	0.050	0.138*	0.084
	[0.050]	[0.079]	[0.062]
Lag bank equity returns rep	-0.002	0.000	-0.003
	[0.011]	[0.021]	[0.013]
Lag real GDP growth rep	0.299**	0.036	0.356*
	[0.133]	[0.265]	[0.190]
Lag Debt/GDP rep	-0.006	-0.014	-0.003
	[0.005]	[0.009]	[0.006]
Lag inflation rep	-0.072	0.294	0.192
	[0.239]	[0.553]	[0.310]
QE indicator rep	0.911	-0.574	1.262
	[0.827]	[1.335]	[1.372]
Observations	73,879	71,426	72,223
R-squared	0.11	0.12	0.11
FE	Cp.Ctry. x Time	Cp.Ctry. x Time	Cp.Ctry. x Time
Cluster	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.
Countries	29	29	29

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Result 2: The role of a global factor

VARIABLES	Flows to all	Flows to banks	Flows to non-banks
Lag policy rate rep	0.190**	0.250*	0.252***
	[0.086]	[0.130]	[0.073]
VIX	-0.136***	-0.143*	-0.160***
	[0.040]	[0.071]	[0.043]
Lag policy rate cp	-0.051	-0.209**	0.013
	[0.063]	[0.097]	[0.062]
Rep.Ctry Controls	Yes	Yes	Yes
Cp.Ctry. Controls	Yes	Yes	Yes
Observations	45,387	44,641	44,241
R-squared	0.02	0.02	0.02
FE	Rep.Ctry. & Cp.Ctry.	Rep.Ctry. & Cp.Ctry.	Rep.Ctry. & Cp.Ctry.
Cluster	Rep. & Cp. Ctry	Rep. & Cp. Ctry	Rep. & Cp. Ctry
Countries	29	29	29

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Result 3: Cross-border vs. domestic claims

VARIABLES	(1) Credit to non-banks	(2) Credit to non-banks	(3) Credit to non-banks
Lag policy rate	0.406***	0.459***	0.389***
	[0.099]	[0.106]	[0.115]
Lag policy rate X Domestic ind.		-0.584***	-0.607***
		[0.155]	[0.212]
QE indicator	1.131	1.164	1.590
	[1.370]	[1.376]	[0.973]
Lag bank equity returns	-0.003	-0.003	0.001
	[0.012]	[0.012]	[0.015]
Lag real GDP growth	0.363*	0.357*	0.120
	[0.188]	[0.186]	[0.239]
Lag Debt/GDP	-0.004	-0.004	0.005
	[0.006]	[0.006]	[0.009]
Lag inflation	0.072	0.070	0.117*
	[0.063]	[0.065]	[0.063]
Observations	77,731	77,731	45,052
R-squared	0.10	0.10	0.11
Sample	All	All	Before 2007Q3
FE	Cp. Ctry. X time	Cp. Ctry. X time	Cp. Ctry. X time
Cluster	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.

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Result 4: Do cross-border claims go to EME vs AE?

VARIABLES	(1) Flows to all	(2) Flows to banks	(3) Flows to non-banks
Lag policy rate rep	0.347***	0.509***	0.408***
	[0.087]	[0.126]	[0.130]
Lag policy rate rep x EME dummy	-0.207*	-0.669***	0.119
	[0.104]	[0.188]	[0.190]
Rep. Ctry. Constrols	Yes	Yes	Yes
Rep. Ctry. Constrols x EME dummy	Yes	Yes	Yes
Observations	73,879	71,426	72,223
R-squared	0.11	0.12	0.11
FE	Cp.Ctry. x Time	Cp.Ctry. x Time	Cp.Ctry. x Time
Cluster	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.
Countries	29	29	29

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Result 5: Do cross-border claims go to non-investment Countries?

	(1)	(2)	(3)
VARIABLES	Flows to all	Flows to banks	Flows to non-banks
Lag policy rate rep	0.308***	0.402***	0.461***
	[0.093]	[0.127]	[0.128]
Lag policy rate rep x Non-investment grade dummy	-0.160	-0.477**	-0.063
	[0.105]	[0.207]	[0.153]
Rep. Ctry. Controls	Yes	Yes	Yes
Rep. Ctry. Controls x Non-inv. grade dummy	Yes	Yes	Yes
Observations	70,670	68,447	69,039
R-squared	0.11	0.11	0.10
FE	Cp.Ctry. Rep.Ctry. time	Cp.Ctry. Rep.Ctry. time	Cp.Ctry. Rep.Ctry. time
Cluster	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.
Countries	29	29	29

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Result 6a: Monetary policy and real activity

VARIABLES	Flows to all	Flows to banks	Flows to non-banks
Lag policy rate rep	0.248**	0.256*	0.467***
	[0.111]	[0.138]	[0.123]
Low GDP rep	-1.332***	-2.125***	-0.520
	[0.468]	[0.764]	[0.391]
Lag policy rate rep x Low GDP rep	0.270	0.458*	0.042
	[0.160]	[0.242]	[0.113]
Lag CR gr rep	0.064	0.145*	0.101
	[0.054]	[0.082]	[0.067]
Lag bank equity returns rep	-0.000	0.000	0.000
	[0.011]	[0.021]	[0.013]
Lag Debt/GDP rep	-0.006	-0.013	-0.003
	[0.004]	[0.008]	[0.006]
Lag inflation rep	-0.052	0.296	0.182
	[0.229]	[0.552]	[0.274]
QE indicator rep	1.016	-0.485	1.362
	[0.798]	[1.275]	[1.373]
Observations	74,667	72,179	72,992
R-squared	0.11	0.12	0.11
FE	Cp.Ctry. x time	Cp.Ctry. x time	Cp.Ctry. x time
Countries	29	29	29

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Result 6b: Monetary policy and real activity in the EU

VARIABLES	(1) Flows to all	(2) Flows to banks	(3) Flows to non-banks
Lag policy rate rep	0.253***	0.304***	0.380***
	[0.078]	[0.091]	[0.095]
Lag policy rate rep x Eurozone rep	0.668***	1.153***	0.496*
	[0.200]	[0.359]	[0.264]
Eurozone rep	-2.619**	-5.097**	-3.198**
	[1.113]	[2.013]	[1.238]
Rep. Ctry Controls	Yes	Yes	Yes
Rep. Ctry Controls x Eurozone	Yes	Yes	Yes
Observations	73,879	71,426	72,223
R-squared	0.11	0.12	0.11
FE	Cp.Ctry. x time	Cp.Ctry. x time	Cp.Ctry. x time
Cluster	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.
Countries	29	29	29

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Result 7: Exclude financial centers (UK, SG, HK, US)

VARIABLES	Flows to all	Flows to banks	Flows to non-banks	Flows to all	Flows to banks	Flows to non-banks
	no fin centers (reporting)			no fin centers (counterparty)		
Lag policy rate rep	0.292***	0.355**	0.511***	0.287***	0.341**	0.417***
	[0.104]	[0.148]	[0.139]	[0.093]	[0.124]	[0.099]
Lag credit growth rep	0.062	0.153	0.082	0.041	0.128	0.092
	[0.059]	[0.100]	[0.079]	[0.052]	[0.083]	[0.067]
Lag bank equity returns rep	-0.006	-0.016	-0.004	-0.002	-0.003	-0.002
	[0.012]	[0.022]	[0.015]	[0.012]	[0.023]	[0.014]
Lag real GDP growth rep	0.340**	0.080	0.417**	0.324**	0.018	0.446**
	[0.144]	[0.262]	[0.187]	[0.156]	[0.312]	[0.197]
Lag Debt/GDP rep	-0.010	-0.021**	-0.006	-0.005	-0.012	-0.002
	[0.006]	[0.009]	[0.006]	[0.005]	[0.008]	[0.006]
Lag inflation rep	-0.123	0.278	0.140	0.015	0.416	0.269
	[0.288]	[0.665]	[0.395]	[0.249]	[0.587]	[0.299]
QE indicator rep	1.780**	-0.482	2.649***	0.930	-0.551	1.274
	[0.809]	[1.172]	[0.911]	[0.832]	[1.353]	[1.419]
Observations	62,403	59,938	60,793	67,683	65,246	66,145
R-squared	0.12	0.13	0.12	0.12	0.12	0.11
FE	Cp.Ctry. x Time	Cp.Ctry. x Time	Cp.Ctry. x Time	Cp.Ctry. x Time	Cp.Ctry. x Time	Cp.Ctry. x Time
Cluster	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.	Rep. & Cp. Ctry.
Countries	26	26	26	29	29	29

Conclusions

- We use novel data to identify changes in banks' foreign credit supply due to changes in domestic monetary policy
- An increase in the domestic monetary policy rate leads to higher growth in cross-border claims
- foreign credit goes to relatively safer destination
- The results are robust across different country splits
- Our results have financial stability implications : credit flows may go to countries where credit growth has to slow down

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Additional slides

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Results – Main specification (Before and after GFC)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Flows to all	Flows to banks	Flows to non-banks	Flows to all	Flows to banks	Flows to non-banks
	Before 2007q3	Before 2007q3	Before 2007q3	After 2007q3	After 2007q3	After 2007q3
Lag policy rate rep	0.181**	0.215**	0.379***	0.565***	0.766***	0.669***
	[0.078]	[0.104]	[0.115]	[0.124]	[0.209]	[0.196]
Lag credit growth rep	0.020	0.046	0.107	0.074	0.219	0.071
	[0.068]	[0.131]	[0.090]	[0.083]	[0.129]	[0.073]
Lag bank equity returns rep	-0.013	-0.010	0.003	0.008	0.009	-0.006
	[0.017]	[0.036]	[0.017]	[0.013]	[0.028]	[0.019]
Lag real GDP growth rep	0.193	0.011	0.139	0.371*	0.035	0.526*
	[0.192]	[0.498]	[0.195]	[0.185]	[0.311]	[0.265]
Lag Debt/GDP rep	-0.005	-0.005	0.007	-0.005	-0.014**	-0.009
	[0.007]	[0.016]	[0.008]	[0.004]	[0.006]	[0.006]
Lag inflation rep	0.489	0.606	0.349	-0.663*	-0.268	-0.091
	[0.287]	[0.650]	[0.297]	[0.345]	[0.690]	[0.536]
QE indicator rep	1.452*	-2.847	1.822*	1.004	0.443	1.002
	[0.724]	[1.865]	[1.042]	[1.044]	[1.625]	[1.690]
Observations	43,460	42,161	42,474	30,419	29,265	29,749
R-squared	0.11	0.12	0.11	0.11	0.11	0.09

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Related Literature

- Monetary policy transmission
  - Bank lending channel: Bernanke and Gertler (JEP 1995) , Haan et al (JME 2007)
  - Risk-taking channel: Bruno and Shin (JME 2015); Bekaert et al (JME 2013)

- International transmission of shocks and global banks
  - Cetorelli and Goldberg (JIE 2012, JF 2012)

- Cross border banking flows
  - Bruno and Shin (RES 2014); Cerutti, Claessens and Ratnovski (IMF 2014); Cerutti and Claessens (IMF 2014)

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Result : Iceland as a counterparty

VARIABLES	(1) Flows to all	(2) Flows to banks	(3) Flows to non-banks
Lag policy rate ret	2.803*	0.532	2.152*
	[1.328]	[1.907]	[1.190]
Lag credit growth rep	-0.250	0.250	0.230
	[0.302]	[0.364]	[0.323]
Lag bank equity returns rep	-0.088	-0.152	-0.088
	[0.068]	[0.091]	[0.083]
Lag real GDP growth rep	1.086	-1.895	1.892*
	[0.856]	[1.272]	[1.029]
Lag Debt/GDP rep	0.066**	0.018	0.117**
	[0.025]	[0.022]	[0.041]
Lag inflation rep	0.863	3.254	-0.882
	[2.618]	[4.316]	[2.441]
QE indicator rep	2.133	-0.154	-3.266
	[2.511]	[4.169]	[4.055]
Observations	851	848	836
R-squared	0.17	0.17	0.12
FE	Cp.Ctry. x time	Cp.Ctry. x time	Cp.Ctry. x time
Countries	12	12	12

Data – BIS reporting (sending) countries

Reporting countries	Obs.
AUSTRALIA	1,467
AUSTRIA	3,832
BELGIUM	4,034
BRAZIL	819
CANADA	2,333
DENMARK	2,238
FINLAND	1,581
FRANCE	5,228
GERMANY	5,318
GREECE	845
HONG KONG	2,184
INDIA	1,764
INDONESIA	274
IRELAND	2,265
ITALY	3,348
JAPAN	3,410
KOREA	2,160
LUXEMBOURG	2,549
MALAYSIA	866
MEXICO	170
NETHERLANDS	4,094
PORTUGAL	1,479
SOUTH AFRICA	373
SPAIN	3,285
SWEDEN	2,227
SWITZERLAND	5,236
TURKEY	794
UNITED KINGDOM	5,236
UNITED STATES	3,889

29 Countries

Data – BIS counterparty countries

Cp. Countries	Obs.	Cp. Countries	Obs.	Cp. Countries	Obs.
AUSTRALIA	1,316	ITALY	1,508	Russia	1,314
AUSTRIA	1,389	Iceland	838	SINGAPORE	1,483
Algeria	456	Israel	1,017	SOUTH AFRICA	1,195
Argentina	1,014	JAPAN	1,561	SPAIN	1,406
BELGIUM	1,498	Jamaica	231	SWEDEN	1,393
BRAZIL	1,276	Jordan	406	SWITZERLAND	1,595
Bolivia	123	KOREA	1,134	Saudi Arabia	1,004
Bulgaria	672	Kuwait	557	Senegal	172
CANADA	1,402	LUXEMBOURG	1,487	Slovak Republic	555
CHILE	1,171	Latvia	73	Slovenia	582
CYPRUS	777	Libya	169	Sri Lanka	538
China	1,376	Lithuania	270	TAIWAN	946
Colombia	700	MALAYSIA	933	TURKEY	1,317
Cote d'Ivoire	231	MEXICO	1,219	Thailand	940
Croatia	473	Mauritius	388	Tunisia	635
Czech Republic	951	Morocco	892	UNITED KINGDOM	1,652
DENMARK	1,394	NETHERLANDS	1,612	UNITED STATES	1,647
Estonia	122	NORWAY	1,391	Ukraine	309
FINLAND	1,270	New Zeeland	901	Venezuela	963
FRANCE	1,636	Oman	500		
GERMANY	1,598	PANAMA	1,097		
GREECE	1,143	PORTUGAL	1,295		
Ghana	346	Pakistan	707		
Guatemala	345	Paraguay	341		
HONG KONG	1,362	Peru	918		
Hungary	936	Philippines	1,004		
INDIA	1,074	Poland	1,128		
INDONESIA	1,308	Qatar	564		
IRELAND	1,505	Romania	647		

77 Countries

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Summary stats

	Observations	Mean	Median	StDev	Min	Max
Cross-Border Flows (CBF)						
CBF to Banks and Non-Banks	73879	4.02	0.85	24.19	-44.10	89.25
CBF to Banks	71426	8.92	0.52	46.82	-66.59	195.74
CBF to Non-Banks	72223	4.79	0.57	26.99	-47.58	107.35
Reporting Country						
MPrate_rep	73879	3.07	2.61	3.23	0.00	61.00
CRgr_rep	73879	1.89	1.76	5.01	-18.99	20.97
Bankret_rep	73879	2.63	3.00	16.98	-83.43	90.74
GDPgr_rep	73879	0.53	0.57	1.03	-6.90	7.33
Debt/GDP_rep	73879	68.35	62.83	39.01	3.08	244.25
Infl_rep	73879	0.54	0.49	0.68	-3.42	9.79
QE_rep	73879	0.05	0.00	0.22	0.00	1.00
Counterparty Country						
MPrate_cp	67271	5.60	3.83	9.70	0.00	284.00
CRgr_cp	67271	2.31	2.19	5.57	-37.97	22.89
Bankret_cp	67271	3.56	3.13	19.21	-83.43	232.17
GDPgr_cp	67271	0.73	0.76	1.39	-13.13	13.33
Debt/GDP_cp	67271	56.25	48.70	35.23	1.85	244.25
Infl_cp	67271	1.19	0.67	5.07	-7.38	387.80

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Thank you!