Can macroprudential regulation make cross-border lending more resilient? Lessons from the taper tantrum

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Motivation

- Growing use of macroprudential tools since the financial crisis

- Little evidence on how effective they are
  (e.g. at stabilizing lending during stress)

- Particularly in an international setting

- We look into this by combining the BIS IBS and the IBRN macroprudential database

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Research question

- Did countries which had stricter prudential measures in place weather the tantrum better?

  - How did prudential measures implemented beforehand affect how bilateral cross-border bank lending "reacted" to the taper tantrum?

  - Did borrowers' country or lending banking systems' regulations play a stronger role?

  - How was interbank lending affected relative to lending to non-banks?

- Hypothesis: More macroprudential tools make lending more resilient under stress (i.e. during the taper tantrum)
  - No specific hypothesis about specific tools and their effects

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Results

- Macroprudential tools applied in borrower countries did stabilize the taper tantrum related lending shock

- Stabilization is stronger for measures in advanced economies

- Effect is present both in bank and non-bank lending

- No evidence of interactions

Policy implications

- Macroprudential tools can enhance the stability of cross-border financial flows

- Keep you house in order

- International coordination should not be ignored

Data: Macroprudential database

- Source: IBRN and IMF cooperation
    - 2013 Global Macro Prudential Instruments (GMPI) survey
    - No stress tests
    - Cerrutti et al (2015); Correa et al (2016)

- Main issues:
    - Does not measure prudential stance at any time, only change (~cross-section)
    - Timing is hard to identify due to expectations (~time series)
    - Not all prudential action has the same strength and effect (~asymmetry)

Data: Prudential database (2)

Nine categories

sscb_res	Change in sector specific capital buffer: Real estate credit. Requires banks to finance a larger fraction of these exposures with capital.
sscb_cons	Change in sector specific capital buffer: Consumer credit Requires banks to finance a larger fraction of these exposures with capital.
sscb_oth	Change in sector specific capital buffer: Other sectors. Requires banks to finance a larger fraction of these exposures with capital.
cap_req	*Change in capital requirements. Implementation of Basel capital agreements.*
concrat	Change in concentration limit. Limits banks' exposures to specific borrowers or sectors.
ibex	Change in interbank exposure limit. Limits banks exposures to other banks.
ltv_cap	Change in the loan-to-value ratio cap. Limits on loans to residential borrowers.
rr_foreign	Change in reserve requirements on foreign currency-denominated accounts.
rr_local	Change in reserve requirements on local currency-denominated accounts.

Data: Prudential database (3)

- Pre-defined aggregate indices:
  - **PruC**: Country index by time t and country c, equal to 1 if the sum of the 9 instruments is >=1 and -1 if the sum of the instruments is <=-1, 0 otherwise.
  - **Pruc2**: Country index by time t and country c, equal to 1 if the sum of the 9 instruments is >=1 and -1 if the sum of the instruments is <=-1, 0 otherwise. In this case, all individual instruments are adjusted to have maximum and minimum changes of 1 and -1
- Our benchmark regression uses Pruc6
  - **Pruc6**: Country index by time t and country c, equal to 1 if the sum of the **8 instruments (i.e. without *cap_req*)** is >=1 and -1 if the sum of the instruments is <=-1, 0 otherwise.

Data: Bilateral cross-border bank flows: BIS IBS Stage 1

- Linking lending banking systems with borrowing countries while retaining information on currency composition

	Currency composition (A)	Residence of borrower (B)	Nationality of lending bank (C)
Consolidated Data	No	Yes	No
Locational Data			
by Residence	Yes	Yes	No
by Nationality	Yes	No	Yes
Stage 1 data	**Yes**	**Yes**	**Yes**

- Why nationality and not residence of the lender?
    - Example: German bank's UK subsidiary lending to the US
    - "Same country" lending
    - See illustration chart printout for example

Recall: data features for analytic design

- Recall data features:
  - Change in policies is measured, rather than stance
  - Policy expectations influence timing
  - (Macro)prudential action might signal vulnerability
  - Impact of prudential actions may vary across countries

- Methodological approach:
  - Use identified major shock: taper tantrum (only cross-section)
  - Use cumulative change up until the tantrum (~time series)

- Two-sided effects: (macro)prudential regulation in both home banking system and host country can affect bank flows' resilience

Analysis: Basic regression setup

- Fixed effects on lending *and* borrowing side
- Difference-in-difference regressions:

$\Delta flows_{ij} =$	
$\beta_0 + \beta_1 source\_reg\_ind_j + \beta_2 dem\_host_i + \varepsilon_{ij}$	(1)
$\gamma_0 + \gamma_1 host\_reg\_ind_i + \gamma_2 dem\_source_j + \upsilon_{ij}$	(2)
$\delta_0 + \delta_1 host\_reg\_ind_i + \delta_2 source\_reg\_ind_j + \upsilon_{ij}$	(3)
$\theta_0 + \theta_1 dem_{host_i} + \theta_2 dem_{source_j}$ $+ \theta_3 host\_reg\_ind_i * source\_reg\_ind_i + \upsilon_{ij}$	(4)

- Δclaims: Change in bilateral claims growth between source and host country, that is, change in claims from Q4 2012 to Q1 2013 (before tantrum) compared to change in claims from Q3 2013 to Q4 2013 (after tantrum)

Benchmark: all countries, all sectors, Pruc6

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lending flows by borrower sector:	Total	Total	Total	Banks	Banks	Banks	Non-banks	Non-banks	Non-banks
Variables									
Cumulative source Pruc6 index	0.147		0.111	0.291		0.175	-0.420		-0.471
	(0.790)		(0.749)	(1.392)		(1.282)	(1.310)		(1.332)
Cumulative host Pruc6 index		1.040***	1.035***		0.885**	1.029**		1.263***	1.079***
		(0.300)	(0.263)		(0.434)	(0.381)		(0.332)	(0.338)
Constant	-21.85	-0.559**	3.626**	39.14	-3.567***	1.479	-31.56*	0.750***	4.520**
	(15.99)	(0.219)	(1.429)	(30.99)	(0.404)	(2.121)	(17.41)	(0.181)	(1.972)
Observations	1,875	1,875	1,875	1,591	1,591	1,591	1,734	1,734	1,734
R-squared	0.06	0.06	0.01	0.06	0.05	0.002	0.07	0.10	0.01
Source Fixed Effects	No	Yes	No	No	Yes	No	No	Yes	No
Host Fixed Effects	Yes	No	No	Yes	No	No	Yes	No	No

Difference in the tantrum effect on bilateral lending outflows from banks in *source* banking systems at the 90th vs 10th percentile of Pruc6 regulations index

	0.88		0.664	1.75		1.047	-2.1		-2.35

Difference in the tantrum effect on bilateral lending inflows to borrowers in *host* countries at the 90th vs 10th percentile of Pruc6 regulations index

		8.31	8.28		7.08	8.23		10.1	8.63

Extensions show robustness

- Similar results for
    - Pre-defined Pruc index (but weaker in magnitude)
    - Advanced economies (but stronger)
    - Emerging markets (but weaker)

- Some tools were more effective than others
    - Host country LTV ratios seems the strongest

- No interaction across home and host tools

Robustness checks

- Repeat main and advanced emerging market tables for:
  - clustering standard errors along host countries,
  - no clustering of standard errors,
  - using pre-defined index Pruc2 for the macroprudential variable,
  - creating a new index (Pruc5) similar to our PruC6 with the same eight subindices but without constraining the quarterly index value on the {-1,0,1} spectrum,
  - dropping source (lending) banking systems one by one from the sample (to ensure outliers do not drive the results),
  - dropping the hosts countries of borrowers one by one from the sample (for the same reason as above),
  - adding macroeconomic controls to source and host countries.
- For the euro area
- Macroprudential measures accumulate post-crisis

Caveats

- We do not know the extent to which
    - lending is substituted away
    - "tantrum experience" can be generalized

- Changes in macro-prudential tools might signal vulnerability

- No information on (comparable) prudential stance

Conclusion

- Macroprudential tools applied in borrower countries did stabilize the taper tantrum related lending shock

- Stabilization is stronger for measures in advanced economies

- Effect is present both in bank and non-bank lending

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- Keep you house in order, but do not discard int'l coordination

Thank you!

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