The Use and Effectiveness of Macroprudential Policies: New Evidence

By

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New Challenges in Central Banking: Monetary Policy Governance and Macroprudential Issues

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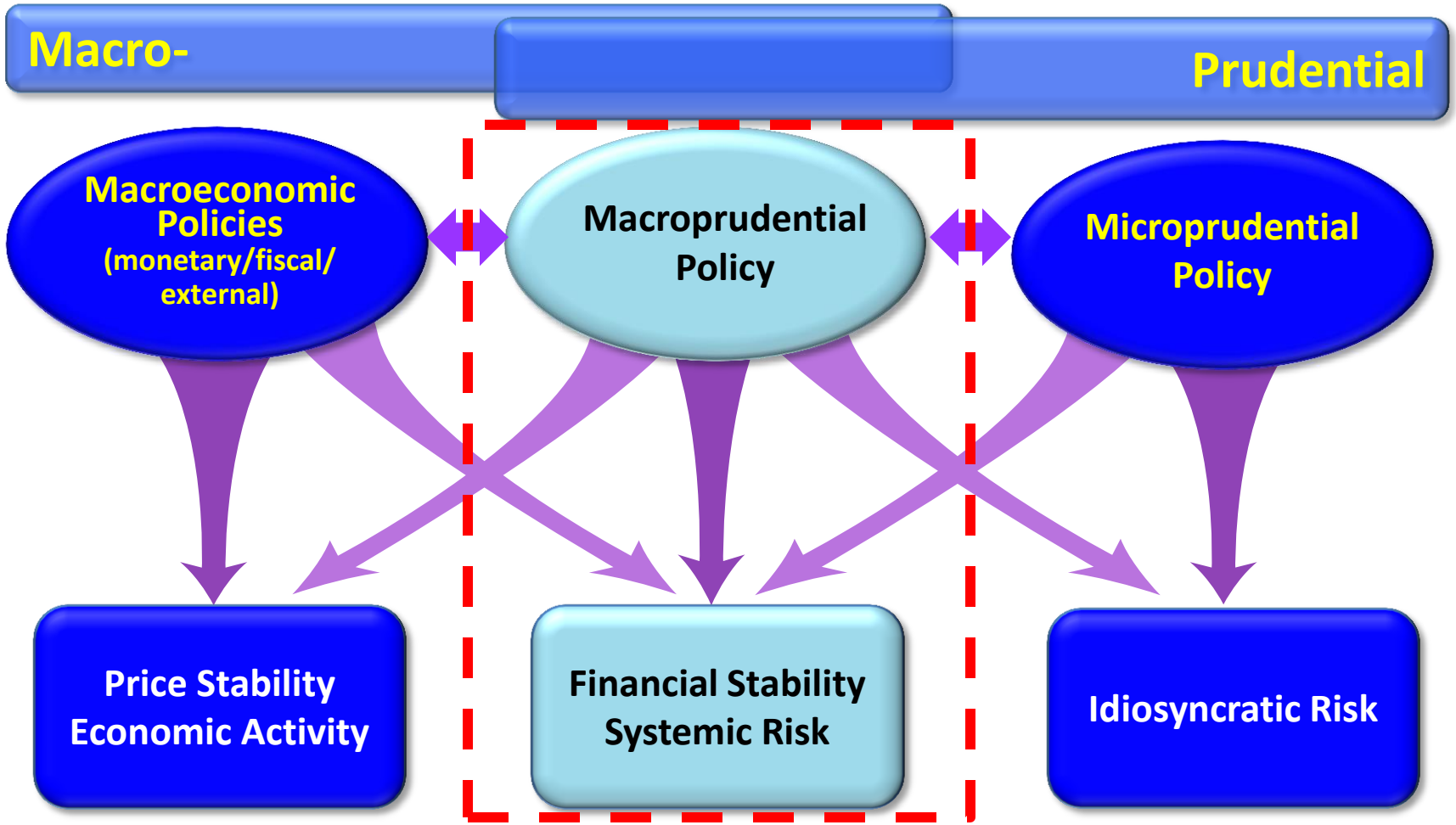
Introduction/Overview

- With the recent crisis macro-prudential policies (MAPs) have received greater attention
- But knowledge on MAPs remains still limited
  - Limited experiences (many MAPs introduced after GFC).
  - Incomplete data on the use of prudential tools

Structure of presentation

- Quick Review
  - Why are MAPs needed?
  - How effective have MAPs been?
    - Focus on reducing procyclicality risks
- 2017 JFS Paper (large 119 countries sample)
  - Which MAPs have countries used?
  - What effects on credit and house prices?
- Some results from Cerutti, Correa, Fiorentino & Segalla (IBRN project/dataset)
  - Intensity in usage across selected MAPs
- Conclusions

Why are MAPs Needed?



How Effective Have MAPs Been?

Cross-Country Analyses

- Advantages/disadvantages
  - Can consider overall effects and some country differences
  - But identification of channels, endogeneity of MAP harder
- Examples (up to 57 countries)
  - Lim et al. (2011):LTV and DTI caps, credit growth, reserve requirements, dynamic provisioning mitigate procyclicality
  - IMF (2013): capital, RRs lower credit; LTV, capital reduce house prices: RR reduce portfolio inflows in floating EMs; effects of MAPs on GDP growth, sectoral allocations
  - Akinci and Olmstead-Rumsey (2015): Housing related MAPs (e.g., LTV) curb bank credit, housing credit, and house price inflation.

How Effective Have MAPs Been?

Country Case Studies (More Micro)

- Advantages/disadvantages
  - Better identification, control for specifics (e.g., banks' cap)
  - But no ability to investigate role of country circumstances
- Examples
  - Jiménez et al (2015), **Spain**: dynamic provisioning tame credit supply and help smooth downturn, uphold credit
  - Aiyar, Calomiris and Wieladek (2016), **UK**: higher capital adequacy requirements can help mitigate lending booms
  - Wong, Fong, Li and Choi (2011), **Hong Kong**: targeted at real estate borrowing reduce real estate cycles

Overall Evidence: Still Early Days

- Evidence on effectiveness of MAPs
  - Some evidence of temporary cooling effect and building buffers for bad times. But not always sustained, seldom sufficient for bust
  - Rarely explicitly at externalities/market failures
- Don’t know side effects of MAPs
  - Financial, economic, political costs and risks
- Partly due to data and other limitations
  - Smaller samples. Limited time-periods. Sometimes only certain financial segments

How does our paper fit in the Literature?

External Validity:

Cross-country studies

Cerutti, Claessens & Laeven (2015)	Countries	Period	Policies
	119	2000-13	12

Documents MAPs usage (whether it is in use or not) and analyzes their effectiveness

Internal Validity:

Identification

Jimenez, Ongena, Peydro & Saurina (2015)	Countries	Period	Policies
	Spain	1998Q4-2010Q4	DP

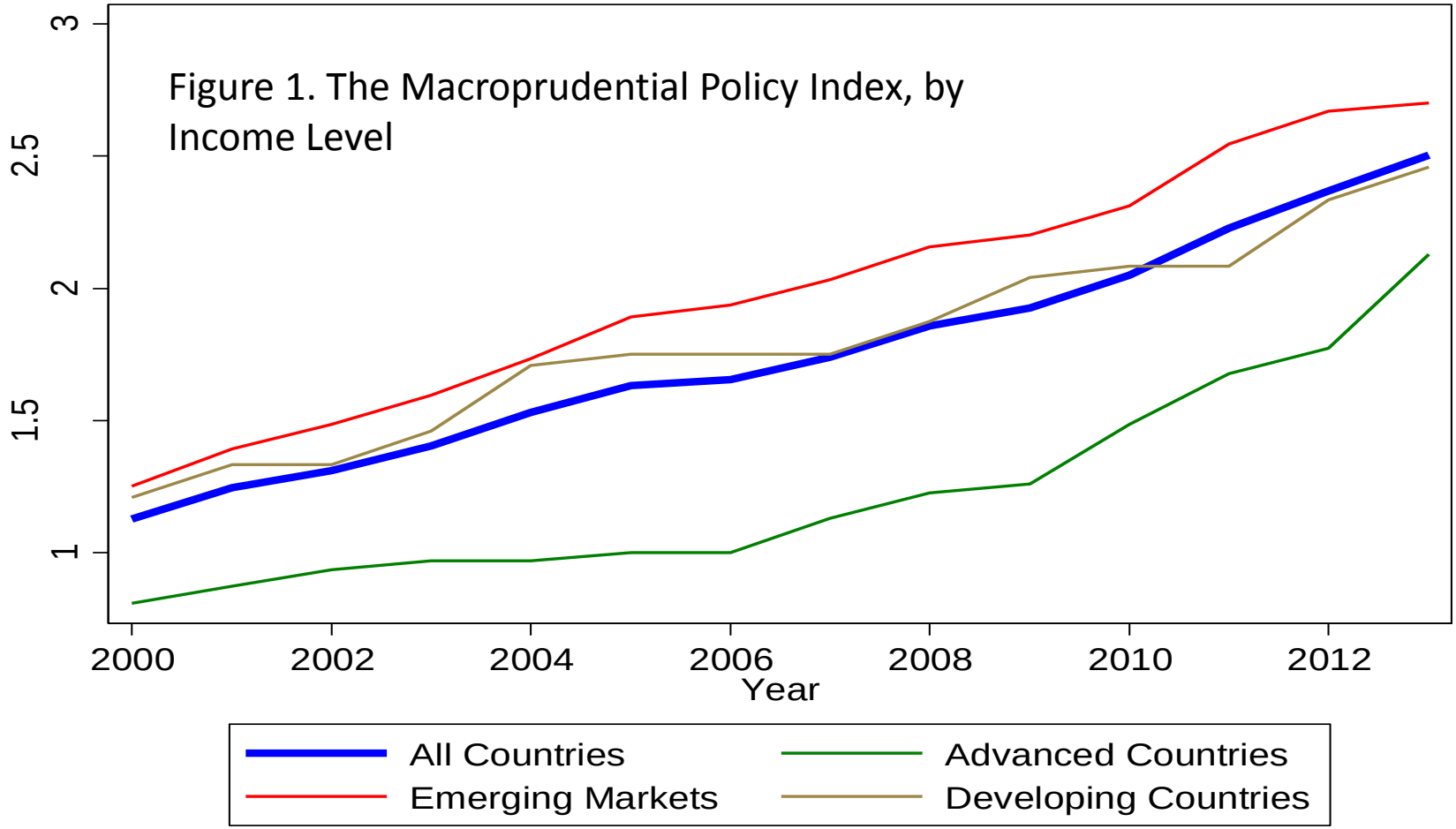
Identification: micro-level demand controls (e.g., firm*time FEs)

Cerutti, Claessens and Laeven (2015)

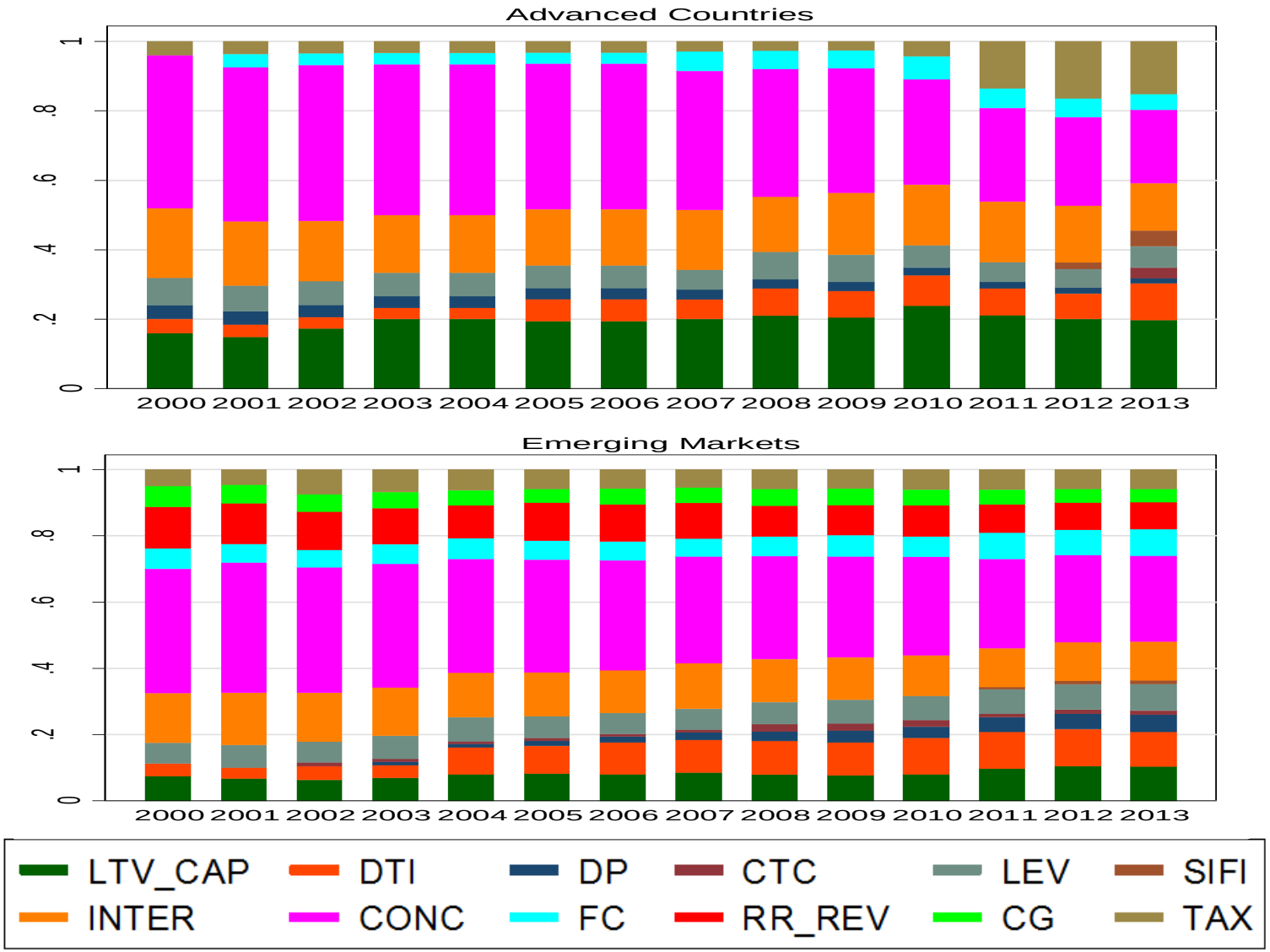
- Country coverage: 119 (31 AEs, 64 EMs, and 24 LICs)
- Time coverage: 2000-2013 (annual data)
- Usage = binary measure (whether in place or not)
- 12 MAPs out of the 18 surveyed in GMPI (IMF Survey):

-Loan-to-Value Cap (LTV)
-Debt-to-Income Ratio (DTI)
-Time-Varying/Dynamic Loan-Loss Provisioning (DP)
-Counter-Cyclical Requirements (CTC)
-Leverage Ratio (LEV)
-Capital Surcharges on SIFIs (SIFI)
-Limits on Interbank Exposures (INTER)
-Concentration Limits (CONC)
-Limits on Foreign Lending (FC)
-Reserve Requirements (RR)
-Credit Growth Caps (CG)
-Levy/Tax on Financial institutions (TAX)

More MAPs Use Over Time
ACs Less Than EMs & DCs



ACs Use More Borrower-based
EMs Use Broad Set of MAPs



Regression setup

- Panel investigation of effects of MAPs. Model:

$$Y_{i,t} = \alpha Y_{i,t-1} + \beta^* \text{Macropru}_{i,t-1} + \theta * X_{i,t-1} + \mu_i + \varepsilon_{i,t}$$

- Lagged dependent variable
- Macropru = MPI (overall index); Individual; Groups: Borrower based; Financial institutions based
- Country-level: time-varying controls (lagged GDP growth+ crisis+ interest rate), fixed effects
- Arellano Bond GMM panel (to limit endogeneity, to take advantage of our large N & small T sample)

Base Regression Result: Total Credit

Table 4. Macroprudential Policies and Credit Growth: Main Regression Results

Variables	All		Advanced	Emerging	Developing	Open	Closed
	(1) - GMM	(2) - OLS	(3) - GMM	(4) - GMM	(5) - GMM	(6) - GMM	(7) - GMM
MPI	-7.637***	-2.112***	-1.376*	-5.327***	-6.743**	-2.910**	-6.605***
	[1.876]	[0.651]	[0.781]	[1.619]	[3.076]	[1.251]	[2.073]
Credit Growth	0.245***	0.324***	0.485***	0.264***	0.157*	0.351***	0.231***
	[0.0715]	[0.0512]	[0.134]	[0.0897]	[0.0872]	[0.0869]	[0.0798]
GDP Growth	0.399	0.649***	0.123	0.427	0.902*	0.343	0.586**
	[0.243]	[0.144]	[0.215]	[0.288]	[0.517]	[0.226]	[0.291]
Crisis	-14.24**	-5.967***	-5.781***	-17.07	4.385	-3.147	-16.47
	[6.669]	[1.706]	[1.984]	[11.17]	[2.702]	[2.904]	[11.55]
Policy Rate	-1.071***	-0.697***	-0.952**	-0.645	-1.389***	-0.544	-0.958***
	[0.340]	[0.196]	[0.417]	[0.394]	[0.284]	[0.346]	[0.358]
Countries	106	106	31	56	19	47	58
Observations	972	972	318	525	129	452	509

- MPI significant across specifications, also w/ OLS
- Lagged credit growth + significant, especially in AC
- Demand, GDP growth, +
- Crisis, drop in credit
- Some decrease with policy rate
- EM and closed countries driving the results more

Economic Effects are Large, but Controls Vary in Importance

- For ACs, a one standard deviation (STD) in MPI reduces credit growth by 2.2 percentage points. Large effect, equivalent to about 1/4th STD in credit growth (9.04) for ACs
- Even larger for EMs. A one STD in MPI reduces credit growth by 8.3 percentage points, about 2/3rd STD credit growth
- But MPI less effective in open economies, suggesting evasion

Regression Results by MAP Subgroups

Table 5: Effects of Instrument by Subgroups

Variables	BORROWER					FINANCIAL				
	All	Advanced	Emerging	Open	Closed	All	Advanced	Emerging	Open	Closed
	(1)	(2)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
BORROWER	-11.06**	-2.16	-8.389**	-5.288*	-7.712*					
	[4.496]	[2.288]	[3.637]	[3.128]	[4.517]					
FINANCIAL						-8.838***	-0.983	-6.625***	-4.591***	-8.282***
						[2.523]	[0.935]	[2.213]	[1.650]	[2.851]
Credit Growth	0.277***	0.487***	0.291***	0.343***	0.261***	0.284***	0.487***	0.292***	0.380***	0.249***
	[0.0707]	[0.125]	[0.0868]	[0.0807]	[0.0835]	[0.0693]	[0.143]	[0.0868]	[0.0947]	[0.0751]
GDP Growth	0.428*	0.136	0.600**	0.318	0.635**	0.26	0.0521	0.351	0.192	0.473*
	[0.241]	[0.210]	[0.302]	[0.232]	[0.306]	[0.232]	[0.234]	[0.287]	[0.225]	[0.279]
Crisis	-21.15**	-5.991***	-19.68	-5.127*	-21.6	-13.87**	-7.390***	-15.8	-4.506*	-15.34
	[9.170]	[2.094]	[13.21]	[2.960]	[14.83]	[6.146]	[2.198]	[9.912]	[2.622]	[10.36]
Policy Rate	-0.833**	-0.937**	-0.498	-0.558	-0.796**	-0.873***	-0.998**	-0.555	-0.602*	-0.870***
	[0.391]	[0.428]	[0.396]	[0.380]	[0.367]	[0.311]	[0.435]	[0.342]	[0.341]	[0.323]
Countries	106	31	56	47	58	106	31	56	47	58
Observations	972	318	525	452	509	972	318	525	452	509

- Borrower based are important, even more so in EMs and closed
- Financial institutions based matter as well, again less so in ACs

Results by Subsector + Instrument

Table 6: Effects of Individual Instruments on Several Variables

Variables	Credit Growth				HH Credit Growth		Corp Credit Growth		House Price Growth	
	All	Advanced	Emerging	Developing	Advanced	Emerging	Advanced	Emerging	Advanced	Emerging
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
MPI	-7.637***	-1.376*	-5.327***	-6.743**	-0.763***	-1.942	0.678	-1.022	-0.0449	-0.907
BORROWER	-11.06**	-2.16	-8.389**	-14.45***	-1.047*	-7.636**	-0.982	-3.068	-1.039	-1.156
FINANCIAL	-8.838***	-0.983	-6.625***	-7.007	-0.487	-0.0857	1.552	-0.584	0.174	-1.159
LTV_CAP	-12.35*	-5.298	-6.861	-14.45***	-1.447	-7.956**	-3.287***	-5.307	-1.145	0.362
DTI	-24.16**	-0.499	-15.56**		-1.780*	-11.72***	0.584	-3.561*	-0.477	-3.322
DP	-16.39***		-12.73***			1.233		6.182***		-3.297
CTC	-8.629		-12.75	-5.731***						
LEV	-2.716		1.426	-3.963**	5.714*	1.332	13.12*	4.073***	1.538	1.796
SIFI	9.853		-1.242	29.63***		1.332		4.073***	0.885	1.796
INTER	-35.46**	-0.462	-39.37**	-10.53***	-1.228		3.899		0.72	-16.91***
CONC	-29.84*	-2.028	-9.287		2.861	-4.044	7.481	4.333**	6.218	3.503*
FC	-9.489*	-3.132	-12.23***	-17.46***	-2.644***	-1.146	0.0281	-8.596***	-3.627	1.565***
RR_REV	-42.84*		-22.74*			-8.661***		-14.68***		9.732***
CG	-46.16		-14.35	-12.99						
TAX	-5.196	-1.356	-5.533	-1.701***	-0.637	6.413	0.0129	1.187	0.426	-2.616**
Countries	106	31	56	19	22	9	22	9	31	18
Observations	972	318	525	129	241	79	241	79	307	142

- Household credit responsive to borrower based, in EMs especially
- House prices not to borrower based
- Corporate sector credit not
- LTV affects overall credit, HH credit in EMs, corp. in ACs
- DTI also, espec. HH credit and corp. in EMs
- DP in EMs (users few), not corp. (+)
- FC strong, espec. in EMs, not HP
- RR in EMs, for all credit types, not HP (positive)
- INTER some effect on credit, HP EMs

Cross-Border and Country Effects

- Higher MPI $\rightarrow$ increases share of cross-border claims
  - One STD increase in MPI increases cross-border ratio in open countries by 6 pp, about 1/3th its STD

  $\Rightarrow$ Consider MAPs together with CFM tools
- Country characteristics, besides type, can matter
  - MPI not more effective with higher GDP/Capita or institutional development
  - But MPI less impact on credit in more developed financial systems, more flexible exchange rate, but not for de-jure more open

  $\Rightarrow$ More developed, tap alternatives, circumvent MAPs

Additional Interaction Effects

- Higher Credit Growth $\rightarrow$ extra decrease MPI impact
  - MAPs more effective in dampening when credit growth is high, especially in ACs and EMs
- Lower Credit Growth $\rightarrow$ MPI impact increases
  - MAPs can be effective in maintaining credit growth in ACs and open economies

  $\Rightarrow$ Impact of MAPS is asymmetric: less credit in upswing, more in downswing

  $\Rightarrow$ Suggests need to consider phase of financial cycle

2017 IBRN Project: Measuring Intensity

External Validity:

Cross-country studies

Cerutti, Claessens & Laeven (2017)	Countries	Period	Policies
	119	2000-13	12

Documents MAPs usage (whether it is in use or not) and analyzes their effectiveness

Cerutti, Correa, Fiorentino & Segalla (2017)	Countries	Period	Policies
	64	2000Q1-2014Q4	5

Objective: Capture changes in prudential policy intensity in a cross-country, cross-time consistent way

Internal Validity:

Identification

Jimenez, Ongena, Peydro & Saurina (2015)	Countries	Period	Policies
	Spain	1998Q4-2010Q4	DP

Identification: micro-level demand controls (e.g., firm*time FEs)

Cerutti, Correa, Fiorentino, and Segalla (2017)

- Documents usage intensity of prudential policies
- Country coverage: 64 (30 AEs and 34 EMs)
- Time coverage: 2000-2014 (quarterly data)
- "Prudential" = wider coverage to avoid omissions
- "Usage intensity" = recording a tightening (+1), or loosening (-1) or no-change in each given quarter when the instrument is in place.
- 5 type of prudential instruments: interbank exposure limits, concentration limits, LTV caps, reserve requirements, and capital buffers.

Cerutti, Correa, Fiorentino, and Segalla (2017)

Usage of Prudential Policies

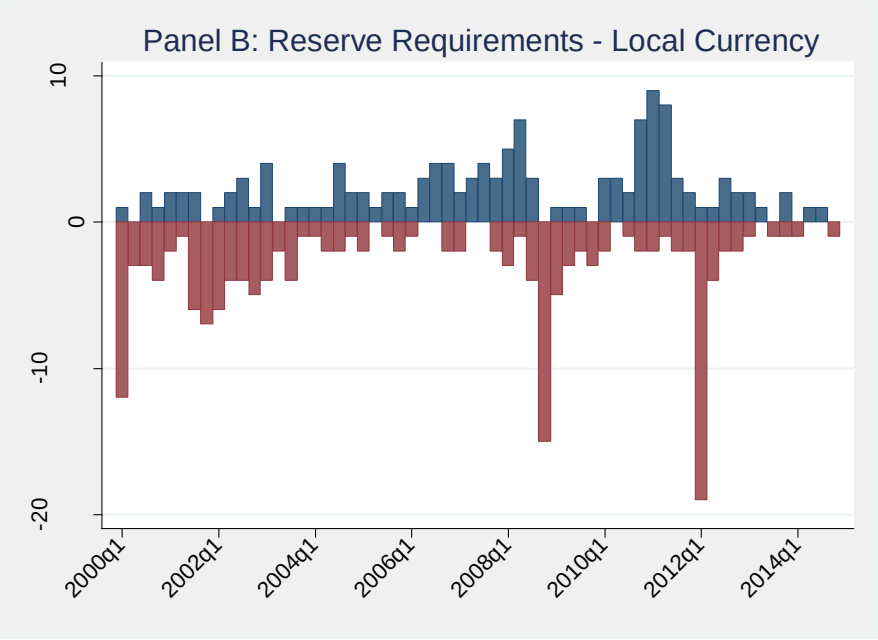
- RR and LTV have the largest number of tightening and loosening episodes
- CONC and INTER not often adjusted in intensity
- Cap. Req. tightened especially after GFC

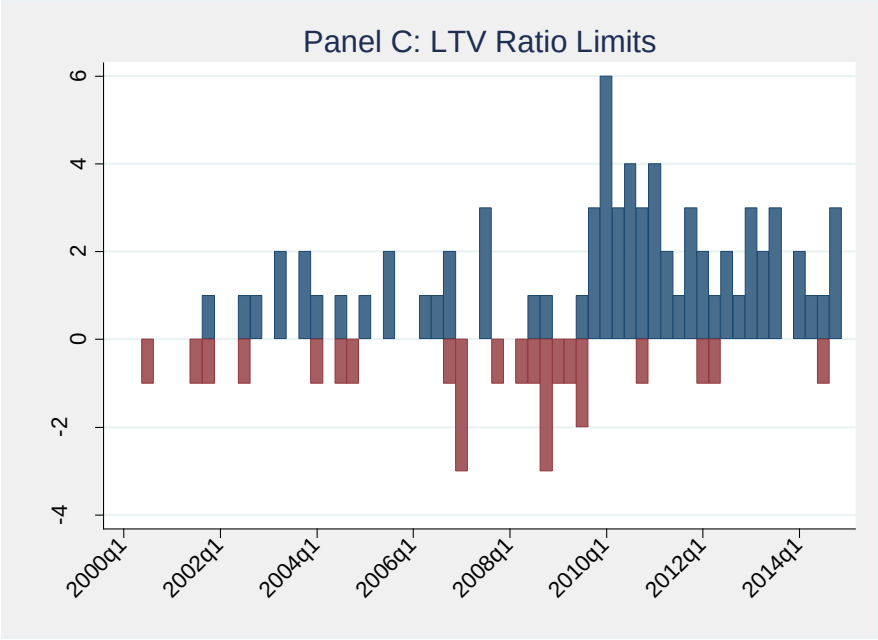
	Distinct countries with instrument changes	Countries with tightening episodes	Countries with loosening episodes	Countries with instrument
SSCB Real estate loans	22	20	9	64
SSCB Consumer loans	9	7	3	64
SSCB other loans	12	11	3	64
Concentration limits	22	21	2	36
Interbank exposures	14	13	1	22
RR foreign currency	21	20	17	64
RR local currency	46	29	44	64
Loan to value ratio limits	36	33	14	38
General capital requirements	55	55	0	57

Cerutti, Correa, Fiorentino, and Segalla (2017)

Usage of Prudential Policies

- RR loosening coincided with GFC and the European sovereign debt crisis
- LTV tightened often after GFC (counter acting loose monetary policies in several countries)

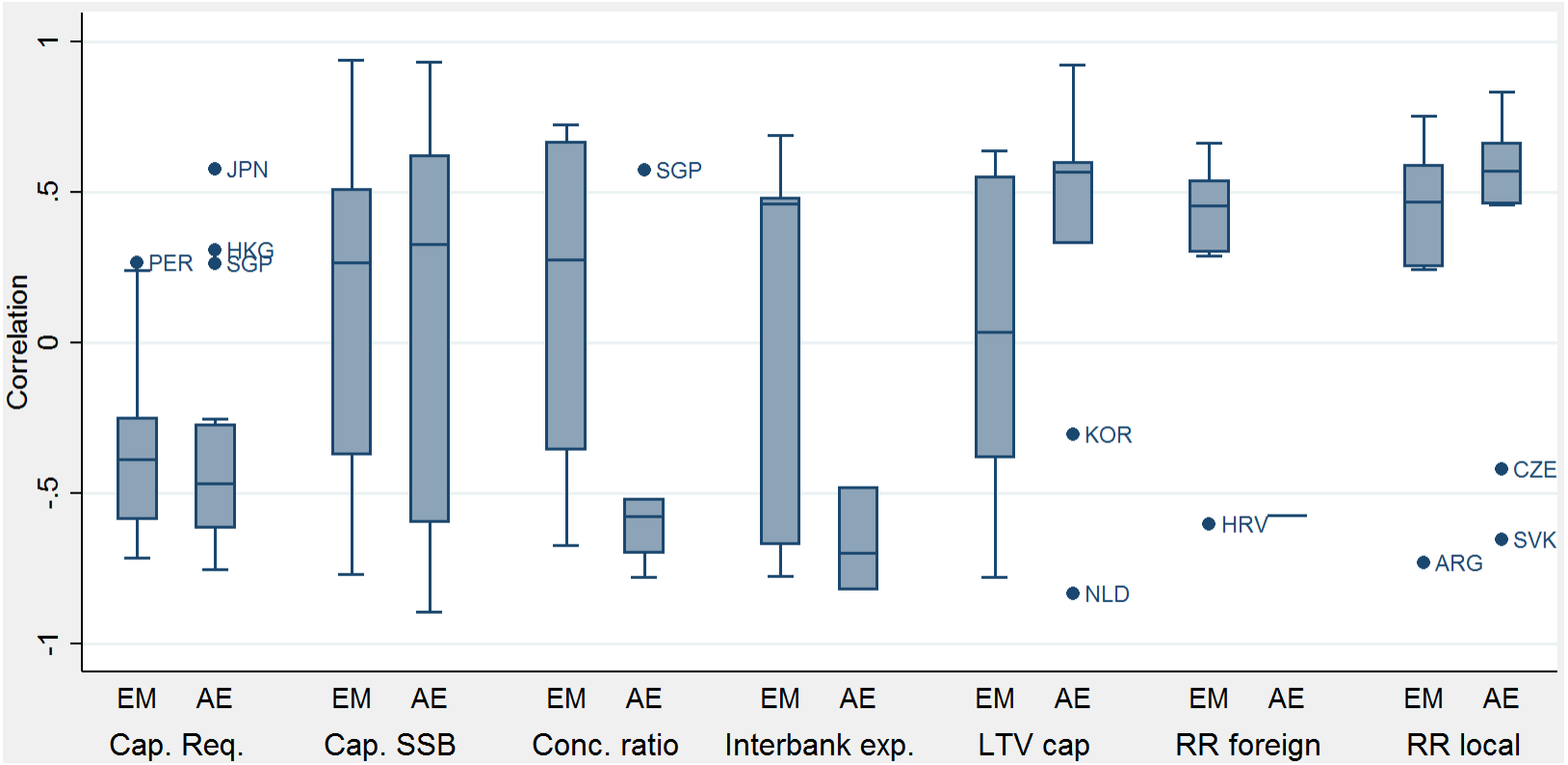




Cerutti, Correa, Fiorentino, and Segalla (2017)

Cyclical or counter-cyclical usage w.r.t. credit?

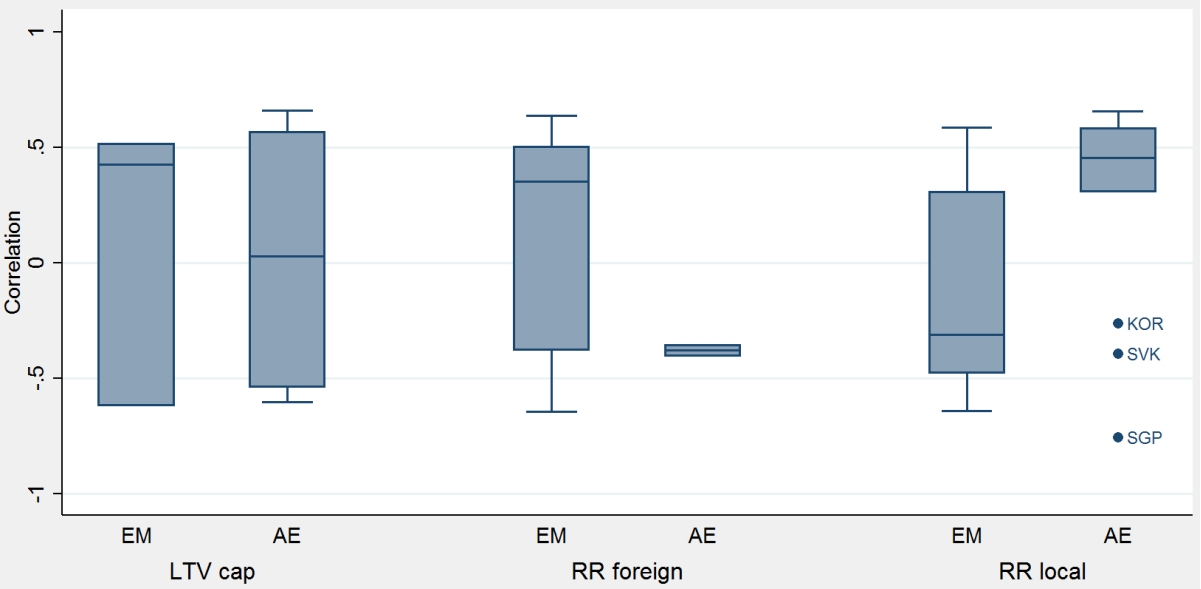
- Cap. SSB, CONC, INTER: not many statistically significant correlations and broadly distributed
- LTV and RR show more counter-cyclical usage



Cerutti, Correa, Fiorentino, and Segalla (2017)

Complementary usage with policy rates?

- LTV used with higher policy rates in some AEs, but also to tighten while lowering policy rates (e.g., Canada, Hong Kong)
- RR (Local) used more to (partially) offset policy rate changes, but there is general heterogeneity



General Conclusions

- Empirically: some evidence of impact of MAPs
  - Especially on credit (overall and HH credit)
  - But differentiate by country and individual MAPs
  - Also usage intensity analysis points in same direction
- Suggests scope for MAP
  - But need to be pragmatic, a times discretionary within frameworks, targeted at specific markets/objectives
  - Ensuring resilience can reinforce avoiding booms/busts
- But overall, MAP still at early stage
  - Interactions with other policies. Adaptations. Costs. Political economy concerns. Rules vs. discretion.

$\Rightarrow$ More data, research on effects, risks, calibrations, etc.