XII Annual Seminar on
Risk, Financial Stability and Banking

Countercyclical Macroprudential Policy: Evidence from an Emerging Country

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BANCO CENTRAL DO BRASIL

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Summary

- Motivation
- Data
- Identification
- Results

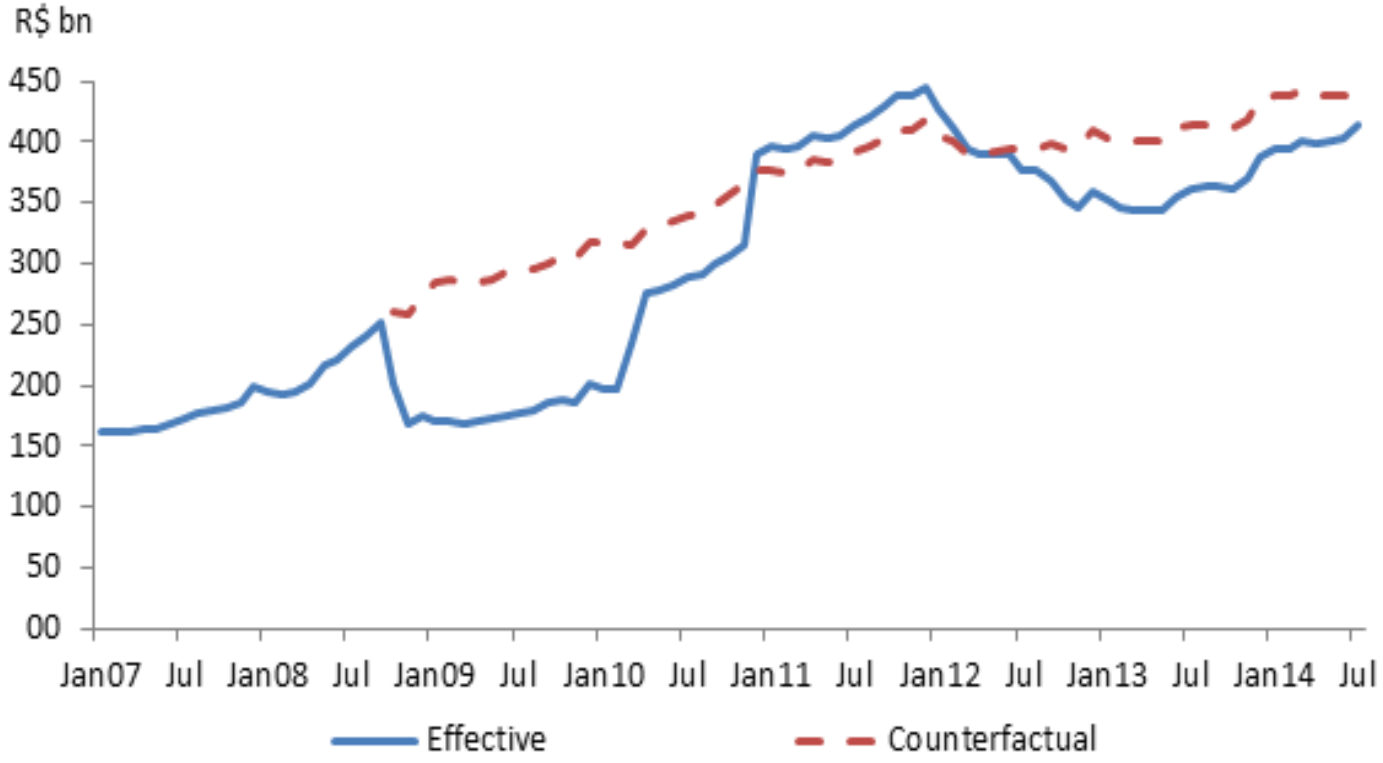
Motivation

- RR are a tax on banks' assets;
  - Fiscal role (e.g. De Kock, 1964; Cardoso and Koyama, 1999)
  - Monetary policy role (e.g. Kashyap and Stein, 2012, Camors, 2016)
  - Macroprudential role and countercyclical policy (e.g. Montoro and Moreno, 2011)

Motivation

- Countercyclical macroprudential policy;
  - Toolkit and Basel III (BCBS, 201)
  - Empirical literature : Lending – channel and risk-taking of countercyclical policy (e.g. Jimenez et al., 2017)
  - Countercyclical RR (Bustamante and Hazan, 2015)

Motivation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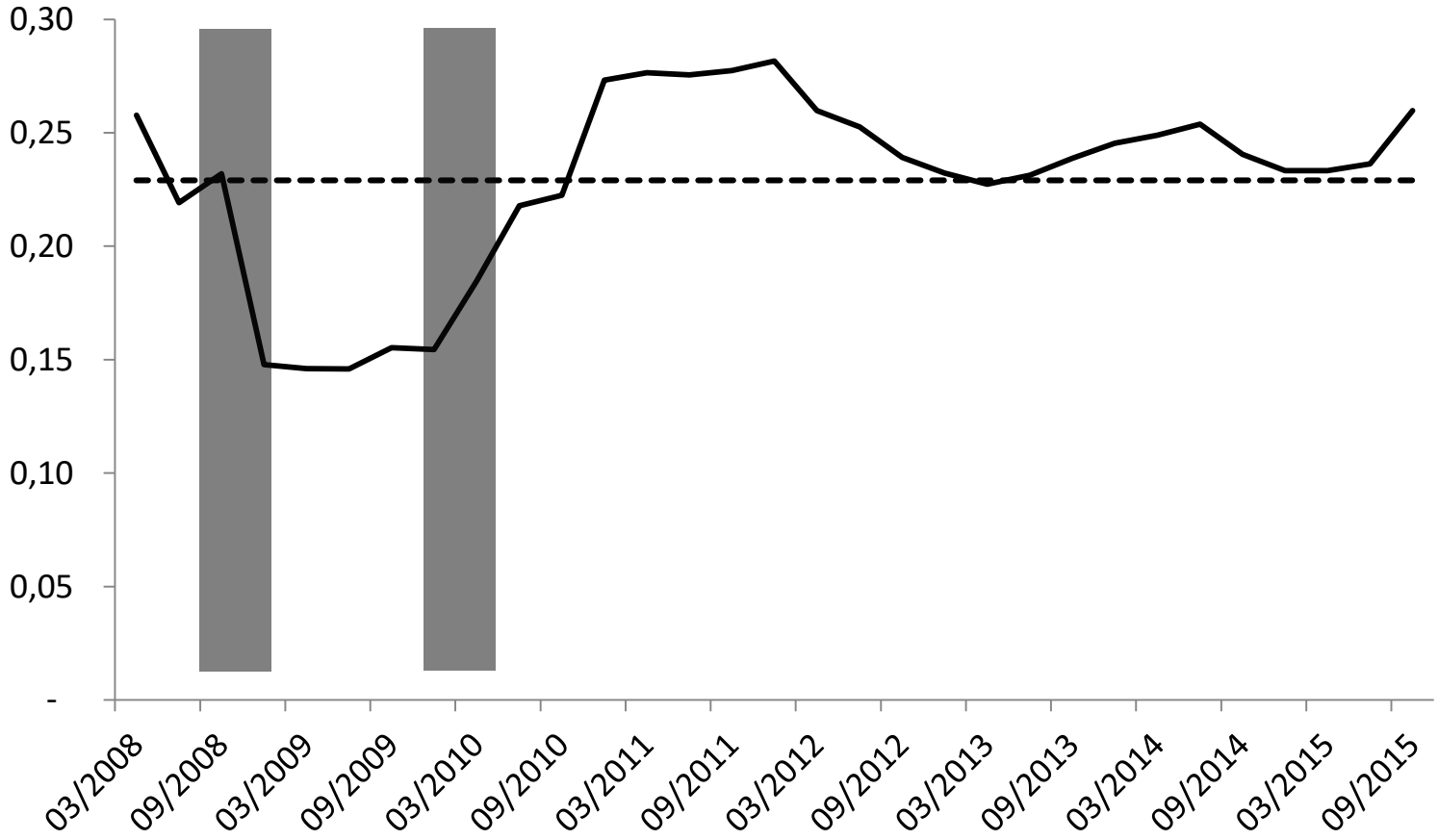
Motivation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Data

- Credit registry (loan-level and firm level)
  - ~1M firms
  - 1.5M Loans
  - 5,482 counties
  - 76 sectors
  - 126 banks
- Bank controls and Firm controls
- Loan-level data and dif-in-dif identification from Camors et al. (2016) and Khwaja and Mian (2008)

Identification Strategy

$$\Delta ReservReq_t^b = 100 * \left[\Delta \left(\frac{Current_t^b - Counterfactual_t^b}{Liabilities_t^b} \right) \right]$$

$$\Delta ln\left(Credit_{f,t-1,t+2}^b\right) = \Delta ReservReq_t^b + \Delta ReservReq_t^b + X_{f,t-1}^b + \alpha_f$$

$$\Delta ln\left(Credit_{f,t-1,t+2}\right) = w\Delta ReservReq_{f,t} + wX_{f,t-1}^b + X_{f,t-1} + \alpha_{s*c}$$

Results: Lending-channel

Dependent variable: $\Delta \ln(\text{credit}_{b,f,t+2})$

	Easing of countercyclical RR (November, 2008 shock)					Tightening of countercyclical RR (March, 2010 shock)				
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ΔResReq $_{b,t}$	-1.105**	-1.099**	-1.022**	-1.191***	-1.137***	-0.387*	-0.395**	-0.392**	-0.590***	-0.567***
	(0.471)	(0.489)	(0.439)	(0.451)	(0.416)	(0.198)	(0.184)	(0.173)	(0.189)	(0.165)
Observations	861,016	861,016	861,016	861,016	861,016	983,554	983,554	983,554	983,554	983,554
R-squared	0.004	0.016	0.382	0.029	0.392	0.001	0.014	0.388	0.019	0.392
Firm-Bank Controls	NO	YES	YES	YES	YES	NO	YES	YES	YES	YES
Firm Controls	NO	YES	<>	YES	<>	NO	YES	<>	YES	<>
Bank Controls	NO	NO	NO	YES	YES	NO	NO	NO	YES	YES
Firm FE	NO	NO	YES	NO	YES	NO	NO	YES	NO	YES
Cluster	bank	bank	bank	bank	bank	bank	bank	bank	bank	bank
ΔResReq	Count. 08	Count. 08	Count. 08	Count. 08	Count. 08	Count. 10	Count. 10	Count. 10	Count. 10	Count. 10

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results: Lending-channel (comp)

Easing of countercyclical RR

Model	Δln(credit) $_{b,f,t+2}$	Δln(loans) $_{b,f,t+2}$	Δln(credit line) $_{b,f,t+2}$	Δln(short credit) $_{b,f,t+2}$	Δln(long credit) $_{b,f,t+2}$	Σln(new credit) $_{b,f,t+2}$
	(1)	(2)	(3)	(4)	(5)	(6)
ΔResReq $_{b,t}$	-1.137***	-3.381**	2.085	2.124**	-2.021	-0.494**
	(0.416)	(1.552)	(1.740)	(1.065)	(1.596)	(0.220)
Observations	861,016	861,016	861,016	861,016	861,016	861,016
R-squared	0.392	0.409	0.392	0.367	0.380	0.480
Firm-Bank Controls	YES	YES	YES	YES	YES	YES
Firm Controls	<>	<>	<>	<>	<>	<>
Bank Controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Bank FE	<>	<>	<>	<>	<>	<>
Cluster	bank	bank	bank	bank	bank	bank

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Tightening of countercyclical RR

Model	Δln(credit) $_{b,f,t+2}$	Δln(loans) $_{b,f,t+2}$	Δln(credit line) $_{b,f,t+2}$	Δln(short credit) $_{b,f,t+2}$	Δln(long credit) $_{b,f,t+2}$	Σln(new credit) $_{b,f,t+2}$
	(1)	(2)	(3)	(4)	(5)	(6)
ΔResReq $_{b,t}$	-0.567***	-0.649***	0.428**	1.073***	-1.856***	-0.235***
	(0.165)	(0.233)	(0.181)	(0.382)	(0.559)	(0.063)
Observations	983,554	983,554	983,554	983,554	983,554	983,554
R-squared	0.392	0.414	0.402	0.379	0.399	0.483
Firm-Bank Controls	YES	YES	YES	YES	YES	YES
Firm Controls	<>	<>	<>	<>	<>	<>
Bank Controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Bank FE	<>	<>	<>	<>	<>	<>
Cluster	bank	bank	bank	bank	bank	bank

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results: bank heterogeneity

Dependent variable: $\Delta \ln(\text{credit}_{b,f,t+2})$

	Easing of countercyclical RR						
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ΔResReq $_{b,t}$	-1.137***	-1.139***	-1.136***	-2.046***	-1.108**	-1.945***	-2.096***
	(0.416)	(0.422)	(0.415)	(0.476)	(0.532)	(0.472)	(0.575)
ΔResReq $_{b,t}$							
* capital$_{t-1}$		-0.145					-2.257
		(0.569)					(1.590)
* ROE$_{t-1}$			-0.008				-0.053
			(0.041)				(0.099)
* gov$_{t-1}$				2.312***			0.398
				(0.584)			(0.715)
* foreign$_{t-1}$					-0.206		-0.936
					(1.184)		(1.643)
* small$_{t-1}$						2.183***	2.460***
						(0.555)	(0.782)
Observations	861,016	861,016	861,016	861,016	861,016	861,016	861,016
R-squared	0.392	0.392	0.392	0.393	0.392	0.393	0.393
Firm-Bank Controls	YES	YES	YES	YES	YES	YES	YES
Firm Controls	<>	<>	<>	<>	<>	<>	<>
Bank Controls	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES
Cluster	bank	bank	bank	bank	bank	bank	bank

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results: bank heterogeneity

Dependent variable: $\Delta \ln(\text{credit}_{b,f,t+2})$

	Tightening of countercyclical RR						
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ΔResReq $_{b,t}$	-0.567***	-0.053	-0.522***	-0.573***	-0.588***	-0.567***	-1.090*
	(0.165)	(0.199)	(0.183)	(0.165)	(0.158)	(0.164)	(0.599)
ΔResReq $_{b,t}$							
* capital$_{t-1}$		-4.601***					1.959
		(1.596)					(2.931)
* ROE$_{t-1}$			-0.082				0.471
			(0.092)				(0.344)
* gov$_{t-1}$				-3.150			5.789
				(3.080)			(4.552)
* foreign$_{t-1}$					4.815***		8.053**
					(1.325)		(3.386)
* small$_{t-1}$						0.768	5.789
						(1.807)	(4.552)
Observations	983,554	983,554	983,554	983,554	983,554	983,554	983,554
R-squared	0.392	0.392	0.392	0.392	0.392	0.392	0.393
Firm-Bank Controls	YES	YES	YES	YES	YES	YES	YES
Firm Controls	<>	<>	<>	<>	<>	<>	<>
Bank Controls	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES
Cluster	bank	bank	bank	bank	bank	bank	bank

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results: risk - taking

	Easing of countercyclical RR							
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ΔResReq $_{b,t}$	-1.137***	-1.135***	-1.203***	-1.126***	-1.201***		-1.104***	
	(0.336)	(0.334)	(0.334)	(0.330)	(0.330)		(0.334)	
ΔResReq $_{b,t}$								
* firm risk $_{t-1}$		0.114			0.018	-0.103	-0.045	-0.086
		(0.094)			(0.083)	(0.080)	(0.091)	(0.066)
* future default $_{t+12}$			0.591***		0.583***	0.513**	0.682***	0.536***
			(0.207)		(0.195)	(0.241)	(0.187)	(0.180)
* n_employees$_{t-1}$				-0.043			-0.053	0.041
				(0.055)			(0.051)	(0.064)
future default $_{t+12}$			8.518***		8.487***	6.546***	8.918***	8.918***
			(0.784)		(0.733)	(0.765)	(0.105)	(0.077)
Observations	861,016	861,016	861,016	861,016	861,016	861,016	861,016	861,016
R-squared	0.392	0.392	0.393	0.392	0.393	0.401	0.383	0.401
Firm-Bank Controls	YES	YES	YES	YES	YES	YES	YES	YES
Firm Controls	<>	<>	<>	<>	<>	<>	<>	<>
Bank Controls	YES	YES	YES	YES	YES	<>	YES	<>
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	NO	NO	NO	NO	NO	<>	NO	<>
Cluster	bank sector	bank sector	bank sector	bank sector	bank sector	bank sector	bank sector	bank sector

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results: risk - taking

Dependent variable: $\Delta \ln(\text{credit}_{b,f,t+2})$

	Tightening of countercyclical RR							
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ΔResReq $_{b,t}$	-0.567***	-0.561***	-0.563***	-0.561***	-0.554***		-0.383***	
	(0.125)	(0.334)	(0.334)	(0.330)	(0.126)		(0.137)	
ΔResReq $_{b,t}$								
* firm risk $_{t-1}$		0.073*			0.070*	0.030	0.079*	0.035
		(0.042)			(0.036)	(0.041)	(0.044)	(0.035)
* future default $_{t+12}$			0.075		0.031	0.097	-0.004	0.101
			(0.105)		(0.095)	(0.095)	(0.097)	(0.095)
* n_employees$_{t-1}$				-0.011			-0.003	0.008
				(0.018)			(0.017)	(0.018)
future default $_{t+12}$			5.117***		5.191***	3.994***	5.821***	3.987***
			(0.794)		(0.793)	(0.658)	(0.892)	(0.424)
Observations	983,554	983,554	983,554	983,554	983,554	983,554	983,554	983,554
R-squared	0.392	0.392	0.392	0.392	0.392	0.406	0.389	0.406
Firm-Bank Controls	YES	YES	YES	YES	YES	YES	YES	YES
Firm Controls	<>	<>	<>	<>	<>	<>	<>	<>
Bank Controls	YES	YES	YES	YES	YES	<>	YES	<>
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	NO	NO	NO	NO	NO	<>	NO	<>
Cluster	bank sector	bank sector	bank sector	bank sector	bank sector	bank sector	bank sector	bank sector

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent variable: $\Delta \ln(credit_{b,f,t+1})$

	Easing of countercyclical RR					Tightening of countercyclical RR				
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\Delta ResReq_{b,t}$	-1.099**	-1.100**	-1.119**	-1.102**	-1.158***	-0.398*	-0.387**	-0.406**	-0.411**	-0.647***
	(0.480)	(0.461)	(0.464)	(0.468)	(0.382)	(0.216)	(0.195)	(0.191)	(0.191)	(0.171)
Observations	1,517,290	1,517,290	1,517,190	1,493,980	1,493,980	1,779,715	1,779,715	1,779,639	1,754,782	1,754,782
R-squared	0.004	0.012	0.017	0.047	0.056	0.001	0.009	0.014	0.042	0.048
Firm-Bank Controls	NO	YES	YES	YES	YES	NO	YES	YES	YES	YES
Firm Controls	NO	YES	YES	YES	YES	NO	YES	YES	YES	YES
Bank Controls	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES
Industry FE	NO	YES	YES	<>	<>	NO	YES	YES	<>	<>
Industry*Region FE	NO	NO	NO	YES	YES	NO	NO	NO	YES	YES
Cluster	bank	bank	bank	bank	bank	bank	bank	bank	bank	bank

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Dependent variable: $\Delta \ln(credit_{f,t+2})$

	Easing of countercyclical RR (November, 2008 shock)				Tightening of countercyclical RR (March, 2010 shock)			
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta ResReq_{f,t}$	-0.797**	-0.802	-0.717*	-0.761	-0.700***	-0.935***	-0.684***	-0.929***
	(0.402)	(0.541)	(0.431)	(0.558)	(0.061)	(0.181)	(0.067)	(0.183)
Observations	318,577	974,849	299,827	943,993	373,546	1,169,706	353,404	1,136,801
R-squared	0.038	0.034	0.109	0.080	0.035	0.031	0.103	0.074
Firm-Bank Controls	YES	YES	YES	YES	YES	YES	YES	YES
Firm Controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	<>	<>	YES	YES	<>	<>
Region FE	NO	NO	<>	<>	NO	NO	<>	<>
Industry*Region FE	NO	NO	YES	YES	NO	NO	YES	YES
Cluster	max_bank	max_bank	max_bank	max_bank	max_bank	max_bank	max_bank	max_bank

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Thank you!