VI Seminar on Risk, Financial Stability and Banking of the Banco Central do Brasil

How do banks manage their capital ratios in Brazil?

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BANCO CENTRAL DO BRASIL

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Motivation

- **Banks' capital ratios** have received much attention because these ratios are a **natural indicator of soundness**, and a failure of a systemically relevant bank may threaten to derail the economy as a whole.

- At the same time, banks face a **trade-off when choosing** the appropriate level of **their capital ratio**.

  On the one hand regulatory authorities force the banks to maintain a **minimum capital ratio**. On the other hand, banks try to **maximize their return on capital** to satisfy their investors.

Paper objectives

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  4) Is there any significant difference between Basel I and Basel II periods?

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In December 2010, the median of the regulatory capital ratio in our sample was 18.9%, while the median of the negative log debt ratio was 18.3%.

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$\vartheta \equiv 1 - \beta$ measures the overall speed of adjustment: the higher ϑ, the more quickly the capital ratio is adjusted. If $\vartheta = 0$, the bank does not adjust the capital ratio after shocks of the asset value, this is equivalent to $\beta = 1$. Therefore, the question of whether the bank adjusts the capital ratio to a predefined level is equivalent to performing a *unit-root test*.

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  1ˢᵗ) the share to which the adjustment of liabilities – measured by the speed of adjustment on the liability side (υ_l) – contributes to the adjustment of the capital ratio

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  2nd) the relative size of the adaptive measures (i) and (ii)

  $$\rho \equiv \upsilon_a / \upsilon_l$$

  if $\rho > 1$ the adjustment speed of the asset side is greater than the one of the liability side
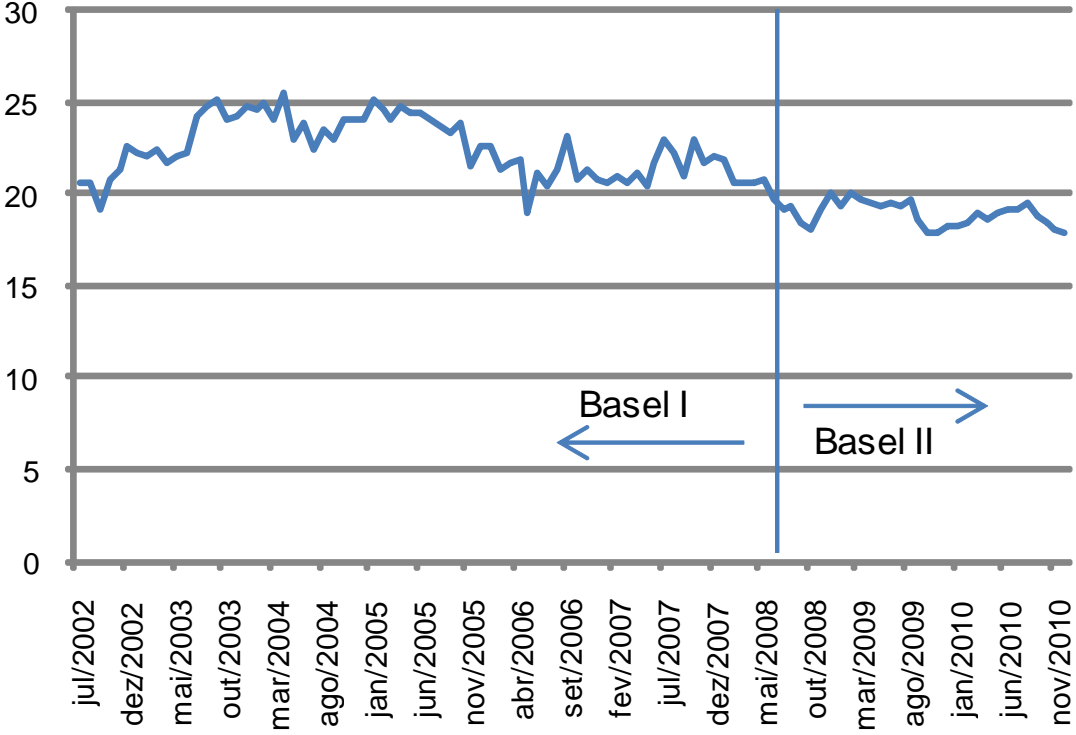
Data

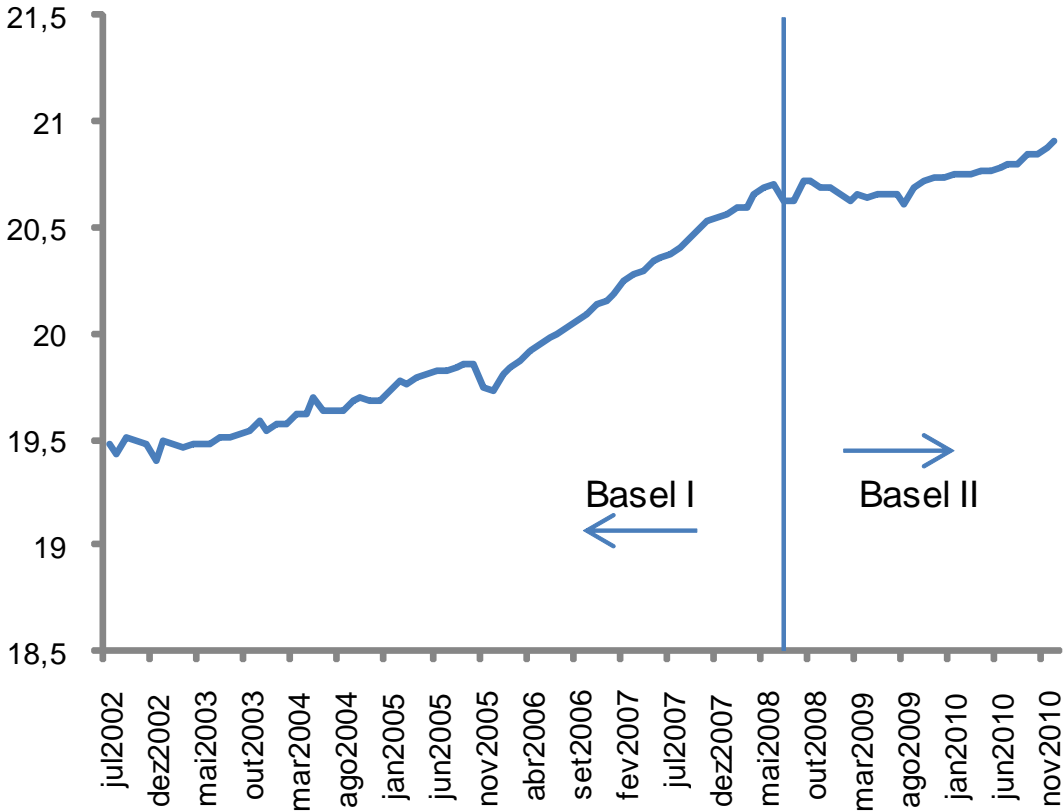- Monthly data: July 2002 – December 2010
- 113 banks
- Basel I and Basel II

Data

Median of the regulatory capital ratio

Data

Mean of the risk-weigthed assets

Estimation

- We **estimate separate equations for each bank** because we are **interested in individual coefficients** and do not impose the assumption of equal adjustment coefficients as is necessary with the classic dynamic panel estimator.

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- Ordinary least squares (OLS) regression.

Results

Results of the Augmented Dickey-Fuller (ADF) test

Significance level (%)	# of banks	# of banks with rejected unit root process	Proportion of banks with rejected unit root process
Big banks			
1	10	3	30.00%
5	10	4	40.00%
10	10	5	50.00%
Medium banks			
1	6	0	0.00%
5	6	1	16.67%
10	6	2	33.33%
Small banks			
1	97	28	28.87%
5	97	42	43.30%
10	97	50	51.55%

Results

Parameter estimates

Parameter	Estimated coefficient			Estimated standard errors		
	10% lowest	Median	10% largest	10% lowest	Median	10% largest
Adjustment coefficient (per month)	10.29%	22.25%	44.76%	3.46%	5.79%	7.88%
Capital ratio target	13.34%	18.68%	62.84%	0.45%	1.47%	23.03%
Asset volatility (per month)	1.07%	3.00%	55.20%	-	-	-

Results

Mean of parameter estimates

	Big banks	Small banks	Equality of means tests (big vs. small banks)
Basel I			
Adjustment coefficient	35.21%	27.98%	[41.65%]
	(8.75%)	(7.25%)	
Capital ratio target	15.66%	38.65%	[0.22%]***
	(0.58%)	(5.80%)	
Asset volatility	9.36%	14.51%	[34.65%]
Basel II			
Adjustment coefficient	30.44%	41.07%	[31.42%]
	(11.99%)	(12.94%)	
Capital ratio target	16.52%	32.27%	[0.99%]***
	(1.24%)	(5.37%)	
Asset volatility	5.62%	16.42%	[0.91%]***
Equality of means tests (Basel I vs. II)			
Adjustment coefficient	[77.09%]	[0.37%]***	
Capital ratio target	[33.16%]	[14.88%]	
Asset volatility	[23.42%]	[62.66%]	
# of banks	5	50	

Results

Adjustment of asset vs. liability side (ϑ_a and ϑ_l positive)

	# of banks	Mean	10% lowest	Median	10% largest
Basel I					
ϕ: the share to which the adjustment of liabilities contributes to total adiustment	51	0.620	0.346	0.634	0.879
ρ: adjustment speed of assets over adjustment speed of liabilities	51	4.826	0.188	2.924	8.655
Basel II					
ϕ: the share to which the adjustment of liabilities contributes to total adiustment	36	0.593	0.151	0.648	0.870
ρ: adjustment speed of assets over adjustment speed of liabilities	36	9.463	0.522	2.187	13.199

Equality of means tests (Basel I vs. II)	
ϕ: the share to which the adjustment of liabilities contributes to total adiustment	[59,00%]
ρ: adjustment speed of assets over adjustment speed of liabilities	[29,83%]

Conclusions

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For half of the banks investigated, we can reject the hypothesis of regulatory capital ratios fluctuating randomly; i.e., **there seems to be a target ratio that banks seek to obtain**.

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> Banks try to maintain a certain capital buffer **above the regulatory requirements**.

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1) Do banks adjust their regulatory capital ratios to a predefined target level or do the ratios fluctuate just randomly?

For half of the banks investigated, we can reject the hypothesis of regulatory capital ratios fluctuating randomly; i.e., **there seems to be a target ratio that banks seek to obtain**.

Banks try to maintain a certain capital buffer **above the regulatory requirements**.

The **target level** and the **adjustment speed** of the capital ratio for each bank was estimated separately and it was found **large variation across banks**.

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Adjusting on the liability side is more effective than via buying/selling assets or changing their riskiness, although **adjustment rates on the asset side are higher**.

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Bank capital ratios tend to be inversely related to asset size.

This might reflect greater diversification, scale economies in risk management, and/or lower expected cost of raising new equity on short notice. For the very largest banks, another contributor to low capital may be the presence of conjectural government guarantees ("too big to fail").

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This might due to the use of the Basel II standardized approach in Brazil

Thank you