The Cyclical Behavior of Bank Capital Buffers in an Emerging Economy: Size Does Matter

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Disclamer:

The findings, recommendations, interpretations and conclusions expressed in this paper are those of the authors and not necessarily reflect the view of the Banco de la República or its Board of Directors, or the Department of Economics of the Universidad del Rosario.

Motivation and Objective

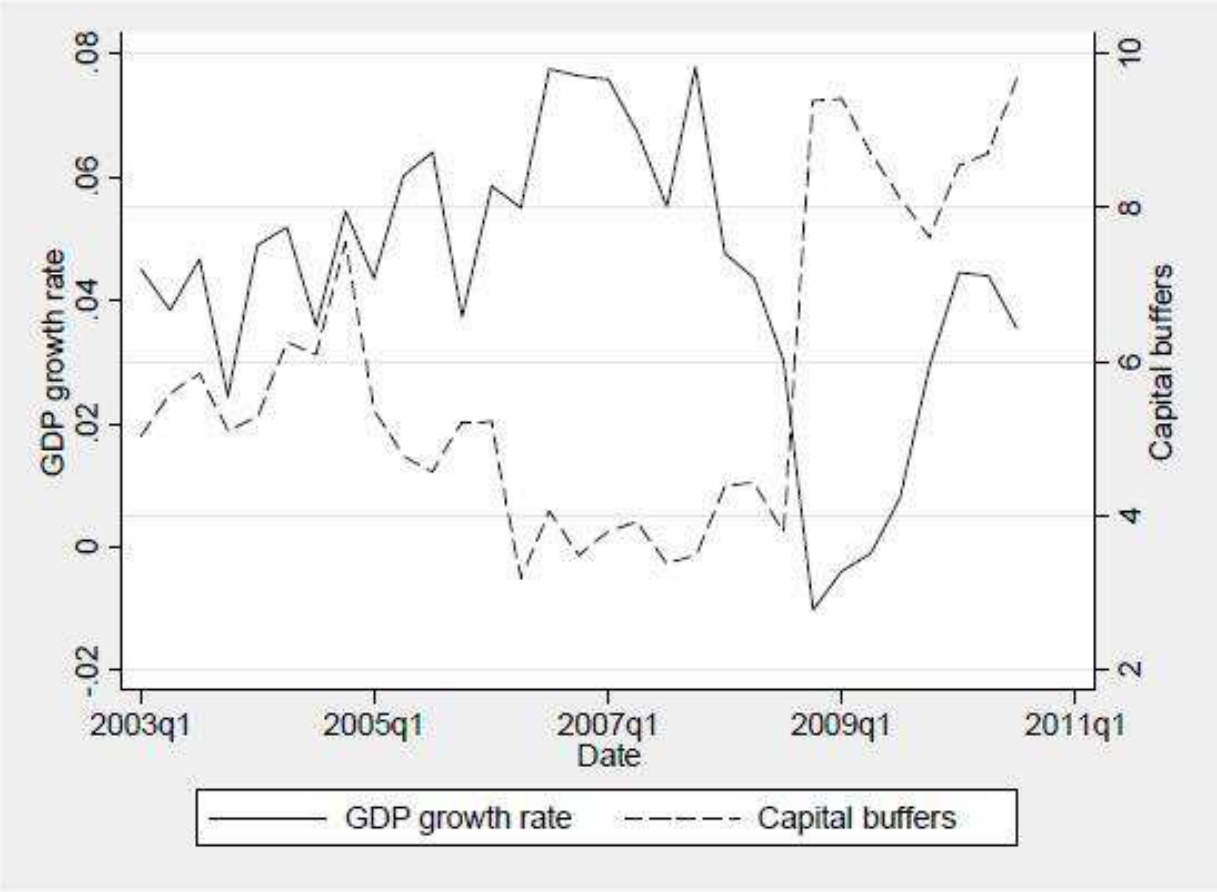
- Many theoretical and empirical works have shown that the solvency ratio is a good predictor of default probability of banks (Whalen,1991; Wheelock and Wilson, 1995; Estrella, 1995; Gómez-González and Kiefer, 2009). It has been shown that increases in the solvency ratios significantly reduce the probability of default for banks.
- Basel Committee has recognized this fact and proposed some rules about minimum solvency ratios. Most part of the countries have followed this approach.
- In Colombia, the minimum solvency ratio ($\frac{Capital}{RiskyAssets}$) for Banks and other loan institutions is equivalent to 9%

Motivation and Objective

- To present a solvency ratio below the minimum requirement is too costly for financial institutions. Supervisors usually impose exemplary sanctions when this type of event occurs. In some cases the final result is a definitive possession of the entity by the regulator.
- In a frictionless world in which banks have unlimited access to capital markets, having a solvency ratio above the minimum required level (positive buffer) would be inefficient. In this case, all banks should present a buffer equal to zero.
- However, in the real world we can observe banks with positive buffers. Additionally, in some cases we can observe a tremendous heterogeneity in which banks present quite different levels of capital buffers.

Average of Capital Buffers and GDP growth in Colombia (2003-2010)

Figure 1: Capital buffers and GDP



Motivation and Objective

- Capital buffers have presented a negative co-movement with respect to the economic cycle in some developed economies (i.e United States, England, Germany and Spain). In other words, financial intermediaries tend to reduce their capital buffers in expansionary scenarios and to increase them in the negative stance of the economic cycle.
- Some economists have claimed that this fact shows a myopic behavior of banks (Borio.et al, 2001). In expansionary scenarios, Banks tend to take more risks without increasing their security margins in a proportional way. In the negative stance of the cycle in which credit risk is materialized, they simply try to maintain their solvency ratios above the minimum required level.

Data and Empirical Model

- In order to identify the relationship between economic cycle and capital buffers in an emerging economy, we use a panel of Colombian banks with quarterly data for a period between 1996:1 and 2010:3.
- Additionally we study if the observed heterogeneity affects the behavior of buffers. In particular, we intend to capture a differential behavior depending on the size of the banks.
- This is the first study about capital buffers behavior for an emerging economy.
- We use a long period of data which allows identifying in an appropriate way the potential co-movement of capital buffers and economic cycle.

Empirical Model

- We use a partial adjustment framework in which bank i seeks to attain its optimal capital buffer $BUF^*_{i,t}$, given its observed capital buffer at time $t-1$. The speed of adjustment is denoted by λ

$$\Delta BUF_{i,t} = \lambda(BUF^*_{i,t} - BUF_{i,t-1}) + \epsilon_{i,t} i = 1, ..., N; t = 1, ..., T$$

- Adding $BUF_{i,t-1}$ in both sides of the previous equation we obtain:

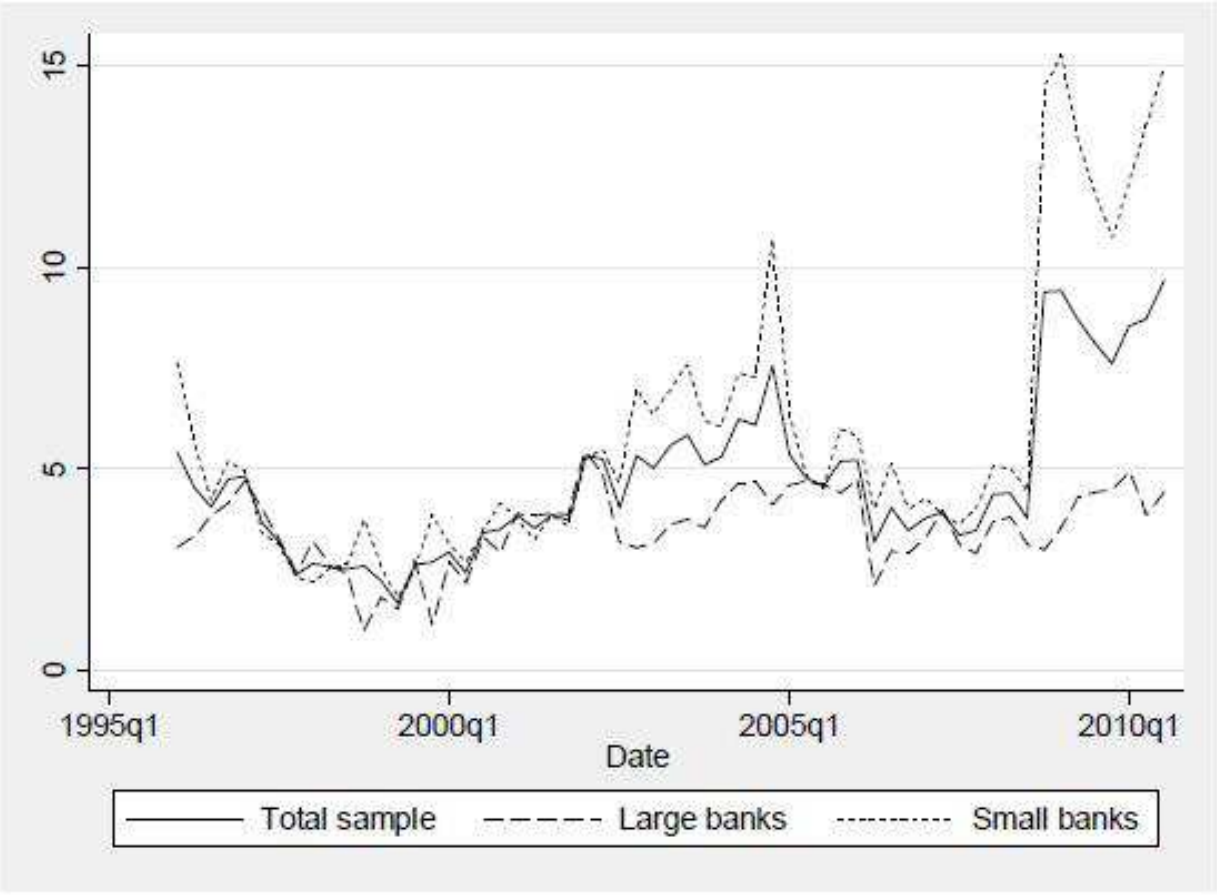
$$BUF_{i,t} = \lambda(BUF^*_{i,t}) + (1-\lambda)BUF_{i,t-1} + \epsilon_{i,t}$$

- The optimal level of capital buffer is not observable. We instrument the target capital buffer in terms of some observable variables such as the business cycle, credit risk measures and bank-specific variables. Our empirical specification is given by the equation:

$$BUF_{i,t} = \beta_0 + \beta_1 BUF_{i,t-1} + X'_{i,t}\theta + \epsilon_{i,t}$$

- $X_{i,t}$ is a vector of control variables that includes the annual GDP growth rate (GDP), profitability of equity (ROE), the ratio of non-performing loans to total loans (RISK), the real growth rate of loans (DLOAN), and the loan to asset ratio (LOANS). Additionally we include two dummy variables; one controls for bank size (DUMMY SIZE), separating large banks from small banks, and the other one controls for the inclusion of SARC in 2007 (DUMMYSARC).

Average Level of Buffers in Colombia 1996-2010. Large and Small Banks



Descriptive Statistics

Table 1*a*: Average value of regressos by sub-period. Whole sample

Period	ROE	RISK	DLOAN	LOANS
1996-1999	-0.011	0.067	0.188	0.663
2000-2003	-0.056	0.076	0.001	0.611
2004-2008	0.193	0.045	0.169	0.610
2009-2010	0.127	0.047	0.067	0.629

Table 1*b*: Average value of regressos by sub-period. Large banks

Period	ROE	RISK	DLOAN	LOANS
1996-1999	0.106	0.068	0.128	0.653
2000-2003	0.023	0.089	-0.027	0.568
2004-2008	0.251	0.043	0.219	0.576
2009-2010	0.228	0.043	0.068	0.602

Table 1*c*: Average value of regressos by sub-period. Small banks

Period	ROE	RISK	DLOAN	LOANS
1996-1999	-0.107	0.067	0.237	0.670
2000-2003	-0.119	0.066	0.024	0.646
2004-2008	0.145	0.047	0.127	0.639
2009-2010	0.026	0.051	0.066	0.656

Estimation

- The estimated equation establishes a dynamic structure of panel.
- We use the methodology for dynamic panel data estimations proposed by Blundell and Bond (1998). This methodology generalizes the one proposed by Arellano and Bond (1991) avoiding the problem of weak instruments and controlling by specific components in the error term.
- Considering that we use quarterly data, we incorporate a maximum number of lags equivalent to 5 periods. We consider the four periods lag for GDP growth.

Results

Table 2: Blundell-Bond two-step system GMM estimates for the capital buffer, 1996:1 - 2010:3

Variables	Total sample	Large banks	Small banks
DIFBUFFER(-1)	-0.0858***	-0.132***	-0.135***
	(0.0244)	(0.0332)	(0.0321)
DIFBUFFER(-2)	-0.123***	-0.0437	-0.185***
	(0.0243)	(0.0321)	(0.0321)
DIFBUFFER(-3)	-0.195***	-0.225***	-0.258***
	(0.0348)	(0.0407)	(0.0460)
DIFBUFFER(-4)	0.0340	0.0698*	-0.0511
	(0.0516)	(0.0391)	(0.0767)
ROE	0.0740	-0.520	0.0960
	(0.0858)	(0.318)	(0.104)
RISK	4.717*	1.642	-0.660
	(2.760)	(1.770)	(5.045)
DLOAN	-1.057**	-0.124	-1.760**
	(0.453)	(0.278)	(0.717)
LOANS	-1.269	1.243*	-3.720**
	(1.193)	(0.753)	(1.729)
GDP(-4)	-1.030	-5.357***	-1.290
	(3.351)	(2.002)	(5.756)
DUMMYSARC	0.353	0.118	0.478
	(0.260)	(0.144)	(0.552)
DUMMYSIZE	-1.002**		
	(0.396)		
CONSTANT	0.682	-1.102**	2.220**
	(0.756)	(0.458)	(1.092)
Observations	1,159	545	614
Sargan test (p-value)	0.99	0.12	0.93
Number of banco	34	16	25

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results

Table 3: Blundell-Bond two-step system GMM estimates for the capital buffer, 1996:1 - 2008:3

Variables	Total sample	Large banks	Small banks
DIFBUFFER(-1)	-0.0858***	-0.134***	-0.136***
	(0.0261)	(0.0358)	(0.0341)
DIFBUFFER(-2)	-0.123***	-0.0437	-0.187***
	(0.0259)	(0.0347)	(0.0341)
DIFBUFFER(-3)	-0.199***	-0.221***	-0.267***
	(0.0372)	(0.0442)	(0.0489)
DIFBUFFER(-4)	0.0369	0.0735*	-0.0618
	(0.0563)	(0.0423)	(0.0838)
ROE	0.0799	-0.492	0.0967
	(0.0907)	(0.345)	(0.109)
RISK	4.712	1.619	-2.128
	(3.090)	(1.944)	(5.602)
DLOAN	-1.113**	-0.102	-2.052***
	(0.490)	(0.299)	(0.771)
LOANS	-1.640	1.285	-4.446**
	(1.402)	(0.854)	(1.947)
GDP(-4)	-2.096	-5.954**	-3.111
	(4.102)	(2.467)	(6.662)
DUMMYSARC	0.536	0.0524	0.888
	(0.428)	(0.233)	(0.780)
DUMMYSIZE	-1.054**		
	(0.495)		
CONSTANT	0.964	-1.115**	2.828**
	(0.886)	(0.528)	(1.242)
Observations	1,023	474	549
Sargan test (p-value)	0.99	0.07	0.91
Number of banco	32	15	23

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Conclusions

- We found a negative and significant co-movement between capital buffers and the economic cycle.
- However, this relationship is asymmetrical for large and small banks. For the former, the capital buffers present a contracyclical behavior and for the latter it does not seem to present this kind of behavior.
- We relate this fact to the differential access of banks to capital markets. If large banks have a better access to capital markets (Hölmstrom and Tirole, 1997), they can maintain lower levels of capital buffers in the expansionary periods. In contrast, small banks need to be more conservative in order to avoid big problems in the future.

Conclusions

- For small banks it is too costly to constitute capital in times of an economic contraction. As a result, their buffers respond less to the variation of economic conditions.
- There are two important considerations from our results. The first one is related to the transmission of monetary policy and the second one considers the impact of market development over the risk taking decisions of financial intermediaries.

Implications of Results

- In terms of the transmission of monetary policy, the impact of changes in the short term interest rates can differ depending on the specific phase of the economic cycle and the level of capital buffers of banks.
- If development of capital markets generates a better access for small banks, we can expect for capital buffers of these entities to exhibit a similar pattern to the current behavior of capital buffers of large banks. As a result, the problem of procyclicality of banking industry would increase.
- To set capital requirements that vary over the economic cycle could be a good idea.

Thank you!!!
Comments and suggestions:

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