

## **BANK CAPITAL, LENDING BOOMS, AND BUSTS. EVIDENCE FROM SPAIN IN THE LAST 150 YEARS**

SUMMARY OF BANCO DE ESPAÑA WORKING PAPER N° 1847

MIKEL BEDAYO, ÁNGEL ESTRADA AND JESÚS SAURINA

*We analyze the effect of bank capital on credit cycles for nearly 150 years in Spain. We first build up a thorough measure of bank leverage (i.e. the capital to assets ratio) for the Spanish banking sector starting in the year 1880. Then, we analyze the impact that bank capital levels have on lending cycles, controlling for other determinants of credit growth. We find robust empirical evidence of an asymmetric relationship between bank capital and credit cycles. In particular, an increase in bank capital before expansions reduces credit growth, while it increases credit growth when the recession arrives. Conversely, a too depleted level of bank capital when entering in a recession has a severe impact on lending (i.e. may bring about quite negative and lasting effects in the economy and the wellbeing of the society as a whole). These findings support macroprudential policies (dynamic provisions and the countercyclical capital buffer) that have been very recently put in place, as they will help smooth the credit cycle.*

### **Introduction**

The last financial crisis has shown the impact that bank failures and/or bank recapitalizations may have on the economy and the society as a whole. The international banking crisis that hit the United States, the United Kingdom, Spain and many other developed countries has had a long and lasting impact on the economy, the level of employment and the distribution of income (see Estrada and Saurina, 2016), with some ripples reaching also the political arena.

Policy makers and regulators opened soon after the crisis's most acute phase a soul search process trying to understand and amend what went wrong at banks before the crisis. As a result, the G-20 mandated the newly renamed Financial Stability Board (FSB) to look into the causes and remedies of the financial crisis. The FSB in the subsequent years pushed for reforms in banking regulation and beyond.<sup>1</sup> One of the main empirical conclusions of bank regulators and supervisors

<sup>1</sup> See, among others, FSF (2009) as well as G-20 press releases to see the sense of urgency and the direction of the reforms. In particular, the one after the meeting in London in April 2009 (see G-20 press release, 2009) asked for a significant increase in bank capital, as well as for countercyclical capital buffers and better provisioning requirements.

together with policy makers was that banks entered into the crisis with a too low level of capital. Moreover, the financial crisis underlined the need to move from a pure microprudential view of capital requirements (i.e. focused only on the level of capital at each individual bank) to a more comprehensive or so-called holistic view of capital, where the macroprudential approach is also a key ingredient.<sup>2</sup> That is, policy makers need to pay attention to how aggregate bank capital ratios evolve along the financial cycle. Therefore, capital requirements need to have a countercyclical component, so that when the lending cycle is in full swing, banks need to reinforce the level of capital in order to help authorities to rein on the lending growth and the risk expansion, and even more importantly, build up a buffer to protect against future losses that may appear when the economy changes trend. This need crystalized in the Basel 3 agreement (BCBS, 2011).

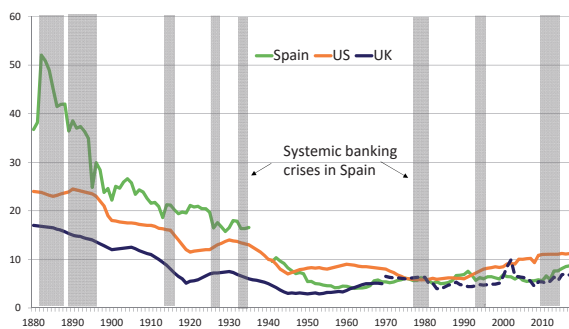
There is a solid and robust empirical evidence of both the need for countercyclical tools (Jiménez and Saurina, 2006) and its usefulness to reduce credit crunches during recessions (Jiménez et al., 2017) during the last lending boom and bust in Spain. What we do in this paper is to expand quite significantly the perspective, so that we can learn from quite a long list of previous ones. In fact, we start our analysis in 1880, almost a century and a half ago, in order to find even more robust empirical evidence, now from an aggregate point of view, to support macroprudential policies in very different economic development stages and banking structures (with or without foreign banks, with more or less stringent regulation, with more or less oligopolistic structures, etc.)

In order to do that we had constructed a long series of a bank capital ratio for the Spanish banking system. This allows us to compare the historical levels of capital ratios of the Spanish banking sector with, for instance, the ones for the US (Berger et al. (1995)) or the UK (Alessandri and Haldane (2009)), available for long time periods. The comparison is quite telling. As Martín-Aceña (2013) and others have convincingly insisted over time, the Spanish banking developments and crises, as well as many other developments in the economy and the political arena, are a reflection of international developments happening around the same

<sup>2</sup> See, among others, Crocket (2000), Borio (2003), and more recently IMF (2014) and Mencía and Saurina (2016).

time. Similarly, the level of bank capital along the last century and a half behaves quite in parallel with developments in the US and the UK. As it can be seen in Figure 1, we find for Spain a much higher level of bank capital in the late 19th century than in current times. In fact, until the Spanish Civil War, this ratio was also higher in Spain than in the US and the UK, but in all these three countries a steady decline was observed until the early sixties, resulting in a marked convergence.

**EQUITY OVER TOTAL ASSETS. 1880-2017** FIGURE 1

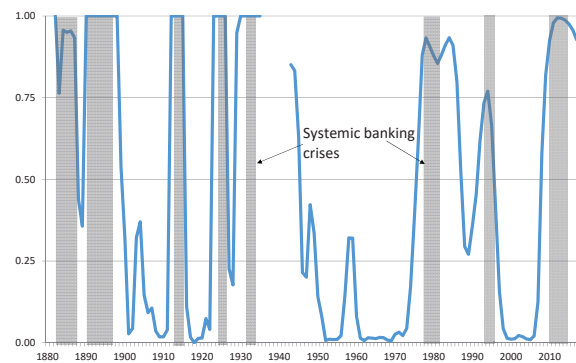


NOTES: Commercial US banks and UK banks operating in the UK are considered. Sources: BdE, own calculations, Berger et al. (1995), Sheppard (1971), Federal Reserve Economic Data and World Bank's World Development Indicators. The UK's dotted line includes banks' reserves and not only capital, given that after 1970 published accounts do not separate both entries.

### Bank capital and credit cycles in Spain over the last 150 years

In order to analyze the role played by bank capital in the credit cycles, we model aggregated credit growth, following Bernanke and Lown (1991) and Peek and Rosengren (1995), as a function of macroeconomic determinants, including the level and evolution of bank capital, using a non-linear model (a Markov-switching regime model) to endogenously distinguish between periods of high and low credit growth. During the years analyzed, there are a number of lending cycles, as well as banking crises, that allow us to estimate the elasticity of credit to bank capital. In fact, as it can be seen in Figure 2, the probability of being in a period of negative credit growth estimated with a very simple version of this non-linear model (only considering an autoregressive term) concur quite well with the systemic banking crises identified with narrative techniques in Martín-Aceña (2013). Notice how in all the identified crises that probability is almost 100%; however, the duration of the episodes is not always matched (especially in that of the mid-seventies) and there is one period right after the Civil War where the results of the model are compatible with a stress episode which has not been identified as a systemic banking crisis with the narrative approach.

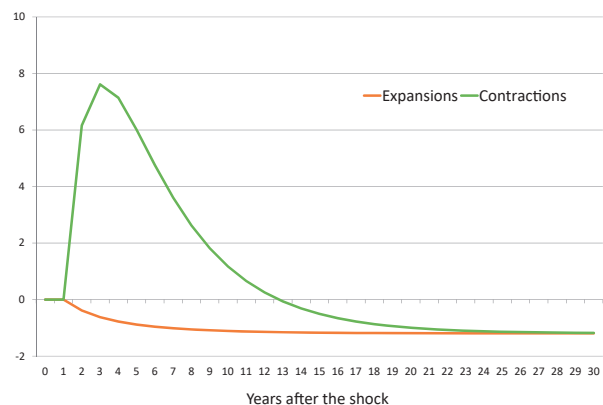
**SYSTEMIC BANKING CRISIS AND PROBABILITY OF BEING IN THE NEGATIVE CREDIT GROWTH STATE. 1880-2017** FIGURE 2



SOURCE: Own calculations.

Once we include in the non-linear model the traditional explanatory variables of credit growth (GDP, real interest rates and housing prices) jointly with the capital ratio, and allow for different elasticities of the capital ratio in credit booms and busts, we obtain highly asymmetric effects in the credit cycle. In fact, what we find is that increasing the capital ratio in advance of a credit boom reduces credit growth; on the contrary, if that is done in advance of a credit bust, it increases the average credit growth or cater for a lower contraction in credit (see figure 3). These results are quite relevant from a policy point of view. They could be interpreted as if a countercyclical capital buffer would reduce the size of the credit expansion, as well as the magnitude of the subsequent credit crunch. In other words, banks need to deleverage less (i.e. to cut lending to the private sector) if they have accumulated a larger amount of capital during expansions. Conversely, a depletion of capital during the expansionary phase leaves not only banks but also the economy to their own fate, as the recession hits borrowers and lenders and the latter do

**CREDIT GROWTH DYNAMIC MULTIPLIERS OF THE CAPITAL RATIO. 1880-2017** FIGURE 3



SOURCE: Own calculations.

not have room of manoeuvre to react, amplifying the impact of credit on the real economy. We interpret these results as a support for the use of the new macroprudential tools and, specially, the countercyclical capital buffer to smooth the financial cycle.

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