

# THE COUNTERCYCLICAL CAPITAL BUFFER OF BASEL III: A CRITICAL ASSESSMENT

Rafael Repullo and Jesús Saurina

CEMFI Working Paper No. 1102

June 2011

CEMFI  
Casado del Alisal 5; 28014 Madrid  
Tel. (34) 914 290 551 Fax (34) 914 291 056  
Internet: [www.cemfi.es](http://www.cemfi.es)

The views expressed in this paper are those of the authors and should not be attributed to the Banco de España or the Eurosystem. We would like to thank Ugo Albertazzi, Michael Gordy, Xavier Freixas, Michal Kowalik, Luis Servén, and Javier Suarez for helpful comments, as well as Carlos Trucharte for his contribution to our related work on the procyclicality of Basel II, and Francesc Rodríguez for his excellent research assistance. Financial support from the Spanish Ministry of Science and Innovation (Grant No. EC2008-00801) is gratefully acknowledged.

CEMFI Working Paper 1102

June 2011

## THE COUNTERCYCLICAL CAPITAL BUFFER OF BASEL III: A CRITICAL ASSESSMENT

### **Abstract**

We provide a critical assessment of the countercyclical capital buffer in the new regulatory framework known as Basel III, which is based on the deviation of the credit-to-GDP ratio with respect to its trend. We argue that a mechanical application of the buffer would tend to reduce capital requirements when GDP growth is high and increase them when GDP growth is low, so it may end up exacerbating the inherent pro-cyclicality of risk-sensitive bank capital regulation. We also note that Basel III does not address pro-cyclicality in any other way. We propose a rule-based smoothing of minimum capital requirements based on GDP growth.

.

*Keywords:* Bank capital regulation, Basel III, Pro-cyclicality, Business cycles, Credit crunch.

*JEL Codes:* E32, G28.

Rafael Repullo  
CEMFI  
repullo@cemfi.es

Jesús Saurina  
Banco de España  
jsaurina@bde.es

## 1. Introduction

Since their first meeting during the financial turmoil, which took place in Sao Paulo on the second weekend of November 2008, the G-20 has been aware of the problem of pro-cyclicality in the regulatory framework. They agreed that it was important “to address the issue of pro-cyclicality in financial markets regulations and supervisory systems.” One week later, in Washington, they referred again to this problem, now under one of the five principles for reform of financial markets, namely the principle of “enhancing sound regulation.” They also instructed the International Monetary Fund (IMF), the Financial Stability Forum (FSF), later renamed Financial Stability Board (FSB), and the Basel Committee on Banking Supervision (BCBS) “to develop recommendations to mitigate pro-cyclicality, including the review of how valuation and leverage, bank capital, executive compensation, and provisioning practices may exacerbate cyclical trends.” Not only these institutions, but also the G-20 Finance Ministers were requested to formulate recommendations on “mitigating against pro-cyclicality in regulatory policy.” Therefore, since the beginning of the crisis pro-cyclicality was regarded a key issue to be addressed.

Four months later, a Progress Report was more specific,<sup>1</sup> making reference to “building buffers of resources in good times and measures to constrain leverage” in order to “ensure that financial regulations dampen rather than exacerbate economic cycles.” This sentence would appear in the following G-20 statements. The Progress Report on the Actions of the Washington Action Plan, presented on 2 April 2009 in London, stated that the FSF had formed three work streams to study the forces that contribute to pro-cyclicality in the financial system, one of them focusing on bank capital. Moreover, a deadline of end of 2009 was set to take forward “implementation of the recommendations to mitigate pro-cyclicality, including a requirement for banks to build buffers of resources in good times that they can draw down when conditions deteriorate.”

---

<sup>1</sup> Progress Report on the Immediate Actions of the Washington Action Plan prepared by the UK Chair of the G20, 14 March 2009. This and all subsequent references to G-20 documents are available at [http://www.g20.org/pub\\_communique.aspx](http://www.g20.org/pub_communique.aspx).

In September 2009, another Progress Report highlighted the efforts to come up with a proposal.<sup>2</sup> “The BCBS has developed objectives for what a countercyclical capital buffer should achieve and concrete proposals for how it could work. An integrated proposal will be reviewed at the BCBS’s September meeting.” It also added that “the BCBS continues to work on approaches to address any excessive cyclicity of minimum capital requirements”. This was the first time that the G-20 made an explicit reference to the cyclicity of minimum capital requirements. The statement of the following Pittsburgh summit called on Finance Ministers and Central Bank Governors to reach agreement on an international framework of reform in four critical areas, the first one being “building high quality capital and mitigating pro-cyclicity.” It was also noted in the Progress Report of 25 September 2009 that “the Group of Central Bank Governors and Heads of Supervision, the oversight body of the BCBS, reached agreement in September to introduce a framework for countercyclical capital buffers above the minimum requirement. The framework will include capital conservation measures such as constraints on capital distributions. The Basel Committee will review an appropriate set of indicators, such as earnings and credit-based variables, as a way to condition the build up and release of capital buffers.”

In December 2009, the Basel Committee published a consultative document that considered a series of measures to address pro-cyclicity (BCBS, 2009), with the following four key objectives: dampen any excess cyclicity of the minimum capital requirement, promote more forward looking provisions, conserve capital to build buffers that can be used in stress, and achieve the broader macro-prudential goal of protecting the banking sector from periods of excess credit growth. The third objective gave rise to the *capital conservation buffer* and the fourth to the *countercyclical capital buffer* of the new regulatory framework known as Basel III.

The rationale for the countercyclical capital buffer was presented in the following terms: “As witnessed during the financial crisis, losses incurred in the banking sector during a downturn preceded by a period of excess credit growth can be extremely large. These

---

<sup>2</sup> Progress Report on the Actions of the London and Washington G-20 Summits, 5 September 2009.

can destabilise the banking sector, which in turn can bring about or exacerbate a downturn in the real economy, which can further destabilise the banking sector. These inter-linkages highlight the particular importance of the banking sector building up its capital defences in periods when credit has grown to excessive levels. As capital is more expensive than other forms of funding, the building up of these defences should have the additional benefit of helping to moderate credit growth.”

A key element of the proposal was to identify a macro-economic variable or group of variables “to assess the extent to which in any given jurisdiction there was a significant risk that credit had grown to excessive levels.” The buffer would operate as follows: “For each jurisdiction, when the variable breached certain pre-defined thresholds this would give rise to a benchmark buffer requirement. This could then be used by national jurisdictions to expand the size of the capital conservation buffer.” The Basel Committee added that “as an example, one variable which is being considered is the difference between the aggregate credit-to-GDP ratio and its long term trend,” but they also noted that “the proposal under development could not be implemented as a strict rules-based regime. Such an approach would require a high degree of confidence that the variables used would always, under all circumstances, perform as intended and would not send out false signals. This level of confidence will not be possible.”

In July 2010, the Basel Committee published for consultation the countercyclical capital buffer proposal (BCBS, 2010a). The proposal was justified “to achieve the broader macro-prudential goal of protecting banking sector from periods of excess credit growth that have often being associated with the build-up of systemic-wide risk.” The proposal, which will be described in detail in Section 2 below, was to use the deviations of the credit-to-GDP ratio with respect to its trend as the macroeconomic variable that would drive the behaviour of the buffer. The consultative document also described how the buffer should be implemented for banks operating in different jurisdictions, as well as the principles that should govern the decisions on the buffer and its interaction with the capital conservation buffer. The proposal was incorporated with minor changes in the Basel III document issued by the Basel Committee in December 2010 (BCBS, 2010b). A guidance for national authorities operating the countercyclical capital buffer was published at the same time (BCBS, 2010c).

The interest on using macro-prudential instruments to deal with the pro-cyclicality of the financial system goes beyond the circle of G-20/FSB/BCBS. The Bank for International Settlements (BIS) has consistently supported the use of macro-prudential instruments to address pro-cyclicality. For instance, BIS (2010) contains a list of such instruments, including the Spanish dynamic provisions. Also a recent Group of Thirty Report (Group of Thirty, 2010) notes that pro-cyclical practices within the financial sector can be reinforced by regulatory practices including, among others, risk-sensitive capital requirements à la Basel II and Basel III. For that reason, they support the adoption of countercyclical capital buffers.

On the academic front, there is the early work of Kashyap and Stein (2004) in which they propose a simple framework for optimal bank capital regulation according to which capital charges should depend on the state of the business cycle. In contrast with the normative approach of Kashyap and Stein (2004), the approach of Repullo and Suarez (2009) is positive. They show that under risk-based capital requirements banks hold larger buffers in expansions than in recessions, but these buffers are insufficient to prevent a significant contraction in the supply of credit at the arrival of a recession. They also show that cyclical adjustments in capital requirements can ameliorate these effects. More recent arguments in favour of time-varying capital requirements may be found in Hanson, Kashyap, and Stein (2010) and in Shleifer and Vishny (2010). The work of Gordy and Howells (2006) addresses how to correct the cyclicality of minimum capital requirements over the business cycle. Using Spanish data, Repullo, Saurina, and Trucharte (2010) compare the different procedures to adjust capital requirements over the cycle, concluding that the best procedure is to use a business cycle multiplier based on GDP growth.

The purpose of this paper is to provide a critical assessment of the countercyclical capital buffer proposal agreed by the Basel Committee in December 2010. This buffer constitutes the most significant macro-prudential element of the Basel III package. However, we argue that the key macroeconomic variable on which it based, the deviation of the credit-to-GDP ratio with respect to its trend, the credit-to-GDP gap, is for many countries negatively correlated with GDP growth. This result may be traced to

the fact that credit usually lags the business cycle, especially in downturns, and that the use of deviations of the credit-to-GDP ratio with respect to its trend compounds the problem, because it takes some time before the ratio crosses the trend line. The implication is that a mechanical application of the new regulation would tend to reduce capital requirements in good times and increase capital requirements in bad times, so it may end up exacerbating rather than ameliorating the inherent pro-cyclicality of risk-sensitive bank capital regulation.

The paper is organized as follows. Section 2 describes the Basel III countercyclical capital buffer. Section 3 presents and discusses the evidence on the correlation of the credit-to-GDP gap variable on which the buffer is based and GDP growth. Section 4 considers whether it would have been better to use credit growth as the macroeconomic variable driving the behaviour of the buffer. Section 5 reviews the approach in Repullo, Saurina, and Trucharte (2010) of addressing the pro-cyclicality of minimum capital requirements with a business cycle multiplier based on GDP growth. Section 6 concludes.

## **2. The Countercyclical Capital Buffer**

This section presents a summary of the countercyclical capital buffer described in Section IV of the Basel III document (BCBS, 2010b) and in the Guidance document (BCBS, 2010c). Basel III requires national authorities “to monitor credit growth and other indicators that may signal a build-up of systemic-wide risk.” Based on this assessment they will put in place a countercyclical capital buffer which will extend the capital conservation buffer (described in Section III of BCBS, 2010b), so banks will be subject to restrictions on capital distributions (dividends, share repurchases, and discretionary bonus payments to staff) if they do not meet the additional capital requirement.

The countercyclical capital buffer will range from zero to 2.5% of risk-weighted assets. National authorities will pre-announce the decision to raise the level of the buffer by up

to 12 months, but the decision to decrease the level of the buffer will take effect immediately.

The Guidance document specifies five principles, the first restating the objectives of the buffer, the second noting that a useful common reference point for taking buffer decisions is the behaviour of the credit-to-GDP guide, the third warning about the possibility that this variable may give misleading signals, the fourth mandating the prompt release of the buffer in times of stress, and the fifth reminding authorities that they should also consider other macro-prudential tools. Annex 1 of the Guidance document presents a detailed description of the methodology developed “to calculate an internationally consistent buffer guide that can serve as a common starting reference point for taking buffer decisions.” This methodology may be summarized as follows.

Let  $x_t$  denote the aggregate private sector credit-to-GDP ratio, and let  $\bar{x}_t$  denote the Hodrick-Prescott trend of  $x_t$ , computed using a smoothing parameter  $\lambda = 400,000$ . Then the *credit-to-GDP gap*  $z_t$  is defined as the deviation of the credit-to-GDP ratio from its trend, that is:

$$z_t = x_t - \bar{x}_t.$$

The benchmark countercyclical capital buffer  $b_t$  will be set according to the following formula:

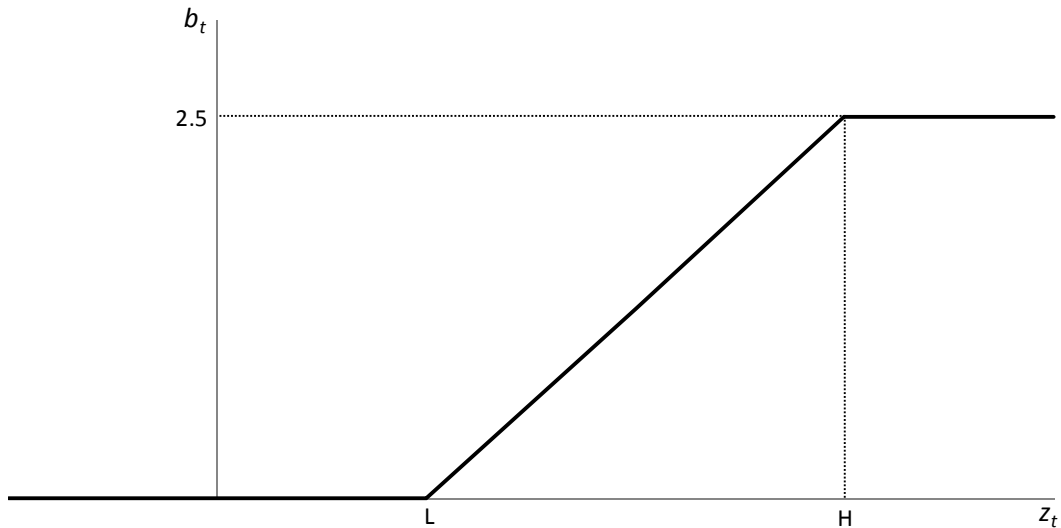
$$b_t = b(z_t) = \begin{cases} 0 & \text{if } z_t < L \\ \frac{z_t - L}{H - L} 2.5 & \text{if } L \leq z_t \leq H \\ 2.5 & \text{if } H < z_t \end{cases}$$

where  $L$  and  $H$  denote a lower and an upper threshold for the gap. The buffer  $b_t$  will be zero when the gap  $z_t$  is below the lower threshold  $L$  and will be at its maximum level (2.5%) when the gap  $z_t$  is above the upper threshold  $H$ . Between these two levels, the buffer is a linearly increasing function of the gap. With respect to the values of  $L$  and  $H$  the Guidance states: “BCBS analysis has found that an adjustment factor based on  $L = 2$



and  $H = 10$  provides a reasonable and robust specification based on historical banking crisis.” Figure 1 plots the relationship between the countercyclical buffer  $b_t$  and the credit-to-GDP gap  $z_t$ .

Figure 1. Relationship between the countercyclical capital buffer and credit-to-GDP gap



The rationale for this specification of the buffer as well as for the choice of the credit-to-GDP gap as the “common reference point” for taking buffer decisions is found in Drehmann et al. (2010): “The analysis shows that the best variables which could be used as signals for the pace and size of the accumulation of the buffers are not necessarily the best signalling the timing and intensity of the release. Credit seems to be preferable for the build-up phase. In particular when measured by the deviation of the credit-to-GDP ratio from its trend, it has proven leading indicator properties for financial distress.” They also conclude that “some measure of aggregate banking sector losses, possibly combined with indicators of credit conditions, seems best for signalling the beginning of the release phase.”

In other words, the strategy in their paper is to find the best leading indicator of systemic banking crisis, which they claim is the credit-to-GDP gap. They also acknowledge that this indicator does not perform very well in bad times, so they propose other indicators for the release phase. However, no consideration is given to the possible relationship between the credit-to-GDP gap and standard business cycle

indicators such as the rate of growth of the GDP, which are key to assessing the pro-cyclicality of the proposed regulation. This will be the focus of our discussion in Section 3 below.

It is important to note that the Guidance document introduced some caveats with respect to the use of the credit-to-GDP gap. First, they state that “authorities should look for evidence as to whether the inferences from the credit/GDP guide are consistent with those of other variables.” Second, they add that “given that credit growth can be a lagging indicator of stress, promptly releasing the buffer may be required to reduce the risk of the supply of credit being constrained by regulatory capital requirements.” In other words, they warn that the credit-to-GDP gap may give misleading signals and should probably not be used for the release of the buffer. So judgement should be exercised in the build-up phase and especially in the release phase. In the Basel jargon, this means that the countercyclical capital buffer incorporates elements of both Pillar 1 (minimum capital requirements) and Pillar 2 (supervisory review process).<sup>3</sup>

### **3. The Credit-to-GDP Gap and the Business Cycle**

In Section 2 we noted that the choice of the credit-to-GDP gap as the “common reference point” for taking buffer decisions was based on its properties as leading indicator of systemic banking crisis, without regard to how it might correlate with standard business cycle indicators such as the rate of growth of the GDP. This section looks at this correlation in order to assess to what extent the countercyclical capital buffer may have some undesirable side-effects on the pro-cyclicality of the Basel III regime.

We use the data on domestic credit to the private sector as a percentage of GDP from the database of the World Bank<sup>4</sup> for a number of countries to compute the credit-to-

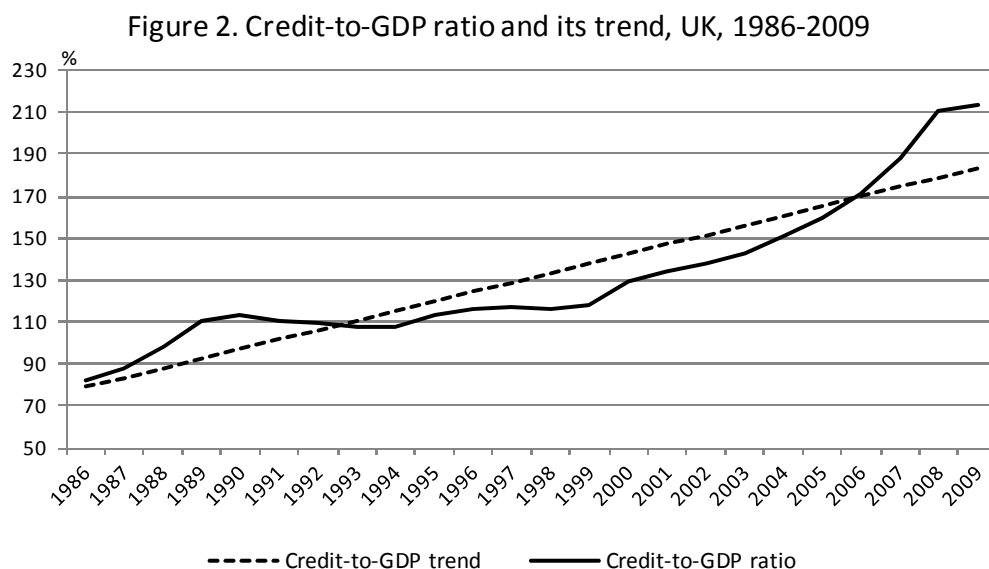
---

<sup>3</sup> In the words of the Guidance document: “The countercyclical capital buffer (...) is like a Pillar 1 approach in that it is a framework consisting of a set of mandatory rules and disclosure requirements. However, its use of jurisdictional judgement in setting buffer levels and the discretion provided in terms of how authorities explain buffer actions are more akin to a Pillar 2 approach.”

<sup>4</sup> See <http://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS>.

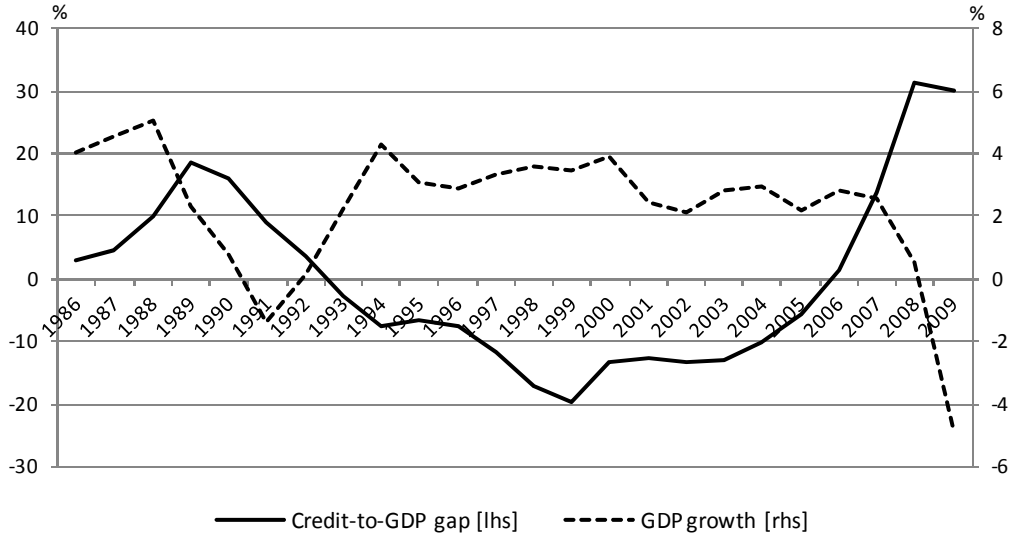
GDP gap for the period 1986-2009, which we then correlate with the corresponding rate of growth of the GDP.

Let us take the UK as an illustrative example. The solid line in Figure 2 represents the evolution of domestic credit to the private sector as a percentage of GDP for the 24 years of the sample. This variable increases from 81.8% in 1986 to 213.4% in 2009. The dashed line is the corresponding Hodrick-Prescott (HP) trend computed, as suggested by the Guidance document (BCBS, 2010c), with a smoothing parameter  $\lambda = 400,000$  (which makes it essentially a linear trend).



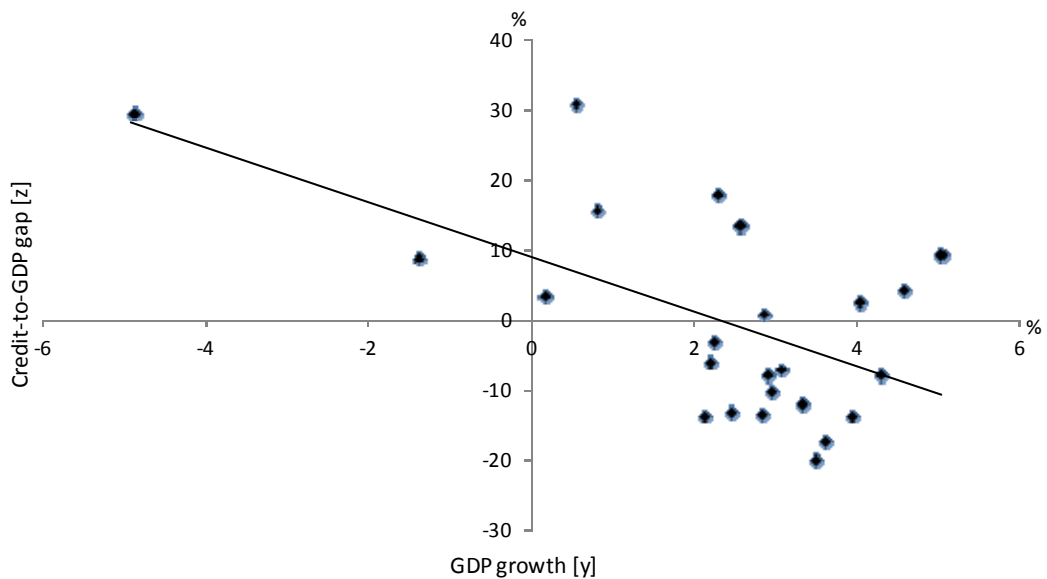
The solid line in Figure 3 represents the evolution of the credit-to-GDP gap  $z_t$  in the UK, that is, the difference between the credit-to-GDP ratio (the solid line in Figure 2) and its HP trend (the dashed line in Figure 2). The gap starts from 2.9% in 1986, it peaks at 18.5% in 1989, it then decreases until it reaches its minimum at -19.5% in 1999, thereafter increasing until it reaches its maximum at 31.4% in 2008. The dashed line in Figure 3 represents the corresponding evolution of real GDP growth, denoted  $y_t$ . It is pretty clear that the two variables are negatively correlated: when GDP growth is low (like in the two recessions in the sample) the credit-to-GDP gap tends to be high, and vice versa.

Figure 3. Credit-to-GDP gap and GDP growth, UK, 1986-2009



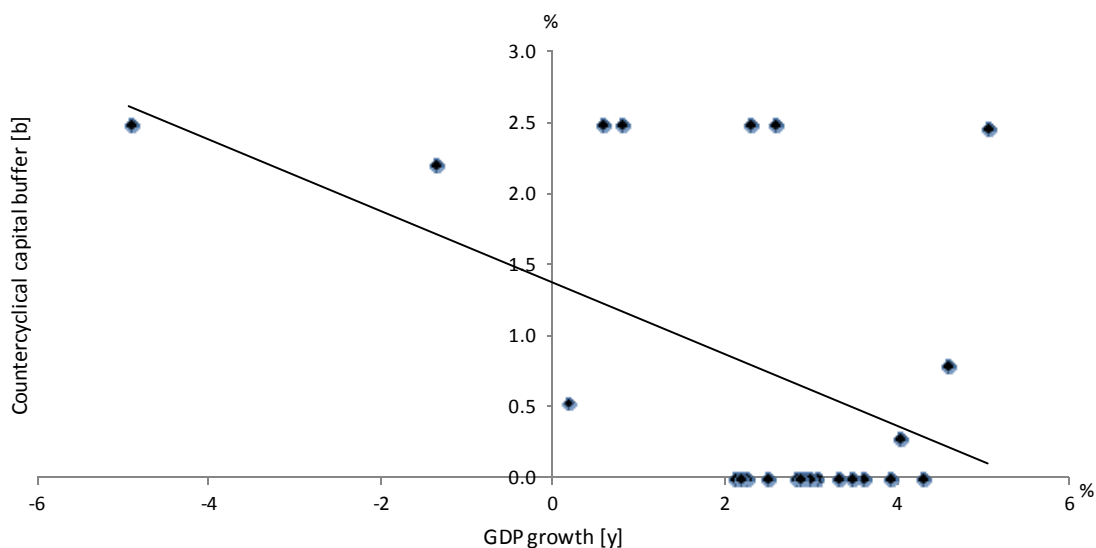
To further illustrate this point, Figure 4 shows the scatter plot of the two variables, GDP growth  $y_t$  in the horizontal axis and credit-to-GDP gap  $z_t$  in the vertical axis, together with the corresponding regression line. The slope coefficient is negative and statistically significant, with a  $p$ -value of 0.003.

Figure 4. Credit-to-GDP gap and GDP growth, UK, 1986-2009



Finally, Figure 5 shows the scatter plot of GDP growth  $y_t$  in the horizontal axis and the countercyclical capital buffer  $b_t$  in the vertical axis. Note that the buffer  $b_t$  is zero for those years in the sample for which the gap  $z_t$  is below the lower threshold  $L = 2\%$ , and it is at its maximum (2.5%) for those years for which the gap  $z_t$  is above the upper threshold  $H = 10\%$ . The corresponding regression line has a negative slope coefficient, which is again statistically significant, with a  $p$ -value of 0.017.

Figure 5. Countercyclical capital buffer and GDP growth, UK, 1986-2009



We have computed these correlations for six other countries: France, Germany, Italy, Japan, Spain, and the United States. The first column of Table 1 shows the correlations between GDP growth  $y_t$  and the credit-to-GDP gap  $z_t$  for these countries. All the correlations are negative, except the one for the US, but the average correlation across countries is  $-0.21$ . The second column of Table 1 shows the correlations between GDP growth  $y_t$  and the countercyclical capital buffer  $b_t$  for these countries. All the correlations are again negative, except the one for the US, with an average across countries of  $-0.19$ . Figures A1-A6 in the Appendix represent the credit-to-GDP gap and GDP growth for the six countries.

**Table 1.** Correlation between GDP growth  $y_t$  and the credit-to-GDP gap  $z_t$  and between GDP growth  $y_t$  and the countercyclical capital buffer  $b_t$  for selected countries, 1986-2009, using World Bank data on domestic credit to the private sector.

	Corr. ( $y_t, z_t$ )	Corr. ( $y_t, b_t$ )
France	-0.42	-0.48
Germany	-0.06	-0.04
Italy	-0.22	-0.35
Japan	-0.19	-0.22
Spain	-0.29	-0.01
United Kingdom	-0.58	-0.48
United States	0.30	0.26

To check the robustness of these results we have computed these correlations using the data on private credit by deposit money banks and other financial institutions as a percentage of GDP in the new database of the World Bank on Financial Development and Structure.<sup>5</sup> The first column of Table 2 shows the correlations between GDP growth  $y_t$  and the credit-to-GDP gap  $z_t$  for the alternative credit measure. All the correlations are negative, except the one for Germany, but the average correlation across countries is  $-0.21$ . The second column of Table 2 shows the correlations between GDP growth  $y_t$  and the countercyclical capital buffer  $b_t$  for the alternative credit measure. Here all the correlations are negative, except the one for Spain, but the average across countries is  $-0.19$ . The positive correlations for Germany and Spain are, in any case, very close to zero.

<sup>5</sup> See <http://go.worldbank.org/X23UD9QUX0> and Beck and Demirgüç-Kunt (2009).

**Table 2.** Correlation between GDP growth  $y_t$  and the credit-to-GDP gap  $z_t$  and between GDP growth  $y_t$  and the countercyclical capital buffer  $b_t$  for selected countries, 1986-2009, using World Bank data on private credit by deposit money banks and other financial institutions.

	Corr.( $y_t, z_t$ )	Corr.( $y_t, b_t$ )
France	-0.61	-0.65
Germany	0.07	-0.10
Italy	-0.32	-0.40
Japan	-0.26	-0.28
Spain	-0.43	0.05
United Kingdom	-0.72	-0.67
United States	-0.23	-0.18

It is important to note that correlations for individual countries are very sensitive to the definition of the credit variable and the choice of sample period. For example, the ones for the US go from positive in Table 1 to negative in Table 2. Also, leaving out 2009 changes the figure for Germany in the first column of Table 2 from 0.07 to  $-0.29$ , and it changes the figure for the US in the second column of Table 2 from  $-0.18$  to 0.05.

The conclusion from these results is that the variable chosen by the Basel Committee as “common reference point” for taking buffer decisions fails the Hippocratic dictum: “First, do no harm.” Its correlation with GDP growth is generally negative, which means that the credit-to-GDP gap would tend to signal to reduce capital requirements when GDP growth is high, and to increase capital requirements when GDP growth is low. Thus, the countercyclical capital buffer of Basel III appears to contradict the mandate of the G-20 to require banks “to build buffers of resources in good times that they can draw down when conditions deteriorate.”

The problems with the credit-to-GDP gap variable may be traced to the following two sources. First, there is the empirical regularity that credit usually lags the business cycle (see, for example, the evidence in Giannone, Lenza, and Reichlin, 2010). In particular, in downturns the credit-to-GDP ratio continues to be high due to greater credit demand by households and firms (making use of credit lines, partly to finance inventory accumulation) and a slower, sometimes even negative, GDP growth. Second, the use of deviations of the credit-to-GDP ratio with respect to its trend compounds the problem, because it takes some time before the ratio crosses the trend line. This is clearly illustrated in Figures 2 and 3. In 2009, in the middle of the biggest recession since the Great Depression, the credit-to-GDP gap in the UK was 29.9%, way above the upper threshold  $H = 10\%$  below which the buffer starts to be reduced from its maximum 2.5% level, and even more distant from the lower threshold  $L = 2\%$  below which the buffer is completely released.

However, one should note the caveats of the Basel Committee with respect to the mechanical use of the credit-to-GDP gap. In particular, they acknowledged that the gap may not be a good indicator of stress in downturns and proposed to use supervisory judgement to release the buffer.

We have a number of concerns about this proposal too. First, the key role given to supervisory judgement may create an unlevel playing field at the international level. Second, the mixture of Pillar 1 and Pillar 2 elements may pose implementation problems in some jurisdictions. For example, in the US, the Federal Deposit Insurance Corporation Improvement Act (FDICIA) requires supervisors to undertake certain actions only when specified Pillar 1 capital ratio thresholds are breached. Third, a micro-oriented supervisor concerned about bank failures would naturally be averse to reducing capital requirements in a downturn. Finally, financial markets might react very negatively to a supervisory decision to release of the buffer due to the worsening of economic conditions. Thus, even a macro-oriented supervisor would probably do too little too late, which could contribute to further reducing the supply of credit in downturns.



#### 4. Would Credit Growth Be Better?

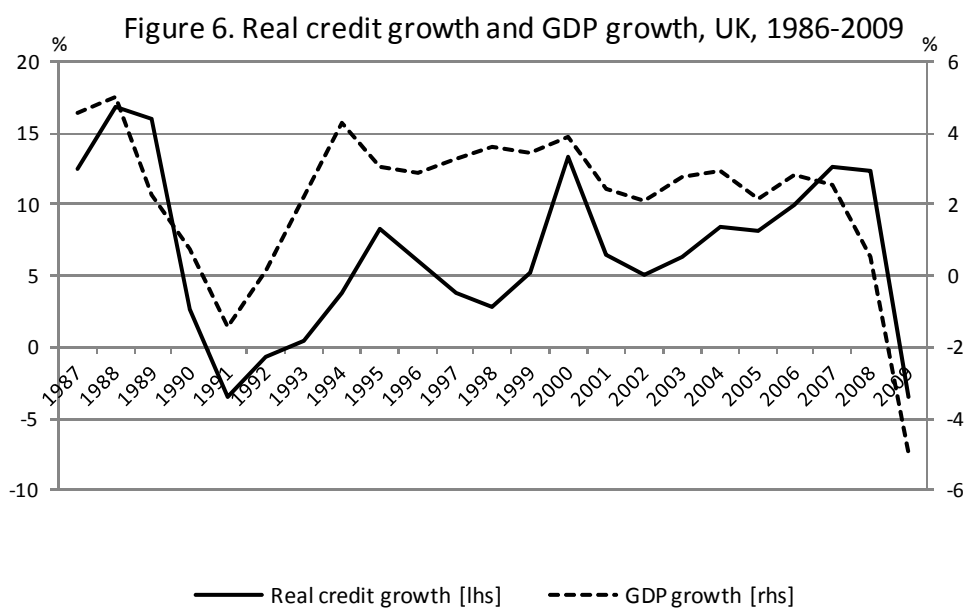
An obvious alternative to using the credit-to-GDP gap as the “common reference point” for taking buffer decisions would be to use credit growth, or to be more precise the deviations of credit growth with respect to a long-run average. It would share the same rationale as the credit-to-GDP gap in terms of being a leading indicator of systemic banking crisis,<sup>6</sup> it would also have the problem of lagging the business cycle, but at least it would not have the additional lag introduced by using deviations of the credit-to-GDP ratio with respect to its trend.

As in the previous section, we look at how credit growth correlates with GDP growth in order to assess to what extent a countercyclical capital buffer based on credit growth would contribute to the pro-cyclicality of the Basel III regime. Again, we take the UK as an illustrative example, and use the data on domestic credit to the private sector from the database of the World Bank.<sup>7</sup> We use the GDP deflator to get from nominal to real values. The solid line in Figure 6 represents the rate of growth of real domestic credit to the private sector in the UK for the 24 years of the sample. The series exhibits four peaks, in 1988, 1995, 2000, and 2007, and shows negative values for 1991, 1992, and 2009. The dashed line in Figure 6 represents the corresponding evolution of real GDP growth. The two variables seem to be positively correlated, with a lagged response of credit apparent in 1988, 1995, and 2008.

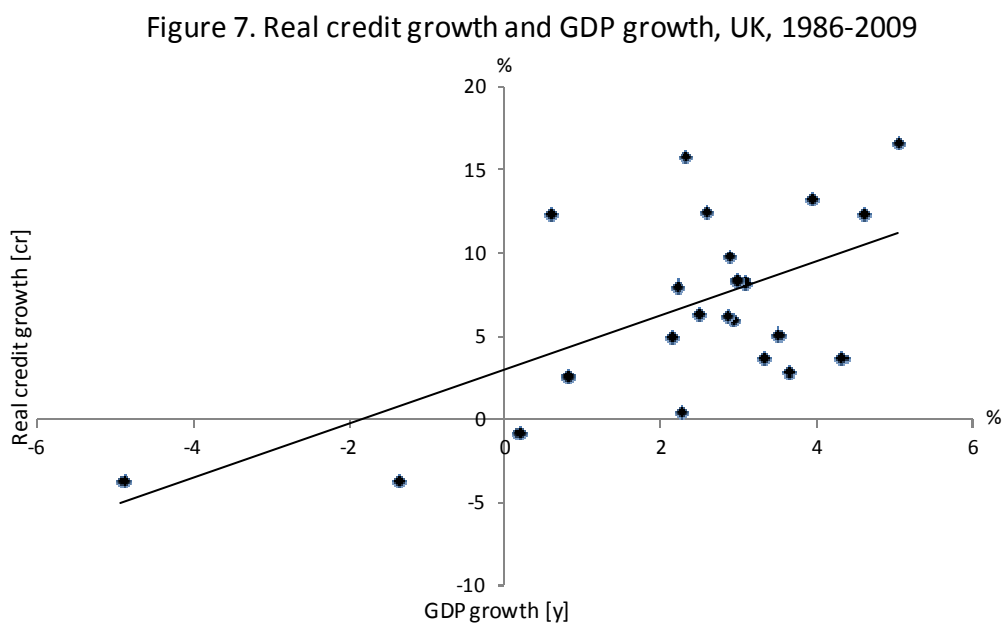
---

<sup>6</sup> Recent work by Jordà, Schularick, and Taylor (2010), based on data on financial crisis in 14 countries during the past 140 years, concludes that “credit growth generates the best predictive signals of impending financial instability.”

<sup>7</sup> See <http://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS>.



To further illustrate this point, Figure 7 shows the scatter plot of the two variables, GDP growth  $y_t$  in the horizontal axis and real credit growth  $cr_t$  in the vertical axis, together with the corresponding regression line. The slope coefficient is positive and statistically significant, with a  $p$ -value of 0.002.



We have computed the correlations between credit growth (both in nominal and real terms) and GDP growth for the seven countries considered in Section 3. The first column of Table 3 shows the correlations between GDP growth  $y_t$  and real credit growth  $cr_t$  for these countries. In sharp contrast with the results for the credit-to-GDP gap in Tables 1 and 2, all the correlations are now positive, with an average across countries of 0.51. The second column of Table 3 shows the correlations between GDP growth  $y_t$  and nominal credit growth  $cn_t$  for these countries. Again, all the correlations are positive, with an average across countries of 0.55.

**Table 3.** Correlation between GDP growth  $y_t$  and real credit growth  $cr_t$  and between GDP growth  $y_t$  and nominal credit growth  $cn_t$  for selected countries, 1986-2009, using World Bank data on domestic credit to the private sector.

	Corr.( $y_t, cr_t$ )	Corr.( $y_t, cn_t$ )
France	0.62	0.60
Germany	0.32	0.52
Italy	0.30	0.43
Japan	0.61	0.62
Spain	0.67	0.69
United Kingdom	0.62	0.55
United States	0.43	0.44

The conclusion from these results is that credit growth appears to be a much better common reference point for the countercyclical capital buffer, in the sense that it is a good signal of the build-up of systemic risk and it does not exacerbate the underlying pro-cyclicality of the minimum capital requirements. For purpose of regulation, it would make sense to introduce it in deviations with respect to a long-run average. Further

work would be needed on the precise definition of the long-run average as well as on the choice between real and nominal credit growth.<sup>8</sup>

However, it is important to note that this improved common reference point for the countercyclical capital buffer leaves essentially untouched the really important problem, which is the cyclical nature of the minimum capital requirement. We now turn to this issue.

## **5. The Pro-Cyclicality of the Minimum Capital Requirement**

As noted above, the December 2009 consultative document of the Basel Committee (BCBS, 2009) considered a series of measures to address pro-cyclicality with four key objectives, the first one being to “dampen any excess cyclical nature of the minimum capital requirement.” They noted that “it is still too early to opine on whether the Basel II framework is proving to be more cyclical than expected,” adding that “should the cyclical nature of the minimum capital requirement be greater than supervisors deem appropriate, the Committee will consider additional measures to dampen such cyclical nature.” No such measures were introduced in the Basel III document (BCBS, 2010c), which only repeats this last sentence. In fact, the document explicitly downplays the importance of the issue: “It is not possible to achieve greater risk sensitivity across institutions at a given point in time without introducing *a certain degree of cyclical nature* (our italics) in minimum capital requirements over time.”

In our view this is unfortunate. The work of Kashyap and Stein (2004), Gordy and Howells (2006), and Repullo and Suarez (2009) warns about the potential business cycle amplification effects of Basel II. More recently, the empirical work of Repullo, Saurina, and Trucharte (2010) shows that Basel II capital requirements are highly negatively correlated with the business cycle. The analysis is based on the results of the estimation of a logistic model of the one-year-ahead probabilities of default (PDs) of Spanish firms during the period 1987-2008, using information from the Credit Register

---

<sup>8</sup> One advantage of the latter would be that it is available with a shorter lag and it is not subject to the problem of revisions in the GDP deflator.

of the Bank of Spain.<sup>9</sup> The explanatory variables used comprise characteristics of the firm (industry, location, age, credit line utilization, and previous delinquencies and loan defaults), characteristics of its loans (size, collateral, and maturity), characteristics of the banks from which the firm borrows (distribution of exposures among lenders and changes in the main provider of finance), and macroeconomic controls (the rate of growth of the GDP, the rate of growth of bank credit, and the return of the stock market). The estimated point-in-time PDs are then used to compute the corresponding time series of aggregate Basel II capital requirements per unit of loans. These requirements move significantly along the business cycle, ranging from 7.6% (in 2006) to 11.9% (in 1993). The variability of 57% from peak to trough in Basel II capital requirements contrasts with the flat 8% requirement of Basel I. Earlier work of Saurina and Trucharte (2007) had found an even larger variability for the mortgage portfolio of Spanish banks: minimum capital requirements based on point-in-time PDs could increase more than twice from peak to trough.<sup>10</sup>

All in all, this evidence suggests that the pro-cyclicality of Basel II is a real problem. The same can be said about Basel III, since the new regulation does not change the risk-sensitivity of minimum capital requirements. The result is that bank capital regulation may amplify business cycle fluctuations. The effect could be especially important in downturns, with banks possibly facing a “capital crunch” that would further restrict their lending.<sup>11</sup>

Therefore, an outstanding policy issue is how to mitigate the pro-cyclicality of minimum capital requirements embedded in Basel III. According to Gordy and Howells (2006) there are two basic alternatives: One can either smooth the input of the Basel III formulas, by using some sort of through-the-cycle adjustment of the PDs, or smooth the

---

<sup>9</sup> This is a comprehensive database containing information of any loan granted in Spain by any bank operating in Spain above a minimum threshold of € 6,000. Further details of this database may be found in Jiménez, López, and Saurina (2009a).

<sup>10</sup> The effect could be even bigger if losses given default (LGDs) and exposures at default (EADs) also vary with the business cycle; see Repullo, Saurina, and Trucharte (2010) and Jiménez, López, and Saurina (2009b), respectively.

<sup>11</sup> For an earlier discussion of capital crunches and bank regulation see Bernanke and Lown (1991), Hancock and Wilcox (1994), and Peek and Rosengren (1995).

output by using some adjustment of the Basel III capital requirements computed from the point-in-time PDs.

A note published by the joint FSF-BCBS Working Group on Capital Issues in March 2009 recommended that “the Basel Committee should monitor the impact of the Basel II framework and make appropriate adjustments to dampen excessive cyclicality of the minimum capital requirements,” adding that “the preliminary conclusion of the Committee is to maintain the risk sensitivity of the inputs of the Basel II capital requirements and instead focus on dampening the outputs.” Although this statement pointed in the direction of “smoothing the output” approaches, nothing has been done along these lines, and the Basel Committee now seems to favour the alternative through-the-cycle approaches.<sup>12</sup>

The use of through-the-cycle approaches was criticized by Gordy and Howells (2006) on the grounds that they are “less sensitive to market conditions than point-in-time ones, (so) they are less useful for active portfolio management and as inputs to ratings-based pricing models.” Moreover, they also noted that “despite the ubiquity of the term ‘through-the-cycle’ in descriptions of rating methods, there seems to be no consensus on precisely what is meant.” The UK Financial Services Authority (2009) found challenging adjusting PDs so that they reflect “an average experience across the cycle,” since it requires “the ability to differentiate changes in default experience that are due entirely to the economic cycle from those that are due to a changing level of noncyclical risk in the portfolio.”

We share these concerns about through-the-cycle approaches. In particular, we believe that the proper assessment of risk, for both management and regulatory purposes, should be done conditional on the state of the economy, not in an unconditional manner. Doing the latter, which is the essence of through-the-cycle approaches, may contradict the Basel Committee requirement of using “all relevant and material information in assigning ratings” (BCBS, 2006, par. 426).<sup>13</sup>

---

<sup>12</sup> See BCBS (2010c), par. 20-22.

<sup>13</sup> Also, forcing banks to use unconditional assessments of risk for regulatory purposes would contradict another requirement of the Basel II (BCBS, 2006, par. 444): “Internal ratings and default and loss

The preceding arguments suggest that “smoothing the input” of the Basel III formulas has many shortcomings. Repullo, Saurina, and Trucharte (2010) analyze in detail the alternative of “smoothing the output.” Their proposal is to adjust the point-in-time capital requirements with a multiplier  $\mu_t$  defined by

$$\mu_t = \mu(g_t) = 2N\left(\frac{\alpha(g_t - \bar{g})}{\sigma_g}\right),$$

where  $g_t$  is the rate of growth of the GDP,  $\bar{g}$  its long-run average,  $\sigma_g$  its long-run standard deviation,  $N(\cdot)$  is the standard normal cumulative distribution function, and  $\alpha$  is a positive parameter to be estimated.<sup>14</sup> The multiplier  $\mu_t$  is continuous and increasing in  $g_t$ , so capital requirements would be increased in good times and reduced in bad times, it is equal to 1 when  $g_t = \bar{g}$ , so there would be no adjustment at the mid point of the business cycle, and it is bounded between 0 and 2, so capital requirements would not increase without bound or become negative. The normalization by  $\sigma_g$  allows to express capital surcharges or reductions per standard deviation of GDP growth.

Repullo, Saurina, and Trucharte (2010) conclude that dampening the excess cyclicality of minimum capital requirements with a multiplier of this kind is better than through-the-cycle approaches in terms of “simplicity, transparency, low cost of implementation, consistency with banks’ risk pricing and risk management systems, and even consistency with the idea of a single aggregate risk factor that underlies the capital requirements of Basel II.”

It is important to stress that the proposal of smoothing minimum capital requirements using GDP growth is fully rule-based. There would be no intervention of supervisory

---

estimates must play an essential role in the credit approval, risk management, internal capital allocations, and corporate governance functions of banks using the IRB approach.”

<sup>14</sup> Apart from GDP growth, they also consider bank credit growth and the return of the stock market, as well as proxies for the business cycle that are more closely related to banks’ business activity, such as loan losses or profitability (ROA and ROE). Their empirical results show that GDP growth is better than any of the other alternatives.

authorities, and hence it would be a pure Pillar 1 approach. This is a significant advantage, since authorities may de facto be reluctant to adjust Pillar 2 surcharges with the state of the business cycle. Moreover, it would be completely transparent, so investors and analysts could at any point in the business cycle observe both the adjusted and unadjusted minimum capital requirements. Importantly, minimum capital requirements would retain the full risk-sensitivity of Basel III in the cross-section, but allow the capital charge curve to shift with the state of the business cycle. During expansions, minimum requirements would be above those based on point-in-time PDs, contributing to slow the lending cycle and to build up a higher cushion of capital to be used to protect banks' solvency in bad times. Conversely, during recessions, minimum requirements would be below those based on point-in-time PDs, helping to support lending during downturns.

## **6. Conclusion**

The December 2009 consultative document of the Basel Committee on Banking Supervision (BCBS, 2009) considered a series of measures to address pro-cyclicality with the following four key objectives: dampen any excess cyclicality of the minimum capital requirement, promote more forward looking provisions, conserve capital to build buffers that can be used in stress, and achieve the broader macro-prudential goal of protecting the banking sector from periods of excess credit growth. The third objective gave rise to the capital conservation buffer and the fourth to the countercyclical capital buffer of Basel III (BCBS, 2010c).

We have assessed the countercyclical capital buffer, focussing our discussion on the proposed common reference point for taking buffer decisions, which is the difference between the aggregate credit-to-GDP ratio and its trend (the credit-to-GDP gap). Our results show that the correlation between the credit-to-GDP gap and GDP growth is generally negative, which means that that the credit-to-GDP gap would tend to signal to reduce capital requirements when GDP growth is high, and to increase capital requirements when GDP growth is low. Thus, the countercyclical capital buffer appears



to contradict the mandate of the G-20 to require banks “to build buffers of resources in good times that they can draw down when conditions deteriorate.”

The Basel Committee was aware of the shortcomings of the credit-to-GDP gap, in particular in downturns, and proposed to use supervisory judgement to release the buffer. We have examined this proposal, and concluded that a micro-oriented supervisor concerned about bank failures would naturally be averse to reducing capital requirements in a downturn, and that even a macro-oriented supervisor would probably do too little too late, which could contribute to further reducing the supply of credit in downturns.

Of course, banks may be able to use in downturns the flexibility provided by the capital conservation buffer, which amounts to an additional common equity requirement of 2.5% of risk-weighted assets. However, banks may prefer to reduce credit extension rather than being subject to restrictions on capital distributions (dividends, share repurchases, and especially discretionary bonus payments to staff) if they do not meet the additional capital requirement.

The Basel III document makes no progress to the first two key objectives to address pro-cyclicality, namely to dampen any excess cyclicality of the minimum capital requirement and to promote more forward looking provisions. And this decision seems to have been endorsed by G-20. Despite the initial prominent role given to “mitigating pro-cyclicality,” the Seoul communiqué simply stated: “We endorsed the landmark agreement reached by the BCBS on the new bank capital and liquidity framework, which increases the resilience of the global banking system by raising the quality, quantity and international consistency of bank capital and liquidity, constrains the build-up of leverage and maturity mismatches, and introduces capital buffers above the minimum requirements that can be drawn upon in bad times.”

We have argued that this is unfortunate. Risk-sensitive capital requirements are, almost by definition, highly pro-cyclical, so correcting this feature with a business cycle multiplier of the type proposed by Repullo, Saurina, and Trucharte (2010) combined by some version of the Spanish forward looking loan loss provisions is, in our view,

essential.<sup>15</sup> Such mechanisms would work as “automatic stabilizers,” increasing the buffers of capital and provisions in good times and using them in bad times, without supervisory discretion in any phase.

By contrast, the countercyclical capital buffer of Basel III, in its current shape, will not help to dampen the pro-cyclicality of bank capital regulation and may even exacerbate it. For this reason, the credit-to-GDP “common reference point” should be abandoned. In fact, we believe that it will be abandoned, certainly in the US, where Section 616 of the Dodd-Frank Act clearly states: “Each appropriate Federal banking agency shall seek to make the capital standards required under this section or other provisions of Federal law for insured depository institutions countercyclical so that the amount of capital required to be maintained by an insured depository institution increases in times of economic expansion and decreases in times of economic contraction, consistent with the safety and soundness of the insured depository institution.”

---

<sup>15</sup> The rationale, the workings and the impact of dynamic provisions in Spain may be found in Jiménez and Saurina (2006), Saurina (2009) and Saurina (2011). An interesting application of dynamic provisions to the US is in Fillat and Montoriol-Garriga (2010). Some of the policy difficulties to implement dynamic provisions in Spain, shared with other macroprudential tools, are summarized in Caruana (2010).

## References

Basel Committee on Banking Supervision (2006): “Basel II: International Convergence of Capital Measurement and Capital Standards. A Revised Framework,” Bank for International Settlements, Basel.

Basel Committee on Banking Supervision (2009): “Strengthening the Resilience of the Banking Sector,” Consultative Document, Bank for International Settlements, Basel.

Basel Committee on Banking Supervision (2010a): “Countercyclical Capital Buffer Proposal,” Consultative Document, Bank for International Settlements, Basel.

Basel Committee on Banking Supervision (2010b): “Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems,” Bank for International Settlements, Basel.

Basel Committee on Banking Supervision (2010c): “Guidance for National Authorities Operating the Countercyclical Capital Buffer,” Bank for International Settlements, Basel.

Beck, T., and A. Demirgüç-Kunt (2009): “Financial Institutions and Markets across Countries and over Time: Data and Analysis,” World Bank Policy Research Working Paper No. 4943.

Bernanke, B. S., and C. S. Lown (1991): “The Credit Crunch,” *Brookings Papers on Economics Activity*, 2, 205-248.

Bank for International Settlements (2010): “80<sup>th</sup> Annual Report,” Bank for International Settlements, Basel.

Caruana, J. (2010): “Macroprudential Policy: Could It Have Been Different this Time?,” People’s Bank of China Seminar on Macroprudential Policy, Bank for International Settlements.

Drehmann, M., C. Borio, L. Gambacorta, G. Jimenez, and C. Trucharte (2010): “Countercyclical Capital Buffers: Exploring Options,” BIS Working Paper No. 317.

Fillat, J., and J. Montoriol-Garriga (2010): “Addressing the Pro-Cyclicality of Capital Requirements with a Dynamic Loan Loss Provision System,” Working Paper QAU10-4, Federal Reserve Bank of Boston.

Financial Services Authority (2009): “A Regulatory Response to the Global Banking Crisis,” Discussion Paper 09/02.

Giannone, D., M. Lenza, and L. Reichlin (2010): “Money, Credit, Monetary Policy and the Business Cycle in the Euro Area,” mimeo.

Gordy, M., and B. Howells (2006): “Pro-cyclicality in Basel II: Can We Treat the Disease without Killing the Patient?,” *Journal of Financial Intermediation*, 15, 395–417.

Group of Thirty (2010): “Enhancing Financial Stability and Resilience. Macroprudential Policy, Tools, and Systems for the Future,” Washington, D.C.

Hancock, D., and J. A. Wilcox (1994): “Bank Capital, Loan Delinquencies, and Real Estate Lending,” *Journal of Housing Economics*, 4, 121-146.

Hanson, S., A. Kashyap, and J. Stein (2011): “A Macroprudential Approach to Financial Regulation,” *Journal of Economic Perspectives*, forthcoming.

Jiménez, G., J. A. Lopez, and J. Saurina (2009a), “Empirical Analysis of Corporate Credit Lines,” *Review of Financial Studies*, 22, 5069-5098.

Jiménez, G., J. A. Lopez, and J. Saurina (2009b): “EAD Calibration for corporate credit lines”. *Journal of Risk Management of Financial Institutions*, 2, 121-129.

Jiménez, G., and J. Saurina (2006): “Credit Cycles, Credit Risk, and Prudential Regulation,” *International Journal of Central Banking*, 2, 65-98.

Jordà, O., M. Schularick, and A. M. Taylor (2010): “Financial Crises, Credit Booms, and External Imbalances: 140 Years of Lessons,” NBER Working Paper No. 16567.

Kashyap, A., and J. Stein (2004): “Cyclical Implications of Basel II Capital Standards,” Federal Reserve Bank of Chicago, Economic Perspectives, 1st Quarter, 18-31.

Peek, J., and E. S. Rosengren (1995): “The Capital Crunch: Neither a Borrower nor a Lender Be,” *Journal of Money, Credit, and Banking*, 27, 621-638.

Repullo, R., J. Saurina, and C. Trucharte (2010): “Mitigating the Pro-cyclicality of Basel II,” *Economic Policy*, 64, 659-702.

Repullo, R., and J. Suarez (2009): “The Procyclical Effects of Basel II,” CEPR Discussion Paper No. 6862.

Saurina, J. (2009): “Dynamic Provisioning. The Experience of Spain,” in “Crisis Response. Public Policy for the Private Sector,” Note No. 7, The World Bank.

Saurina, J. (2011): “Working Macroprudential Tools,” in *Macroprudential Regulatory Policies. The New Road to Financial Stability?*, Federal Reserve Bank of Chicago and the International Monetary Fund, forthcoming.

Saurina, J., and C. Trucharte (2007): ‘An Assessment of Basel II Procyclicality in Mortgage Portfolios,’ *Journal of Financial Services Research*, 32, 81-101.

Shleifer, A., and R. Vishny (2010): ‘Unstable Banking,’ *Journal of Financial Economics*, 97, 306-318.

## Appendix

Figure A1. Credit-to-GDP gap and GDP growth, France, 1986-2009

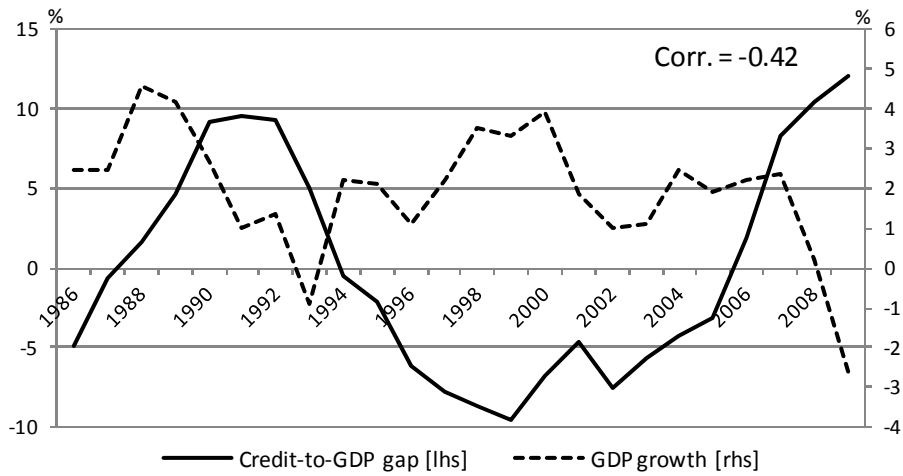


Figure A2. Credit-to-GDP gap and GDP growth, Germany, 1986-2009

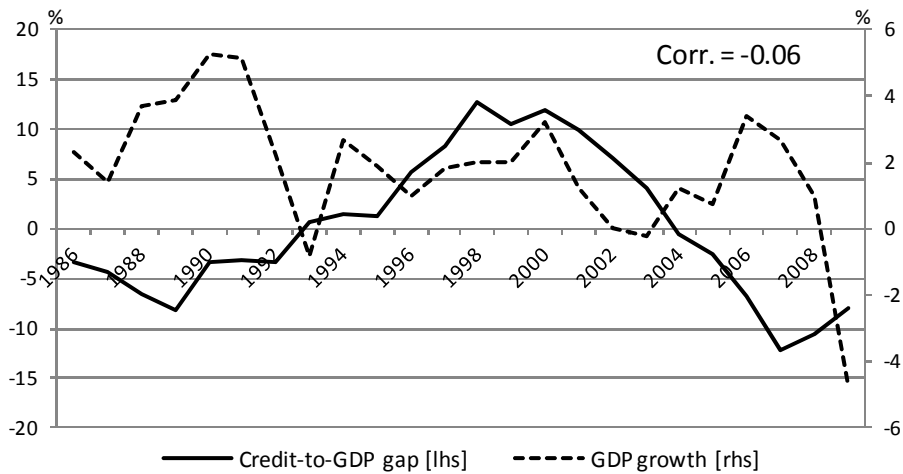


Figure A3. Credit-to-GDP gap and GDP growth, Italy, 1986-2009

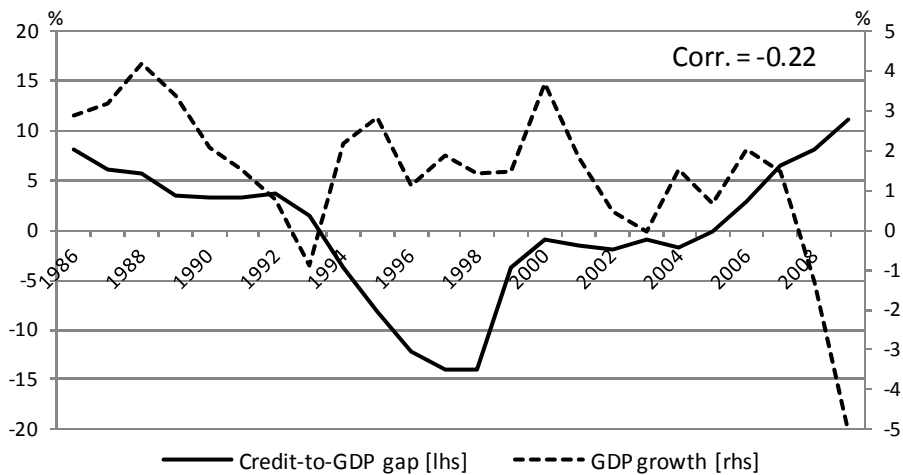


Figure A4. Credit-to-GDP gap and GDP growth, Japan, 1986-2009

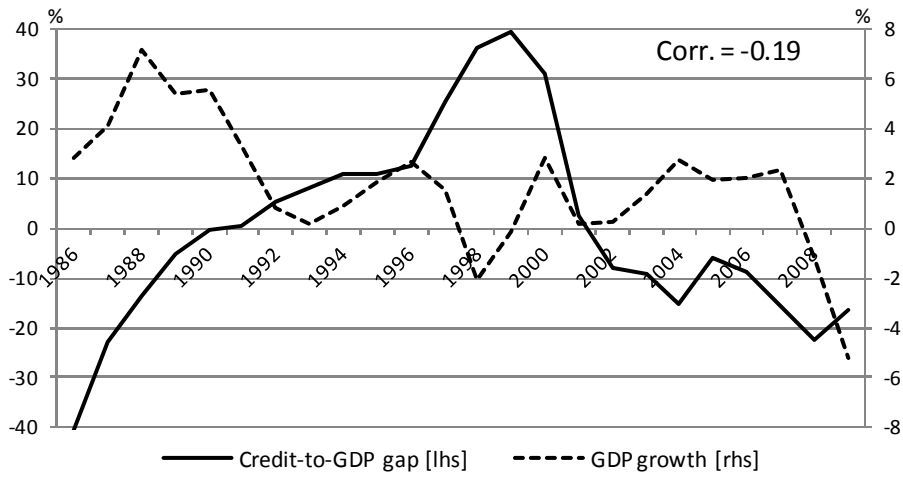


Figure A5. Credit-to-GDP gap and GDP growth, Spain, 1986-2009

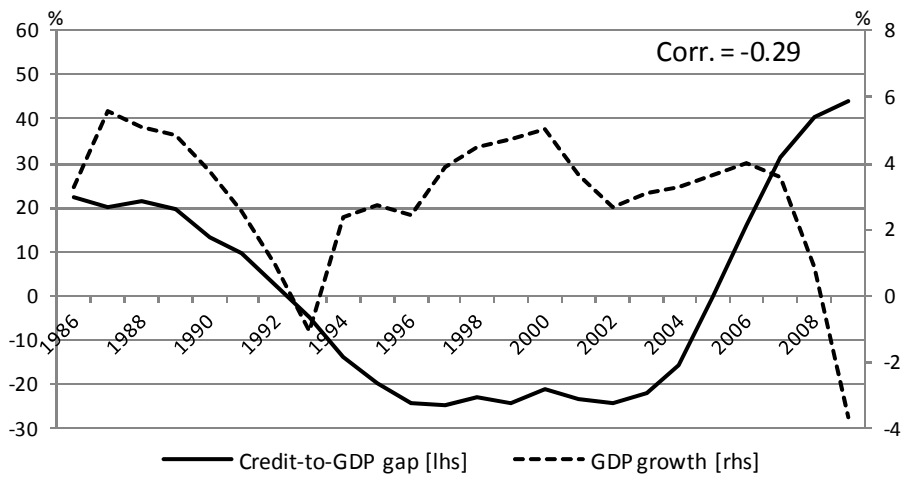
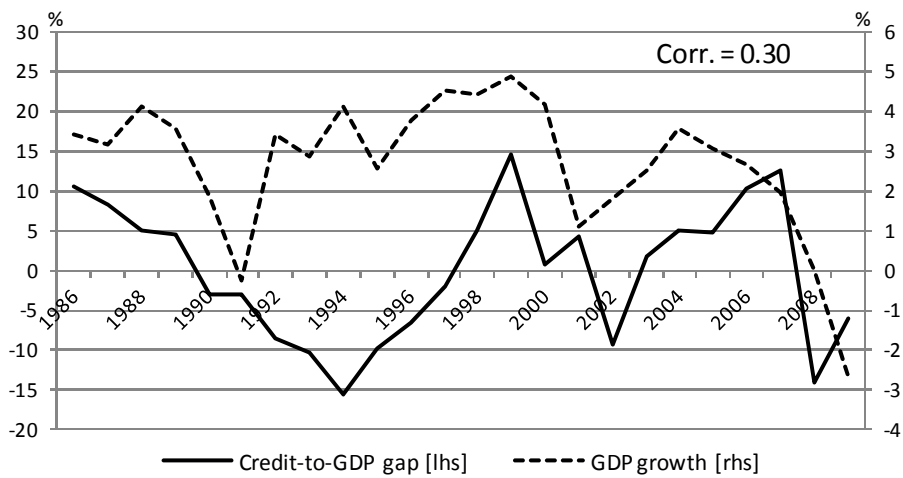


Figure A6. Credit-to-GDP gap and GDP growth, US, 1986-2009



## CEMFI WORKING PAPERS

- 0801 *David Martínez-Miera and Rafael Repullo*: “Does competition reduce the risk of bank failure?”.
- 0802 *Joan Lull*: “The impact of immigration on productivity”.
- 0803 *Cristina López-Mayán*: “Microeconometric analysis of residential water demand”.
- 0804 *Javier Mencía and Enrique Sentana*: “Distributional tests in multivariate dynamic models with Normal and Student  $t$  innovations”.
- 0805 *Javier Mencía and Enrique Sentana*: “Multivariate location-scale mixtures of normals and mean-variance-skewness portfolio allocation”.
- 0806 *Dante Amengual and Enrique Sentana*: “A comparison of mean-variance efficiency tests”.
- 0807 *Enrique Sentana*: “The econometrics of mean-variance efficiency tests: A survey”.
- 0808 *Anne Layne-Farrar, Gerard Llobet and A. Jorge Padilla*: “Are joint negotiations in standard setting “reasonably necessary”?”.
- 0809 *Rafael Repullo and Javier Suarez*: “The procyclical effects of Basel II”.
- 0810 *Ildelfonso Mendez*: “Promoting permanent employment: Lessons from Spain”.
- 0811 *Ildelfonso Mendez*: “Intergenerational time transfers and internal migration: Accounting for low spatial mobility in Southern Europe”.
- 0812 *Francisco Maeso and Ildelfonso Mendez*: “The role of partnership status and expectations on the emancipation behaviour of Spanish graduates”.
- 0813 *Rubén Hernández-Murillo, Gerard Llobet and Roberto Fuentes*: “Strategic online-banking adoption”.
- 0901 *Max Bruche and Javier Suarez*: “The macroeconomics of money market freezes”.
- 0902 *Max Bruche*: “Bankruptcy codes, liquidation timing, and debt valuation”.
- 0903 *Rafael Repullo, Jesús Saurina and Carlos Trucharte*: “Mitigating the procyclicality of Basel II”.
- 0904 *Manuel Arellano and Stéphane Bonhomme*: “Identifying distributional characteristics in random coefficients panel data models”.
- 0905 *Manuel Arellano, Lars Peter Hansen and Enrique Sentana*: “Underidentification?”.
- 0906 *Stéphane Bonhomme and Ulrich Sauder*: “Accounting for unobservables in comparing selective and comprehensive schooling”.
- 0907 *Roberto Serrano*: “On Watson’s non-forcing contracts and renegotiation”.
- 0908 *Roberto Serrano and Rajiv Vohra*: “Multiplicity of mixed equilibria in mechanisms: a unified approach to exact and approximate implementation”.
- 0909 *Roland Pongou and Roberto Serrano*: “A dynamic theory of fidelity networks with an application to the spread of HIV / AIDS”.
- 0910 *Josep Pijoan-Mas and Virginia Sánchez-Marcos*: “Spain is different: Falling trends of inequality”.
- 0911 *Yusuke Kamishiro and Roberto Serrano*: “Equilibrium blocking in large quasilinear economies”.
- 0912 *Gabriele Fiorentini and Enrique Sentana*: “Dynamic specification tests for static factor models”.



- 0913 *Javier Mencía and Enrique Sentana*: “Valuation of VIX derivatives”.
- 1001 *Gerard Llobet and Javier Suarez*: “Entrepreneurial innovation, patent protection and industry dynamics”.
- 1002 *Anne Layne-Farrar, Gerard Llobet and A. Jorge Padilla*: “An economic take on patent licensing: Understanding the implications of the “first sale patent exhaustion” doctrine.
- 1003 *Max Bruche and Gerard Llobet*: “Walking wounded or living dead? Making banks foreclose bad loans”.
- 1004 *Francisco Peñaranda and Enrique Sentana*: “A Unifying approach to the empirical evaluation of asset pricing models”.
- 1005 *Javier Suarez*: “The Spanish crisis: Background and policy challenges”.
- 1006 *Enrique Moral-Benito*: “Panel growth regressions with general predetermined variables: Likelihood-based estimation and Bayesian averaging”.
- 1007 *Laura Crespo and Pedro Mira*: “Caregiving to elderly parents and employment status of European mature women”.
- 1008 *Enrique Moral-Benito*: “Model averaging in economics”.
- 1009 *Samuel Bentolila, Pierre Cahuc, Juan J. Dolado and Thomas Le Barbanchon*: “Two-tier labor markets in the Great Recession: France vs. Spain”.
- 1010 *Manuel García-Santana and Josep Pijoan-Mas*: “Small Scale Reservation Laws and the misallocation of talent”.
- 1101 *Javier Díaz-Giménez and Josep Pijoan-Mas*: “Flat tax reforms: Investment expensing and progressivity”.
- 1102 *Rafael Repullo and Jesús Saurina*: “The countercyclical capital buffer of Basel III: A critical assessment”.