



## How much capital is enough?

Jaime Caruana

General Manager, Bank for International Settlements

IESE Business School conference on “Challenges for the future of banking: regulation, supervision and the structure of banking”

London, 26 November 2014

Thank you for inviting me. The topics of this conference are indeed relevant and timely ones. I’ve been asked to lead off a discussion about the levels and quality of capital. This is an important part –but only one part – of a larger post-crisis regulatory agenda. A great deal of progress has been made on this lengthy agenda, but now attention has rightly turned to new challenges: implementing what has been agreed, monitoring the effects on the financial system and real economy, and spotlighting and addressing new risks and vulnerabilities.

I am sometimes surprised about the never-ending debate about capital, because from the regulators’ perspective, most of the work has been done and is already in the implementation phase. After a lengthy consultation process, banking regulators reached agreement on the minimum risk-weighted requirements for high-quality capital under the Basel III framework back in 2010, and on the additional loss absorbency to be required of the largest global systemic banks in 2011.

However, it is also true that some aspects are still under discussion: in particular, the final calibration of the leverage ratio and, related but different, the framework for total loss-absorbing capacity (TLAC), which also covers needs in the event of resolution. Furthermore, national authorities have discretion to set thresholds above those specified in the global standards, and many already have. And now that a few years have passed since the agreement, it makes sense to step back and reflect on whether we ended up requiring too much capital or too little and how the process has worked so far.

Today I’d like to review the main costs and benefits of bank capital, from the perspective of the contribution to the real economy and stability of the financial system. I’ll review how banks have adjusted so far to Basel III, and what this says about the predictions that were made about this process when we started. I would argue that, overall, the adjustment has gone rather well, and that the minimum capital requirements requested by Basel III provide a comfort zone which allows national regulators to go further and request banks to fund their assets with even more capital than they do today, if they deem it appropriate for their financial system. Finally, I’ll offer a few words about some areas outside the banking system where leverage seems to be mounting, and I’ll suggest that these are the areas where regulators and other policymakers now need to focus our efforts.

### 1. The benefits of higher and better capital are now widely understood

#### Benefits of more capital

I’ll start with the easy part: the benefits.



First, capital serves as a shock absorber for losses. Capital provides room for manoeuvre to deal with shocks and gives banks more scope to take on risks. This means banks can provide credit to a wider range of investments. As long as the banks are wise in identifying projects that have a positive net present value, and as long as asset quality is properly assessed and maintained, this activity should contribute to economic growth.

Second, capital helps with a number of incentive problems.

For one thing, it can help to align the incentives of shareholders with those of the holders of banks' other liabilities. For any corporation, the limited liability structure generates incentives to attach more value to the upside of the business than the downside. The result is more risk shifted onto bondholders. This doesn't just apply to banks, but banks are unusually highly leveraged relative to non-financial corporations. So insufficient capital could lead to too much risk-taking, with risks shifted to bondholders and depositors.

Another important incentive problem relates to the separation of ownership and control. In any large corporation, executives may be tempted to undertake excessively risky strategies, since they benefit from "empire-building" when their strategy succeeds but incur limited cost if it fails. The best way to address this is through sound governance and compensation practices (which were also part of the regulatory reforms). But requiring banks to maintain more capital can complement these practices by reducing the imbalance, from the manager's point of view, between upside and downside risks.

Perhaps most importantly, bank capital can compensate for the moral hazard coming from deposit insurance or "too big to fail". Despite progress towards ending "too big to fail", expected government support, either explicitly through deposit insurance or through the implicit perception of the likelihood of public bailouts, still provides some boost to banks' credit quality (Graph 1). This not only reinforces the temptation for shareholders and managers to support excessive risk-taking; it also reduces the incentive of creditors to look after their share of the risk. The official sector, as the provider of these guarantees, needs to control the associated moral hazard. Capital is one of the tools for doing this.

Third, capital is a means to help internalise externalities related to systemic risk. In finance there are incentives to take risks and rewards today at the cost of potential systemic instability in an uncertain tomorrow. Capital requirements help to internalise at least some of these externalities.

## Conditions for reaping the benefits

To perform all of these tasks effectively, the risk weights in the capital framework need to be proportionate to risks. They need to be calibrated so as to ensure that banks manage their risks sensibly and allow for model uncertainty and estimation errors. To achieve that, supervisors and risk managers need to understand the limitations of human knowledge and recognise that, even with state of the art risk management systems, some risks can't be fully measured and internalised. The financial system has become more complex, more globalised and more intertwined with the real economy. As in any complex system, the behaviour of the whole financial system depends not only on the parts but also on the linkages, which can evolve rapidly. A good part of the complexity comes from this continuous evolution and adaptation, including to new regulations. In complex systems, initial conditions – that is, sound capital and liquidity buffers – are critical to mitigate adverse dynamics and to be resilient to regime changes.

Since models and risk weights do not fully capture all relevant risks, the leverage ratio in Basel III serves as a simple complement to the risk-weighted framework. It guards against model risk and "unknown unknowns", thereby acting as a limit on the growth of banks' leverage. The introduction of additional constraints, such as capital floors, benchmarks and other restrictions on the risk models, may also be necessary to guard against model risk and to limit the scope for excessive dispersion of results. And both



the risk-weighted and non-risk-weighted capital ratios can work well only if the quality of the bank's assets is properly and consistently assessed and losses are recognised early.

It's also critically important that the capital be "high-quality" – in other words, that it be able to absorb losses smoothly, without forcing other claims to be restructured or triggering other remedial actions. Before the crisis, we were lulled into a false sense of security by apparently high capital ratios, when in fact many capital instruments were not fully loss-absorbing in this sense. When the banks actually started suffering losses, markets quickly lost confidence in the banks because, even though their total capital ratios appeared to be strong, their common equity cushions were weak. For this reason, the risk-weighted ratios in Basel III are formulated primarily in terms of common equity.

## How banks have adjusted so far

Before I go into the costs, let's look at some numbers. The latest Basel III Monitoring Report looks at data as of 31 December 2013 from 227 banks, comprising 102 large internationally active banks with Tier 1 capital of more than €3 billion (Group 1) and a sample of 125 smaller banks (Group 2).

Under the fully phased-in Basel III rules, average Common Equity Tier 1 (CET1) capital ratios are 10.2% for Group 1 banks and 10.0% for Group 2 banks.<sup>1</sup> These ratios have steadily improved over the last few years (Graph 2). At the end of 2009, for a slightly different sample of banks, the CET1 ratios were 5.7% for Group 1 and 7.8% for Group 2.<sup>2</sup> Since then they've risen 4½ percentage points for Group 1, and more than 2 percentage points for Group 2.

Most large internationally active banks now meet the Basel III risk-based capital requirements, including the capital conservation buffer, even though those rules won't formally be in place for a few more years. And the aggregate of capital shortfalls for those banks which don't yet reach the minimum has been further reduced (Graph 3). For the Group 1 banks, the aggregate shortfall relative to the CET1 target of 7.0% (plus the surcharges on G-SIBs as applicable) was €15 billion at the end of 2013 – compared with €57.5 billion on 30 June 2013 and €486 billion as of end-June 2011.<sup>3</sup> This represents around 5% of the banks' 2013 profits after tax, and 15% of what they paid out in dividends in 2013.<sup>4</sup> For Group 2, the shortfall is about €9 billion. This is 41% of their 2013 profits – but is also less than the amount they paid in dividends in 2012 and 2013.

Now let's take a look at the leverage ratio (Graph 4). The average Basel III Tier 1 leverage ratio at end-2013 was 4.4% for Group 1 banks and 5.1% for Group 2 banks.<sup>5</sup> Only 25 of the Group 1 banks and 16 of the Group 2 banks did not meet a 3% leverage ratio, the level which the Basel Committee is currently monitoring (the calibration of the leverage ratio is to be finalised by 2017). Once these banks raise enough capital to meet the target risk-based capital requirements, most of them will have met the leverage ratio as well.

How much more capital will banks need to meet the leverage ratio, on top of what is needed to meet the risk-weighted ratio? The answer needs to be in terms of Tier 1 capital, since the numerator of the

---

<sup>1</sup> BCBS (2014), Table A.5, last line.

<sup>2</sup> BCBS (2010b).

<sup>3</sup> BCBS (2014), Table A.7.

<sup>4</sup> BCBS (2014), Table A.9.

<sup>5</sup> BCBS (2014), Table A.18. Note that each half-yearly figure shown in Graph 4 is based on the exposure measure (denominator of the leverage ratio) that was under consideration by the Basel Committee at the time that the leverage ratios were calculated. This measure has changed over time.



leverage ratio is specified in terms of Tier 1. For Group 1, the amount of Tier 1 capital needed rises by €19.4 billion (ie from €159.4 billion to €178.8 billion). For Group 2 banks, the leverage ratio calls for an additional €5.6 billion in Tier 1 capital.

I'm reciting all these numbers to make a simple point: whatever you may think of the costs of increased bank capital, in fact banks have made impressive progress towards achieving higher capital ratios over the last few years. Most of them now meet the new requirements, and the others are not far off.

## 2. But we should not deny that there are some costs

So what are the possible costs?

The main concern often expressed is that higher capital requirements increase borrowers' funding costs and that this will reduce investment and growth. The *transition* to more and better capital could amplify this funding cost channel by forcing banks which are unable to raise capital from profits or external issuance to restrain lending and/or sell assets rapidly, which could be destabilising. Corporations (and not just banks) are always reluctant to issue new equity, because this tends to drive down the value of existing shares. Banks tend to be even less willing than other corporations to issue new shares. They're also reluctant to cut dividends. So they may find that selling assets, or slowing asset growth as they build up capital through retained earnings, is the easiest path to increase their capital ratios.

### An illustrative calculation: cost of funding

I will discuss the transition costs in a moment. But first I want to address the cost of capital argument with a simple exercise.

Even under rather conservative assumptions (eg assuming the Modigliani-Miller theorem does not hold at all and thus the bank's funding costs do not get any benefit as a result of its having more equity), the increase in weighted average funding costs (leaving taxes apart), resulting from a switch from Basel II to Basel III is not large. For example, let's say, as in this example, that a bank raises its equity capital from 2% to 7% of its risk-weighted assets, and reduces its non-equity capital somewhat, thereby staying at the minimum threshold for each instrument category under the Basel framework (Table 1). The remainder of its funding is from debt.

Consider a two-year loan to a small or medium-sized enterprise (SME) of a credit quality equivalent to BB (Table 2). The capital charge could be calculated under either of two options available in the Basel framework: the SME loan could be treated as part of a portfolio of retail exposures (each exposure below €1 million), or as a loan to an individual SME (sales below €50 million) with a sales volume correction factor. The risk weight that determines the funding structure varies from 41% for the Internal Ratings-Based (IRB) approach if the SME is in a portfolio of small retail exposures to 100% under the Standardised Approach for an SME (with €5 million sales). Even under the conservative assumption mentioned, the overall funding cost increase from Basel II to Basel III would range from 19 to 47 basis points.

Graph 5 tries to provide a sense of how relevant this amount is in relation to the fluctuation of interest rates during the same period when banks were increasing their capital ratios. The blue arrow is 47 bp in height, while the lines show nominal two-year government bond yields for the US, Germany and the UK. I will leave the conclusions to you.

It could still be argued that the increase of funding costs is not negligible. But first remember that in the example we have not considered any Modigliani-Miller compensation. This is a stringent assumption; normally, less leverage should lower the cost of debt and reduce the expected return-on-equity (RoE)



(Miles et al (2013)). Second, it could be offset by increased efficiency at the bank level, for example a reduction in operating costs. Most importantly, even if there is no compensating reduction in required RoEs or in the cost structure, the benefits for the economy would be higher, as we'll see later.

As it happens, actual RoEs have fallen since the crisis. While there are a number of reasons for this, it reflects, at least in part, the fact that banks have become less leveraged. For Graph 6 we've taken about 100 large global banks (not the same sample as in the Basel Committee analysis discussed above), divided roughly equally among banks from advanced European economies, banks from other advanced economies, and banks from emerging market economies (EMEs). Average RoEs were about 19% in both groups of advanced economy banks in the three years before the crisis, and fell to 4% for the European banks and 10% for the others in 2010–13, while capital ratios for both groups rose. EME banks have managed to maintain their profitability. But as the graph shows, they also had higher capital ratios ahead of the crisis, and since then their capital ratios have remained about the same on average.

This has been just a mechanistic exercise to provide some sense of order of magnitudes. Let me now turn to a deeper analysis, particularly of the transition costs.

### 3. The transition costs do not seem to have been as large as feared

It's been a few years now since the basic outlines of Basel III were agreed. At the time, there was a lively debate on how these stronger capital requirements would affect the real economy. Some of the estimated impacts are listed in Table 3. The BIS played a role in this by chairing the Macroeconomic Assessment Group (MAG), which pooled the model estimates of forecasters at regulators and central banks around the world as well as at the IMF.

A priori, it's clear that the impact will depend on which side of the balance sheet banks focus on as they attempt to raise capital ratios. If banks tighten standards, or widen their lending spreads, thereby cutting into investment and growth, this could have negative real effects. If banks choose to reduce dividend payouts or issue new equity, this would minimise the real economy impact.

#### Lending standards, lending spreads and drivers of capital ratios

So what has happened? Let me make four observations.

First, we're still only a few years into this process, and the macroeconomic environment has been difficult to say the least. And yet, in the time since the acute phase of the crisis, banks have not tightened lending standards (Graph 7). Until this year, lending surveys still indicated some tightness in lending conditions in Europe, but things are nowhere near as bad as during the crisis. It seems plausible that tighter standards in Europe primarily reflected the sovereign debt crisis, disappointing recovery and concerns about asset quality, rather than the adjustments made by banks.

Second, lending spreads have not shown a clear widening trend, and certainly not the sharp widening that some observers predicted back in 2010. Graph 8 shows different spreads in different economies and market sectors: some are wider, some narrower. Interestingly, when you look at banks' net interest income as a share of assets, it has increased by about 20–30 basis points since the crisis. The increase is very much on the same scale as the studies that I listed a moment ago, or the accounting exercise I did earlier with respect to funding costs.

Third, when you look at what individual banks have done to boost their capital ratios, you find that they have relied on retained earnings, and many have successfully issued new equity, rather than reducing lending growth. The Basel Committee's capital monitoring exercise bears this out (Table 4). Looking again at our sample of about 100 banks, in the left-hand panel of Graph 9, you can see that increases in



capital (the yellow bars) have driven higher capital ratios, and have outweighed the countervailing effect of asset growth (the red bars). If banks had deleveraged by cutting assets, these red bars would be positive rather than negative. Lower average risk weights on existing assets (the light blue bars) have also played a role, but not much. The right-hand panel looks more closely at capital, ie the numerator. Most of the growth has been through net income (the light brown bars). New issues of capital, which accounts for most of the residual (“other”) represented in the dark blue bars, have also taken place.

My fourth observation is that Europe has been a notable exception to these patterns. We already saw that bank lending standards have remained somewhat tight in Europe, more so than in other regions. In the left-hand panel of Graph 9, you can see that slow lending growth and asset sales (deleveraging) have been relatively more important in contributing to higher capital ratios for European banks, while in the right-hand panel you can see that, through end-2013, European banks had not done much in the way of raising new capital.

This can be explained in part by the weak euro area economy since the crisis (a sovereign debt crisis on top of the financial crisis) and the weaker state of European bank balance sheets. But it’s also now clear that, in the immediate aftermath of the crisis, European authorities were not as aggressive as, for example, the US authorities, in pressing their banks to recognise losses and adopt and implement credible plans to raise new capital.

The establishment of the Single Supervisory Mechanism and the recently concluded Comprehensive Assessment can only improve things in this regard. The combined asset quality review and macro stress test confirmed that European banks have indeed been lagging in repairing and strengthening their balance sheets. The good news is that European banks have already started addressing these challenges. The assessment found a total capital shortfall in December 2013 of €25 billion, across 25 banks that fell below the required threshold under the stress test. But the ECB also reported that this shortfall has fallen to €9.5 billion since the end of 2013 because of remedial actions by the banks in question. Overall, the 130 participating banks have increased their capital by an aggregate €203 billion since July 2013, from capital issues, asset sales and internal capital generation. Hopefully these actions will dispel some of the uncertainty that has surrounded the European banking system.

#### 4. Long-term economic impact analysis suggests there is room for more capital

##### Actual capital ratios: well below where social costs would outweigh social benefits

So much for the transition. What about the longer term?

In 2010, in parallel with the transition study, a Basel Committee task force looked at the longer-term costs and benefits of higher capital and liquidity requirements (BCBS (2010a)). Task force members determined that the main costs would be wider lending spreads, under the conservative assumption that the Modigliani-Miller theorem would not hold and that higher funding costs would feed fully into the rates that banks charge to borrowers. They then compared the cost of this, in terms of lower investment and GDP, to the benefits in terms of reduced GDP losses in the future due to a lower frequency and impact of financial crises.

This calculation depends on what you assume about the cost of financial crises – in particular, whether they have a permanent, long-term effect on output, or whether output eventually recovers to its pre-crisis trend. Studies of past financial crises have come to different conclusions on this question. Certainly the most recent crisis experience would seem to support the view of the “permanent effect” camp.



In any event, the 2010 study found that, even if you assume that crises have only a transitory impact on trend GDP, as represented by the blue lines in Graph 10, higher capital ratios offer net benefits at levels up to 15% or so. This is the case whether you only look at higher capital ratios (right-hand panel) or when these are combined with higher liquidity coverage ratios (left-hand panel). And if you assume, in line with our experience since 2009, that financial crises permanently reduce output below its trend, as shown by the red lines, the optimal capital ratio is quite a bit larger – well to the right of the range shown in these two graphs. Other research – for example, work done at the Bank of England by David Miles and his colleagues – supports the view that capital ratios can be even higher than they are at present while still delivering net benefits to the real economy.

### Additional loss-absorbing capacity

This discussion has assumed added relevance as regulators look at additional ways to ensure that, in the event of resolution, global systemically important banks have sufficient loss-absorbing capacity to implement an orderly resolution that mitigates risks to financial stability, ensures continuity of critical functions and minimises taxpayers' exposures to losses. As you have no doubt heard, the FSB and the Basel Committee have developed proposals for total loss-absorbing capacity, or TLAC, with this objective in mind.

Why TLAC? There were points during the crisis when policymakers were reluctant to impose haircuts on bondholders of failed or failing banks, for fear that this would be a source of contagion to other weak banks. This approach may have been called for at the time, given crisis conditions, but it generates moral hazard. For this reason, work to strengthen resolution frameworks since the crisis, including the FSB's *Key Attributes of Effective Resolution Regimes for Financial Institutions* and the resolution frameworks developed by the EU and a number of other jurisdictions, has emphasised the bailing-in of bank bondholders in resolution. The goal of TLAC is to give substance to this approach by requiring the largest global banks to maintain a quantum of unsecured liabilities that may not count as common equity capital but can be bailed in as part of a resolution process.

There are many details still to be worked out in this proposal. A consultative document was published on 10 November, and an impact assessment and a market study will be carried out before reaching final conclusions. But the key point here is that, going forward, holders of bank debt as well as equity should have a direct interest in making sure banks are run soundly and risk is managed properly. Liabilities that are not eligible as TLAC remain subject to potential exposure to loss in resolution, in accordance with the applicable resolution law.

## 5. Concluding remarks

Let me summarise my main points, and then conclude with some remarks about the transformation of leverage and the need to broaden our attention to these new developments.

- Bank capital ratios have improved steadily since the crisis. Banks have achieved this primarily by accumulating retained earnings.
- The material negative impacts that some feared for the real economy and financial system have not materialised. Banks' returns on equity have fallen, as we would expect with lower leverage and lower risk-free rates. There is still room for national supervisors to adjust capital upwards according to their needs.
- There is also room for bail-inable debt or loss absorbency in the event of resolution for the systemic banks under the TLAC framework. Banks should be able to achieve this comfortably as



long as they have enough time to implement the new requirements. Details and proper calibration are important and will be based on the ongoing consultations and data collection.

All in all, thanks to tougher regulation and market pressures, leverage in the banking system has gone down. However, leverage at the global level is evolving, and total debt-to-GDP remains high, in fact 20 percentage points of GDP higher than at the beginning of the crisis in 2007 (Graph 11).

A number of advanced and emerging market economies that did not suffer in the crisis have seen a combination of rapid credit growth, rapid property price increases and high ratios of debt service to income, to levels that in the past have signalled potential problems. This may leave them vulnerable to higher interest rates over the next few years, as central banks move to normalise monetary policy.

I'd like to conclude by briefly pointing out some areas outside banking where leverage is growing and may be giving rise to systemic risks – systemic risks which may affect banks even if the origin of the distress is not banking.

According to the latest monitoring report on shadow banking,<sup>6</sup> global financial assets outside banks, insurers, pension funds and central banks rose about 7% in 2013 over the previous year, to a total of \$75 trillion (Graph 12). This is almost back to the pre-crisis level as a share of GDP. Not all of this should be considered "shadow banking" as such, and, whatever name we use, not all of it is necessarily a risk to the system. But it does point to a growing volume of financial activity outside the regulatory perimeter that could give rise to maturity and liquidity mismatches, and cannot easily be monitored or managed by traditional regulatory tools. A number of initiatives to address these concerns are under way.

Finally, let me just briefly point out some other areas of concern:

- Global corporate bond issuance has been growing steadily since the crisis. The high-yield segment is growing the fastest. It would be reassuring if all of this issuance went for investment in plant and equipment – but, in fact, much of it has gone for share buybacks; in other words, simply an increase in corporate leverage.
- Increased corporate debt issuance has properly focused attention on global investment funds and their managers. While the funds themselves are generally not highly leveraged, they may exhibit "leverage-like" behaviour in some circumstances.

With these final points, I would like to underline that financial stability will continue to require attention that goes beyond banking.

---

<sup>6</sup> FSB (2014).



## References

Basel Committee on Banking Supervision (2010a): "An assessment of the long-term economic impact of stronger capital and liquidity requirements", August, [www.bis.org/publ/bcbs173.pdf](http://www.bis.org/publ/bcbs173.pdf).

——— (2010b): "Results of the comprehensive quantitative impact study", December, [www.bis.org/publ/bcbs186.pdf](http://www.bis.org/publ/bcbs186.pdf).

——— (2014): "Results of the Basel III monitoring exercise as of 31 December 2013", September, [www.bis.org/publ/bcbs289.pdf](http://www.bis.org/publ/bcbs289.pdf).

Elliott, D, S Salloy and A Oliveira Santos (2012): "Assessing the cost of financial regulation", *International Monetary Fund Working Paper*, WP/12/233, September.

Financial Stability Board (2014): *Global shadow banking monitoring report 2014*, 30 October, [www.financialstabilityboard.org/wp-content/uploads/r\\_141030.pdf](http://www.financialstabilityboard.org/wp-content/uploads/r_141030.pdf).

Institute of International Finance (2011): "The cumulative impact on the global economy of changes in the financial regulatory framework", September.

Macroeconomic Assessment Group (2010): "Assessing the macroeconomic impact of the transition to stronger capital and liquidity requirements: Interim Report", August, [www.bis.org/publ/othp10.pdf](http://www.bis.org/publ/othp10.pdf).

Miles, D, J Yang and G Marcheggiano (2013): "Optimal bank capital", *The Economic Journal*, vol 123, pp 1–37, March.

Oxford Economics (2013): "Analyzing the impact of bank capital and liquidity regulations on US Economic Growth", The Clearing House Association, April.

Slovik, P and B Cournède (2011): "Macroeconomic impact of Basel III", *OECD Economics Department Working Paper*, no 844, February.

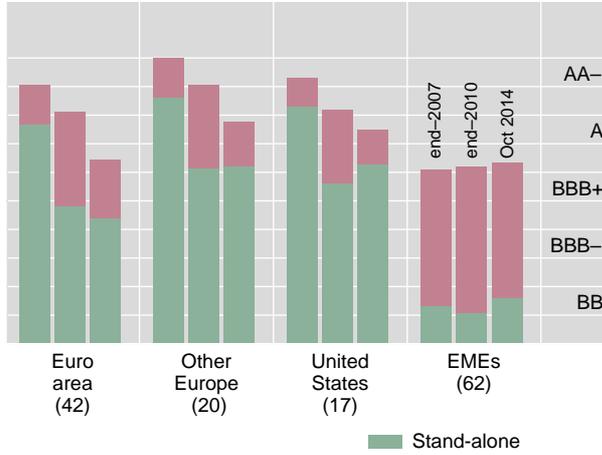


## Components of bank credit ratings

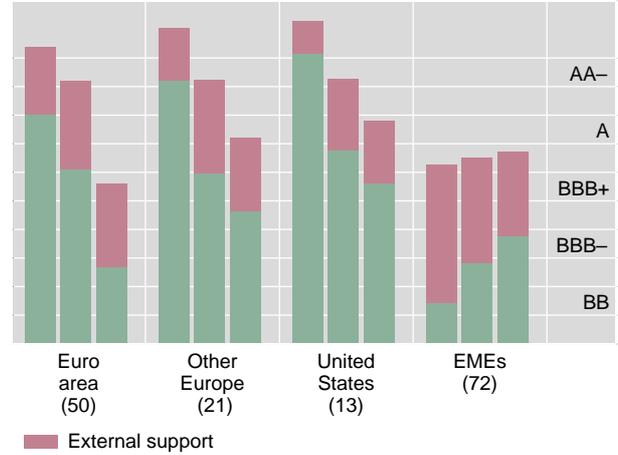
Asset-weighted averages

Graph 1

Bank ratings, Fitch



Bank ratings, Moody's

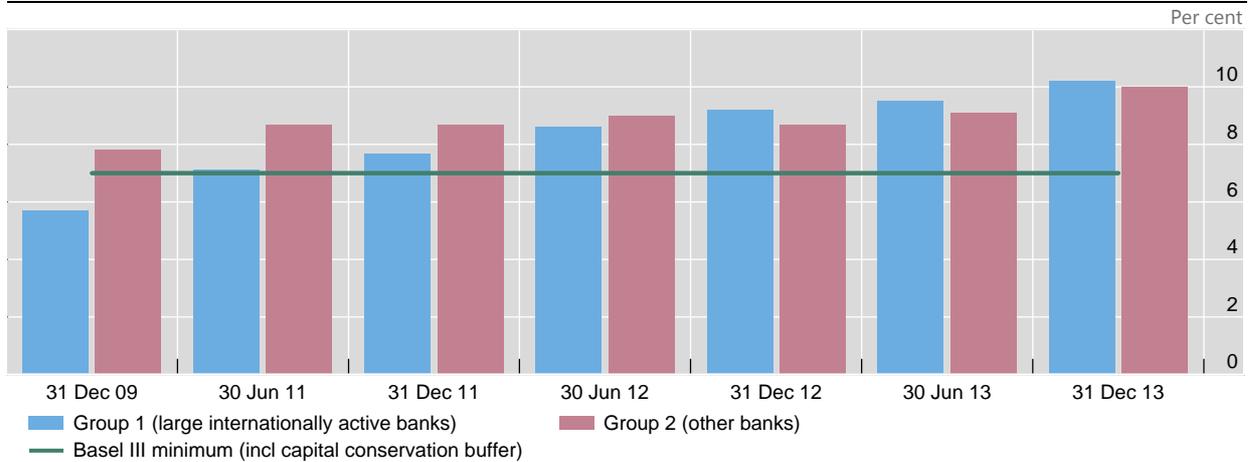


Number of banks in parentheses.

Sources: Bloomberg; Fitch Ratings; Moody's; BIS calculations.

## CET1 capital ratios under fully phased-in Basel III definitions

Graph 2



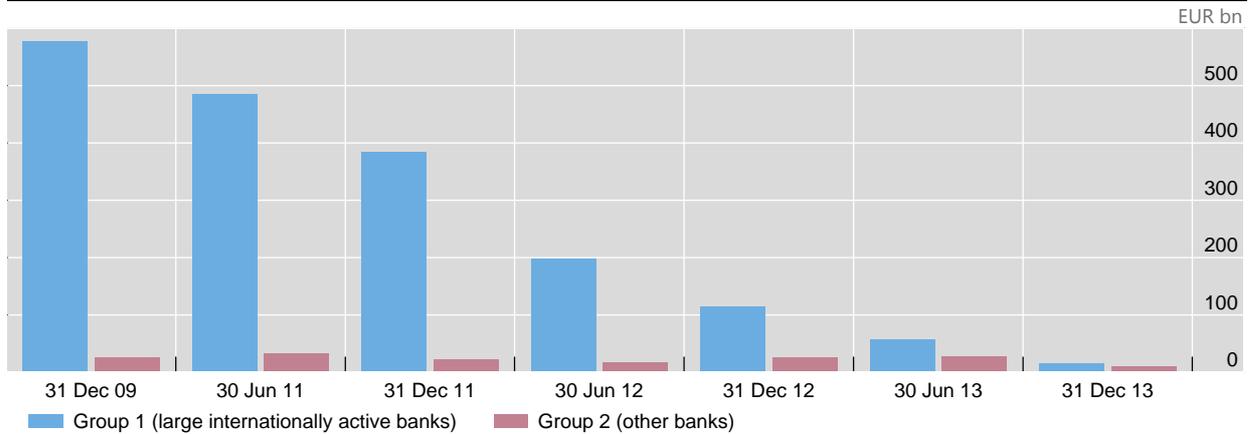
Sample for end-2009 data was not the same as for 2011-13.

Source: Basel Committee on Banking Supervision.



### Estimated CET1 capital shortfall from the 7% target level

Graph 3

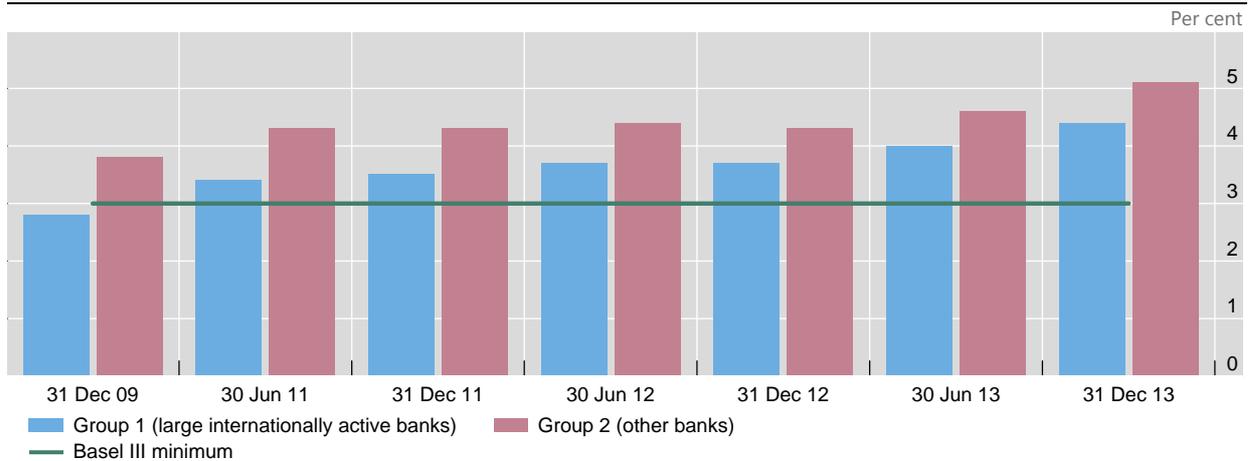


Sample for end-2009 data was not the same as for 2011–13.

Source: Basel Committee on Banking Supervision.

### Basel III Tier 1 leverage ratios

Graph 4



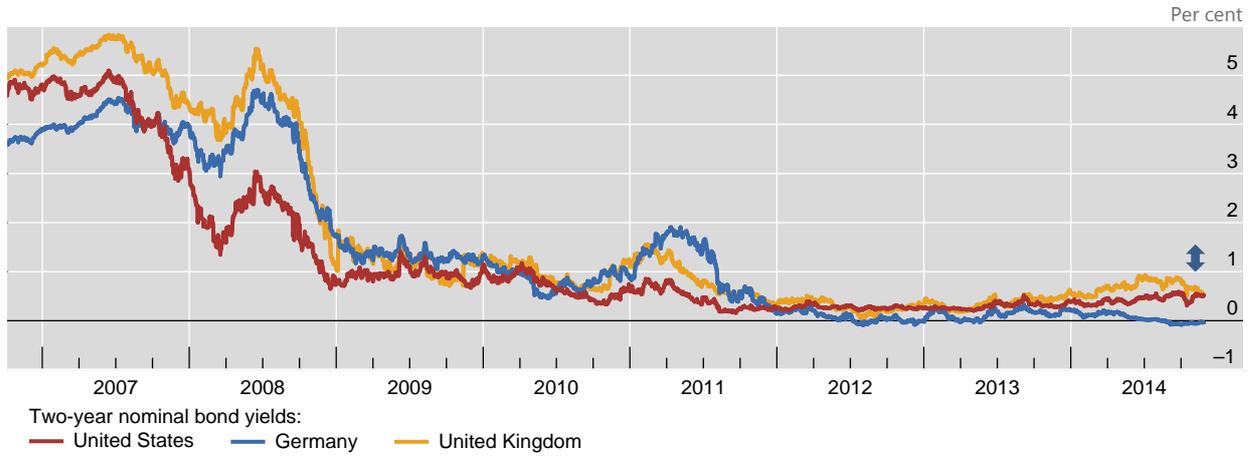
Sample for end-2009 data was not the same as for 2011–13.

Source: Basel Committee on Banking Supervision.



### Two-year government bond yields in the US, Germany and the UK

Graph 5



The blue arrow has a height of 47 basis points.

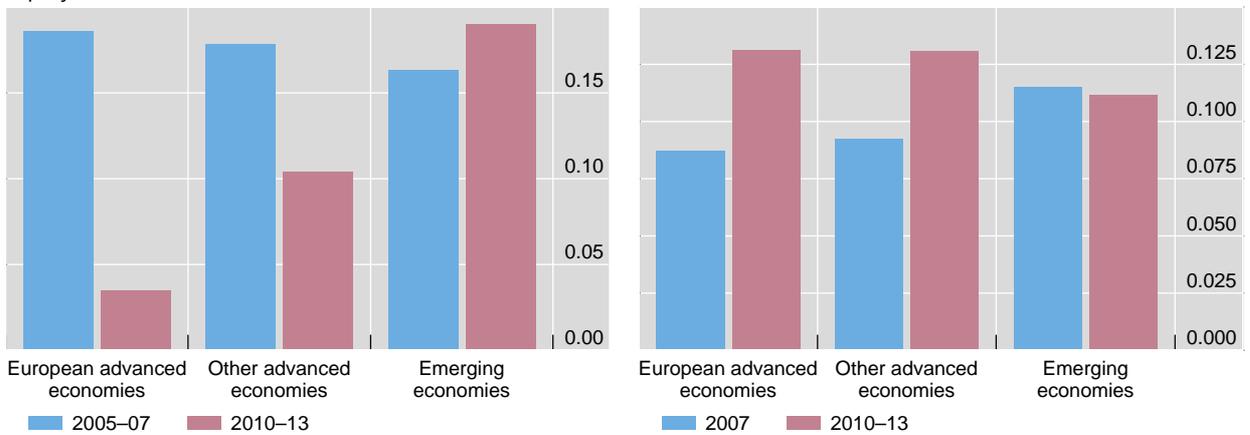
Source: Bloomberg.

### Bank returns on equity and risk-weighted capital ratios

Graph 6

Profitability of major banks, as a percentage of common equity

Risk-weighted capital ratio



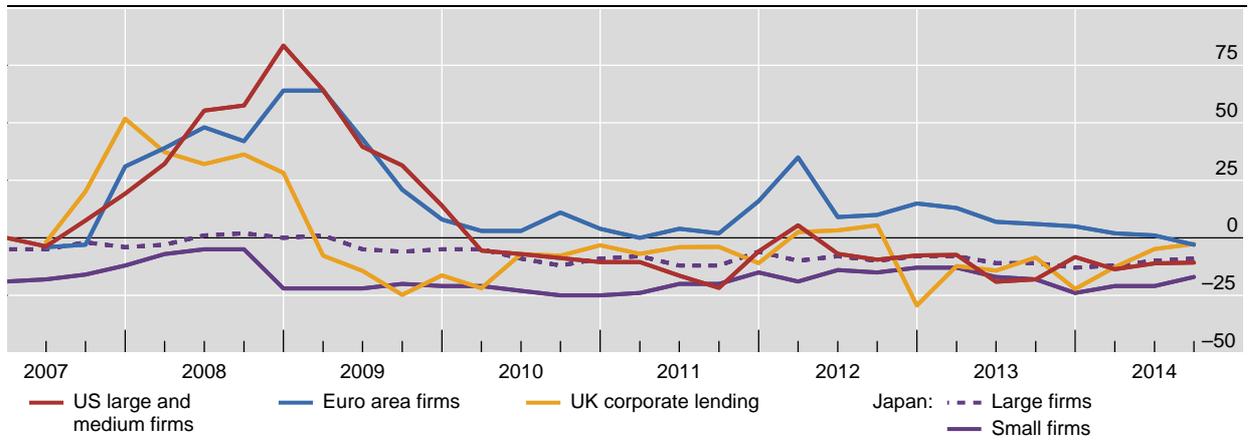
Sources: Bankscope; BIS calculations.



### Survey responses on banking standards<sup>1</sup>

Net tightening, in percentage points

Graph 7

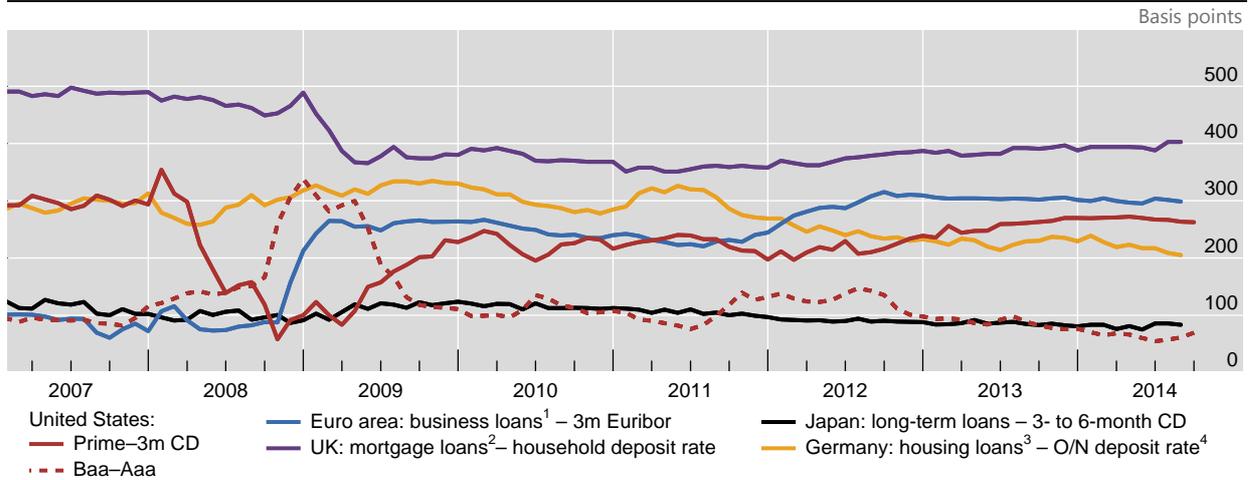


<sup>1</sup> Difference between banks reporting tighter lending conditions during the previous quarter and those reporting looser conditions.

Sources: Bank of England; Bank of Japan; European Central Bank; Federal Reserve Board.

### Lending spreads in selected economies

Graph 8



<sup>1</sup> One- to five-year business loans. <sup>2</sup> Variable rate mortgages. <sup>3</sup> One- to five-year housing loans. <sup>4</sup> Deposits of non-financial corporates.

Source: National data.

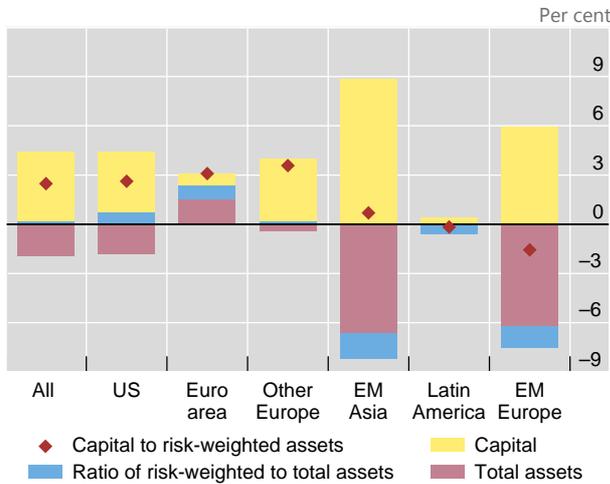


## Determinants of changes in bank capital ratios and bank capital<sup>1</sup>

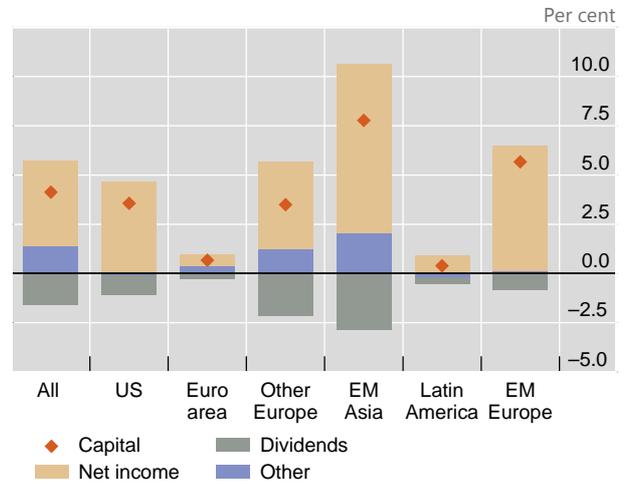
Changes between end-2009 and end-2013, normalised as percentage points of capital ratios

Graph 9

### Drivers of capital ratios



### Sources of bank capital



<sup>1</sup> The graph decomposes the change in the ratio of common equity capital to risk-weighted assets (left-hand panel) and the percentage change in common equity capital (right-hand panel) into additive components. Overall changes are shown by diamonds. The contribution of a particular component is denoted by the height of the corresponding segment. A negative contribution indicates that the component had a depressive effect. All figures are weighted averages using end-2013 total assets as weights.

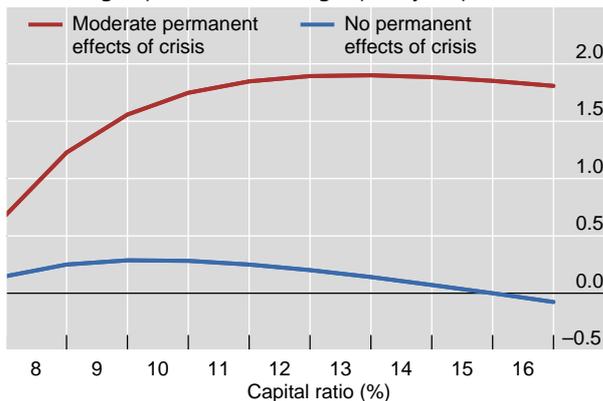
Sources: B Cohen and M Scatigna, "Banks and capital requirements: channels of adjustment", *BIS Working Papers*, no 443, March 2014; Bankscope; Bloomberg.

## Net benefits of capital and liquidity requirements

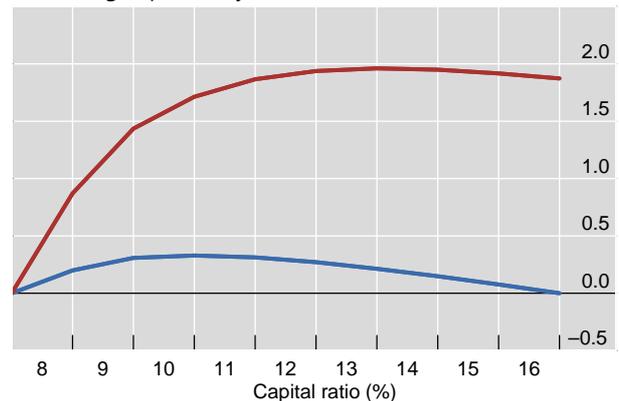
Impact on the level of output (%)

Graph 10

### Increasing capital and meeting liquidity requirements



### Increasing capital only



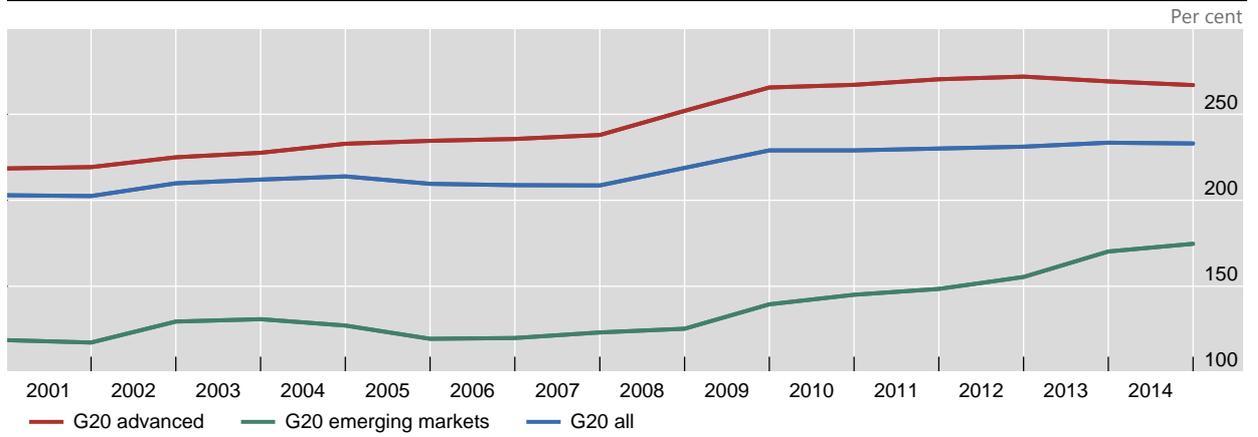
The capital ratio is defined as tangible common equity over risk-weighted assets. The origin corresponds to the pre-reform steady state, approximated by historical averages for total capital ratios (7%) and the average probability of banking crises. Net benefits are measured by the difference between expected benefits and expected costs. Expected benefits equal the reduction in the probability of crises times the corresponding output losses. The red and blue lines refer to different estimates of net benefits, assuming that the effects of crises on output are permanent but moderate (which also corresponds to the median estimate across all comparable studies) or only transitory.

Source: Basel Committee on Banking Supervision.



### Public and private sector debt as a percentage of GDP

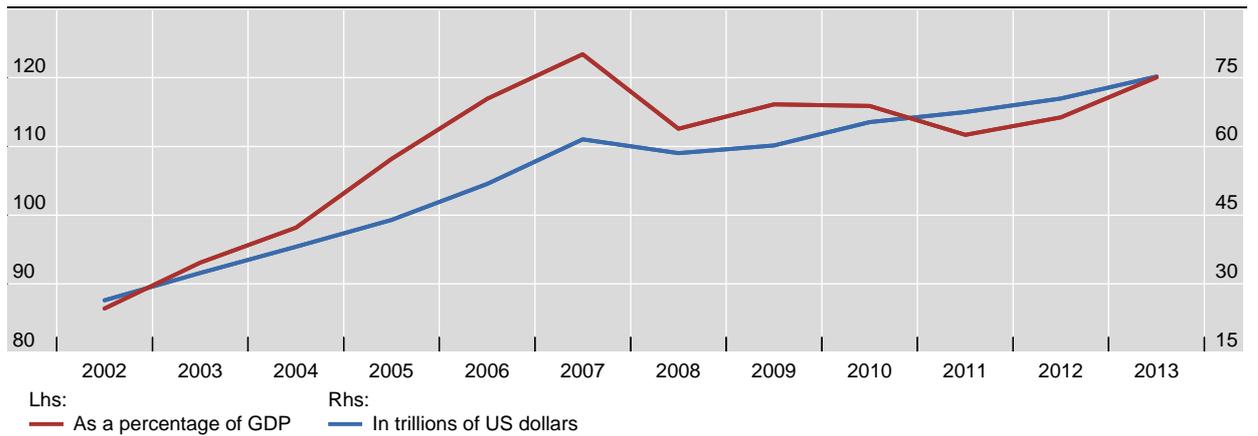
Graph 11



Sources: IMF; OECD; national data; BIS calculations.

### Assets of "other financial institutions"<sup>1</sup>

Graph 12



<sup>1</sup> Assets held by financial entities that are not banks, insurance companies, pension funds, public financial institutions, central banks or financial auxiliaries.

Sources: National financial accounts data; other national sources.



Capital requirements (%)

Table 1

	Basel II minimum	Basel III target
Total capital	8	10.5
Equity	2	7
Additional Tier 1	2	1.5
Tier 2	4	2

Sources: Basel Committee on Banking Supervision.

Funding cost for SME loans under different supervisory frameworks<sup>1</sup>

Table 2

	SMEs as pool of retail exposures				SME €5 million sales			
	Standardised		IRB		Standardised		IRB	
	Basel II	Basel III	Basel II	Basel III	Basel II	Basel III	Basel II	Basel III
<b>Risk weight (%)</b>	75%	75%	41%	41%	100%	100%	62%	62%
<b>Share of each instrument used to fund the exposure (%)</b>								
Equity	1.5	5.3	0.8	2.9	2.0	7.0	1.2	4.3
Additional Tier 1	1.5	1.1	0.8	0.6	2.0	1.5	1.2	0.9
Tier 2	3.0	1.5	1.6	0.8	4.0	2.0	2.5	1.2
Debt	94.0	92.1	96.7	95.7	92.0	89.5	95.0	93.5
<b>Weighted funding cost (%)</b>	3.44%	3.78%	3.24%	3.43%	3.58%	4.05%	3.36%	3.65%
<b>Increase in funding cost from Basel II to Basel III</b>		0.35%		0.19%		0.47%		0.29%

<sup>1</sup> The table shows the instruments used to fund a two-year loan to a BB-rated (equivalent) SME with \$5 million in annual sales, with a loss-given-default (LGD) of 45%. The loan can be treated as part of a pool of retail exposures, or as a separate exposure. In the latter case the risk weight would be determined by the €5 million sales figure. For each of these approaches, the minimum required funding share of each category of instrument (equity, additional Tier 1, Tier 2 and debt) is calculated under the Standardised and IRB approaches, for the Basel II and Basel III frameworks. Assumed costs of funding are as follows: equity 15%, additional Tier 1 10%, Tier 2 8% and debt 3%. The last line shows the increase in weighted funding costs from Basel II to Basel III under each approach.

Sources: Basel Committee on Banking Supervision; BIS calculations.



## Estimates of the impact of higher capital requirements on growth

Impact of a 1 percentage point increase in the risk-weighted capital ratio

Table 3

	Lending spread	Lending volume	Growth (annual rate)
MAG (2010)	+15–17 bp	–1–2%	–4 bp over 4 years
BCBS (2010a)	+13 bp	(not estimated)	–9 bp <sup>2</sup>
IIF (2011) <sup>1</sup>	+30–80 bp	–0.8–1.0%	–6–12 bp over 5–10 years
Slovik & Cournède, OECD (2011)	+8–20 bp	(not estimated)	–4 bp over 9 years
Elliott et al, IMF (2012) <sup>1</sup>	+5–15 bp	(not estimated)	(not estimated)
Miles et al (2013)	+5.5 bp	(not estimated)	–4.5 bp, permanent <sup>2</sup>
Oxford Economics (2013)	+15 bp	(not estimated)	–1.6 bp over 9 years

<sup>1</sup> Also includes the impact of other regulatory measures. <sup>2</sup> Long-term reduction in growth relative to the benchmark.

Sources: As listed in table; BIS calculations.

## Profits, dividends and capital raised

In billions of euros, consistent sample of banks, exchange rates as of 31 December 2013

Table 4

	Group 1 banks			Group 2 banks		
	Profit after tax	Common share dividend	CET1 raised	Profit after tax	Common share dividend	CET1 raised
H1 2011	135.8	54.3	38.8	13.8	3.1	5.8
H2 2011	106.4	30.6	24.9	6.8	3.5	7.9
H1 2012	128.4	54.7	30.2	11.6	3.6	2.4
H2 2012	153.6	28.1	28.0	9.0	2.6	5.6
H1 2013	160.6	71.0	24.5	11.5	3.8	1.3
H2 2013	129.9	27.4	30.8	11.2	3.3	4.8

Source: Basel Committee on Banking Supervision.