Annex accompanying the

CONSULTATION PAPER

on the possible impact of the CRR and CRD IV on bank financing of the economy

Contents

1. Introduction, scope and objectives of the report

The financial crisis exposed gaping holes in banking regulation. As a result, the EU revised its prudential regulations for banks. The Capital Requirements Regulation[1] (CRR) and Capital Requirements Directive IV[2] (CRD IV) establish the new prudential framework that most European banks are now required to adopt. The requirements are designed to ensure that banks are appropriately equipped in order to guard against the risks that their business entails.

Articles 501, 505 and 506 of the CRR require the Commission to report on the impact of the new legislation on bank financing of the economy, particularly on lensing to SMEs and long-term investment, including investment in infrastructure and lending to SMEs. A thorough, comprehensive and open evaluation of the effects of the single prudential framework on long-term finance is essential if the Commission is to maintain and strengthen its commitment to supporting investment, growth and jobs – one of its key priorities.

Analysis of these issues can also provide useful insights into the effects that the recapitalisation of the EU banking system may have on the rest of the economy. This plays an invaluable role in informing decisions relating to the timing, scope and ambition of any possible future proposals to improve the prudential framework, which may be made in response to changes in international consensus on prudential regulation or as a result of the experience gained in applying the current regulation in Europe.

Section 2 of the Annex to the Consultation paper provides an overview of significant changes in EU banking regulation over the last decade, which mostly reflected international developments and agreements by bank supervisors. Section 3 of the Annex provides an analysis of the trends and developments in bank balance sheets prior to, during and in the aftermath of the crisis,. Section 4 aims trying to draw parallels between changes in the prudential framework and changes in the banks' structure and volumes of assets and liabilities It provides a conceptual underpinning to discuss the capital-lending relationship, but also discribes findings and conclusions of some the most important economic research conducted so far. Finally, section 5 elaborates on the potential effects of macroprudential instruments contained in CRR and CRD IV on lending to the economy. The section also discusses the potential mechanics of CRR requirements to the specific areas of bank lending: SME lending and infrastructure financing.

The Annex to the Consultation paper should help the respondents to form his/her better views on the questions raised in some sections of the Consultation Paper, namely *Capitalisation*, *Regulation*, *Lending to SMEs* and *Lending to infrastructure*. The annex is not intended to provide direct analytical support to other sections of the Consultation paper: *Proportionality*,

[1] Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012 (OJ L 321, 26.6.2013, p. 6).

[2] Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms, amending Directive 2002/87/EC and repealing Directives 2006/48/EC and 2006/49/EC (OJ L 176, 27.6.2013, p. 338).

Scope for simplification, *Regulation and discretion*, *Use of implementing legislation* or *Sustainability of the banking sector*.

The results from the stakeholder consultation will feed into the final report of the Commission. The report will also take into account the discussion from the public hearing currently planned later this year, but also the results from the analysis on SME lending which is currently being undertaken by the European Banking Authority as well as from independent research commissioned specifically for this purpose.

2. Overview of changes to the prudential framework in the aftermath of the financial crisis

The prudential and supervisory response to the financial crisis has been implemented in three stages via CRDII, CRDIII and CRR/CRDIV, the latter one introducing the most significant changes to the capital and other prudential requirements. These changes represent a significant broadening (to cover other sources of risk) and tightening of prudential safeguards.

As outlined in Chapter 1, the evaluation will focus primarily on the impact of CRR on long-term lending in line with the Commission's mandate. The crux of the evaluation is whether these tighter requirements have changed the capacity of banks to lend, notably for longer term productive investment. The evaluation will not focus on liquidity or leverage requirements as they do not yet apply or in some cases have not even been adopted. These features of the regulatory regime will be subject to separate evaluations or impact assessments during their preparation.

This section provides a broad overview of the regulatory changes in prudential requirements introduced since the onset of the crisis. Without intending to change the scope of the evaluation mandated in CRR, this section aims to convey an overall understanding of the changes in and the dynamics of the EU prudential framework for financial institutions in response to what was initially believed to be a financial turmoil, but what later evolved into a systemic financial crisis.

2.1. The increasing need for a new legislative approach

In the 2000s, the EU regulatory framework followed a principles-based approach that was embodied in the principle of minimum harmonisation. Directives were used as the main legislative instrument, setting minimum requirements for prudential supervision. Member States were required to transpose those Directives into their respective national legislation. The use of the Directive gave Member States a degree of flexibility in setting the regulatory framework for banks as long as they did not 'go below' the minimum standards required by the EU law. However, in line with the principle-based approach to regulation, Member States typically did not implement overly prescriptive rules, which would provide specific and detailed guidance to supervisors for exercising their duties. During the same period, national supervisory authorities were responsible for applying and enforcing the prudential requirements set out in the Directives. These empowered each national supervisory authority

to take the steps it considered necessary to implement prudential measures, in order to safeguard the resilience of the banks it supervised and the financial stability of the banking sector as a whole. National supervisors enjoyed a considerable degree of discretion that allowed them to apply requirements stricter than the minimum standards set out by the Directives.

In other words, nothing in the Directives prevented Member States and their national supervisors from taking appropriate measures to further reduce the risk of a bank failing or risks to the stability of the overall financial system.

The crisis has taught us a lot about the failure of some European banks to manage their risks prudently and some national regulators and supervisors to exercise their powers with sufficient rigour. Many studies and reports have been produced to analyse the consequences of the principles-based approach pursued by national regulators and how national supervisors exercised their oversight and enforcement duties in the pre-crisis period (Jacques de Larosière Report, High-level Expert Group report headed by Liikanen, etc.).

Reliance on soft and light-touch approaches and low supervisory intensity encouraged by the principles-based approach to regulation, inadequate resources and insufficient attention to banks' corporate governance systems represent the most prominent causes of the various supervisory failures observed in several Member States. Too often, national supervisors took a narrow focus on credit risk and underestimated the importance of concentration, liquidity and funding risks. Too little attention was given to macro-prudential considerations and effective early warning mechanisms, which could have helped national authorities to detect emerging risks early and prevent bubbles from growing.

The EU Capital Requirements Directive (CRD) adopted by the European Parliament and the Council in 2006, required national supervisors to conduct a thorough assessment of the risk management systems and governance of the banks they supervised and to take measures suitable to the specific risk profile of the bank in question. The Directive also stipulated explicit requirements for the management of liquidity and concentration risk as well as risks arising from exposures to real estate markets. If national supervisors had used these powers to the full extent allowed by the Directive, a number of major difficulties could have been prevented.

Robust risk management and governance structures in banks and effective oversight and control systems were the two indispensable conditions for the success of principles-based regulation. In the absence of these two preconditions, the regulatory effects intended by the Directive could not be realised.

These deficiencies also revealed important shortcomings in the governance of the institutional framework for supervision itself and have sparked a period of unprecedented reforms in the EU, backed by an international (G20) consensus on the causes of the financial crisis and the actions needed to address it. The reforms had two distinct dimensions, a regulatory one and an institutional one.

On the regulatory side, there has been, in line with international developments, a pronounced shift to a more rules-based approach. Introducing more detailed guidance in the regulatory frameworks for supervisors, to ensure that they step up their supervisory scrutiny was considered essential. As a result, the new regulatory requirements have been made more prescriptive, the coverage of risks has been expanded and the prudential treatment of those risks has been strengthened.

This reform was carried out in two phases.

2.2. First phase: the CRD II and CRD III framework

On 16 September 2009, the Council and the European Parliament officially adopted Directive 2009/111/EC (CRD II) (6 articles in total). The CRDII amended the original CRD with the aim of improving the management of large exposures, the quality of banks' capital, liquidity risk management and the risk management for securitised products.[3] The 'colleges of supervisors' were established for banking groups that operate in multiple EU countries. These amendments formed part of the Commission's response to the financial crisis by strengthening the regulatory framework in those areas which at that time were believed to be among its main causes. The proposed amendments were a direct follow-up to the Roadmap for the current financial turmoil agreed by EU Finance Ministers. In part, they were also a response to the recommendations of the G-7 Financial Stability Forum.

The main changes that had to be transposed into national law by 31 October 2010 were the following:

- **Improving the management of large exposures**. Banks were restricted in lending beyond a certain limit to any one party. As a result, in the inter-bank market, banks were prohibited to lend or place money with other banks beyond a certain amount, while borrowing banks were effectively restricted in how much and from whom they can borrow.
- **Improving supervision of cross-border banking groups**. 'Colleges of supervisors' were established for banking groups that operate in multiple EU countries. The rights and responsibilities of the respective national supervisory authorities were clarified in order to make their cooperation more effective.
- **Improving the quality of banks' capital**. New EU-wide criteria were introduced for assessing whether 'hybrid' capital, i.e. having both equity and debt features, is eligible to be counted as part of a bank's overall capital.
- **Improving liquidity risk management**. For banking groups that operate in multiple EU countries, liquidity risk management — i.e. how operations are funded on a day-to-day basis — was made subject to discussion and coordination within 'colleges of supervisors'.

[3] In 2000, seven Banking Directives and their amending Directives were replaced by one single Banking Directive (Codification) (2000/12/EC), which aimed to improve the clarity and transparency of the EU legislation and to create a kind of 'European Banking Act'.

- **Improving risk management for securitised products**. Rules on securitised debt — the repayment of which depends on the performance of a dedicated pool of loans — were tightened. Firms (known as 'originators') that re-package loans into tradable securities were required to retain some risk exposure to these securities, while firms that invest in the securities were allowed to make their decisions only after conducting comprehensive due diligence. If they failed to do so, they would be subject to capital penalties.

On 14 December 2010, the final text of the Directive amending the Capital Requirement Directive as regards capital requirements for the trading book and for re-securitisations, and the supervisory review of remuneration policies was published in the Official Journal of the European Union (CRD III)[4] (6 articles in total).

These proposals aimed to address specific risks linked to **two key drivers of the crisis, namely the inadequate regulation of securitisation and staff remuneration**. They also aimed to ensure that banks hold enough capital to reflect the true risks they are taking. In particular, banks are now supposed to offset risks associated with highly complex re-securitisation products and deal with destructive incentives created by pay and bonus schemes. Banks and investment firms are legally obliged to have remuneration policies consistent with effective risk management. Supervisors were given the powers to take measures, including increased capital requirements, to address any failures:

- **Capital requirements for re-securitisations**. New rules on re-securitisations – highly complex financial products that caused significant losses for banks – required banks to hold significantly more capital to cover their risks when investing in these products. CRD III defines a 're-securitisation' as a securitisation where the risk associated with an underlying pool of exposures is tranched and at least one of the underlying exposures is a securitisation position. For the same 'credit quality step' (i.e., credit rating grade), re-securitisation positions received a higher risk weight than securitisation positions. Risk weights for 'resecuritisation exposures' increased (the actual size of increase depends on the rating of exposure) to a level approximately 200% higher than comparably rated non-re-securitisation exposures for banks under standardised approach (SA) and approximately 300 % higher than comparably rated non-re-securitisation exposures for banks subject to internal ratings-based (IRB) approach.
- **Disclosure of securitisation exposures**. Proper disclosure of the level of risks to which banks are exposed was considered necessary for market confidence. The new rules tightened disclosure requirements with a view to increasing market confidence in order to encourage banks to start lending to each other again.

[4] Directive (2010/76/EU) of 24 November 2010 amending the Capital Requirements Directive (2006/48/EC and 2006/49/EC) as regards capital requirements for the trading book and for re-securitisations and the supervisory review of remuneration policies**,** http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:329:0003:0035:EN:PDF.

- **Capital requirements for the trading book.** The trading book consists of all the financial instruments that a bank holds with the intention of re-selling in the short term, or in order to hedge other instruments in the trading book. CRD III changed the way that banks assess risks connected with their trading books to ensure that they fully reflect the potential losses from adverse market movements in stressed conditions. Table 1 provides an estimate of the impact the regulatory changes had on risk weights in the largest international banks.

Table 1. Effect of increased trading book capital requirements.[5]

Increase in trading book RWA %	Trading book RWA as share of total RWA %	Impact on overall RWA %
57.4	5.4	3.1

- **Remuneration policies and practices within banks.** CRD III also aimed to change unreasonable pay incentives by requiring banks and investment firms to have sound remuneration policies that do not encourage or reward excessive risk-taking. Bank supervisors were given the power to sanction banks with remuneration policies that do not comply with the new requirements.

2.3. The CRR/CRD IV framework

The CRR/CRD IV represents an additional step of the EU response to the banking crisis and complements the establishment of the EU Banking Union by establishing a common set of rules and institutions to deal with banks and bank failures/resolution in Member States participating in the Banking Union.

The CRR/CRD IV package (680 articles in total) lays the foundations for the supervision of all 8000 banks in the European Union. It implements the international regulatory consensus on bank prudential regulation as embodied in the Basel III agreement and endorsed by the G20. It addresses risks and shortcomings that emerged starkly during the financial crisis. **These included the under-capitalisation of banks and new risks not adequately addressed by the previous framework** (notably in the areas of liquidity, leverage, localised systemic bubbles, remuneration). It brings a more uniform and rigorous approach to bank supervision through the prescriptive harmonisation of rules, and by reducing the scope for national discretion in its implementation.

[5] Sample includes the largest internationally active banks ('Group 1'), of which 29 are G-SIBs. Data as of 31 December 2013. Changes to trading book RWA reflect the impact of Basel 2.5: stressed value-at-risk, the incremental risk charge (IRC), capital charges for the correlation trading portfolio, as well as changes to the standardised measurement method for other securitisations and n-th to default derivatives.

Applicable since January 2014, implementation of the CRR/CRD IV is an ongoing process requiring the development of further implementing legislation by the EBA and the Commission, and ongoing adaptation, enforcement and compliance on behalf of supervisors and banks.

The CRR/CRD IV package marks an important step towards **a single banking rule-book** by reducing the scope for national discretion in its implementation. The provisions of CRR/CRD IV are complemented by a large series of (75) implementing measures which provide additional instructions on how some key provisions should be applied.

- **Increased quantity and improved quality of bank capital is** the principal change introduced in CRR/CRD IV (see table 2 below). This gives effect to the international agreement that, prior to the crisis, the quality as well as the quantity of bank capital was too weak (effectively, only a quarter of capital had to be 'of the highest quality' or 'common equity Tier 1'). Hence, bank capital did not sufficiently absorb losses, leading to bank failures and taxpayer interventions.

Table 2. Basel III phase-in arrangements. Shading indicates transition periods – all dates are as of 1 January

	2014	2015	2016	2017	2018	As of 2019
Leverage ratio	Parallel run 1 Jan 2013 – 1 Jan 2017 Disclosure starts 1 Jan 2015				Migration to Pillar 1	
Minimum CET1 ratio	4.0%	4.5%	4.5%	4.5%	4.5%	4.5%
Capital conservation buffer			0.625%	1.25%	1.875%	2.50%
G-SIB surcharge			Phase-in			1.0%–2.5%
Minimum common equity plus capital conservation buffer	4.0%	4.5%	5.125%	5.75%	6.375%	7.0%
Phase-in of deductions from CET1 (including amounts exceeding the limit for DTAs, MSRs and financials)	20%	40%	60%	80%	100%	100%
Minimum Tier 1 capital	5.5%	6.0%	6.0%	6.0%	6.0%	6.0%
Minimum total capital	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
Minimum total capital plus capital conservation buffer	8.0%	8.0%	8.625%	9.25%	9.875%	10.5%
Capital instruments that no longer qualify as Tier 1 capital or Tier 2 capital	Phased out over 10 year horizon beginning 2013					

Liquidity coverage ratio		60%	70%	80%	90%	100%
Net stable funding ratio					Introduce minimum standard	

Regarding the quantity of capital, the minimum total capital (Common Equity Tier 1 plus additional capital buffers) will now increase to 10.5% in 2019.

Regarding the quality of capital, the following important items will be gradually deducted from own funds:

- Goodwill and (other) intangibles
- Deferred tax assets which rely on future profitability
- IRB shortfall (EL-Provisions)
- Significant and non-significant financial investments
- Minority interests
- Unrealised losses on Available-For-Sale assets (phase-out of filter)
- Unrealised gains on Available-For-Sale assets (phase-out of filter)

A 2% RWA Common Equity Tier 1 ratio under Basel II would only add up to a 1% RWA Common Equity Tier 1 ratio when applying the rigour of Basel III. The CRR gives Member States discretion to phase-in these deductions faster than the minimum required under CRR/CRD IV.[6] In any event all these deductions will have to be fully implemented starting from 2018.

- **An EU-wide macro-prudential framework** was established for the first time at the EU level and countercyclical policy measures were introduced to enhance banks' capacity to absorb losses during periods of stress and address localised systemic risks such as real estate bubbles or excessive consumer lending. This allows national authorities to take a range of measures to insulate institutions from localised systemic risks. During 2014, more than 90 measures were taken by Member States. One issue in the coming years will be ensuring that these national powers are used in a way that limits impacts on the banking systems of neighbouring countries and does not impinge on economic recovery.
- **Safeguarding the flow of credit to SMEs.** Capital charges for exposures up to EUR 1.5 million to SMEs are reduced through the application of a supporting factor equal to 0.7619 which aims to neutralises the increase of capital requirements foreseen in Basel III (0.7619 corresponds with the ratio between the current ratio of 8%, and the new one of 10.5%, which is inclusive of the capital conservation buffer).
- **Requirements for management and capitalisation of counterparty credit risk of over-the-counter (OTC) derivatives** were strengthened through a recalibration of the default risk capital charges and the introduction of new capital charges to account for mark-to-market losses of OTC derivatives.
- The financial crisis highlighted the importance of **liquidity management** in ensuring the resilience of banks to liquidity shocks. On the basis of empowerment provided by the CRR, the EU adopted in 2014 a Delegated Act on Liquidity Coverage Requirement.[7] It implements the CRR requirement for banks to hold enough liquid

[6] See Article 467-470, 479 of Regulation No 575/2013.
[7] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015R0061&rid=1.

assets to survive a 30-day stress period, which is also in line with G20-endorsed standards. Liquidity Coveragea Requirement will be applicable to banks as of October 2015 and therefore it is not further discussed in the annex.

- The CRR also foresees that the Commission will assess and eventually come forward with legislation to establish a Net Stable Funding Ratio and a Binding Leverage Requirement. When contemplating new regulatory measures, such as the Net Stable Funding Ratio and Leverage Ratio, care will be have to be taken to ensure a calibration that optimises the trade-off between financial stability and funding of the real economy. Notably, this will include taking account of the impact of these measures on different types of bank and business lines, so that these measures reflect properly the specific circumstances and needs of the European banking system and wider economy. The Commission decisions on the Net Stable Funding Ratio and Leverage Ratio are required by the end of 2016, and therefore the potential impact of these ratios are not part of the analysis contained in this annex.
- CRR/CRD IV also contains requirements regarding **the governance and management of banks**. It establishes rules on transactions with related parties etc. to minimise conflicts of interest. It also saw the introduction of significant provisions on remuneration policy and restrictions on payment of bonuses in order to limit incentives for excessive risk taking.

3. A bird's eye perspective on the euro area banking sector balance sheet in the period 1997-2014

3.1. Introduction

Prior to the 2008 financial system crisis, European banks expanded rapidly on a global scale while hidden systemic risks built up. This took place with respect to both national and international markets. In the process, European banks became excessively leveraged and reliant on short-term funding sources, making them more susceptible to shocks that could force them to adjust their operations abruptly and shrink their balance sheets.

When the crisis erupted, the pre-crisis process of financial expansion and integration was put into reverse. Banks reacted by slashing trading assets, reducing excessive lending, focusing on core deposits as a funding source, and realigning their business models.

Since the onset of the crisis, the EU banking sector has started a process of deleveraging, including retaining earnings and raising additional capital, and downsizing its balance sheets. From a microprudential perspective, this is desirable to enhance the resilience and stability of the banking sector. However, **from a macroprudential perspective and as emphasised by those arguing against stricter microprudential requirements, the collective deleveraging process may tighten credit conditions, thereby reinforcing the recession or hindering economic recovery.** The collective bank deleveraging process that has occurred in Europe is to a large extent driven by changes in bank strategies and de-risking and by the difficulties for banks to obtain funding in the market. It is worth bearing in mind that a disorderly deleveraging process has also been avoided through ongoing state aid and support from central banks.

Irrespective of the underlying reasons, the more important point is that **deleveraging need not reduce lending**. Orderly yet prompt and appropriate deleveraging entails banks cleaning up their balance sheets by writing down the troubled assets accumulated before the crisis and reducing interconnectedness and complexity. If the size of banks' balance sheets shrinks because losses are recognised and accounting values are adjusted downwards, this adjustment may better support the economy from a medium-term perspective. Instead, not recognising losses from non-performing assets may prolong (and could be prolonging) the period of stagnation, giving rise to debt overhang problems and the ever-greening of bad loans.[8]

Widespread forbearance poses the risk that banks will devote scarce resources for lending to unhealthy corporates, crowding out lending to healthier and more productive firms. Moreover, when a universal bank with extensive investment and wholesale banking activities decides to de-risk away from market activities, its balance sheet will shrink. But again, the impact on lending may be limited, and the shrinking of the balance sheet may deliver de-risking benefits.

[8] Japan is usually referred to as an example of the negative consequences of forbearance. See Caballero et al. (2008).

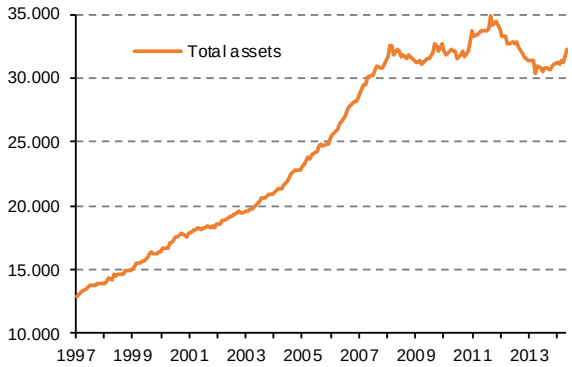
A number of policy actions have been taken to support deleveraging. For example, the new risk-based capital framework (CRD IV package) provides for higher capital charges against market risk and trading book exposures, which gives incentives to focus deleveraging on more risky assets that contributed to the build-up of vulnerabilities in banks' balance sheets prior to the crisis. Additionally, the ECB and other central bank liquidity operations performed since the crisis, alleviated pressures on bank funding and helped banks to continue granting credit to the economy. Another example is the EBA capitalisation exercise in 2011-2013 that required banks to create a capital buffer to sustain systemic risk arising from the sovereign debt crisis and provided detailed guidance to prevent banks from simply curtailing lending. As a final example, the Vienna 2.0 initiative seeks to limit the impact of deleveraging in Central, Eastern and South Eastern Europe where EU cross-border banks may otherwise be induced to withdraw or cut back lending in the region.

3.2. Analysis of changes to the assets side of bank balance sheets

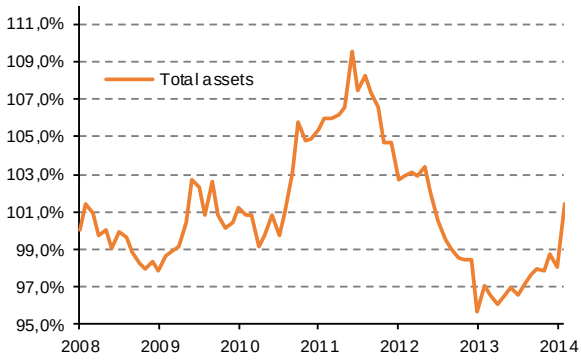
Evolution of total assets

Chart 3.1: Total banking assets, euro area MFIs, excluding the Eurosystem

Total assets, billion EUR



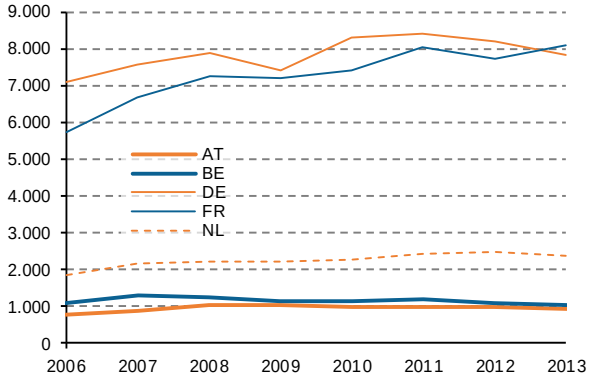
December 2008 = 100



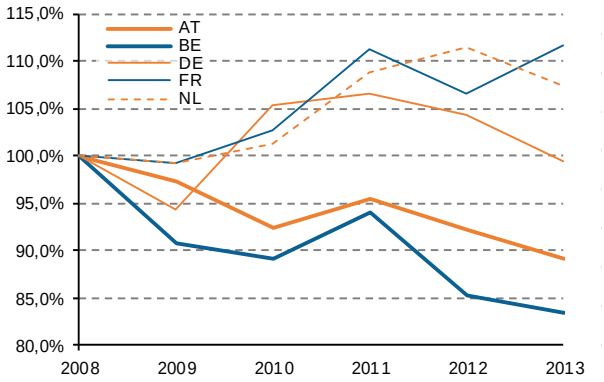
Source: ECB and own calculations

Chart 3.2: Total banking assets in core euro area countries

Total assets, billion EUR



2008 = 100

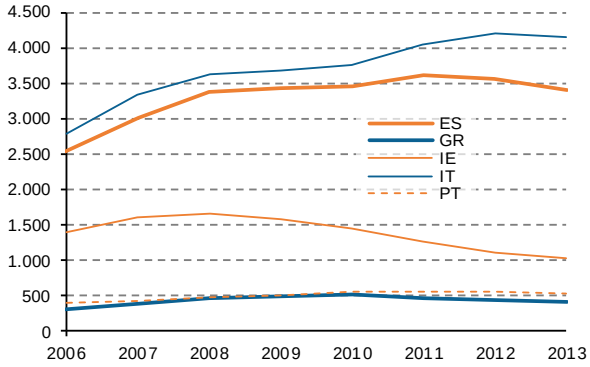


Source: OECD[9]and own calculations

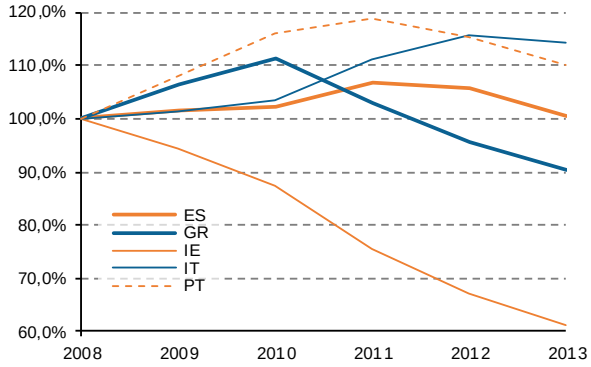
[9] See: http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ECO/WKP%282013%2994&docLanguage=En.

Chart 3.3: Total banking assets in non-core euro area countries

Total assets, billion EUR



2008 = 100



Source: OECD and own calculations

Prior to 2008, total banking assets in the euro area increased by 8.3 % each year on average. Overall, the sharp increase in total assets ceased with the eruption of the crisis, with a negative average annual increase of -0.3% between 2008 and 2014. Nonetheless, the euro area did not experience a significant decline in total assets compared to the pre-crisis peak level. In Q4 2014, total assets were at 98% of their level in Q4 2008.

The size of the banking sector balance sheet in core euro area countries is relatively flat from 2007 to 2011. **Since the onset of the financial crisis, total assets have increased in 2013 compared to 2008 in a number of core euro area countries** (+11.6% in FR and +7.4% in NL), **while they have decreased in others** (-10.9% in AT, -16.5% in BE and -0.6% in DE).

In the aftermath of the crisis, the size of the banking sector has contracted the most in Greece and Ireland (-9.52 % and -38.94 % respectively) when 2008 and 2013 levels are compared (see chart 3.3). By contrast, Italy and Portugal have seen the largest increase in total banking assets since the beginning of the crisis (+14.4 % and +10.2 % respectively), while they have remained relatively constant in ES (+0.4%).

Breakdown by asset classes

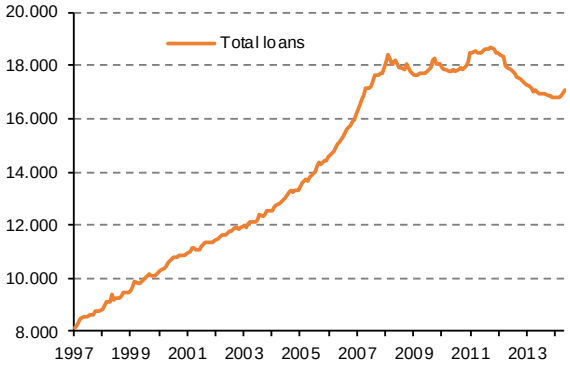
In the run up to the crisis, total loans to all counterparts (including financials) more than doubled. The average annual growth rate between 1997 and 2008 amounted to +7.2%, outpacing nominal GDP growth in that period, which was, on average, +4.4%[10] for the nominal GDP of both the euro area and the EU as a whole. After 2008, the average annual growth rate was -1.1% (see chart 3.4).

The changes in lending towards specific counterparts (NFCs, governments, households, financial corporations) have not always been the same. Prior to the crisis, all loan types displayed positive average annual growth rates. Loans to insurance corporations and pensions funds (ICPFs) increased most from 1997 to 2008 (+15.9% average annual growth rate), followed by loans to financial corporations (+14.0% average growth rate).

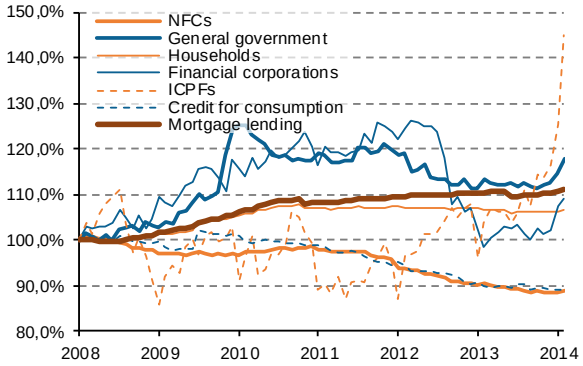
[10] Based on annual figures from Eurostat.

Chart 3.4: Total loans outstanding and breakdown by type of loan, euro area MFIs, excluding the Eurosystem

Total loans, billion EUR



December 2008 = 100



Source: ECB and own calculations

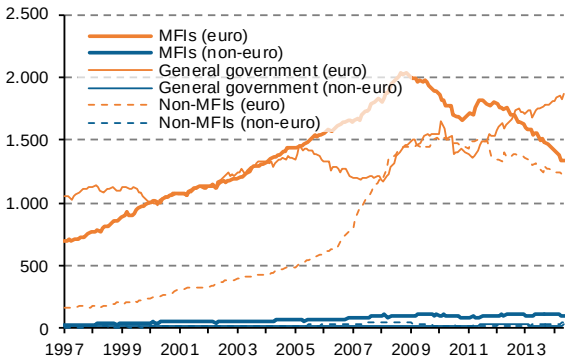
Between 2008 and 2014, euro area banks have lended chiefly to insurance corporations and pension funds (ICPFs) (+4.7% average annual growth rate), **to general government** (+2.7% average growth rate) **and mortgage lending** (+1.7 % average growth rate)**. On the other hand, loans to NFCs have decreased by 2.0 % on average, while credit for consumption has dropped by 1.9 % on average**.

Before 2008, euro area banks increased their holdings of debt securities (see chart 3.5), mainly issued by non-MFIs (monetary financial institutions) and denominated both in euro (+22.1% average growth rate) and other currencies (+15.9% average growth rate). Throughout this period, debt securities issued by general government and denominated in currencies other than euro were the only category in which banks decreased their holdings (-0.7% average growth rate).

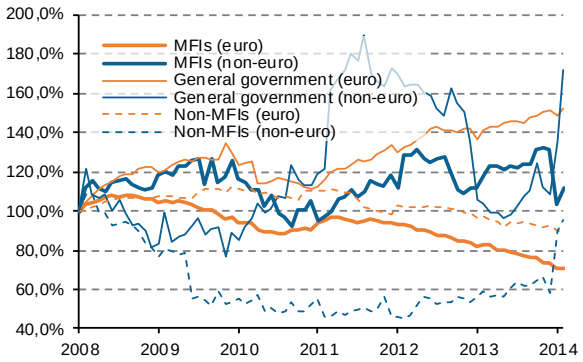
Between 2008 and 2014, banks purchased debt securities for the most part issued by general government, with the average annual growth government debt securities denominated in other currencies +9.8% and those denominated in euro +7.2% (see chart 3.5)**. Banks have decreased their holdings of debt securities denominated in euro and issued by both MFIs** (-5.4% on average) **and non-MFIs** (-1.6% on average)**.**

Chart 3.5: Total debt securities held by euro area monetary financial institutions (MFIs), excluding the Eurosystem

Debt securities held, billion EUR



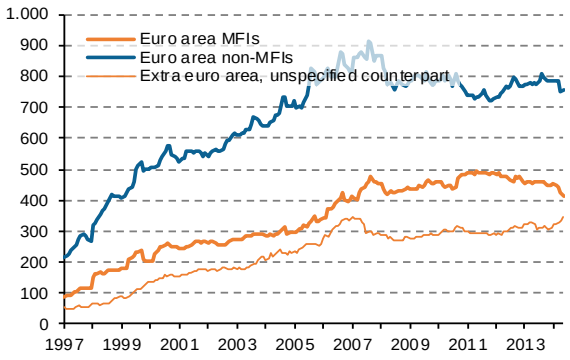
December 2008 = 100



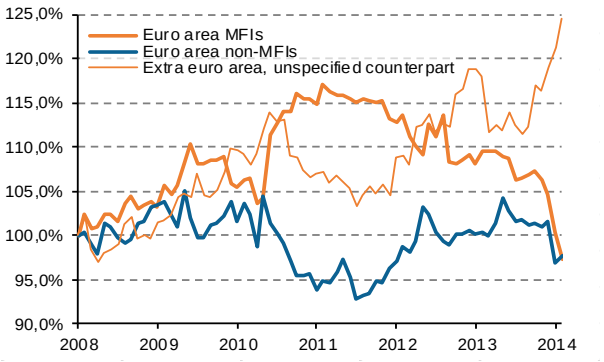
Source: ECB and own calculations

Chart 3.6: Total equity securities held by type of issuer and currency, euro area MFIs, excluding the Eurosystem

Equity securities held, billion EUR



December 2008 = 100



Source: ECB and own calculations

Between 1997 and 2008, euro area banks increased their holdings of equity securities in all three categories of issuers illustrated in Chart 3.6. Equity securities issued outside the euro area experienced the largest average annual increase (+18.3 %).

Between 2008 and 2014, banks continued to increase their holdings of equity securities issued outside the euro area, but the pace of growth decreased compared with the pre-crisis period and was equal to +3.3%. On the other hand, banks' holdings of equities issued by non-MFIs domiciled in the euro area decreased by 0.4 % on average.

3.3. Analysis of changes to the liabilities side of bank balance sheets

Capital and reserves have continuously increased year-on-year throughout the period. The average annual growth rate was higher prior to 2008 (+9.0 %), compared with the 2008-2014 sub-period (+5.3 %) (see chart 3.7).

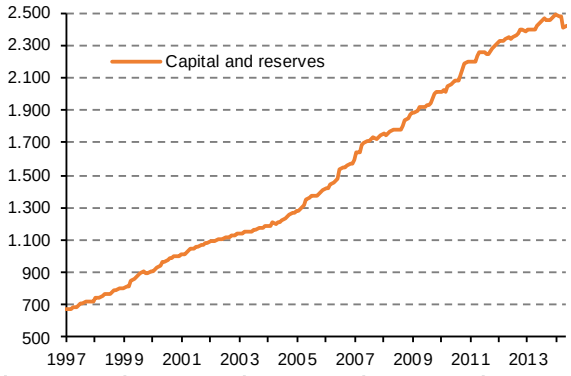
The increase in the volume of capital and reserves is partially explained through the State aid received by several banks. Between 1 October 2008 and 1 October 2014, the Commission took more than 450 decisions authorising State aid measures in the financial sector. The aid granted represents a maximum (contingent exposure) aid of 1 288 billion EUR (10.3 % of EU 2008 GDP) for guarantees on bank debt and a total (cash expenditure) aid of 671 billion EUR (5.4 % of EU 2008 GDP) in recapitalisation measures.[11] In every instance, the Member States could only provide State aid under the conditionality of restructuring of the bank benefitting from such aid in order to ensure its return to long term viability; as well as burden sharing and addressing competition distortions.

Prior to 2008, the volume of debt securities issued by banks in the euro area increased by 8.1 % on average, while between 2008 and 2014 it dropped by 2.7 % on average (see chart 3.8). Before 2008, the volume of total deposits in euro area banks increased on average by 7.2 %, while average annual growth decelerated thereafter (+0.1 % from 2008 up to 2014) (see chart 3.9).

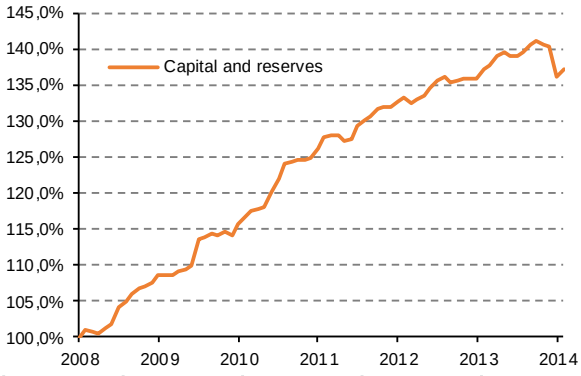
[11] See Adamczyk and Windisch (2015).

Chart 3.7: Total capital and reserves, euro area MFIs, excluding the Eurosystem

Capital and reserves, billion EUR



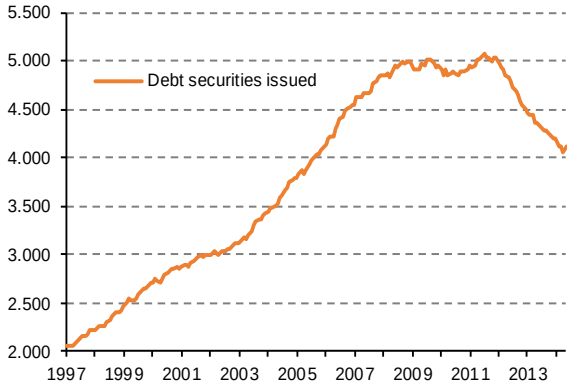
December 2008 = 100



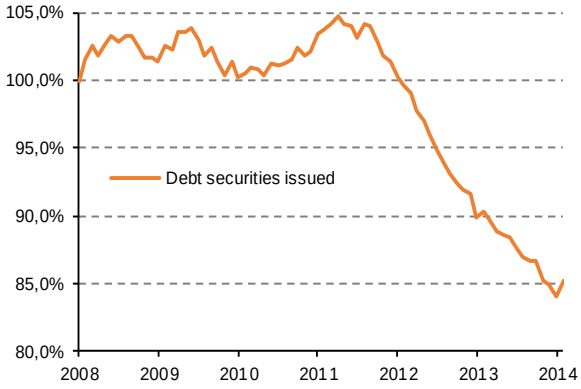
Source: ECB and own calculations

Chart 3.8: Total debt securities issued, euro area MFIs, excluding the Eurosystem

Debt securities issued, billion EUR



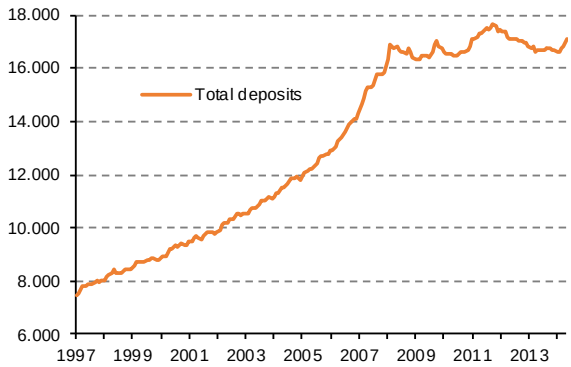
December 2008 = 100



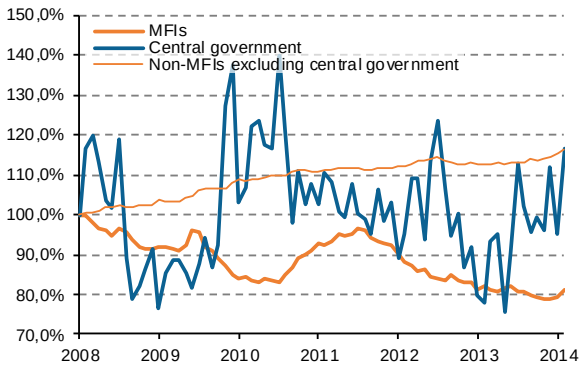
Source: ECB and own calculations

Chart 3.9: Total deposits and breakdown by counterpart sector, euro area MFIs, excluding the Eurosystem

Total deposits held, billion EUR



December 2008 = 100



Source: ECB and own calculations

The changes in the volume of deposits provided by different counterpart sectors varied. Prior to 2008, average annual growth rates were positive in all three categories, with the largest increase being in deposits by MFIs (+7.8%). After 2008, the volume of deposits from MFIs decreased on average by 3.6% each year up to 2014, whereas the volume of deposits from non-MFIs (excluding central government) increased the most during this sub-period (+2.4% average annual growth rate).

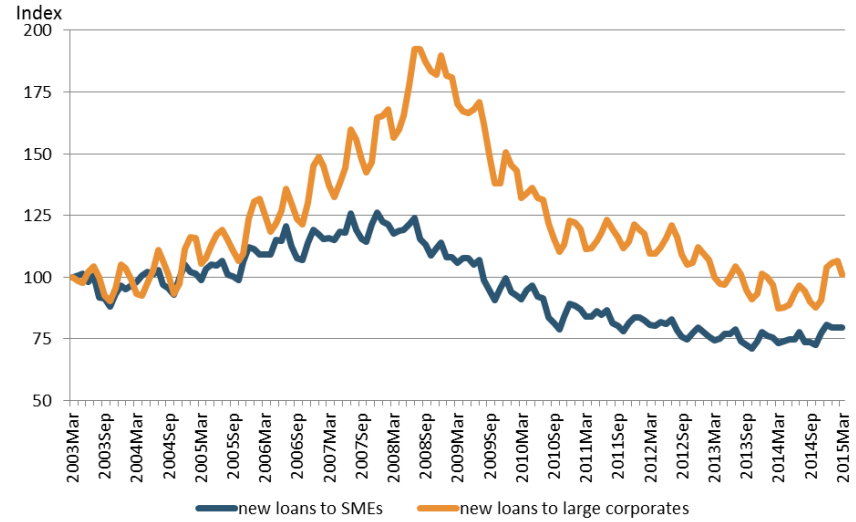
3.4. Concluding remarks

Before the financial crisis, aggregate bank balance sheets in Europe grew by 18 488.1 billion EUR, vastly outweighing the increase in customer loans on the asset side (+9 603.7 billion EUR). This expansion of balance sheets can be partially attributed to increased intra-financial business and banks building up their asset inventories in relation to their trading activities.

At the end of 2014, loans made by euro area MFIs to households and non-financial corporations made up only 30.4% of their aggregate balance sheet. The relationship between changes in the size of banks' balance sheets and the provision of loans to the economy is therefore not evident. Balance sheet reductions can be achieved without reducing real economy lending, for example through reductions in intra-financial system exposures and by cutting lengthy intermediation chains.

This is not to say that the crisis did not slow down the aggregate flow of credit to the economy. With the onset of the crisis, the growth in bank loans observed prior to the crisis stopped markedly, with a particularly sharp reversal in the trend observed for lending to non-financial corporations (see chart 3.10).

Chart 3.10: New bank lending to SMEs and larger corporates (March 2003=100; three-month moving average)



Note: SME loans proxied by loans up to and including EUR 1mn; loans to large corporates proxied by loans over EUR 1 million.
Source: ECB MFI interest rate statistics.ource:

The change in aggregate bank credit patterns partly reflects corrections of pre-crisis excesses. As explained in the next chapter, before the crisis, banks were operating with levels of capital and liquidity resources that were insufficient to absorb solvency and liquidity shocks. There was a general mispricing of risks in the market. Credit seemed abundant, but this abundance turned out to be unsustainable and contributed to the crisis. Ultimately it resulted in banks and other parts of the financial system being unable to carry out their critical economic functions. Therefore, pre-crisis credit provision cannot serve as a benchmark, since credit at that time was often excessive and credit intemediation rested on weak foundations.

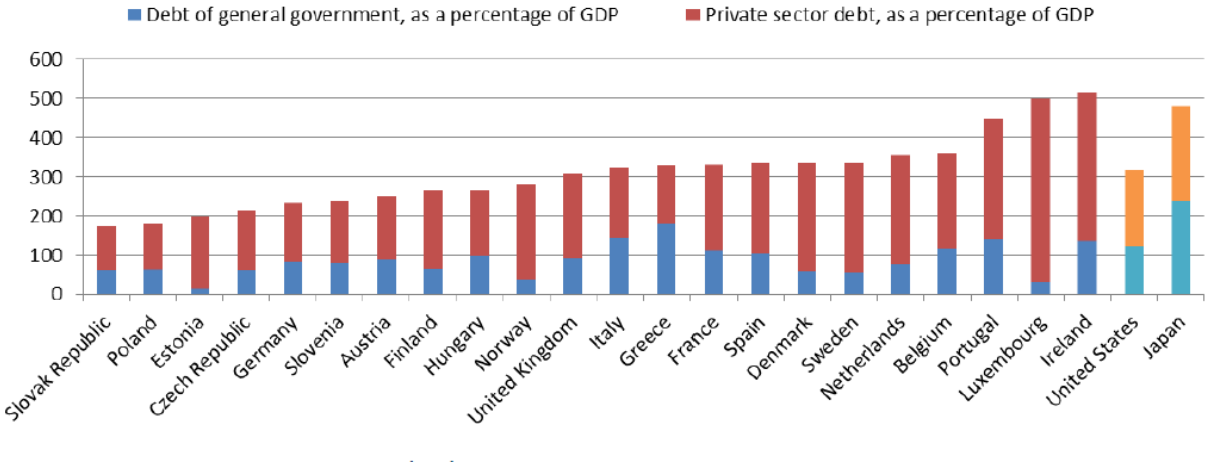
The lack of credit since the onset of the crisis, especially in stressed economies, reflects the interplay between:

A) **Constrained credit supply** – because bank balance sheets are still weak resulting from excessive leverage (debt overhang), legacy assets and high levels of non-performing loans; and because raising significant amounts of bank equity in primary markets (rather than through bank profit retention) can be difficult under the relatively weak economic circumstances;

B) **Low credit demand** stemming from the excessive indebtedness of firms[12] and households, as well as due to generally weak economic conditions and growth expectations.

While banks have tightened credit conditions since the start of the crisis (with some improvements recently), reductions in credit have also been significantly driven by lower demand. Europe's economy is highly indebted. **Public and private sector debt is high and one may argue that, in many cases, both excessive and unsustainable** (see chart 3.11).

Chart 3.11: Debt of general government and private sector debt as a percentage of GDP (EU–OECD countries, USA and Japan, end of 2013)



Source: EBA; Risk assessment of the European Banking system; June 2015

[12] Although not part of the financial regulation agenda, it should be noted that in order to address the corporate debt overhang problem the European Commission has issued a Recommendation for a new approach to business failure and insolvency, setting out best practice principles to enable the early restructuring of viable enterprises and to allow bankrupt entrepreneurs to have a second chance (C(2014) 1500).

Credit demand is held back not only by weak economic activity, but also low investment, borrowers' risk and persistently high levels of economic uncertainty. Recent ECB bank lending surveys suggest that these demand factors hamper credit significantly.

There does not seem to be a general credit shortage in Europe (thanks to large-scale public intervention and central bank liquidity support). In fact, nominal and real interest rates are extraordinarily low and financing is very cheap in many parts of Europe. Nonetheless, there are some important areas of concern in credit supply: the first is access to finance for SMEs, which tend to be especially dependent on bank finance, less able to tap alternative funding sources, and usually face higher lending rates. Consumers, in particular more vulnerable ones, face similar problems when trying to access credit. Where short-term and low-value lending are concerned, financial institutions, which do not have the status of credit institutions and thus are not subject to prudential regulation, often fill the gap in credit supply. However, this usually implies a higher cost of lending and may also result in consumers potentially being exposed to unfair commercial practices. Much of the underlying problem in SME finance comes down to credit information. That is to say, potential providers of finance find it difficult to assess the quality of the borrower and acquiring such information would be costly. These issues related to non-bank lending to SMEs are currently being examined by the Commission within the framework of the Capital Markets Union plan – one of the top priorities for the Commission[13].

The second area of concern is **that costs of and access to finance differ significantly across the EU and within the euro area in particular. This reflects the ongoing challenges of adverse feedback loops between the banking sector, sovereign debt and the economy in the euro area countries under stress.** Although sovereign debt problems have somewhat eased, significant challenges remain.

In the Member States under stress – Greece, Spain, Ireland and Portugal – weak banks with thin buffers and relatively high funding costs have been exacerbating the problems in the real economy by tightening credit conditions, rationing credit and increasing interest rates on new loans. At the same time, weaknesses in the real economy have compounded the problems of weak banks. The corporate sector (and in some countries the household sector) is heavily indebted, and this high leverage has interacted with weak profitability to create debt-servicing difficulties. This, in turn, has led to an increase in non-performing loans, worsening the assets on bank balance sheets. Banks with weak balance sheets are less able and willing to recognise losses and thus become more likely to forbear on loans.[14] Widespread forbearance poses the risk that banks will devote scarce resources to unhealthy corporates ('zombie' firm lending), thereby crowding out lending to healthier and more productive firms.

[13] http://ec.europa.eu/finance/capital-markets-union/index_en.htm

[14] See analysis of the interaction between weak banks and weak corporates in IMF Global Financial Stability Report 2013.

Breaking this vicious feedback loop requires tackling both weak bank balance sheets and debt overhang in the economy. The required orderly deleveraging will take time and presents significant transition challenges. As already noted, this is why many rules are phased in over time and why continuing monitoring is required to address any unintended consequences, given the on-going adverse market conditions.

In the aftermath of the crisis, banks have undertaken measures to strengthen their balance sheets in order to comply with regulatory requirements.The above discussion illustrates that the evolution of bank lending since the start of the crisis is not only (or even mainly) driven by regulation.

Chart 3.12 provides a summary of the changes to the assets and liabilities sections of euro area banks' balance sheets after the crisis. The differences are calculated on the basis of the volumes between 31 December 2008 and 31 December 2014.

Chart 3.12: Summary of changes to euro area MFIs' balance sheets, 31/12/2014 compared to 31/12/2008

Difference between 31/12/2014 and 31/12/2008			
Assets (bln EUR)		Liabilities (bln EUR)	
Loans	**308,5**	**Capital and reserves**	**639,1**
NFCs	*-551,9*		
General government	*144,1*		
Households	*314,8*		
Financial corporations	*73,3*		
ICPFs	*23,7*		
Credit for consumption	*-70,2*		
Mortgage lending	*374,7*		
Debt securities held	**-84,3**	**Debt securities issued**	**-772,0**
MFIs (euro)	*-552,3*		
MFIs (non-euro)	*3,0*	**Deposits**	**72,8**
General government (euro)	*596,2*	*MFIs*	*-1.418,1*
General government (non-euro)	*6,9*	*Central government*	*-9,2*
Non-MFIs (euro)	*-132,9*	*Non-MFIs excluding central government*	*1.500,0*
Non-MFIs (non-euro)	*-5,3*		
MMF shares/units	**-57,7**	**MMF shares/units**	**-366,8**
Equity and non-MMF shares/units	**35,5**		
Euro area MFIs	1,4		
Euro area non-MFIs	-24,5		
Extra euro area, unspecified counterpart	58,5		
Non-financial assets (incl. fixed assets)	**-10,9**		
Remaining assets and cash	**-354,2**	**Remaining liabilities**	**845,4**
External assets	**-459,8**	**External liabilities**	**-1.041,3**
TOTAL ASSETS	**-622,8**	**TOTAL LIABILITIES**	**-622,8**

Source: ECB and own calculations

Total banking assets in the euro area have decreased by 622.8 billion EUR. Loans have increased overall from December 2008 to December 2014 (+308.5 billion EUR), mainly driven by loans to households (+314.8 billion EUR) and housing loans (+374.7 billion EUR). Loans to sovereigns also increased (+144.1 billion EUR) while lending to non-financial corporations retrenched by 551.9 billlion EUR.

On the liabilities side, capital and reserves expanded by 639.1 billion EUR, while the volume of debt securities issued was down by 772 billion EUR.

4. Analysing the effect of strengthened capital ratios

This chapter begins with a basic justification for imposing minimum bank capital requirements. It then presents how minimum bank capital requirements have evolved over a long period of time and compares them with the equity ratios of non-banks. It documents the increase in minimum bank capital requirements following the financial crisis and the corresponding post-crisis trends in EU bank capital levels. It explores the ways banks have adjusted to the increased capital requirements. Moreover, it examines how borrower rates have evolved since the crisis. This chapter concludes with an analysis of the expected and actual impact of increased capital requirements and capital levels on the real economy (i.e. on growth, jobs and lending).

4.1 Justification for imposing minimum bank capital requirements

Banks play an important role in society. By helping individuals save and invest for their future, they channel savings towards their best use, provide lending to households and businesses in the process, and support the economy. Banks also play a key role in facilitating payment transactions. Moreover, modern banks help corporations and households insure themselves against liquidity and other risks.

By performing these key functions, banks ensure a well-functioning financial system that contributes to economic growth and job creation. Nevertheless, potential depositor and short-term creditor runs on directly and indirectly connected banks make the banking system fragile and prone to confidence crises. Hence, to support the essential work of banks and consumers, public authorities have established safety nets, such as deposit guarantee schemes and lender of last resort facilities.

While these safety nets bring many benefits, they could encourage banks and their management to engage in excessive risk taking (moral hazard). Given their limited liability, bank managers and shareholders have an incentive to maximise private returns in the good times at the expense of public support in the bad times. As a consequence, public authorities have established countervailing measures and remedies, including imposing minimum bank capital requirements which among others aim to prevent market failures:

- Firstly, **with lower capital, a bank's management can increase the return to shareholders by increasing its leverage at the expense of increasing the risk of contagion and the probability of a systemic crisis**. Since the risk of financial instability and contagion arising due to low capital levels is not internalised by banks, government intervention is needed. Without it, risk-taking would be too high, as would non equity-funding; the financial system would be instable. Bank capital must stand at levels beyond what is privately optimal to ensure the costs and benefits for society as a whole are balanced. Imposing minimum bank capital requirements helps restrain moral hazard considerations driving risky activities on the part of banks. More generally, the greater willingness of poorly capitalised banks to reinforce volatility and exacerbate booms and busts is well-known. Kapan and Miniu (2013) analyse the

relation between bank balance sheet strength (i.e. higher capitalisation) and the impact of financial shocks and their transmission. In particular, they analyse the international bank lending channel, by exploiting the variation in banks' reliance on wholesale funding, their structural liquidity positions and their level of capitalisation in Q2 2007 to estimate their impact on the supply of bank credit. **The paper shows how banks with stronger balance sheets were better able to maintain lending during the crisis.** In particular, banks with higher and better-quality capital mitigated the impact arising from being ex-ante dependent on market funding and lower structural liquidity in their supply of credit. Jimenez, Ongena, Peydró and Saurina (2014) show how lowly capitalised banks tend to grant more loan applications to (ex-ante) riskier firms than highly capitalised banks when the macroeconomic environment is benign. Moreover, when granting loans to these firms, lowly capitalised banks commit more credit and require less collateral, even if their granted loan applications face an overall higher likelihood of future default. Furthermore, such poorly capitalised banks also tend to restrict credit more sharply when external conditions become more challenging.

- Secondly, credit supply may be constrained. **Banks with low capital levels encounter difficulties raising new capital in order to lend or to engage in positive net present value projects.** This is because the benefits of doing so would mainly benefit bank creditors, rather than managers and shareholders (debt overhang). In addition, with low capital levels, creditors might be concerned about the bank's financial health and refuse to provide it with credit. In a stress situation, bank management prefers to reduce illiquid assets,[15] as they require more capital to hold for the associated risks. Banks therefore cut the supply of new loans to non-financial firms or adjust their risk premium on existing loans accordingly, thus hampering investments, economic activity and job creation.
- **Low capital levels limit the ability of public authorities to ensure that a bank's losses do not spill over onto the rest of society.**[16] Bank capital is the private guarantee of a bank's financial soundness. It ensures it can absorb losses that are higher than expected. In this way, bank capital protects taxpayers from having to bear a banks' unexpected losses.

To summarise, regulators need to establish minimum levels of capital required for banks to absorb potential losses, preventing banking problems from spreading to the rest of the economy. The benefits of a well-capitalised banking system in terms of lower probability and

[15] During times of stress, further negative externalities may arise, as made evident during the crisis. For instance, when a bank under stress needs to liquidate assets rapidly, it will do so at below market prices to expedite the process. This will also affect negatively the value of similar assets held by other banks. A sell-off by banks under stress therefore imposes costs on other market participants, putting pressure on their capital position and forcing them to liquidate their assets too. This in turn pushes asset prices down further and a vicious cycle is set in motion.

[16] Expected losses should be covered by provisions and the income generated by the institution.

cost of financial crises and the resulting lower macroeconomic volatility are well recognised and have been analysed in a large number of studies.

A principles-based approach characterised EU financial regulation prior to the crisis and became embodied in the principle of minimum harmonisation, i.e. setting minimum requirements for prudential supervision. It was up to EU Member States and their supervisory authorities to apply and enforce prudential requirements. The directives empowered them to take any extra steps they considered necessary to safeguard the resilience of supervised banks and the financial stability of the banking system as a whole.

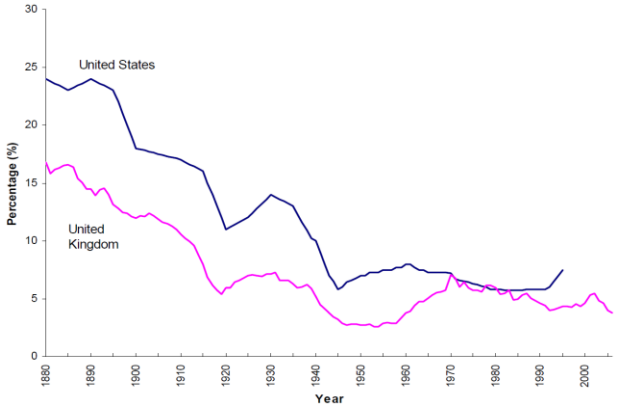
4.2. Bank capital levels over time and compared with other industries

It is important to understand banks' current levels of equity, both in relation to previous decades and compared to other industries or sectors in the economy.

Long time series evidence regarding bank capital levels

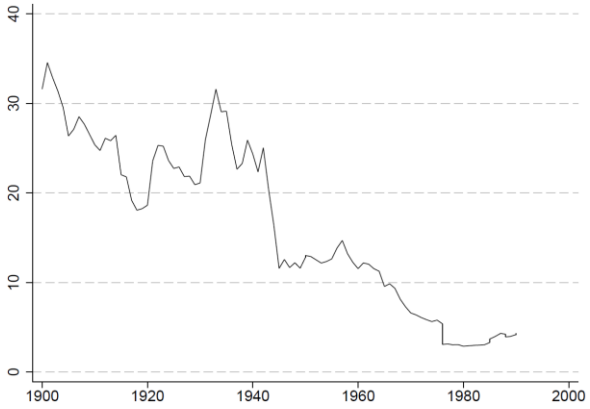
Charts 4.1 and 4.2 present equity ratios of banks throughout history. The charts illustrate that book equity ratios have declined significantly in the decades running up to the financial crisis.

Chart 4.1 UK and US bank book equity ratios: from 1880



Sources: USA: Berger, Herring, and G. Szegö (1995). UK: Billings and Capie (2007), Sheppard, D (1971), BBA.

Chart 4.2 Dutch bank book equity ratios: from 1900



Sources: Bonner, and Hilbers (2015).

Comparative or cross-sectional data: comparing book equity ratios of banks to non-banks

Different industries work with different levels of equity. Table 4.1 makes evident that differences between banks and non-banks levels of equity are surprisingly large. Whereas the aggregate book capital ratio (equity over total assets) amounts to 6.4% for financials, equity ratios for non-bank sectors range between 30% and 47% and are at least 5 times as high as those for financials (end 2012 data). The average book equity ratio for the average top 10 banks (4.6%) are even lower than the average for the entire financial sector. Somewhat

paradoxically, banks have capital ratios that are only a fraction compared to capital ratios of non-financials, despite having balance sheets that dwarf those of non-financials (Table 4.2).[17]

Table 4.1: Book equity ratios across sectors (2012 data)

Financials	**6.4%**
All sectors (un-weighted)	**27.2%**
Utilities	**29.8%**
Consumer	**33.8%**
Telecom	**35.3%**
IT	**38.4%**
Energy	**43.1%**
Materials	**43.8%**
Healthcare	**47.3%**

Source: CapitalIQ, own calculations, 3238 EU companies with balance sheets >1 billion euro

Note that bank balance sheets are far larger than non-bank balance sheets whilst having significantly lower book capital (acting as a cushion to absorb losses). For instance, HSBC, one of the largest EU banks, has a balance sheet that is more than 6 times as big as the largest EU non-bank (Volkswagen), but has an equity buffer to absorb shocks that is 4 times as small.[18] Moreover, ESRB (2014) illustrates that the growth, as a percentage of GDP, of the aggregate EU bank balance sheet in the period 1996-2012 has been almost entirely due to the rapid growth of the 20 largest EU banking groups.

Table 4.2: Average balance sheet size top 10 companies per sector, 2012 data, million euro

Financials	**1698049**
Utilities	**116089**
Energy	**103008**
Consumer	**99352**
Telecom	**75505**
Materials	**56978**
Healthcare	**35529**
IT	**17306**

Source: CapitalIQ, own calculations

[17] Mian and Sufi (2014) focus on issues raised by the fact that banks' equity (or capital, in regulatory terms) is senior vis-à-vis households and non-financial corporations equity and the problems this raises and has raised in the context of the US crisis with respect to ensuring banks have enough capital levels to absorb losses. The most significant consequence of the above is that NFCs and HHs' equity effectively represents a first loss threshold for banks. As Mian and Sufi (2014) forcefully argue, this structure presents several shortcomings for banks' due diligence, risk management, and ultimate responsibility in their lending and investment practices. That is, banks can issue low levels of equity because of the explicit cushion represented by NFCs' and HHs' equity.

[18] There are only 4 non-financials in the top 100 EU firms in terms of balance sheet size: Volkswagen, Shell, EdF, and BP (with ranks 72, 82, 86 and 90, respectively). All other 96 companies are financials. The average size of a top-10 bank balance sheet is 1700 billion euro, whereas the utilities sector ranked as second is characterised by companies which are on average 15 times as small.

The coexistence of large balance sheets with relatively low shock absorbers for banks compared to non-banks can be related to the ability and willingness of banks to expand and leverage up. The ability of banks to expand and leverage up can be explained as follows:

- Financial innovation (securitisation, etc.), but also deregulation and globalisation allowed bank balance sheets to grow aggressively since the 1970s, significantly outpacing GDP growth.
- Another factor explaining the difference in size and leverage is the lack of market discipline enjoyed by banks compared to non-banks, given the explicit and implicit public safety nets that have been put in place, notably deposit guarantee schemes, but also too-big-to-fail implicit subsidies which effectively shield depositors and creditors against losses and which allow for artificially rapid expansion and risk-taking.
- A third factor has been risk-based Basel capital requirements, which has allowed banks to expand procyclically and rapidly and which gave insufficient weight to liquidity risk and to systemic risk.

Moreover, the willingness of banks to expand and leverage up can be explained as follows:

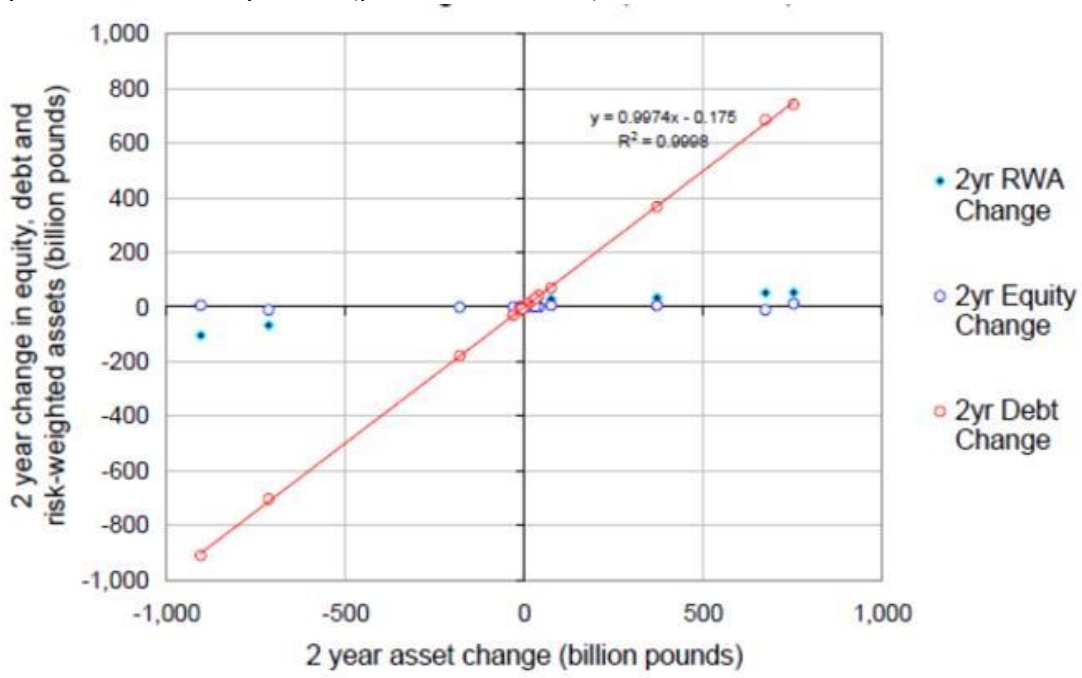
- Greater leverage and bank size allows banks to increase their return on equity (and hence dividends, bonuses, etc.).
- Greater leverage and size allows banks to privatise gains and socialise losses, i.e. to make the payoffs from their activities asymmetric.

In the decade prior to the financial crisis, regulators promoted certain bank activities, such as issuance of asset-backed securities (ABS) and securitisation through what clearly inadequately low risk weights, based on the belief that securitisation would generate more economic growth and more financial stability (dispersion of credit risk to those that can bear it, rather than on leveraged bank balance sheets), and other benefits (price discovery, tailored risk return possibilities, etc.).

Chart 4.3 shows that large banks typically expand their balance sheet by increasing the issuance of (short-term) debt, whilst keeping equity more or less stable over time. Interestingly, risk-weighted assets are (significantly) more stable compared with total assets, as corroborated by Charts 4.4 and 4.5.

Inefficient firms should fail and exit the market in order for there to be effective competition. However, for a number of reasons, this has often not been the case with respect to banks. This is partly because normal insolvency regimes are not suited to deal with bank failures. A bank cannot work through a bankruptcy proceeding as a non-financial corporate: as a general rule, it cannot obtain temporary protection from its depositors and creditors that is vital for banks to ensure continuity in the provision of payment services which are critical to society. As a result, if a bank failure occurs, it is likely to disrupt society and the economy at large far more than is the case with a non-financial corporate. Thus, governments have often intervened to avoid bank failures and provided public support.

Chart 4.3: Plotting total asset dynamics versus equity, debt and risk-weighted asset dynamics for Barclays Bank (period 2011-2012)



Source: Bankscope data

PWC (2015) states that 'there is a large degree of scepticism as to whether banks have genuinely reduced the riskiness of their assets. Have they been taking advantage of the discretion regulators allow them to adjust their internal model-based approaches? The ECB admits it was 'difficult to assess to what extent the asset shedding has led to a true de-risking of balance sheets'. No wonder: the central bank found that the decline in RWAs as a share of total assets at the banks it tracks ranged from 16 % to 85 %. The EBA added that the flexibility banks have to tweak their risk models 'may in some situations raise concerns as to whether related improvements in capital ratios adequately address the assessment of risk'.'

Chart 4.4: Commerzbank — Evolution of assets and risk weighted assets

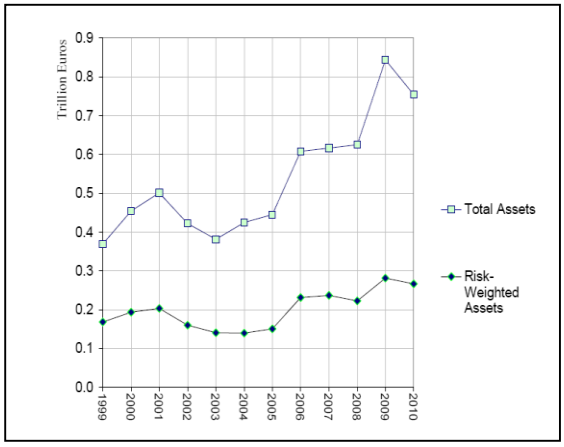
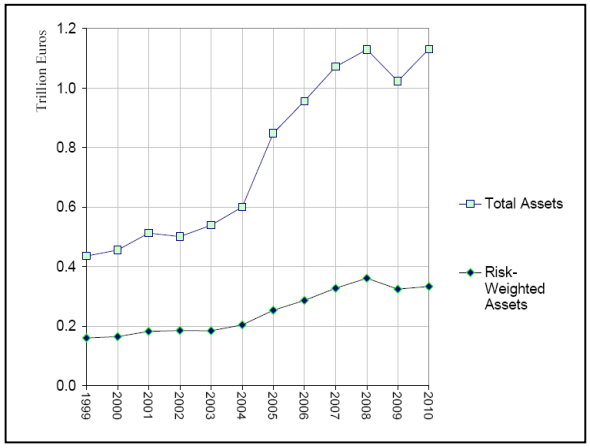


Chart 4.5: Société Générale — Evolution of assets and risk-weighted assets



Source: Bankscope data.

Given the low bank capital ratios (both from a historical perspective and compared with other sectors) and given the scope for financial panic following disorderly bankruptcy, it should not come as a surprise that European governments provided significant state aid to the financial system to prevent its collapse.[19] The Commission authorised a total aid of almost 1.3 trillion EUR between 2008 and 2014 (i.e. more than 10 % of EU 2008 GDP). Of this, **capital support measures alone (recapitalisation and asset relief) account for about 671 billion EUR (equalling 5.4% of EU 2012 GDP). This cumulative amount is equivalent to one third of the total equity held by EU banks as of the end of 2008: i.e. EUR 1.8 trillion.**[20]

4.3. Increased minimum bank capital requirements following the crisis

In 2010, and as a result of the obvious lack of quality capital in bank regulations made evident by the crisis, regulators through the Basel Committee on Banking Supervision (BCBS) significantly increased the quality and quantity of minimum capital requirements compared with those agreed in 2004. Carney (2014) states that risk-weighted CET1 capital requirements have been increased sevenfold or more (depending on whether buffer requirements are included or not), albeit from a very low level compared with the pre-crisis period (see Table 4.3).

Table 4.3: Basel III minimum capital requirements (2019, but de facto realised)

Minimum capital Requirements	(% of RWA)	Multiple of pre-crisis-requirement (Basel III interpretation)
Basel 2 (Basel 3 rigor)	1.0%	1 times
Basel 2 (CET1)	2.0%	2 times
Basel 3 (CET1)	4.5%	4.5 times
+ Capital conservation buffer	7.0%	**7 times**
+ G-SIB buffer	8 to 10.5%	8 to **10.5 times**
Countercyclical capital buffer	8 to 13%	8 to **13 times**

[19] Filing bankruptcy was not an option as it would give rise to financial panic and systemic risk. Special resolution regimes have been put in place in order to achieve an orderly resolution of failed banks outside bankruptcy.

[20] The above amounts represent ex-post injected capital. In particular, they do not reflect the pre-emptive levels of capital needed to avert future crises, mitigate systemic risk and address risk-seeking behaviour by management.

4.4. How do banks adjust to higher capital requirements: quantities

Channels of adjustment

A bank needing to increase its risk-adjusted capital ratio can do so through different adjustment strategies:

- Adjustment strategy 1 (increase numerator): The bank can retain earnings and build up reserves. It can retain earnings by reducing the share of profits it pays out to shareholders in dividends. Alternatively, it may try to boost profit. The most direct way to do this would be by increasing the spread between the interest rates it charges for loans and those it pays on its funding. Lending spreads would rise across the system if all banks followed a similar strategy and alternative funding channels (such as capital markets) did not offer more attractive rates. Other ways to increase net income include increasing profit margins on other business lines, such as custody or advisory services, or reducing overall operating expenses.
- Adjustment strategy 2 (increase numerator): The bank can issue new capital (equity), such as through a rights issue to existing shareholders, an equity offering on the open market or placing a block of shares with an outside investor. This is likely to be the least attractive option for bank shareholders, however, given that a new share issue tends to reduce the market value of the existing shares.
- Adjustment strategy 3 (reduce denominator): The bank can run down its loan portfolio or sell some of its assets and use the proceeds from loan repayments or asset sales to pay down debt. Alternatively, it can slow down its lending, such that retained earnings can catch up.
- Adjustment strategy 4 (reduce denominator): The bank can reduce its risk-weighted assets, either by replacing riskier loans with safer ones or with government securities; or try to reduce its risk weights by optimising its internal risk models.

It is important to realise that the chosen approach is likely to influence the macroeconomic impact of an increase in regulatory capital ratios. If banks reduce their dividend pay-outs or issue new shares (strategies 1 or 2), this may reduce the returns received by existing bank shareholders (although it should not necessarily reduce their risk-corrected returns), but would have little or no impact on the broader macro-economy. If banks choose, however, to slow down their lending or reduce their lending to risky projects (strategy 3), this could constrain investment and possibly consumption. Evidence that such a slowdown results from reduced bank lending supply rather than reduced loan demand by borrowers would emerge in the form of tighter bank lending standards.

Note that a slowdown is not necessarily undesirable for the macroeconomy in the medium run; a robust recovery in the aftermath of a financial crisis characterised by debt overhang requires legacy assets to be written off and overleveraged borrowers to pay down their debts. Balance sheet clean-up and shortfalls in aggregate demand may be part of a painful but necessary adjustment process. Takats and Upper (2013) find that declining bank credit to the

private sector does not necessarily constrain growth in the aftermath of a financial crisis, in cases where such a crisis followed a rapid increase in debt.

Observed adjustment

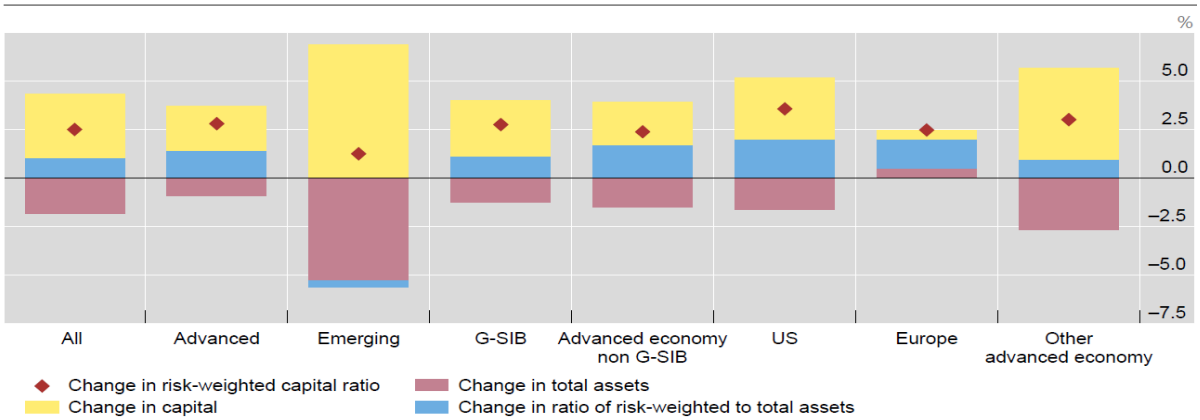
Cohen and Scatigna (2014) decompose and analyse the capital ratio in three parts: increases in capital (strategies 1 and 2 above), reductions in total assets (strategy 3), and reductions in RWA/TA ratios (strategy 4), following the decomposition:

$$\text{capital/RWA} = \text{capital}/((\text{RWA/TA})*\text{TA})$$

They find that the adjustment strategy across all 94 banks in the sample has primarily focused on adjustment strategies 1 and 2. Overall, two-thirds of the increased capital ratio levels in the period 2009-2012 originates from retained earnings with the remaining third coming from capital issuance (rather than from sharp reductions in lending or asset growth, In fact, total assets have grown significantly). More profitable banks have expanded assets and lending faster than others. However, this overall result is just the average across all banks in the sample and remarkable differences can be observed when examining banks from different regions.

In this analysis, **European banks (35 banks in the sample) perform relatively poorly compared with banks in the US and in other countries with advanced economies (see Chart 4.6). European banks have increased their capital ratios by 2.5 percentage points (pp) of risk-weighted assets between end 2009 and end 2012. The impact of the reduction in RWA factor (2.0pp) is four times as important as the increase in capital (0.5pp). This means that the increased ratio mostly reflects reductions in RWA and not increased capital.** This is somewhat worrying, given banks' pre-crisis track record of overly optimistic risk reporting.

Chart 4.6: Sources of changes in bank capital ratios (changes between end 2009 and end 2012, normalised as percentage points of end 2009 RWA)



The graph shows the change in the ratios of common equity to risk-weighted assets at the (fiscal-year) end of 2009 and 2012, respectively, in percentage points. The overall change is shown by the red diamonds. The components of this change are the terms on the right-hand side of equation (2) in the text, normalised by the ratio (b-a)/(ln(b) – ln(a)). All figures are weighted averages, using end-2012 assets as weights.

Sources: Bankscope; Bloomberg; BIS calculations.

Source: Cohen and Scatigna (2014)

US banks (16 banks in the sample) have increased their capital ratios by 3.6 percentage points between end 2009 and end-2012. The bulk of the increase reflects increased capital (3.2pp). The reduced 0.4pp RWA effect is a combination of increased total assets and an important reduced ratio of RWA to TA, the effect of which is more consequential than the downward effect of the increased TA. Note that the increased capital effect of 3.2pp is 6 times higher for US banks than for European banks.

Banks from other advanced economies (15 in the sample) increased their capital ratio by 3.0pp. This is the net result of a sharp increase in capital (4.8pp), a significant increase in total assets (impact of 2.7pp), and a small reduction in the RWA to TA ratio.

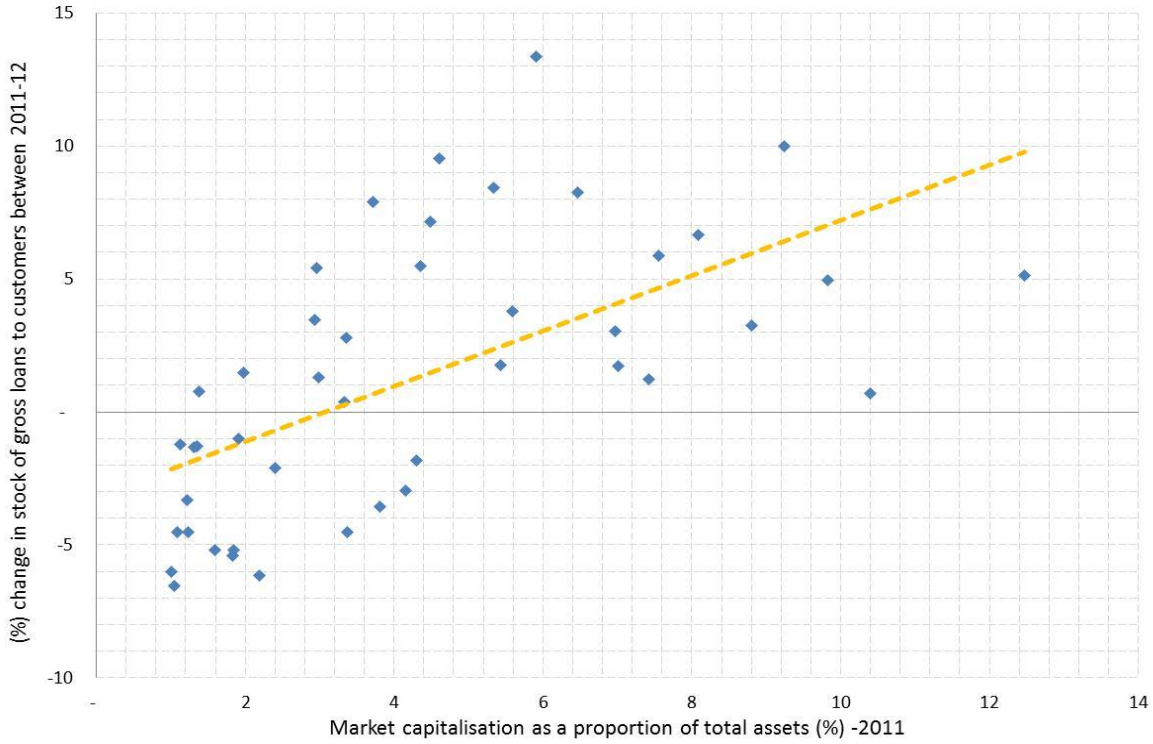
BIS (2014) and Caruana (2014) update the numbers for the period end 2009 to end 2013 rather than end 2012. Results and conclusions remain roughly the same. For the euro area, the chart suggests that the reduction in RWA is still significantly larger than the increase in capital levels, but that the observed reduction in RWA as such is driven more by total asset reduction than a RWA/TA ratio reduction, as was the case for the sample period until 2012.

Individual bank behaviour

The overall adjustment to higher regulatory capital ratios can be linked to a number of different factors. Moreover, it can arise from different banks across the distribution in the banking sector. For that reason, it is relevant to analyse not only what the average bank did (which is equivalent to the total banking system), but the behaviour of individual banks. In this regard, it is relevant to consider banks' (i) overall ability to provide credit, i.e. the level of credit; and (ii) their ability to provide credit irrespective of the economic environment, i.e. the volatility of credit.

Chart 4.7 presents some data concerning EU banks. In particular, it presents the relation between end 2011 levels of bank market capitalisation ratios (i.e. not regulatory capital ratios) and the subsequent change in the stock of loans over the period 2011-2012. The evidence presented bears out the importance and ability of well-capitalised banks to provide credit to firms and households. That is, the chart backs up the claim that higher capitalised banks, far from being an impediment to the real economy, actually reinforce it by providing funding.

Chart 4.7: Market capitalisation and loan growth



Source: Commission services and Carney (2013)

Buch and Prieto (2012) analyse the link between bank capital and bank loans in Germany during 1960-2010 and conclude that there is a positive long-term relationship between capital and lending. More specifically, a one percent increase in the level of bank capital is found to increase bank loans by about 0.22 percent. Similar evidence has been found in other empirical studies, where it appears that higher levels of bank capital are associated with higher lending and liquidity creation by large banks, bigger market shares and lower probabilities of default for banks, as well as higher bank values. However, an increase in regulatory capital requirements may be connected with small effects in terms of reduced lending, non-trivial transitional costs and a shift of lending from regulated to unregulated sectors.

The IMF (2012)[21] finds that higher economic growth and less growth volatility is linked to higher capital and liquidity buffers within banks. The effects of buffer variables are non-linear, showing the trade-off between economic growth and stability. But this trade-off becomes material only at very high capital levels: higher capital buffers up to a threshold of above 25% of total assets are all thought to have a positive impact on economic growth, and the relationship reverses only beyond that threshold.

Together, the above empirical evidence suggests that the main challenge banks face is not higher capital levels as such, but the transition away from excessive leverage and

[21] See IMF (2012) Global Financial Stability Report October 2012, page 158.

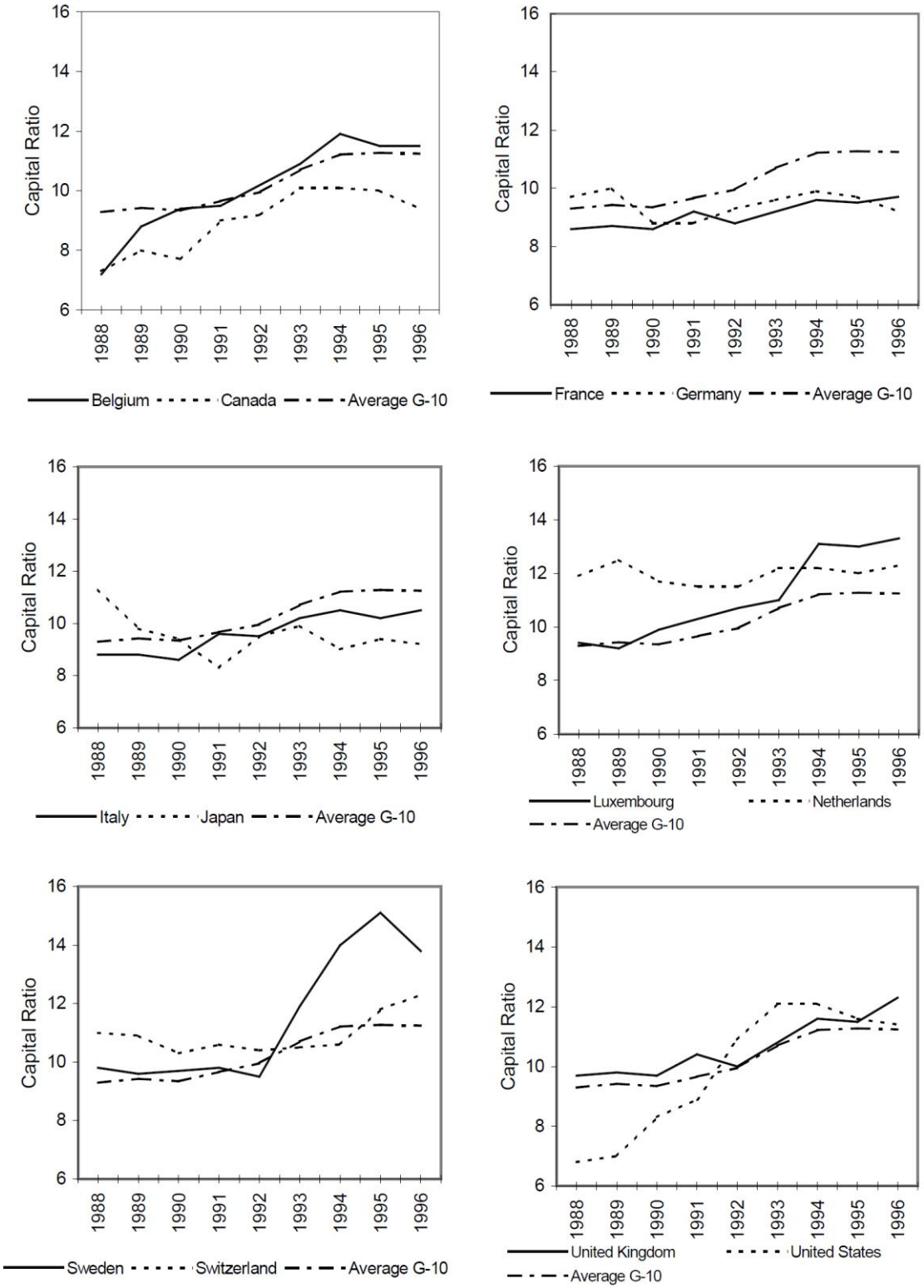
towards a more stable and safer banking system. The costs generated by the crisis constitute ample evidence for the need to move forward (with appropriate phasing-in and observations periods). As summarised in PwC (2013): 'There will be disruptions and adjustment costs, but concerns about economic viability under the additional capital load (including at product level) are unfounded — reduced leverage is bringing down the cost of bank equity and this trend will continue'.

Evidence coming from Basel I increases in minimum capital requirements

In view of the above, it is important to consider the impact of the increase in regulatory capital ratios of banks experienced in the G-10 economies between 1988 and 1996 as a result of the Basel I reform. It is useful to compare observed changes in regulatory capital levels now with previous instances where similar changes in the regulatory framework took place. In particular, the Basel Committee on Banking Supervision (BCBS) (1999), gathered evidence regarding such changes. Its objective was none other than to evaluate whether, as a consequence of the Basel I reforms, the adoption of fixed minimum capital requirements led some banks to maintain higher capital ratios than would otherwise have been the case and whether any increase was achieved by increasing capital or reducing lending.

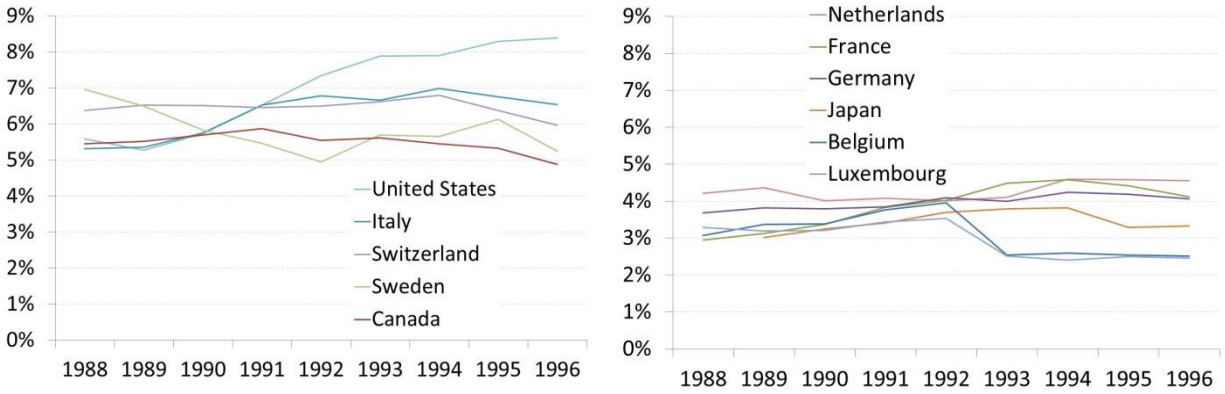
In this regard, data on the capital ratios of banks from Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Sweden, Switzerland, United Kingdom, and United States indicate that the introduction of the Basel Accord was followed by an increase in risk-weighted capital ratios in a number of countries. As a result, the average ratio of capital to risk-weighted assets of major banks rose from 9.3% to 11.2% between 1988 and 1996 in the G-10 economies (i.e. the above economies) (see Chart 4.8).

Chart 4.8: Observed bank regulatory capital ratios in the G-10 economies plus Luxembourg (associate member): evidence between 1988 to 1996.



Source: BCBS (1999) based on calculations by De Nederlansche Bank.

Chart 4.9: Evolution of bank capital ratios (capital and reserves over total assets) between 1988 to 1996 in the G-10 economies plus Luxembourg (associate member).

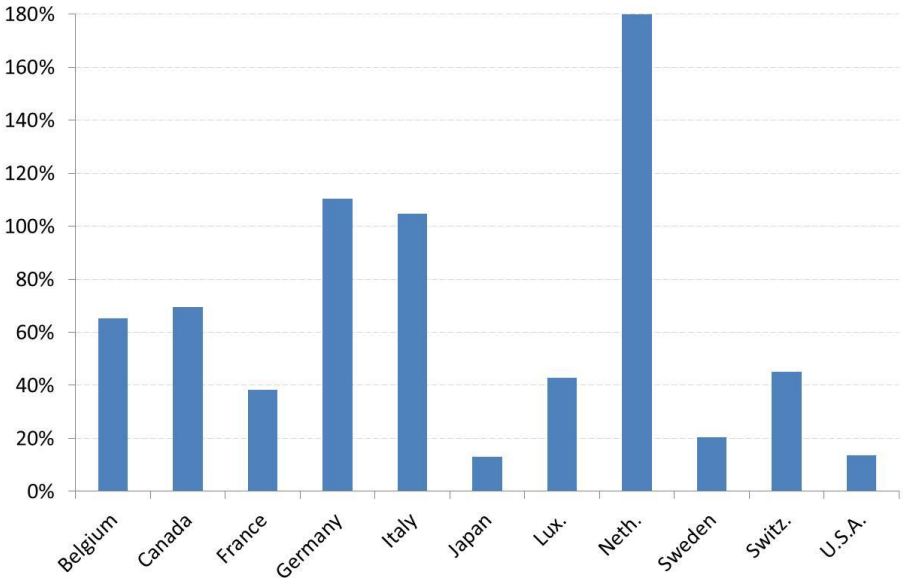


Source: OECD Bank Profitability Statistics.

The increase in the regulatory capital ratios of banks in the G-10 economies took place in a context where the ratio of capital and reserves over total assets did not experience such an increase (see Chart 4.9).

In particular, Chart 4.10 shows that in this case, far from experiencing a contraction, lending increased considerably. Moreover, the large discrepancies in lending growth between the different G-10 economies suggest that **a common increase in regulatory minima need not necessarily lead to a similar impact across banks nor is the single defining feature of the evolution in bank lending in a country during a given time period.**

Chart 4.10: Change in total loans experienced between 1988 to 1996 in the G-10 economies plus Luxembourg (associate member).



Source: OECD Bank Profitability Statistics.
Note: Japan beginning period refers to 1989.

4.5. How do banks adjust to higher capital requirements: prices

There is a general concern that increased capital requirements might increase the price of loans. This could therefore lead to lower bank lending to the economy and therefore might reduce economic growth.

It is feared that the transition to more and better capital could amplify concerns about funding costs by forcing banks, which are unable to raise capital from profits or external issuance, to restrain lending and/or sell assets rapidly.

The industry has argued that higher bank capital requirements can lower economic growth permanently and that the adjustment towards higher requirements would put a drag on the already slow recovery from the current crisis (e.g. Institute of International Finance 2010).

The issue can, in fact, be broken down into two aspects: (i) the rise in bank funding costs and (ii) the translation of higher funding costs into higher costs for bank borrowers.

Rise in bank funding costs

The idea of higher capital requirements is typically resisted by the industry, which argues that increasing capital requirements will raise the cost of capital and hence the cost of credit, causing serious damage to economic growth. This claim is, of course, at odds with the basic proposition of corporate finance theory — the Modigliani-Miller (1958) irrelevance theorem — which states that the cost of capital is independent of its debt-equity structure, under certain assumptions. The Miller and Modigliani irrelevance theorem states that a firm's capital structure (choice between debt and equity) does not affect the value of the firm. Put differently, there is no optimal capital structure (e.g. one with very low levels of capital and high levels of debt and deposits). However, the theorem assumes competitive and frictionless financial markets that are free of information and agency problems. Under those circumstances, it can be shown that the weighted average cost of capital will be unchanged following a change in capital structure.

Equity-holders require a greater return than bondholders because as first loss-bearers they face more risk. But as banks increase their equity/debt ratio, the risk of holding both equity and debt securities decrease to such an extent that the firm's weighted average cost of capital remains unchanged. Making more use of the relatively 'expensive' equity source of funding implies that debt and equity become less expensive, precisely to the extent that the weighted average cost of capital remains unchanged. In short, a bank's overall funding cost depends on the underlying value of a firm, not on the proportion of its funding that goes to debt and equity.

Opponents of higher capital requirements object that the Miller-Modigliani theorem does not apply in reality, and especially not to banks. There are two ways of responding to this:

- First, whether or not the Miller-Modigliani theorem applies, a bank that claims it must pay its shareholders a relatively high annual return on equity, when the risk-free rate is

close to zero, implies that it is a seriously risky bank. Therefore, it would be in a public interest to require these riskier banks to hold more capital in order to avoid a recourse to taxpayers' money in the event of a crisis.

- The second line of response is to recognise that the Miller-Modigliani theorem does not apply precisely. The question is then whether more realistic assumptions weaken or strengthen the conclusion that higher equity requirements on banks would not significantly increase costs. The key frictions that favour bank leverage are tax benefits and government guarantees (implicit and explicit). Taxes and implicit guarantees invalidate Miller and Modigliani's irrelevance theorem. However, neither friction is 'real', so to speak: these frictions are private benefits to banks, but not social benefits. They merely represent transfers from taxpayers. The government, and ultimately the public, are therefore (contingent) creditors of banks. Increasing equity then shifts risk back from the public finances to private investors, thereby increasing private funding costs. At the same time, the creditworthiness of the government improves, lowering government borrowing costs. The Miller-Modigliani theorem may therefore still hold when the impact on the public finances is taken into account. If these bank subsidies are beneficial, one can in principle replace them with subsidies that do not promote bank fragility. The key question to raise is whether 'real' frictions exist that justify high leverage for banks as compared with non-banks.

Miller (1995)[22] has, however, acknowledged that raising equity can be expensive, especially for smaller banks, if only due to the flotation and underwriting costs that are involved. The Miller and Modigliani theorem is a proposition that is concerned with having equity, as opposed to raising equity. Furthermore, stock offerings usually come at a discount, mainly due to the information asymmetry faced by potential investors who do not know the bank's real state as well as its management does.[23] In addition, there is a limit to the funds available for investment in bank stocks over a specific period of time, possibly requiring an even deeper discount to attract investors.

The post-crisis market conditions may make it particularly challenging to raise substantial amounts of bank equity, especially for the banks with weak balance sheets or subject to major litigation risks. Hence, **higher capital requirements could raise the overall cost of banks' capital, especially during the transition to higher standards. This, in turn, could have an impact on the lending rates to the extent that costs are passed through to clients. However, other regulatory initiatives incentivise banks to reduce the overall riskiness of their balance sheets, contributing to a general lowering of their cost of capital, so that the risk-adjusted return of both debt and equity investors may remain unchanged. Moreover, the new capital requirements are phased in over time, giving banks time to make the required adjustments and thereby limiting costs in the transition phase. On**

[22] See Miller (1995).

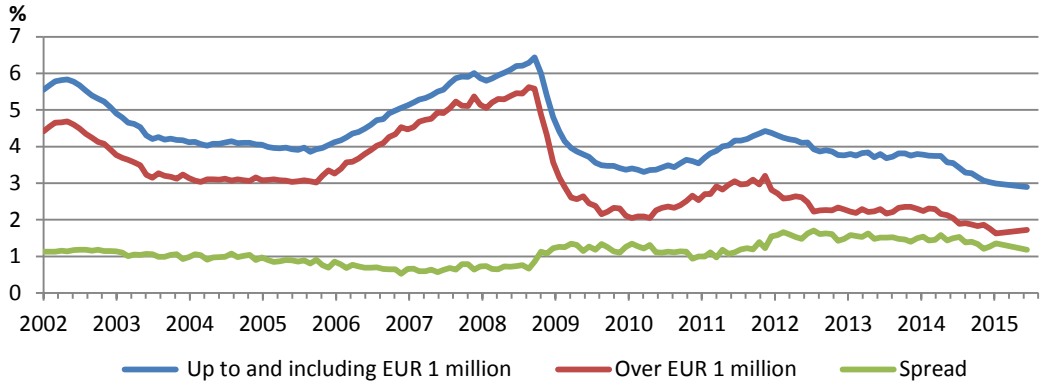
[23] Debt is exposed to this phenomenon to a much smaller extent, because it is insensitive to any variations in banks' future performance except for default, provided debt is held to maturity. The specific financial performance matters a lot to shareholders though.

balance, therefore, one should not expect any significant impact of higher capital requirements on banks' aggregate cost of funding and even less so on the lending rates.

Translation of higher funding costs into higher costs for bank borrowers

Policies implemented by regulators to address bank weaknesses might have affected banks' funding costs. Moreover, banks may have transfered part of these funding costs onto customers. However, in trying to understand the cost of lending by banks to customers it is important to bear in mind several other possible factors. One such factor is the monetary policy of central banks whereby key interest rates are frequently changed across the business cycle. Due to low interest rate environment resulting from ECB monetary policy, the average interest rates to non-financial corporatios in the euro area reached below pre-crisis levels (see chart 4.11) since 2009, despite increased bank spreads.

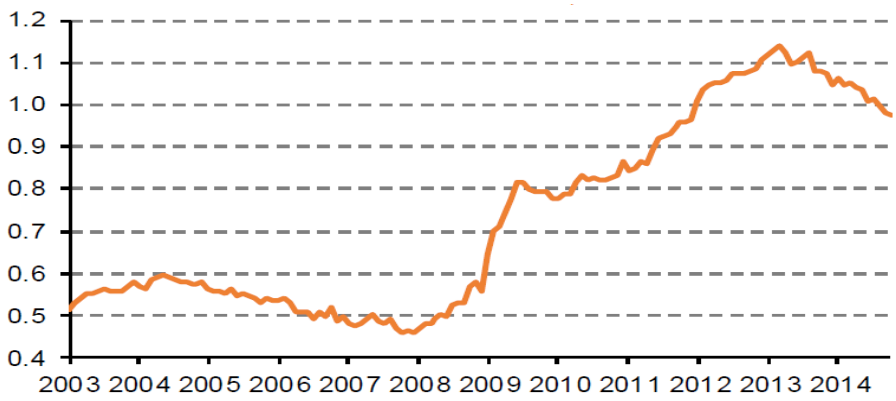
Chart 4.11: Bank interest rates to non-financial corporations in the euro area



Source: ECB Monetary and Financial Institutions Interest Rate Statistics

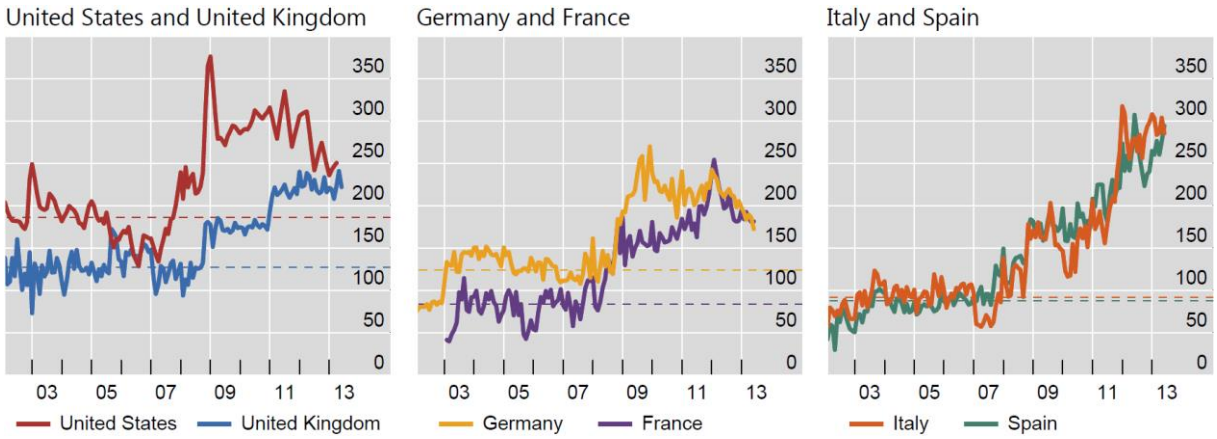
Nevertheless, the changes in the average interest rate does not hold true for Member States experienced stress, such as Cyprus or Spain, where bank lending rates to non-financial corporations were often higher in the aftermath of the crisis, especially during the peak of the sovereign crisis in 2011, in comparison to pre-2009 interest rates. The amount of the increased divergences in the funding conditions across Member States can be clearly seen from chart 4.12.

Chart 4.12: Dispersion of yields on loans to NFCs (standard deviation, euro area countries)



Source: European Commission, European Financial Stability and Integration Report April 2015

Chart 4.13: Spreads between rates on loans to non-financial corporates and the overnight interbank rate



Source: BIS (2013)

Borio and Fritz (1995) and Cottarelli and Kourelis (1994) have been among the pioneering studies in empirical analyses focusing on the pass-through of monetary policy to lending rates. Both found that the degree of competition and the structural characteristics of the banking systems are key ingredients of such transmission. In any case, whilst the determinants of bank margins and the subsequent ability of banks to absorb cost shocks (such as an increase in bank capital requirements) are relevant, research generally finds that price 'sticky-ness' and rigidities are pervasive and limit the ability of banks to pass on cost increases to clients.[24] This includes the ability to pass on costs coming from stricter banking regulation.

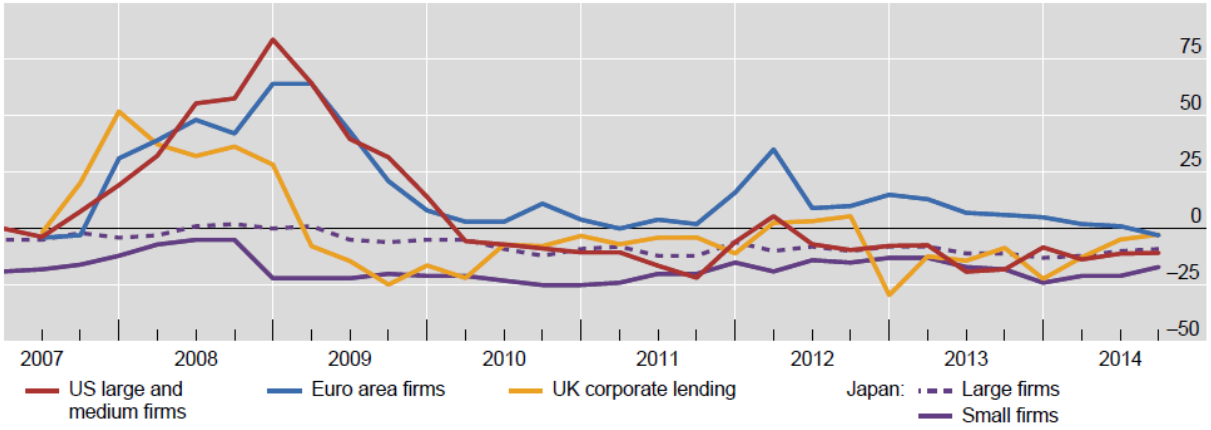
Illes and Lombardi (2013) and Gambacorta et al. (2014) analyse the transmission of policy rates and impairments that took place during the global financial crisis in France, Germany Italy, Spain, the United Kingdom, and the United States. For the euro area, the authors find that spreads between loans to non-financial corporates and policy rates differ substantially across countries (see Chart 4.13).

The authors estimate whether there is a long-term relationship between the lending rate and policy rates and try to establish whether there have been factors that have generated changes in such a relationship. In particular, the authors consider whether there has been a change in banks' pricing of their non-financial borrowers' credit risk. Such a (demand-driven) factor is captured (or, rather, proxied) by the delinquency rate. Still, following a balance sheet recession, banks themselves might be in need of repair, in particular to their balance sheets, and may have to adapt to new banking regulations. To control for such a (supply-driven) factor, the authors incorporate the information contained in Bank Lending Surveys.[25]

[24] See Carbó-Valverde and Rodríguez-Fernández (2007) and Schluter, Hartmann-Wendels, Busch and Sievers (2012).

[25] If banks choose to slow down their lending or reduce their lending to risky projects, this could constrain investment and possibly consumption. Tighter bank lending standards would constitute evidence that such a slowdown results from reduced bank lending supply rather than reduced loan demand by borrowers.

Chart 4.14: Banking lending standards: survey responses during 2007-2014 (net tightening in percentage points)



[1] 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.

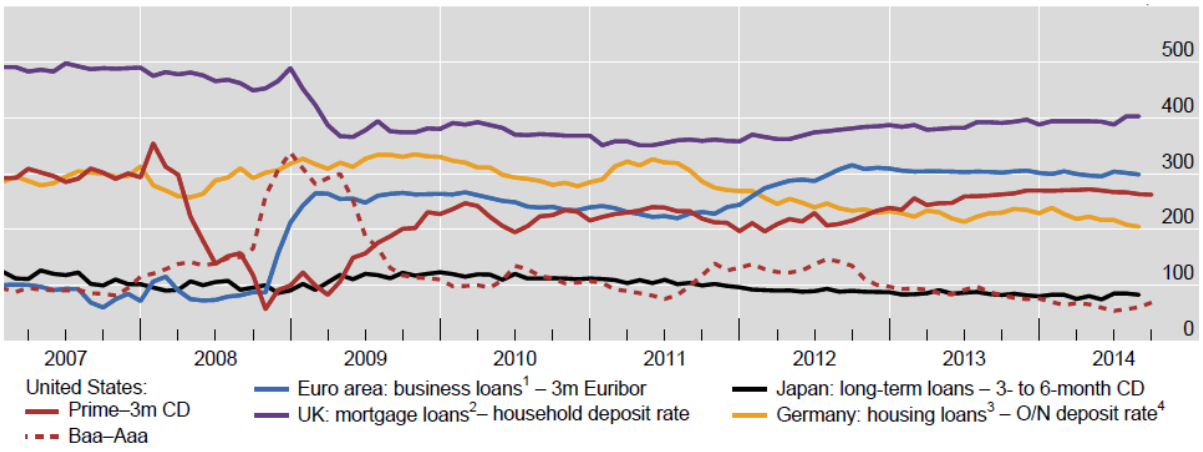
Source: Caruana (2014)

In this regard, it is important to realise that not all three factors are found to be significant:

- The policy rate always drives the lending rate of banks to their NFCs in all countries.
- The measure of changes in loan demand (including the risk coming from a bank's clientele) is always significant.
- Measures of changes in bank supply (including, possibly, banks' risk or banks need to reinforce their balance sheet due to regulatory or market pressures) are not always significant.

Chart 4.14 presents evidence on bank lending standards across time and regions. **The chart makes evident that lending standards did not tighten once higher capital requirements were announced and started to be implemented.**

Chart 4.15: Lending spreads in selected countries in the period 2007-2014 (basis points)

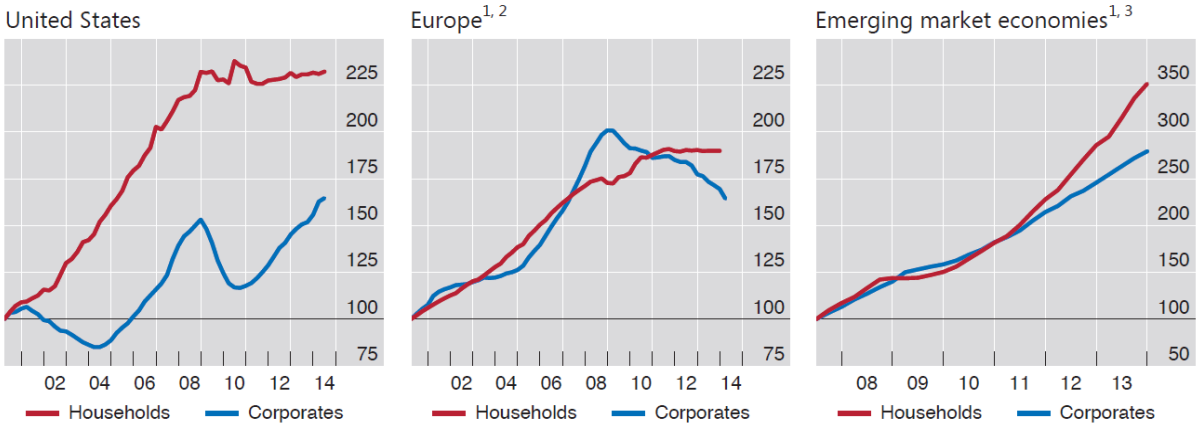


[1] One- to five-year business loans. [2] Variable rate mortgages. [3] One- to five-year housing loans. [4] Deposits of non-financial corporates.

Source: National data.

Source: Caruana (2014)

Chart 4.16: Bank lending to households and corporates in US, EU and emerging market economies in the period 2000-2014 (normalised to 100 in 2000)



[1] Weighted averages based on 2005 GDP and PPP exchange rates. [2] The euro area and the United Kingdom. [3] Argentina, China, Hong Kong SAR, India, Indonesia, Korea, Mexico, Poland and Russia.

Sources: Datastream; national data; BIS estimates.

Source: BIS (2014)

Again, chart 4.15 does not suggest there has been a significant increase across the board in lending spreads, as was initially feared and predicted by the banking industry and some other stakeholders. Finally, chart 4.16 plots quantities lent by banks between 2000-2014 in the US, EU and emerging market economies. Bank lending seems to have increased, although not everywhere and not to the same extent.

Across banks in advanced economies, margins and costs have generally been squeezed, while lending has been growing. Banks have been shrinking their return on assets, cutting their net interest margins and reducing their operating costs, as they increased capital levels (Cecchetti (2014)). When comparing 2013 data with the pre-crisis 2000-2007, interest rate spreads fell on average by more than 30bp and operating costs by 75bp, whilst bank-credit to the non-financial sector has been rising.

According to the previous charts, the euro area is somewhat of a notable exception to the general trends. Net interest margins have increased and loans are down, in particular for corporates. Bank lending standards have remained somewhat tight, more so than in other regions. Lending spreads are significantly above pre-crisis levels and have not come down in recent years. Slow lending growth and asset sales have been relatively more important in contributing to higher capital ratios for euro area banks. Caruana (2014) argues that the inferior performance is due to the sovereign debt crisis coming on top of the financial system crisis, the weaker state of euro area banks, and a less aggressive policy response to the crisis.

In summary, there is recent evidence to believe that the impact of banking regulation in particular, and banking lending supply restrictions more generally, have not been all that significant to explain the change in bank pricing patterns during and after the crisis.

4.6. Expected and actual impact of higher capital requirements on growth and jobs

Expected impact of capital requirement increases

Capital is not set aside and thus is also available for lending. It is a source of funding, and the funds can be used freely in financing any asset as long as the capital requirements are complied with. Usually, undercapitalised banks may indeed prefer to forego lending opportunities funded with equity as equity issuance would improve the position of existing creditors. However, undercapitalised banks may also have incentives to 'gamble for resurrection' by issuing even more debt and increasing their riskiness and therefore their return. Debt overhang problems can therefore only be tackled decisively if regulators require the recapitalisation of undercapitalised banks. As discussed in section 4.1, well-capitalised banks make better lending and investment decisions because they face less balance sheet constraints and have fewer incentives to take excessive risk as a result.

Table 4.4 and Table 4.5 summarise the estimated or predicted macroeconomic impact of increases in capital requirements. While Table 4.4 presents the impact per percentage point increase in capital ratios, table 4.5 presents the overall impact of the implemented reforms to date. The estimated impact varies widely across different studies. Moreover, the estimations and predictions assume that the main costs of increased capital requirements are wider lending standards typically under conservative assumptions that monetary policy stance does not change and that the Miller-Modigliani theorem does not hold and that higher funding costs for banks would feed fully into the rates that banks charge to borrowers. Such assumptions have been discussed previously in section 3.6.

Table 4.4: The impact of a one percentage point increase in capital ratios on lending spreads, lending volumes and economic growth: selected forecasts

	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[2]
IIF (2011)[1]	+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)[1]	+5–15 bp	(not estimated)	(not estimated)
Miles et al (2013)	+5.5 bp	(not estimated)	–4.5 bp, permanent[2]
Oxford Economics (2013)	+15 bp	(not estimated)	–1.6 bp over 9 years

[1] Also includes the impact of other regulatory measures. [2] Long-term reduction in growth relative to the benchmark.

Sources: As listed in table; BIS calculations.

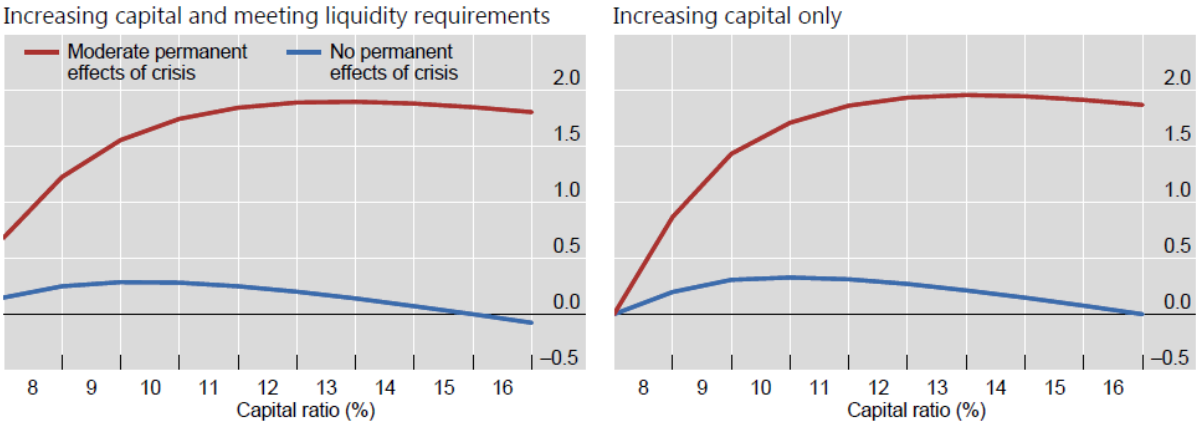
Table 4.5: The overall impact of an increase in capital requirements on capital ratios and growth: selected forecasts

	Required increase in capital percentage points	Growth annual rate
MAG (2010a)	1.3 pp	– 5 basis points over 4 years
IIF (2011)*	4.8 pp	–30–60 basis points over 5 yrs
Cournede & Slovik, OECD (2011)	3.7 pp	–15 basis points over 9 years
Elliott et al, IMF (2012)*	1.2–2.7 pp	(not estimated)
Miles et al (2013)	3.3 pp	– 15 basis points, permanent**
Oxford Economics (2013)*	4–10 pp	–7–16 basis points over 9 years

* Also includes impact of other regulatory measures.

Sources: As listed; BIS calculations.

Chart 4.17: Net benefits of capital and liquidity requirements – impact on output level (in %)



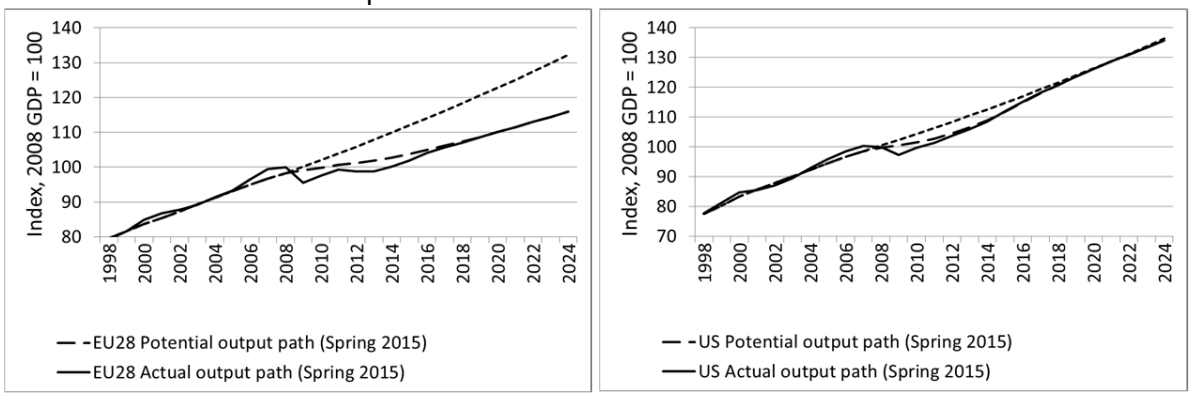
The capital ratio is defined as tangible common equity over risk-weighted assets. The origin corresponds to the pre-reform steady state, approximated by historical averages for total capital ratios (7%) and the average probability of banking crises. Net benefits are measured by the difference between 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.

Source: Caruana (2014)

The cost of increased capital requirements in terms of lower investment and GDP would need to be be compared with the benefits in terms of reduced GDP losses in the future thanks to fewer and less damaging financial crises. The estimation results will depend on what one assumes about the cost of financial crises, in particular whether they have a permanent long-term effect on output, or whether output eventually returns to the pre-crisis trend. Even if one assumes that crises only have a transitory impact on GDP trends (which seems to go against recent experience, see below), higher capital ratios offer net benefits at levels up to 15% of tangible common equity over risk weighted assets or so (chart 4.17). If one assumes even moderate permanent effects of a crisis, net benefits would be positive for capital requirements that even go significantly beyond 15% of risk-weighted assets.

Chart 4.18: Real GDP in the period 2000-2014 for EU 28 and the U.S



Source: European Commission

Chart 4.18 illustrates that the euro area has so far been unable to return to the pre-crisis growth trend, let alone to recoup some of the lost output following the 2008 financial system crisis, which underlies the concern about undesirably low economic growth. The question is to what extent this is due to the financial reforms and whether the gains from higher capital requirements may have in fact been underestimated, if policy makers assumed that crises only have temporary effects.

Relation between credit and economic growth at high levels of economic development

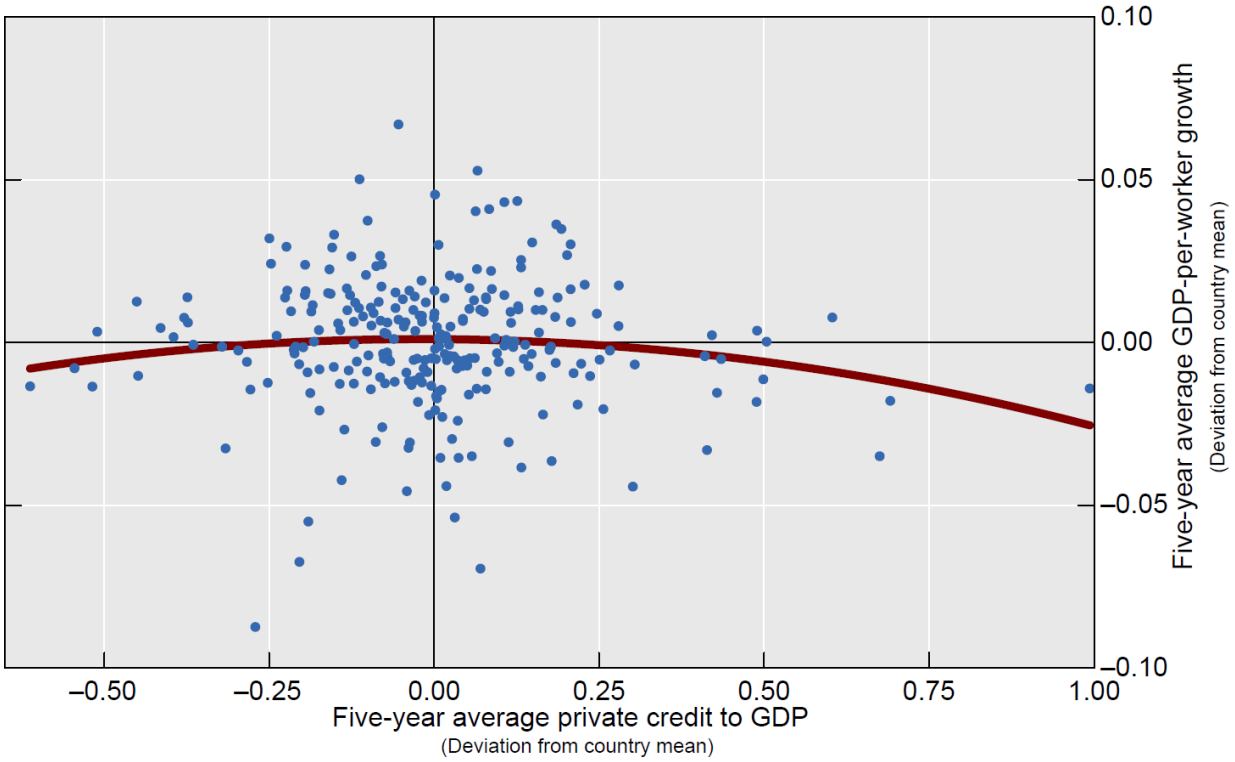
Financial development and, in particular, the development of debt markets has long been linked to economic growth. The idea at least dates back to Bagehot (1873) and Schumpeter (1911), though its origins can be found in discussions of the English Financial Revolution, see Wennerlind (2011).

Empirical analyses establishing a relationship between finance and growth are more recent. Nevertheless, there are still significant lacunae regarding how such links are established. Moreover, the relationship is not at all obvious, nor is whether it applies to all levels of development; i.e. whether the positive effect of debt on growth vanishes beyond some threshold level after which countries no longer benefit from more access to finance and it perhaps even becomes detrimental to growth.

Most recent work has focused on establishing precisely whether there are such threshold effects:

- Public finance: Reinhart and Rogoff (2009).
- International finance and international capital flows: Kose et al. (2009).
- Cross-country studies: Beck et al. (2014).
- Distinguishing by periods of financial liberalization: Rousseau and Wachtel (2011).
- Evaluating the specific impact on advanced economies: Cecchetti and Kharroubi (2012) – see chart 4.19.
- Establishing an absolute threshold of credit in relation to the size of the economy: Arcand et al. (2012).

Chart 4.19: Private credit to GDP ratio and growth.



Source: Cecchetti and Kharroubi (2012)

The incidence of financial crises seems to have had an impact and dampened the effect of financial deepening on growth in recent decades. Excessive financial deepening or a too rapid rate of credit growth may have led to several negative effects on growth, including through inflation and weakened banking systems. These in turn have given rise to growth-inhibiting financial crises, when comparing the period 1990-2004 with 1960-1989. Moreover, the factors that may have had a negative impact on growth in mature financial systems include the magnitude of financial cycles and consequent macroeconomic volatility, as well as the importance of non-intermediation activities.[26]

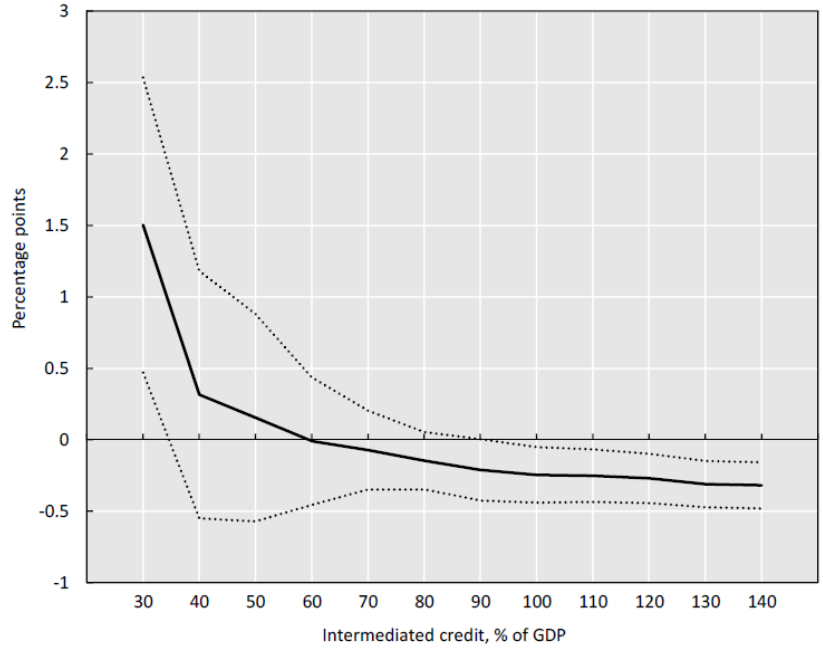
Moreover, the empirical evidence for OECD countries over the past five decades indicates that more finance is linked to sharply higher growth at low levels of financial development but that, above a certain point and at the margin, further financial expansion is associated with slower growth.

A rise in intermediated credit from 20 to 30% of GDP is associated with economic growth rising by more than a percentage point. This economically large effect is also statistically significant at the 10% level (see chart 4.20). However, this relationship quickly becomes much smaller and then negative, so that for instance an increase from 100 to 110% of GDP is

[26] The financial industry competes for resources with the rest of the economy. It requires not only physical capital, but highly skilled workers as well. Philippon and Resehf (2012) present evidence on the evolution of wages in the U.S. financial industry over time, relating them to the underlying fundamentals justifying such changes.

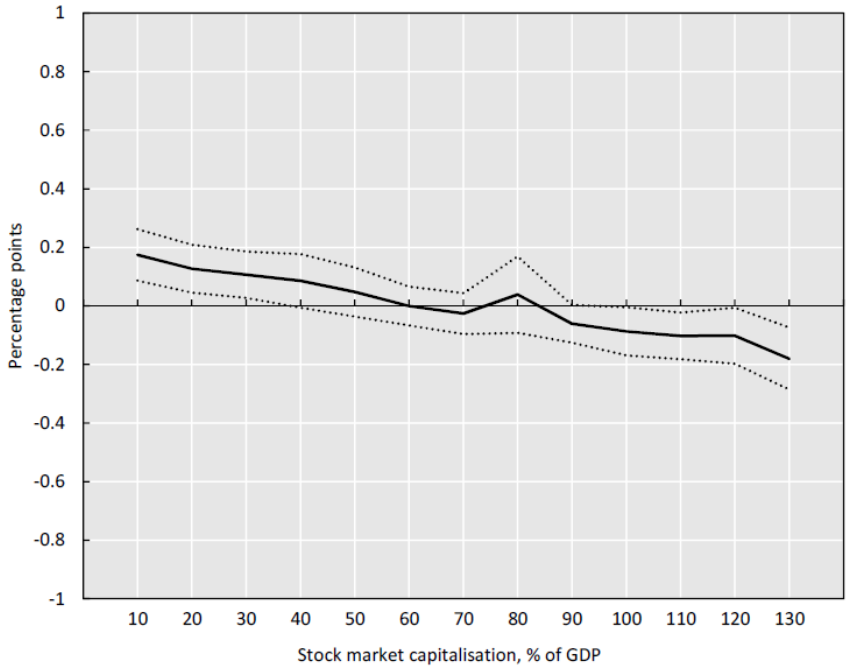
linked to a 0.25 percentage point reduction in economic growth. A similar pattern holds for increases in stock market funding: when they occur from a low to moderate base, they are associated with marked increases in economic growth, but stock market expansion from a higher base brings lower additional benefits, and from a very high base, it is linked to slower growth (see chart 4.21).

Chart 4.20: Estimated change in per capita GDP growth when credit intermediation increases by 10% of GDP



Source: OECD (2015)

Chart 4.21: Estimated change in per capita GDP growth when stock markets expand by 10% of GDP



Source: OECD (2015)

In this context, if the EU more generally, the euro area and some specific Member States in the euro area were to present high levels of debt relative to other economies. Moreover, in this context, the expectation that non-financial corporates and households in the EU are suffering from a lack of access to credit seems at odds with the evidence above and the development and subsequent burst of the EU debt crisis.

Charts 4.22 to 4.25 present the levels of public and private debt in several countries as a proportion of GDP. Finally, and given the above charts of public and private debt, Chart 4.26 presents the level of public plus private debt in the EU and relates it to estimates of potential GDP growth, an unobservable variable extracted through statistical methods. The graph suggests a negative relation between both variables, in parallel to that found between growth and private debt in Chart 4.19.

Charts 4.22 - 4.25: Indebtedness in selected advanced economies, 2013 (% of GDP)

Chart 4.22: Government

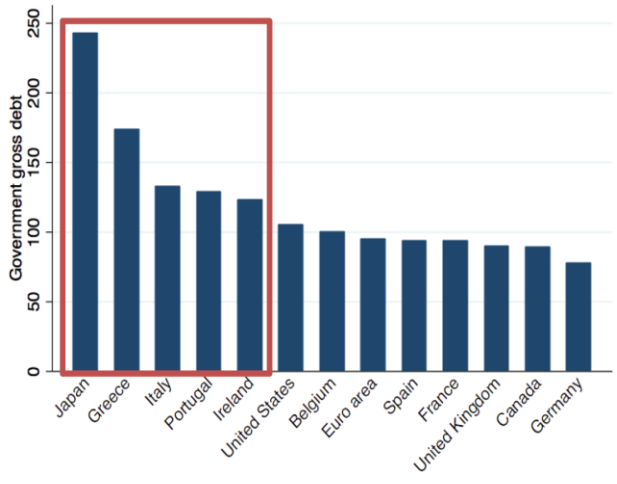


Chart 4.23: Household

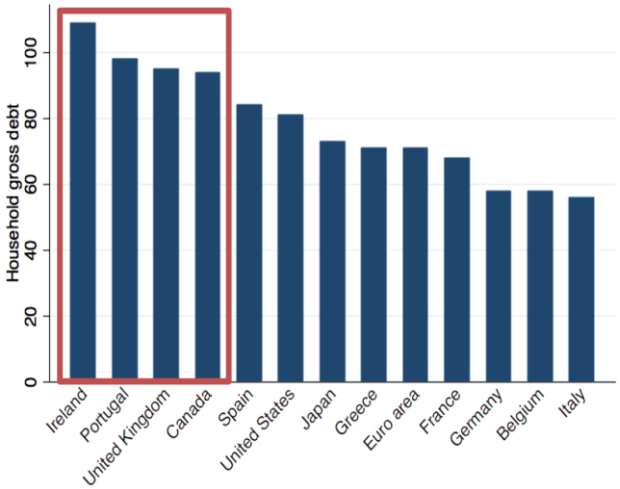


Chart 4.24: Non-financial corporate

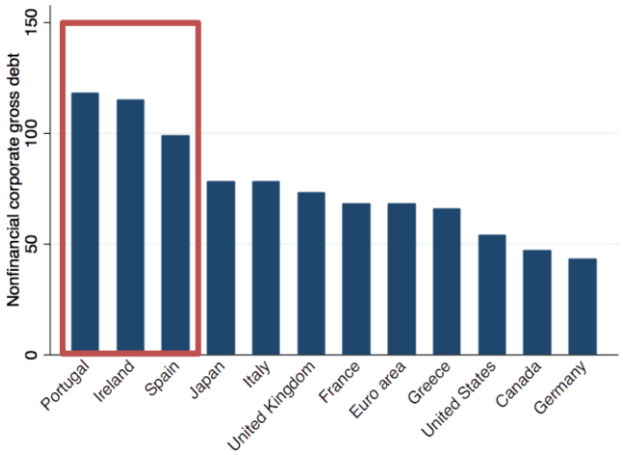
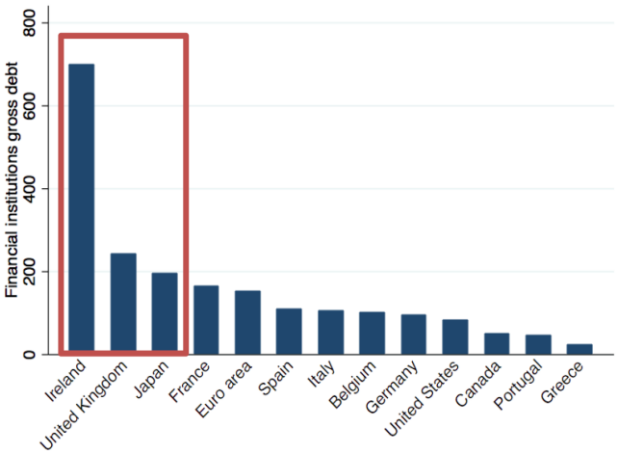
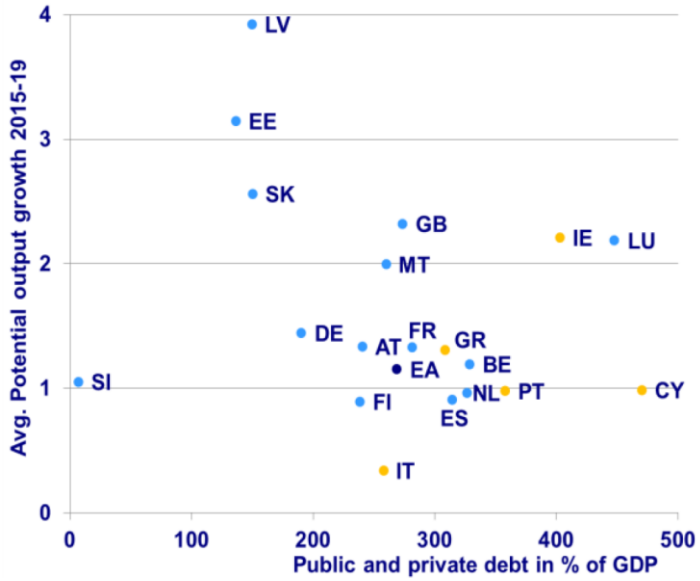


Chart 4.25: Financial corporate



Source: Lo and Rogoff (2015)

Chart 4.26: Average potential growth versus public and private debt.

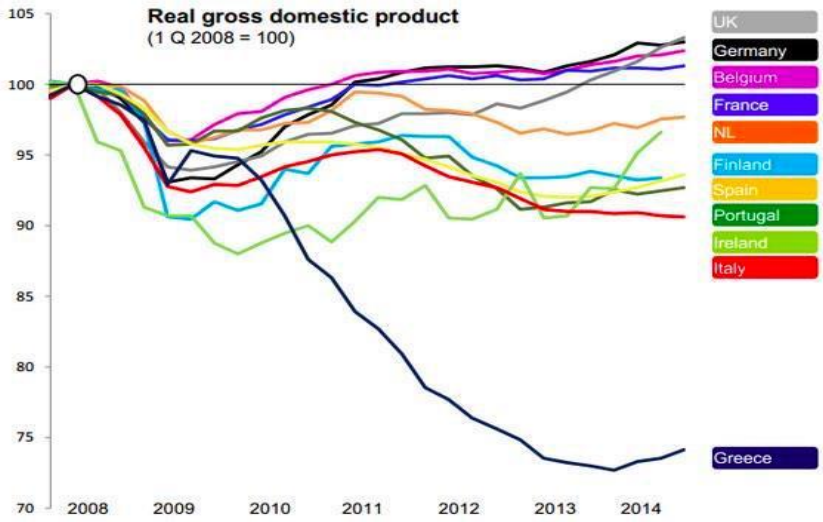


Source: February 12th 2015 Analytical note by Jean-Claude Juncker

4.7. Concluding remarks

Chart 4.27 illustrates how real GDP dynamics have differed significantly across EU Member States since the financial crisis. While several core Member States by now exceed pre-crisis real GDP levels after a severe recession, periphery Member State real GDP is still significantly below 2008 levels, seven years after the crisis struck. Even if higher bank capital requirements were to have an impact on economic growth, the charts suggest that this impact would likely be relatively unimportant compared with the overall impact of the devastating crisis, which was partially due to inadequate bank regulation. Moreover, capital requirements have been increased across many countries in the world, meaning that they cannot be blamed for the lacklustre economic growth performance of some euro area countries in particular.

Chart 4.27: Real GDP in the period 2008-2014 for selected EU Member States



Source: Eurostat

5. Analysing the effect of other relevant regulatory features

5.1. Macro prudential requirements

One of the lessons learned from the financial crisis was a necessity to build effective institutional frameworks and regulatory powers so that risks to financial stability are identified well in advance and that responsible authorities can effectively take appropriate measures – so called macroprudential measures – early enough to contain those risks. A number of macroprudential tools, namely a countercyclical capital buffer, G-SIB and D-SIB (G-SII and O-SII under CRD IV) buffers – all of which are capital instruments, were agreed at the international level under the Basel Agreement.

EU Member States could have transposed the Basel Agreement without the Union legislation. However, the imperative of the single market and ensuring a level playing field called for EU legislation. The EU legislation sets up the general regulatory framework for a number of different macroprudential tools, focusing on the need for cooperation among authorities and coordination of policies, but also determining the level or limits for some specific macroprudential tools. However, not all macroprudential measures are currently enshrined in the law of the Union.

Macroprudential instruments can be classified into three broad categories: a) capital-based tools (for instance, countercyclical capital buffers – CCBs – or sectoral capital requirements, leverage ratios); b) liquidity-based tools (for instance, liquidity requirements); and c) asset-based tools (for instance, caps on loan-to-value (LTV) and loan-to-income (LTI) ratios). The first group aims at enhancing the solvency of the bank, the second at enhancing its ability to withstand temporary liquidity shortages and the last one focuses on demand side. to improve the quality of the bank's asset side. Only capital-related macro-prudential instruments are currently harmonised under EU law.

Under CRR/CRD IV, the responsibility for the activation of macroprudential measures rests with designated national and/or competent authorities. Since the adoption of the SSM Regulation, macro-prudential supervision is a shared competence between national authorities and the ECB/SSM for countries in the Banking Union. The Single Supervisory Mechanism (SSM) has the power to further strengthen the measures adopted by national authorities.

The legislation also provides a framework to address exceptional circumstances when there are considerable financial stability risks for the EU as a whole, allowing the Commission to adopt a delegated act on macroprudential measures, in particular upon the recommendation or opinion of the European Systemic Risk Board (ESRB) or European Banking Authority (EBA). The economic developments in the EU so far have not necessitated the use of such an option, but this cannot be excluded in the future.

Many Member States actively pursued macroprudential policy in 2014. According to ESRB, around 90 measures were decided, roughly half of which governed by Union law (primarily the use of capital instruments) with the remainder based on national law, such as loan-to-value (LTV) ratios on residential mortgage loans.

Table 5.1: Key macroprudential measures

CRD IV	CRR (Art 458)	In addition to the EU legal texts
Countercyclical capital buffer (Art 130, 135-140) Systemic risk buffer (Art 133-134) G-SII and O-SII capital buffer (Art 131)	Level of own funds (minimum capital requirements) Level of capital conservation buffer Risk weights for residential and commercial property sector Liquidity requirements (liquidity coverage ratio, as of 2015; net stable funding ratio, as of 2019) Intra financial sector exposures limits Large exposure limits Increased public disclosure requirements	LTV ratio caps LTI ratio caps LTD ratio caps Levy on non-stable funding Margin and haircuts requirements

Source: ECB.
Note: The list of instruments not covered by EU law is non-exhaustive. The last column includes only illustrative examples.

Source: Financial Stability Review, Banque de France, April 2015; p. 76

Before discussing the potential impact of these macroprudential measures, it should be borne in mind that the macroprudential toolbox provided in CRR/CRD IV is not a new invention; but it is the first time that macroprudential tools were included in EU legislation. Before CRR/CRD IV entered into force, national authorities could and should have used those measures in order to contain financial risks to their economy both before the crisis and after the crisis. Therefore the ideal benchmark to assess the impact of macroprudential tools should be counterfactual where CRR/CRD IV would not include macroprudential tools.

There are a number of areas where macroprudential tools as regulated by CRR/CRD IV could have an impact on the level and amount of capital to be held by banks, which in turn might affect bank decisions on the amount of credit to be supplied to the economy.

Countercyclic capital buffer (CCB)

The idea behind CCBs is to require banks to build buffers in good times that can be draw down in bad times so as to smoothen a credit cycle. Such buffers go beyond the minimum capital requirement, and serve the purpose of absorbing losses that could materialise in downturns, thereby increasing the resilience of banks to shocks. Moreover, such buffers contribute to mitigating economic fluctuations by lessening the excessive procyclicality of credit provision. During upturns, the build-up of capital buffers is expected to slow down credit-fed booms, while their release during downturns should decrease the likelihood that banks curtail lending dramatically. In an insightful paper, Jiménez et al. (2013) estimate the impact of dynamic provisioning – which, according to the paper, can be assimilated into CCBs – on the supply of credit and real activity in Spain.[27] The study finds that countercyclical dynamic provisions contributed to smoothing out the credit cycle by decreasing credit supply in good times and supporting firm financing in bad times. Several

[27] *The goal of dynamic provisions is to cover banks' future losses which could materialise on their assets. As such, they are a special type of general loan loss provisions and, from a prudential perspective, the above mentioned study argues that they are akin to a capital buffer. The formula used for their calculation determines their countercyclical nature: dynamic provisions are built up in good times from retained profits and are drawn down in bad times. This implies that dynamic provisions generate countercyclical bank capital buffers.* See Jiménez (G.), ongena (S.), Peydró (J.‑L.) and Saurina (J.) (2013) "Macroprudential policy, countercyclical bank capital buffers and credit supply: evidence from the Spanish dynamic provisioning experiments", Working Paper, Universitat Pompeu Fabra; page 34.

Member States have front-loaded the CCB before its mandatory application date of 1 January 2016, but so far only Sweden has activated it at a level above 0 %, to be applicable as of Q3 2015 (1.5 % as of june 2016).

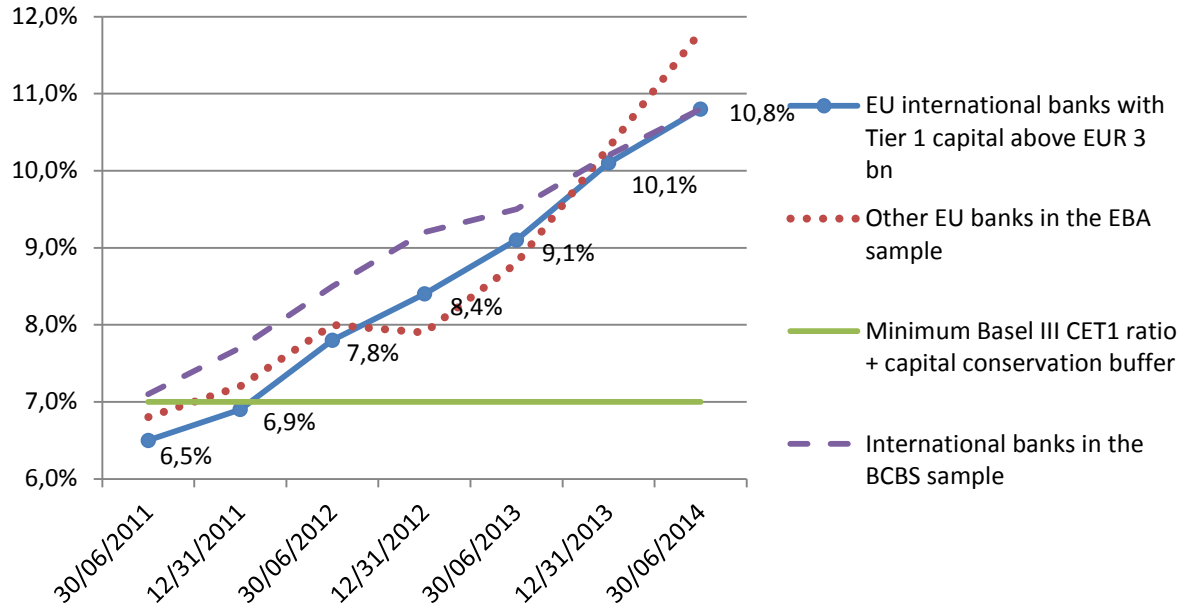
Buffer for global systemically important institutions (G-SII).

The Financial Stability Board identified[28] 30 global systemically important banks (out of which 14 are EU banks) on the basis of the methodology developed by BCBS. CRD IV and EBA technical standards provided the methodology for computing the amount of CET1 capital to be kept by systemically important institutions on top of other prudential requirements. The amount of G-SII buffer for these EU banks will range from 1 to 2% of CET1 capital and lead to the same results as the BCBS methodology. The gradual phase-in of this capital surcharge will start in 2016 and will be fully applicable as of 2019. Competent and designated national authorities will have to follow EBA technical standards and will formally determine the size of the buffer.

CRD IV and related EBA technical standards provide certainty to global systemically important banks on the size of G-SII surcharge. These capital surcharges could therefore have already been reflected in banks' capital ratios. Group 1 banks (which could be regarded as a rough proxy for EU systemic banks subject to G-SII buffers) indeed gradually increased CET1 capital (see chart 5.1). However, other European banks also increased their capital buffers in a very similar fashion. Therefore this CET1 capital ratio development pattern raises doubts whether the current CET1 level in G-SII has already been affected by G-SII buffer. Indeed, G-SII buffer will be phased in only gradually from 2016 and will be fully applicable as of 2019. Secondly, a majority of the EBA sample of Group 1 banks are not G-SIIs, whereas most G-SIIs will be subject to a 1% CET1 surcharge. These factors could explain why chart 5.1 does not show such a large difference between internationally active banks and other EU banks. What this chart does, however, show is a major CET1 build-up over the last three years. Therefore, more granular analysis needs to be undertaken comparing the capital levels of G-SIIs and other banks so as to obtain further evidence of the relative importance of the G-SII buffer in the CET1 ratios.

[28] http://www.financialstabilityboard.org/wp-content/uploads/r_141106b.pdf

Chart 5.1: Developments on CET1 capital ratio in European banks



Source: EBA and BCBS reports on Basel III monitoring exercise

Buffer for other systemically important institutions (O-SII buffer)

Designated and/or competent authorities have to follow EBA Guidelines in assessing other significantly important institutions (O-SIIs). These authorities will have to develop their methodology to determine the size of the O-SII buffer for the identified O-SII, which can be fully applicable as of 2016. As with the G-SII buffer, this measure is directed at systemically important institutions but there are no mandatory EU-level requirements for the buffer's use. Responsibility for the determination of the size of the buffer as well as its activation lies with the competent and designated authorities.

Paradoxically, O-SII buffer rules could also have a capital reducing effect compared to a counterfactual in which procedures would be less burdensome. CRD IV provides a maximum size for the O-SII buffer which may be decided on by the designated or responsible authorities: 2% as a general rule, and 1% for subsidiaries of G-SIIs or O-SIIs. Therefore it can be argued that the cap on the O-SII buffer could become binding for the national competent and/or designated authorities and could even prevent them from fully addressing financial stability risks in some circumstances. Had there been no maximum limits for the O-SII buffer, Member States could have opted for higher O-SII buffers than envisaged by EU legislation.

Evidence suggests that some Member States could have been bound by these maximum limits: they set O-SII buffers at the maximum limits or used the systemic risk buffer (SRB) instead of a more appropriate O-SII buffer to address risks stemming from a number of systemically important domestic institutions, given that the O-SII buffer can only be applied as of 2016. These countries include Norway (O-SII of 2% for 2 largest banks from 2016) and Denmark, which set an SRB of between 1 % and 3 % depending on their systemic importance (see below).

Systemic risk buffer (SRB)

The responsible and/or designated authorities may also decide to impose a systemic risk buffer (SRB) to address other non-cyclical risks to financial stability. The SRB can be used as of 2014. If the responsible and/or designated authorities wish to impose an SRB above 3%, the authorities have to describe and justify adequately the need for an SRB buffer and await the opinion of the Commission. An opinion from the pan-European authority might be necessary in order to maintain a free flow of capital across the EU and to avoid capital from being unnecessarily locked up in a given Member State, thus limiting the spillover to other Member States.

Six countries have decided on SRB buffers to date, five of which have already reached the 3% threshold: Norway (SRB of 3% applied to all banks), Sweden (SRB of 3% and 2% of Pillar 2 add-on to the four largest banking groups), Bulgaria (3% applied to domestic exposures), Czech Republic and Croatia (1% to 3% depending on the systemic importance of the institution concerned; applied to all exposures), Denmark (1% to 3% SRB to identified O-SIIs). Estonia is still below the 3% threshold (2%, applied to all exposures).

These numbers suggest that the 3% threshold set in CRD IV, which would require the designated and competent authorities to go through a more burdensome procedure, was likely to have an impact on the level of SRB that the banks were required to hold. The 3% threshold could have encouraged Member States' authorities not to impose SRB beyond the 3% limit. Moreover, designated and/or competent authorities can still require banks to strengthen capital buffers in other ways, such as imposing Pillar 2 measures (Sweden) or imposing an increase in risk weights on certain assets (Belgium).

Proportionality considerations

Designated national authorities decided on O-SII and SRB buffers primarily aiming to address the financial stability risks stemming from systemically important institutions. These capital buffers, including a world-wide harmonised G-SII surcharge, could also be seen as prudential measures making the capital requirements proportionate to the size of institutions. Only large systemically important institutions or those bank exposures assessed as posing systemic risks are subject to these additional capital surcharges.

Concluding remarks

The international agreements – via the recognition of macroprudential tools – have rubberstamped the need for macroprudential authorities to address financial stability risks effectively and the systemic importance of financial institutions. While these internationally agreed measures would have been implemented at the national level at any rate, the CRR/CRD IV have added to them a single market perspective – considering also the spillover effects across borders (specifically in the case of the CCB where mandatory reciprocation requirements are provided for in CRD IV) and ensuring better coordination between different macroprudential authorities.

While there is no doubt that the macroprudential measures taken by macroprudential authorities will translate into higher capital levels in banks, at the moment there is no conclusive evidence as to what extent this has already taken place. Furthermore, it is difficult to conclusively determine the degree to which capital buffers may have had adverse effects on lending, particularly if institutions were already fully compliant with and/or above the minimum capital requirements as well as the relevant capital buffers at the time they became applicable. Many capital-based macroprudential tools are not yet required to be applied by CRD IV (G-SII, O-SII buffers, CCB) and more targeted analysis needs to be performed. Moreover, the analysis should also consider that the source of the impact on the level of capital and potentially credit growth may be not only CRR and CRD IV, but also the decisions taken by national designated and or competent authorities, which enjoy vast powers in the activation and implementation of macroprudential tools.

Regarding the CCB, there are clear links between this particular buffer and bank lending to the wider economy, though the calibration and purpose of this macroprudential instrument ensures that these effects are balanced over the cycle. Thus, while this tool may have adverse effects on lending at times of an economic upturn (reducing it in gross terms), these are countered by credit-suporting effects during a downturn.

The preliminary analysis above suggests that stipulating maximum limits for the O-SII buffer and thresholds for the SRB in CRD IV could have some harmonisation effect in the single market. In the absence of EU-wide regulation, the designated and/or competent authorities' could have easily chosen to go beyond these thresholds which would have led to higher capital requirements than those at present, with potentially more detrimental effects on lending.

Notwithstanding the potential positive effect of avoiding extreme increases in capital buffers in the light of systemic risks to financial stability, the macro-prudential measures of CRR/CRD IV have contributed to ensuring the proportionality of the prudential framework, whereby G-SII and O-SII additional capital surcharges are applicable only to large systemic institutions.

5.2. Requirements for counterparty credit risk: OTC derivatives

What does the CRR change with respect to the preceding regulation?

The 2007 financial crisis demonstrated that risks associated with OTC derivatives tended to be underestimated by institutions. This was especially the case for derivatives not cleared through a central counterparty (CCP). As a result, the G-20 decided to push for a comprehensive reform of the prudential framework with the double objective of: 1) strengthening the prudential requirements for all financial counterparties involved in OTC derivatives transactions; 2) mandating the clearing of those transactions through CCPs.[29]

[29] Only OTC derivatives that are sufficiently standardised can be cleared centrally. Those which are not will remain risk-managed on a bilateral basis.

Several international standard-setting bodies (BCBS, CPMI and IOSCO) were mandated to develop standards to meet the first objective. The main elements of those standards were:

- the strengthening of capital requirements for counterparty credit risk arising from OTC[30] derivatives exposures;
- the introduction of margin requirements for derivatives not cleared through a CCP.

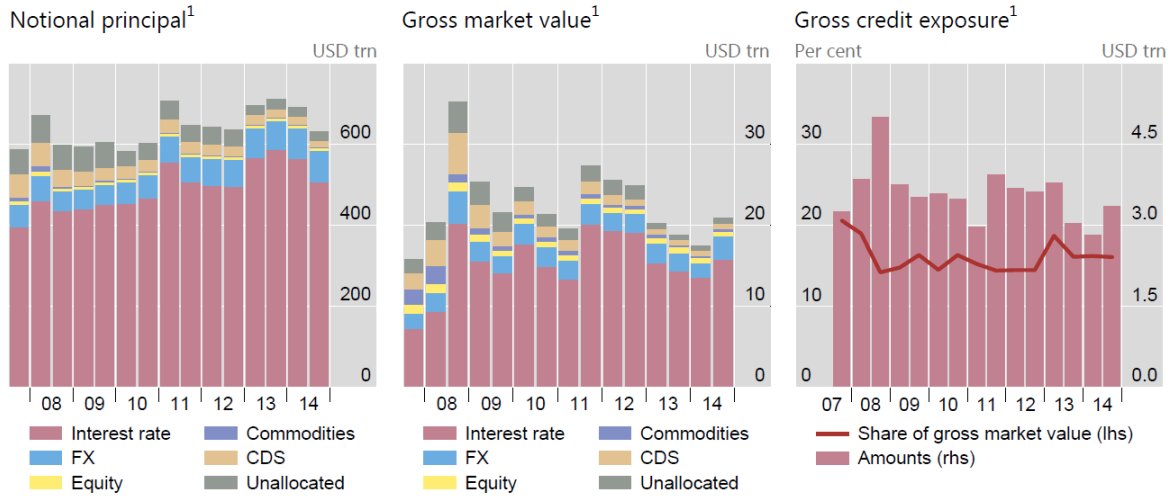
The clearing obligation and margin requirements for non-CCP cleared OTC derivatives were implemented through Regulation (EU) No 648/2012 (EMIR), and are therefore not *per se* the object of study in this report. However, the analysis should bear them in mind because of the way they interact with the rest of the framework.

The strengthening of the capital requirements for counterparty credit risk arising from OTC-derivatives exposures was implemented through the CRR. It is these rules that this report seeks to analyse. The main changes introduced by the CRR can be summarised as follows:

- a requirement to use stressed inputs in the calibration of internal models used by institutions to calculate the capital requirements for counterparty credit risk;
- strengthened requirements for collateral management and initial margining (e.g. institutions with large and illiquid OTC derivative exposures have to apply longer margining periods as a basis for determining the capital requirement);
- enhancements in the areas of back- testing and stress testing;
- requirements to better address wrong-way risk (i.e. cases where the exposure increases when the credit quality of the counterparty deteriorates) and highly leveraged counterparties;
- new capital requirements for exposures to CCPs, with the size of the capital requirement depending on the type of exposure and the type of CCP (exposures to a qualifying CCP (QCCP) are subject to a lower capital requirement compared to exposures to a non-QCCP).[31]
- a new capital charge for potential mark-to-market losses, known as credit valuation adjustment (CVA) charge, for OTC derivatives which are not cleared through a QCCP. This charge has, however, important exemptions in the CRR, most notably the exemption for transactions with non-financial counterparties.

[30] These changes also concern securities financing transactions
[31] Under the previous law, exposures to CCPs were not subject to a capital requirement.

Chart 5.2: Global derivatives markets. Notional amount of derivatives outstanding.



[1] At half year-end (end-June and end-December). Amounts denominated in currencies other than US dollars are converted to US dollars at the exchange rate prevailing on the reference date.

Source: Bank of International Settlements (BIS)

General Considerations on the possible effects of the regulation

In the first place, it is worth noting that, having overcome the financial crisis, the OTC derivatives global market has been growing moderately, with some ups and downs.[32] Between 2012 and 2013, global notional amounts outstanding of OTC derivatives increased steadily (see chart 5.2), but since 2014 global notional amounts are experiencing a decrease. All in all, we can say that overall growth in this market during the post-crisis period has been greater that in other cases, such as the securitisation market.

In general, we can say that the new framework establishes higher capital requirements for counterparty credit risk arising from OTC derivatives exposures compared with the pre-existing regulation and, according to the BIS, that the CVA charge[33] is the main contributor to the increase in capital requirements. However, OTC derivatives cleared through QCCPs involve a significantly lower (counterparty credit risk) capital charge, as opposed to those negotiated bilaterally or cleared through non-qualifying CCPs. This differentiation between cleared and non-cleared exposures, in terms of capital requirements, already existed in the preceding regulation. But with the introduction of the CVA charge in the CRR, which is only applicable to non-QCCPs cleared exposures, we can say that the difference in capital requirements between the two types of exposures has grown. All in all, we can say that this regulation could have as potential consequences, an increase in both a) the volume of OTC derivatives cleared in QCCPs and b) the price of OTC derivatives which are not cleared through a QCCP.

The impact of the CRR on volumes of OTC derivatives cleared through CCPs

[32] CEPS: The OTC derivatives markets after financial reforms, Cosmina Amariei and Diego Valiante, May 2014

[33] BIS, August 2013, Macroeconomic assessment group on derivatives. This assessment is based on macroeconomic models. Page 13

The lower capital requirements for exposures arising from OTC derivatives cleared through QCCPs (compared to those not cleared through QCCPs)[34] should - leaving aside costs other than those related to the capital requirements- lead to higher volumes of OTC derivatives to be cleared through QCCPs. In turn, the higher the volume of OTC derivatives that are cleared the lower the overall impact of the new regulation.

However, in the decision whether to clear an OTC derivative through a QCCP or not there will be other important considerations for the counterparties involved, which can reduce the actual flow of OTC derivatives to central clearing:

- clearing through a CCP implies posting initial margin to the CCP;[35]
- central clearing involves other costs as well, like the fees charged by the CCP and the costs associated with the membership in the CCP, such as contributions to the default fund(s) of the CCPs.

Regarding initial margin, it involves a capital cost (initial margin posted to the CCP is treated as an exposure to the CCP and subject to a capital requirement, albeit a very low one in case of a QCCP), an opportunity cost (the institution cannot use the money for something else) and liquidity risk (the vast majority of margin provided is in the form of cash, so in case of a margin call, the institution needs to have sufficient cash to meet the call). OTC derivatives that are not centrally cleared usually do not involve the posting of initial margin between counterparties. All else being equal, initial margin therefore increases the cost of central clearing and may therefore incentivise institutions to clear fewer OTC derivatives centrally. And additional advantage of OTC derivatives not cleared through a CCP is that any initial margin received by an institution can be used to reduce the capital requirement (however, if the institution has to post initial margin at the same time, the reduction is offset by the increase in the exposure due to the initial margin posted[36]). In the CCP-clearing environment the institution cannot benefit from this reduction as only the CCP has the "right" to ask for initial margin.

However, these different practices in terms of initial margin will not persist for long. OTC derivatives which are not cleared through a CCP will be subject to initial margin requirements in the future as well, according to international commitments. Standards are being developed both at international level and in the EU to require financial institutions that enter into OTC derivatives that are not centrally cleared to exchange initial margin. Once these will be in place, the cost difference between centrally- and non-centrally-cleared OTC derivatives will

[34] The differentiation between QCCPs and non-QCCPs is relevant for CCPs not located in the EU only. To operate as a CCP in the EU there is the need of a prior authorisation. In order to get that authorisation, the CCP must meet the requirements laid down in EMIR. Once authorised, the CCP is automatically considered a QCCP. In other words, within the EU, a non-QCCP cannot exist. However, outside the EU, the requirements to operate as a CCPs may be different to those established by EU legislation. A third-country CCP can be considered as a QCCP only if it meets the criteria for recognition under EMIR (e.g. the rules to which it is subject must be deemed equivalent to those laid down in EMIR).

[35] The rules governing the amount of initial margin required by CCPs are not part of the CRR; they are laid down in EMIR.

[36] This is because the institution's counterparty would ask for the same amount of initial margin.

be impacted (the direction on the impact will depend on the calibration of the models used by CCPs and institutions to calculate initial margin requirements).

Regarding default fund contributions, similar considerations (capital cost, opportunity cost, and liquidity risk) to those applicable to initial margin apply. Unlike in the case of initial margin, there are no default fund contributions for OTC derivatives not cleared by a CCP. However, it is not likely that this puts central clearing at a disadvantage overall.

In the analysis of the how CRR requirements have influenced the volumes of OTC derivatives cleared through QCCPs, all these other regulatory as well as other non-regulatory features should to be taken into account. According to some literature,[37] a substantial fraction of the derivatives markets – about two thirds – will not be centrally cleared due to insufficient standardisation. Central clearing of OTC derivatives remains most well established for interest rate and index credit derivatives, while limited progress has been made in other asset classes.

The impact of the CRR on the pricing of OTC derivatives

Increasing the price of OTC derivative contracts, especially those negotiated bilaterally or through non-qualifying CCP, given their relatively higher capital requirements.

The possible increases in prices of OTC derivatives due to the higher capital requirements involve a two-step process. In the first step, the increase in the capital requirements may lead to an increase in funding cost for the institution due to the higher proportion of a more expensive source of funding. This issue has already been covered in section 4.

In the second step, the increased funding cost may have an impact on the price of the OTC derivative contract. This will largely depend on whether and to what extent the increase in the funding costs is passed through to the counterparty through an increase in the price of the contract. This will depend on a number of factors, related both to the internal dynamics and management of the institution and to the specific sector of the OTC derivatives market, in particular the number of participants and competitive structure of that sector of the market. For example, a largely standardised, plain-vanilla OTC derivative, where there can be a wide range of counterparties willing to enter that contract, the pass-through might be lower, since institutions would have a lower bargaining power in this case. Alternatively, for a less standardised type of derivative, such as an exotic option, the market can be much narrower, and there could be more margin for manoeuvre to increase prices.

The additional capital requirements may affect not only the price of OTC derivatives, but also the pricing of other products offered by the institution. For example, the BIS, in its impact study of the OTC derivatives reform,[38] made the assumption that additional costs resulting from the whole OTC derivatives international regulatory reforms would be fully absorbed by banks, and that they would recover those costs not through increasing the prices of OTC

[37] CEPS: The OTC derivates markets after financial reforms, Cosmina Amariei and Diego Valiante, May 2014

[38] BIS Macroeconomic assessment group on derivatives: Macroeconomic impact assessment of the OTC derivatives regulatory reform. August 2013.

derivatives in particular, but rather by widening the lending spreads (the difference between average lending and deposit rates) across their whole loan book. The BIS estimated an increase in the margin of **between 6 and 13 basis points** (depending on the scenario). Given that these figures summarise the impact more than just capital requirements (e.g. they also include the cost of margin requirements), and also that there are some differences between the international principles and the specific capital requirements established in the CRR (such as the CVA exemptions), the impact of the CRR requirements, under the same assumptions, should be substantially smaller.

Characterization of the scope of markets/instruments to be analysed.

OTC derivatives are usually issued by a financial company, and can be bought by a financial or non-financial company. Depending on the type of derivative, either one party (e.g. the buyer of an option) or both parties to the contract are subject to counterparty credit risk (e.g. in case of a forward contract or a swap).

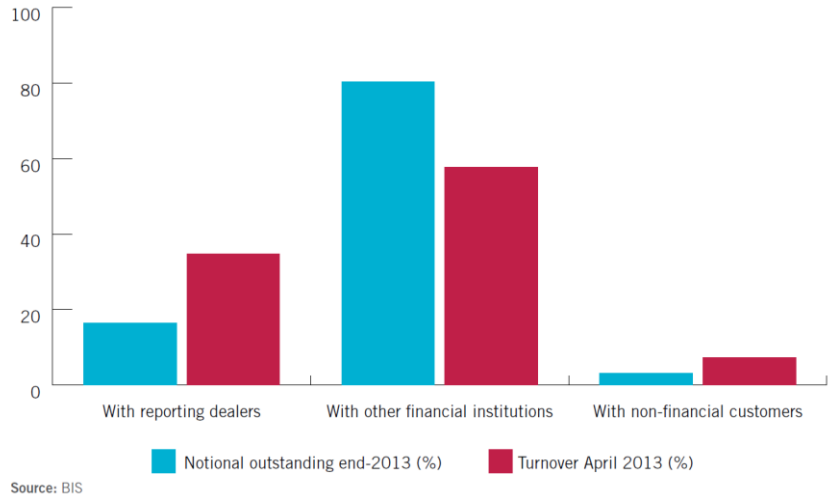
There can also be OTC derivatives contracts in which both parties are non-financial companies. However, these are, by definition, excluded from the regulatory scope of the CRR and will not be the object of our study.

The purposes for which OTC derivatives are used are generally categorised as follows: hedging, trading and arbitrage. In cases where there is a financial counterparty involved, the OTC derivative can be held for any of these purposes. However, it is generally difficult to disentangle for which purpose OTC derivatives portfolios are used in practice by looking at the data. In the case of non-financial counterparties, OTC derivatives will usually be used for hedging purposes only.

On the one hand, given that the objective of this study is to analyse financing to the economy and that its focus is on the long term, our analysis should focus on the effects of the CRR requirements on OTC derivatives which have a non-financial counterparty. These derivatives fulfil an important function for non-financials, helping them hedge different types of financial risks they may be subject to, for example:

- exchange rate risk associated with the cross-country sale of final goods or purchase of intermediate goods.
- interest rate risk of liabilities,
- price risk of commodities (raw materials) which will be used as an input for the production process.

Chart 5.3. Percentage represented by different types of counterparties in the global interest rate OTC derivatives market, in terms of notional outstanding and turnover.



Source: ISDA, BIS

Since these risks are financial and not directly associated with the company's core business, hedging them helps preserve the sustainability of their projects and business operations in the long run. However, in terms of size, the market of OTC derivatives with a non-financial counterparty constitutes a relatively small share of the overall market. Some studies, using global data from the BIS (which, in turn, is based on data obtained from BIS reporting dealers) estimate that interest rate OTC derivatives (the biggest OTC derivatives market globally) involving a non-financial counterparty constitute around 3% of global interest rate OTC derivatives by outstanding notional amount and around 7% by average daily turnover (see chart 5.3).[39] A very important feature concerning these OTC derivatives is that they are exempt from the CVA charge, according to the CRR, which makes them substantially cheaper in terms of capital than derivatives between financials.

On the other hand, OTC derivatives in which both parties are financial (for example, a bank hedging the credit spread risk of a securitisation placed in its trading book) do not seem in principle to play a direct role in the financing of the economy in the long term. However, there may indeed be indirect, second round effects of the increased capital requirements for these contracts on the financing of the real economy. For example:

- an OTC derivative in which both parties are financial may actually be used by an institution to specifically hedge an open position in another OTC derivative with a non-financial counterparty. Therefore, the CVA charge for OTC derivatives between financials could indirectly affect the price of OTC derivatives with non-financials;
- the increased capital requirements for OTC derivatives between financials may increase the overall funding cost of an institution subject to the CRR because of the subsequent pass-through to the price of other assets in the balance sheets, including

[39] Dispelling Myths: End-User Activity in OTC Derivatives, August 2014, ISDA

those more directly linked to the long-term financing of the economy, such as a loan to an SME.

- a bank may use OTC derivatives to hedge its own balance sheet against the risks involved in certain instruments. Some of these instruments can be directly related to the long term financing of the economy (for example, a long-term bond issued by a large corporate). The increased cost or difficulty in hedging these risks may actually reduce a bank's demand for these instruments.

While these second round effects do exist, they are in general difficult to measure and their overall impact may not be very significant.

Final remarks

Given that the purpose of our study is to analyse the impact of CRR requirements on the financing of the real economy in the long run, the focus should be on the market of OTC derivatives with a non-financial counterparty. These fulfil an important function related to the hedging of financial risks, supporting the stability and the sustainability of business in the long run.

For trades not cleared through a CCP, capital requirements in this market segment may be only marginally higher than in the previous regulation, given that the main feature that contributed to the increase in capital requirements – the CVA charge – does not apply to OTC derivatives with a non-financial counterparty.

For centrally cleared trades (at least those cleared with QCCPs), capital requirements are higher than in the previous regulation (2% increase in risk weights for trade exposures).

Still, there is a difference in terms of capital requirements between bilateral and centrally cleared trades.As a result:

- Incentives for banks to negotiate OTC derivatives with non-financials through QCCP because of beneficial risk weights do exist, but are nonetheless lower than in the case of other types of OTC derivatives. This is due to the absence of a CVA charge in bilateral trades. Also, these incentives are not substantially different than those in the previous regulatory framework.
- There are also incentives for non-financials to negotiate these contracts bilaterally, instead of through QCCP, since they are not subject to margin requirements, which may involve an opportunity cost and create liquidity risks.

Consequently, in terms of volumes, the new regulation does not seem to have the power to substantially influence the market, altering the share of these contracts negotiated through QCCP or bilaterally.

Regarding the effect on price, given that the increase in capital requirements for these OTC derivatives transactions with non-financials has been marginal (both QCCP and bilateral), and that only a share of those incremental costs would be passed through to the non-financial counterparty, the overall effect on price on this type of derivatives should not be very significant, in principle.

5.3. Lending to SMEs

SMEs are often referred to as the 'backbone' of the European economy because of the fundamental role they play in providing employment and sustaining economic growth. However, SMEs tend to face structural financing obstacles as they are largely dependent on bank financing. Larger companies, on the other hand, have a more diversified source of funding because of their access to capital markets.

A major change that could potentially affect SME lending (and also other exposure classes) would be the introduction of the so-called capital conservation buffer (2.5% of risk-weighted assets) in addition to the current 8% total capital requirement. This new requirement will be phased in from 2016 to 2019. Both the banking industry and the SMEs sector have expressed their anxiety about the potential impact of this measure, which is applicable to all exposure classes, and argued that this requirement should be neutralised for SME exposures.

Responding to this concern, the EU legislator introduced a specific provision in the CRR aimed at safeguarding and increasing the flow of credit to SMEs. Capital charges for exposures up to EUR 1.5 million to SMEs are reduced through the application of a supporting factor equal to 0.7619 which neutralises the increase of capital requirements foreseen in Basel III (0.7619 corresponds to the ratio between the current ratio – 8% – and the new one inclusive of the capital conservation buffer, 10.5%). Among the relevant criteria for defining SMEs in this respect is a maximum annual turnover of EUR 50 million.

The relationship between banks' capital and lending policies is difficult to assess. According to the ECB, the reasons for the tightening of lending standards may derive to some extent from banks' capital constraints. However, the liquidity position, access to market financing and economic outlook also play an important role.

Data on the precise developments in bank lending to SMEs are not readily available. The CRR requires banks to report to competent authorities every three months on the total amount of exposures to SMEs, but this requirement is effective only from 1 January 2014 onwards.

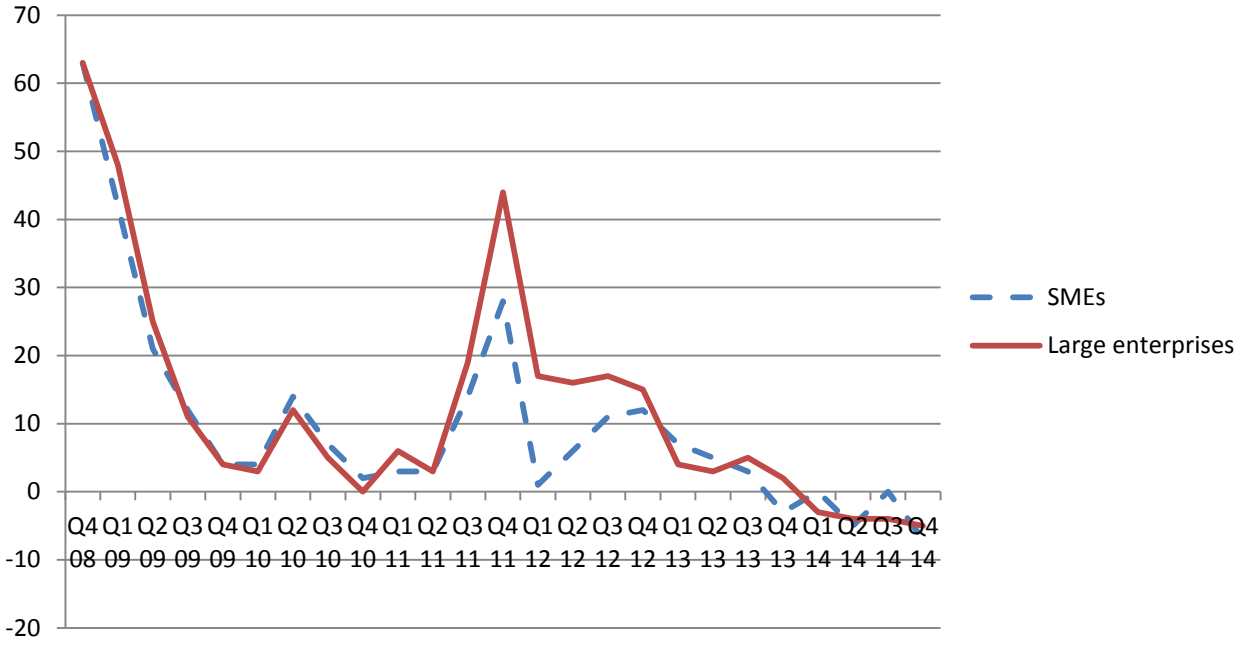
The ECB regularly publishes the Euro-area bank lending survey. The results of the survey include quantitative data indicating how European banks' desire to provide loans to enterprises changes over time. More importantly, the survey also makes a distinction between loans to SMEs and loans to large corporates. The sample group of banks participating in the ECB survey comprises more than 100 banks, representing all of the euro area countries, and takes into account the characteristics of their respective national banking structures.

The change in the banks' desire to provide lending to enterprises is measured using a synthetic indicator which is calculated as a weighted difference between the banks reporting the tightening of their credit standards[40] and those reporting the easing of credit standards.

Chart 5.4 presents an overview of the changes in banks' credit standards over the last 6 years (24 quarterly observations), starting from Q1 2009. As can be seen from the chart, in the periods between Q1 2009 to Q2 2011 as well as Q4 2013 to Q4 2014, Euro-area banks do not make a distinction between SMEs and other enterprises when deciding to change their policies on loans acceptance.

Nevertheless, Q3 2011 to Q3 2012 indicates that tightening credit standards in the banks' policies was more beneficial to SMEs than to large corporates The value of this synthetic loans tightening/easing indicator (see chart 5.5) illustrates a permanent positive shift in the banks' policies towards SMEs.

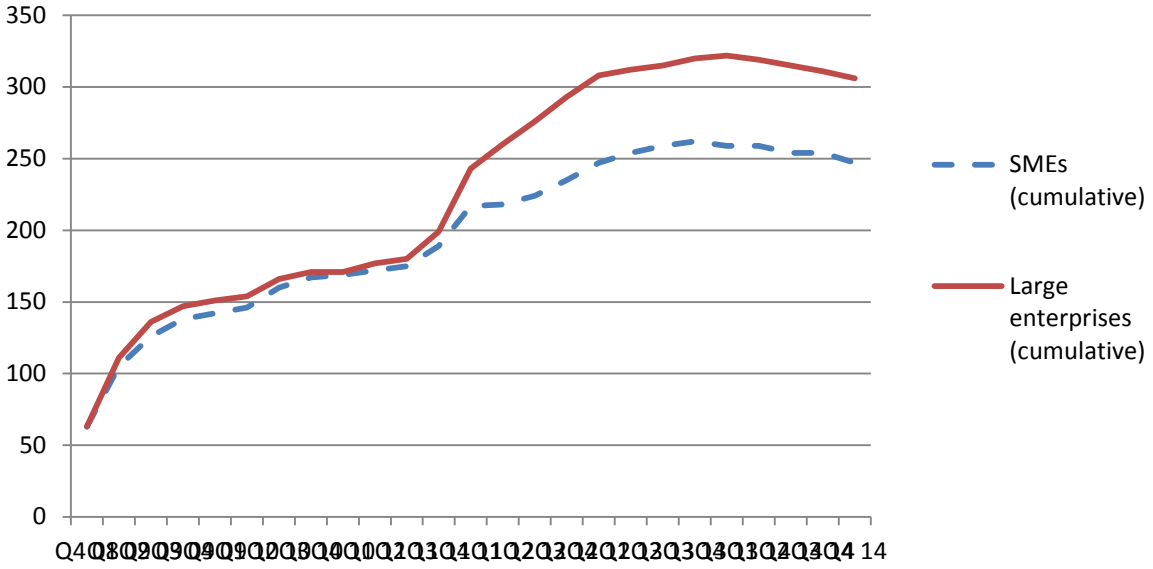
Chart 5.4: Tightening (+)/easing (-) of credit standards in Euro-area banks over 2009 - 2014



Source: ECB, own calculations

[40] The written and unwritten criteria, or other practices related to a bank's lending policy, that define the types of loan a bank considers desirable or undesirable, its designated geographical priorities, collateral deemed acceptable or unacceptable, etc. For the purposes of the ECB lending survey, changes in written loan policies, together with changes in their application, should be reported.

Chart 5.5: Cumulative tightening (+)/easing (-) of credit standards in Euro-area banks between 2009 - 2014



Source: ECB; European Commission calculations

It should be noted that Q3 2011 to Q3 2012 was marked by a number of events that could have had an impact on banks' policies on loans acceptance:

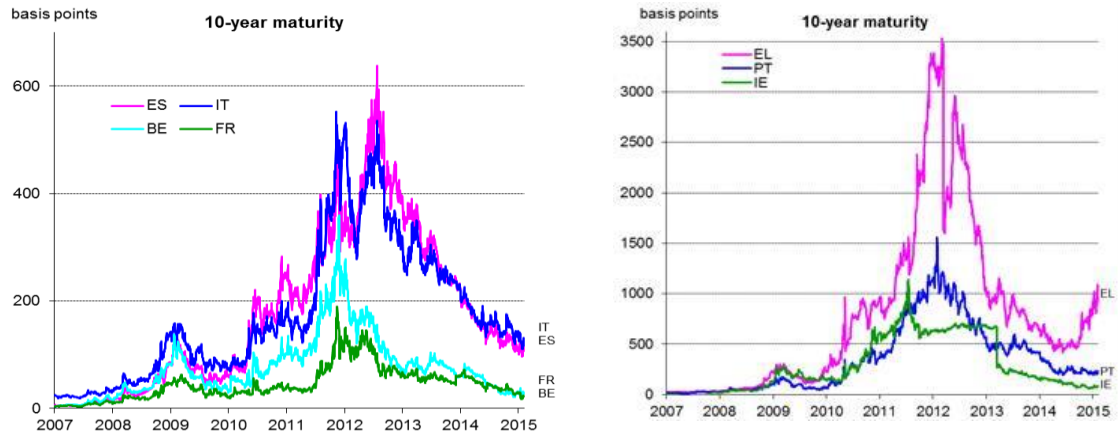
1) Change in the regulatory environment. In July 2011, the Commission adopted the CRR and CRD IV proposal. The Commission did not propose a specific SME supporting factor in the CRR. The banking industry (and, presumably, SMEs), however, supported addressing the possible increase in banks' capital requirements that could take place with respect to loans provided to SMEs.[41] Instead, on June 12th 2012, the Economic and Monetary Affairs Committee (ECON) of the European Parliament adopted the report prepared by Rapporteur Othmar Karas, which already included an SME Supporting Factor.

2) Increased intensity of the sovereign crisis. Starting in Q3 2011, the euro-area sovereign crisis intensified, sending bond yields for some sovereigns to record levels, including the relevant CDS prices (see chart 5.6). This reduced expectations for economic recovery and growth in these Member States considerably.

Worsening economic prospects due to the sovereign crisis undoubtedly had an impact on the tightening of banks' credit standards, which is validated by the ECB lending survey. From Q4 2008 to Q2 2009 – another period of significant tightening – no difference was observed between SMEs and large corporates with respect to the change of banks' policies on loan acceptance (see chart 5.5).

[41] See, for example the presentation of June 2011 from the Italian Banking Association and R.E TE. Imprese Italia (Italian Enterprise Network)

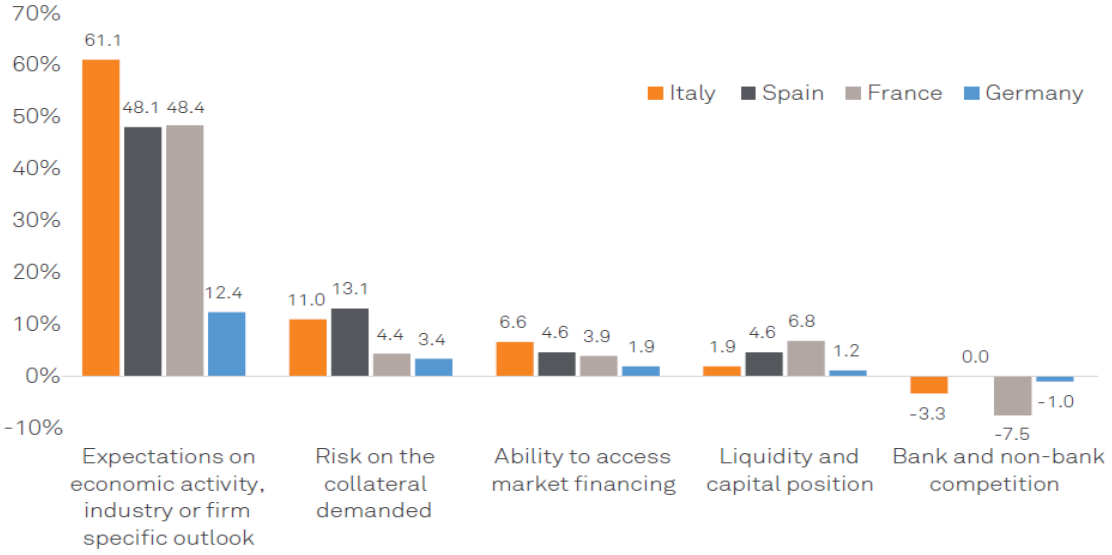
Chart 5.6: Sovereign bond spreads to German bund



Source: Bloomberg, own calculations

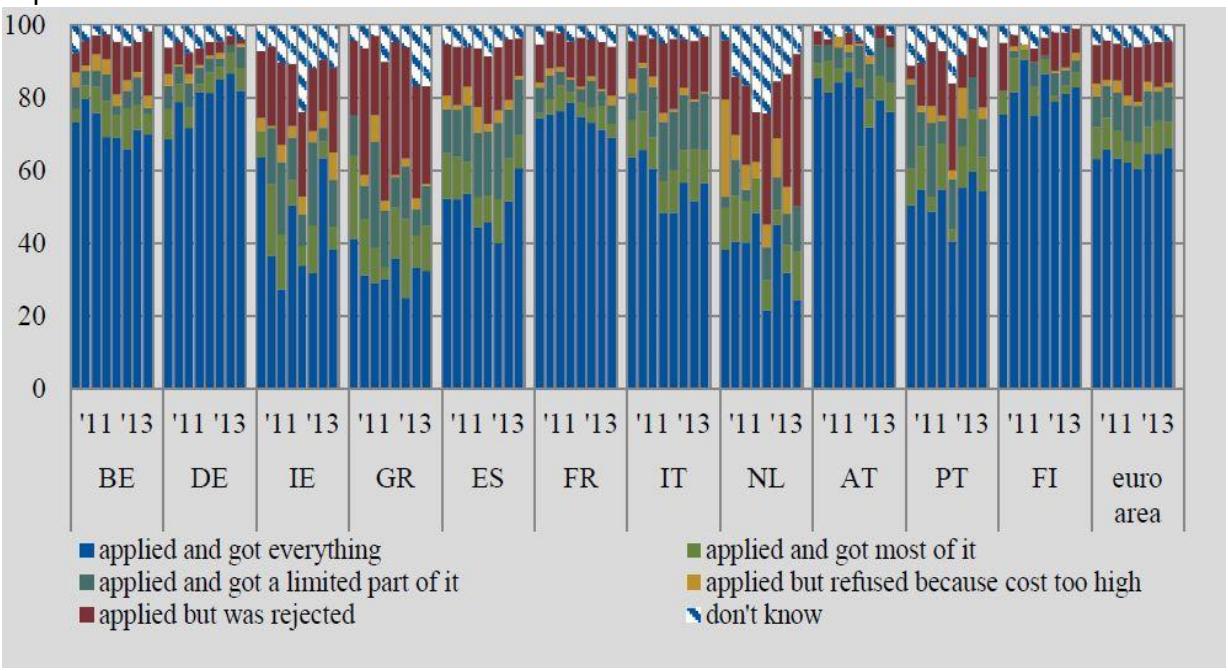
The ECB lending survey does not include a regular assessment of the regulatory impact on the change in banks' loan acceptance policies. However, chart 5.7 provides an important insight into the relative importance of other factors affecting banks' attitude towards loans acceptance. As can clearly be inferred from the graph, the expectations for economic activity played a much more significant role than other factors. More importantly, according to bank responses, the **liquidity or capital position of banks**, which as defined in the survey could have been affected by regulatory and supervisory changes, **had a very limited role on banks' loan acceptance policies.**

Chart 5.7: Factors affecting credit standards applied to approval of SME lending, Q2 2008 – Q2 2014.



Source: EBF Facts & Figures 2014; ECB lending survey

Chart 5.8. Outcome of applications for bank loans in the past 6 months by SMEs across euro area countries, percentage of firms that applied for bank loans. Figures compare the March-September 2010 round with the October 2013-March 2014 round.



Source: ECB, April 2014

The relatively low importance of the banks' capital position on their policies for loan acceptance is further evidenced by the recent ECB Survey on the Access to Finance of Enterprises (SAFE), which identified great disparities among euro area Member States despite the fact that the single rulebook has been applied in the EU as of 2014 (see chart 5.8). Loans acceptance levels remain largely dependent on the Member State from which a particular SME comes. SMEs from BE, DE, AT, FR and FI are more likely to obtain favourable news from banks than SMEs from crisis-hit countries, such as IE, PT or GR. The chart suggests that beyond a change in the SME discount factor, more fundamental macroeconomic variables come into play, including economic health and the prospects of a sovereign and its banking sector; the effectiveness of the monetary transmission mechanism; etc.

Moreover, even at the level of individual Member States, loan acceptance rates remained relatively stable during the period March 2010 to March 2014, except in a few Member States like IE and NL where there was a large variation in the rates for loan acceptance.

Figures show that 80% of German SMEs that request a loan succeed in getting the full amount of credit. This percentage falls below 60% in Southern European countries and even as low as 30% in Greece. Moreover, in Greece this figure concerns the 18% of SMEs that actually applied for a loan; 29% of them did not apply for fear of rejection.

5.4. Effect of CRR requirements on infrastructure financing: some preliminary ideas

Definition of infrastructure for the purposes of this exercise

Infrastructure is a heterogeneous asset class for which it seems difficult to establish an unanimously accepted definition. The OECD glossary defines infrastructure as 'the system of public works in a country, state or region, including roads, utility lines and public buildings'.[42] Other sources, including numerous academics, also count, for instance, energy generation as part of the infrastructure sector, i.e. mainly power plants (gas, coal, wind farms, etc.) or energy commodities extraction and treatment facilities (refinery, mines). Some difficulties may thus occur when examining vertically integrated companies, such as an energy provider that performs uranium extraction, power generation, and power distribution. Depending on the retained definition, only the distribution component, which requires the construction of a grid network, might be considered infrastructure. Similarly, telecommunication industries present the same difficulty where optical fiber cable networks are considered. Some might considered these networks infrastructure, even though they may not count telecommunication companies themselves as infrastructure.

As a consequence, the scope of the definition of infrastructure will greatly determine the level of involvement by public actors in this sector. According to a broad definition, infrastructure is built and operated in an environment with little public involvement, as is the case for power plants, energy commodities, purely private telecommunication networks and toll roads for instance. According to a narrower definition, infrastructure mainly involves joint projects and cooperation between the public sector and private sector. These generally take the form of a Private Public Partnership (PPP) with the aim of building public infrastructure. The following sections will focus particularly on public infrastructure, in accordance with the latter, narrower definition of infrastructure.

Financing schemes

The financing of public infrastructure can be directly provided by the public authority. In this case, there is no need for a private company to finance the operation – via credit institution loans for instance – since the public authority provides funds ex ante to the construction company in order to build the infrastructure. It is the reason why only PPP operations, requiring specific financing schemes, will be detailed in this part.

The financing of public infrastructure by the private sector via PPPs usually implies the creation of a project company comprising private partners, which generally involve one or several construction companies. The project company then enters into a contract with a public entity (known as the off-taker in project finance) through which it ensures the construction and management of the infrastructure. In order to finance construction, the project company

[42] http://stats.oecd.org/glossary/detail.asp?ID=4511.

can rely on the capital invested by the private partners, but it is essentially financed by banking loans or bonds issuance.

This scheme can also be applied to private infrastructure financing. The final recipient of the infrastructure – which may be different from the construction company – is then the project company itself and its private partners (e.g. power providers), whilst the construction company may have absolutely no link with the project company.

Nevertheless, public infrastructure can also be financed directly with corporate debt and equity, without having to resort to ad hoc project companies. In this case, it seems unrealistic to distinguish construction companies' funding used for financing infrastructure, from funding intended to finance other types of activities. Given that the largest infrastructure operations are financed through project companies, and considering that construction companies may conduct a wide range of operations leading to a fungibility obstacle, this study will restrict analysis to financing schemes based on project companies. It thus excludes financing schemes based on corporate debt and equity.

Financing instruments and general figures

In 2011, infrastructure project investment reached USD 405 billion (USD 94 billion for PPPs) worldwide. Western Europe represented EUR 57 billion of this amount, of which EUR 21 billion was for PPPs.[43] If infrastructure projects were globally driven by Asia, Europe remained one of the major players in terms of PPPs operations, with France representing around EUR 14 billion[44] in its own right.

Equity represented only 15% (USD 62 billion) of financing instruments worldwide, with only 5% in Europe. Except for project stakeholders such as construction companies and operating companies, equity is mostly held by infrastructure funds or pension funds. Unlike usual corporate stock, project equity generally has an expiration date. Depending on whether the project company owns the underlying asset, the return on invested capital will either come from the proceeds of the sale of the asset, or just from the dividend payments made during the life of the project. Project equity is by nature unlisted, and therefore no market values are available. There are, however, listed investment funds, albeit very few, investing only in project equity.

Loans represented the majority of financing instruments (USD 328bn, 81%), with credit institutions playing the primary role in issuance. This is the case even if insurance companies in particular hold loans on their balance sheets by direct issuance or transfer of credit claims, e.g. through securitisation.

Infrastructure bonds constituted a minor part of total funding with 4% of global financing instruments (USD 16 billion). However, new forms of credit enhancement through guarantees

[43] Agefi 01-26-2012 based on Dealogic data.
[44] 150% more than in 2010, mainly due to TGV lines projects, including "Tours-Bordeaux" (EUR 7.8bn)

could lead to an expansion in the market for such securities (for instance the EU2020 Project Bond Initiative).[45]

Remuneration of private actors in PPPs operations

Once the facilities are built, the project company manages the infrastructure, which can consist solely in maintenance; this is generally the case for schools, public hospitals, public buildings, etc.; it can, however, also include operating a service of general interest under a public service delegation agreement, by which the public authority is allowed to ensure close supervision. Delegations of public services are frequent in the case of port or airport operating, water supply, waste disposal facility, transport facilities in urban areas, etc.

Given this distinction, the remuneration of the project company can take different forms. In the Private Finance Initiative model designed by the UK government at the start of the 1990s, the project company is remunerated by a fixed rent from the co-contractor – generally for a fairly long-term period (20-30 years). This enables the company to pay back debt and issue dividends to investors. In this case, PPPs are categorised as an availability-based project, where the company only provides building and maintenance services. In the traditional French model of public service concession,[46] the company takes on more risks since the company's remuneration is now substantially ensured by the private users of the facilities, and thus dependant on the level of usage. In this case, the company also operates a public service via a public service delegation and the PPP is classified as a demand-based project. Other remuneration models or combinations of these models can exist, but they *a priori* do not influence the prudential treatment applicable to credit institutions' exposures to project companies.

Nature of risks

Blanc-Brude (2013) mapped the main risks associated with infrastructure project investments, distinguishing between endogenous and exogenous risks.

Main endogenous risks include construction risk, e.g. delays or cost escalation; operating risk, e.g. higher maintenance costs; and traditional financial risks, e.g. inadequate hedging of revenue streams. These risks potentially affect all kinds of infrastructure projects.

Main exogenous risks include political/regulatory risk, which predominantly affects availability-based PPPs; and the revenue risk, which, as already explained, concerns only demand-based projects. Finally, infrastructure projects may also bear an exogenous handback risk (lower than expected value of the asset at handover), which does not concern availability-based PPPs, since the infrastructure asset belongs to the public authority from the beginning of the operation.

[45] According to an EU forecast € 10-20 billion per annum by 2020.
[46] It is generally a public works concession.

Most PPPs are availability-based projects, for which there is neither revenue risk nor handback risk. This analysis should provide arguments to demonstrate that PPPs are *a priori* less risky than private infrastructure projects. This is at least the case in countries where the political/regulatory risk is unlikely to be substituted for the revenue risk. Indeed, the public authority could be unable to service its external financial obligations (default risk) or could try to modify the terms of agreement (remuneration, for instance) if they happened to be too favourable for the private actors.

As the construction risk does not concern the entire infrastructure project's life, another feature of such exposures is that the initial construction phase risk is generally followed by the less risky operation period.[47] Besides, once the construction phase is finished, the recovery rate in case of default of the project company is likely to increase, further improving the global credit quality of the exposure. According to Moody's Finance Study (2013), the credit quality of banks loans for project finance improve significantly after an initial three year period. This is not the case for traditional corporate's credit quality, which is rather stable over time.

Prudential treatment under the Credit Risk Framework

RW calculation. Regarding prudential aspects, the risk weight calculation for debt exposures attributable to infrastructure financing operations was not modified with the regulatory evolution of Basel II into Basel III framework. In any case, debt exposures of credit institutions to project companies will be considered 'exposures to corporates' with regards to credit. For credit institutions that use internal models, theses exposures belong to a specific sub-set of 'corporate exposures' called 'specialised lending'.

In CRR's standardised approach to credit risk, a weighting between 20% and 150% is applied for these exposures, depending on the credit quality of the project company (Article 122). This should be estimated by an registered ECAI. If the project company is not rated, debt exposures will be assigned a weighting equal to the maximum [100%; risk weight of exposures to the central government of the jurisdiction in which the corporate is incorporated]. If, for instance, a credit assessment for a specific project bond issuance (issue credit assessment) exists, then it shall be used to determine the risk weight to be assigned to these specific exposures (Article 139).

For credit institutions using the Internal ratings-based (IRB) approach infrastructure project debt exposures should fall into the 'specialised lending' portfolio. They can be treated according to the Advanced IRB method – which allows credit institutions to determine probability of default (PD) and loss given default (LG) –, or the Foundation IRB method – which restricts banks' own estimates to PD. Moreover, for exposures for which an institution is not able to estimate PDs, the credit institution can assign risk weights to these exposures

[47] See EIOPA/13/513 (2013): Technical Report on Standard Formula Design and Calibration for Certain Long Term Investments.

according to a CRR fixed table (Article 153), based on qualitative criteria (e.g. economic strength) as well as the maturity of the exposure (above/below 2.5 years); in the case of exposures attributable to infrastructure projects, the maturity should be superior to 2.5 years (at least initially).

Credit risk mitigation. Credit institutions' infrastructure exposures can receive unfunded protections (guarantees) from other financial or corporate institutions, or, in some structures, directly from central/local governments or public sector entities. These external guarantees might allow the project company to benefit from lower interest rates and a better rating from ECAIs. In addition, CRR offers a specific prudential treatment when using guarantees, which are termed 'unfunded credit protections' (Article 203) – a sub-set of the general 'credit risk mitigation' category. A guarantee permits the lowering of the weighting which would have been otherwise applied through a substitution mechanism. If, for instance, a company offers a full guarantee to its subsidiary – let us assume the subsidiary is the project company – the credit institution could consider the exposures on the subsidiary as an exposure to the parent company for credit risk aspects.[48] The same would apply if the guarantee were provided by a public entity, since the exposure would then be considered an exposure on the public entity for prudential aspects. However, this RW substitution mechanism is not really introduced by CRR; it is roughly similar to the one permitted by the previous regulatory framework.[49]

General tightening of the regulatory framework

As with the other types of credit exposures, infrastructure financing should be affected by the global tightening of capital requirements under the transition to Basel III (new definition of eligible capital, increase in minimum requirement under Pillar 1, additional capital buffers, etc). The increase in capital requirements may affect the financing costs to the same extent. In this case, there is no obvious reason to think that this global tightening will penalise infrastructure financing more than other types of financing.

The question is how additional capital requirements will impact the price of this type of loans For activities with little profitability, like some PPPs, if the profitability of low-margin activities came under a certain absolute threshold banks might turn away from these operations. Moreover, the increase in capital requirement might theoretically induce a bias in credit institutions' preferences. It is, however, hard to say in which direction this bias would go; depending on bank-specfic factors (like capitalization) it could either be for less risky operations or for riskier ones.

[48] Provided that the parent company presents a better credit quality than the subsidiary.
[49] Funded credit protections (e.g. real estate collateral for IRB banks) can also be applied in principle.

6. References

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