CRD IV - Impact Assessment of the different Measures within the Capital Requirements Directive IV

STUDY
Abstract
The three main pillars of the new regulatory framework for banks are: capital, leverage and liquidity requirements. The assessment of the CRD IV measures shows that there is a sound chance of increasing stability of the banking sector resulting in net benefits for the overall economy. Nevertheless, these findings are surrounded by a high degree of uncertainty in connection with the actual behaviour of the involved market participants. Empirical evidence for the EU shows that the links between the proposed restrictions and the portfolio choice of banks are weak. The quantitative analyses indicate that in the short run financing costs of banks will increase by 0.06% per additional percentage point of regulatory capital requirements. The impact of liquidity requirements will be in the range of 0.05% per percentage point. The growth impact in the short run is estimated to be -0.18% for capital and -0.15% for liquidity requirements (per percentage point). In the long run the impact will be close to zero. Capital regulation beyond 13% capital requirements and above 5% additional liquidity are associated with excessive macroeconomic cost unlikely to be recovered from gains from increased economic stability.
This document was requested by the European Parliament's Committee on Economic and Monetary Affairs.

**AUTHOR(S)**

Prof. Dr. Udo REIFNER, Institut für Finanzdienstleistungen e.V. (iff), Hamburg
Prof. Dr. Doris NEUBERGER
Roger RISSI, lic. oec. publ., FRM
Sebastien CLERC-RENAUD, Institut für Finanzdienstleistungen e.V. (iff), Hamburg

with research assistance of Daniel KRAUS, Oliver MÄSCHLE, Saskia LASER and Stephan HACKENBERG

**RESPONSIBLE ADMINISTRATOR**

Doris KOLASSA
Policy Department Economic and Scientific Policy
European Parliament
B-1047 Brussels
E-mail: Poldep-Economy-Science@europarl.europa.eu

**LINGUISTIC VERSIONS**

Original: EN
Abstract: DE, FR

**ABOUT THE EDITOR**

To contact the Policy Department or to subscribe to its newsletter please write to: Poldep-Economy-Science@europarl.europa.eu

Manuscript completed in June 2011.

This document is available on the Internet at: http://www.europarl.europa.eu/activities/committees/studies.do?language=EN

**DISCLAIMER**

The opinions expressed in this document are the sole responsibility of the author and do not necessarily represent the official position of the European Parliament.

Reproduction and translation for non-commercial purposes are authorised, provided the source is acknowledged and the publisher is given prior notice and sent a copy.
CONTENTS

LIST OF ABBREVIATIONS 5

EXECUTIVE SUMMARY 6

1. FINANCIAL INDUSTRY AND REGULATION 9
   1.1 Lessons from the financial crisis 9
   1.2 The overarching framework of the new regulatory efforts 10
   1.3 Conclusion regarding the regulatory framework 13

2. THE EFFORTS OF THE EU: THE CRD IV MEASURES 14
   2.1 The pivotal role of banks for the EU 14
   2.2 Goals and measures 15
   2.3 Timing of implementation 16

3. CRD IV MEASURES: IMPACT ASSESSMENT 18
   3.1 Requirements for the efficiency of the CRD IV measures 18
   3.2 Cost-benefit: effects of CRD IV measures on banks 19
      3.2.1 Capital requirements 19
         3.2.1.1 Capital requirements and bank economic capital 19
         3.2.1.2 Risk estimation and risk-weighted assets 22
         3.2.1.3 Definition of eligible regulatory capital: the issue of contingent capital 23
         3.2.1.4 Conclusion on higher capital requirements and eligible regulatory capital 25
         3.2.1.5 Counter-cyclical capital requirements 25
         3.2.1.6 Conclusion on counter-cyclical capital requirements 28
      3.2.2 Leverage Ratio 29
         3.2.2.1 Definition of leverage and leverage ratio 29
         3.2.2.2 Effects of introducing a leverage ratio 30
         3.2.2.3 Conclusion on leverage ratio 33
      3.2.3 Liquidity standards 33
         3.2.3.1 Benefits of liquidity standards 33
         3.2.3.2 Possible unintended consequences of liquidity standards 36
         3.2.3.3 Calibration of liquidity standards 37
         3.2.3.4 Effects of liquidity requirements on interest rates 38
         3.2.3.5 Conclusion on liquidity standards 40
      3.2.4 The cost of banking – Weighted Average Cost of Capital (WACC) and credit interest rates 40
         3.2.4.1 Capital Requirements Scenario 1: Fixed equity returns and debt interest rates 40
         3.2.4.2 Conclusion on Scenario 1 43
3.2.4.3 Capital Requirements Scenario 2: complete/incomplete pass-through of increased bank financing costs to bank customers 43
3.2.4.4 Capital Requirements Scenario 3: The banks’ financing costs do not change 44
3.2.4.5 Conclusion on Capital Requirements Scenarios 2 and 3 45
3.2.4.6 Overall conclusion on capital requirements scenarios 45

3.2.5 Banks’ Portfolio Selection 45
3.2.5.1 Effects of CRD IV on banks’ investment portfolios 45
3.2.5.2 Conclusion on banks’ portfolio selection 50

3.2.6 Integrated impacts of capital requirements, liquidity standards and leverage ratio on a bank 51

3.3 Cost-benefit: effects of CRD IV measures on banking market competition and equilibrium 52

3.4 Cost-benefit: effects of CRD IV measures on business cycles and economic growth 53

3.4.1 Benefits to economic output and growth 53
3.4.2 Costs to economic output and growth 54
3.4.3 Conclusion on cost-benefit: effects of CRD IV measures on business cycles and economic growth 59

3.5 Cost-benefit: effects of CRD IV measures on the overall stability of the financial system; the issue of SIFIs 60

3.6 Cost-benefit: effects of CRD IV measures on the efficiency of monetary and fiscal policy 62

CONCLUSIONS 65

ANNEX I: MACROPRUDENTIAL FINANCIAL REGULATION APPROACH - THEORETICAL AND EMPIRICAL BACKGROUND 68

ANNEX II: RELATION OF CRD IV TO OTHER REGULATORY MEASURES 70

ANNEX III: CRD IV MEASURES 71

ANNEX IV: OVERVIEW ON THE STRUCTURE OF A BANK’S BALANCE SHEET AND TYPES OF CAPITAL 80

ANNEX V: FORMULAS 82

GLOSSARY 83

LIST OF TABLES 99

LIST OF FIGURES 99

REFERENCES 100
# LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCBS</td>
<td>Basel Committee on Banking Supervision</td>
</tr>
<tr>
<td>BIS</td>
<td>Bank for International Settlements</td>
</tr>
<tr>
<td>CCB</td>
<td>Capital conservation buffer</td>
</tr>
<tr>
<td>CCCB</td>
<td>Counter-cyclical capital buffer</td>
</tr>
<tr>
<td>CCF</td>
<td>Credit Conversion Factor</td>
</tr>
<tr>
<td>CCPs</td>
<td>Central Counterparties</td>
</tr>
<tr>
<td>CET 1</td>
<td>Common Equity Tier 1 ratio</td>
</tr>
<tr>
<td>CoCo</td>
<td>Contingent convertible</td>
</tr>
<tr>
<td>CRA</td>
<td>Credit Rating Agencies</td>
</tr>
<tr>
<td>CRD</td>
<td>Capital Requirements Directive (I-IV)</td>
</tr>
<tr>
<td>CVA</td>
<td>Credit Valuation Adjustment</td>
</tr>
<tr>
<td>EPE</td>
<td>Expected Positive Exposure</td>
</tr>
<tr>
<td>ERBA</td>
<td>External Ratings Based Approach</td>
</tr>
<tr>
<td>ESRB</td>
<td>European Systemic Risk Board</td>
</tr>
<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>IRBA</td>
<td>Internal Ratings Based Approach</td>
</tr>
<tr>
<td>LCR</td>
<td>Liquidity Coverage Requirement</td>
</tr>
<tr>
<td>LGD</td>
<td>Loss given default</td>
</tr>
<tr>
<td>LR</td>
<td>Leverage ratio</td>
</tr>
<tr>
<td>LTI</td>
<td>Loan-to-income</td>
</tr>
<tr>
<td>LTV</td>
<td>Loan-to-value</td>
</tr>
<tr>
<td>NSFR</td>
<td>Net Stable Funding Requirement</td>
</tr>
<tr>
<td>RWA</td>
<td>Risk-Weighted Assets</td>
</tr>
<tr>
<td>SIFIs</td>
<td>Systemically important financial institutions</td>
</tr>
<tr>
<td>SME</td>
<td>Small and Medium Enterprise</td>
</tr>
<tr>
<td>VaR</td>
<td>Value-at-Risk</td>
</tr>
<tr>
<td>WACC</td>
<td>Weighted Average Cost of Capital</td>
</tr>
</tbody>
</table>
EXECUTIVE SUMMARY

The primary goal of the envisaged CRD IV measures is to enhance the stability of banking to foster stable economic growth. The planned CRD IV measures impact banks’ balance sheets in a twofold way:

1) Capital and leverage requirements will affect the liability side resulting in a potential change in their funding costs (financing portfolio), and
2) Regulation with respect to liquidity will influence banks’ investment opportunities on the asset side of the balance sheet (investment portfolio).

Within the framework of their asset and liability management, banks will try to balance/adjust the risk-return profile of the overall balance sheet. Banks’ decisions on lending rates will not only affect the overall availability of loan volume but will also spill over to the capital markets as firms and households try to substitute bank loans with other forms of financing. The lower the effects of CRD IV on banks’ funding costs and the lower the ability of banks to pass through higher funding costs to customers, the lower will be the possible negative effects on investments and economic growth. The changes in the financial landscape will also alter the effectiveness of monetary and fiscal policy. Therefore, it is important to align monetary, fiscal and industrial policy in order to achieve the goal of higher financial and economic stability (see Figure 1 below).

Figure 1: Impact sequence of CRD IV measures

Source: iff

1 Figure 1 shows in a generic way the subsequent impact on other items; the intensity of the impact of any particular measure has to be determined on each level and affects the following level.
The following table summarises the key findings of this study:

**Table 1: Summary of key findings**

<table>
<thead>
<tr>
<th>Findings</th>
<th>Increase/decrease on sound banking</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measure: Capital Requirements</strong></td>
<td></td>
</tr>
<tr>
<td>Higher Capital Requirements: Empirical evidence shows that (1) the foundations for the calibration of sound regulatory capital are not robust; (2) capital regulation play a secondary role in banks’ capital decisions; (3) well capitalised banks have a better performance over the business cycles.</td>
<td>Increase of financial stability</td>
</tr>
<tr>
<td>Counter Cyclical Capital Buffers: The pro cyclical capital management of banks amplifies the volatility of the business cycles. The new capital regulation will dampen if not reverse this pattern and thereby increase stability of the financial system and the economy.</td>
<td>Increase of financial stability</td>
</tr>
<tr>
<td>The capital requirements have no significant impact on the investment portfolio failures of banks. As a bank increases its capital base, its equity becomes less risky, and therefore the capital markets require a lower return.</td>
<td>No reduction in bank failures</td>
</tr>
<tr>
<td>Increased capital requirements have only a modest impact on cost of capital and interest rates in the short run and thereby on economic growth.</td>
<td>No effect</td>
</tr>
</tbody>
</table>

**Conclusion:** The new capital regulation will increase the stability of the banking system, but only in the sense of bank failure absorption. The likelihood of bank failures is not necessarily directly reduced. Only if the capital regulations restrict the banks’ investment portfolio decisions, the likelihood of bank failures will decrease, too.

<table>
<thead>
<tr>
<th>Measure: Leverage Ratio Requirements</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bankers are procyclically gearing their balance sheet to meet investment opportunities at the price of amplifying the financial and thereby business cycles. A leverage ratio performs just as well as a risk-adjusted measure of capital.</td>
<td>Increase of financial stability</td>
</tr>
<tr>
<td>Analysis provides the insight that the 5% leverage ratio threshold is more binding than the 6% tier 1 risk-based requirement.</td>
<td></td>
</tr>
<tr>
<td>Leverage ratios just as capital requirements have only a modest impact on cost of capital and interest rates in the short run and thereby on economic growth.</td>
<td>No effect</td>
</tr>
<tr>
<td>For European banks the link between banking portfolio quality and leverage ratios is at best weak.</td>
<td>No reduction in bank failures</td>
</tr>
</tbody>
</table>

**Conclusion:** Leverage ratios are highly linked with capital regulations. It is an open question whether this additional regulation increases stability, compared with the capital requirements and pro-cyclical capital buffers.
Findings

**Measure: Liquidity Requirements**

Significant empirical evidence supports the argument that sound liquidity holdings in the banking industry will reduce the risk of contagion and endogenously reinforcing destabilisation of financial market resulting from negative economic shocks. Therefore the introduction of liquidity requirements will foster the stability of banking.

A 1% increase in liquidity requirements raises the funding costs on average by 5 basis points. The effect on different bank types varies relatively little.

**Conclusion:** Liquidity standards have a modest impact on reducing the bank failure risk, however, significantly reduce the risk of financial failure propagation.

**Overall assessment:** Cost/Benefit

Capital and leverage ratios increase interest rates charged by banks only in a very modest temporary way, so the direct effect on growth is negligible, especially in the long run.

**Conclusion:** For the capital requirements decreasing benefits are observed, levelling off at 13%. This result indicates that increasing capital requirements above this level will not further increase the stability of the banking industry.

In the event of a financial crisis due to capital and liquidity buffers the effects are significantly dampened.

The planned combination of capital and liquidity requirements is most efficient for increasing the stability of the financial system. Only capital requirements beyond 13% and above 5% additional liquidity are associated with no extra gains from increased economic stability.

**Source:** IfF research findings.

---

Remark: The discussion on the implementation of liquidity requirements is still at an early stage.
1. FINANCIAL INDUSTRY AND REGULATION

1.1 Lessons from the financial crisis

Lessons from the recent financial crisis are manifold, but – with respect to the regulation of the financial industry – boil down to the following:\(^3\)

1. Capital requirements cannot eliminate the risk of financial crisis happening. However, they force the regulator to intervene earlier than it otherwise would have to. That potentially contributes to a reduction in resolution costs.

2. It is important that banks are in full control of their risks (intellectually and technologically) and that the supervisory authority comprehends the risks involved in the banking business and its relations to other parts in the economy. Regulators need to develop a much better understanding of the financial system as a complex, dynamic, social and interdependent system by using technology which is geared towards understanding and identifying complex feedback mechanisms. A static and linear view of the world is inappropriate.

3. As it will never be possible to prevent financial crises from happening with certainty, capital requirements and adequate risk control systems play an important role in alleviating them. But, additionally, there needs to be a regulatory setup to deal with and resolve financial crises should they occur after all.

4. The different components of the regulatory framework (crisis prevention, crisis management, crisis resolution) need to be aligned with the other elements of the macroprudential framework (monetary and fiscal policy as well as other industrial policies) and constitute a consistent and coherent system of rules in itself, reducing moral hazard problems and dovetailing with adequate incentive structures.

To be efficient and effective (future) banking regulation, restrictions have to be imposed to enforce sound banking and/or the cost of bank failures:\(^4\)

Underwriting standards

Benign macroeconomic conditions might give rise to complacency among market participants leading to an erosion of sound practices (underwriting standards, credit assessment standards) in major sectors of the financial system leading to excessive and uncontrolled proliferation of credit volume. This might be amplified by misaligned incentives culminating in fraudulent practices pervading major financial market segments.

Model failures

Inadequate explicit or implicit assumptions underlying employed risk management tools of financial firms, in particular with respect to estimations of potential losses in the adverse tail of risk distributions, the absence of historical data to calibrate the models on as well as the flawed concept of correlation, coupled with the complexity of financial products sold, created too optimistic and biased estimates of potential future losses.

---


In general, market participants severely underestimate the interplay of the different risk categories (default risks, concentration risks, market risks, liquidity risks and credit risks), and are trapped in a silo mentality, concentrating on managing the corresponding risks in isolation.5

Reliance on and overconfidence in third-party assessments
The unscrutinised use of third-party judgements and assessments (e.g. the unquestioned use of external rating agencies’ assessment of the creditworthiness of a counterparty or a financial product) might lead its user to imagine they are safe while, at the same time, masking weaknesses in the applied assessment models (e.g. insufficient provision of information about the assumptions used in rating structured products). This is true for financial intermediaries as well as for the retail and institutional investors. Weak due diligence practices on the institutional investor side might fuel the issuance of complex structured products.

Incentive schemes and control failures
Wrong incentive schemes (volume driven sales targets) combined with weak controls over on- and off-balance sheet growth as well as inadequate communication and aggregation across business lines and functions.

Incentive distortions
Originators, arrangers, distributors and managers in an originate-to-distribute chain, putting no equity of their own at risk, have insufficient incentives to generate and provide initial and on-going information on the quality and performance of underlying assets. Inefficient incentives due to the corresponding compensation schemes (boni) might aggravate the situation by encouraging disproportionate risk-taking with insufficient regard to longer-term risks. The originate-to-distribute model was developed by large U.S. banks, but adopted by large European banks because of its record breaking profitability6. Securitisation has expanded dramatically over the last decade particularly in the euro area.7

1.2 The overarching framework of the new regulatory efforts
Banking regulation is primarily concerned with ensuring the safety and soundness of the banking system through prudential rules. These rules, known as the Basel Accord, are predominantly decided upon through a rather informal body comprised of world central bank regulators who convene forming the Basel Committee on Banking Supervision (BCBS). The detailed rules and standards they set undergo periodic changes and some very significant final amendments to the Basel II framework (‘Basel III’ which includes the introduction of a global liquidity standard) were adopted by the BCBS and G20 in December 2010, following several years of consultation and discussion.

During that time, the EU, which is supposed to apply these rules in its law, also conducted its own analysis and legislation of the necessary changes ahead of final adoption, and the European Commission produced a public consultation paper outlining how possible changes (the new planned CRD IV measures) could enhance the Directives 2006/48/EC and 2006/49/EC (‘the Capital Requirements Directive’, ‘CRD’). Pending imminent publication of the European Commission’s draft proposals in light of the findings of its own impact assessment of measures, the planned implementation of Basel III for EU credit institutions in the CRD IV is expected in 2011 (see Annex III).

To ensure the efficiency of the new regulatory efforts, the design of new measures has to take into account the effects on the entire economic, political and regulatory landscape.8 Macroprudential financial regulation aims at limiting systemic financial risk. A microprudential regulation focus is, by its conception, aimed at preventing the costly failure of individual financial institutions.9 Macroprudential policy is a complement to microprudential financial regulation and it interacts with other types of public policy that have an impact on systemic financial stability.10

Policymakers and academics agree that the overarching orientation of financial regulation needs to move in a macroprudential direction. A macroprudential financial regulation approach recognises the importance of equilibrium effects, and seeks to safeguard the financial system as a whole. One can characterise the macroprudential financial regulation approach to financial regulation as ‘an effort to control the social costs associated with excessive balance-sheet shrinkage on the part of multiple financial institutions hit with a common shock’.11

---


The overarching goal of a macroprudential financial regulation framework is to ensure the three dimensions of stability of the financial system as a whole: structural stability, functional stability and worst-case stability. The following key characteristics torpedo financial stability:

- (a) systematically important financial institutions (SIFIs) also originally referred to as too-big-to-fail (TBTF)-institutions,
- (b) interdependencies within the financial sector and between the financial sector and the real economy,
- (c) substitutability of a failing institution or its functions provided,
- (d) homogeneity of business models of the financial sector (i.e. diversification of the portfolio of business strategies).

The three pillars of the above macroprudential financial regulation framework to address these threats to financial stability are:

- (a) monetary policy,
- (b) fiscal policy, and
- (c) industrial policy.

Figure 2: Macroprudential policy framework

Source: iff

The overarching goal of a macroprudential financial regulation framework is to ensure the three dimensions of stability of the financial system as a whole: structural stability, functional stability and worst-case stability. The following key characteristics torpedo financial stability:

- (a) systematically important financial institutions (SIFIs) also originally referred to as too-big-to-fail (TBTF)-institutions,
- (b) interdependencies within the financial sector and between the financial sector and the real economy,
- (c) substitutability of a failing institution or its functions provided,
- (d) homogeneity of business models of the financial sector (i.e. diversification of the portfolio of business strategies).

The three pillars of the above macroprudential financial regulation framework to address these threats to financial stability are:

- (a) monetary policy,
- (b) fiscal policy, and
- (c) industrial policy.
Apart from addressing macroprudential dimensions, industrial policy also focuses on microprudential issues, defining the financial constraints of banks. Key aspects of current regulation in that field are: risk measurement methodologies, financial reporting, regulatory capital, funding liquidity standards, collateral arrangements, risk concentration limits, compensation schemes, profit distribution restrictions, insurance mechanisms, and more (for an overview of further measures some of which are being analysed by the parallel ‘Banking Study’, see Annex II). Three of the most discussed ones have been highlighted in the Figure 2: liquidity requirements, leverage ratio requirements and capital requirements.

1.3 Conclusion regarding the regulatory framework
To ensure the economic success of the planned CRD IV measures their impact on the banking industry has to be evaluated taking into account the effects on the economy as a whole by analysing the efficiency/stability of banking, the behaviour of the bank management, the financial market structures, the offerings of the banks to the non-financial sector, fiscal and monetary policy, business cycle and growth, as well as the international effects. The planned measures need to fit into a theoretically sound framework of macroprudential supervision in order to ensure that the benefits of increased stability exceed possible costs of reduced growth. The window of opportunity for a sound and implementable macroprudential financial regulation framework should not be missed.
2. THE EFFORTS OF THE EU: THE CRD IV MEASURES

2.1 The pivotal role of banks for the EU

The effects of the CRD IV measures on financial stability and the real economy depend on the role of banks in the economy. Banks are the anchor point of the European financial system; direct financing by capital market transaction (e.g. by issuing equity or bonds) plays a less prominent role.

Figure 3: The financial structure of the EU


The stability of the EU economy crucially depends on the soundness of the banking system. In Europe, Small and Medium-sized enterprises (SMEs) are seen as the backbone of a sound economy. Since they rely heavily on bank financing, the effects of the CRD IV measures calculated below reflect mainly the effects on SMEs. Empirical research clearly shows that bank failures share some typical patterns. Failures in financial market activities are remarkably few and isolated events in Europe. Bank lending, particularly real estate lending, are often the source of widespread banking problems worldwide: first, low interest rates and/or loose lending standards initiate rising real estate prices encouraged more lending; second, due to an economic recession and/or rebounding interest rates cause the collapse of inflated estate prices, which leads directly to failures.

13 More than 99% of all enterprises in the EU are SMEs. They provide two thirds of the private sector jobs and contribute to more than half of the total value-added created by businesses in the EU (http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/index_en.htm, 16.06.2011).


15 E.g. the Herstatt failure due to non-successful USD speculations, and bank management failures (operational risk), e.g. rogue trading: Barings failures, the case of the Société Générale.
Economic history shows that unsound credit policies and credit risk taking by banks were the most important cause of financial crises triggered by banks, leading to significant and long lasting recessions. The banking failures had more severe effects and/or were more difficult to resolve when they hit banks that were weakly capitalised. Therefore, higher capital requirements as proposed by CRD IV are likely to have large benefits by reducing the probability and severity of financial crises in the European bank-based financial systems.

2.2 Goals and measures
The planned CRD IV measures (including the amendments inserted by CRD II and CRD III ahead of Basel III) are the EU implementation of Basel III and the targeted response to banking sector vulnerability and to some of the main causes of the financial market crisis (see the Annex III for details of the CRD IV measures). The changes to the bank capital requirements address the demonstrated insufficient regulatory capital requirement and the partly doubtful quality of that capital, with the goal to restrict the risk-taking capability over the business cycle (e.g. via a capital buffer or a leverage ratio). To address the risk-taking of banks directly, the new regulation impose guidelines to properly address counterparty risk arising from the failure of a counterparty (for example the Lehman Brothers case, e.g. via higher risk weights on exposures to financial institutions). The financial risks of the maturity/liquidity mismatch resulting from long-term credit exposures an short-term refinancing of banks are handled by funding/liquidity requirements reducing the risk of bank runs (e.g. via two minimum liquidity ratios). The changes planned by CRD IV can be broken down into micro and macro prudential measures on the basis of the main areas they address (see also Annex I for the distinction between the two) as indicated in Table 2 below.

---


18 E.g. by imposing a stricter definition of capital or adding a minimum ratio of common equity.
Table 2: Overview of the CRD IV measures

<table>
<thead>
<tr>
<th>Regulation Dimension / Measures</th>
<th>Banking System Resilience</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strengthening Capital Base</strong></td>
<td>Capital buffers to limit excessive credit growth: introduction of capital conservation buffers and a counter-cyclical capital buffers pending only: Capital surcharges for SIFIs (closer scrutiny in the areas of capital adequacy, liquidity, transparency, compensation structures). Higher capital requirements for systemic derivatives</td>
</tr>
<tr>
<td>of the Banking System</td>
<td></td>
</tr>
<tr>
<td><strong>Goals</strong></td>
<td></td>
</tr>
<tr>
<td>Stability of a Single Bank</td>
<td></td>
</tr>
<tr>
<td>Quality and quantity of capital base: Stricter eligibility rules, core equity, contingent capital, new narrowly defined Common Tier 1 ratio (CET 1), new/increased deductions; unrealised gains and losses</td>
<td></td>
</tr>
<tr>
<td><strong>Restricting Leverage</strong></td>
<td>Maximum leverage ratio (gross, non-risk-based, on and off balance sheet items at full conversion)</td>
</tr>
<tr>
<td><strong>Increasing Liquidity</strong></td>
<td>Short-term stressed ratio (Liquidity Coverage Ratio)</td>
</tr>
<tr>
<td><strong>Strengthening Funding</strong></td>
<td>Long-term structural ratio (Net Stable Funding Ratio, NSFR)</td>
</tr>
<tr>
<td><strong>Enhancing Risk Coverage</strong></td>
<td>Capital incentives for using central counter parties CCPs instead of over the counter transactions Higher capital for inter financial institution exposures Higher capital for counterparty credit risk (derivatives, repos and securities)</td>
</tr>
<tr>
<td><strong>Enhancing risk assessment and measurement</strong></td>
<td>Correcting risk-measurement methods (assessing market risk under stress scenarios)</td>
</tr>
<tr>
<td>Source: IfF presentation based on BCBS and European Commission consultation document of February 2010 ('the Consultation Paper').</td>
<td></td>
</tr>
</tbody>
</table>

### 2.3 Timing of implementation

Regarding implementation of Basel III, the new rules will be implemented from 2013 and be fully applicable from 2019 onwards. Two important elements still need to be filled in: the re-calibration of the risk-weight of assets and a surcharge for Systemically Important Financial Institutions (SIFIs).

In terms of the capital requirement ratios themselves, different implementation deadlines have been set. For example, the upgraded 8% minimum Tier 1 and Tier 2 is applicable from 2013, but the restricted definition of capital will be phased in gradually and will only fully apply from 2018 onwards. Deductions from CET 1 will be phased in (starting with 20% in 2014 to progressively 100% by 2018). Regarding the liquidity standards, observation periods have started for the LCR (2012) and NSFR (2012) before the planned introduction of the minimum standard for the LCR (2015) and NSFR (2018). Likewise, the mandatory introduction of a simple un-weighted capital ratio (leverage ratio) alongside the existing capital ratios, presented in Figure 4, is only planned for 2018.
In the 7 years before its migration to Pillar 1 regulation, the ratio will first undergo supervisory monitoring, a parallel run from 2013 onwards including disclosure of the ratios starting in 2015. Figure 4 shows the timeline of the proposed implementation schedule for the capital ratios:

**Figure 4: Implementation timeline of the capital requirements**

![Timeline of capital requirements](image)

*Source: iff presentation based on BCBS and EC Consultation Paper.*
3. CRD IV MEASURES: IMPACT ASSESSMENT

3.1 Requirements for the efficiency of the CRD IV measures

The goal of the new regulations is that the risk taking of banks becomes more prudential. The key for successful implementation of capital/leverage and liquidity builds on the financial constraints of banks as well as the incentives and mechanisms of banks decision making.

Figure 5: Regulation and the optimisation of banks

To achieve the goal of a stable financial banking system in the European Union, the following conditions must be met:

(1) Efficiency of the new regulations
   a. Regulatory capital and/or leverage requirements must restrict banks’ risk taking and their investment portfolio
   b. Liquidity requirements must increase the buffer of banks in the case of a shortage of liquidity

(2) Full integration of the new measures in the policy landscape, i.e. monetary, fiscal and industrial regulation.

If one of these conditions is not met, the efficiency of the new measures is at least in jeopardy.
3.2 Cost-benefit: effects of CRD IV measures on banks

3.2.1 Capital requirements

3.2.1.1 Capital requirements and bank economic capital

One important lesson from the recent financial crisis is that capital requirements cannot eliminate the risk of such a crisis. The empirical research reveals that: before the financial crisis 2008, stock returns were not influenced by differences in bank capital; stronger bank capital position was rewarded during the financial crisis by an outperforming stock market performance, especially for larger banks; and higher quality forms of capital (Tier 1 capital and tangible common equity) were key for the stability of a bank.19

Banks’ capital structure choices are rather stable over time and bank specific (see figures 6 and 7), and capital regulation may only be of second order role in determining the capital structure of most banks.20

Figure 6: Tier 1 ratio and bank size (average 2000-2010)

Tier 1 Ratio in %

Banks’ capital structure choices are rather stable over time and bank specific (see figures 6 and 7), and capital regulation may only be of second order role in determining the capital structure of most banks.20

Source: own calculation based on Bankscope data.

---


In general banks hold significantly more capital (economic capital) than the minimum required by bank regulators because the banks’ management determines the capital from a market perspective by using their internal value at risk measures, rather than regulatory constraints (see Figure 6). This allows banks to flexibly adjust to the current economic environment. This implies also, that capital regulations so far have not had a controlling impact on the banks’ business constraints.

This implies that capital requirements are an indirect way of influencing the decision making process of banks so as to achieve higher stability. In our view, a more effective and efficient way to achieve this goal would be to implement measures taking direct effect on the asset side of a bank’s balance-sheet rather than on the liability side as it is primarily the former that is the source of risks and to a lesser extent (funding liquidity risk) the latter. As shown in Figure 8, there is no significant relationship between banks’ capital ratios and the quality of their credit portfolios.
Nevertheless, if one is willing to work under the premise that capital requirements are an adequate way of imposing binding restrictions on banks, limiting their risk-taking behaviour and ensuring higher financial stability, theory has provided guidelines of how the risk weights involved in risk-related capital regulation need to be chosen in order to be successful. The theoretically correct (optimal) risk weights depend on three factors: (a) the expected returns of the involved assets, (b) their variance-covariance structure, and (c) the upper bound on the allowable insolvency risk the regulators have in mind.\textsuperscript{21}

Given the goal to strengthen the banks’ capital base, it is reasonable to build up quality capital. The capital metric to determine the required capital has been the ratio of total Tier 1 capital to Risk-Weighted Assets (RWA). The logic of the risk weight metric is based on underlying risk of an exposure: higher risk, implying a higher potential loss must be supported by more regulatory capital. A major drawback of quantitatively and qualitatively higher capital requirements are incentives for regulatory arbitrage through the shadow banking system: in order to mitigate them, an additional request for imposing similar capital requirements on a given asset class for intermediaries in the shadow banking system has been raised.\textsuperscript{22}

\textsuperscript{21} Kim, D., Santomero, A. M., ‘Risk in Banking and Capital Regulation’, \textit{The Journal of Finance} 43 (5), 1988, pp. 1219-1233, \url{http://www.afajof.org/journal/jstabstract.asp?ref=10869}. Note that ideally regulators should therefore determine the correct risk weights for each bank individually as opposed to defining them generally. The regulatory authority would be in a position to limit the insolvency risk of banks to an acceptable level.

\textsuperscript{22} Shadow banks are non-depository banks and other financial institutions (e.g., investment banks, hedge funds, money market funds) that are not subject to the same regulations as depository banks. See Glossary.
3.2.1.2. Risk estimation and risk-weighted assets

Measuring regulatory and economic capital is challenging for many reasons. First, the future is uncertain, so the outcome of a bank’s investment can only be estimated. Second, different business activities of banks generate more than one type of risk: market, credit and operational risk and these different risk types are linked together. Third, the aggregate risk a bank runs and manages by holding capital is generally not equal to the sum of the stand-alone risks associated with each exposure, since the banks investments are impacted by common core risk factors. The covariance of the performance of a bank’s assets shapes the overall risk of a bank’s portfolio. In practice, banks face a critical choice about how to measure and aggregate risks to get a best estimate of their (economic) capital. This is a challenge the regulators also face in their efforts to ensure the soundness of the financial system.

A key input for the capital calculations for credit risk in the banking book are the probability of default, loss given default and exposure at default. The accuracy of these estimates is crucial for the soundness of a bank and even for the financial system. The forward looking rating approach also required by the Basel Committee is the key challenge of all risk evaluations, because the expectations are always characterised by high degree of uncertainty. Risk based regulatory capital requirements incentivise banks to assign in their internal credit assessments upward biased ratings:

(1) as the regulatory capital requirement increase with the risk of credit exposure, better ratings reduce regulatory capital burden;

(2) in a competitive environment a smaller risk premium charged to the bank’s customer, creates a competitive advantage;

(3) point-in-time risk estimates in boom periods allow bankers to assign good ratings, disregarding the future downturns.

Supervisors therefore pay very close attention to the applied rating tools as well as the number and direct of rating overrides. A key finding of the research on the quality of the banks’ risk assessment is that most lenders are in rough agreement on average about the credit quality of common borrowers. But at the same time, some lenders are on average significantly more optimistic than others. These disagreements are primarily idiosyncratic and are not the outcome of a systematic bank policy. Therefore the differences in the banks’ risk assessments probably are the outcome of simple differences of opinion about individual credit quality and errors.

---


Empirical studies show that differences in product-specific risks are not adequately taken into account by the risk-based regulatory capital requirements: while the riskiness of interbank claims has been underestimated, the riskiness of the asset classes’ corporate loans (including SMEs) and retail loans has been highly overestimated.\footnote{Erlebach, J., Grasshoff, G., Berg, T., ‘Die Effekte von Basel III: Gleiche Bedingungen im Bank- und Handelsbuch?’, Die Bank, Heft 10/2010, S. 54-58.} Basel II reduced capital requirements for loans to SMEs as retail customers, but increased capital requirements for loans to SMEs as corporates. As a consequence, the risk premium that the banks charge on non-guaranteed loans to SMEs as corporates increased.\footnote{Altman, E. I., Sabato, G., ‘Effects of the New Basel Capital Accord on Bank Capital Requirements for SMEs’, Journal of Financial Services Research 28, 2005, pp. 15–42, http://www.springerlink.com/content/7727874056277611/; Cardone-Riportella, C., Trujillo-Ponce, A., Briozzo, A., What do Basel Capital Accords Mean for SMEs?, Universidad Carlos III de Madrid, Working Paper 10, Business Economic Series 04 April 2011, http://e-archivo.uc3m.es/bitstream/10016/10892/1/wb111004.pdf.} A movement towards risk-indifferent capital requirements by a leverage ratio (see chapter 3.2.2.) would reduce this distortion.

Most banks address the capital estimates as measures of volatility, by considering the aggregate volatility across all risk types under certain assumptions about correlations between the risk types: "This is a straightforward statistical calculation, albeit one that is critically influenced by the assumptions about correlation that are made."\footnote{Basel Committee on Banking Supervision, ‘The Joint Forum, Trends in Risk Integration and Aggregation’, Bank for International Settlements, 2003, http://www.bis.org/publ/joint07.pdf.}

3.2.1.3. Definition of eligible regulatory capital: the issue of contingent capital

Eligible regulatory capital is loss-absorbing financial capital that can be used in varying types to satisfy minimum capital requirements. In the current discussion on widening the definition of eligible regulatory capital, Tier 1 requirements should be related to equity, or instruments that are contractually guaranteed to convert into equity in financially difficult situations (contingent capital).

To increase loss-absorbency in a financial crisis situation the Financial Stability Board and the European Commission are evaluating the idea of including contingent capital into the definition of eligible regulatory capital which provides an ‘automatic’ mechanism for increasing equity capital, or the contingent write-off of debt in times of financial stress. It enables banks’ to meet their capital needs at times when other options are impossible, either due to unfavourable market conditions or because they are unattractive to investors. This option of an automatic conversion reduces the risk of fire sales and could help avoid contagion in times of systemic financial instability. For the implementation of contingent capital schemes the following concerns have been raised: Design features of this new type of financial instruments are essential for ensuring their effectiveness and their ability to mitigate risks at the bank and systemic level. Currently, these instruments are largely untested and may have undesired impacts for financial stability, particularly in times of elevated market instability. Concerns have been raised regarding the marketability of the contingent capital instruments: (1) the conversion triggers make the pricing of these instruments complex, (2) due to the complexity of these instruments, the risk/return profile and the sufficient demand with investors has to be questioned. Regarding their efficiency to enhance financial soundness the major doubt is that the conversion in a stress situation can be seen as a negative signal leading to further destabilisation and to contagion.
As Tier 1 core capital is scarce, two types of contingent capital instruments may be used: a) First, so-called ‘reverse convertibles’ or ‘contingent convertibles’. a bank issues a debt security that automatically converts into equity if the regulatory capital or stock-market value of the bank falls below a fixed benchmark. b) Second, so-called ‘capital insurance’: a bank purchases an insurance policy that pays off in difficult times, again as captured by some pre-specified trigger.

The key characteristics of Contingent Convertible bonds (CoCos) are: (1) at initiation they enter the balance sheet as debt, therefore benefiting from a tax shield; (2) they contain rules defining under what conditions this source of funding is automatically converted into equity, i.e. primary loss-absorbing capital; (3) this automatic conversion feature is seen as a relatively low-cost mechanism to increase the capital base of a bank in distress, i.e. a situation where traditional seasoned equity offerings might even be impossible.

CoCos reduce greatly the expected economic costs of bankruptcy for the benefit of all debt and equity holders. A CoCos’ buffer may help reduce bank vulnerability and provide greater counter-cyclical resilience. In terms of the amount of CoCos to be issued, estimates range from 2% to 4% of total assets, with a maturity of no less than 30 years. The advantage of CoCos is that at initiation they enter the balance sheet as debt, therefore benefiting from a tax shield with the additional effect of alleviating the principal-agent conflict between management and shareholders of a financial institution. The automatic conversion of this debt instrument under certain conditions into equity is seen as a relatively low-cost mechanism to increase the capital base of a bank in distress. Some other authors also stress that CoCos would be more effective and less costly than a pure common equity requirement. CoCos can create strong incentives for the prompt recapitalisation of banks after significant losses of equity but before the bank has run out of options to access the equity market.

Other authors highlight potential moral hazard problems of CoCos: if the conversion price is set too high (i.e. the number of shares a CoCos holder receives in case of a conversion is too low) CoCos provide a huge disincentive to raise new equity capital in times of distress before conversion has taken place as shareholders benefit most of appreciations in asset value when the bank is just above the trigger point of conversion. Shareholders will be tempted gamble for resurrection trying to expropriate the bondholders resulting additionally in the debt overhang problem.

---

29 There is a close connection between contingent capital and certain proposals to reform executive compensation by imposing bonus holdbacks on key employees of financial firms, i.e. withholding a significant share of each senior manager’s total compensation for several years, where managers would forfeit their holdbacks if the firm were to fail.
CRD IV – Impact Assessment of the Different Measures

Estimates of this wealth transfer from bond- to shareholders are in the range of 50% of the notional of the CoCos and seem to be highly economically significant. Additionally, analyses indicate that bank owner incentives for risk-taking increases by a factor of 5 to 10.

Net increases in asset values shareholders require at that stage to undertake new investments would amount to roughly 20%. Without CoCos this number would be only in the range of 1%.34

### 3.2.1.4. Conclusion on higher capital requirements and eligible regulatory capital

Empirical evidence35 shows that (1) the foundations for the calibration of sound regulatory capital are not robust; (2) capital regulation plays a secondary role in banks’ capital decisions; and (3) the credit supply of well-capitalised banks is less dependent on the business cycle and these banks thereby have a stabilising effect on the economy.36 Increased capital requirements, while reducing the risk of losses for bank debt holders and therefore reducing the risk of spillovers of a bank failure to other financial institutions and investors, has no significant effect on the quality of credit portfolios.

Concerning risk estimation and risk-weighted assets, the financial crisis has shown that the ratings and correlations are vague and sometimes biased estimates of the true risk of the banks’ investment portfolios. To ensure a sound financial system conservative estimates (through-the-cycle estimates) on the risks of single exposures as well as for the correlation of the banking risks have to be imposed by the regulators.

Due to the complexity of design and valuation of contingent capital, it should only be counted as satisfying a part of capital requirements if these financial instruments are of superior quality than equity.

A major drawback of the higher capital requirements are incentives for regulatory arbitrage through the shadow banking system: in order to mitigate them, an additional request for imposing similar capital requirements on a given asset class for intermediaries in the shadow banking system has been raised.37

### 3.2.1.5. Counter-cyclical capital requirements

The fact that banking business is procyclical, i.e. the financial system has an inherent tendency to amplify swings of macroeconomic developments, has its roots in incomplete information about the evolution of investment risks over time (see Figure 9). One intuitively appealing response to the multiplier effects of the financial system is to impose a regime of time-varying capital requirements, with banks being asked to build-up/hold higher capital ratios in booms and reduce their capital in recession.

---


**Figure 9: Return on total assets and the business cycle 2000-2010**

Return on Total Assets in %

Real GDP Growth in %

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure9.png}
\caption{Return on Total Assets in % versus Real GDP Growth in % over the period 2000-2010.}
\end{figure}

\textit{Source:} own calculation based on Bankscope data.

That would imply \textit{ceteris paribus} that the proposed measures would foster the stability of the lending process.\footnote{Through its objective of making capital requirements more risk-sensitive, the Basel II approach (which amended Basel I where capital requirements could only change over time if the structure of a bank’s assets changed, to one where changes in the credit quality of a given portfolio also play a role) made capital requirements more procyclical by construction (i.e. co-moving with the economic cycle). Swings in the real economy are amplified because as the downturn causes some loan quality to deteriorate, rating downgrades call for greater capital requirements to match the increased risk (as larger RWA reduces the capital ratio to below the regulatory minimum), and the conservative stance from banks mean that volumes of credit granted to the economy fall, contracting the economy further, causing further rise in non-performing loans etc. If we understand “procyclicality” as being a description of the resulting amplification of the economic cycle (see the Glossary), then a procyclical capital requirement is a situation whereby the increase (decrease) in economic growth is causing a reduction (build-up) in the level of capital requirement, an increase (decrease) in leverage, more lenient (restrictive) credit standards in terms of screening of borrowers and in collateral requirements, causing them to be in a weaker position to absorb losses when the cycle turns. The CRD IV measure introducing an extra capital buffer (a stock) seeks to mitigate this procyclicality with counter-cyclical requirements (building up capital in good times and reducing it in more difficult times). The additional counter-cyclical buffer of between 0-2% will not only protect the banking sector from losses in stress periods after a boom, but help ensure that credit availability is not affected in such a negative way as experienced during the crisis.}

26
However, counter-cyclical capital requirements face two critical challenges: (1) The timing and the definition of booms and recession: For an efficient counter-cyclical capital requirement to work, the regulator must be in the position to accurately predict the business cycle, to prevent regulatory imposed business cycles to occur. (2) The fact, that the current regulatory capital requirements are a non-binding constraint even in recessions makes high capital requirements in booms necessary: In order to have time-varying capital ratios limiting the procyclical banking business, "the regulatory minimum in good times must substantially exceed the market-imposed standard in bad times. Thus if the market-imposed standard for equity-to-assets in bad times is 8%, and the regulator wants banks to be able to absorb losses of, say, 4% of assets without pressure to shrink, then the regulatory minimum for equity-to-assets in good times would have to be at least 12%." Moreover, a loss of 4% of assets is lower than that of the major banks during the recent financial crisis; according to the IMF, in the period 2007-2010 the cumulative credit losses at U.S. banks amounted to about 7% of assets. Based on this experience, the regulatory minimum equity-to-assets ratio in good times would have to be 15%. These levels obtained from a macroprudential calculation are significantly higher than those resulting from a microprudential one that asks only how much capital is necessary to avoid failure.

For the European Union counter-cyclical capital ratios can be observed, meaning that instead of using their capital buffers in an economic downturn, banks are to the contrary increasing their buffer (see Figure 10). The new capital regulations will reverse this pattern, implying *ceteris paribus* that the proposed measures would foster the stability of the financial system and the economy.

---


Figure 10: Bank capital ratio over the business cycle 2000-2010

Banks’ Capital Ratio in %
(inverse leverage ratio)

Real GDP Growth in %

Source: own calculation based on Bankscope data.

3.2.1.6. Conclusion on counter-cyclical capital requirements

At this stage the development of a fully rule-based mechanism for counter-cyclical capital requirements may not be possible as some degree of judgment seems inevitable. Empirical evaluations allow the conclusion that a counter-cyclical capital requirements' rule is capable of reducing in a sizeable way the instability\(^\text{42}\) of the financial system and output.\(^\text{43}\) Experience of counter-cyclical capital requirements however show that a restraining effect may be relatively small, since the banks’ ability to raise capital in good times is relatively easy and the impact of higher capital on loan spreads is relatively small. In general, however, the ability of banks to by-pass counter-cyclical capital requirements should not be underestimated.

---


3.2.2 Leverage Ratio

3.2.2.1 Definition of leverage and leverage ratio
Leverage is the use of borrowed money to increase investing power. Whenever a bank’s assets exceed its equity base, that bank is considered ‘leveraged’.\(^44\) The more assets a bank borrows with the view to enhancing its returns, the higher is that bank’s leverage. By leveraging, a bank bets that the interest paid on the borrowed capital will be smaller than the return generated, thus improving the bank’s performance. While leverage may allow a bank to amplify its income and capacity to lend, thus enhancing profitability, it also creates a source of additional amplified volatility by increased sensitivity to unforeseen shocks. The regulation of banks’ leverage is usually referred to as a ‘leverage ratio’. Specifically, the idea is to set a lower limit to the capital-to-assets ratio of banks. It is an empirical fact that leverage is procyclical. Leverage possibilities increase when balance sheets expand due to positive market developments and the options to leverage shrink when balance sheets contract because of adverse business conditions and/or financial market developments.\(^45\)

Bankers are gearing their balance sheet to flexibly adjust their investment portfolios at the price of amplifying the financial and thereby business cycles.

Compared to other industries, banks tend to hold very low levels of capital: listed non-financial firms have an average capital-to-asset ratio of roughly 30% to 40%. Before the recent financial crises, big internationally active banks held, on average, only 4% of capital. The driving forces shaping the banks’ capital structure are:

(1) The cost-of-capital premium: equity capital is seen as a more expensive form of financing than loans and deposits. Banks operate in a highly-leveraged fashion, due to the special nature of banking market competition. "Unlike in many other industries, the most important (and in some cases, essentially the only) competitive advantage that banks bring to bear for many types of transactions is their ability to fund themselves cheaply."\(^46\)

(2) Highly leveraged banks lead bank’s shareholders and managers to generate systematic profit from risky strategies, since their focus is on the upside only. The downside risks, i.e. the losses of these risky strategies, are passed on to the depositors and creditors of the banks.

(3) The very same fact is also the cause of conflict of interest between equity investors and the management. Shareholders as residual claimants are concerned that bad decisions by management will dissipate the value of their shareholdings. By contrast, secured short-term creditors are better protected against bank management failures.\(^47\)

---

\(^{44}\) One can distinguish between balance sheet leverage, economic leverage and embedded leverage. Balance sheet leverage relates only to the visible leverage on the balance-sheet due to borrowed money. Economic leverage relates to all leverage of a financial intermediary. Economic leverage also includes the leverage resulting from off-balance sheet items. Embedded leverage can be found in products that in themselves are leveraged, but whose leverage is not represented in reporting. This leverage would not show on the balance sheet. An optimal leverage ratio should account for all three types of leverage that can occur. In addition, the procyclical effects arising from the interplay between leverage and valuation need to be assessed from a macroprudential perspective.


Thus the tendency for banks to finance themselves largely with short-term debt reflects an optimal response of the bank management to governance problems, i.e. to reduce the incentives of shareholders to control the bank management.

All these risk-shifting behaviour is a moral hazard problem from the perspective of the debt holders that is socially costly and inefficient.48

3.2.2.2 Effects of introducing a leverage ratio

The effect of introducing a leverage ratio, i.e. a minimum level of capital as a proportion of total assets (which reciprocally can be seen as a cap on the leverage multiple) is to act as a ‘backstop’, thereby mitigating the regulatory and other model uncertainties that can arise from risk-based approaches. The CRD IV introduces a leverage ratio that has been defined as the average of the monthly leverage ratio over the quarter based on Tier 1 capital and total exposure. The minimum ratio is currently calibrated at 3% and it will be applied as a complement to the risk-weighted approach as reflected in the current Basel framework, meaning that there will be two independent measures of capital adequacy, and banks would have to meet a minimum requirement for both measures. Research reveals that risk-weighted capital ratios and leverage ratios contain complementary information about banks’ financial conditions. Therefore, by regulating capital, risk-weighted capital ratios and leverage ratios, supervisors are better positioned to ensure financial stability.49 A leverage ratio performs just as well as a risk-adjusted measure of capital and simple leverage ratios seem to predict bank failures as well as more complex risk-weighted capital ratios (particularly over short time horizons).50 However, the current leverage ratio in the new Basel III framework of 3% is a non-binding restriction for the banking business. To make sure the leverage ratio helps reducing bank failures, leverage ratios in the range of 6%-10% must be imposed.51 This would lead to significant effects on credit portfolio and loan rates. Since the leverage ratio measures equity to the un-weighted sum of the bank’s total assets, low-risk activities will be accounted for in the same way as higher risk loans generating higher interest rates. This might create incentives for banks to reduce low-risk lending. This repositioning of the credit portfolios will lead to a rise of interest rates for low risk loans, due to the reduced offering of loans by the banks and to decreasing high-risk lending rates. Very little evidence and data were available to assess the extent to which certain business models may be significantly affected by the leverage ratio and whether loan volumes would change in practice.


Properly defined leverage ratios play an important role in a macroprudential framework (as indicators of potential excesses and safeguards against amplification mechanisms). Empirical evidence shows that the frequency of bank failures drops below 10% for a leverage ratio in the range of 4% to 5% and below 1% for a leverage ratio of 6% to 7%. Research indicates that depending on the accuracy of the credit assessment and the therein involved model risks (in particular with respect to low-risk loans) an inadequately specified leverage ratio might even reduce banks' stability due to the risk of contagion resulting from increased bulk risk as banks' portfolios tend to be of a similar structure. Nevertheless, a clear advantage of the leverage ratio is simplicity: it is virtually costless to administer and very transparent. This is particularly important if supervisory authorities have limited ability to identify and/or to sanction dishonest banks. In such situations an additional, risk-independent leverage ratio restriction may be necessary to induce truthful risk reporting. The leverage ratio represents a mitigating control helping to offset the banks’ potential capital savings by understating their risks. Figure 11 clearly shows that the leverage ratio is smaller for large banks than for small banks in the EU.

**Figure 11: Leverage ratio and bank size in the EU 2000-2010**

Total Capital Ratio in % (un-weighted assets)

![Graph showing leverage ratio and bank size in the EU 2000-2010](image)

Bank Size

**Source:** own calculation based on Bankscope data.

---


Previous Figure 10 shows the leverage ratios of European banks over the last 10 years. The (inverse of the) leverage ratios in the boom years in the first decade of the millennium showed a significant decrease, this implies that the expansion of banking activities was primarily driven by debt financing. The differences in leverage ratios can be explained by empirical evidence; this is particularly important for large banks dealing with larger customers where competition is intense: even small increases in funding costs result in competitive disadvantage.

Small banks focus on the informational intensive relationship banking. This type of business results in relationships with a higher degree of locking-in between firms and their small bank lenders. For these banks pricing seems to be of second order importance.56

The key goal of leverage requirements is to ensure the soundness of banks’ investment decisions. However, empirical research clearly documents that this link between banks’ leverage ratios and the performance of their credit portfolio is weak (see Figure 12).57 In countries like the US or Canada where the “old-fashioned” leverage ratios have existed alongside the “modern” risk-sensitive requirements, the leverage ratio has helped protect the US banking system from even greater calamity and has been one of the contributing factors behind the robust performance of Canadian banks over the crisis (the Canadian ratio including elements of off-balance sheet assets which the CRD IV also aims to do). This is not necessarily because the leverage ratio encourages more prudent behaviour, but because the leverage ratio ensures a minimal buffer to absorb the negative consequences of imprudent behaviour.58 In the US, the leverage ratio did not apply to the investment banks, and while many commercial banks in the country suffered losses during the crisis, some commentators say that the situation would have been even worse had the banks entered the crisis with lower leverage ratios than they had.

---


3.2.2.3 Conclusion on leverage ratio

A leverage ratio requirement as a complement to the Basel II risk-weighted capital requirements is beneficial for financial stability, because it mitigates the model uncertainties of risk-based approaches and represents a mitigating control helping to offset the banks’ potential capital savings by understating their risks.\textsuperscript{59} For European banks the link between banking portfolio quality and leverage ratios is at best weak. Nevertheless, properly defined leverage ratios play an important role in a macroprudential framework as safeguards against amplification mechanisms. Research indicates that the current leverage ratio in the new Basel III framework of 3\% is too low. Analysis provides the insight that a 5\% leverage ratio threshold would have more impact than the 6\% Tier 1 risk-based capital requirement.\textsuperscript{60}

3.2.3 Liquidity standards

3.2.3.1 Benefits of liquidity standards

The creation of liquidity is a key function of financial intermediation for an economy. Since negative market-wide events impact on all market participants in the same way, the reactions to such events are generally synchronised, see the co-movement of the liquidity ratio in Figure 13.


The high degree of financial interdependencies within the EU banking industry poses a key challenge to ensure financial stability, especially in economic downturns. History shows that funding liquidity risk has played a key role in all systemic banking crises. Empirical evidence finds that funding liquidity risk is typically low and stable, with occasional spikes around certain key events. A study for the European banking industry finds an average estimated Net Stable Funding Ratio (i.e. the proportion of long term assets which are funded by long term, stable funding) of 91% for 50 large banks, which is below the intended target of 100% [of the Basel III regulatory framework]. Empirical evidence indicates that bank liquidity is a part of the propagation mechanism of financial crisis rather than the cause.

Figure 13: Bank liquidity over the business cycle 2000-2010

Market participants with leveraged portfolios and financial institutions whose balance sheets are highly leveraged are taking the risk to face great changes of their net-portfolio values with regard to market fluctuations, and therefore will be very sensitive to price changes coming from the asset side of their balance sheets. This crucial link between fixed debt and fluctuating asset prices will magnify these swings of the financial markets, because they will automatically trigger corrective actions to bring the risk-return trade-off back in-line.

---

61 Funding liquidity is the ability to satisfy the demand for money immediately. Funding liquidity risk is the possibility that a bank will be unable to meet the demand for money over a specific horizon; Drehmann, M., Nikolaou K., 'Funding Liquidity Risk: Definition and Measurement', CESifo and Deutsche Bundesbank conference on "Liquidity: Concepts and Risks" Munich 17-18 October 2008, http://www.bundesbank.de/download/vfz/konferenzen/2008_10_17_muenchen//presentation_drehmann.pdf.

The liquidity of the financial system is essential for the absorption of financial instabilities – stopping a downward spiral, giving room to absorb securities offered on the market, since it offers market participants the opportunity to buy in falling markets.

Figure 14 illustrates the interconnectedness of the banks within the European Union. This interlinked banking system is prone to contagion effects resulting from the illiquidity of a major bank.63

Recent work in economic theory shows that this risk of contagion depends on the precise pattern of interbank linkages.64 Higher liquidity standards are expected to reduce not just the probability, but also the severity of banking crises.

There is weak empirical evidence suggesting that lower capital-to-asset ratios and lower liquidity ratios are associated with higher output losses. The deficits of sound liquidity risk management at financial institutions were clearly highlighted during the financial crisis. Consequently, the new regulations require banks to maintain higher and better-quality liquid assets and improve their liquidity risk management.

**Figure 14: Interbank ratio and bank size (average 2000-2010)**

Interbank Ratio in %

Source: own calculation based on Bankscope data.

---


A further benefit of the introduction of liquidity standards can be seen in the reduction of social costs of government support. Empirical evidence shows that state guarantees are successful in reducing liquidity pressure on financial institutions due to deposit withdrawals but are indeed costly not for banks, but for the taxpayer, without additional liquidity support, the fiscal costs historically amount to approximately 7.7% of GDP; with additional liquidity support the combined fiscal costs historically amount to an average of 26.8% of GDP.65 There is empirical evidence suggesting the absence of risk shifting in the behaviour of the banks guaranteed, but these guarantees might pose a potential future threat to the financial system as institutions outside the safety-net seem to increase risks in order to compensate the competitive disadvantage resulting from these guarantees.66

3.2.3.2 Possible unintended consequences of liquidity standards
If many market participants are forced to follow similar rules and regulations, the more or less synchronised reactions will lead to an acceleration of the declines in asset prices and higher levels of measured risk as financial intermediaries start deleveraging their positions (one of many examples during the recent financial crisis was the unwinding of the Dollar-Yen-Carry-Trades67).

---


67 The term ‘carry trade’ refers to a currency trade where investors borrow a low-yielding currency and lend a higher-yielding currency. Because the Bank of Japan has kept Japanese interest rates at very low levels, the Yen-carry-trade had represented an easy money arbitrage opportunity as investors saw profit in borrowing the Yen to fund activities in other currencies (including US subprime lending). It started to unwind in 2007 when large numbers of people had to close out positions and thus repay their Yen denominated loans. To do so, investors had to convert their foreign currency back into Yen. That increased demand drove up the price of the Yen which started off a classic vicious spiral i.e. the higher the Yen became; the worse the (non-Yen) assets bought with that loan appeared. Because one’s gains could be wiped out entirely by the currency appreciation,
Since tumbling asset prices may violate externally imposed liquidity requirements or bank internal policies, the market participants will have to sell-off their positions amplifying the fall of asset prices. In this way, the combinations of mark-to-market accounting and liquidity regulations have the potential to induce asset market downturns that far outweigh the required equilibrium adjustment initialised by a change of economic or political conditions.

Basel III falls short of establishing macroprudential rules for bank liquidity, is targeting only individual banks’ liquidity buffer, and does not address additional risk of such simultaneous shortfalls resulting from interconnectedness of various institutions. Meeting the liquidity requirements changes the balance sheet structure on the asset side, since banks are forced to hold more liquid securities earning lower interest income. At the same time, these securities are generally less-risky assets asking for less costly regulatory equity capital. The net-effect on banking costs for meeting the more stringent liquidity requirements, i.e. taking account of synergies between the liquidity and capital regulation, are estimated to amount to 12 basis points or even less.68

3.2.3.3 Calibration of liquidity standards

The proposed measures 'Liquidity Coverage Ratio' (LCR), requiring banks to maintain a stock of 'high-quality liquid assets' that is sufficient to cover net cash outflows for a 30-day period under a stress scenario and the 'Net Stable Funding Ratio' (NSFR), i.e. the proportion of long term assets which are funded by long term, stable funding, have the target to ensure sound liquidity funding to reduce the risk of banking business; i.e. to more efficiently align the liquidity of banks’ assets with banks’ liabilities.

If the LCR and NSFR are well calibrated, they can improve banks’ liquidity and funding stability. To reach this aim, further quantitative impact studies are necessary. The weights and factors used in the calibrations must not excessively restrict neither banks in their maturity transformation nor money markets in their ability to help banks manage short-term liquidity. An overly restrictive calibration is likely to encourage banks to transfer activities into the shadow-banking system. To prevent this, the liquidity requirements would have to be extended to these less-regulated financial institutions. Further unintended consequences for financial stability would arise, if the liquidity rules induce banks to take similar actions, which would increase asset concentrations and correlation across certain types of assets. "The LCR may lead to high holdings in eligible liquid assets that could effectively reduce their liquidity during a systemic crisis. Applying uniform quantitative standards across bank types and jurisdictions has its advantages, but the standards may not be suitable for all countries. For instance, a number of countries may not have the markets to extend long term funding for banks given the absence of a bond market in domestic currency, and doing so would require banks to take on exchange rate risks".69


First empirical results indicate that Basel III limits liquidity tail risk\textsuperscript{70}, in particular if it leads to a higher quality of liquid asset holdings of banks.\textsuperscript{71}

\textbf{3.2.3.4 Effects of liquidity requirements on interest rates}

Increasing the liquidity requirements will reduce the business opportunities of banks, because they are forced to hold more 'idle' funds on their balance sheets. So only a fraction of raised capital can be invested in yield generating credits and assets. Banks approve a credit if the generated yields are greater or equal to the weighted cost of capital available for investment. Consequently the loan exposures have to generate interest rates covering the WACC divided by one minus the liquidity/asset ratio (see Annex V for the formula).

If banks have no room for a downward adjustment of their lending spreads, banks will be forced to increase their lending rates for credit customers. Under these premises the increase of interest rates due to higher liquidity requirements are calculated and summarised in Table 3 below. A 1\% increase in liquidity requirements above the current level raises the interest rates charged to bank borrowers at worst by 5.2 basis points. The impacts on interest rates in Member States, because of differences in starting-points, vary between 3.2 and 15.6 basis points.

\textsuperscript{70} Tail risk is a form of portfolio risk arising when the possibility that an investment will move more than three standard deviations from the mean is greater than what is shown by a normal distribution (i.e. outside the 99.97\% probability that returns will move between the mean and three standard deviations either side is). The concept of tail risk suggests that the distribution is not normal, but skewed, and has fatter tails (black swan occurrences). When applied to liquidity risk, banks have an interest to avoid fat tails i.e. abnormal events whereby liquidity stress (probably systemic) cause severe difficulties, and such tail risks of a stress scenario are substantially lower if banks adjust to the CRD IV liquidity standards by holding a higher quality of liquid assets (i.e. a narrowly defined liquidity buffer).

Table 3: Increase of EU Bank funding cost due to higher levels of liquidity requirements

<table>
<thead>
<tr>
<th>WACC As is</th>
<th>Increase in Bank Liquidity by...</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1%</td>
</tr>
<tr>
<td>Austria</td>
<td>3.31</td>
</tr>
<tr>
<td>Belgium</td>
<td>3.75</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>5.06</td>
</tr>
<tr>
<td>Cyprus</td>
<td>4.07</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>4.42</td>
</tr>
<tr>
<td>Denmark</td>
<td>3.39</td>
</tr>
<tr>
<td>Estonia</td>
<td>5.22</td>
</tr>
<tr>
<td>Finland</td>
<td>2.81</td>
</tr>
<tr>
<td>France</td>
<td>3.77</td>
</tr>
<tr>
<td>Germany</td>
<td>3.53</td>
</tr>
<tr>
<td>Greece</td>
<td>3.07</td>
</tr>
<tr>
<td>Hungary</td>
<td>5.93</td>
</tr>
<tr>
<td>Ireland</td>
<td>4.62</td>
</tr>
<tr>
<td>Italy</td>
<td>2.71</td>
</tr>
<tr>
<td>Latvia</td>
<td>4.49</td>
</tr>
<tr>
<td>Lithuania</td>
<td>4.22</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>5.64</td>
</tr>
<tr>
<td>Malta</td>
<td>3.79</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3.86</td>
</tr>
<tr>
<td>Poland</td>
<td>3.77</td>
</tr>
<tr>
<td>Portugal</td>
<td>5.32</td>
</tr>
<tr>
<td>Romania</td>
<td>9.17</td>
</tr>
<tr>
<td>Slovakia</td>
<td>6.65</td>
</tr>
<tr>
<td>Slovenia</td>
<td>3.83</td>
</tr>
<tr>
<td>Spain</td>
<td>2.59</td>
</tr>
<tr>
<td>Sweden</td>
<td>3.05</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3.42</td>
</tr>
<tr>
<td>European Union</td>
<td>3.48</td>
</tr>
</tbody>
</table>

**Source:** own calculation based on Bankscope data.

Higher liquidity requirements have a relatively homogenous impact on funding cost of banks. Thus the differences of weighted average capital cost increases in EU Member States are the result of different structures of the banking industries in these countries, see Table 4.
Table 4: Increase of EU Bank funding cost due to higher levels of liquidity requirements

<table>
<thead>
<tr>
<th>Liquidity Requirement</th>
<th>Average WACC %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>Bank Holdings</td>
<td>3.55</td>
</tr>
<tr>
<td>Commercial Banks</td>
<td>3.79</td>
</tr>
<tr>
<td>Cooperative Bank</td>
<td>2.79</td>
</tr>
<tr>
<td>Other Banks</td>
<td>3.78</td>
</tr>
<tr>
<td>European Union</td>
<td>3.48</td>
</tr>
</tbody>
</table>

Source: own calculation based on Bankscope data.

3.2.3.5 Conclusion on liquidity standards
The discussion on the implementation of liquidity requirements is still at an early stage. However there is significant empirical evidence that sound liquidity holdings in the banking industry will reduce the risk of contagion and endogenously reinforcing destabilisation of financial market resulting from negative economic shocks. Therefore the introduction of liquidity requirements will foster the stability of banking. A 1% increase in liquidity requirements raises the funding costs on average by 5 basis points. The effect on different bank types varies relatively little. Liquidity standards have a modest impact on reducing the bank failure risk, however, significantly reduce the risk of financial failure propagation.

3.2.4 The cost of banking – Weighted Average Cost of Capital (WACC) and credit interest rates
In discussions on bank capital regulation bankers and others warn that high capital requirements, while beneficial for the stability of the financial system, are also costly for the system restricting the provision of credit and would impede economic growth. The effects of the new regulations will be by design spread over the time horizon of 2011-2019. This phasing in will allow banks to engage in adjustment process which is spreading the impacts over time. The potential effects of the new capital requirements on the cost of capital and thereby on interest rate are evaluated with three scenarios: (1) fixed return on equity and bank debt interest rates, (2) complete/incomplete pass-through of increased bank financing costs to bank customers, (3) Modigliani-Miller perspective of bank financing, i.e. the banks' financing costs do not change.

3.2.4.1 Capital Requirements Scenario 1: Fixed equity returns and debt interest rates
This first scenario reflects the economic fact that economic adjustments time. The difference in returns are explained by the fact that equity is always more risky than debt. As the banks’ leverage falls so will the riskiness of a bank’s equity. Due to the gradual facing in the first impact of the capital regulations will have limited effects on the required interest rates and return on equities. Banks’ responses may vary considerably from one country to another depending on cross-country variations in banks’ net cost of raising equity as well as the changes interest rates.72

---

To evaluate a potential impact of capital regulation for the European Union on the financing cost of banks, we use the Weighted Average Cost of Capital (WACC) formula based on averages for the period 2000-2010 (see Annex V for the formula). The results are summarised in Table 5.

The calculation shows the upper boundary of the effects of an increased equity requirement, by assuming that the cost of equity, return on equity and interest rate for deposits and liabilities remain unchanged. As shown in the table, a 1% raise in capital requirements will increase the weighted average cost of capital by 6 basis points. Looking at the 27 Member States, the impact of a 1% raise in capital requirements varies from 5 to 12 basis points.  

Table 5: Increase of EU bank funding cost due to higher levels of capital requirements

<table>
<thead>
<tr>
<th>Country</th>
<th>WACC 8%</th>
<th>9%</th>
<th>10%</th>
<th>11%</th>
<th>12%</th>
<th>13%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>3.31</td>
<td>0.05</td>
<td>0.11</td>
<td>0.16</td>
<td>0.21</td>
<td>0.26</td>
</tr>
<tr>
<td>Belgium</td>
<td>3.75</td>
<td>0.05</td>
<td>0.10</td>
<td>0.15</td>
<td>0.20</td>
<td>0.25</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>5.06</td>
<td>0.11</td>
<td>0.21</td>
<td>0.32</td>
<td>0.42</td>
<td>0.53</td>
</tr>
<tr>
<td>Cyprus</td>
<td>4.07</td>
<td>0.06</td>
<td>0.12</td>
<td>0.18</td>
<td>0.25</td>
<td>0.31</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>4.42</td>
<td>0.11</td>
<td>0.21</td>
<td>0.32</td>
<td>0.42</td>
<td>0.53</td>
</tr>
<tr>
<td>Denmark</td>
<td>3.39</td>
<td>0.09</td>
<td>0.18</td>
<td>0.26</td>
<td>0.35</td>
<td>0.44</td>
</tr>
<tr>
<td>Estonia</td>
<td>5.22</td>
<td>0.12</td>
<td>0.24</td>
<td>0.35</td>
<td>0.47</td>
<td>0.59</td>
</tr>
<tr>
<td>Finland</td>
<td>2.81</td>
<td>0.05</td>
<td>0.10</td>
<td>0.15</td>
<td>0.20</td>
<td>0.24</td>
</tr>
<tr>
<td>France</td>
<td>3.77</td>
<td>0.04</td>
<td>0.08</td>
<td>0.12</td>
<td>0.16</td>
<td>0.20</td>
</tr>
<tr>
<td>Germany</td>
<td>3.53</td>
<td>0.03</td>
<td>0.05</td>
<td>0.08</td>
<td>0.11</td>
<td>0.14</td>
</tr>
<tr>
<td>Greece</td>
<td>3.07</td>
<td>0.04</td>
<td>0.09</td>
<td>0.13</td>
<td>0.18</td>
<td>0.22</td>
</tr>
<tr>
<td>Hungary</td>
<td>5.93</td>
<td>0.11</td>
<td>0.21</td>
<td>0.32</td>
<td>0.42</td>
<td>0.53</td>
</tr>
<tr>
<td>Ireland</td>
<td>4.62</td>
<td>0.08</td>
<td>0.16</td>
<td>0.24</td>
<td>0.32</td>
<td>0.40</td>
</tr>
<tr>
<td>Italy</td>
<td>2.71</td>
<td>0.06</td>
<td>0.11</td>
<td>0.17</td>
<td>0.23</td>
<td>0.29</td>
</tr>
<tr>
<td>Latvia</td>
<td>4.49</td>
<td>0.11</td>
<td>0.22</td>
<td>0.33</td>
<td>0.44</td>
<td>0.55</td>
</tr>
<tr>
<td>Lithuania</td>
<td>4.22</td>
<td>0.11</td>
<td>0.23</td>
<td>0.34</td>
<td>0.46</td>
<td>0.57</td>
</tr>
<tr>
<td>Luxemburg</td>
<td>5.64</td>
<td>0.05</td>
<td>0.10</td>
<td>0.15</td>
<td>0.20</td>
<td>0.25</td>
</tr>
<tr>
<td>Malta</td>
<td>3.79</td>
<td>0.08</td>
<td>0.16</td>
<td>0.24</td>
<td>0.32</td>
<td>0.40</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3.86</td>
<td>0.05</td>
<td>0.10</td>
<td>0.15</td>
<td>0.19</td>
<td>0.24</td>
</tr>
<tr>
<td>Poland</td>
<td>3.77</td>
<td>0.09</td>
<td>0.19</td>
<td>0.28</td>
<td>0.37</td>
<td>0.47</td>
</tr>
<tr>
<td>Portugal</td>
<td>5.32</td>
<td>0.06</td>
<td>0.12</td>
<td>0.19</td>
<td>0.25</td>
<td>0.31</td>
</tr>
<tr>
<td>Romania</td>
<td>9.17</td>
<td>0.07</td>
<td>0.14</td>
<td>0.21</td>
<td>0.29</td>
<td>0.36</td>
</tr>
<tr>
<td>Slovakia</td>
<td>6.65</td>
<td>0.12</td>
<td>0.23</td>
<td>0.35</td>
<td>0.47</td>
<td>0.58</td>
</tr>
<tr>
<td>Slovenia</td>
<td>3.83</td>
<td>0.07</td>
<td>0.13</td>
<td>0.20</td>
<td>0.27</td>
<td>0.33</td>
</tr>
<tr>
<td>Spain</td>
<td>2.59</td>
<td>0.06</td>
<td>0.12</td>
<td>0.19</td>
<td>0.25</td>
<td>0.31</td>
</tr>
<tr>
<td>Sweden</td>
<td>3.05</td>
<td>0.06</td>
<td>0.11</td>
<td>0.17</td>
<td>0.22</td>
<td>0.28</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>3.42</td>
<td>0.06</td>
<td>0.11</td>
<td>0.17</td>
<td>0.22</td>
<td>0.28</td>
</tr>
<tr>
<td><strong>European Union</strong></td>
<td><strong>3.48</strong></td>
<td><strong>0.06</strong></td>
<td><strong>0.13</strong></td>
<td><strong>0.19</strong></td>
<td><strong>0.25</strong></td>
<td><strong>0.31</strong></td>
</tr>
</tbody>
</table>

Remarks: WACC 8% refers to the current level of capital regulation under Basel II (Basis Average 2000-2010)

Source: own calculation based on Bankscope data.

Empirical research clearly shows that the effects of banking regulations differ by bank type, especially on banks' risk profile, on the ownership structure of banks as well as on the bank size: small banks generally provide loans with less credit risk than large banks. For the European Union the weighted average costs of capital increases shown in Table 6 have been calculated. Regarding the banking types the evaluation shows more homogenous impacts on weighted average cost of capital. Therefore the differences between the Member States of the European Union are the result of the different structures of the banking industry.
Table 6: Increase of EU bank funding cost due to higher levels of capital requirements

<table>
<thead>
<tr>
<th>Capital Requirement</th>
<th>Average WACC %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8%*</td>
</tr>
<tr>
<td>Bank Holdings</td>
<td>3.55</td>
</tr>
<tr>
<td>Commercial Banks</td>
<td>3.79</td>
</tr>
<tr>
<td>Cooperative Bank</td>
<td>2.79</td>
</tr>
<tr>
<td>Other Banks</td>
<td>3.78</td>
</tr>
<tr>
<td>European Union</td>
<td>3.48</td>
</tr>
</tbody>
</table>

Source: own calculation based on Bankscope data.

3.2.4.2 Conclusion on Scenario 1

We conclude that the immediate effects of higher capital requirements on the weighted average cost of capital and thereby on the credit interest rates, even in the case of unchanged return on equity and interest rates for bank funds, are for the European Union likely to be modest; in case of an increase of capital requirements to 13% 31 basis points, the increase varies between 59 and 14 basis points for the Member States.

Due to the specific nature of competition in the banking industry especially in the European Union, even these modest increases and cost differentials raise significant incentives to migrate credit-creation activities to the shadow-banking sector. These effects may bring back fragility to the overall financial system.

3.2.4.3 Capital Requirements Scenario 2: complete/incomplete pass-through of increased bank financing costs to bank customers

Whether it is possible for banks to pass on an increase of their weighted cost of capital to borrowers depends on the elasticity of demand for loans, and other country-specific as well as institutional factors. The link between the weighted average cost of capital and lending rates is variable (see Figure 16) other factors such as economic activity and especially the bank's assessment of risk play also an important role. This implies that the increase of weighted average cost of capital can be dampened by a decrease in interest margins. For the period of 2000-2010, there was a trend of shrinking interest margins within the EU, from 2.75% in 2000 to 1.9%.

---

3.2.4.4 Capital Requirements Scenario 3: The banks’ financing costs do not change

From the perspective of Modigliani-Miller, the arguments cited before are lacking any economic basis:75 The returns/risks a bank runs are determined by its portfolio selection. The risk/returns of a bank’s equity, debts and deposits are therefore fixed by the assets of a bank, the riskier a bank’s investments are, so are its stocks, debts and deposits. The structure of a bank’s liabilities will shift the total risk and return a bank generates between shareholders, creditors and depositors. The argument above, i.e. more equity will increase the costs of banking, disregards a key financial principle, i.e. that the returns are aligned to risks: the higher the risks the higher the expected return. Even if banks do not change their own investment portfolio, increasing capital will reduce the risk of loss for a share and thereby the risk-premium investors are asking for. Consequently, by altering the financing structure, only risk and return are shifted between different groups financing the bank, the total funding cost however remains the same.

A second argument states that the banks’ return on equity will shrink due to higher tax expenses. In the profit and loss statement, interest paid is accounted for as expenses, lowering in many tax systems the taxable bank profit, i.e. debt financing creates a debt tax shield. Any increase in the required equity lowers the extent banks can benefit from this tax shield. The tax shield for banks in the EU, the profit tax rate, amounts to about 30% (2005-2010) and thus significantly subsidises bank debt funding, benefiting shareholders and encouraging bank management to generate higher than efficient leverage and thereby creating an externality in the sense of systemic risk and financial instability.

---

The tax shield distortion holds for all industries and cannot therefore count as an argument for banks to have high levels of leverage.

The cost of capital will also not change if banks reduce their buffers of economic capital that they hold above the regulatory capital in such a way that their total capital holdings remain unchanged. For the banks in the European Union this option exists, because they hold substantial buffers of economic capital.

3.2.4.5 Conclusion on Capital Requirements Scenarios 2 and 3
If increased bank financing costs are passed through to customers (scenario 2) or if the banks’ financing costs do not change at all (scenario 3), the impact of increased capital requirements on interest rates are modest at worst.

3.2.4.6 Overall conclusion on capital requirements scenarios
The scenarios outlined above show that the impact of increased capital requirements on interest rates are modest at worst. This potential short run effect is further dampened by (1) the gradual implementation of the new capital requirements which allow a smooth build-up of capital, and (2) an adaptation of risk perception of bank equity and debts to the new risk profile. So the long run effects on interest rates resulting from new capital requirements can be ignored.

3.2.5 Banks’ Portfolio Selection

3.2.5.1 Effects of CRD IV on banks’ investment portfolios
The Basel III and CRD IV measures’ ultimate goal is to stabilise the banking system by imposing restrictions on the banking business. Banks fail mainly for two reasons: liquidity and/or solvency problems. Therefore the pivotal point for the success of all banking regulation is that banks are being incentivised to choose sound investment portfolios and thereby foster economic stability.

The quality of the credit portfolio is a focal point for banking success. In the European Union, the trade-off bankers face (a non-linear trade-off between the quality of the loan portfolio and the return on equity) is shown in Figure 17.
Economic analyses\textsuperscript{76} provide the insight that the effect of capital requirements on the overall safety and soundness of the banking investment portfolios as a whole depends on the distribution of risk aversion across banks, the economy they serve, i.e. their possibilities to diversify. A tightening of the required leverage ratio restricts the banks’ investment budget. Banks may respond to this new situation by altering the mix of assets in their portfolio per unit of capital. The way in which the composition of the optimal portfolio adjusts, however, depends crucially on the risk aversion of bankers and their incentives. More stringent capital requirements can make some banks safer, some banks riskier depending on the reaction pattern of the banks, and thereby the banking system as a whole either more or less safe.

Empirical research finds that minimum capital requirements have little long term impact on bank behaviour. A more effective tool seems to be the audit frequency in order to restrain moral hazard.\textsuperscript{77} The analyses of balance sheets and income statements of the European banking industry provides no evidence of a statistically significant relationship between capital and the quality of credit as measured by the impaired loan ratio (see figures 8 and 12).


Some empirical evidence indicates a significant link between bank efficiency and risk taking: bank inefficiency causes higher risk taking and moral hazard incentives appear to fall as bank capital increases. Cost (and profit) efficiencies are also found to positively impact on bank capital. In other words: more efficient banks seem to eventually become more capitalised and higher capital also tends to have a positive effect on efficiency levels.78

For banks in the European Union similar patterns of credit portfolio performance can be observed over the business cycles from 2000-2010, indicating similar credit assessment capacities and policies in these institutions (see figures 18 and 19 below).

Figure 18: Bank portfolio quality and the business cycle in the EU 2000-2010

Impaired Loans (NPLs)/ Gross Loans in %  Real GDP Growth in %

Source: own calculation based on Bankscope data.

Table 7: Bank type and impaired loans/gross loans in %

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank Holding Companies</td>
<td>3.83</td>
<td>3.88</td>
<td>2.98</td>
<td>1.95</td>
<td>2.09</td>
<td>2.38</td>
<td>2.49</td>
<td>3.85</td>
<td>3.46</td>
<td>4.38</td>
<td>3.12</td>
</tr>
<tr>
<td>Commercial Banks</td>
<td>5.72</td>
<td>5.37</td>
<td>3.79</td>
<td>3.03</td>
<td>3.28</td>
<td>3.01</td>
<td>3.71</td>
<td>4.70</td>
<td>4.94</td>
<td>3.68</td>
<td>3.65</td>
</tr>
<tr>
<td>Cooperative Bank</td>
<td>6.31</td>
<td>7.30</td>
<td>6.01</td>
<td>5.56</td>
<td>5.87</td>
<td>3.20</td>
<td>2.29</td>
<td>4.16</td>
<td>3.93</td>
<td>5.18</td>
<td>4.94</td>
</tr>
<tr>
<td>Other Banks</td>
<td>3.70</td>
<td>4.52</td>
<td>3.26</td>
<td>2.18</td>
<td>2.26</td>
<td>1.78</td>
<td>2.78</td>
<td>2.40</td>
<td>2.36</td>
<td>2.62</td>
<td>3.42</td>
</tr>
<tr>
<td>European Union</td>
<td>5.21</td>
<td>5.85</td>
<td>4.45</td>
<td>3.78</td>
<td>4.09</td>
<td>2.76</td>
<td>3.07</td>
<td>4.16</td>
<td>4.28</td>
<td>3.69</td>
<td>3.58</td>
</tr>
</tbody>
</table>

Source: own calculation based on Bankscope data.

An indication of the efficiency of credit management performance can be drawn from Figure 19. Larger banks tend to incur less credit losses than smaller banks.

**Figure 19: Bank size and the performance of loan portfolios**

Impaired Loans (NPLs)/ Gross Loans in %

Changes in commercial credit standards are highly significant in predicting commercial bank loans, real GDP, and inventory investment in the trade sector. If standards are tightened extraordinarily, lower levels of loans and slower rates of output can be expected. One strand of literature argues that higher capital and liquidity requirements will force banks to more closely monitor customers and be forced into investing in safer assets. But there is also the chance that banks will tilt their portfolios towards riskier loans trying to compensate for the increased cost of funding. Other authors find that maybe other/additional factors affect the risk-taking behaviour of banks: empirical evidence implies that the wealth and the financial positions of managers and directors significantly influence their own attitudes toward taking risk and their bank’s risk-return trade-offs. Our analyses for the EU-27 show that there is a significant and nonlinear relationship between the non-performing loans ratio and return on equity (see Figure 17). A couple of bad loans might significantly reduce the profitability of a bank. This might set the stage for an increase in risk seeking behaviour to compensate for lost return.

---


With the instrument of securitisation 'originated' credit portfolios are split up in tradable tranches, having different risk/return profiles. The business model of securitisation, ‘originate and distribute’ (compared to the more European model of 'originate to hold'), has two conflicting impacts on the stability of the financial system: (1) securitisation increases the possibilities to diversify credit and investment portfolios and thereby to increase banks’ stability. (2) However, securitisation reduces incentives for the originator to seriously assess the credit quality of loans that are passed on, relative to those exposures that banks keeps on their balance sheets, this increases the riskiness of the financial system overall, since the increased risk taken, despite it being shared, will have ultimately to be borne by someone. A crucial consequence of securitisation business was that it allowed expanding the total lending by banks thus increasing their returns. This effect can be observed in Figure 20. Very large banks, being involved in the business of securitisation, earned significantly higher returns between 2003 and 2007.

Figure 20: Return on Equity and the business cycle 2000-2010

![Return on Equity and Real GDP Growth](image)

Source: own calculation based on Bankscope data.

Empirical research clearly showed, and the subprime crisis substantiated this fact, that access to and aggressive use of an external loan sales market to manage credit risk leads bigger banks to enjoy lower capital ratios and higher lending as this allows a bank to hold less capital, invest less in low-yield, high-liquidity assets, while at the same time increase its holdings of higher-risk, higher-return assets. Nevertheless, this behaviour does not seem to result in neither higher nor lower risk because banks seem to spend the benefits from the risk-reducing activities in the loan sales market (i.e. lower risk as measured by lower variability of loan losses and profits) on higher risk activities (e.g. lending to businesses) in order to increase profitability. Empirical evidence seems to suggest that profits are higher at banks that buy and sell loans.82

82 Just like hedging activities in the form of derivatives trading and swap activities allow firms to manage their market risks and influence firm performance and risk, banks can also benefit by trading credit risks in the loan sales market (primarily via securitisation or the secondary market for syndicated loans). While there may be other reasons why banks might buy or sell loans (e.g. in response to the relative strength of loan demand conditions or funding conditions), when conducted for active risk management purposes, banks are able to use...
Despite the emergence of the ‘originate and distribute’ model among EU banks and very
dynamic development of the European structured finance market before the crisis, this was
from a very low base, reaching a low level of development compared to the US markets in
terms of size, structure and complexity of products.83

The difference between the US and the EU in this respect did not nevertheless prevent the
EU banks from being damaged - while less incurring losses due to issuance, they faced
write-downs through their holdings of these US collateral-based ABS, CDOs and RMBSs in
their investment portfolio. Through the serious misalignment of interest the model allows
for, the extent to which risks are transferred off the balance sheet (and loans sold lose in
informational content) suggests weakening credit standards which can have drastic
repercussions on the entire financial system, economy and society as observed in the US.
While the EU has already addressed this problem in previous CRD amendments by
introducing a retention rate for originated loans (see Annex III), the growth of
securitisation was in part facilitated by the different regulatory treatment of the trading
book and the banking book, giving financial institutions incentives to move positions from
the banking book to the trading book. With some issues remaining outstanding (e.g.
accounting standards) other measures such as those in the CRD IV aim to set securitisation
on a sounder footing e.g. by correcting for previous regulatory parameters that saw the
demand for structured finance products especially increase during periods of low volatility,
as such a move would result in lower capital charges and increased market value of assets.

Regulators have adopted more stringent treatment of contingent and off-balance-sheet
assets and liabilities insisting that the portfolios of structured investment vehicles and
conduits be brought back onto bank balance sheets and that adequate capital be held
against them. The analysis will thus centre on the different impacts capital regulation might
have on the securitisation of bank loans and regulatory arbitrage.

3.2.5.2 Conclusion on banks’ portfolio selection

The new regulations generate a modest increase of banks’ weighted average cost of capital
in an adjustment phase that fade out in the long run, allowing the banks to maintain the
same asset volumes on their balance sheets. The risk/return portfolio decisions by banks
will be impacted only if the capital requirements are a binding constraint. Because of the
fact that banks hold significantly more capital than is currently required, the adjustments of
risk weights could be absorbed without an impact on banks’ portfolio choices. The
introduction of capital requirements for off-balance sheet exposures will change the
optimising space of banks, making risk taking more capital intensive. Since the primary
focus of banks’ management is how financial market honours their efforts, regulatory
capital will stay a secondary and therefore non-binding issue for banks’ business
considerations.

83 In 2007, total issuance volumes in the US were five times higher than in Europe, attributable to a lower share
of the supply of mortgages funded through securitisation in the EU versus the US (13% and 50% respectively)
which may partly be attributable to their alternative funding through covered bonds (which do not usually
tail a credit risk transfer with assets thus remaining on the originators' balance sheet). See ECB, 'The
incentive structure of the ‘originate and distribute’ model', December 2008,
3.2.6 Integrated impacts of capital requirements, liquidity standards and leverage ratio on a bank

More stringent regulatory requirements are expected to reduce the risk of bank defaults. In the current debate it is argued that the new regulations increase the cost of bank intermediation. This objection rests on the crucial assumption that the risk profiles of the banks’ financing instruments do not change, i.e. the required return on equity on the financial markets and cost of bank debt do not adjust to the new risk situation. In this case banks will increase lending spreads, to compensate for the higher cost of funding. This may induce bank customers to present riskier projects, having the chance of higher returns, but carrying the risk of greater bank instability of the economy as a whole. The overall impact of the capital, leverage and liquidity requirements are indicated in Table 8 and illustrated in Figure 21.

Table 8: Impact of the capital, leverage and liquidity requirements on the cost of banking (measured by the WACC)

<table>
<thead>
<tr>
<th>Capital Requirements</th>
<th>0%</th>
<th>1%</th>
<th>2%</th>
<th>3%</th>
<th>4%</th>
<th>5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>8%</td>
<td>0.00%</td>
<td>0.05%</td>
<td>0.10%</td>
<td>0.15%</td>
<td>0.20%</td>
<td>0.26%</td>
</tr>
<tr>
<td>9%</td>
<td>0.06%</td>
<td>0.11%</td>
<td>0.16%</td>
<td>0.21%</td>
<td>0.27%</td>
<td>0.32%</td>
</tr>
<tr>
<td>10%</td>
<td>0.13%</td>
<td>0.17%</td>
<td>0.22%</td>
<td>0.28%</td>
<td>0.33%</td>
<td>0.38%</td>
</tr>
<tr>
<td>11%</td>
<td>0.19%</td>
<td>0.24%</td>
<td>0.29%</td>
<td>0.34%</td>
<td>0.39%</td>
<td>0.45%</td>
</tr>
<tr>
<td>12%</td>
<td>0.25%</td>
<td>0.30%</td>
<td>0.35%</td>
<td>0.40%</td>
<td>0.46%</td>
<td>0.51%</td>
</tr>
<tr>
<td>13%</td>
<td>0.32%</td>
<td>0.36%</td>
<td>0.41%</td>
<td>0.47%</td>
<td>0.52%</td>
<td>0.57%</td>
</tr>
</tbody>
</table>

Source: own calculation based on Bankscope data.

The combined effect of a 1% increase in capital and liquidity requirements will increase the weighted average cost of capital 11.5 basis points as a short run reaction, i.e. given that return on equity and bank liabilities interest rates do not change. For a long run perspective, with equity and bank interest rates fully adapting to the bank financing risk profile, only the liquidity effect on weighted average cost of capital will prevail, i.e. an increase of 5 basis points per imposed 1% increase of liquidity requirements. Figure 21 shows the constellation of the three variables in 3D.
3.3 Cost-benefit: effects of CRD IV measures on banking market competition and equilibrium

In general there is agreement that regulatory capital requirements are useful in mitigating risk-taking behaviour of banks, regardless of the competitive structure of the market. But, there is no consensus as to which competitive market structure optimises both efficiency and stability of the financial industry. Regulators face the following trade-off: competition is beneficial for efficiency, but because competitive pressures force managers to minimise costs; competition could at the same threaten the solvency and thereby the stability of the financial system. Empirical findings show that (1) tighter regulations on bank entry and bank activities boost net interest margins; and (2) a larger bank asset to GDP ratio as well as a lower market concentration ratio lead to lower margins and profits. Contrary, market power provides incentives for banks to behave prudently, at the price of a lower financial efficiency. As a result, the goal may not be to eliminate market power, but to facilitate an environment that promotes a certain competitive behaviour and at the same time invoking efficient regulations to ensure financial stability.
3.4 Cost-benefit: effects of CRD IV measures on business cycles and economic growth

3.4.1 Benefits to economic output and growth

Possible benefits of the CRD IV measures are expected gains from reducing the probability and severity of banking crises. A sound and efficient financial intermediation system has positive effects on output and economic growth by influencing the saving rate, the costs of financial intermediation, making funds available for investment, and by selecting investment projects. Empirical experience suggests that, in any given country, banking crises occur on average once every 20 to 25 years, i.e. the average annual probability of a crisis is of the order of 4 to 5%. Historical experience shows that the cumulative (discounted) output losses from banking crises range from 20% to well in excess of 100% of pre-crisis output, depending on how long-lasting the effects are estimated to be. Across all comparable studies, each 1 percentage point reduction in the annual probability of a crisis yields an expected benefit per year equal to 0.6% of output when banking crises are seen to have a permanent effect on real activity. While Annex I provides details on why macroprudential regulation is increasingly becoming important for financial regulation, Figure 22 shows the benefits available by plotting the expected cost of a crisis and the likelihood of a crisis against the potential benefit in the form of a reduction of crisis cost by financial regulation. Our calculations show that without (additional) regulation, the annual expected losses from a crisis would be 8% of GDP. This is the cumulative discounted output loss from a banking crisis that causes a loss of up to 100% of GDP in the year of the crisis and the following years with a probability of 5%. Financial regulation reduces the expected crisis cost by reducing the probability of a crisis (from 5% to 0% at the horizontal axis) and the output losses from a crisis (from 100% to 0% of GDP at the axis to the north-east).


3.4.2 Costs to economic output and growth

The key question is, whether CRD IV measures face a trade-off of increased stability of the banking sector at the price of a lower economic growth rate. Empirical analysis and impact studies generally show that increased stability comes at a price of a lower economic growth rate. The literature disagrees on the reasons for that:

a) One strand of literature argues that this type of regulation can diminish economic growth by shifting banks’ portfolios from more productive risky investment projects towards less productive but safer projects. This structural portfolio change reduces output and also individuals’ incomes. This then results in decreasing savings and, ultimately, investment.\(^87\)

b) Other authors argue that higher equity and liquidity requirements will lead to an increase in funding costs which will be passed on to customers which will lead to a decrease in demand for credit and therefore a corresponding decrease in investment activity.\(^88\)

c) Yet another strand of literature argues that banks will compensate for the increased funding costs by increased risk taking therefore counterbalancing the targeted increase in stability to some degree.\(^89,90\)

---


The empirical analysis shows that tighter capital rules and liquidity requirements have a modest dampening effect on the volatility of output: an increase in the capital ratio by one per cent translates into a 0.09% output loss relative to the level that would have prevailed in the absence of the capital tightening. The effects of more stringent liquidity requirements on output are calculated to be 25 or 50% increase in the liquid asset/total asset ratio. The steady state output reduction is estimated to be in the range of 0.08 to 0.15%. At this stage all the empirical findings are still surrounded by considerable uncertainty. Empirical research also indicates the crucial importance of the institutional set-up for financial stability because the findings show that a bank-based financial system tends to be more pro-cyclical with regard to GDP growth than a market-based system.

In Figure 23 and Table 9 it is shown that, in the short run, impacts of capital and liquidity requirements on economic growth are relatively small compared with an average economic recession; the recent financial crisis reduced the economic growth in the European Union by approx. 5% in one year. Due to the gradual implementation of the regulation over time the potential loss of economic growth for capital is even more modest, for a 1% increase of capital only -0.18%.

**Figure 23: Short-term growth impact of regulatory capital requirements**

GDP growth in %

Increased Liquidity Requirements in %

Capital Requirements in % ratio

Source: own calculation based on Bankscope data.


92 Critical for the investment impact is the structure of the economy: large corporates have the option to move to the capital market, while SME are generally restricted to the credit financing channel. International transactions can be financed outside of the European Union. For this change in financing behaviour no empirical analysis has been conducted so far.
Table 9: Growth impact of regulatory capital and liquidity requirements

<table>
<thead>
<tr>
<th>Capital Requirements</th>
<th>0%</th>
<th>1%</th>
<th>2%</th>
<th>3%</th>
<th>4%</th>
<th>5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>8%</td>
<td>0.00%</td>
<td>-0.15%</td>
<td>-0.30%</td>
<td>-0.46%</td>
<td>-0.61%</td>
<td>-0.79%</td>
</tr>
<tr>
<td>9%</td>
<td>-0.18%</td>
<td>-0.33%</td>
<td>-0.49%</td>
<td>-0.64%</td>
<td>-0.82%</td>
<td>-0.97%</td>
</tr>
<tr>
<td>10%</td>
<td>-0.39%</td>
<td>-0.52%</td>
<td>-0.67%</td>
<td>-0.85%</td>
<td>-1.00%</td>
<td>-1.15%</td>
</tr>
<tr>
<td>11%</td>
<td>-0.58%</td>
<td>-0.73%</td>
<td>-0.88%</td>
<td>-1.03%</td>
<td>-1.18%</td>
<td>-1.37%</td>
</tr>
<tr>
<td>12%</td>
<td>-0.76%</td>
<td>-0.91%</td>
<td>-1.06%</td>
<td>-1.21%</td>
<td>-1.40%</td>
<td>-1.55%</td>
</tr>
<tr>
<td>13%</td>
<td>-0.97%</td>
<td>-1.09%</td>
<td>-1.24%</td>
<td>-1.43%</td>
<td>-1.58%</td>
<td>-1.73%</td>
</tr>
</tbody>
</table>

**Source:** own calculation based on Bankscope data.

Due to the adjustments of the required returns on equity and bank debts the short run effects of increased capital requirements will disappear, because of the increase stability of a bank as well as the banking industry as whole. The loss of economic growth due to liquidity requirements is permanent, since the imposed restriction on holding idle liquidity reduced the investment budget of banks. A reduced growth rate of about -0.15% is the price of a 1% increase in bank liquidity.

Tables 10 and 11 summarise the impacts of increased capital and liquidity requirements for the 27 EU Member States.
### Table 10: Short-term growth impact of regulatory capital requirements

<table>
<thead>
<tr>
<th>Country</th>
<th>Regulatory Capital Requirements</th>
<th>9%</th>
<th>10%</th>
<th>11%</th>
<th>12%</th>
<th>13%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td></td>
<td>-0.28%</td>
<td>-0.61%</td>
<td>-0.89%</td>
<td>-1.17%</td>
<td>-1.45%</td>
</tr>
<tr>
<td>Belgium</td>
<td></td>
<td>-0.11%</td>
<td>-0.21%</td>
<td>-0.32%</td>
<td>-0.42%</td>
<td>-0.53%</td>
</tr>
<tr>
<td>Bulgaria</td>
<td></td>
<td>-0.22%</td>
<td>-0.43%</td>
<td>-0.65%</td>
<td>-0.86%</td>
<td>-1.08%</td>
</tr>
<tr>
<td>Cyprus</td>
<td></td>
<td>-0.05%</td>
<td>-0.09%</td>
<td>-0.14%</td>
<td>-0.20%</td>
<td>-0.24%</td>
</tr>
<tr>
<td>Czech Republic</td>
<td></td>
<td>-0.36%</td>
<td>-0.69%</td>
<td>-1.04%</td>
<td>-1.37%</td>
<td>-1.73%</td>
</tr>
<tr>
<td>Denmark</td>
<td></td>
<td>-0.29%</td>
<td>-0.57%</td>
<td>-0.83%</td>
<td>-1.11%</td>
<td>-1.40%</td>
</tr>
<tr>
<td>Estonia</td>
<td></td>
<td>-0.36%</td>
<td>-0.73%</td>
<td>-1.06%</td>
<td>-1.43%</td>
<td>-1.79%</td>
</tr>
<tr>
<td>Finland</td>
<td></td>
<td>-0.25%</td>
<td>-0.49%</td>
<td>-0.74%</td>
<td>-0.98%</td>
<td>-1.18%</td>
</tr>
<tr>
<td>France</td>
<td></td>
<td>-0.09%</td>
<td>-0.18%</td>
<td>-0.27%</td>
<td>-0.35%</td>
<td>-0.44%</td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td>-0.09%</td>
<td>-0.15%</td>
<td>-0.23%</td>
<td>-0.32%</td>
<td>-0.41%</td>
</tr>
<tr>
<td>Greece</td>
<td></td>
<td>-0.11%</td>
<td>-0.26%</td>
<td>-0.37%</td>
<td>-0.51%</td>
<td>-0.63%</td>
</tr>
<tr>
<td>Hungary</td>
<td></td>
<td>-0.21%</td>
<td>-0.40%</td>
<td>-0.61%</td>
<td>-0.80%</td>
<td>-1.01%</td>
</tr>
<tr>
<td>Ireland</td>
<td></td>
<td>-0.16%</td>
<td>-0.32%</td>
<td>-0.47%</td>
<td>-0.63%</td>
<td>-0.79%</td>
</tr>
<tr>
<td>Italy</td>
<td></td>
<td>-0.23%</td>
<td>-0.42%</td>
<td>-0.65%</td>
<td>-0.88%</td>
<td>-1.11%</td>
</tr>
<tr>
<td>Latvia</td>
<td></td>
<td>-0.37%</td>
<td>-0.73%</td>
<td>-1.10%</td>
<td>-1.47%</td>
<td>-1.84%</td>
</tr>
<tr>
<td>Lithuania</td>
<td></td>
<td>-0.32%</td>
<td>-0.66%</td>
<td>-0.98%</td>
<td>-1.32%</td>
<td>-1.64%</td>
</tr>
<tr>
<td>Luxemburg</td>
<td></td>
<td>-0.09%</td>
<td>-0.17%</td>
<td>-0.26%</td>
<td>-0.34%</td>
<td>-0.43%</td>
</tr>
<tr>
<td>Malta</td>
<td></td>
<td>-0.09%</td>
<td>-0.19%</td>
<td>-0.28%</td>
<td>-0.37%</td>
<td>-0.46%</td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td>-0.15%</td>
<td>-0.31%</td>
<td>-0.46%</td>
<td>-0.59%</td>
<td>-0.74%</td>
</tr>
<tr>
<td>Poland</td>
<td></td>
<td>-0.25%</td>
<td>-0.52%</td>
<td>-0.77%</td>
<td>-1.01%</td>
<td>-1.29%</td>
</tr>
<tr>
<td>Portugal</td>
<td></td>
<td>-0.12%</td>
<td>-0.24%</td>
<td>-0.39%</td>
<td>-0.51%</td>
<td>-0.63%</td>
</tr>
<tr>
<td>Romania</td>
<td></td>
<td>-0.08%</td>
<td>-0.16%</td>
<td>-0.24%</td>
<td>-0.33%</td>
<td>-0.40%</td>
</tr>
<tr>
<td>Slovakia</td>
<td></td>
<td>-0.22%</td>
<td>-0.42%</td>
<td>-0.64%</td>
<td>-0.86%</td>
<td>-1.06%</td>
</tr>
<tr>
<td>Slovenia</td>
<td></td>
<td>-0.29%</td>
<td>-0.54%</td>
<td>-0.83%</td>
<td>-1.12%</td>
<td>-1.37%</td>
</tr>
<tr>
<td>Spain</td>
<td></td>
<td>-0.39%</td>
<td>-0.78%</td>
<td>-1.24%</td>
<td>-1.63%</td>
<td>-2.02%</td>
</tr>
<tr>
<td>Sweden</td>
<td></td>
<td>-0.19%</td>
<td>-0.35%</td>
<td>-0.54%</td>
<td>-0.69%</td>
<td>-0.88%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td></td>
<td>-0.16%</td>
<td>-0.29%</td>
<td>-0.45%</td>
<td>-0.58%</td>
<td>-0.74%</td>
</tr>
<tr>
<td>European Union</td>
<td></td>
<td>-0.18%</td>
<td>-0.39%</td>
<td>-0.56%</td>
<td>-0.74%</td>
<td>-0.92%</td>
</tr>
</tbody>
</table>

**Source:** own calculation based on Bankscope data. Note that short-run growth means growth under scenario 1 in the calculation of the change of WAAC): in the short run, when return on equity and funding costs do not change, loan rates rise and hence loan volume and output decline. In the long run, this effect is dampened under scenarios 2 and 3 (see Section 3.2.4.)
### Table 11: Growth impact of regulatory liquidity requirements

<table>
<thead>
<tr>
<th>Country</th>
<th>Requirements to increase liquidity above current level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+1%</td>
</tr>
<tr>
<td>Austria</td>
<td>-0.22%</td>
</tr>
<tr>
<td>Belgium</td>
<td>-0.11%</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>-0.16%</td>
</tr>
<tr>
<td>Cyprus</td>
<td>-0.04%</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>-0.26%</td>
</tr>
<tr>
<td>Denmark</td>
<td>-0.13%</td>
</tr>
<tr>
<td>Estonia</td>
<td>-0.27%</td>
</tr>
<tr>
<td>Finland</td>
<td>-0.20%</td>
</tr>
<tr>
<td>France</td>
<td>-0.13%</td>
</tr>
<tr>
<td>Germany</td>
<td>-0.15%</td>
</tr>
<tr>
<td>Greece</td>
<td>-0.11%</td>
</tr>
<tr>
<td>Hungary</td>
<td>-0.13%</td>
</tr>
<tr>
<td>Ireland</td>
<td>-0.14%</td>
</tr>
<tr>
<td>Italy</td>
<td>-0.15%</td>
</tr>
<tr>
<td>Latvia</td>
<td>-0.23%</td>
</tr>
<tr>
<td>Lithuania</td>
<td>-0.17%</td>
</tr>
<tr>
<td>Luxemburg</td>
<td>-0.15%</td>
</tr>
<tr>
<td>Malta</td>
<td>-0.06%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>-0.19%</td>
</tr>
<tr>
<td>Poland</td>
<td>-0.14%</td>
</tr>
<tr>
<td>Portugal</td>
<td>-0.14%</td>
</tr>
<tr>
<td>Romania</td>
<td>-0.17%</td>
</tr>
<tr>
<td>Slovakia</td>
<td>-0.22%</td>
</tr>
<tr>
<td>Slovenia</td>
<td>-0.25%</td>
</tr>
<tr>
<td>Spain</td>
<td>-0.20%</td>
</tr>
<tr>
<td>Sweden</td>
<td>-0.13%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>-0.11%</td>
</tr>
<tr>
<td>European Union</td>
<td>-0.15%</td>
</tr>
</tbody>
</table>

**Source:** own calculation based on Bankscope data.

Figure 24 shows the increase of banking stability depending on the implementation of liquidity standards and capital/leverage requirements. Both regulations add to financial stability. An increase of 1% liquidity requirement reduces the probability of a financial crisis by approximately 0.3%. For the capital requirements decreasing benefits are observed: the likelihood of bank failure falls by -1.1% for a capital increase from 8%-9%, levelling out with a reduction of 0.2% for an increase from 12%-13%. This result indicates that increasing capital requirements above this level will not further increase the stability of the banking industry.
Figure 24: Increase in financial stability due to CRD IV measures

Reduction of the Likelihood of Financial Crisis in %

Increased Liquidity Requirements in %  Capital Requirements in % ratio

Source: own calculation based on Bankscope data.

3.4.3 Conclusion on cost-benefit: effects of CRD IV measures on business cycles and economic growth

To reach a final conclusion on the cost-benefits of banking regulation the efficiency of regulations are evaluated with a break-even analysis. On one hand, as discussed above the likelihood of banking failures is reduced on the other hand, due to capital and liquidity buffers the effects of financial crisis are dampened. In Figure 25 the break-even plane separates the space of inefficient regulation outcomes, i.e. below the plane, from efficient outcomes, the space above the plane.

Figure 25 clearly shows that a combination of capital and liquidity requirements will be most efficient for increasing the stability of the financial system. Only capital requirements beyond 13% and above 5% additional liquidity are associated with no extra gains from increased economic stability.
Figure 25: Break-even evaluation for capital and liquidity requirements

Break-even reduction in growth loss due to financial crisis for CRD IV measures in %

Source: own calculation based on Bankscope data.

3.5 Cost-benefit: effects of CRD IV measures on the overall stability of the financial system; the issue of SIFIs

To ensure systemic stability the financial externalities that may result from bank failures, especially for systemically important financial institutions (SIFIs), have to be internalised. Most proposals want to achieve this goal by raising capital buffers and liquidity requirements. Critical for the macroprudential regulation is the calculation of capital surcharges in a way that would induce institutions to take into account their spillovers to the rest of the global financial system. The difficulty of this task stems from the fact that, among other things, measures of systemic risk should consider the multiplier effects following a distress event.

93 The issue of SIFIs and the assessment of the impact of suggested measures targeting such institutions will be covered by another Banking Study which will evaluate the broad range of EU regulatory reforms; publication of this Study is planned for Autumn 2011.

Questions such as ‘what is an appropriate means of measuring and addressing systemic importance?’ and ‘what is a consistent prudential treatment of systemic importance across financial sectors and markets, i.e. what are the pros and cons of the different approaches to resolve the problem of too-big-to-fail?’ are at the centre of the analysis to evaluate the effects of CRD IV measures on the overall stability of the financial system.

There is however, disagreement about what measure captures best systemic importance of financial institutions. While some argue that size alone should not be considered a reliable measure for systemic importance, the link between the relative size and the risk contribution seems to be non-linear and portfolio-dependent, others claim that it is a good proxy for indicators which are more complicated to measure. A couple of alternatives are available to address systemic importance, including:

1. A capital-based approach, i.e. to impose a systemic capital charge to compensate for the systemic risk contribution potentially not covered by the minimum capital requirements for the ‘average’ institution.

2. Charging a kind of fee/premium or tax to accumulate funds similar to a deposit guarantee scheme so as to internalise the externalities of a systemic crisis and reduce the incentives of financial intermediaries to become a SIFI. The premium would be based on a financial institution’s contribution to the systemic loss.

3. A requirement on financial intermediaries to issue debt instruments which will be automatically converted into equity capital if certain triggers are reached (see section 3.2.1.3 on contingent equity capital). This might reduce the necessity and problem of defining SIFIs.

---


With respect to the assessment of the extent of the externality of each financial institution, one proposal puts forward the concept to use of a scoring model which uses the following indicators: (1) the size of an institution, (2) the degree of interconnectedness\textsuperscript{101} with the rest of the system (interbank lending divided by assets, short-term funding divided by liabilities, correlation of asset positions), and (3) the degree of complexity of an institution (holdings of certain derivatives, international claims and off-balance-sheet activities).\textsuperscript{102}

Systemically relevant banks do not only cause negative externalities, but also cause inefficiencies by enjoying monopolist advantages. Therefore it can be claimed that strong incentives exist for financial intermediaries to be considered systemically relevant by regulators, resulting in the following advantages: lower funding costs, higher revenues, and higher probability of being bailed out in a crisis event. ‘However, from a general welfare perspective, there is no convincing evidence that the presence of systemically relevant market participants increases economic efficiency. Thus, it is the responsibility of the political system to offset the “unfair” advantages of institutions that excessively emit systemic risk to the wider economy’.\textsuperscript{103} For the U.S., estimates for the competitive advantage in terms of reduced funding costs are in the range of 0.5%.\textsuperscript{104}

There is disagreement about how to measure systemic importance and different approaches can lead to materially different measures of systemic importance, the whether larger banks are more efficient providers of financial services, due to economic scale and scope, than small banks. Therefore, regulators face a great challenge to design and implement that optimally solves this trade-off.\textsuperscript{105}

### 3.6 Cost-benefit: effects of CRD IV measures on the efficiency of monetary and fiscal policy

CRD IV measures will change the banking landscape and the portfolios banks hold. Monetary policy influences banks in many ways. The net effect of a monetary policy change on banks depends on the balance of three forces: interest rate pass-through, risk shifting (perceptions of, and attitude towards risk), and leverage. A monetary easing encourages greater leverage and lower monitoring. Restrictive monetary policy shifts the search for yield process, especially in the case of nominal return targets. The impact of interest rates changes valuations, incomes and cash flows, which in turn can modify how banks measured risk. However the net-effect depends on the initial capitalisation of the banks and the market structure: facing a policy rate cut; well capitalised banks get incentivised to reduce their monitoring efforts, while highly levered banks are going to increase them. The contestability of the banking industry is therefore likely to vary across countries and over time. In sum, monetary policy influences the economy through its effects on credit conditions facing economic decision makers (households and firms).


This will influence the interest rates available on bank deposits and bank loans as well as the funding costs for firms (in the form of bank credit, debt issued on the capital market, or equity).  

The role of the central bank/government in responding to financial system instabilities as a lender-of-last-resort to resolve systemic problems is associated with moral hazard problems: banks may be lured into more risky investments because their risk-taking is subsidised in case of failure. This moral hazard is itself a rationale for regulation. In principle, the lender-of-last-resort interventions should only be directed to solvent but illiquid banks. However, in practice lender-of-last-resort institutions face great difficulties in a time of financial stress to distinguish between fundamentally sound but illiquid banks and those that are in fact insolvent.

The effectiveness of monetary policy depends on the state of the financial system and various financial developments (i.e. interest rate deregulation, capital account liberalisation, development of capital markets, securitisation, derivatives, financial consolidation, payment instrument technology and determining factors thereof, influenced by regulation) can potentially change the way monetary policy is transmitted through the financial system. Overall, there is evidence of significant differences in the nature of the pass-through of policy rates to both retail bank deposit and lending rates. Whether a trade-off between the two objectives of price and financial stability exists depends on specific economic circumstances: no trade-off between price and financial stability may exist when an economy nears the peak of a cycle, when banks tend to take the most risks and prices are under pressure. Monetary tightening in such a situation would most likely decrease leverage and risk taking and, at the same time contain price pressures. In contrast, a trade-off between the two objectives could emerge in an environment with low inflation but excessive risk taking. In this situation, the policy base rate cannot deal with both objectives at the same time: Tightening may reduce risk-taking, but will lead to an undesired contraction in aggregate economic activity and/or to deflation. Additional macroprudential tools are needed in such a situation. There is also consensus that monetary policy can have an (indirect) impact on stability by influencing the risk-taking behaviour of banks. Low interest rates may boost the search for high yielding assets and encourage banks to invest in riskier assets. Empirical evidence for U.S. over the period 1997-2008 investigating the link between monetary policy, commercial property prices and the risk taking behaviour of banks does not support the hypothesis that loose monetary policy over this period increased the risk taking for the entire banking system as a whole. However, the evidence seems to indicate that there are important and significant differences among different types of banks: small domestic banks seem to increase their risk exposure, foreign banks lower their risk profile and large domestic banks do not change their risk exposure.

---


An empirical analysis finds that a 1% increase in the monetary policy indicator leads to a decline in lending of approximately 1.2% for an average bank, with results varying substantially among different types of banks (0.2% to 1.8%). The evidence seems to confirm theory in the sense that the effects of a monetary tightening are smaller for banks with higher capital ratios, which have easier access to uninsured financing.\textsuperscript{110}

CONCLUSIONS

Conclusions regarding capital requirements

- Higher capital requirements:

Empirical evidence shows that (1) the foundations for the calibration of a sound regulatory capital are not robust, (2) capital regulation plays a secondary role in banks’ capital decisions, and (3) the credit supply of well-capitalised banks is less dependent on the business cycle and thereby has a stabilising effect on the economy.

Increased capital requirements, while reducing the risk of losses for bank debt holders and therefore reducing the risk of spillovers of a bank failure to other financial instructions and investors, has no significant effect on the quality of credit portfolios. As a bank increases its capital base, its equity becomes less risky, and therefore the capital markets require a lower return.

Increased capital requirements have only a modest impact on cost of capital and interest rates in the short run and thereby on economic growth.

A major drawback of the higher capital requirements are incentives for regulatory arbitrage through the shadow banking system: in order to mitigate them, an additional request for imposing similar capital requirements on a given asset class for intermediaries in the shadow banking system has been raised.

The new capital regulation will increase the stability of the banking system, but only in the sense of bank failure absorption. The likelihood of bank failures is not necessarily directly reduced. Only if the capital regulations restrict the banks’ investment portfolio decisions, the likelihood of bank failures will decrease, too.

- Contingent capital:

Due to the complexity of the design and of valuation, contingent capital should only be counted as part of capital requirements if these financial instruments are of superior quality than equity. The claim that banks’ will lose the tax benefits resulting from contingent capital as debt-like financial instruments is not legitimate.

- Counter-cyclical capital buffers:

At this stage the designing of a fully rule-based mechanism for counter-cyclical capital requirements may not be possible as some degree of judgment seems inevitable. Empirical evaluations allow the conclusion that a counter-cyclical capital requirements rule is capable of reducing in a sizeable way the instability of the financial system and output. Experience of counter-cyclical capital requirements however show that a restraining effect may be relatively small, since the banks’ ability to raise capital in good times is relatively easy and the impact of higher capital on loan spreads is relatively small. In general, however, the ability of banks to by-pass cyclical capital requirements should not be underestimated.

- Leverage Ratio Requirements

A leverage ratio requirement as a complement to the Basel II risk-weighted capital requirements is beneficial for financial stability, because it mitigates the model uncertainties of risk-based approaches and represents a mitigating control helping to offset the banks’ potential capital savings by understating their risks. For European banks the link between banking portfolio quality and leverage ratios is at best weak. Nevertheless, properly defined leverage ratios play an important role in a macroprudential framework as safeguards against amplification mechanisms. Research indicates that the current leverage ratio in the new Basel III framework of 3% is too low.
Analysis provides the insight that a 5% leverage ratio threshold would have more impact than the 6% Tier 1 risk-based capital requirement. Leverage ratios just as capital requirements have only a modest impact on cost of capital and interest rates in the short run and thereby on economic growth.

**Conclusions regarding liquidity requirements**

The discussion on the implementation of liquidity requirements is still at an early stage. However there is significant empirical evidence that sound liquidity holdings in the banking industry will reduce the risk of contagion and endogenously reinforcing destabilisation of financial market resulting from negative economic shocks. Therefore the introduction of liquidity requirements will foster the stability of banking. A 1% increase in liquidity requirements raises the funding costs on average by 5 basis points. The effect on different bank types varies relatively little. Liquidity standards have a modest impact on reducing the bank failure risk, however, significantly reduce the risk of financial failure propagation.

**Conclusions regarding the cost of banking – Weighted Average Cost of Capital (WAAC) and credit interest rates**

The immediate effect of higher capital requirements on the weighted average cost of capital and thereby on the credit interest rates, even in the case of unchanged return on equity and interest rates for bank funds (scenario 1), are for the European Union likely to be modest, for the case of an increase of capital requirements to 13% 31 basis points, for the Member States the increase varies between 59 and 14 basis points.

If increased bank financing costs are passed through to customers (scenario 2) or if the banks’ financing costs do not change at all (scenario 3), the impact of increased capital requirements on interest rates are modest at worst. This potential short run effect is further dampened by (1) the gradual implementation of the new capital requirements allow a smooth build-up of capital, (2) an adaptation of risk perception of bank equity and debts to the new risk profile. So the long run effects on interest rates resulting from new capital requirements can be ignored.

Due to the specific nature of competition in the banking industry especially in the European Union, even these modest increases and cost differentials raise significant incentives (1) to migrate credit-creation activities to the shadow-banking sector and tilt the level playing field of banks within the European Union. These effects may bring back fragility to the overall financial system.

**Conclusions regarding Banks’ Portfolio Selection**

The new regulations generate a modest increase of banks’ weighted average cost of capital in an adjustment phase that fading out in the long run, allowing the banks to maintain the same asset volumes on their balance sheets. The risk/return portfolio decisions by banks only will be impacted if the capital requirements are a binding constraint. Because of the fact that banks hold significantly more capital than is currently required, the adjustments of the risk weights could be absorbed without an impact on banks’ portfolio choices. The introduction of capital requirements for off-balance sheet exposures will change the optimising space of banks, making risk taking more capital intensive. Since losses are unintended/unexpected events, banks have likely learned their lessons from the subprime crises, and improved their risk management and processes as well as their capital allocation. Since the primary focus of the banks’ management is how financial market honours their efforts, regulatory capital will stay a secondary and therefore non-binding for banks’ business considerations.
Conclusions regarding integrated impacts of capital requirements, liquidity standards and leverage ratio on a bank

The combined effect of a 1% increase in capital and liquidity requirements will increase the weighted average cost of capital 11.5 basis points as a short run reaction, i.e. given that return on equity and bank liabilities interest rates do not change. For a long run perspective, with equity and bank interest rates fully adapting to the bank financing risk profile, only the liquidity effect on weighted average cost of capital will prevail, i.e. an increase of 5 basis points per imposed 1% increase of liquidity requirements.

Conclusions regarding effects of CRD IV measures on business cycles and economic growth (Cost-Benefit assessment)

To reach a final conclusion on the cost-benefits of banking regulation the efficiency of regulations are evaluated with a break-even analysis. On one hand, the likelihood of banking failures is reduced on the other hand, due to capital and liquidity buffers the effects of financial crisis are dampened. We find that a combination of capital and liquidity requirements will be most efficient for increasing the stability of the financial system. Capital requirements beyond 13% and above 5% additional liquidity are associated with no extra gains from increased economic stability.
ANNEX I: MACROPRUDENTIAL FINANCIAL REGULATION APPROACH - THEORETICAL AND EMPIRICAL BACKGROUND

In this annex the theoretical foundations of a macroprudential approach to regulation are explained. Given the benefits of the CRD IV measures in terms of expected gains from reducing the probability and severity of banking crises as outlined in section 3.4.1, policymakers and academics agree that the overarching orientation of financial regulation needs to move in a macroprudential direction.

A macroprudential financial regulation approach recognises the importance of general-equilibrium effects, and seeks to safeguard the financial system as a whole. In the simplest terms, one can characterise the macroprudential financial regulation approach to financial regulation as ‘an effort to control the social costs associated with excessive balance-sheet shrinkage on the part of multiple financial institutions hit with a common shock’.111

Macroprudential financial regulation aims at limiting systemic financial risk. A microprudential regulation focus is, by its conception, aimed at preventing the costly failure of individual financial institutions.112 Macroprudential policy is a complement to microprudential financial regulation and it interacts with other types of public policy that have an impact on systemic financial stability.113 The main differences between microprudential and macroprudential regulation are summarised in Table 12.

Table 12: Microprudential versus macroprudential regulation

<table>
<thead>
<tr>
<th>Microprudential Regulation</th>
<th>Macroprudential Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals</td>
<td>Limit system-wide (systemic) financial risk</td>
</tr>
<tr>
<td>Control social costs of using the deposit insurance fund, mitigate moral hazard</td>
<td>Control social costs when many financial firms shrink their assets at the same time: credit crunch, fire-sale effects</td>
</tr>
<tr>
<td>Target group</td>
<td>All providers of credit, liquidity, and maturity transformation, individual systemically important institutions, financial market infrastructures</td>
</tr>
<tr>
<td>Banks financed with government-insured deposits</td>
<td>Global, taking into account local conditions (one size does not fit all)</td>
</tr>
<tr>
<td>Geographical range</td>
<td>National</td>
</tr>
<tr>
<td>Global, taking into account local conditions (one size does not fit all)</td>
<td></td>
</tr>
<tr>
<td>Risks to be identified and surveyed</td>
<td>Idiosyncratic risks (credit risks, market risks, operational risks) at microeconomic level</td>
</tr>
<tr>
<td>Macroeconomic risks arising from financial imbalances, common exposures, risk concentrations, linkages, interdependencies that are sources of contagion and spill-over, excessive credit growth, interaction of business and financial cycles, cross-border spillovers, financial stability over time – i.e. procyclicality in the financial system, cross-sectional financial stability – i.e. distribution of risk at a point in time within the financial system/contributions to systemic risk of individual institutions</td>
<td></td>
</tr>
</tbody>
</table>


---


The Commission Services recognise that the cumulative effect of the proposed (micro- and macroprudential) provisions ‘might be substantial, and could have implications for the amounts of funds that banks have available to lend to businesses’.\textsuperscript{114} It may therefore be appropriate – in addition to the impact assessments that have been or will be carried out in connection with each set of proposed amendments – to assess separately the aggregate effect of the proposed revisions to capital requirements and their potential impact on financial recovery and the ‘real economy’. Therefore, the ‘field of vision’ is a system-wide or macroprudential oversight.\textsuperscript{115}


ANNEX II: RELATION OF CRD IV TO OTHER REGULATORY MEASURES

This study on the CRD IV concerns prudential regulations to prevent future banking crises. It is connected with a second parallel study for the European Parliament covering further measures of bank regulation with regard to the financial crisis. In this Banking Study, regulations on Credit Rating Agencies, short-selling, selling of financial services (MiFID), Deposit Guarantee Schemes, Investor Compensation Schemes, OTC derivatives, taxes and bank levies, accounting standards and bank resolution will be incorporated together with the findings of the CRD IV impact assessment to reach an overall holistic assessment. Table 13 gives an overview of regulations affecting bank behaviour.

Table 13: Overview of regulations affecting bank behaviour

<table>
<thead>
<tr>
<th>Goals</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Behaviour</td>
<td>MiFID, Short Sales, Accounting Standards</td>
</tr>
<tr>
<td>Investor Protection</td>
<td>DGS, ICS</td>
</tr>
<tr>
<td>Product Quality</td>
<td>Product regulation, e.g. OTC Derivatives</td>
</tr>
<tr>
<td></td>
<td>Micro-/macro-prudential regulation (CRD IV: capital requirements, leverage ratio requirements, liquidity requirements)</td>
</tr>
<tr>
<td>Prevention of crisis</td>
<td>Protective regulation, e.g. deposit guarantee schemes, bank resolution</td>
</tr>
<tr>
<td>Crisis resolution</td>
<td>‘Responsible Credit’ (2008/48/EU), Investment Directive (UCIT IV), Payments Directive</td>
</tr>
</tbody>
</table>

Source: iff

Consumer protection rules, which have been a core element of recent EU regulation, are not taken into account in neither the present study nor the parallel ‘Banking Study’. In fact, a principle like the obligation of ‘responsible lending’, price disclosure rules, good advice in the sale of financial products and certain restrictions on the sale of investment products or the sale of securitised claims also affect the stability of banks. If strict product and behavioural rules limit the ability of banks to market risky products, there is less need for prudential regulation that restricts the possibilities and incentives of banks to take excessive risks. An ever more complex prudential regulation such as CRD IV may increase the incentives and capabilities of banks to use regulatory arbitrage that cannot be controlled by supervisory bodies. At product level, the development of risky products as retail investment offerings or certain endowment mortgages can be restricted. At the sales level, professional rules as well as consumer protection rules such as those on conduct of business and information provision may apply, which by calling for more transparency and integrity thus impede the marketing of risky products. Prudential regulation instead is focussed on possibilities and incentives of banks to use products and marketing activities which increase the probability of a crisis and therefore should have been prevented. Finally, protective measures like state intervention, nationalisation and rescue, are at the end point of the development and probably most costly and harmful to the real economy. Intervention at an early stage will have an impact on the cost of banking and will reduce offers and marketing practices at the individual bank level.

ANNEX III: CRD IV MEASURES

Because inefficiently functioning financial systems are a major cause for poor economic growth and economic instability\(^{117}\), banking regulation through prudential and other rules aims to prevent or at least mitigate market failures of credit institutions and thus failures in these markets. The role of government is twofold: supervision of banks and restricting bank activities. The primary goal of the proposed measures is to foster the resilience of the banking sector towards destabilising shocks, and therefore supporting sustainable economic growth.

In line with G20 decisions, in December 2010, as well as January 2011 and revisions in June 2011, the Basel Committee on Banking Supervision (BCBS) published wide ranging changes, to global standards on capital and liquidity requirements. Because these standards are to be adhered to in the formulation of final rules in each jurisdiction, the CRD IV measures planned are the legal transposition of these rules for the European Union. While the EU has launched a breadth of reform initiatives in response to specific weaknesses that became apparent through the recent financial and economic crisis, the changes to the bank prudential rules through the amendment of the EU Capital Requirements Directive are one of the most significant reforms.

The new planned CRD IV measures enhance the Directives 2006/48/EC and 2006/49/EC (‘the Capital Requirements Directive’, ‘CRD’). The possible changes are closely aligned with the amendments to the Basel II framework and the introduction of a global liquidity standard (Basel III) that has been drawn up by the Basel Committee on Banking Supervision (BCBS). They also reflect commitments made by G-20 leaders in London on 2 April 2009 and in Pittsburgh on 24-25 September 2009 as regards building high quality capital, strengthening risk coverage, mitigating pro-cyclicality, discouraging leverage as well as strengthening liquidity risk requirements and forward-looking provisioning for credit losses.\(^{118}\)

The aim of the CRD IV measures is to promote a more resilient European banking system, with an improved ability for banks to absorb shocks and a reduced level of systemic risk in the banking sector as a whole. The CRD IV, like Basel III, is based around five building blocks targeting:

**Solvency:**

1) Strengthening capital: Changing the definition of capital to improve the quality, consistency and transparency of banks’ capital base;

2) Enhancing risk coverage: Strengthening the risk coverage of the framework with new standards for counterparty credit risk exposures arising from derivatives, repos and securities financing activities;

3) Limiting leverage: Introducing a leverage ratio that serves as a backstop to risk-based capital measures and is intended to constrain the build up of excessive debt financed activities in the banking system and provide an extra layer of protection against model risk and measurement error.


Liquidity:

4) Improving liquidity management: Introducing a new liquidity framework, which includes two minimum liquidity risk ratios – a 30-day LCR and a 1-year NSFR – and a set of common monitoring metrics and application standards; and

Stability:

5) Limiting procyclicality: Improving measures to address procyclicality (i.e. the cyclical effects of risk based capital requirements) – in particular, the introduction of counter-cyclical buffers in addition to capital requirements that vary with the economic cycle.

These dimensions of the CRD IV as well as others outlined in the European Commission’s public consultation document outlining its envisaged CRD IV measures such as SIFIs and a single rule book are briefly summarised in this section and presented in Figure 26 around the capital ratio equation.

**Figure 26: Capital ratio equation and overview of CRD IV measures**

![Capital ratio equation and overview of CRD IV measures](http://www.bis.org/review/r081216d.pdf)


**Capital quantity and quality**

The reason why the CRD IV changes will have such an impact is because while on the one hand the proposals increase common equity requirements, and lead to a significant reduction of eligible capital (the numerator), on the other hand, they create the possibility, depending on the firm’s circumstances, of a significant increase in a bank’s risk-weighted assets (the denominator). This more limited recognition of Tier 1 capital and increased risk weighting will have the arithmetic effect of reducing the bank’s capital adequacy ratio. In addition, this third element of the capital ratio equation is also affected by proposals affecting its benchmark minimum level. For example, common equity Tier 1 ratio (also known as ‘core equity’) will need to increase from a minimum of 2% to 4.5%.

---

119 Mainly arising from changes to deductions from capital for various items like minority interests, investments in financial institutions and deferred tax etc.
The introduction of additional capital buffers and the implementation of all changes to the new ratios are to occur on the following timetable (all dates as of 1 January):

### Table 14: Timeline for meeting the changes to the capital adequacy ratios (%)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4.5</td>
</tr>
<tr>
<td>Common Equity Capital Ratio</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Conservation Buffer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.5</td>
</tr>
<tr>
<td>Minimum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.0</td>
</tr>
<tr>
<td>Common Equity plus Capital Conservation Buffer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phase-in of deductions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Minimum Tier 1 Capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Total Capital</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.0</td>
</tr>
<tr>
<td>Minimum Total Capital plus Capital Conservation Buffer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.0</td>
</tr>
<tr>
<td>Source: BIS.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10.5</td>
</tr>
</tbody>
</table>

The CRD IV planned changes with regard to changes in the definition of capital aim to raise the quality, consistency and transparency of the capital base, which in turn will improve the nature of the capital used by banks as a buffer to reliably absorb any unexpected losses that could otherwise threaten the continued activities (going concern) of the financial institution. By simplifying the structure of own funds and redefining equity so that it more closely matches the desired attributes of such ownership instruments, EU banks will be less vulnerable to the threat of insolvency. The measures will also bring about greater convergence in the EU and globally on the issue of eligible capital. While CRD II introduced improvements to the definition of capital (greater emphasis on loss absorbency), the CRD IV changes place a greater emphasis on the importance of ‘going concern’ capital i.e. capital that can help to prevent an institution from becoming insolvent. They include a principles-oriented approach to EU harmonisation of the definition of capital with a proposal to have a clear catalogue of criteria for the eligibility of capital instruments for regulatory purposes, and apply adjustments (the filters and deductions) to the highest quality of capital.

---

120 Capital can either absorb losses on a going concern basis (allowing an institution to continue its activities and helping to prevent insolvency) or absorb losses on a gone concern basis (helping to ensure that depositors and senior creditors can be repaid in the event of a wind-up). As a reminder, the purpose of regulatory capital is to absorb the losses that a firm does not expect to make in the normal course of business (unexpected losses) as opposed to the losses that an institution expects to make (expected losses) as the latter are not covered by regulatory capital and must rather be covered by generated income or by provisions.
The main redefining capital features of the proposal that will have a measurable impact are:

a) the harmonisation whereby the predominant part of Tier 1 capital should be **common equity** (common shares and retained earnings for joint stock companies) and

b) the revision of the **capital structure** so that it is comprised of:
   - Tier 1 ‘going-concern’ capital (Core Tier 1 = common equity, and Non-Core Tier 1 = hybrid capital) and
   - Tier 2 ‘gone-concern’ capital.

The Commission is still reflecting on whether the proportion of Tier 1 capital that must comprise Core Tier 1 capital (i.e. the required level of predominance of Core Tier 1) should be raised above the current level of 50%. For instruments other than common equity to be included, specific criteria are introduced to ensure these absorb losses on a going-concern basis. Conforming the list of regulatory adjustments, especially the harmonisation of **deductions** and **prudential filters** from the common equity component of Tier 1 Capital (e.g. for goodwill and intangibles, minority interests, deferred tax assets etc.), e.g. minority interest would no longer be eligible as core Tier 1 capital under the proposal, and the Commission is considering a similar removal for the accounting treatment of unrealised gains. Other changes include using only core capital as an assessment base for the limits applicable in case of **large exposures** (aimed at limiting the maximum loss that may be incurred by any single client e.g. with proposed identification thresholds and exposure limits of 10% and 25% of own funds respectively). Changes also include deduction of participations in financial institutions and reflections on contingent capital. These CRD IV changes to the definition of capital may have to be implemented by end-2012.

In addition, the Commission proposes to introduce explicit higher minimum requirements for the minimum levels of the ratios of Common Equity Tier 1, Tier 1 and total capital (net of deductions) to risk weighted assets:121

- Raised minimum capital requirement levels at the micro level of: Minimum common equity to 4.5% from 2.0%; Minimum Tier 1 capital to 6.0% from 4.0%; with Minimum total capital remaining at 8.0%; and

- Banks will be required to hold an additional capital conservation buffer of 2.5% of RWA to withstand future periods of stress, with the ratio to be met with common equity and banks allowed to draw on this buffer in periods of stress; however the closer their common equity is to the minimum requirement, the greater the constraints they will face on the distribution of earnings (dividend, share buybacks, bonuses etc.).

**Counterparty Credit Risk (CCR)**

The CRD IV planned changes in the area of CCR look to ensure efficient, safe and sound derivatives markets by increasing transparency in those markets, reducing counterparty and operational risk in trading and enhancing market integrity and oversight.122 This is to be achieved by strengthening the capital requirements for counterparty credit risk exposures arising from derivatives, repos and securities financing activities.

---

121 See Glossary for definitions of RWA etc. and Annex IV for the new minimum ratios, capital definitions and a schematic overview of a bank’s balance sheet. Note that capital requirements will already be increased de facto, as a result of other measures changing the composition of capital itself.

122 The Commission has also consulted on counterparty credit risk in February 2011 focusing primarily on collecting evidence and views on (i) capitalisation of exposures to central counterparties and (ii) the treatment of incurred credit valuation adjustments.
Measures proposed in the CRD IV Paper focus on enhancing the risk coverage of the CRD and will help reduce systemic risk across the financial system. They include raising the capital buffers backing these exposures, reducing pro-cyclicality and providing additional incentives to move OTC derivative contracts to central counterparties (CCPs). In particular, they require banks to determine capital charges for CCR using stressed inputs, similar to the approach used for determining stressed Value-at-Risk (VaR) for market risk. In addition, a capital charge for mark-to-market losses (i.e. credit valuation adjustment risk - CVA) is introduced, along with additional collateral and margin requirements for illiquid derivative transactions and higher capital charges for bilateral OTC exposures to financial institutions. The following changes will have an impact on banks: the improved measurement to better address counterparty credit risk (e.g. capturing generalised wrong-way risk, and using stressed effective Expected Positive Exposure (EPE); the raised risk weights on exposures to financial institutions due to their higher interconnectedness; and the incentive given to use CCPs, by freeing up more capital than when not using CCPs.

**Liquidity Standards**

The CRD IV changes on liquidity standards introduce standards regarding how much liquidity, i.e. available assets that can be quickly converted in cash, banks need to hold in order to be prudent. The new standards include a liquidity coverage ratio requirement underpinned by a longer-term structural liquidity ratio.

The setting of liquidity standards is necessary because lessons from the crisis have taught regulators the importance of liquidity to meet payment commitments and ensure continued business operations in periods of stress. Whereas the CRD II introduced requirements for liquidity risk management and supervision, the CRD IV planned changes set global quantitative standards for liquidity regulation in all EU Member States. Pending final calibration and design, two ratios for liquidity risk are being considered to boost crisis resistance: the Liquidity Coverage Requirement (LCR) will require credit institutions and certain investment firms to match net liquidity outflows during 30 days of acute stress with high quality liquid assets (LCR >100%); and the Net Stable Funding Ratio (NSFR) will require these firms to have a sound funding structure over one year in an extended firm-specific stress scenario (NSFR >100%). Both standards set out to reduce the potential for a future liquidity crisis by improving financial institutions’ liquidity management and they will have to be fulfilled at all times. Proposals thus introduce a harmonised approach to liquidity standards in Europe, applied to banks of all sizes and irrespective of their business model with a requirement that the LCR’s ‘high quality’ liquid assets should be eligible as collateral for central bank credit operations.

**Leverage Ratio**

The discussed introduction of a ‘leverage ratio’ aims to limit how much a bank is allowed to borrow and it will supplement the above mentioned risk-based capital ratio measures. As a result of past build-up of excessive risk from excessive leverage in certain corners of the financial industry (causing losses during the crisis to force banks to reduce their leverage in a short period with adverse consequences), this change imposes a mandatory ratio at EU level on a ‘one-size-fits-all’ basis. It will be defined as a Pillar 1 measure and technical details being proposed include the netting of adjustments (e.g. netting of repurchase transactions and securities lending transactions, which will set it apart from accounting practices in the US).

---

123 In cases of stress (e.g. sudden loss of deposits) there is a possibility to temporarily fail the LCR test however the provider is required to restore compliance over a short time frame.

124 Different accounting approaches cause different asset valuations e.g. if accounting allows derecognition of a securitised asset (i.e. the removal of an asset or liability (or a portion thereof) from an entity’s balance sheet), the retained positions and liquidity facilities provided by the originator to the special-purpose vehicle (SPV) are
Pending final design and calibration, the Commission has already indicated that the ratio will be phased-in in such a way as not to impede financial and economic recovery:

- The ratio that is being considered is a non-risk-based, gross leverage ratio that is based on going-concern regulatory capital, incorporating an institution's on- and off-balance sheet assets and applicable at the same level as minimum capital requirements, i.e. at the solo, consolidated and sub-consolidated levels;

- Under Basel III there has been an agreement to test a minimum Tier 1 leverage ratio of 3% starting from January 2013 to 2017, disclosure of the leverage ratio and its components is to start from January 2015, with final adjustments to take place in 2017 and a view to a move to mandatory Pillar 1 levels by 2018 after review and calibration;

- Risk management and supervisory review will be strengthened with provisions on senior management level understanding (amendments to Annex V of the CRD) and an EU harmonised supervisory approach to leverage (in the list of risks to be reviewed Annex XI of the CRD).

### Counter-cyclical measures

The measures in this section aim to address the problem of excessive pro-cyclicality that can weaken the financial soundness of institutions through economic cycles. The behaviour of market participants and their misperceptions of risk or inappropriate responses to risk, often mean that financial institutions undertake insufficient, and therefore pro-cyclical, provisioning for credit risks during good times. Related to the leverage ratio, measures such as the proposed counter-cyclical capital buffers (additional shock absorbers) provide a preventative solution to the destabilising effects of the amplification of financial shocks across the financial system. The CRD IV proposals are designed to dampen excess cyclical, promote forward-looking provisioning, conserve capital to be available during periods of stress, and protect the banking sector from periods of excess credit growth. Also significant will be the effects of conserving capital and creating buffers in ‘good times’ that can absorb shocks/losses in periods of stress by introducing a fixed target buffer (capital conservation buffer) over the regulatory capital minimum. Banks would be expected to build up such capital in good times, and failure to fulfil these targets would mean constraints on capital distributions (e.g. dividend payments) until fixed target buffers are reached. Requiring capital to rise during periods of strong earnings will help dampen excessive banking sector credit extension and leverage.

---

included in the asset measure. The setting of the leverage ratio is especially sensitive to differences in accounting regimes. The use of International Financial Reporting Standards (IFRS) results in significantly higher total asset amounts, and therefore lower leverage ratios for similar exposures, than does the use of U.S. generally accepted accounting principles (GAAP). This is because under the IFRS, netting conditions are much stricter and the gross replacement value of derivatives is therefore generally shown on the balance sheet, even when positions are held under master netting agreements with the same counterparty. The IFRS results in significantly higher total balance sheet and thus produces lower apparent leverage ratio for similar types of exposures than U.S. GAAP (under IFRS, netting is recognised only if an institution has the right and intent to settle on a net basis, whereas under US GAAP, netting of derivatives and repurchase transactions are possible when they are subject to enforceable master netting agreements). See: D’Hulster, K., ‘The Leverage Ratio - A New Binding Limit on Banks’, World Bank Public Policy Journal, Crisis Response Policy Briefs, No 11, December 2009, http://iru.worldbank.org/documents/CrisisResponse/Note11.pdf; Dalmaz, S., ‘The Basel III Leverage Ratio Is A Raw Measure, But Could Supplement Risk-Based Capital Metrics’, Standard & Poor’s, April 2010, http://www.bis.org/publ/bcbs165/splr.pdf.
Systemically Important Financial Institutions (SIFIs)
The Commission is consulting on appropriate measures to deal with the risk posed by so-called systemically important institutions. As such, the CRD IV Paper does not yet contain specific proposals (such as additional capital, liquidity or other supervisory measures) that specifically target systemic importance. While details have not yet been formulated, measures that could be included in the future are: stricter prudential measures; a cross border resolution framework; structural reforms (limit the scope of activities or size); competition policy considerations (dominant position) etc.

Single Rule Book in Banking
The Commission is consulting on areas where more stringent requirements might be necessary including on the appropriate prudential treatment of real estate lending. The measures falling under this section are part of the Commission's commitment to create a ‘single rule book’ in Europe, and they serve the objective of reducing the number of options and discretions in the CRD. While recognising differences and local specificities deserving discretion (such as in the area of mortgage credit), the Commission suggests removing national options and discretions from the CRD, and achieving full harmonisation by no longer allowing Member States to apply stricter rules, unless compelling evidence is brought that stricter rules in specific areas are needed on financial stability grounds.

CRD IV changes include the introduction of a mandatory hard test for the preferential treatment for residential and commercial real-estate, introduction of a specific maximum harmonised Loan-to-Income (LTI) ratio and/or other indicators as an additional precondition for the application of the preferential treatment of exposures secured by residential real estate. As outlined in the CRD IV, the Commission is considering whether to increase existing preferential risk weights and the appropriateness of harmonisation towards a mandatory prudential treatment of mortgage lending e.g.:

- Residential real estate: Harmonised Loan to Income ratio (33-50%) and harmonised LTV ratio (e.g. 80%) for preferential treatment; and
- Commercial real estate: Amendment of existing LTV and mortgage lending value benchmarks or introduction of other indicators for preferential treatment.
- Other possible measures being considered to address real estate lending throughout the economic cycle include the application of an adjustment factor to property price increases when calculating the relevant indicators, and a more extensive use of the mortgage lending value (valuation method that ignores speculative elements in its assessment).

Summary of CRD recent amendments
The EU has already adopted urgent changes to the capital requirements directive (CRD) in the CRD II and III that were adopted in the course of 2009 and 2010 (for example, rules on the 5% retention for securitisation and rules on bank remuneration).

CRD II (Directive 2009/111/EC) changes: introduced the following main measures proposed in October 2008 and in effect since 31 December 2010:

- Own funds: Harmonisation of an important source of own funds for banks i.e. hybrid capital and loss absorbency criteria;
- Large exposures: Harmonised regulatory treatment to any single counterparty or borrower (interbank lending);
- Supervisory arrangements: Amended shortcomings in the supervisory arrangements for cross-border banking groups (colleges, home/host);
- Securitisation: Introduced greater rigour and due diligence amongst originators and investors in the securitisation markets;
- Liquidity risk management: Introduced qualitative requirements

**CRD III (Directive 2010/76/EU) changes:** introduced the following measures proposed in July 2009 and in effect since 1 January 2011:

- Trading book: Increased capital requirements for banks’ exposure to market risk and removing arbitrage by aligning rules of trading and banking books;
- Re-securitisation: Increased capital requirements for complex securitisation of an underlying securitisation, and a possible stricter treatment (full deduction from capital) than proposed by the Basel Committee for some re-securitisation positions;
- Securitisation: Improved market transparency by tightening up disclosure requirements of securitisation exposures;
- Remuneration: Introduced a binding obligation on credit institutions to have sound remuneration policies subject to review by national supervisors.
<table>
<thead>
<tr>
<th><strong>Objectives and key changes</strong></th>
<th><strong>Main implications</strong></th>
<th><strong>Example of issues</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capital quality (definition):</strong></td>
<td>Tier 1 capital composed of more common equity and retained earnings; Harmonisation of Tier 2; Full deduction for capital components with little loss-absorption capacity</td>
<td>Banks have been adjusting their balance sheets already; Capital raising by banks, profit retention and reduced dividends; CoCos may be allowed for non-core Tier 1</td>
</tr>
<tr>
<td><strong>Capital quantity (ratios, buffers):</strong></td>
<td>Minimum CET1 (up from 2% to 4.5%+Conservation buffer CB of 2.5%=7% by 2019); Minimum capital (from 8% to 10.5% incl. CB); Counter-cyclical capital buffer (CCB) (discretionary and pending development)</td>
<td>Capital requirement substantially higher (need to raise equity or retain profits); CB could be drawn in times of stress (trade-off with earnings distribution constraint); Banks likely to target a higher CET; Further SIFI and CCB could mean banks target a total capital ratio of up to 15%</td>
</tr>
<tr>
<td><strong>Counterparty credit risk (risk coverage):</strong></td>
<td>Coverage increased by changing treatment of exposures to financial institutions and counterparty risk on derivative exposures; Modelling approaches calibrated to stress periods; New capital charges for CVA and wrong-way risk; Incentive to use CCPs</td>
<td>Accrued importance of controlling quality of CCPs’ risk management; Reduced level of intra-financial sector business (inter-bank lending); Business models may change due to pricing of costs of financial counterparties.</td>
</tr>
<tr>
<td><strong>Leverage ratio (LR):</strong></td>
<td>Introduction of supplementary non-risk-based backstop; Limit set at 3% (i.e. bank’s total assets incl. off-balance sheet assets cannot be more than 33 times bank capital); Monitoring data starts in 2013 and effective 2018</td>
<td>Potential reduced lending; Incentive to improve capital position (Groups may also firm level); Incentive to focus on higher-risk/higher return lending; Pressure to sell low margin assets (mortgages) which could drive down asset prices; Higher market and CRA LR expectation</td>
</tr>
<tr>
<td><strong>Liquidity coverage ratio (LCR):</strong></td>
<td>Short-term coverage of sufficient high-quality liquid assets to withstand expected cash outflows over a 30-day stress scenario; Assets are given a liquidity based weighting (corporate bonds 0-50% only)</td>
<td>Risk of impact from bank-run reduced (financial sector stability); Banks need to hold much more liquid, low-yielding assets to meet the LCR (profitability will fall); National regulators may interpret different ‘right’ run-off rates (distorting level-playing field)</td>
</tr>
<tr>
<td><strong>Net Stable Funding Ratio (NSFR):</strong></td>
<td>Compares available funding sources with funding needs (required based on its assets); Amounts determined using weights: Assets based on ‘stability’ of funding available and duration (0-5% for cash and government bonds, 65% for mortgages; 85% for retail loans); Liabilities (100% Tier1, 90% core deposits, 50% unsecured wholesale funding, 0% ECB funding).</td>
<td>Reduced reliance on short-term wholesale funding (more stable funding mix); Will increase share of wholesale and corporate deposits with maturities &gt;1year (dependant on investor appetite); Banks increase their short-term assets (change in asset mix will reduce yield); Competition may be reduced (if weaker banks with lower NSFR become less competitive)</td>
</tr>
</tbody>
</table>

Source: iff
ANNEX IV: OVERVIEW ON THE STRUCTURE OF A BANK’S BALANCE SHEET AND TYPES OF CAPITAL

Table 16: A bank balance sheet (selected components, by way of example)

<table>
<thead>
<tr>
<th>Component</th>
<th>EUR</th>
<th>Risk-</th>
<th>RWA</th>
<th>now</th>
<th>Post-CRD IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL ASSETS</td>
<td>1000</td>
<td>720</td>
<td></td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>Cash and balances at central banks</td>
<td>200</td>
<td>0%</td>
<td>0</td>
<td>400</td>
<td>380</td>
</tr>
<tr>
<td>Interbank claims (trading book)</td>
<td>100</td>
<td>20%</td>
<td>20</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Net loans, leases and mortgages (banking book)</td>
<td>500</td>
<td>100%</td>
<td>500</td>
<td>300</td>
<td>280</td>
</tr>
<tr>
<td>Investment and securities (banking book)</td>
<td>50</td>
<td>100%</td>
<td>50</td>
<td>85.6</td>
<td>89.6</td>
</tr>
<tr>
<td>Other assets (e.g. property, goodwill and intangible assets)</td>
<td>50</td>
<td>100%</td>
<td>50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** iff

**Note:** Assume bank investment decisions are constant (e.g. lending stays the same), new minimum capital requirements mean more equity is needed. The output from Table 17 (new minimum equity requirements from the CRD IV, e.g. 50.4 in the example shown) increases the bottom right cell of the right side of the balance sheet above. With now adjustment on the asset side, the difference between now and Post CRD IV on the liability side of the given example, shows that (deposits and debt - 40) and other liabilities +4 would be the adjustment made to counterbalance the increase in equity by 36.

Table 17: Example of capital structure and a focus on equity

<table>
<thead>
<tr>
<th>Current minimum ratios (% of RWA)</th>
<th>EUR bn</th>
<th>New CRD IV rules on minimum ratios (% of RWA)</th>
<th>EUR bn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1</td>
<td>4.0%</td>
<td>(=720*4%)=28.8</td>
<td>6.0%</td>
</tr>
<tr>
<td>Tier 2</td>
<td>4.0%</td>
<td>(=720*4%)=28.8</td>
<td>2.0%</td>
</tr>
<tr>
<td>Total (minimum requirement)</td>
<td></td>
<td>(=T1+T2=57.6)</td>
<td></td>
</tr>
<tr>
<td>o/w</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity (CET)</td>
<td>2.0%</td>
<td>(=720*2%)=14.4</td>
<td>4.5%</td>
</tr>
<tr>
<td>Equity - CCB</td>
<td>0.0%</td>
<td>0</td>
<td>2.5%</td>
</tr>
<tr>
<td><strong>Total equity</strong></td>
<td></td>
<td><strong>14.4</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** iff
### Table 18: Calibration of the CRD IV/Basel III capital framework

<table>
<thead>
<tr>
<th></th>
<th>Common Equity Tier 1 (CET1 or Core Tier 1)</th>
<th>Tier 1 Capital (CET 1 + additional Tier 1/non-Core Tier 1)</th>
<th>Total Capital (Tier1+Tier2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum ratio</td>
<td>4.5</td>
<td>6.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Conservation buffer (CB)</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum + CB</td>
<td>7.0</td>
<td>8.5</td>
<td>10.5</td>
</tr>
<tr>
<td>Counter-cyclical buffer range (CCB)</td>
<td>0 - 2.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** BCBS and CRD IV Consultation Paper.

**Note:** Capital requirements and buffers (all numbers in percent).

### Definition of capital

#### Table 19: Definition of capital

<table>
<thead>
<tr>
<th>Elements of capital</th>
<th>Components of capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 1 Capital (going-concern capital)</td>
<td>a) Common Equity Tier 1 Common shares issued by the bank that meet the criteria for classification; Stock surplus (share premium); Retained earnings; Accumulated other comprehensive income and other disclosed reserves; Common shares issued by consolidated subsidiaries of the bank and held by third parties (i.e. minority interest) that meet the criteria; and Regulatory adjustments applied in the calculation of Common Equity Tier 1.</td>
</tr>
<tr>
<td></td>
<td>b) Additional Tier 1 Instruments issued by the bank that meet the criteria (and are not included in CET 1); Stock surplus (share premium); Instruments issued by consolidated subsidiaries of the bank and held by third parties that meet the criteria; Regulatory adjustments applied in the calculation of Additional Tier 1 Capital.</td>
</tr>
<tr>
<td>Tier 2 Capital (gone-concern capital)</td>
<td>Instruments issued by the bank that meet the criteria (and are not included in Tier 1 capital); Stock surplus (share premium); Instruments issued by consolidated subsidiaries of the bank and held by third parties that meet the criteria; Certain loan loss provisions; and Regulatory adjustments applied in the calculation of Tier 2 Capital.</td>
</tr>
</tbody>
</table>

**Source:** BCBS (according to the new definition)
ANNEX V: FORMULAS

The two formulae referred to in the report are listed below.

**Weighted Average Cost of Capital (WACC)** – used in Chapter 3.2.4.1.

Used to evaluate the potential impact of capital regulation for the EU on the financing cost of banks:

\[ WACC = R_D \cdot (1 - T_C) \cdot \frac{D}{TA} + R_E \cdot \frac{E}{TA} \]

Where:
- E: Bank equity
- D: Bank debts
- RE: Return on equity
- RD: Interest rate paid on debt instruments
- TA: Total assets
- TC: Bank tax rate average

**Credit interest rate rule at the margin** – used in Chapter 3.2.4.5.

Used to assess whether a bank will approve a credit or not following a rise in the liquidity requirements.

\[ R_L \geq \frac{WACC}{1 - \frac{LQ}{TA}} \text{ respectively } WACC \leq R_L \cdot \left(1 - \frac{LQ}{TA}\right) \]

Where:
- WACC: Weighted Average Cost of Capital
- LQ: Bank liquidity
- RL: Credit Interest rate
- TA: Total assets

Increasing the liquidity requirements above the current level implies the following inequality:

\[ R_{L, As-Is} \cdot \left(1 - \frac{LQ_{As-Is}}{TA}\right) > R_{L, New} \cdot \left(1 - \frac{LQ_{New}}{TA}\right) \]
**Bank-based financial systems**

In bank-based systems, the intermediation between saving and investment is primarily done by deposit-taking institutions i.e. banks provide most of the credit to the economy. This is in contrast to market-based systems where firms raise funds in capital markets (bond and equity markets).

**Banking Book**

In order to calculate regulatory capital requirements, credit institutions and investment firms classify their assets and off-balance-sheet items either under the banking book or the trading book. The banking book holds most medium- and long-term transactions and is subject to regulatory capital requirements for the credit risk arising from these transactions. The banking book is an accounting book that includes all securities that are not actively traded by the institution, that are meant to be held until they mature. These securities are accounted for in a different way than those in the trading book, which are traded on the market and valued by the performance of the market. All exposures not held in trading book must be held in banking book. The “Philosophy” of banking book capital is to cover unexpected credit losses incurred over a one-year holding period.

**Basel Committee on Banking Supervision (BCBS)**

The Basel Committee provides a forum for regular cooperation on banking supervisory matters. Its objective is to enhance understanding of key supervisory issues and improve the quality of banking supervision worldwide. It seeks to do so by exchanging information on national supervisory issues, approaches and techniques, with a view to promoting common understanding. At times, the Committee uses this common understanding to develop guidelines and supervisory standards in areas where they are considered desirable. In this regard, the Committee is best known for its international standards on capital adequacy; the Core Principles for Effective Banking Supervision; and the Concordat on cross-border banking supervision. It is associated with the Bank for International Settlements (BIS), a coordinating organisation for central bankers around the world. See http://www.bis.org/bcbs/.

**Basel I**

The 1988 Basel Accord set by the Basel Committee on Banking Supervision which globally for the first time: set a common capital adequacy standard; defined capital as equity and subordinated debt; defined a measure of credit risk called risk-weighted assets (RWAs); and required banks to operate with a minimum ratio of capital to RWAs of 8%. While the rules grouped assets into a small number of categories and applied a risk-weighting to each category, the crudeness of these simple categories encouraged “gaming” and misallocation of resources and weightings had been fairly arbitrary.
Basel II  An accord providing a comprehensive revision of the Basel capital adequacy standards issued by the BCBS. Based on 3 Pillars: 1) Rules should be more ‘risk-sensitive’ and regulatory capital should approximate economic capital; 2) Less regulation, more supervision; and 3) Disclosure as an aid to market discipline. Basel II revisions made four major changes to the risk-weighted asset calculations: Refinement of categories (broken down in much greater detail than in Basel I, with more variation in the risk weighting); Ratings (the major credit rating agencies became more important in the risk weightings); Internal risk modelling (sophisticated global banks could use their own internal risk rating models to determine the risk weightings for their own particular assets, with some exceptions); Trading assets (new method for calculating the risk of assets that were held in trading accounts "value at risk" (VAR))

Basel III  These are the amendments to Basel II made public end 2010 (the CRD IV measures assessed in this study are based on them); they provide: Tighter definition of tier 1 capital (common equity) and increased to 7%; Less reliance on bank models, but bank models remain the basis for regulatory capital determination; Limits on maturity mismatches in wholesale funding (NSFR, 2019); Liquidity coverage ratios (LCRs, 2018). Note: Not included in Basel III are final details on: Counter-cyclical capital ‘buffer’ (up to 2.5%); Capital surcharge for SIFIs; and contingent convertible capital instruments (Cocos).

Basis point  One one-hundredth of 1 percent (i.e. 0.01%). 100 basis points equal 1%. Basis points are often used to measure differences in bond yields. E.g. if the yield on a bond changes from 5.55% to 5.5%, it has dropped 5 basis points.

Capital  One of the most important concepts in banking which in its simplest form, represents the funding portion of a bank’s assets which have no associated contractual commitment for repayment. Capital appears on the liability side of the balance sheet and serves as a cushion against unexpected losses, e.g. in case the bank’s assets (loans) declines or its other liabilities (deposits) rise. Capital exists to protect against risk and thus more is needed when greater risks are being taken. The focus is on the asset side because liabilities are generally known with great precision, since a deposit or a bond must be repaid based on specific contractual terms (a major contrast with the insurance industry where future outflows are unknown). Unlike bank liabilities, bank assets can go down, or occasionally up, in value. In particular, bank loans may not be repaid and securities may default or may need to be sold at a time when their market value has declined.

Capital - Economic capital  The methods or practices that allow banks to consistently assess risk and attribute capital to cover the economic effects of risk-taking activities beyond the minimum level of capital required by regulators. The economic capital requirement is a result of the models used in the banks for their calculations and a function of the chosen "rating" that a bank is aiming to aquire in order to raise debt at a lower rate of interest, e.g. a bank that wants an AA rating needs more economic capital than a bank with an AA- rating (given the same portfolio and risk models).

Capital - Regulatory capital  The minimum required capital stipulated by regulation. Should be calculated mainly as a charge on bank risk-taking (not to be confused with a ‘reserve’ see above).
### Capital conservation buffer

The purpose of the conservation buffer is to ensure that banks maintain a buffer of capital that can be used to absorb losses during periods of financial and economic stress. While Basel II did not contain rules on a capital conservation buffer, Basel III means banks will be required to hold a capital conservation buffer of 2.5% to withstand future periods of stress (bringing the total common equity requirements to 7% and with the 2.5% to be met with common equity, after the application of deductions). While banks are allowed to draw on the buffer during such periods of stress, the closer their regulatory capital ratios approach the minimum requirement, the greater the constraints on earnings distributions.

### Capital markets

Capital markets are the electronic and physical markets in which bonds and other financial instruments such as shares and commodities are sold to investors. Institutions such as governments and corporations use the capital markets to raise money through public offerings of bonds and shares or through private placements of securities to institutional investors such as pension funds and insurance companies.

### Capital Requirements Directive (I-IV)

The Capital Requirements Directive (CRD) for the EU financial services industry introduced a supervisory framework in the EU which reflects the Basel II rules on capital measurement and capital standards. It was formally adopted by the Council and the European Parliament on 14 June 2006. The Capital Requirements Directive, comprising Directive 2006/48/EC and Directive 2006/49/EC, was published in the Official Journal on 30 June 2006. There have been subsequent amendments to the law, and the latest one being discussed (and subject of this study) is the CRD IV which is the implementation of Basel III into EU law.

### Capital structure

The relative proportions of equity capital and debt capital in a firm's balance sheet.

### Central Counterparty (CCP)

A CCP is an independent legal entity that interposes itself between the buyer and the seller of a derivative security (serving as a clearing house). When trading through a CCP, the single contract between two initial counterparties that is the hallmark of an over-the-counter (OTC) trade is still executed, but it is then replaced by two new contracts – between the CCP and each of the two contracting parties. At that point, the buyer and seller are no longer counterparties to each other – instead, each acquires the CCP as its counterparty. This structure has three clear benefits. First, it improves the management of counterparty risk. Second, it allows the CCP to perform multilateral netting of exposures as well as payments. Third, it increases transparency by making information on market activity and exposures – both prices and quantities – available to regulators and the public. Wider use of central counterparties (CCPs) for OTC derivatives has the potential to improve market resilience by lowering counterparty risk and increasing transparency.

### Collateral

Assets with monetary value which are used to guarantee a loan. If a borrower defaults and fails to repay a loan, the collateral or some portion of it, may become the property of the lender. Secured loans are loans that are guaranteed by collateral. The existence of collateral reduces the risk of loss.
**Collateralised debt**

Collateralised debt (securitisation, structured products and covered bonds) has been one of the fastest developing investment vehicles in the last decade based on the idea that credit can be advanced on the basis of whatever collateral, security, or compensation in the case of default of a borrower. The collateralised debt instrument is therefore a kind of promissory note backed by this collateral e.g. mortgages or loans or asset-backed securities. A collateralised debt obligation (CDO) is a type of securitisation, whereby a diversified pool of loans or securities is packaged into various tranches backed by the cash flows of the asset pool.

**Commercial paper**

Short term, private unsecured bond notes issued by a corporation or a bank to meet immediate short term needs for cash. Maturities typically range from 2 to 270 days. Commercial paper is usually issued by corporations with high credit ratings and sold at a discount from face value. Typically new issues refinance maturing ones.

**Common Equity Tier 1 (CET 1)**

The CRD IV intends to define CET 1 (i.e. Common equity or Core Tier 1) as common shares, the related share premium accounts, reserves and profits and losses brought forward as a result of the final application of profit and loss. CET1 must be at least 4.5% of risk-weighted assets at all times. The CRD IV also plans to compel banks which disclose ratios involving components of regulatory capital (e.g. “Equity Tier 1”, “Core Tier 1” or “Tangible Common Equity” ratios) to accompany such disclosures with a comprehensive explanation of how these ratios are calculated.

**Contingent Convertible bonds (CoCos)**

A convertible bond is one that can be converted into a predetermined amount of the company’s equity at certain times during its life, usually at the discretion of the bondholder (essentially a bond with a stock option). A contingent convertible bond involves a bank issuing a debt security that automatically converts into equity if a measure of either the bank’s regulatory capital or stock-market value falls below a fixed benchmark. It is one of two broad types of contingent capital instruments that have been proposed to strengthen capital structures (see part 3.2.1.3 for more detail).

**Countercyclical capital buffer (CCB)**

A capital buffer add-on to minimum capital requirements when the provision of aggregate private sector credit in relation to GDP exceeds a long term trend. The buffer aims to achieve the broader macroprudential goal of protecting the banking sector from periods of excess aggregate credit growth that have often been associated with the build-up of system-wide risk. In addressing this primary aim, the CCB regime may also help to lean against the build-up phase of the cycle in the first place, by raising the cost of credit and thus dampening its demand. Jurisdictions will be required to monitor credit growth in relation to measures such as GDP and assess whether growth is excessive and leading to the build-up of system-wide risk. Based on this assessment a CCB requirement, ranging from 0 to 2.5% of risk-weighted assets, may be put in place.

**Counterparty Credit Risk (CCR)**

The risk that the counterparty to a transaction could default before the final settlement of the transaction’s cash flows. An economic loss would occur if the transactions or portfolio of transactions with the counterparty has a positive economic value at the time of default. Unlike a firm’s exposure to credit risk through a loan, where the exposure to credit risk is unilateral and only the lending bank faces the risk of loss, CCR creates a bilateral risk of loss: the market value of the transaction can be positive or negative to either counterparty to the transaction. The market value is uncertain and can vary over time with the movement of underlying market factors.
Debt issued by banks that are fully collateralised by residential or commercial mortgage loans or by loans to public sector institutions. It is a debt obligation on which the investor has recourse first to a pool of assets that secures the bond. Unlike asset-backed securities, covered bonds remain on the issuer’s consolidated balance sheet and thus provide creditors with a second level of protection through recourse to other assets of the borrower. Covered bonds typically have the highest credit ratings. Covered bonds are the second largest segment of the European bond market after government bonds. Germany leads issuance in the European covered bond market. Under existing parameters, covered bonds are particularly affected by the CRD IV measure setting the Liquidity Coverage Ratio.

Off-balance-sheet items under the standardised approach will be converted into credit exposure equivalents through the use of credit conversion factors.

A specific kind of counterparty agreement that allows the transfer of third-party credit risk from one party to another. The first party or lender faces credit risk from a third party. The counterparty agrees to insure this risk in exchange for regular periodic payments (essentially an insurance premium). If the third party defaults, the counterparty or insurer purchases the defaulted asset from the insured party. In turn, the insurer pays the insured the remaining interest on the debt, as well as the principal. A CDS is a default-triggered credit derivative. Most CDS default settlements are “physical,” whereby the protection seller buys a defaulted reference asset from the protection buyer at its face value. “Cash” settlement involves a net payment to the protection buyer equal to the difference between the reference asset face value and the price of the defaulted asset.

A financial contract under which an agent buys or sells risk protection against the credit risk associated with a specific reference entity (or entities). For a periodic fee, the protection seller agrees to make a contingent payment to the buyer on the occurrence of a credit event (default in the case of a credit default swap).

Designations used by credit rating agencies to give relative indications of credit quality of bond issuers by formally evaluating an issuer on a specific set of objective criteria such as a company’s financial health and ability to repay debt obligations. Each major rating service in Europe and the US such as Standard & Poor’s, Moody’s and Fitch Ratings uses somewhat different criteria to assess issuers but the evaluation is summarised in a rating along a spectrum from highest quality investment grade to speculative or AAA (Aaa) to D. Ratings usually affect the interest rate a bond issuer must pay to attract investors—lower rated issuers pay higher rates. These ratings are used by some banks to determine the risk weights for their capital charge.
Credit risk
The potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms. It involves credit extension both as credit that are assets and those as contingent liabilities of the financial institution (e.g. via a guarantee arisen from a credit transaction). The goal of credit risk management is to maximise a bank's risk-adjusted rate of return by maintaining credit risk exposure within acceptable parameters. Under the Basel rules, Pillar I is only focused on credit risk. Also known as default risk i.e. the risk for bond investors that the issuer will default on its obligation or that the bond value will decline and/or that the bond price performance will compare unfavourably to other bonds against which the investment is compared due either to perceived increase in the risk that an issuer will default (credit spread risk) or that a company's credit rating will be lowered (downgrade risk).

Credit Valuation Adjustment (CVA)
An adjustment to the mid-market valuation of the portfolio of trades with a counterparty. This adjustment reflects the market value of the credit risk due to any failure to perform on contractual agreements with a counterparty. This adjustment may reflect the market value of the credit risk of the counterparty or the market value of the credit risk of both the bank and the counterparty. It is the risk of loss caused by changes in the credit spread of a counterparty due to changes in its credit quality (also referred to as the market value of counterparty credit risk). Under Basel II, the risk of counterparty default and credit migration risk were addressed but mark-to-market losses due to CVA were not. During the financial crisis, however, roughly two-thirds of losses attributed to counterparty credit risk were due to CVA losses and only about one-third were due to actual defaults. The CRD IV measures relating to CVA seek to take into account the deterioration of the credit worthiness of a counterparty in the context bilateral derivative transactions.

Deductions from capital
For the purpose of calculating the risk-weighted capital ratio, certain deductions should be made from the capital base (the stated balance sheet figures for capital). For example, goodwill (which arises when a company or asset is purchased for more than its book value) is deducted from Tier 1 capital because it is not tangible, effectively treating it as worthless for loss absorption.

Derivative
Complex and varied financial instruments with values that change in response to changes of the underlying assets, interest rates, currency exchange rates or indices. The main types of derivatives are futures, forwards, options and swaps. Derivatives are sometimes known as “synthetics.” Derivatives may be tools in their own right or may be used to build other investment vehicles such as structured products. The main purpose of a derivative is to reduce risk to one party.

Equity
Total assets minus total liabilities, also called shareholder's equity. In general, equity exposures are defined on the basis of the economic substance of the instrument. They include both direct and indirect ownership interests, whether voting or nonvoting, in the assets and income of a commercial enterprise or of a financial institution that is not consolidated. An instrument is considered to be an equity exposure if it meets all of the following requirements: It is irredeemable in the sense that the return of invested funds can be achieved only by the sale of the investment or sale of the rights to the investment or by the liquidation of the issuer; it does not embody an obligation on the part of the issuer; and it conveys a residual claim on the assets or income of the issuer.
| **Expected loss (EL)** | Banks following the internal ratings-based approach must calculate EL as PD x LGD x EAD for corporate, sovereign, bank, and retail exposures (where PD is probability of default, LGD is loss given default, and EAD is Exposure at Default). Any excess of EL over impairment allowances is a deduction from capital. |
| **Expected Positive Exposure (EPE)** | The weighted average over time of expected exposures where the weights are the proportion that an individual expected exposure represents of the entire time interval. When calculating the minimum capital requirement, the average is taken over the first year or, if all the contracts in the netting set matures before one year, over the time period of the longest-maturity contract in the netting set. |
| **Financial Stability Board (FSB)** | A global coordinating body established in 2009 as a revised version of the Financial Stability Forum (FSF) which was itself set up in 1999 on the initiative of the finance ministers and central bankers of the G7. The FSF was expanded and reformatted as the FSB at the behest of the larger G20 club. The FSB is mandated to help advise and coordinate international actions to protect the stability of the financial system. As such, it will present recommendations regarding capital requirements, even if only in the form of broad principles which leave the detailed decisions to the Basel Committee and individual national regulators. The G20 itself has provided guidance to the FSB about certain broad principles to be considered in reforming rules for the financial system. These include the avoidance of abrupt actions to raise capital standards which could exacerbate the existing credit crunch and also the consideration of ways to avoid having capital standards act pro-cyclically to create credit crunches in the future. |
| **Forward-looking provisioning** | A measure to address procyclicality, it consists in constituting provisions deducted from profits in good times for expected losses on loan portfolios. While some banks have established provisioning policies with forward-looking elements that attempt to cover some expected losses over the life of a loan, general provisions are only a relatively small part of total provisions. Also known as dynamic provisioning, Spain is an EU Member State that has already implemented this form of provisioning. |
| **Funding liquidity** | Ability to satisfy the demand for money immediately. |
| **Funding liquidity risk** | Possibility that a bank will be unable to meet the demand for money over a specific horizon. |
| **Hedging** | Offsetting an existing risk exposure by taking an opposite position in the same or similar risk—for example, in related derivatives contracts. |
Hybrid capital: Instruments which combine characteristics of equity capital and of debt. Their precise specifications differ from country to country, but they should meet the following requirements: they are unsecured, subordinated, and fully paid-up; they are not redeemable at the initiative of the holder or without the prior consent of the supervisory authority; they are available to participate in losses without the bank being obliged to cease trading (unlike conventional subordinated debt); although the capital instrument may carry an obligation to pay interest that cannot permanently be reduced or waived (unlike dividends on ordinary shareholders' equity), it should allow service obligations to be deferred (as with cumulative preference shares) where the profitability of the bank would not support payment. Cumulative preference shares, having these characteristics, would be eligible for inclusion in this category. In addition, the following are examples of instruments that may be eligible for inclusion: long-term preferred shares in Canada, "titres participatifs" and "titres subordonnés à durée indéterminée" in France, "Genusscheine" in Germany, perpetual subordinated debt and preference shares in the U.K., and mandatory convertible debt instruments in the U.S. Hybrid capital are classified under Non-Core Tier 1 capital in the planned CRD IV.

Institutional investor: A bank, insurance company, pension fund, mutual fund, hedge fund, brokerage, or other financial group that takes investments from clients or invests on its own behalf. These entities are relied upon to buy the debt securities issued by banks.

Intermediation: The process of transferring funds from the ultimate source to the ultimate user. A financial institution, such as a bank, intermediates when it obtains money from depositors or other lenders and lends on to borrowers.

Internal ratings-based approach (IRBA): A methodology of the Basel Capital Accord that enables banks to use their internal models to generate estimates of risk parameters that are inputs into the calculation of their risk-based capital requirements. Subject to certain minimum conditions and disclosure requirements, banks that have received supervisory approval to use the IRB approach may rely on their own internal estimates of risk components in determining the capital requirement for a given exposure. The risk components include measures of the probability of default (PD), loss given default (LGD), the exposure at default (EAD), and effective maturity (M). In some cases, banks may be required to use a supervisory value as opposed to an internal estimate for one or more of the risk components.
**Leverage**

The use of borrowed money to increase investing power. Leverage allows a financial institution to increase the potential gains or losses on a position or investment beyond what would be possible through a direct investment of its own funds. There are three types of leverage: balance sheet leverage (whenever an entity’s assets exceed its equity base via borrowing to acquire more assets with the aim of increasing their return on equity); economic leverage (market-dependent future cash flow concept, e.g. when a bank is exposed to a change in the value of a position by more than the amount they paid for it – a loan guarantee that does not show up on the bank’s balance sheet even though it involves a contingent commitment); and embedded leverage (which refers to a position with an exposure larger than the underlying market factor, such as when an institution holds a security or exposure that is itself leveraged). Regulators control the level of leverage using a leverage ratio, which can be expressed either as a minimum ratio or as a multiple. The leverage ratio is generally expressed as Tier 1 capital as a proportion of total adjusted assets. In the case of the CRD IV, the ratio is both a measure of balance sheet and economic leverage (because it also includes off-balance-sheet exposures). It will be used as an additional test of capital adequacy to serve as a "safety net" to protect against problems with risk weightings.

**Liquidity Coverage Ratio (LCR)**

Aims to promote the short-term resilience of the liquidity profile of banks to survive significant stress. It requires banks to continuously maintain a stock of 'high quality unencumbered liquid assets' that is sufficient to cover net cash outflows for a 30 calendar day period under a prescribed severe stress scenario. The formula used is: Unencumbered stock of high quality liquid assets / total net cash outflows over a 30 day time period = greater than or equal to 100%. It is one of two new standards introduced by Basel III and the planned CRD IV developed for use in the supervision of liquidity risk management. While buffer assets must be unencumbered and readily convertible into cash, there have been some disagreements from industry regarding technical details, which are still at an early stage.

**Liquidity/Market-ability**

The ability to fund increases in assets and meet obligations as they come due. A measure of the relative ease and speed with which a security can be purchased or sold in the secondary market at a price that is reasonably related to its actual market value. For example, liquid investments or assets are defined as those that can be converted into cash quickly and without great impact on the price of the asset so buyers can be found for a bond if an investor wants to sell. A market is illiquid when there is insufficient cash flowing to meet financial debts or obligations. In the context of bonds or other investments, illiquid refers to a bond or other investment that cannot be converted into cash quickly or near prevailing market prices. Liquid investments or assets are defined as those that can be converted into cash quickly and without great impact on the price of the asset.

**Loss given default (LGD)**

The fraction of a loan or security’s nominal value that would not be recovered following default. A bank must estimate an LGD for each facility that aims to reflect economic downturn conditions where necessary to capture the relevant risks. This LGD cannot be less than the long-run default-weighted average loss rate given default calculated based on the average economic loss of all observed defaults within the data source for that type of facility. In addition, a bank must take into account the potential for the LGD of the facility to be higher than the default-weighted average during a period when credit losses are substantially higher than average.
**Macro-prudential regulation**

Aims at limiting systemic financial risk and thus providing for financial stability. It is a complement to microprudential financial regulation. Its approach recognises the importance of equilibrium effects, and seeks to safeguard the financial system as a whole, thus controlling the social costs of a shock. Macro-prudential supervision focuses on limiting risks to the financial system as a whole that may arise from broad developments in the economy (e.g. excessive domestic credit expansion). While risks to the financial system can in principle arise from the failure of one financial institution alone if it is large enough in relation to the country concerned and/or with multiple branches/subsidiaries in other countries, the much more important systemic risk arises from the common exposure of many financial institutions to the same risk factors. Thus analysis must pay particular attention to common or correlated shocks and to shocks to those parts of the financial system that trigger contagious knock-on or feedback effects.

**Market risk**

The risk of losses in on- and off-balance-sheet positions arising from movements in market prices. The risks subject to this requirement are: the risks pertaining to interest rate related instruments and equities in the trading book; foreign exchange risk and commodities risk throughout the bank.

**Mark-to-market**

Also known as ‘fair value accounting’, it refers to accounting for the fair value of an asset or liability based on the current market price of the asset or liability, or for similar assets and liabilities, or based on another objectively assessed "fair" value. The valuation of a position or portfolio is made by reference to the most recent price at which a financial instrument can be bought or sold in normal volumes.

**Micro-prudential regulation**

Aims at preventing the costly failure of individual financial institutions. Main objective is to supervise and limit the risk of distress in individual financial institutions (i.e. to achieve their safety). By preventing the failure of individual financial institutions, micro-prudential supervision attempts to protect the clients of the institutions and maintain confidence in the financial system.

**Model risk**

The risk involved in using models to value financial securities. Basel II and III both allow the sophisticated global banks to use internal risk models as key determinants of their capital requirements. The argument in favour of this is that banks devote far more resources than regulators can to developing sophisticated approaches to evaluating the risk they are taking on and they have a strong incentive to get it right, in order to maximize their own profitability over time. Unfortunately, we now know that the risk modelling leading into the crisis was seriously flawed by a combination of excessive reliance on a limited historical record and perverse compensation incentives. There is good reason to believe that the modelling is better now, both because of extensive efforts to fix the problems and because the historical record now includes a much worse set of events, automatically increasing their conservatism.

**Modigliani and Miller (M&M)**

Authors of the Modigliani–Miller theorem, also often called the capital structure irrelevance principle. It showed that, under idealised conditions, the total cost of capital does not differ depending on the breakdown of the capital into shares and debt. For example, 2 firms that have the same business operations and same kind of assets, but have only a different mix in their liabilities (i.e. funding from debt and equity) would according to the theorem make no difference to the value of the firm as this is determined by real assets and not its capital structure. If this applied in the case of banks, they would likely issue far more common shares to reassure regulators, rating agencies, and other parties.
Net Stable Funding Ratio (NSFR)

This funding ratio introduced by the CRD IV seeks to calculate the proportion of long term assets which are funded by long term, stable funding (i.e. customer deposits, long-term wholesale funding (from the interbank lending market), and equity, but excluding short-term wholesale funding. These components of stable funding are not equally weighted. The requirement for a minimum amount of ‘stable funding’ over a one year time horizon based on liquidity risk factors assigned to assets, off-balance sheet liquidity exposures and other contingent funding obligations. The objective of the standard is to ensure stable funding on an on-going, viable entity basis, over one year to cover an extended firm-specific stress scenario, where a bank encounters: a significant decline in profitability or solvency; a potential downgrade in the institution’s debt, counterparty credit or deposit rating; a material event that calls into question the reputation or credit quality of the institution. The CRD IV does not consider extended borrowings from central bank lending facilities outside regular open market operations in the above scenario and the formula that must be respected is: Available amount of stable funding / Required amount of stable funding = greater than 100%.

Off-Balance Sheet financing

Any form of funding that avoids placing owners’ equity, liabilities or assets on a firm’s balance sheet. This is generally accomplished by placing those items on some other entity’s balance sheet. A standard approach is to form a special purpose vehicle/entity (SPV/SPE) and place assets and liabilities on its balance sheet. An SPV is a firm or legal entity established to perform some narrowly-defined or temporary purpose. To avoid having accounting regimes make the bank carry the associated assets or liabilities on its own balance sheet, the sponsoring firm typically takes only a partial (or no) ownership position in the SPV. SPVs are used in a variety of transactions, including securitisations, project finance, and leasing. Off-balance sheet financing is attractive from a risk management standpoint and often employed as a means of asset-liability management. Banks have used off-balance sheet financing to achieve reductions in their regulatory capital requirements, and has been a compelling reason for many securitisations.

On-Balance Sheet financing

Any form of direct debt or equity funding of a firm. If the funding is equity, it appears on the firm’s balance sheet as owner’s equity. If it is debt, it appears on the balance sheet as a liability. Any asset the firm acquires with the funding also appears on the balance sheet.

Operational risk

The risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events (including legal risk, but excluding strategic and reputational risk).

Originate-to-distribute model

Business model of financial intermediation, under which financial institutions originate loans such as mortgages, repackagge them into securitised products, and then sell them to investors. While the model provides banks with the option to bear the risk, banks can transfer the risk by not holding the credit assets they originate until maturity, but distributing them to different types of investors through the issuance of structured finance products. The increased demand for these structured products and thus the success of the model was partly due to the different prudential treatment of the trading book and the banking book, which gave financial institutions incentives to move positions from the banking book to the trading book because during a period of low volatility, such a move would result in lower capital charges and increased market value of assets. The model was already affected by changes to the Capital Requirements Directive (CRD II) which included a provision requiring that a small part of the credit risk be retained by the originator, and will be further affected by some of the planned CRD IV measures.
Pillar 1-3 Pillar 1 [of the Basel II accord] presents the calculation of the minimum Basel II regulatory capital requirements for credit, market, and operational risk (to (a) reduce risk of failure by cushioning against losses and (b) provide continuing access to financial markets to meet liquidity needs, and (c) provide incentives for prudent risk management); Pillar 2 concerns the key principles of supervisory review, risk management guidance and supervisory transparency and accountability produced by the Committee with respect to banking risks, including guidance relating to, among other things, the treatment of interest rate risk in the banking book, credit risk (stress testing, definition of default, residual risk, and credit concentration risk), operational risk, enhanced cross-border communication and cooperation, and securitisation; Pillar 3 is based on market discipline used to complement Pillars 1 and 2 and relies on accounting transparency allowing market participants to assess key pieces of information on the scope of application, capital, risk exposures, risk assessment processes, and hence the capital adequacy of the institution (i.e. public disclosure requirements compel improved bank risk management).

Probability of default (PD) An estimate of the likelihood of default of a borrower. PD estimates must be a long-run average of one-year default rates for borrowers in the grade, with the exception of retail exposures. For retail exposures, the definition of default can be applied at the level of a particular facility, rather than at the level of the obligor. As such, default by a borrower on one obligation does not require a bank to treat all other obligations to the banking group as defaulted.

Pro-cyclicality A term used to describe how an economic quantity is related to economic fluctuations i.e. when an indicator is positively correlated with the overall state of the economy. In the context of economic policy, it refers to any aspect of economic policy that could magnify economic or financial fluctuations. Excessive risk-taking and a build-up of vulnerabilities is one example of a source of pro-cyclicality, i.e. of mechanisms through which the financial system can amplify business fluctuations that are particularly disruptive during an economic downturn or when the financial system is facing strains. Basel II rules are said to encourage procyclicality because the rules, by requiring banks to increase their capital ratios when they face greater risks, unfortunately may require them to lend less during a recession or a credit crunch, which could aggravate the downturn (a similar criticism has been directed at fair value accounting rules as well). Procyclicality in regulatory capital can be dampened through either demanding a buffer of additional capital during a business cycle expansion (see counter-cyclical capital buffer)

Prudential supervision Aims to safeguard the solvency of financial institutions and, by extension, their ability to honour their promises to depositors or policyholders [see macro/micro prudential definition above]. It is traditionally distinguished from conduct of business supervision, which aims to ensure honest dealings both in the markets and in individual contracts with consumers/investors. Alongside prudential regulation, regulation of the financial sector also involves resolution tools, oversight of the clearing and settlement systems and conduct of business regulation.

Regulatory arbitrage The process of taking advantage of differences in regulatory treatment across countries or different financial sectors, as well as differences between the real (economic) risks and the regulatory risk, to reduce regulatory capital requirements.
Repo (Repurchase) market

Arrangements through which market professionals agree to repurchase various types of securities at a price and date set prior to the sale. In effect, a repurchase agreement is a collateralised loan in which the securities serve as collateral. The repo market is used by financial institutions to finance the purchase of securities, lend excess funds and raise short term capital. These instruments will be affected by some of the CRD IV measures establishing liquidity standards.

Risk premium

The extra expected return on an asset that investors demand in exchange for accepting the higher risk associated with the asset.

Risk-weight

The Bank for International Settlements introduced the concept of risk weighting bank assets into common banking language in 1988 (see Basel I). Since then, bank capital ratios have been expressed as available capital as a percentage of aggregate risk-weighted assets. To compute risk-weighted assets, banks multiply capital charges by the conventional Basel conversion factor of 12.5. This conversion factor is the inverse of the 8% capital ratio, which is the regulatory minimum benchmark set by the Basel committee for indicating that a bank has sufficient capital to meet its risk-adjusted exposure. The logic of the risk weight metric is based on underlying risk of an exposure: higher risk, implying a higher potential loss must be supported by more regulatory capital.

Risk-Weighted Asset (RWA)

RWA is the risk-weighted total amount of assets held by the bank. It is calculation which allocates a coefficient (weighted by risk) to an asset to help determine how much capital the bank needs to put aside in order to be ‘safe and sound’. That is, the total value of each asset is multiplied by a percentage reflecting its risk level and this adjusted amount is added across all assets to produce a total risk-weighted asset figure. The percentage weighting for each category ranges from 0%, for extremely safe investments such as cash and US government securities, to 100% for riskier classes of assets. In a few cases, the levels exceed 100% for certain very risky assets, such as loans in default or imminent danger of default and the riskiest tranches of securitisations. Commitments to lend that are not carried on the balance sheet are converted to an asset amount using weightings that depend on the type of commitment, with those that are certain to be drawn down receiving 100% weightings. These asset equivalent amounts are then treated as if they were already on the balance sheet, with their effect on total RWA depending on the riskiness of their type of credit. Instead of having a static requirement for capital irrespective of what business is being undertaken by the bank, the RWA is a move towards a system based on the riskiness of a bank’s assets, i.e. capital allocation is based on credit risks whether they arise from on-balance-sheet activities (including loans, counterparties, lease receivables, fixed income securities, and interbank deposits and loans) or off-balance sheet activities (such as off-balance-sheet commitments or securitisations). At present, loans that are secured by a letter of credit are to be weighted riskier than a mortgage loan that is secured with collateral.
Securitisation may be broadly defined as the process of issuing new securities backed by a pool of existing assets such as loans, residential or commercial mortgages, credit card debt, or other assets. These securities, which are generally referred to as “mortgage or asset-backed securities” or “RMBS or ABS,” are issued and sold to investors (principally institutions) and the cash flows or economic values following the assets are redirected to them. There are various ways to classify securitised assets, but perhaps the key distinction for investors is whether the assets are amortising or non-amortising, because this affects the cash flows investors receive. The creation of securities from a pool of pre-existing assets and receivables that are placed under the legal control of investors through a special intermediary created for this purpose (a “special purpose vehicle” [SPV] or “special purpose entity” [SPE]) typified the structured finance sector that was at the epicentre of financial market disruption that triggered the crisis. In the case of “synthetic” securitisations, the securities are created from a portfolio of derivative instruments. The changes brought to the securitisation framework by the CRD III are intended to better align the interests of originators, sponsors and investors; promote more robust due diligence amongst investors; and greater issuer transparency.

Shadow banking sector

A system of credit intermediation that involves entities and activities outside the regular banking system, and raises systemic risk concerns (in particular by maturity/liquidity transformation, leverage and flawed credit risk transfer), and/or regulatory arbitrage concerns. The term started to be used widely at the onset of the recent financial crisis, and its emergence reflected a recognition of the increased importance of entities and activities structured outside the regular banking system that perform bank-like functions. A shadow banking system can be composed of a single entity that intermediates between end-suppliers and end-borrowers of funds, or more usually it could involve multiple entities forming a chain of credit intermediation. In the latter case, one or more of the entities in the chain might be a bank or a bank-owned entity. Banks might also be exposed to the shadow banking system through temporary exposures (warehousing), through the provision of finance, and/or through contingent credit lines. In addition, banks can be funded by entities which form part of the shadow banking system. These shadow banks are non-depository banks and other financial institutions (e.g., investment banks, hedge funds, money market funds) that are not subject to the same regulations as depository banks.

Special-purpose vehicle (SPV)

Financial institutions that originate loans sell pools of loans to a special-purpose vehicle (SPV), whose sole function is to buy such assets in order to securitise them. In Europe, the SPV is usually a company, although in the US, trusts are utilised as issuing vehicles. The SPV repackages the loans as interest-bearing securities and actually issues them. The “true sale” of the loans by the sponsor to the SPV provides “bankruptcy remoteness,” insulating the trust from the sponsor. The securities, which are sold to investors by the investment banks that underwrite them, are “credit-enhanced” with one or more forms of extra protection—whether internal, external or both.

Standardised approach

The Basel Committee permits banks a choice between two broad methodologies for calculating their capital requirements for credit risk. One alternative, the standardised approach, will be to measure credit risk in a standardised manner, supported by external credit assessments.
Systemic risk

A relatively new concept related to financial system instability. It is the risk of collapse of an entire financial system or entire market, as opposed to risk associated with any one individual entity, group or component of a system. It refers to the risks imposed by interlinkages and interdependencies in a system or market, where the failure of a single entity or cluster of entities can cause a cascading failure, which could potentially bankrupt or bring down the entire system or market.

Tier 1 Capital

Includes only permanent shareholders’ equity (issued and fully paid ordinary shares/common stock and perpetual non-cumulative preference shares) and disclosed reserves (created or increased by appropriations of retained earnings or other surplus, e.g. share premiums, retained profit, general reserves, and legal reserves). Disclosed reserves also include general funds (such as fund for general banking risk in certain European Community countries) of the same quality that meet the following criteria: Allocations to the funds must be made out of post-tax retained earnings or out of pre-tax earnings adjusted for all potential tax liabilities; the funds and movements into or out of them must be disclosed separately in the bank's published accounts; the funds must be available to a bank to meet losses for unrestricted and immediate use as soon as they occur; losses cannot be charged directly to the funds but must be taken through the profit and loss account. In the case of consolidated accounts, this also includes minority interests in the equity of subsidiaries which are less than wholly owned. This basic definition of capital excludes revaluation reserves and cumulative preference shares.

Tier 2 Capital

Tier 2 capital includes various categories of equity capital: “undisclosed reserves” that are effectively the same as retained earnings, but are separately accounted for; Certain assets to be held at historical values that can be well below current market values, the difference being held as a “revaluation reserve”; General loan loss provisions may be held which are not allocated to specific claims and are therefore available to absorb any unexpected losses; Certain “hybrid debt capital instruments” are considered to have enough of the aspects of common shares to be considered Tier 2 capital; and subordinated debt instruments with at least a five year maturity are allowed to count as Tier 2 capital to a limited extent.

Trading Book

The trading book (TB) consists of positions in financial instruments and commodities held either with trading intent or in order to hedge other elements of the TB, and which is subject to capital requirements for market risk (the TB includes most derivatives, e.g. financial futures, interest rate/currency swaps, options on securities). Exposures can be held in trading book only if actively managed and held for “trading intent”. The “Philosophy” of TB capital is to cover value losses during a very short period (e.g., 10-20 days) prior to exiting an exposure. The TB is defined as consisting only of positions in financial instruments and commodities held either with trading intent or in order to hedge other elements of the TB and which are either free of any restrictive covenants on their tradability or able to be hedged. Positions held with trading intent are those held intentionally for short-term resale and/or with the intention of benefiting from actual or expected short-term price differences between buying and selling prices, or from other price or interest variations. Banks and investment firms are required to have a TB policy which sets out the firm’s policy for booking of positions in the TB and to maintain systems and controls in relation to the operation of their TB operations. The regulatory capital requirements for the TB assets of an institution attract a lower regulatory capital burden than assets held in the banking book. This is the result of an assumption that underpins the
regulatory framework that banking book assets are non-tradable (and therefore presumed to be held for life) whereas TB assets are tradable and therefore can be disposed of in the market for their market value. As a result TB positions are measured, and regulatory capital is held, on a net basis. This assumption has been challenged recently – most particularly in respect of structured securities and the ability of Value at Risk (VaR) models to capture all relevant losses in the TB.

**Value-at-risk (VaR)**

An estimate of the unexpected loss, over a given horizon, that is statistically unlikely to be exceeded at a given probability level. Value at Risk is a technique used to estimate the probability of portfolio losses based on the statistical analysis of historical price trends and volatilities. These calculations attempt to capture both, the overall market risk of different types of securities and the specific credit or other risks that apply to particular securities. Alongside market VaR, VaR is also calculated for credit portfolios, and exposures in the banking book. Although Basel III adds layers of conservatism, the VaR concept is criticised because it appears to work better for evaluating daily or weekly risks than for longer holding periods.

**Weighted Average Cost of Capital (WACC)**

Measures the capital discount of a firm’s income and expenditure. It is a component of the formula used for calculating the expected cost of new capital and it represents the rate that a firm is expected to pay to finance its assets. It is thus the minimum return that a company must earn on its existing asset base to satisfy its creditors, owners, and other providers of capital. WACC is calculated by taking into account the relative weight of each component of a company’s capital structure. The calculation usually uses the market values of the components, rather than their book values. The WACC equation is the cost of each capital component multiplied by its proportional weight and then summing.

**Wrong-Way Risk**

General Wrong-Way Risk arises when the probability of default of counterparties is positively correlated with general market risk factors; specific Wrong-Way Risk arises when the exposure to a particular counterpart is positively correlated with the probability of default of the counterparty due to the nature of the transactions with the counterparty.
LIST OF TABLES

Table 1: Summary of key findings 7
Table 2: Overview of the CRD IV measures 16
Table 3: Increase of EU Bank funding cost due to higher levels of liquidity requirements 39
Table 4: Increase of EU Bank funding cost due to higher levels of liquidity requirements 40
Table 5: Increase of EU bank funding cost due to higher levels of capital requirements 42
Table 6: Increase of EU bank funding cost due to higher levels of capital requirements 43
Table 7: Bank type and impaired loans/gross loans in % 47
Table 8: Impact of the capital, leverage and liquidity requirements on the cost of banking (measured by the WACC) 51
Table 9: Growth impact of regulatory capital and liquidity requirements 56
Table 10: Short-term growth impact of regulatory capital requirements 57
Table 11: Growth impact of regulatory liquidity requirements 58
Table 12: Microprudential versus macroprudential regulation 68
Table 13: Overview of regulations affecting bank behaviour 70
Table 14: Timeline for meeting the changes to the capital adequacy ratios (%) 73
Table 15: CRD IV measures, implications and certain issues 79
Table 16: A bank balance sheet (selected components, fictitious) 80
Table 17: Growth impact of regulatory liquidity requirements 80
Table 18: Calibration of the CRD IV/Basel III capital framework 81
Table 19: Definition of capital 81

LIST OF FIGURES

Figure 1: Impact sequence of CRD IV measures 6
Figure 2: Macroprudential policy framework 12
Figure 3: The financial structure of the EU 14
Figure 4: Implementation timeline of the capital requirements 17
Figure 5: Tier 1 ratio and bank size (average 2000-2010) 19
Figure 6: Tier 1 ratio and the business cycle 2000-2010 20
Figure 8: Portfolio quality and bank capital 21
Figure 9: Return on total assets and the business cycle 2000-2010 26
Figure 10: Bank capital ratio over the business cycle 2000-2010 28
Figure 11: Leverage ratio and bank size in the EU 2000-2010 31
Figure 12: Portfolio quality and leverage ratio (average 2000-2010) 33
Figure 13: Bank liquidity over the business cycle 2000-2010 34
Figure 14: Interbank ratio and bank size (average 2000-2010) 35
Figure 15: Banks’ interbank ratio over business cycle 2000-2010 36
Figure 16: Interest margin over the business cycle 2000-2010 44
Figure 17: Bank impaired loans and return on equity 2000-2010 46
Figure 18: Bank portfolio quality and the business cycle in the EU 2000-2010 47
Figure 19: Bank size and the performance of loan portfolios 48
Figure 20: Return on Equity and the business cycle 2000-2010 49
Figure 21: Impact of capital, liquidity and capital requirements on the Weighted Average Cost of Capital of banks 52
Figure 22: Expected benefits of banking regulations 54
Figure 23: Short-term growth impact of regulatory capital requirements 55
Figure 24: Increase in financial stability due to CRD IV measures 59
Figure 25: Break-even evaluation for capital and liquidity requirements 60
Figure 26: Capital ratio equation and overview of CRD IV measures 72
REFERENCES

(sorted alphabetically by subjects)

Credit Portfolio Selection


Capital and Leverage Requirements


Liquidity Standards


Leverage Ratio


- Committee on the Global Financial System, The Role of Valuation and Leverage in Procyclicality’, *CGFS Papers*, No 34, April 2009. [http://www.bis.org/publ/cgfs34.htm](http://www.bis.org/publ/cgfs34.htm)


Integrated Impacts of Capital Requirements, Liquidity Standards and Leverage Ratio on a Bank


Effects of CRD IV Measures on Business Cycles and Economic Growth


---

**Effects of CRD IV Measures on Banking Market Competition and Equilibrium**


Policy Department A: Economic and Scientific Policy


Effects of CRD IV Measures on the Overall Stability of the Financial System


**Effects of CRD IV Measures on the Efficiency of Monetary and Fiscal Policy**


POLICY DEPARTMENT A
ECONOMIC AND SCIENTIFIC POLICY

Role
Policy departments are research units that provide specialised advice to committees, inter-parliamentary delegations and other parliamentary bodies.

Policy Areas
- Economic and Monetary Affairs
- Employment and Social Affairs
- Environment, Public Health and Food Safety
- Industry, Research and Energy
- Internal Market and Consumer Protection

Documents