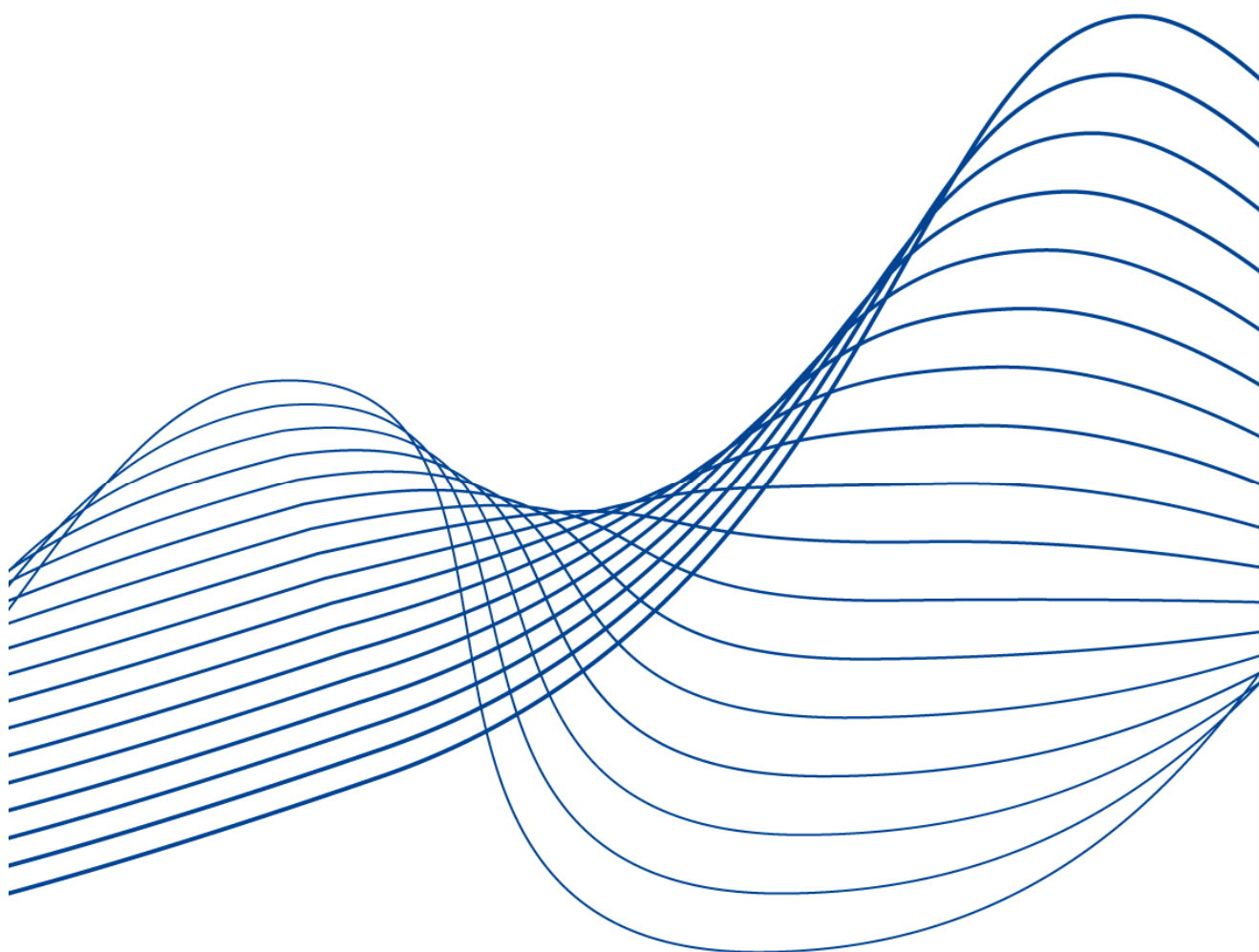


The ESRB Handbook on Operationalising Macro-prudential Policy in the Banking Sector



ESRB

European Systemic Risk Board

European System of Financial Supervision



List of abbreviations

AUROC	area under receiver operating characteristic	ICAAP	internal capital adequacy assessment process
BCBS	Basel Committee on Banking Supervision	IMF	International Monetary Fund
BIS	Bank for International Settlements	IRB	internal ratings-based approach
CADA	competent or designated authority	ITS	implementing technical standard
CBD	consolidated bank data	IWG	Instruments Working Group
CCB	countercyclical capital buffer	LCR	liquidity coverage ratio
CDS	credit default swap	LGD	loss given default
CESEE	Central Eastern and South-eastern Europe	LIBOR	London interbank offered rate
CET1	Common Equity Tier 1	LTD	loan-to-deposit
CFR	core funding ratio	LTi	loan-to- income
CGFS	Committee on the Global Financial System	LTSF	loan-to-stable funding
COM	European Commission	LTV	loan-to-value
COREP	common reporting	MMF	money market fund
CPI	Consumer Price Index	NFC	non-financial corporation
CRD	Capital Requirements Directive	NSFR	net stable funding ratio
CRE	commercial real estate	OIS	overnight indexed swap
CRR	Capital Requirements Regulation	O-SII	other systemically important institution
DSTI	debt-service to income	OTC	over-the-counter
EBA	European Banking Authority	PD	probability of default
ECB	European Central Bank	PTI	payment-to-income
EEA	European Economic Area	RDB	risk dashboard
ESRB	European Systemic Risk Board	ROC	receiver operating characteristic
EU	European Union	RORWA	return on risk-weighted assets
FINREP	financial reporting	RRE	residential real estate
FMLI	financial market liquidity indicator	RTS	regulatory technical standards
FPC	Financial Policy Committee	RW	risk weight
FSA	Financial Services Authority	RWA	risk-weighted asset
FSB	Financial Stability Board	SA	standardised approach
FSR	Financial Stability Report/Review	SF	stable funding
GDP	Gross Domestic Product	SII	systemically important institution
G-SII	global systemically important institution	SRB	systemic risk buffer
HICP	Harmonised Index of Consumer Prices	SREP	supervisory review and evaluation process
HPI	housing price index	SSM	Single Supervisory Mechanism
HQLA	high quality liquid assets		

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Section I: Introduction

Motivation

Macro-prudential policy is today a reality in the European Union.

This Handbook aims to assist macro-prudential authorities in the European Union (EU) to operationalise instruments set out in the new prudential rules for the EU banking sector. While the rules – commonly referred to as the Capital Requirements Directive (CRD) and the Capital Requirements Regulation (CRR)² – are being phased in, Member States can start using some of the macro-prudential instruments from 1 January 2014.

The global financial crisis highlighted fault lines in the existing institutional arrangements, including the lack of a macro-prudential policy framework. The crisis revealed that authorities responsible for overseeing the financial system usually lacked appropriate mandates, analytical tools and/or instruments to address systemic risk. In the EU, a number of important steps have been taken to address these shortcomings. One such step was the establishment of the ESRB, with responsibility for macro-prudential oversight of the EU financial system. Since it was set up in 2010, the ESRB has actively promoted the development of macro-prudential policy frameworks.³

The coming into force of the CRD/CRR on 1 January 2014 is a new milestone in the development of a macro-prudential policy framework in the EU. The new rules provide Member States with a common legal framework and a set of macro-prudential instruments to mitigate systemic risk in the banking sector. Ultimately, this framework will need to be extended beyond the banking sector (for example, to cover e.g. the insurance sector, financial infrastructures, or shadow banking). For now, the CRD/CRR is an important step towards increasing the ability of authorities to conduct macro-prudential policy.

This Handbook and the companion Flagship Report are the ESRB's latest contributions to an EU macro-prudential policy framework. This Handbook is targeted at macro-prudential authorities and offers detailed instrument-specific advice on how to design and implement macro-prudential policy for the banking sector. The companion ESRB Flagship Report is targeted at high-level policy-makers and provides an overview of the new macro-prudential policy framework.⁴

The Handbook is structured in three sections.

The first section presents the overall macro-prudential policy framework and key findings (Chapter 1). By way of synthesis, it provides a roadmap outlining which macro-prudential instruments can be used to achieve specific financial stability objectives. It also

² "CRD" refers to the Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013 on access to the activity of credit institutions and the prudential supervision of credit institutions and investment firms and "CRR" refers to the Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012 (CRR).

³ In 2011 the ESRB recommended that Member States should establish national macro-prudential authorities (ESRB/2011/3) and in 2013 it recommended that they should identify clear intermediate macro-prudential objectives and assign concrete tools to achieve those objectives (ESRB/2013/1).

⁴ ESRB (2014) ESRB Flagship Report on Macro-prudential Policy in the Banking Sector.



discusses the role of indicators in assessing the build-up of vulnerabilities and the possible need for policy action. Finally, it offers general advice on the different phases of the macro-prudential policy cycle – from risk assessment to policy design, implementation and evaluation.

Key features and the role of individual macro-prudential instruments are presented in the second section (Chapters 2 to 7). These chapters describe how specific instruments address intermediate objectives, as well as their respective benefits and shortcomings. They also elucidate on the instruments' operational, legal and institutional features. The instruments covered in this part of the Handbook are: the countercyclical capital buffer (Chapter 2), real estate instruments (Chapter 3), instruments for systemic banks⁵ and structural risks (Chapter 4), liquidity instruments (Chapter 5), instruments available through Pillar 2 (Chapter 6) and national flexibility measures, also referred to as Article 458 instruments (Chapter 7).

Cross-cutting issues are presented in the final section (Chapters 8 to 11). This covers four topics of particular importance when designing and implementing macro-prudential policy: Selecting instruments (Chapter 8); the decision-making process, notably the role of guided discretion (Chapter 9); communication (Chapter 10); and cross-border issues (Chapter 11). For each of these topics, the Handbook highlights core issues and provides practical advice.

⁵ Throughout the report, the general term “bank” is used for simplicity, without referring to a particular type of credit institution.



Chapter 1

Key findings: instruments and policy framework

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⁶ The chapter was prepared by a team led by Andrea Maechler (ESRB Secretariat) and comprising Stijn Ferrari (Nationale Bank van België/Banque Nationale de Belgique), Elias Bengtsson, Timo Kosenko, and Olaf Weeken (all ESRB Secretariat).



1. Instruments

1.1 Objectives

The ultimate objective of macro-prudential policy is to contribute to the safeguarding of the stability of the financial system as a whole. This includes strengthening the resilience of the financial system and decreasing the build-up of vulnerabilities, thereby ensuring a sustainable contribution of the financial sector to economic growth.

The ESRB has identified four intermediate objectives relevant for safeguarding the stability of the banking sector.⁷ These are aimed at preventing and mitigating systemic risks that may arise from:

- **excessive credit growth and leverage.** *Excessive credit growth has been identified as a key driver of financial crises, with leverage acting as an amplifying channel;*
- **excessive maturity mismatch and market illiquidity.** *Reliance on short-term and unstable funding may lead to fire sales, market illiquidity and contagion;*
- **direct and indirect exposure concentrations.** *Exposure concentrations make a financial system vulnerable to common shocks, either directly through balance sheet effects or indirectly through asset fire sales and contagion;*
- **misaligned incentives with a view to reducing moral hazard.** This involves strengthening the resilience of systemically important institutions, while counterbalancing the negative effects of (implicit) government guarantees.

1.2 Instruments by objective

For each intermediate objective, several instruments may be available.⁸ For each intermediate objective, Column 1 in Tables 1.1-1.4 provides a non-exhaustive list of suitable instruments. Column 2 gives an overview of the transmission channels associated with the introduction or tightening of the instruments. It separates how the instruments transmit into increased resilience of banks and how they reduce the build-up of vulnerabilities in the upswing. In the financial downswing, lifting or loosening the measures would have the opposite effects as the ones described in Column 2.

Authorities may need to pursue more than one intermediate objective to address systemic risk. Prior to the global financial crisis, excessive credit growth and increasing maturity mismatch went hand in hand. Excessive risk-taking was fuelled by the perception of the existence of implicit government safety nets. When the financial cycle turned, shocks transmitted through the financial system, through direct and indirect exposure concentrations. Since systemic risk often appears in several guises, authorities may need to use

⁷ The ESRB Recommendation on intermediate objectives and instruments of macro-prudential policy (ESRB/2013/1) also included a fifth objective to strengthen the resilience of financial infrastructures. This objective has been omitted from the Handbook, because it does not fall within the scope of the macro-prudential framework for the banking sector, as provided under the CRD/CRR.

⁸ The ESRB has also recommended that a macro-prudential authority should have at least one instrument to address each intermediate objective. In this context, the ESRB provided an indicative list of 17 instruments (Recommendation ESRB/2013/1).

combinations of instruments to address it.⁹ Conversely, some instruments can be used to address several intermediate objectives (and hence appear in several of the Tables 1.1-1.4).

The macro-prudential instruments discussed in the Handbook have different legal bases. Instruments under the Directive (CRD) are to be transposed into national law, while those provided for in the Regulation (CRR) become EU law with immediate effect. Some instruments are exclusively based on national law (e.g. loan-to-value ratios). Column 3 in Tables 1.1-1.4 provides an overview of the legal basis of the instruments.

The nature and scope for application differs across instruments. Some instruments are new macro-prudential instruments, which have been introduced for the first time by the CRD (e.g. the systemic risk buffer). Others are micro-prudential instruments, which under certain conditions can be topped up for macro-prudential purposes. This includes using instruments through Pillar 2, when the supervisory review and evaluation process (SREP) shows that a specific bank or groups of banks contribute to systemic risks. It also includes so-called “national flexibility measures” in Article 458 CRR. These national flexibility measures can be used only if other measures cannot adequately address systemic risk, and are subject to specific notification and authorisation procedures.

Public disclosure requirements play an important role across all intermediate objectives. They increase transparency and thus strengthen market discipline. They have not been included explicitly in Tables 1.1-1.4, as they strengthen the transmission mechanism of all the instruments.

a) Instruments to address excessive credit growth and leverage

Periods of excessive credit growth are a key predictor of financial crises. This is particularly the case when excessive credit growth coincides with unsustainable developments in real estate markets that lead to a build-up of leverage in the private sector.¹⁰ Table 1.1 highlights six broad groups of macro-prudential instruments available to mitigate and prevent excessive credit growth and leverage.

- *The countercyclical capital buffer (CCB).* This instrument is designed to counter procyclicality in the financial system. It is aimed at building up a capital buffer during periods of excessive credit growth that is released when systemic risks materialise or abate. By increasing resilience during the upturn, the CCB supports the sustainable provision of credit to the economy in the downturn. The CCB can also help dampen the credit cycle during the upturn. The buffer will be between 0% and 2.5% of risk-weighted assets, but can be set higher when justified by the underlying risk. In line with the internationally agreed Basel III framework, national authorities should follow a set of principles and calculate a reference rate as a benchmark to guide their judgement. Much work is being done by the ESRB to help guide EU macro-prudential authorities in exercising their judgment when activating and calibrating the CCB (see Chapter 2).
- *Loan-to-value (LTV), loan-to-income (LTI) and debt service-to-income (DSTI) caps.* These instruments are exclusively based on national law. They include caps that restrict credit in relation to the value of the underlying real estate (LTV cap) or the income of the borrower (LTI/DSTI cap). In contrast to capital-based instruments, they target the

⁹ See Chapter 8 for further details.

¹⁰ See, for example, Borio and Drehmann (2009), Enoch and Ötcher-Robe (2007) and Reinhart and Rogoff (2009).



borrowers who take credit, rather than the banks that provide the credit. Macro-prudential authorities should be able to assess LTV and LTI/DSTI ratios.

- *Sectoral requirements.* Sectoral requirements enable stricter regulatory requirements to be imposed, for example by increasing risk weights for specific exposures or minimum loss given default (LGD) values. Sectoral requirements improve the resilience of banks to risk in the sectors concerned. They can also have a dampening effect on credit growth.
- *Macro-prudential use of Pillar 2.* Pillar 2 allows competent authorities to tighten prudential requirements when the SREP shows that a specific bank (or group of banks) is contributing to systemic risk. In the case of excessive credit growth and leverage, instruments include sectoral requirements, raising own funds and capital conservation buffer requirements. To ensure a holistic approach to mitigating systemic risk, close collaboration is needed between micro-prudential and macro-prudential authorities, since the systemic risks that would be considered in the SREP would typically have been identified by macro-prudential authorities.
- *The systemic risk buffer (SRB).* The SRB is designed to prevent and mitigate structural systemic risks, including excessive leverage. It is a flexible instrument that can be applied to all or to a subset of banks, and is subject to a notification requirement for buffer rates up to 3%. Above that rate, until 2015 the authorisation of the European Commission must be obtained after the delivery of an opinion by the EBA and ESRB. From 2015 the procedure gets more differentiated depending on the scope, geographic exposure and level of the SRB (the procedure is described in more detail in Chapter 4).
- *Additional own funds requirements and capital conservation buffer.* When the above-mentioned instruments are not adequate to address excessive credit growth, macro-prudential authorities can use national flexibility measures to apply add-ons to own funds requirements and the capital conservation buffer, subject to specific procedures and authorisation.
- *A leverage ratio.* The leverage ratio hinders excessive on-balance sheet and off-balance sheet leverage by limiting a bank's total assets (including off-balance sheet) in relation to its equity. Since it is not based on risk-adjusted assets, it also provides a simple and transparent back-stop to safeguard against model and measurement error in the risk-based capital requirements.



Table 1.1: Key instruments to address excessive credit growth and leverage

Instrument	Transmission		Legal basis	Chapter in Handbook
	Increasing resilience	Reducing build-up of vulnerabilities		
CCB	Increase banks' loss absorption capacity	Possibly slowing down credit growth through higher funding cost	Articles 130 and 135-140 of the CRD	2
LTV cap LTI/DSTI cap	Decrease banks' LGD, decrease borrower s' PD	Direct restriction of lending	National law	3
Sectoral requirements	Increase banks' loss absorption capacity, lowers potential losses and shifts lending away from sector	Possible impact on financial cycle through higher funding cost	Article 124 of the CRR, Article 164 of the CRR, Pillar 2 Article 458 of the CRR	3 & 7
SRB	Increase banks' loss absorption capacity		Articles 133-134 of the CRD	4
Own funds conservation buffer	Increase banks' loss absorption capacity		Pillar 2 Article 458 of the CRR	7
Leverage ratio	Limit leverage: safeguards against error in risk-based capital buffers		National law	8

b) Instruments to address excessive maturity mismatch and market illiquidity

The global financial crisis has shown that prudential rules aimed solely at strengthening capital buffers do not sufficiently address liquidity risk. Both sides of banks' balance sheets are subject to liquidity risk: market illiquidity on the asset side and funding risk on the liability side. The materialisation of these risks could lead, among other things, to fire sales and contagion. Hence, there is a need for dedicated liquidity instruments, including at the macro-prudential level that can address these risks (see Table 1.2).

The CRD/CRR offers the possibility of implementing macro-prudential liquidity instruments through two procedures. First, under Pillar 2 as a firm specific measure (when the SREP shows that a specific bank or group of banks contributes to systemic risk); and second, to a lesser extent, under the national flexibility measures (provided other instruments cannot adequately address the identified risks).

- *Net stable funding ratio (NSFR)*. The NSFR is a micro-prudential measure which will enter into force in 2018. Developing a sound NSFR that is aimed at limiting banks' one-year maturity and liquidity mismatches will go a long way towards increasing the stability of banks' funding bases to sudden outflows. A macro-prudential use of the NSFR could impose a (fixed or time-varying) add-on over the prudential minimum requirement.
- *Liquidity buffer ratios*. Liquidity ratios, such as the liquidity coverage ratio (LCR), are micro-prudential measures. They may also increase resilience to liquidity shocks by increasing the stock of liquid assets available to cover sudden outflows. A macro-prudential use of the LCR could impose a (fixed or time-varying) add-on over the



prudential minimum requirement.

- *Liquidity charges.* Liquidity charges could complement the above quantity-based ratios. They could be a Pigouvian levy reflecting banks' contributions to systemic liquidity risk (e.g. the duration of their funding profile or their reliance on wholesale funding).
- *Other stable funding requirements.* These can be introduced at a national level, for instance through loan-to-deposit (LTD) limits.

Table 1.2: Key instruments to address excessive maturity mismatch and market illiquidity

Instrument	Transmission channel		Legal basis	Chapter in Handbook
	Increasing resilience	Reducing build-up of vulnerabilities		
NSFR	Increase stability of funding base to limit sudden outflows	Possible dampening effect on financial cycle if requirements are binding (e.g. shift to liquid assets and/or higher liquidity premia)	Pillar 2, Article 458 of the CRR ³⁾	5
Other stable funding requirements (e.g. LTD limits)			National law	
LCR	Increase stock of liquid assets to cover sudden outflows		Pillar 2, Article 458 of the CRR ³⁾	
Other liquidity buffer			National law	
Liquidity charge	Increase stability of funding base and/or stock of liquid assets		Pillar II (including Article 105 of the CRD)	

The LCR and NSFR are conditional on the adoption of their respective prudential regulations (by 2015 for the LCR and 2018 for the NSFR). The ESRB's work on the use of these instruments remains at the exploratory level. It is important to support the finalisation of the prudential rules so that macro-prudential authorities can start designing adequate instruments to address liquidity risks.

Authorities may also consider simpler liquidity ratios. These include stable funding ratios, such as the long-term stable funding (LTSF) ratio, a cap on the LTD ratio and a ratio of highly liquid assets over total assets. These simple variants could also serve as a backstop to the NSFR and LCR, akin to the way the leverage ratio serves as a backstop for risk-weighted capital requirements.

By targeting banks' funding structures, liquidity instruments could also help to address excessive credit growth and leverage. The LTD ratio, for example, has been applied to reduce reliance on wholesale funding for domestic lending in Portugal. Other liquidity ratios could also be used.

c) Instruments to address direct and indirect exposure concentration

Excessive exposure concentrations make large parts of the financial sector vulnerable to common shocks. Direct concentration risks arise from large exposures to specific sectors (e.g. the real estate, interbank or economic sectors) or asset classes (e.g. asset-backed



securities). They are direct in the sense that a shock to a particular sector or asset class would affect all banks' balance sheets with common exposures to this sector or asset class. Indirect concentration risks arise when a shock weakens banks through contagion channels, such as interconnectedness, asset fire sales and a general dry-up of liquidity. These risks are indirect in the sense that they may stem from fragilities in other parts of the financial sector with repercussions on the pricing or quality of bank assets.

Four broad categories of macro-prudential instruments help address risks related to common exposures, contagion or interconnectedness (see Table 1.3). Except for the SRB, these instruments can also be implemented under Pillar 2 (when the SREP shows that a specific bank or group of banks are contributing to systemic risks) or under the national flexibility measures provided other instruments cannot adequately address the identified risks.

- *Large exposures restrictions.* These restrictions are micro-prudential measures which can be further restricted for a macro-prudential purpose. They can be applied via Pillar 2 on a sectoral basis to reduce banks' exposures to a particular sector and/or asset class (restrictions on intra-financial exposures can be imposed through Article 458 of the CRR). They may target both direct exposures and excessive (indirect) interconnectedness among financial institutions, thereby reducing contagion risk.
- *Capital-based instruments* (e.g. sectoral capital requirements, SRB, own funds requirements and capital conservation buffer). In the context of exposure concentration, the main focus of capital-based instruments is to address contagion risks arising from banks' common exposures and interconnectedness. These instruments are aimed at enhancing bank resilience to shocks, by raising capital buffers and by reducing banks exposures. When applied on a sectoral basis, they may also affect the asset composition of banks.

Table 1.3: Key instruments for addressing exposure concentration

Instrument	Transmission channel		Legal basis	Chapter in Handbook
	Increasing resilience	Reducing build-up of vulnerabilities		
Sectoral capital requirements (including intra-financial)	Increase banks' loss absorption capacity	Possible impact on financial cycle through higher funding cost	Article 124 of the CRR, Article 164 of the CRR, Pillar 2 Article 458 of the CRR	3 & 7
SRB	Increase banks' loss absorption capacity	Possible impact on financial cycle through higher funding cost	Articles 133-134 of the CRD	4
Large exposures restrictions (including intra-financial)	Limit counterparty, concentration and contagion risk	Direct restriction of credit quantity	Pillar 2 Article 458 of the CRR	7
Own funds Conservation buffer	Increase banks' loss absorption capacity	Possible impact on financial cycle through higher funding cost	Pillar 2 Article 458 of the CRR	7



d) Instruments to address misaligned incentives and moral hazard

The perception that certain financial institutions are too systemically important to fail leads to misaligned incentives and magnifies moral hazard. Shocks to these systemically important institutions (SII) may give rise to losses and liquidity shortages in the rest of the financial system, both through direct and indirect channels. Financial institutions are thus categorised as SII when they give rise to systemic risk and may lead to serious negative consequences for the financial system and the real economy.

Table 1.4: Key instruments for addressing misaligned incentives and moral hazard

Instrument	Transmission channel		Legal basis	Chapter in Handbook
	Increasing resilience	Reducing build-up of vulnerabilities		
G-SII buffer	Increase banks' loss absorption capacity	Possible impact on financial cycle through of increased funding cost	Article 131 of the CRD	4
O-SII buffer			Article 131 of the CRD	
SRB			Articles 133-134 of the CRD	
Own funds Conservation buffer			Pillar 2, Article 458 of the CRR	7
Additional liquidity requirements for SII	Increase stability of funding base and/or stock of liquid assets	Pass through of increased funding cost	National law, Pillar 2, Article 458 of the CRR	5

Four broad categories of instruments help address the risks associated with misaligned incentives and moral hazard. They cover both capital-based and liquidity-based instruments:

- *The globally systemically important institutions (G-SII) buffer* is a macro-prudential instrument. It imposes a mandatory capital buffer on banks identified as globally systemically important. The surcharge will be between 1% and 3.5% and will be gradually phased in from 1 January 2016 and will reach its full effect on 1 January 2019.
- *The other systemically important institutions (O-SII) buffer* is another macro-prudential instrument. It enables authorities to impose capital charges on domestically important institutions. A notification procedure and a 2% upper limit are imposed. The O-SII buffer will become applicable on 1 January 2016.
- *The SRB* can be targeted at the risks stemming from SII or the size of the banking sector when considered excessive. The SRB can be applied to a subset of institutions as early as 1 January 2014. For this reason, some countries may apply the SRB to overcome the deferred application of and/or the legal cap on the O-SII buffer.
- *Additional own funds or conservation buffer requirements* can be implemented either under Pillar 2 (when the SREP shows that a specific bank or group of banks are contributing to systemic risks) or under the national flexibility measures (provided other instruments cannot adequately address the identified risks).



- *Additional liquidity requirements.* The resilience of SIIIs may also be increased through additional liquidity requirements or charges. These requirements may also be applied under Pillar 2 (when the SREP shows that a specific bank or groups of banks contribute to systemic risks) or under the national flexibility measures (provided other instruments cannot adequately address the identified risks).

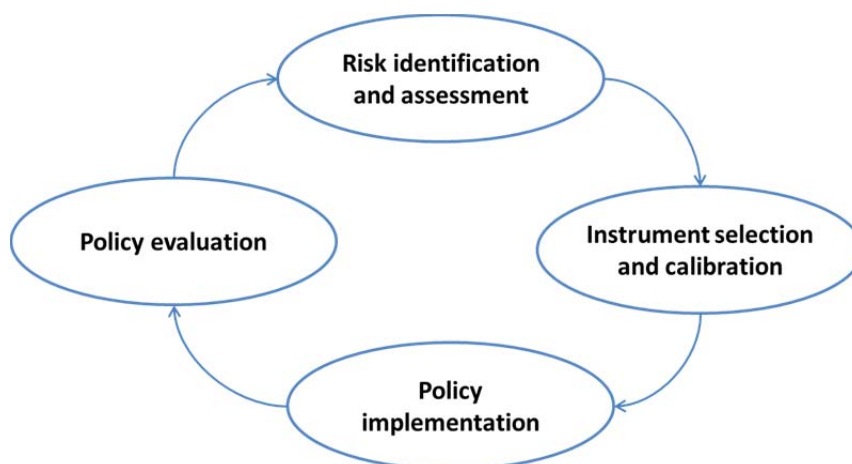
2. Policy framework¹¹

To operationalise macro-prudential instruments, authorities need to develop a macro-prudential strategy. The companion Flagship Report highlights that macro-prudential instruments and intermediate objectives cannot be considered in isolation. This section picks up on this theme and describes how objectives and instruments are part of a wider macro-prudential policy strategy. It aims to help Member States better understand and operationalise each stage of the macro-prudential policy cycle.

A macro-prudential policy strategy relates objectives to indicators and instruments. Indicators help to identify the risks and assess their severity, while instruments help to prevent and mitigate the materialisation of these risks. Narrowing down the list of possible indicators, and identifying indicative thresholds beyond which there would be a presumption to activate an instrument are important areas of ongoing work. The ultimate decision to activate an instrument should also take other factors into account.

A macro-prudential policy strategy follows four stages. These stages make up the policy cycle (see Figure 1.1) and include: (i) the risk identification stage, where relevant indicators help detect and assess vulnerabilities (relative to the intermediate objectives) and where indicative thresholds are defined; (ii) the instrument selection and calibration stage; (iii) the implementation and communication stage, where instruments are activated; and (iv) the evaluation phase, when the impact of instruments is assessed in view of possible adjustment/de-activation. In practice, the four stages are interlinked and cannot be considered in isolation.

Figure 1.1: Macro-prudential policy cycle



¹¹ A more detailed description of the macro-prudential policy strategy can be found in the companion ESRB Flagship Report on Macro-prudential Policy in the Banking Sector (ESRB, 2014).

2.1 Risk identification and assessment

“Key indicator books” help monitor and assess sources of systemic risk. Macro-prudential authorities must assess whether a threat to financial stability might emerge and whether there is a case for macro-prudential intervention. Selecting a targeted set of key indicators that capture the identified sources of systemic risk helps monitor and assess the build-up of these risks. Authorities may find it helpful to compile “key indicator books” that map the intermediate objectives into a well-defined set of key indicators.

Significant progress has been made, but work on indicators is ongoing. Most progress has been on the CCB, where the ESRB has employed an innovative technique that allows for the power of indicators to signal crises across a wide range of indicator thresholds to be evaluated. This technique, which helps model the trade-off between missing crises (type I errors) and false alarms (type II errors), has been used to evaluate a large set of indicators across the EU. Preliminary results show that the credit-to-GDP gap and real estate price-based indicators can signal the types of crisis that the CCB is meant to mitigate as early as five years ahead. Moreover, it has been found that combining indicators that performed well in isolation into a model improves signalling performance (see Chapter 2). It will be important to apply similar techniques to select indicators that signal other sources of systemic risks. Table 1.5 provides a non-exhaustive list of select leading and coincident indicators for each intermediate objective. Box 1.1 presents key findings relating to indicators.

Table 1.5: Examples on how to link intermediate objectives with indicators

Sources of systemic risk	Select indicators	Chapter in Handbook
Mitigate and prevent excessive credit growth and leverage		
Excessive credit growth	Credit-to-GDP gap, real estate price-based indicators, leverage, private sector indebtedness	2
Risks arising from sectoral developments (e.g. real estate boom)	Sectoral credit growth, residential and commercial real estate price-based indicators, LTV/LTI indicators, investment in real estate and value added of construction, sectoral indebtedness	3
Mitigate and prevent excessive maturity mismatch and market illiquidity		
Liquidity risk	Bank funding ratios (e.g. LTD ratio), reliance on central bank funding, maturity structure, net open foreign currency position Liquid asset ratios, asset encumbrance and market liquidity indicators	5
Limit direct and indirect exposure concentration		
Large exposures and interconnectedness	Concentration indicators (e.g. geography, currency, maturity and sectoral), large exposures indicators (ten largest exposures), financial network indicators	4&7
Limit the systemic impact of misaligned incentives with a view to reducing moral hazard		
Distress or failure of a SII	SII indicators related to size, interconnectedness, substitutability, complexity, banking sector size and concentration, and cross-border activities.	4

Macro-prudential authorities should consider identifying indicator thresholds beyond which they may consider taking action. Such thresholds could be public or private, and would depend on a range of factors. An important factor is policy-makers’ preferences about the inherent trade-off between missing crises (when a high threshold is set) and receiving false alarms (when a low threshold is set). Country-specific considerations may also

influence the selection of thresholds. Macro-prudential stress tests can identify stress points in the banking sector and thereby help assess banks' resilience when indicators breach their thresholds.

Box 1.1 Indicators – key findings

1. **Indicators for the build-up and the release of instruments can differ.** This has been backed up by empirical evidence relating to the CCB, real estate instruments and liquidity instruments.
2. **Combining information received from multiple indicators is likely to provide better and stronger signals of vulnerabilities building up.** A combination of strong credit developments (credit-to-GDP gap for the CCB, mortgage credit evolutions for real estate instruments) and high real estate price growth is likely to be a cause of concern in the context of excessive credit growth and leverage.
3. **Information from single indicators is nevertheless important.** For example, an institution may be identified as a SII even when it is important along only one of the dimensions of systemic importance.
4. **Simple structural liquidity ratios seem to be promising leading indicators of systemic liquidity risk.** A simple LTD or core funding ratio seems to provide some signalling power regarding the build-up of systemic liquidity risk.
5. **Market-based indicators play a larger role in the release phase.** Market-based indicators have been found important in the release phase of the CCB. Given the way in which liquidity risk typically crystallises in periods of stress, the role of market-based indicators could play an even larger role in the release phase of liquidity instruments.
6. **The assessment of structural systemic risks is likely to require a broad set of indicators.** Such indicators could capture the probability and size of shocks to the financial system, commonality of institutions' exposures and risk of intra-financial contagion, and the size and concentration of the financial sector.

In order to identify thresholds, it is necessary to understand the relationship between indicators and particular systemic events. Relevant systemic events include banking crises, including those relating to real estate and liquidity crises, losses incurred in such crises and losses related to the distress or failure of SIIs. For example, preliminary work on the CCB has shown that a credit-to-GDP gap in excess of 2 percentage points signals the risk of a banking crisis arising from excessive credit growth.

Important data gaps that hamper the development of key indicators have been identified. Large differences with respect to availability, coverage and definitions of data persist across the EU. Efforts to fill data gaps would allow macro-prudential authorities to make better informed decisions. Specific areas for progress are the following:

- *improving the availability, quality and comparability of data related to the real estate sector, particularly in the context of commercial real estate, for which data is particularly weak.* Given the importance of regional developments in the real estate sector, policy-makers should also be able to monitor such developments and consider measures to prevent them from developing into a systemic risk;



- *improving the availability, quality and comparability of data on key indicators, such as LTV and LTI/DSTI ratios.* This is important in terms of cross-border comparability of data for systemic risk assessments and indicator selection. It would also facilitate cross-country comparisons of lending standards in the real estate sector;
- *having a better overview of funding flows across the financial system as a whole.* Liquidity risk was at the heart of the global financial crisis. But many data gaps prevent monitoring financial flows across the financial system. International and European efforts are underway to address such gaps, but much remains to be done.

2.2 Instrument selection and calibration

The selection and calibration of macro-prudential instruments must reflect the underlying sources of risk. When selecting instruments, macro-prudential authorities should consider economic, legal and cross-border aspects.

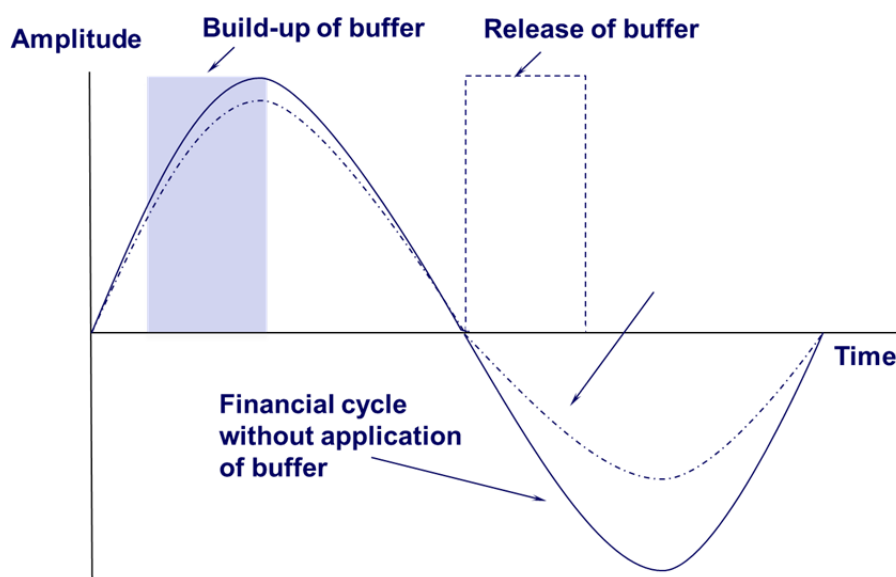
a) Economic considerations

Macro-prudential policy must account for the financial cycle, as systemic risks are magnified by pro-cyclicality. Macro-prudential authorities must be able to assess their broad position in the financial cycle to calibrate their policy stance.

Macro-prudential instruments can dampen both the upswing and the downswing of the financial cycle. They can dampen the upswing of the financial cycle by reducing the build-up of vulnerabilities and can dampen the downswing of the financial cycle by increasing the resilience of the banking system. Figure 1.2 uses the example of a capital buffer to illustrate these channels of this transmission mechanism. For example, by increasing banks' cost of capital, the build-up of the buffer (shaded rectangle) tends to slow credit growth and thus, dampen the upswing of the cycle. Releasing the buffer in the downswing (dashed rectangle) helps dampen the downswing of the cycle, as banks' greater resilience allows them to smooth the provision of credit to the economy. These transmission channels are reflected in Tables 1.1-1.4.

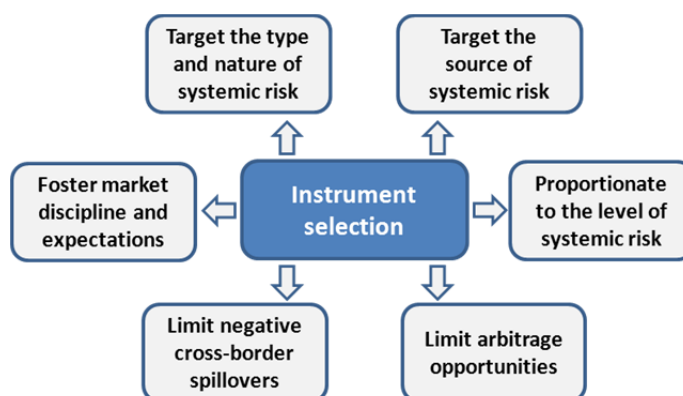
Calibrating macro-prudential instruments to dampen the upswing of the financial cycle will be challenging. An increase in resilience is often easier to quantify and assess. For example, other things being equal, a banking system with €1 more capital will be able to absorb an extra €1 of losses. In contrast, the impact of €1 more capital on credit growth is difficult to assess. This makes it difficult to calibrate and assess the effectiveness of policy measures aimed at reducing the build-up of vulnerabilities.

Figure 1.2: Stylised transmission of buffers over the financial cycle



Macro-prudential authorities should strive to use those instruments which lead to the highest net benefits to society. A practicable approach to this cost-benefit analysis involves assessing the instruments' effectiveness in relation to the desired objective, and the social costs they may give rise to by imposing restrictions on entities and activities. In general, this means favouring instruments that display a number of desirable characteristics, presented in Figure 1.3 and discussed in detail in Chapter 8.

Figure 1.3 Desirable characteristics in instrument selection



Using a combination of instruments may be more effective than using a single instrument. This may be the case when systemic risk has both structural and cyclical dimensions, and when it needs to be addressed by pursuing several intermediate objectives. It may also be the case in situations in which one instrument on its own cannot sufficiently address the level of systemic risk. Combining instruments can also increase effectiveness by limiting arbitrage opportunities.



b) Legal considerations

The CRD/CRR is aimed at ensuring that the use of macro-prudential instruments does not harm the functioning of the internal market. Some instruments can only be used when others are not adequate and under a set of restrictions and requirements. In particular:

- the SRB should only be considered when other CRD measures (including Pillar 2) are not sufficient to address the identified systemic risk;
- similarly, national flexibility measures should only be considered when other measures cannot adequately address the macro-prudential or systemic risk identified.¹²

Some instruments are subject to specific notification and approval procedures (see Table 1.6).¹³ It remains important that macro-prudential authorities have adequate instruments to address the emergence of systemic risk. Thus, the legal procedures should not discourage authorities from using these instruments when appropriate.

Table 1.6: Key notification and approval procedures

	O-SII buffer (Article 131 of the CRD)	SRB (Articles 133-134 of the CRD)	National flexibility measures (Article 458 of the CRR)
Addressee	COM, ESRB, EBA	COM, ESRB, EBA, CADA of Member States concerned	European Parliament, Council, COM, ESRB, EBA
Justification of effectiveness and proportionality	Yes	Yes	Yes
Assessment of likely positive or negative impact on the internal market	Yes	Yes	Yes
Justification of why other particular instruments in the CRD/CRR alone or in combination cannot adequately address the systemic risk	No	Yes	Yes
Approval of addressees required?	No	Under certain conditions (Chapter 4 Table 4.7)	Council may reject measure

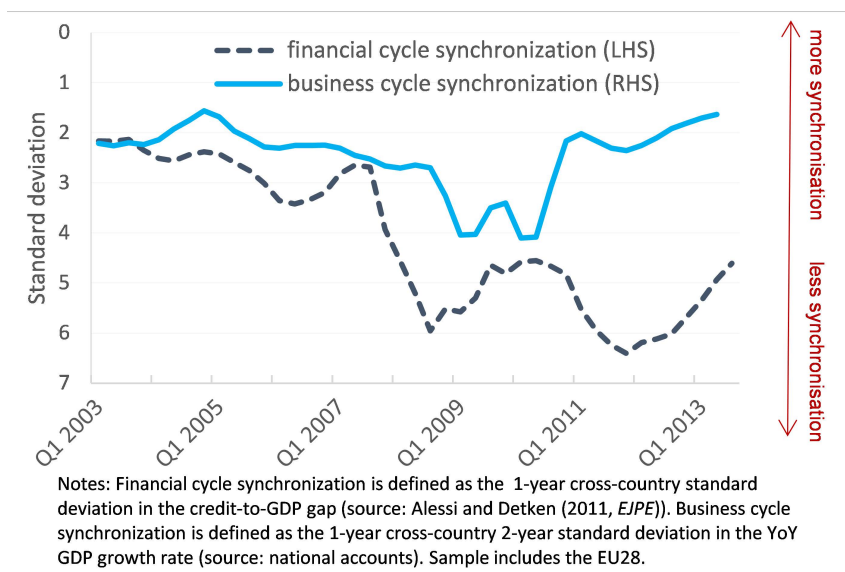
c) Cross-border considerations

Macro-prudential instruments are likely to have positive net effects outside the jurisdiction in question. They might reduce the risk of negative financial or macroeconomic spillovers to other countries. However, spillovers can also be negative. As a general rule, this is more likely when financial cycles are out of sync: some countries will require a “tight” policy stance; others a “loose” stance. Empirical evidence shows that there is substantial variation across financial cycles in the EU (“see Figure 1.4).

¹² Other measures include Articles 124 and 164 of the CRR and Articles 101, 103, 104, 105, 133 and 136 of the CRD.

¹³ Section 2.3c) elaborates on the role of the ESRB in these notification and approval procedures.

Figure 1.4: Divergence of financial cycles in the EU



Macro-prudential authorities should favour instruments for which negative cross-border spillovers are limited.¹⁴ Reflecting this, for the instruments already noted in Table 1.6 (i.e. the O-SII buffer, the SRB and national flexibility measures), the CRD/CRR impose specific notification and approval procedures to ensure that their use does not harm the functioning of the internal market.

The ability to assess cross-border spillovers must improve. Authorities should build the analytical capacity to assess cross-border spillovers. Such analysis must cover both spillovers to other jurisdictions from activating macro-prudential instruments domestically and the domestic impact from measures activated in other countries.

d) Calibration

Authorities should calibrate instruments to reflect the level of systemic risk. Calibration depends on what purpose the instrument serves; the calibration of an instrument aimed at increasing resilience is likely to differ from the calibration required when it is aimed at smoothing the financial cycle.

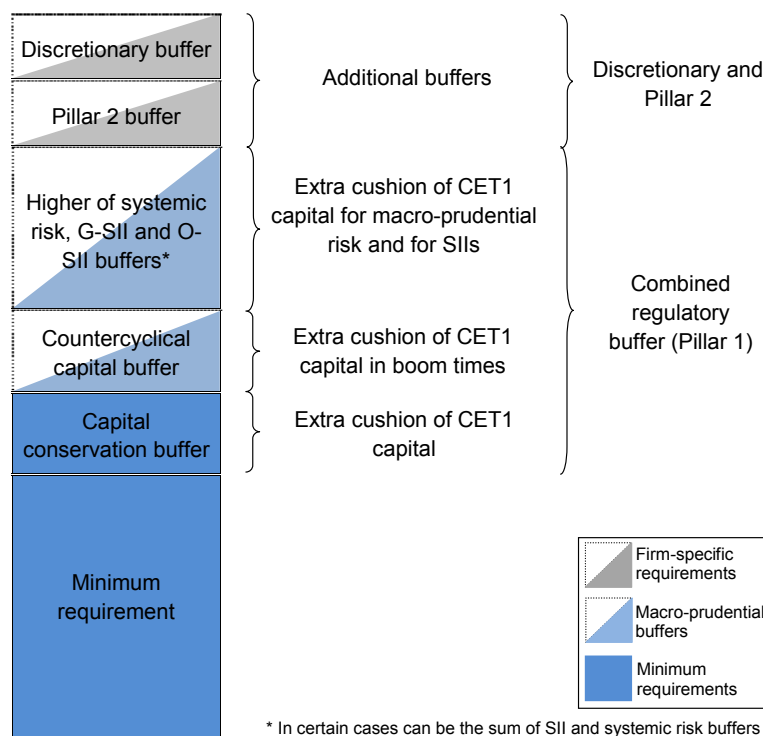
The calibration of instruments should account for potential stressed losses, obtained either from historical data or stress tests. For example, in the context of the CCB, decisions on the appropriate buffer rate should be guided by the objective to protect the banking system against potential losses when the financial cycle turns. The calibration should therefore cover stressed losses and take into account that banks should be able to keep lending to the real economy even in periods of financial stress.

If instruments are applied in combination, they should be calibrated together. Instrument calibration should at least account for the levels of instruments that are already

¹⁴ For an extended discussion on cross-border issues, see Chapter 11.

activated. This is particularly obvious in the case of the activation of multiple capital instruments (see Figure 1.5). However, this rule also applies in the case where different types of instruments (e.g. capital and liquidity, capital and LTV/LTI caps) are combined.

Figure 1.5: Capital requirements in the CRD/CRR



Source: ESRB staff based on European Commission (2013)

2.3 Policy implementation

When implementing macro-prudential policy, a number of cross-cutting issues arise. These include the role of guided discretion, policy coordination, and communication.

a) Guided discretion

Policy-makers need to overcome the “inaction bias” (see Chapter 8). This is because the costs of activating macro-prudential instruments are felt in the short term and are immediately visible, while the benefits are long-term and less obvious. For example, increasing the CCB rate imposes costs on banks, while the lack of a counter-factual makes it difficult to demonstrate that the CCB will successfully mitigate the risk and impact of a systemic crisis. As a result, authorities may be too slow to activate instruments. In a downturn, when losses materialise, policy-makers may be concerned about losses rising further. This can result in instruments being deactivated too late, with excessive negative effects on credit supply.

In theory, a strictly rules-based approach would mitigate the risk of inaction bias. Such an approach would trigger an automatic policy action if a single indicator or a set of indicators breached identified thresholds. It would require authorities to identify indicators that encompass a broad range of risks and thus reliably signal financial crises in a timely manner.



Since indicator thresholds reflect policy-makers' preferences between missing crises and false alarms, it would also require these preferences to be relatively stable over time.

In practice, there is recognition that judgment needs to be exercised, as indicators and thresholds cannot fully capture identified risks. The analytical work underpinning this Handbook identified a number of indicators that performed well in signalling financial crises for the EU as a whole (see Chapter 2). However, such analysis is necessarily backward-looking and cannot fully take account of the fact that financial systems between Member States differ and evolve over time. This means, for example, that policy-makers should be willing to act based on qualitative assessments of the level of systemic risks, even if statistical indicators are not sending clear signals. More generally, because macro-prudential policy is a relatively new tool and its analytical foundations are still in their infancy, it will be necessary to exercise judgment in order to cover new and evolving types of risk.

The new prudential rules for the EU banking sector combine elements of the rules-based approaches and the need for judgement into a principle of “guided discretion”. In particular, Article 136 of the CRD stipulates that, while authorities are free to exercise their judgement when setting the CCB, they should follow a set of principles and publish a benchmark reference rate to guide their judgement. This promotes sound and transparent decision-making, while the ultimate use and design of the instrument would remain under the responsibility of the macro-prudential authority.

The principle of “guided discretion” could serve as a model for other instruments. Some of the other instruments introduced by the new prudential rules include elements of guided discretion. For example, while the CRD sets out an identification methodology for G-SIIs that produces a score, authorities can use supervisory judgement and allocate an institution to a higher G-II sub-category than its score would imply.

b) Coordination

In order to arrive at a holistic view on how to address systemic risks, cooperation between relevant authorities is needed (see Chapter 9 for details). This is particularly the case when different authorities are responsible for macro-prudential and micro-prudential policy. Both of these policy areas have a role in building a more robust and sustainable financial system. They also reinforce each other in terms of risk monitoring and policy design. Cooperation will be particularly beneficial when incorporating macro-prudential elements into the SREP and when using Pillar 2 tools.¹⁵

The presence of potential cross-border spillovers also necessitates EU-wide coordination of national macro-prudential policy. National authorities are recommended to engage in ex-ante coordination when considering a macro-prudential measure with potential significant cross-border effects. This will facilitate the assessment of possible cross-border spillovers and may lead to adjustments of measures. The ESRB will contribute to such coordination by developing a coherent and consistent macro-prudential policy framework in the EU and promoting best practices.

¹⁵ See Chapter 6 for more details.



Coordination across borders can ensure that macro-prudential measures apply to both domestic and foreign banks. To hinder leakages and to promote a level playing field, authorities should seek to ensure that both domestic and foreign banks face the same requirements for their exposures in a particular country. This implies that foreign authorities voluntarily reciprocate macro-prudential measures imposed by the domestic macro-prudential authority.¹⁶

Before activating certain measures laid down in the CRD/CRR, authorities must notify the ESRB (see Box 1.2). For specific instruments, authorities are required to notify the ESRB before activating the measure.¹⁷ Such notifications include an explanation of why a measure is justified and other information on the measures themselves.¹⁸ The ESRB will assess the proposed measures and, if necessary, recommend amendments. For certain instruments, the ESRB is required to provide an opinion (see Table 1.6). The assessment will both cover the benefits of the macro-prudential measures from a financial stability perspective and potential negative spillover effects in the context of the EU internal market.

Box 1.2 Support for the issuing of ESRB opinions

Under the CRD/CRR, the ESRB is charged with issuing opinions and recommendations regarding the proper use of certain measures. This applies to the use of systemic risk buffer rates exceeding 3% (until 2015) and 5% (from 2015), as well as the use of national flexibility measures:

- **recommendations:** the ESRB must issue a “recommendation” when a Member State imposes a systemic risk buffer between 3% and 5%, provided there is at least one EU-owned foreign subsidiary in that Member State. When doing so, the ESRB must assess whether the measure is necessary, effective and proportionate, and whether the systemic risk cannot be adequately addressed by other measure(s);
- **opinion:** the ESRB must issue an opinion when authorities wish to use national flexibility measures. This opinion should cover the justification of effectiveness and proportionality of the measure, why other instruments in the CRD/CRR (alone or in combination) cannot adequately address the systemic risk and the likely impact on the internal market.

In order to ensure an efficient and timely process, the ESRB will publish notification templates for these macro-prudential instruments on its website. The templates will help to harmonise the notification process for Member States and assist the ESRB in assessing the appropriateness of the intended measures. Furthermore, the notifying authorities are asked to inform the Secretariat of an imminent notification in an informal manner, whenever possible five ECB working days prior to submitting the notification.

An ESRB Assessment Team will be created to assess and prepare ESRB opinions on macro-prudential policy measures notified to the ESRB. The Assessment Team will be composed of 13 permanent members (two representatives of the ESRB’s Secretariat, one representative of the ECB, one of the SSM and nine representatives of different EU national central banks), three permanent observers (two representatives of the European Commission and one representative of the EBA). Jurisdictions which have notified a macro-prudential policy measure will be represented by two non-permanent observers. Institutions with a member in the General Board can also have one non-permanent observer, if they have material concerns regarding possible negative cross-border externalities of the notified measure.

¹⁶ For the CCB, reciprocity arrangements are already included in the legal requirements up to certain levels (see Chapter 2).

¹⁷ This includes applying an O-SII buffer and using national flexibility measures under Article 458 of the CRR and SRB rates exceeding 3% (until 2015) and 5% (from 2015).

¹⁸ The detailed requirements on the content of these notifications differ somewhat depending on the instruments. See, for instance, Article 458(2) of the CRR and Article 133(12) of the CRD.



c) Communication

Authorities should promptly communicate macro-prudential measures (see Chapter 11). Such communication needs to include more than purely operational features (e.g. design of the instrument(s), scope of application, timing and likely duration) of the measures. In particular, authorities should provide a simple narrative that links identified systemic risks to the intermediate objectives that are threatened by these risks and explains how measures taken are expected to mitigate these risks.

In some cases, communication should be coordinated between authorities (domestic and foreign) before publicly announcing the activation of a measure. Particularly in stressed circumstances, speaking with one single voice will provide clarity to target audiences and reduce the risk of conflicting and inconsistent messages.

2.4 Policy evaluation

Once a macro-prudential instrument has been activated, authorities should monitor and evaluate its effects. Such evaluations should include to what extent the intermediate objective is sufficiently addressed (e.g. has systemic risk been mitigated?), and whether there are any substantial undesirable spillovers domestically or cross-border. Such evaluations should allow sufficient time for the effects of an instrument to play out.

If the instrument seems to be successful in achieving its objective with few undesirable spillovers, the authority should maintain its policy stance. If the risk recedes over time, authorities should plan for a relaxation of macro-prudential policy. Just as when an instrument is activated, any deactivation should be designed with appropriate timing and phasing arrangements.

Macro-prudential policy should be re-considered if the instrument seems insufficient to effectively address the intermediate objective. This should also be the case if it leads to material unintended spillovers. Reconsiderations could include tightening policy by increasing the requirements of the activated instrument. Other options include complementing or substituting it with other instruments. Any alteration to policy should be carefully designed, taking into account the advice provided in this Handbook.

Policy evaluation also has a role to play in refining the other stages of the policy cycle, including risk assessment, instrument selection and policy implementation more generally. International organisations can provide a useful complement to authorities' internal evaluations. They are at more of a distance from the actual decision-making process, and can bring international best practices and specialised skills to evaluate macro-prudential policy.



Section II: Macro-prudential instruments

Chapter 2

The countercyclical capital buffer¹⁹

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¹⁹ This chapter was prepared by Karsten Gerdrup (Norges Bank) and Olaf Weeken (ESRB Secretariat). It draws heavily on analytical work by the ESRB Expert Group on guidance on setting countercyclical buffer rates chaired by Carsten Detken (European Central Bank). The Expert Group comprised Diana Bonfim/Miguel Medonca Boucinha (Banco de Portugal), Peter Brun (Danmarks Nationalbank), Maciej Brzozowski (Narodowy Bank Polski), Christian E. Castro (Banco de España), Saša Cerovac (Hrvatska narodna banka), (Conn Creedon/Eoin O'Brien), Stijn Ferrari (Nationale Bank van België/Banque Nationale de Belgique), Julia Giese (Bank of England), Gaston Andres Giordana (Banque centrale du Luxembourg), Karsten Gerdrup (Norges Bank), Matilda Gjirja (Finansinspektionen), Philipp Hochreiter (Austrian Financial Market Authority), Anna Jernova (Bank of England, PRA), Jan Kakes (De Nederlandsche Bank), Karlo Kauko (Suomen Pankki – Finlands Bank), Anna Kelber/Benjamin Klaus (Banque de France), Claire Labonne (Autorité de Contrôle Prudentiel), Massimo Libertucci (Banca d'Italia), Stan Maes (European Commission), Ola Melander (Sveriges Riksbank), Florian Neagu (Banca Națională a României), Benjamin Neudorfer (Oesterreichische Nationalbank), Peer Osthoﬀ (BaFin), Evangelia Rentzou (ESRB Secretariat), Štefan Rychtárik (Národná banka Slovenska), Sofia Savvidou (Bank of Greece), Jakub Seidler/Miroslav Plašil (Česká národní banka), Ingrid Stein/Natalia Puzanova (Deutsche Bundesbank), Wolfgang Strohbach (European Banking Authority), Balázs Világi (Magyar Nemzeti Bank), Ianna Yordanova (Finanstilsynet), Balázs Zsomboki (European Central Bank).



Executive summary

The countercyclical capital buffer (CCB) is a key macro-prudential instrument introduced by the new EU capital rules. Countries may implement the CCB from 1 January 2014. It will become operational for all Member States from 2016. This chapter aims to help macro-prudential authorities use the CCB.

The CCB is designed to help counter some of the pro-cyclicality in the financial system. Such pro-cyclicality contributed both to the origin of the global financial crisis and aggravated it: in the economic upswing, credit grew excessively as banks had easy access to debt funding, whereas credit contracted during the economic downswing as this funding dried up, leading to boom and bust.

The CCB increases the resilience of the banking system during periods of excessive credit growth. In addition, during a boom phase, the CCB may help dampen excessive credit growth through a price and/or quantity effect. The CCB will tend to raise the cost of credit since capital is deemed to be more costly than debt, thereby reducing credit demand (price effect). Banks can also meet higher CCB requirements by reducing risk-weighted assets, which may reduce credit supply (quantity effect).

To work as intended, the CCB must be allowed to swing over the financial cycle. Macro-prudential authorities should reduce the CCB during periods of stress or when systemic risks abate. By reducing or fully releasing the CCB, banks are able to absorb losses without constraining the flow of credit to the economy.

The operation of the CCB is outlined in the EU capital rules. Reflecting the principle of “guided discretion” in the internationally agreed Basel III framework, authorities are obliged to calculate a buffer guide as a reference rate to guide their judgement. Macro-prudential authorities are also asked to regularly monitor a range of economic and financial variables that have been associated in the past with excessive credit growth and ensuing financial crisis. Together with qualitative assessments, this should guide authorities in setting the CCB. The CCB rate should be higher than zero when credit growth is excessive and poses systemic risks.

The EU capital rules give the ESRB a mandate to provide guidance to macro-prudential authorities on setting CCB rates. The purpose of this guidance is to ensure that authorities adopt a sound approach to relevant financial cycles and to promote sound and consistent decision-making across Member States.

An ESRB expert group has been set up to conduct the necessary analysis and to develop this guidance. The expert group has collected data on relevant crisis episodes and economic/financial variables that may indicate such crises covering EU Member States. It has also developed a methodology to evaluate the signalling properties of these indicators and built the associated computational infrastructure to implement this evaluation procedure. It is envisaged that eventually this infrastructure will be made available to macro-prudential authorities across the EU, and can also be adapted to operationalise other macro-prudential instruments. Given the substantial amount of analytical work that needs to be undertaken, it is expected that the ESRB will provide guidance on the CCB in the course of 2014. The analysis presented in

this chapter, while preliminary, draws on the results from the expert group. It does not, however, prejudge this guidance.

This chapter has the following **key findings and policy messages**:

- Decisions on the appropriate CCB rate should be guided by the objective to protect the banking system against potential losses when excessive credit growth is associated with a build-up of system-wide risk, thereby supporting the sustainable provision of credit.
- When evaluating the indicators that suggest activating/increasing or releasing the buffer, macro-prudential authorities should develop a sound empirical methodology. Such a methodology would typically involve the following steps, although authorities may wish to explore alternatives to reflect national specificities:
 1. identify periods of financial crisis associated with excessive credit growth;
 2. identify and collect relevant economic/financial explanatory variables;
 3. employ a suitable approach to estimate the relationship between the explanatory variables and the crisis episodes. The expert group has found the following three approaches particularly useful: The signalling approach, which uses the raw data of the indicator; the discrete-choice approach, which transforms the data into the probability of a crisis occurring; and the decision tree approach;
 4. use a comprehensive measure to evaluate the signalling properties of indicators. The area under the receiver operating characteristic (AUROC) curve, which enables policy-makers to evaluate indicators over a wide range of thresholds, is one such measure. Optimal thresholds can be identified for specific preferences. A choice needs to be made between setting high thresholds and thus missing many crises and setting low thresholds and obtaining many false alarms.
- To indicate the build-up of risks, the deviation of the ratio of credit aggregates to GDP from its long-term trend and indicators based on real estate prices have performed well for the EU *as a whole* and in many individual Member States. Macro-prudential authorities may wish to publish such measures as a matter of course. They may also wish to monitor a broader set of indicators, including accounting for national specificities.
- Financial market prices have performed well during the global financial crisis in indicating turning points in the financial cycle that are associated with periods of stress. Lack of data, however, means that these indicators cannot be tested over earlier crises. Determining when to launch the release phase of the CCB may thus require greater exercising of judgment than during the build-up phase.
- Existing methods of mechanically mapping different levels of indicators into different buffer rates – a “buffer guide” – tend to be ad hoc. Further analysis is needed to determine the optimal size of CCBs. Stress tests may also help to calibrate buffer settings.
- Since the CCB is time-varying, it is likely that expectations of future rates will be important for its effectiveness. Macro-prudential authorities should be transparent about how they decide on buffer settings. Therefore, a communication strategy that is consistent with the EU capital rules is needed in order to manage public expectations, foster coordination between macro-prudential authorities and maintain accountability and credibility.



1. Macro-prudential objectives

The CCB is designed to counter some of the pro-cyclicality in the financial system. This pro-cyclicality contributed both to the origin of the global financial crisis and aggravated it: in the economic upswing, credit grew excessively as banks were able to fund themselves easily and cheaply through debt, whereas credit contracted during the economic downswing as funding dried up, leading to boom and bust.

The Basel Committee on Banking Supervision (BCBS, 2010) specified the objective of the CCB in more detail:

“...to achieve the broader macro-prudential 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. Protecting the banking sector in this context is not simply ensuring that individual banks remain solvent through a period of stress, as the minimum capital requirement and capital conservation buffer are together designed to fulfil this objective. Rather, the aim is to ensure that the banking sector in aggregate has the capital on hand to help maintain the flow of credit in the economy without its solvency being questioned, when the broader financial system experiences stress after a period of excess credit growth. This should help to reduce the risk of the supply of credit being constrained by regulatory capital requirements that could undermine the performance of the real economy and result in additional credit losses in the banking system.”

This objective is also reflected in the EU capital rules (Recital 80 of the CRD):

“It is therefore appropriate to require credit institutions and relevant investment firms to hold, in addition to other own fund requirements, a capital conservation buffer and a countercyclical capital buffer to ensure that they accumulate, during periods of economic growth, a sufficient capital base to absorb losses in stressed periods. The countercyclical capital buffer should be built up when aggregate growth in credit and other asset classes with a significant impact on the risk profile of such credit institutions and investment firms are judged to be associated with a build-up of system-wide risk, and drawn down during stressed periods.”

Appropriately pursued, the CCB can contribute to safeguarding the stability of the financial system as a whole, thereby achieving the ultimate objective of macro-prudential policy.

2. Transmission mechanism and effects of the CCB

2.1 Description of the CCB

The CCB is a Common Equity Tier 1 (CET1) buffer requirement on domestic exposures. It shall be set between 0% and 2.5%, but can be set higher when system-wide risks associated with excessive credit growth or other cyclical systemic risks are judged to be high.

Mandatory reciprocity (up to 2.5%)²⁰ ensures that the CCB applies to all exposures in a certain jurisdiction irrespective of the country of origin of the creditor. This contributes to a level playing field between domestic and foreign banks (see also Section 5.3). The risk of regulatory arbitrage and cross-border spillover may be greater in cases where the CCB is set higher than 2.5% and that rate is not fully recognised by other national authorities (see Section 2.4).

Each Member State shall designate a public authority or body (a “designated authority”) that is responsible for the quarterly setting of the CCB rate. There is typically a 12-month lead time from when an increase in the CCB is announced until banks must apply the new buffer rate. A reduction in the buffer can be made effective immediately. If a designated authority reduces the CCB rate, it shall also decide on an indicative period during which no increase in the buffer is expected.

Sections 2.2-2.5 provide an overview of transmission mechanisms of the CCB, possible unintended consequences and cross-border spillovers. Interaction between the CCB and other policy areas is also discussed. Table 2.1 provides an overview of the CCB, including its objective, pros and cons, as well as relevant operational and legal issues.

Table 2.1: Overview of the CCB

<p>Description: The CCB is a CET1 buffer requirement on domestic exposures. It is calibrated in steps of 0.25 percentage point or multiples of 0.25 percentage point and cannot fall below zero (Article 136(4) of the CRD).</p>
<p>Objective: Decisions on the appropriate CCB rate should be guided by the objective to protect the banking system against potential losses when excessive credit growth or other cyclical systemic risks are associated with a build-up of system-wide risk, thereby supporting the sustainable provision of credit to the economy.</p>
<p>Pros:</p> <ul style="list-style-type: none"> - It is a broad-based measure that affects banks’ resilience. - Banks may be allowed to draw down the buffer in periods of stress to help maintain the flow of credit in the economy without their solvency being questioned. - It is time-varying. - Reciprocity allows for the creation of a level playing field between banks regardless of their jurisdiction.

²⁰ Mandatory reciprocity up to a buffer rate of 2.5% applies from 2019.



Cons:

- Leakage/arbitrage may occur to less regulated and non-regulated domestic or foreign entities.
- Possibility of cross-border spillovers to all of the countries in which a bank operates.
- Excessive increase in exposures with low risk weights may be at the expense of exposures with high risk weights.
- The impact on credit growth and economic growth is uncertain.
- The expectation channel is uncertain and will possibly be affected by authorities' communication and practice over time.
- The authorities can reduce or fully release the buffer, but banks can react by increasing their voluntary buffers, so the CCB may not work as intended

Relevant operational issues:

- It is difficult to assess when the financial cycle has turned.
- Mapping credit-to-GDP gaps and possibly other indicators to benchmark buffer rates.
- Sequencing of the CCB and other policy instruments that may have cyclical effects in the implementation or adjustment phase.
- Macro-prudential authorities must balance mechanical rules and judgment/discretion within limits set by ESRB guidance and communicate the rationale for buffer settings.
- Macro-prudential authorities may put a different emphasis on missing crises and false alarms. An authority that judges financial crises to be extremely costly and/or is highly risk averse will tend to activate the CCB more often than other authorities.

Relevant legal/institutional issues:

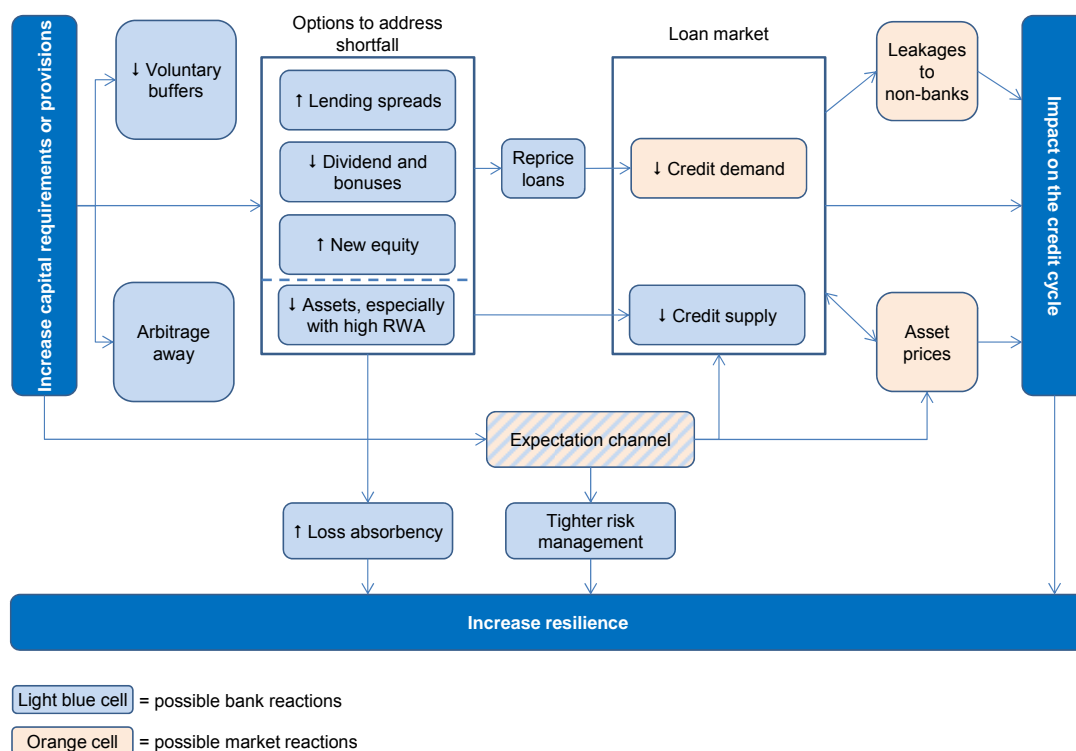
- Member States are required to maintain a CCB (Article 130(1) of the CRD).
- Each Member State shall designate a public authority or body that is responsible for setting the CCB rate (Article 136(1) of the CRD).
- Each designated authority shall calculate for every quarter a buffer guide as a reference to guide its judgment in setting the CCB rate. It shall be based on the deviation of the ratio of credit to GDP from its long-term trend (Article 136(2) of the CRD).
- Each designated authority shall assess and set the appropriate CCB on a quarterly basis, taking into account the buffer guide, any ESRB guidance/recommendations, and other variables relevant for addressing cyclical systemic risk (Article 136(3) of the CRD).
- There is typically a 12-month lead time from when an increase in the CCB is announced until when banks must apply the new buffer rate (Article 136(5) of the CRD). A shorter lead time is possible in exceptional circumstances. A reduction in the buffer can be made effective immediately after its announcement.
- If a designated authority reduces the CCB rate, it shall also decide on an indicative period during which no increase in the buffer is expected (Article 136(6) of the CRD).
- Designated authorities shall notify each quarterly setting of the CCB and specified information to the ESRB. The ESRB shall publish on its website all such notified buffer rates and related information (Article 136(7) of the CRD).
- The ESRB has a mandate to provide guidance to designated authorities on setting CCB rates (Article 135(1) of the CRD).
- The ESRB may issue a recommendation to designated authorities on the appropriate CCB rate for exposures to third countries (Article 138 of the CRD).

2.2 Transmission mechanism and channels

The CCB works through the same channels as other capital requirements as well as banks' own funds (Figure 2.1).²¹ An increase in the CCB rate will have an impact on banks' resilience unless they reduce any voluntary buffers they may hold by an equal amount. However, not all banks have high enough voluntary buffers to enable them to do so, and they would typically want to hold a voluntary buffer on top of the regulatory capital as a safeguard. An increase in the CCB is thus expected to increase banks' overall capital positions. Concerning the potential impact on the financial cycle, a separation can be made between a quantity and a price channel.

Unless banks increase their capital position through retained earnings, reduced dividend payments to shareholders or issuance of new capital, they must reduce their risk-weighted assets (RWA). To the extent that they choose to do so by cutting back on lending, credit conditions will become tighter and economic growth may be reduced. This effect may be warranted from the point of view of policy-makers since it may curb excessive credit growth.

Figure 2.1: Transmission mechanism of raising capital requirements



Source: Adapted from CGFS (2012).

A higher CCB rate may entail higher overall funding costs because equity capital is deemed more costly than debt. This effect is not obvious. A well-known theorem in the finance literature is that the total value of a firm's assets should be independent of how these assets

²¹ See also CGFS (2012) for a description of transmission mechanisms.



are funded (Modigliani and Miller, 1958). This also means that the total cost of funding should be independent of the composition of the firm's funding. When banks are required to hold more capital, shareholders' return on equity will be reduced for a given cost of debt. However, as banks' leverage falls, the risk of their debt also declines. This should offset the cost of having to finance the bank with a greater share of equity. The strict conditions underlying the Modigliani-Miller theorem would typically not hold, owing to, for example, taxes and asymmetric information.

A special feature of banking is that parts of banks' liabilities are subject to explicit (e.g. deposit insurance) and implicit (e.g. "too-big-to-fail" banks) guarantees. The price of bank debt may therefore not properly reflect its risks, and banks may have an incentive to operate with high leverage in order to maximise shareholders' return on equity. Banks may pass on the actual or perceived costs of higher capital resulting from a higher CCB rate to their customers in the form of higher lending rates, possibly leading to reduced demand for credit and lower overall growth in the economy. When the CCB rate is reduced – and provided that banks use the freed up capital – the above-mentioned mechanisms are largely expected to work in reverse.

Since the CCB is time-varying, it is likely that expectations of future CCB rates will become important for the effectiveness of this instrument. These expectations will be formed by authorities' communication, practice and credibility. During a build-up phase, clear and credible communication of the reasons for a higher CCB rate may help in terms of leaning against the cycle as well as building resilience.

The expectation channel may be particularly important in periods of stress or crisis, since market requirements for banks' capital often increase at such times. This could reduce the effectiveness of lowering CCB requirements. This effect is likely to be smaller if banks have built large enough buffers during the upswing of the cycle. To improve the effectiveness of the CCB and increase the predictability of buffer decisions, macro-prudential authorities are required to "*decide an indicative period during which no increase in the buffer is expected*" when the CCB rate is reduced (whether or not it is reduced to zero), see Article 136(6) of the CRD.

2.3 Unintended domestic consequences of the CCB

The effectiveness of the CCB can be reduced by regulatory arbitrage and leakages to entities outside the scope of this instrument. Non-financial companies may substitute credit from banks that face a higher CCB with credit from shadow banks or by issuing bonds or using other instruments to raise funds. Banks may exacerbate such a development by using techniques to transfer exposures to non-regulated entities. A higher CCB may also give banks incentives to increase exposures with low risk weights at the expense of exposures with high risk weights.

While the aim of the CCB is to improve resilience, it is expected to have an impact on the build-up phase of system-wide risk. The latter may be intended or can be a desired side-effect. Unintended domestic consequences can arise if an increase in the CCB reduces the flow of credit growth to the economy by more than is warranted.

Inappropriate timing in releasing/reducing the CCB can also have unintended domestic consequences. Releasing the CCB reduces the risk of the supply of credit being constrained by

regulatory capital requirements when the financial cycle turns. However, if macro-prudential authorities reduce the CCB too late, its countercyclical effect will become less effective. The same applies if banks are being constrained from other sources, for example if they are unable to use the freed-up capital owing to high market requirements for banks' capital.

Unintended consequences can also arise if macro-prudential authorities release the CCB too early, i.e. before systemic risks have abated/no financial stress has occurred. In this case banks' loss absorbing capacity would be reduced if they used the new leeway accordingly. For example, credit growth could be fuelled more than desired, eventually causing banks to become exposed in the event that systemic risks materialise.

2.4 Cross-border spillovers of the CCB

The CCB increases banks' resilience, which contributes to reducing the incidence and severity of financial crises. Given the international nature of financial markets, this should also reduce contagion of financial stresses across countries, giving rise to potentially substantial positive cross-border spillovers.

This international aspect also implies, however, that differences in capital requirements across jurisdictions will create incentives for regulatory arbitrage and contribute to leakages. The EU capital rules on the CCB address some of the challenges arising from arbitrage and leakages through the required reciprocity of buffer decisions (see Section 5.3), but negative cross-border spillovers may still arise in specific cases.

A change in the CCB rate on exposures in a certain country may have spillover effects on all countries where a bank operates. For example, banks may choose to scale down all of their exposures regardless of the jurisdiction of their borrowers in order to meet a higher buffer rate in a country. This may adversely affect credit conditions and economic activity in these countries. Banks may also seek to move more of their business to specific countries, possibly to those which have not increased the CCB. These countries could therefore experience increased supply of credit, which might be desirable if they are in a downturn and systemic risks are low.

Banks may also try to transfer activities to shadow banks as a response to a higher CCB rate. This will have cross-border spillovers to the extent that activities are transferred to entities in other Member States or entities outside the EU.

2.5 Interaction with other policy areas

The CCB may have side effects on the objectives of micro-prudential, monetary and fiscal policy, and vice versa. The use of each policy tool may need to take into account such side effects.

The CCB may interact with monetary policy in many ways. Provided that the CCB affects the price of credit, it may influence the transmission of interest rate changes in both the build-up and the release phase. The CCB and monetary policy often work in the same direction, for example when excessive credit growth goes hand in hand with rising aggregate demand and inflation, or during financial crises, which typically coincide with weak economic growth. At other times, the policy stance in these two areas may be different. Low interest rates over extended periods owing to low inflation may contribute to higher levels of risk-taking and excessive credit

growth. The CCB may also increase the effectiveness of monetary policy. To the extent that the CCB is successful in reducing the incidence and severity of crises, the risk of monetary policy running into constraints such as the zero lower bound may be reduced as a result.

Important interactions may also arise between the CCB and micro-prudential policy. The instruments available under Pillar 2 are numerous and their use is particularly flexible. Regulators in charge of micro-prudential policy may want measures to strengthen the resilience of individual institutions by requiring them to hold higher levels of capital during stressed periods when losses typically increase and perceived risks are elevated. By contrast, regulators in charge of the CCB may prefer to let banks use the freed up capital to support the provision of credit to the economy. To the extent that such situations are not coordinated, policy-makers could end up in a “push-me, pull-you” situation in which micro-prudential policy instruments and the CCB are used more aggressively in opposing directions.²²

Furthermore, there may be a need for coordination or exchange of information/analysis in the implementation phase of other requirements applying to banks in order to reduce the risk of the CCB having unintended domestic or cross-border spillover effects. This applies to both micro-prudential and macro-prudential requirements. In particular, the CCB may interact with real estate-related instruments (e.g. loan-to-value, loan-to-income and sectoral risk weights), since periods of stress or crisis in the financial system are often associated with problems in the real estate sector, implying that the objectives of these instruments partly overlap.

3. Possible indicators for the CCB

3.1 Motivation

In applying the CCB framework, macro-prudential authorities should take as a starting point risks to financial stability at the national level. These risks may differ from Member State to Member State, given that the characteristics of financial systems and financial cycles vary across the EU.

The CCB should be built up when aggregate growth in credit and other asset classes with a significant impact on the risk profile of banks are judged to be associated with a build-up of system-wide risk. Macro-prudential authorities may follow a range of early warning indicators to signal when system-wide risks are building up to a degree that suggests the need to activate or raise the CCB. Different measures of developments in credit and real estate have been found to be particularly useful. This may reflect the fact that they can reinforce each other.

The deviation of the ratio of credit to GDP from its long-term trend (credit-to-GDP gap) has been recognised as a useful indicator by the BCBS (2010) and incorporated into EU capital rules (Article 136(2) of the CRD). Other variables than the credit-to-GDP gap could also have good signalling qualities and should be investigated by macro-prudential authorities. The

²² This type of mechanism has also been used to justify the need to coordinate monetary and macro-prudential policy, see Ingves (2011).

ESRB is tasked with providing guidance on the measurement and calculation of the credit-to-GDP gap, on the calculation of buffer guide(s), and on other relevant indicators for setting the CCB (see Box 2.1).

First, two main approaches used in the literature to assess the performance of different early warning indicators are described below. Second, preliminary results for the credit-to-GDP gap consistent with Article 135(1)(b) of the CRD are reported and possible calculations of the buffer guide are described. Third, other variables indicating the build-up of system-wide risk are considered. Finally, variables that may be more relevant for reducing or fully releasing the buffer are presented. The results are preliminary and reflect work in progress.

Box 2.1: Formulating ESRB guidance

The EU capital rules (Article 135(1) of the CRD) give a mandate to the ESRB to provide guidance to designated authorities on setting CCB rates. This guidance – which will take the form of a recommendation – consists of four items:

1. *Principles* to guide judgment as to the appropriate CCB rate.
2. *General guidance* on the measurement and calculation of the credit-to-GDP gap and the calculation of buffer guides.
3. *Guidance* on variables indicating the build-up of system-wide risks associated with periods of excessive credit growth.
4. *Guidance* on variables that indicate that the buffer should be maintained, reduced or fully released.

To this end, a group of experts has been drawn from the Member States of the EU. Given the substantial amount of analytical work that needs to be undertaken, the guidance is expected to be issued in the course of 2014 following the conclusions drawn by this group. This is well in advance of the regular transition period for the CCB, which is due to start in January 2016.

Since Member States are allowed to implement the CCB from 1 January 2014 (Article 160(6) of the CRD), i.e. prior to the transition period, this chapter of the Handbook draws on preliminary results of the analytical work carried out by the expert group. However, any findings presented here do not prejudice the forthcoming ESRB guidance under Article 135(1) of the CRD.

3.2 Approaches for evaluating indicators to guide decisions on the CCB

The first step in an empirical analysis is to define the type of crisis that the instrument is meant to mitigate (left-hand side variable). For the CCB, the crisis variable should capture periods of systemic-wide crisis associated with excessive credit growth. The next step is to determine the explanatory variables that ought to be tested and to collect the appropriate data (right-hand side variables). The third step is to employ a suitable empirical approach to estimate the relationship between the explanatory variables and the crisis episodes. The final step is to use a measure to evaluate the signalling properties of the indicators/models.

Two traditional methods have been used to assess the performance of early warning indicators in predicting crises. The first approach uses the raw data series of the indicator in question –

henceforth the signalling approach. The second approach transforms the raw series into crisis probabilities using a logit or probit model – henceforth the discrete choice approach.²³

The signalling approach is one of the most common approaches for the statistical evaluation of early warning indicators.²⁴ The signal is extracted directly from the data series when the indicator under consideration breaches a pre-determined or optimised threshold.

Under the discrete choice model, a binary classification set-up first maps various explanatory variables into the probability of there being a systemic banking crisis, i.e. either a probit or a logit mapping function transforms the data into a continuous variable between “0” and “1”, which indicates the probability of there being a crisis. If the probability exceeds a specified threshold, a signal is issued.

There are few studies to guide the choice between these two approaches. An advantage of the discrete choice approach over the signalling approach is that the logit or probit model gives an immediate understanding of whether a variable is statistically significant in relation to crisis observations, even before a threshold for the crisis probability is set.²⁵ This is because the procedure estimates the marginal contribution of each explanatory variable. The signalling approach is more transparent as the link between indicators and warning signals is not mediated by the estimation of a crisis probability. However, it does not offer a multivariate setting for the assessment of the interplay of several indicators.²⁶

A third approach, which is still largely unexplored in the literature on early warning models, is decision tree learning. It is based on numerical algorithms that allocate a set of indicators with larger discriminatory power in a “decision tree” format and calculate optimal decision thresholds at each node of the tree. Decision trees retain the advantages of both of the approaches described above as, on the one hand, they are very easy to explain and use and, on the other hand, they are able to provide an early warning where the relevant indicators are considered in a unitary framework.²⁷

The empirical properties of different indicators/models can be evaluated by means of suitable metrics. One evaluation method that is of interest to policy-makers in evaluating crisis indicators is the AUROC curve.²⁸ The idea behind this approach is that there will always be a trade-off between missed crises (type-I errors) and false alarms (type-II errors). For example, using a higher threshold for indicators to signal crises will result in more type-I errors and fewer type-II errors, whereas using a lower threshold will result in the reverse. Typically, policy-makers’ preferences with regards to type-I and type-II errors, and thus their preferred thresholds, are unknown. If a national authority judges that financial crises are extremely

²³ It became standard following the seminal papers by Hardy and Pararbazioğlu (1998) and Demircuc-Kunt and Detragiache (1999). Recent contributions in this field include Davis and Karim (2008), Barrell et al. (2010) and Lund-Jensen (2012).

²⁴ Following Kaminsky and Reinhart (1999), a number of policy papers utilise this method for an ex post examination of how well various indicators signal approaching crises: see Borio and Lowe (2002), Borio and Drehmann (2009), Drehmann et al. (2010), Alessi and Detken (2011), Drehmann et al. (2011) and CGFS (2012) among other things.

²⁵ See Barrell et al. (2010).

²⁶ Within the signalling approach, it is possible to test the performance of joint indicators which would issue warning signals only if at least two individual indicators breach their respective threshold (see Alessi and Detken (2011)).

²⁷ See Alessi and Detken (2013).

²⁸ See, for example Berge and Jordà (2011), Candelon et al. (2012), Drehmann and Juselius (2013) and Jordà (2012) for a description and more recent application.

costly and/or if the authority is highly risk averse, then it will choose a low threshold for activating the CCB and consequently have it activated for longer periods of time.

The information is summarised in a measure called the AUROC curve.²⁹ This is the area under the receiver operating characteristic curve that plots the noise ratio (false positive rate)³⁰ against the signal ratio (true positive rate)³¹ across a range of thresholds. This approach enables policy-makers to first identify indicators that perform well over a wide range of thresholds, and then to identify thresholds for these indicators which best reflect policy-makers' preferences with regard to type-I and type-II errors.

3.3 Credit-to-GDP gap

The credit-to-GDP gap has been found useful in signalling crises in many countries, most notably across the 27 member countries of the Basel Committee on Banking Supervision (BCBS). In its "Guidance for national authorities operating the CCB" issued in 2010, the BCBS (calculated the credit-to-GDP gap as follows:

- the ratio of broad credit³² to nominal GDP is calculated for each quarter, where GDP in each quarter is taken as the sum of the four most recent quarterly observations;
- the credit-to-GDP gap is the difference between the ratio of credit to GDP and its long-term trend, resulting in a gap in percentage points;
- the long-term trend is calculated with a one-sided Hodrick-Prescott filter, where the smoothing parameter, *lambda* (λ) is set at 400,000.

The credit-to-GDP gap calculated in this manner may not necessarily be appropriate across the EU since only seven³³ EU Member States are also members of the BCBS. Experiences at the national level have also shown that this gap would not always have given the best signal for activating a buffer.

Authorities can analyse and evaluate the sensitivity of the credit-to-GDP gap along different dimensions, for example using different smoothing parameters for the trend, calculating the trend over different sub-samples, using forecasts to reduce end-point problems in the filter and improve signalling qualities³⁴, and using different specifications of credit (e.g. narrow versus broad). Preliminary results of empirical analysis of various measures of the gap performed by the Expert Group on Countercyclical Capital Buffers are reported in Box 2.2.³⁵

²⁹ See, for example, Hanley and McNeil (1982, 1983).

³⁰ Which is equal to the type-II error rate.

³¹ Which is equal to one minus type-I error rate.

³² All credit extended to households and other non-financial private entities in an economy independent of its form and the identity of the supplier of funds. This means that it should include credit extended by domestic and international banks as well as non-bank financial institutions either domestically or directly from abroad, and should also include all debt securities issued domestically or internationally to fund households and other non-financial private entities (including securitisations), regardless of who holds the securities. Available credit data varies across jurisdictions, see BCBS (2010).

³³ These are Belgium, France, Germany, Italy, Luxembourg, the Netherlands, Spain, Sweden and the United Kingdom.

³⁴ Norges Bank uses forecasts in its application of the CCB, see Norges Bank (2013).

³⁵ In principle, buffer decisions need to be based on real-time available data. In practice, however, it may take several months before preliminary data on credit and GDP are published and, in some cases, the correction of initial estimates has been found to be in the same order of magnitude as the gap itself (Edge and Meisenzahl (2011)). However there is little evidence to suggest that the ex post

Box 2.2: Preliminary empirical analysis of the credit-to-GDP gap

The expert group has performed empirical analysis of various measure of the gap. First, a data set was constructed by defining a crisis variable that identified the type of financial crises the CCB is meant to mitigate, and collecting nominal credit and GDP data from which the ratio of credit to GDP could be calculated. Different specifications of the credit-to-GDP gap were then constructed and evaluated using the AUROC-approach mentioned in Section 3.2. The AUROC is larger than 0.5 if an indicator is informative.

Figure 2.2 shows that the credit-to-GDP gap based on the BCBS (2010) method has tended to be relatively high (i.e. above the 2% threshold suggested by the BCBS) as early as 20 quarters ahead of financial crises. The indicator shows good signalling properties, with an AUROC of 0.77. These preliminary findings do not mean that the calculation of the credit-to-GDP gap following BCBS (2010) performs equally well for each Member State. In particular, the estimate of the trend tends to be slow to adjust following structural breaks leading to credit-to-GDP gaps that can be implausibly persistent. More generally, Figure 2.3 shows a markedly different level and pattern for transition and non-transition economies.

Figure 2.2: Average gap and ranges for the EU28

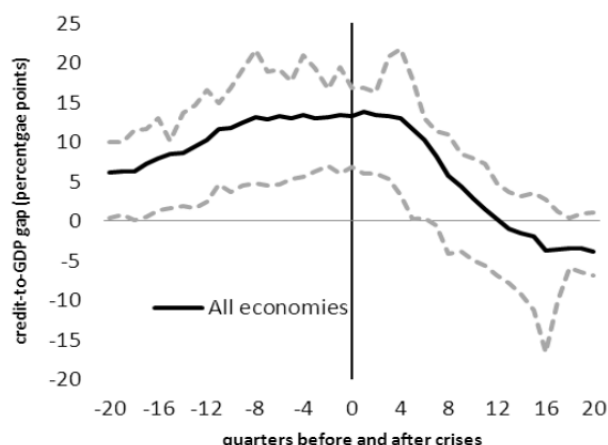
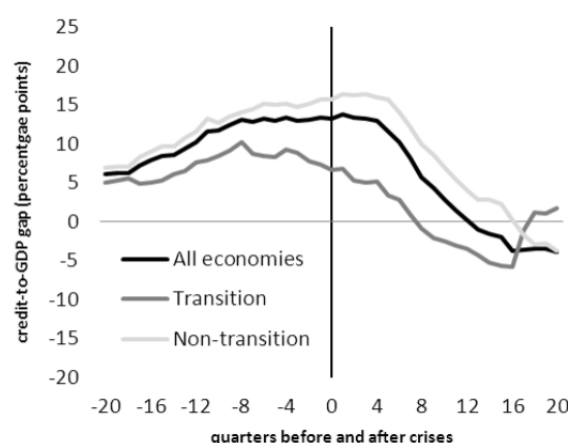


Figure 2.3: Average gaps by country grouping



Notes: The lines represent the average credit gap (in percentage points) from 20 quarters prior to a crisis to 20 quarters after the start of a crisis. Averages are based on all crisis episodes in the set of countries considered. The dashed lines represent the 25th and 75th percentiles.

For the EU28 as a whole, the signalling qualities of different calculations of the gap are robust across a range of specifications. In particular, few calculations of the gap displayed significantly better signalling qualities for future crises than the calculation suggested in the BCBS guidance. The empirical results indicate that it may be useful to use forecasts to reduce end-point problems and improve the signalling qualities of the credit-to-GDP gap. The measures of the gap that perform significantly better than the BCBS (2010) calculation tend to be based on bank credit rather than total credit as in the BCBS (2010). A narrow measure of credit would, however, not be robust to increased credit provision through the non-bank sector as a possible response to the use of CCBs. The household credit-to-GDP gap also performed well.

The results of this work suggest that the BCBS (2010) definition performs sufficiently well such that, for the purposes of international comparison and consistency, there is merit in

measure consistently outperforms the real-time estimates of the gap as an indicator for the CCB (van Norden, 2011) or in predicting periods of increased systemic risk Drehmann et al. (2011).

countries calculating and publishing a credit-to-GDP gap according to this definition. However, given that the BCBS (2010) definition does not work well for all EU countries, Member States should also investigate alternative calculations of the credit-to-GDP gap in order to reduce the incidence of misleading signals.

3.4 Other early warning indicators

Early warning indicators that signal a build-up of risk can be divided into two broad categories. First, macroeconomic and macro-financial indicators, which signal developments in system-wide risk at the aggregate level. Second, aggregate bank balance sheet indicators, which signal a build-up of risks in banks and potential spillovers to the wider economy.³⁶ In general, combining information from several indicators is likely to provide more precise and robust signals of system-wide risks building up. The remainder of this Section describes which types of variable to consider and provides a qualitative summary of empirical results obtained by the expert group.

Macroeconomic and macro-financial aggregates, such as high broad credit and property price growth, can signal a domestic build-up of systemic risk. The emergence of easy credit in anticipation of collateral appreciation could create a self-fulfilling cycle of higher asset prices and indebtedness, further fuelling a credit boom.³⁷ When an adverse shock occurs, the value of the collateral adjusts, leaving banks overexposed.

Sectoral measures can offer additional useful information, as the exuberance may be concentrated in a particular sector of the economy, in particular residential and commercial real estate. Excessive credit growth makes non-financial sector balance sheets more vulnerable. This vulnerability can be measured directly by looking at measures of household and non-financial companies' leverage and debt service stretch. A cyclically high household debt-to-income ratio and high debt servicing costs mean that the household sector is vulnerable to any changes in lending conditions (such as interest rates) or in the valuations of collateral.³⁸

Aggregate bank balance sheet-based indicators can be grouped according to the different types of risk that financial institutions face: solvency risk (including shocks to capital and profitability) and liquidity risk. Macro-prudential authorities may look at system-wide, aggregate measures as well as at measures of systemically important banks. The macro-prudential relevance of such indicators also relates to the funding of accelerating credit growth. Since it is difficult to support rapid growth by means of core funding sources, banks tend to turn to less stable non-core funding sources, which increase the vulnerability of the financial system.

³⁶ Behn et al. (2013) analyse the effects of macroeconomic, macro-financial and banking sector variables in predicting financial vulnerabilities in the financial system in EU Member States.

³⁷ See Kiyotaki and Moore (1997). Irving Fisher noted as early as 1933 that: "...over-indebtedness may lend importance to over-investment or to over-speculation."

³⁸ For example, a study by Drehmann and Juselius (2012) has found that the debt service ratio tends to peak just before systemic banking crises materialise and that, at horizons of around one year before a crisis, the quality of the early warning signal issued by the debt service ratio seems to be more accurate than that provided by the credit-to-GDP gap.



Bank capital-based indicators could potentially be used to signal solvency concerns at the level of the financial system, or levels of excessive leverage and credit more generally. Bank profitability measures track the state of the banking system. For example, periods of high profitability may be related to an increase in banks' risk-taking at a time when capital buffers could be built organically at relatively low cost.³⁹

While the credit-to-GDP gap remains the single best performing indicator, the expert group has identified other single indicators that display reasonable forecasting performance. The most promising of these indicators are measures of overvaluation of commercial and residential real estate markets, the current account-to-GDP ratio and the (household) debt service to income ratio.

Multivariate results using the three different methodologies mentioned above (i.e. multivariate signalling, discrete choice and decision trees) deliver a consistent picture. Models that perform best tend to combine the credit-to-GDP gap with the other single indicators that perform well in isolation. On average, statistics summarising the performance of such models improve by 10-15%.⁴⁰ Typically, the multivariate analysis does not improve much on the rate of true predicted crises (in the range of 70-87% for thresholds calibrated for balanced preferences for both univariate and multivariate models), but it can significantly reduce the rate of false alarms (from about 30% for univariate models to 25-10% for multivariate models).

The main conclusion from the empirical results that are currently available suggests that macro-prudential authorities should take into account warning signals from indicators other than credit-to-GDP gaps when setting the CCB and should publish these indicators accordingly. In particular, looking beyond credit variables seems to reduce the probability of false alarms, as it conditions the credit growth on other developments in the economy. On the other hand, it should also be highlighted that the past performance of several other indicators is focused on the last financial crisis owing to a lack of long enough time series. The last crisis had specific characteristics, which makes it easier to explain (ex-post) and might thus artificially boost the performance of some of these indicators, for which only shorter time series were available. There is thus a trade-off between broadening the set of indicators including those for which only less reliable empirical results regarding their performance in past crises exists, and the likely improvement of the overall assessment potentially obtainable by scrutinising a broader universe of facts. National authorities should also take into account national specificities in their selection of indicators and analysis.

3.5 Variables indicating the need to reduce or fully release the CCB

The buffer may be reduced when: (i) threats to resilience have receded and the financial cycle is turning, or (ii) during periods of financial stress. In the first case, the buffer can be released gradually, for example when the financial cycle turns and risks decrease gradually, without

³⁹ See Behn et al. (2013).

⁴⁰ For example, AUROC curves for multivariate models are in the range of 0.86-0.90, up from the best single indicator AUROC in the range of 0.75 - 0.84. Usefulness measures for balanced preferences between type-I and type-II errors tend to increase by about 30%, but at least half of which is owing to the fact that multivariate models can often only use a shorter sample and are estimated mainly for the recent financial crisis, for which single indicator credit gap models would also perform better.

materialising acutely. In the second case, a prompt release of the buffer may be necessary in periods of stress and rapidly weakening credit conditions. In such situations, the prompt release may avoid constraints in credit supply motivated by uncertainty about the timing of the release of the buffer.

The choice of indicators will depend on the reason for releasing the CCB. In the first case, in which threats are receding, the indicators used for the build-up phase, such as the credit-to-GDP gap, real estate-related indicators and other variables deemed relevant, could be informative. However, the credit-to-GDP gap may decline only slowly after a financial cycle has turned. For example, during a crisis GDP might fall faster than credit, and credit itself might be slow to fall if credit lines are still being drawn. Measures such as growth in credit and asset prices may be more helpful in identifying turning points in the financial cycle.

In the second scenario, i.e. during periods of financial stress, the release of the buffer could be guided by high-frequency and readily available indicators reflecting rapidly weakening credit conditions and stress in the financial sector. Market-based indicators reflecting the situation in money and credit markets (like CDS premia, covered bond spreads, credit spreads, etc.) are available in a timely manner and reflect coincident conditions in relevant markets, while credit growth and credit conditions surveys are crucial to assess the tightness of credit conditions. Such variables have been found useful in empirical studies⁴¹, including the preliminary analysis conducted by the expert group. These variables will also be useful in helping authorities to decide how to ensure that the capital released by the CCB is used for loss-absorbency or to maintain lending, for example whether to limit the distribution of the capital surplus created by the release of the buffer or rule that any reduction in capital ratios should be achieved only by absorbing losses or increasing risk-weighted assets.

Even though such indicators can be useful, authorities should be mindful of possible caveats. First, such indicators tend to be noisy, signalling many false crises. Second, results may be specific to the global financial crisis, as most of the series tested are only available for a few countries and only from the late 1990s. As a result, even more than in the build-up phase, judgment may need to play an even greater role in identifying the appropriate timing for releasing the buffer. This applies especially to countries in which the markets for the respective financial instruments are not deep and liquid.

4. Setting the appropriate level of the CCB

4.1 Principles to guide judgment

The EU capital rules give macro-prudential authorities flexibility in setting the CCB subject to, for example ESRB guidance on principles. The BCBS “*Guidance for national authorities operating the countercyclical capital buffer*” (BCBS, 2010) complemented with guidance laid down in the CRD form a natural starting point for ESRB guidance. A preliminary list of possible principles considered by the expert group is shown in Box 2.3. The first five

⁴¹ Drehmann et al. (2011) analyse credit spreads, LIBOR-OIS spreads and CDS spreads. They find that credit spreads display the best signalling properties for potential release during stress.



principles are largely based on the guidance issued by the BCBS. Given the importance of communication and reciprocity for the effectiveness of the CCB, the list of principles has been extended to cover these two areas.

Box 2.3: Preliminary list of ESRB principles

Principle 1: (Objective) *Decisions on the appropriate CCB rate should be guided by the objective to protect the banking system against potential losses when excessive credit growth is associated with a build-up of system-wide risk, thereby supporting the sustainable provision of credit to the economy.*

Principle 2: (Buffer guide) *The deviation of the ratio of credit to GDP from its long-term trend – the credit-to-GDP gap – should serve as a common starting point in guiding decisions on buffer rates, most notably in the build-up phase. However, this is not the only input in assessing and setting the appropriate countercyclical buffer rate. Designated authorities should explain the quantitative and qualitative information used, and how it is taken into account in the setting of the relevant buffer rate.*

Principle 3: (Risk of misleading signals) *Designated authorities should assess the information contained in the credit-to-GDP gap and any other variables, being mindful of their potential to give misleading signals. In addition, the usefulness of these variables should be periodically reassessed.*

Principle 4: (Prompt release of the buffer) *Prompt partial or full release of the buffer in times of stress or when threats to resilience recede can help reduce the risk that the supply of credit will be constrained by regulatory capital requirements. Designated authorities should take into account all relevant factors when releasing the buffer and determining an indicative period during which no increase in the buffer rate is expected.*

Principle 5: (Other macro-prudential tools) *The CCB forms part of a suite of macro-prudential instruments at the disposal of the authorities in the EU. As part of their macro-prudential policy strategy, authorities should consider when to use the buffer and when to use other instruments at their disposal.*

Principle 6: (Communication) *A good communication strategy for the buffer decisions contributes to managing public expectations plays an important role in the coordination mechanism between designated authorities and is essential for the credibility, accountability and effectiveness of macro-prudential policy. Transparent, stable processes and well defined channels of communication between authorities and key stakeholders constitute the basis of a good communication strategy.*

Principle 7: (Reciprocity) *Designated authorities should recognise the buffer rates applied in other jurisdictions, where appropriate. Designated authorities should consider potential cross-border implications when not recognising a buffer rate for exposures to another Member State and when setting or not recognising a buffer rate for exposures to a third country. The relevant designated authorities and the ESRB should be notified of these decisions.*

4.2 The buffer guide

The buffer guide as calculated in the BCBS guidelines (2010) contains two elements: a measure of the credit-to-GDP gap and an operationalisation to calculate a benchmark buffer rate. To preserve comparability across EU and non-EU countries, national authorities could follow the measurement and calculation of the gap as set out in the BCBS guidelines (2010). In addition, to account for national specificities, EU Member States may calculate a second



measure of the credit-to-GDP gap based on an empirical analysis of data for that Member State.⁴²

The BCBS guidelines (2010) map different levels of the gap into different buffer guides using a linear rule when the credit-to-GDP gap is within a range defined by a lower (L) to trigger the CCB and a higher (H) threshold associated with a CCB of 2.5%. The thresholds were both derived from an empirical analysis:

- *“L should be low enough, so that banks are able to build up capital in a gradual fashion before a potential crisis. As banks are given one year to raise capital, this means that the indicator should breach its threshold at least two to three years prior to a crisis.”*
- *“L should be high enough, so that no additional capital is required during normal times.”*
- *“H should be low enough, so that the buffer would be at its maximum prior to a major banking crisis...”*

Based on these criteria and the noise-to-signal ratio at different thresholds, the BCBS guidelines (2010) suggest a lower threshold of a two percentage point gap ($L=2$) and an upper threshold of a ten percentage point gap ($H=10$).

Although the BCBS guidelines (2010) provide a useful benchmark, mechanistically linking different levels of the credit-to-GDP gap to different buffer rates is an ad hoc approach. Macro-prudential authorities should therefore investigate other rules for mapping the gap into a benchmark buffer rate. Furthermore, authorities may also investigate mapping indicators other than the credit-to-GDP gap into a benchmark buffer rate, since the credit-to-GDP gap may not be sufficient to capture the build-up of system-wide risk associated with excessive credit growth.

4.3 Guided discretion

Article 136(3) of the EU capital rules requires that the designated authority shall assess and set the appropriate CCB rate for its Member State on a quarterly basis, taking into account:

- (a) the buffer guide calculated;
- (b) any current guidance maintained by the ESRB and any recommendations issued by the ESRB on the setting of a buffer rate;
- (c) other variables that the designated authority considers relevant for addressing cyclical systemic risk.

On this basis, CCB rate decisions could emphasise rules or discretion. A rules-based approach would mean that authorities should place substantial weight on a buffer guide when setting the CCB. A discretion-based approach means that authorities would place greater weight on judgment when setting the CCB.

⁴² When issuing its recommendation, the ESRB must account for the differences between Member States (Article 135(2) of the CRD).

In general, macro-prudential authorities should base their CCB decisions on a robust set of principles, indicators and buffer guide(s). When macro-prudential authorities follow a clear objective (i.e. to protect the banking sector from periods of excess aggregate credit growth that have often been associated with the build-up of system-wide risk), they can adjust their approach to accommodate different circumstances within the limits set by EU capital rules and guidance from the ESRB. For instance, while the buffer guide may serve as a common benchmark across the EU, setting the CCB rate according to the buffer guide may not achieve the desired objective of the buffer in all country-specific situations.

The degree to which macro-prudential authorities should adhere to a rules-based approach depends on the accuracy and robustness of the identified indicators. Furthermore, it depends on the extent to which authorities' preferences can be summarised in simple rules.

Macro-prudential authorities may need to rely more on discretion in the release phase than in the build-up phase owing to indicators being less robust (see also Section 3.5). Timing in the release phase will be important. If the buffer is released too early, the released capital might continue to fuel a boom. This supports the argument that authorities should be careful not to release the buffer too early, in particular in the situation when the financial cycle is turning gradually without any systemic risks having materialised.

On the other hand, if the buffer is released too late, stress that have not been identified might have magnified to such an extent that markets question whether capital levels in the system are sufficient. CGFS (2012) notes that policy measures that boost the level of bank capital might in some situations be required to restore confidence. However, when macro-prudential authorities have managed to increase the level of capital sufficiently prior to the crisis, such a situation may be less likely to arise. Stress-testing could allow for estimates of losses under different scenarios.

Box 2.4: Examples of frameworks for setting the CCB

Norway and Switzerland have already introduced a framework for setting the CCB. They have both chosen a small set of key indicators to guide their decisions. The Swiss National Bank can make proposals on setting the CCB based on residential real estate exposures in Switzerland. The Swiss National Bank employs a guided discretion approach whereby a set of key indicators based on mortgage volume and real estate prices are used (Swiss National Bank, 2013). Additional indicators may be used to ensure that the decision is based on a comprehensive view of the developments in the Swiss mortgage market and, in particular, if the key indicators do not depict a homogenous image of the imbalances.

Norges Bank is responsible for giving advice to the Ministry of Finance on the CCB. It has announced that this advice primary will be based on four key indicators: the credit-to-GDP gap, the wholesale funding ratio of Norwegian credit institutions, the ratio of house prices to household disposable income and commercial property prices (Norges Bank, 2013). However, there will not be a mechanical relationship between changes in the indicators or gaps and Norges Bank's advice, in particular when fully releasing the buffer.

The Financial Policy Committee (FPC), which is tasked with setting macro-prudential policy in the United Kingdom, published a draft policy statement (FPC, 2013) on the CCB and also sectoral capital requirements. This includes a list of 17 indicators that will be evaluated regularly comprising 1) indicators of bank balance sheet stretch, 2) indicators of non-bank balance sheet stretch, and 3) indicators that reflect conditions and terms in financial markets. The credit-to-GDP gap is included in the second category.

While there will be ample room for judgment given the complexities of national financial systems and the way in which they evolve over time, this increases the need for clear communication on the decision basis used and trade-offs applied by macro-prudential authorities (see Section 5.4). Box 2.4 illustrates how the trade-offs between rules and discretion have been reflected in the frameworks for setting the CCB in three selected countries.

5. Decision-making, coordination and communication

5.1 Responsible authorities

Each Member State shall designate a public authority or body (a “designated authority”) that is responsible for setting the CCB rate (Article 136(1) of the CRD). When the Single Supervisory Mechanism becomes operational, the ECB will assume the asymmetric responsibility for imposing higher CCBs for member countries of the banking union (Article 5(2) of Council Regulation (EU) No 1024/2013).

5.2 Coordination issues with other authorities

Different macro-prudential instruments help achieve the same overarching objective – financial stability – and, in some cases, several intermediate objectives. The CCB is one of several broad-based instruments included in the CRD/CRR that can contribute to mitigating and preventing excessive credit growth and leverage. The others consist of the systemic risk buffer, own funds under Pillar 1 and 2 respectively, and the capital conservation buffer. Several sectoral instruments can also contribute to the same intermediate objective. These include measures targeting developments in the real estate sector and measures for intra-financial sector exposures.

Institutional arrangements differ among EU Member States, meaning that different coordinating devices are required to achieve the overall objectives in macro-prudential policy. Instruments need to address as much as possible the underlying sources of risk, whether they are due to a build-up of vulnerabilities or to market failures. A distinctive feature of the CCB is that it is designed to help counter some of the pro-cyclicality in the financial system associated with credit growth. The other instruments tackle non-cyclical systemic risks (e.g. the SRB), more institution-specific risks (e.g. Pillar 2 measures) or sector-specific risks (RWs in real estate, LTV limits, LTI limits, etc.). Furthermore, the CCB applies to all banks in a certain jurisdiction, benefits from mandatory reciprocity (see Section 5.3), is transparent and can be a powerful communication tool (see also Section 5.4). It also has low procedural requirements for its activation.

The CCB would thus be the preferred instrument to mitigate a broad-based build-up of systemic risk associated with excessive credit growth. Other instruments targeted at strengthening debtors’ resilience and restricting access to credit (like the LTV and LTI limits) could be used in tandem with the CCB if the aim is to reduce credit growth. To the extent that the CCB and other relevant tools are under the control of different authorities, there is clearly scope for policy coordination. In particular, authorities should be aware of, and resolve,

possible conflicts of interest in the conduct of CCB and micro-prudential policy to avoid situations in which such instruments are used aggressively in opposing direction.

There may be a need for coordination or exchange of information and analysis in the implementation or adjustment phase of other capital and liquidity requirements, in order to reduce the risk of the CCB having unintended domestic or cross-border spillover effects. This applies to both micro-prudential and macro-prudential requirements.

A strong institutional framework for the CCB to pursue its objective can reduce conflict and create more room for manoeuvre for monetary and fiscal policy to pursue their own objectives. Exchange of information, analysis and decisions may furthermore improve economic decisions across the different policy areas.

5.3 Reciprocity agreements

Mandatory reciprocity (up to 2.5%) means that banks with exposures in several countries will face the CCB as a weighted average of the CCBs in all countries where they have exposures. This ensures that the application of the CCB in a given jurisdiction does not distort the level playing field between domestic and foreign bank lending to counterparties in that jurisdiction. Reciprocity also reduces the risk of leakages and ensures the buffer's effectiveness in protecting banks from potential losses from abroad.

The designated authority in a country sets the CCB rate that would apply to credit exposures held by banks located in their jurisdiction. Institutions established in a Member State different from the one setting the CCB rate have to apply the same CCB rate on exposures towards clients located in the country setting the CCB rate. A Member State can also recognise a CCB rate in excess of 2.5%, and shall in such circumstances announce that recognition by publication on its website (Article 137 of the CRD).

The CRD also contains rules regarding third countries. Member States are to refrain from applying to branches of banks headquartered outside the EU regulatory provisions more favourable than those applicable to branches of EU banks (Article 47 of the CRD). Furthermore, a Member State can choose to recognise or set buffer rates for third countries. Article 139(3) of the CRD states that a designated authority in a EU Member State may set a different CCB rate for a third country for the purposes of the calculation by domestically authorised institutions of their institution-specific CCB if they reasonably consider that the buffer rate set by the relevant third-country authority is not sufficient to protect those institutions appropriately from the risks of excessive credit growth in that country.

The EU capital rules (Article 138 of the CRD) give the ESRB an explicit mandate to issue a recommendation to designated authorities on the appropriate CCB rate for exposures to a third country, for example when a CCB rate has not been set and published or the CCB is judged to not sufficiently protect EU institutions from the risk of excessive credit growth in that country.

In the EU/EEA, the reciprocity becomes fully effective only after the end of the transitional period on 31 December 2018 (Article 160 of the CRD). Moreover, if some Member States impose a shorter transitional period and decide to activate the buffer prior to 1 January 2016,

the CCB rates for the exposures located in these Member States will not necessarily apply to the exposures of institutions authorised in other Member States. National authorities should consider recognising CCB rates also for countries that choose to implement it early in order to reduce the risk of regulatory arbitrage and leakage.

5.4 Communication

The EU capital rules (Article 136(7) of the CRD) require national authorities to announce the quarterly setting of the CCB by publication on their websites from 1 January 2016, or earlier for authorities that begin to use it sooner. The information that shall be announced is:

- (a) the applicable countercyclical buffer rate;
- (b) the relevant credit-to-GDP ratio and its deviation from the long-term trend;
- (c) the buffer guide;
- (d) a justification for that buffer rate;
- (e) where the buffer rate has been increased, the date from which the institutions must apply that increased buffer rate for the purposes of calculating their institution-specific countercyclical capital buffer;
- (f) where the date referred to in point (e) is less than 12 months after the date of the announcement under this paragraph, a reference to the exceptional circumstances that justify that shorter deadline for application;
- (g) where the buffer rate has been decreased, the indicative period during which no increase in the buffer rate is expected, together with a justification for that period.

Macro-prudential authorities need to devise a strategy to communicate CCB decisions consistent with these rules. This can act as a coordination mechanism between authorities to prevent/mitigate systemic risk effectively and to manage expectations (see Chapter 10). Regular information from macro-prudential authorities about the indicators, buffer guide(s) and the rationale for their decisions may assist the market in changing its expectations for banks' capital levels accordingly, and may foster accountability and credibility. Over time, banks might be able to anticipate future actions and thus may even act before measures have to be taken.

Clear communication may be particularly important for the successful operation of the CCB during the release period, which relies on the willingness of banks to put the capital released to good use. By providing assurance that the authorities do not plan to increase the buffer again in the near future, banks' willingness to reduce their capital ratios in times of stress may be enhanced.

In order to enhance the CCB's effectiveness, it is important to ensure that authorities can credibly inform markets of banks' resilience when taking decisions on the release of the buffer. This can be done by publishing stress-test results, so as to ensure that the market does not question the adequacy of banks' level of capital.

Given the importance of clearly communicating buffer decisions to all stakeholders, a separate principle dealing specifically with communication may be appropriate, see Section 4.1.

Chapter 3

Real estate instruments⁴³

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Executive summary

This chapter provides operational guidance to the member organisations of the ESRB regarding the use of real estate instruments for macro-prudential purposes, in particular under the CRD/CRR.

Credit booms in real estate markets can create substantial risks to financial stability and the real economy. Unfavourable developments in the real estate sector have played a significant role in major financial crises. Macro-prudential policy continues to be an area that is very much under development. Nevertheless, some practical country experience is already available on how to address systemic concerns originating from the real estate sector, including in EU Member States. Recent developments in the real estate sectors of a number of Member States make it more likely that such instruments will be used in the near future. Against this backdrop, developing and operating macro-prudential instruments that target real estate markets is a key issue for European authorities.

This chapter is structured in four main parts. First, it discusses the transmission mechanism for the real estate instruments, as well as potential unintended effects. Where possible, policy options to mitigate such unintended effects are highlighted. Second, it reviews in detail the individual instruments, which can be grouped into instruments that target banks (sectoral capital requirements) and instruments that target borrowers (loan-to-value or LTV, loan-to-income or LTI, and debt service-to-income or DSTI limits). Third, it lists potential indicators that authorities can employ to inform policy decisions on the (de)activation and adjustment of macro-prudential real estate instruments. These include price-based indicators, volume-based indicators, as well as indicators on the terms and conditions of loans. Finally, the last part discusses relevant legal and institutional issues related to the use of these instruments.

The main analytical findings and policy messages of the chapter are as follows.

- **Macro-prudential real estate instruments contribute to strengthening banks' as well as borrowers' resilience and to dampening credit growth during the upswing of the credit cycle.** Instruments targeting banks (sectoral capital requirements) increase their resilience and may also help in moderating the credit cycle. Instruments targeting borrowers (LTV, LTI and DSTI limits) increase the resilience of both banks and borrowers, and restrict the quantity of credit relative to the value of the collateral or the borrower's income, thereby also dampening the credit cycle. Given the differences in their transmission channels and impact, the two types of instrument complement each other and there can be merit in having both types of instruments in place at the same time.
- **Real estate instruments can be used to address both time-varying and structural systemic risks.** Some instruments may be better suited for including a time-variant element. For example, varying the instruments targeting banks may be relatively easier than changing LTV limits, which may risk destabilising the market by creating incentives to frontload lending in anticipation of tightening measures. Other instruments do not need a time-varying element to smooth the cycle, such as LTI limits. However, macro-prudential policy should not aim to fine-tune the credit cycle, and frequent changes in instrument settings should in general be avoided. It is also important for communication on macro-

prudential policy not to create unrealistic expectations regarding the ability to manage the credit cycle.

- **When using a macro-prudential instrument in a time-varying way, in principle, the instrument should be loosened in a downturn.** Macro-prudential tightening during the upswing of the cycle would provide room for such loosening in downturns, which would support credit growth and potentially help avoid a credit crunch.
- **The systemic risk buffer can also be used as a sectoral capital instrument to address structural risks originating from the real estate sector.** However, cyclical risks related to the real estate sector should be addressed with other instruments.
- **National regulation should allow authorities in Member States to implement LTV and LTI/DSTI limits if they deem this to be appropriate.** Given the large cross-country variation in regulation between Member States, the identification of current best practices by the ESRB could provide guidance as to the design of such regulation. The monitoring of actual LTV and LTI/DSTI ratios should be improved, as they convey important information on mortgage lending practices and provide invaluable guidance to policy-makers when considering implementation of limits or changes to existing limits.
- **High volumes of real estate credit and strong price growth are good leading indicators of banking crises associated with problems in the real estate sector;** a combination of both is of particular cause for concern. Based on empirical performance as well as data availability, macro-prudential policy-makers in Europe should therefore consider both volume-based indicators (real estate credit) and price-based indicators (real estate prices). In addition, there are also promising results for indicators capturing real estate investment. During the release phase, market-based indicators such as spreads are useful, and the exercising of judgment is likely to be more important than in the build-up phase. Bank balance sheet indicators are generally valuable for policy-makers' understanding of banks' resilience, in particular during the release phase.
- **Other indicators are also useful, including LTV and LTI/DSTI ratios, but constraints on data availability can hinder a reliable analysis.** Further work to improve data availability, quality and comparability is therefore needed, especially for LTV and LTI/DSTI ratios and data on commercial real estate. Member States should consider collecting relevant data for LTV and LTI/DSTI, if not yet available. The ESRB could explore ways forward to improve the availability and comparability of data on actual LTV and LTI/DSTI ratios, as well as for data on other indicators related to terms and conditions for loans and data on commercial real estate developments.
- **Given the heterogeneity of national real estate markets, policy-makers should also consider measures to address regional developments that may result in systemic risk.** Because of the regional heterogeneity of real estate markets, it would be desirable to improve the availability of reliable regional data.

1. Macro-prudential objectives

The ultimate objective of macro-prudential policy is to contribute to safeguarding the stability of the financial system as a whole, including by strengthening its resilience and containing the

build-up of systemic risks, thereby ensuring a sustainable contribution of the financial system to economic growth. In its Recommendation of 4 April 2013 on the intermediate objectives and instruments of macro-prudential policy, the ESRB identified a number of intermediate objectives as operational specifications of this final objective. These intermediate objectives include, among other things, mitigating and preventing excessive credit growth and leverage as well as limiting exposure concentration.

Excessive real estate booms are particularly undesirable from a systemic risk perspective as they are often associated with financial and economic busts that are deeper, costlier and longer lasting than average downturns. This is because such booms often go hand in hand with high leverage in the household and financial sectors. In addition, real estate constitutes a large store of household wealth and the construction sector has major supply-side effects on growth. Therefore, the indirect effects of a real estate bust on the broader economy are large enough to justify policy action during a boom.⁴⁴

Real estate instruments for macro-prudential purposes can mitigate and prevent systemic risks in two ways:

- by **increasing the resilience of banks and households** against losses during periods of financial stress, thereby helping to maintain lending. This can be done by decreasing the riskiness of real estate loans, increasing the amount of capital held by lenders to withstand shocks stemming from the real estate sector or both.
- by **dampening credit growth** in the expansive phase of the credit cycle. Note, however, that actively managing the business cycle is beyond the scope of macro-prudential policy.⁴⁵

The effects on credit supply differ between types of instrument. Provided sufficient buffers have been accumulated during the upswing of the credit cycle, the instruments could be relaxed such that they return to their regulatory minimum during a downturn in order to support credit growth, potentially preventing a credit crunch.

2. The instruments, their transmission and effects

Real estate instruments that are used for macro-prudential purposes can be broadly grouped into instruments that target banks and instruments that target borrowers. **Instruments that target banks** work on banks' balance sheets via regulatory capital requirements, either directly (by imposing higher capital requirements for exposures on the real estate sector) or indirectly (by working on variables that affect these capital requirements such as risk weights (RWs) and loss given default (LGD) parameters). **Instruments that target borrowers** work directly on the terms and conditions of the loans by making the volume of credit granted dependent on the value of the underlying real estate (LTV limit) or on the debt servicing capacity of the borrower (LTI and DSTI limits).⁴⁶ In practice, these classifications may overlap (for example, the use of higher RWs for loans that exceed certain LTV, LTI or DSTI limits).

⁴⁴ For a survey on the effects of real estate booms on the financial system, see for example Davis et al. (2011).

⁴⁵ See Chapter 1, which provides more detail on the role of macro-prudential policy in addressing pro-cyclicality.

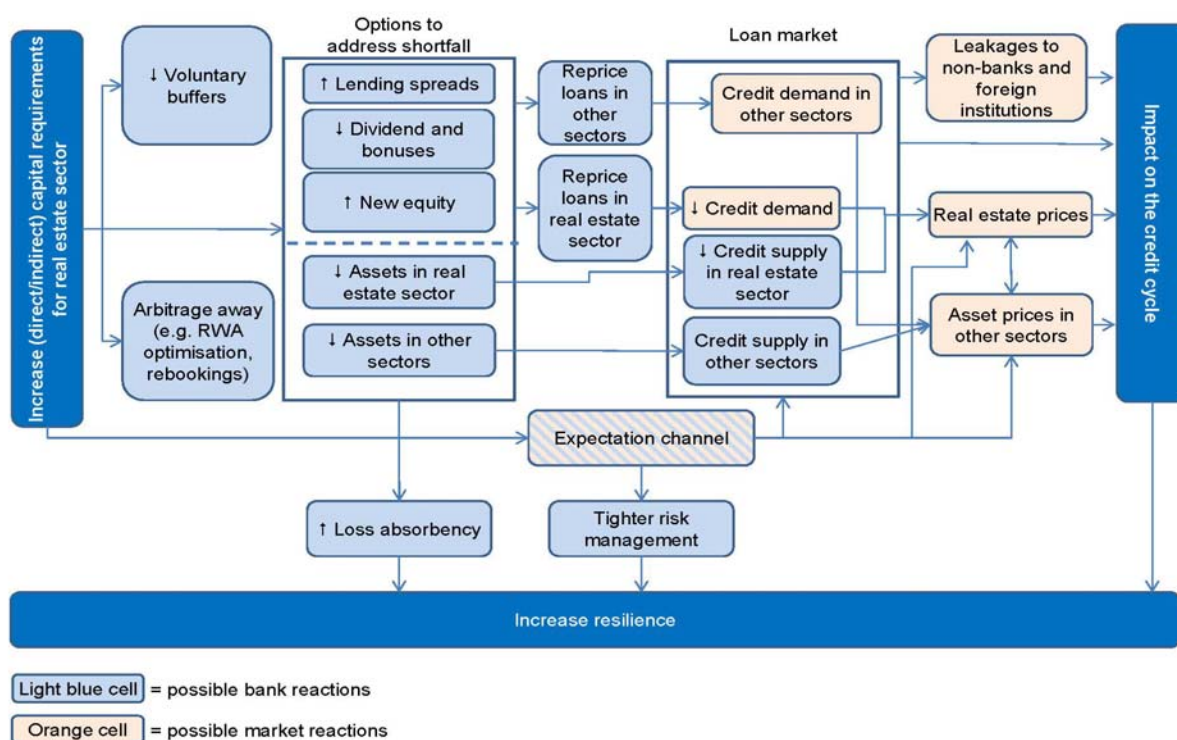
⁴⁶ Other instruments may also be available, such as sectoral concentration limits or loan amortisation requirements.

2.1 Transmission mechanism

a) Instruments targeting banks

Increased capital requirements have a direct impact on banks' resilience and may also help in preventing excessive credit growth and leverage.

Figure 3.1: Transmission channels of an increase in sectoral capital requirements



Source: Adapted from CGFS (2012).

Impact on resilience. Any additional capital held to meet the higher requirements increases banks' capacity to absorb losses stemming from real estate loans. The additional capital can result from the issuance of new equity or from the non-distribution of profit.

Impact on the credit cycle. Banks may choose to restrict their real estate (or other) lending or to increase the cost of credit for borrowers (higher spreads), and these measures may reduce the likelihood of a credit-fuelled real estate boom. However, lending opportunities might be too attractive in a boom period for increased capital requirements to have any significant impact on credit availability for the real estate sector. In a downturn, the additional capital can be released and made available to absorb losses and help to maintain lending. However, reduced regulatory capital requirements can be offset by higher requirements imposed by the market, in particular in crisis situations (See Box 1 for country experiences).



Box 3.1: Empirical evidence on the effect of changes in capital requirements

Higher capital requirements increase banks' resilience, and experience shows that they may also help in moderating the credit cycle. However, the effect on credit is not easy to disentangle from other policy actions or developments.

In **Australia**, an increase of RWs on uninsured "low-doc" mortgages in 2004 has been effective in limiting growth of the low-doc market.

In **Estonia**, RWs on mortgages were raised from 50% to 100% in March 2006. A decline in housing loan growth followed, but Eesti Pank noted in its May 2006 FSR that banks also increased own funds, mitigating some of the impact on credit growth.

The Reserve Bank of **India** increased RWs on commercial real estate (CRE) lending in 2005 and again in 2006. Credit growth to the sector declined – and stayed low – after these actions.

In **Ireland**, RWs on mortgages, particularly high LTV mortgages, were raised in 2006 (and in 2007 for CRE loans). Loan growth started to decline following the increase in RWs, but it is unclear whether this was due to the policy action or to other reasons. Policy-makers now describe the move as "too timid, too late".

In **Norway**, RWs were raised from 50% to 100% on loans with an LTV greater than 75% in 1998 (discontinued in 2001). While Borio and Shim (2007) note that credit growth decreased from above 10% at the end of 1997 to below 7% in mid-1999, it is difficult to distinguish whether this deceleration was the result of the real estate measures or owing to the economic downturn following the Asian crisis.

In **Portugal**, more capital was required for housing loans with LTVs above 75% from July 2000 onwards. There is some evidence that loan growth declined, but Borio and Shim (2007) note that it is difficult to disentangle this from the effects of higher interest rates.

Recently, **Hong Kong and Sweden** have introduced residential mortgage risk weight floors of 15%. There is some tentative evidence, at least for Hong Kong, that this may have resulted in higher mortgage rates, but it is too early to reach firm conclusions on the impact and effectiveness of these measures.

Expectation channel. Expectations of future policy measures may already have an impact on banks' lending policies before any measures are actually implemented.

Leakage and arbitrage. The effect of the instruments can be reduced through various types of leakages and arbitrage. Banks' ability to draw down their voluntary capital buffers to meet higher requirements could mitigate the impact. Subject to supervisory scrutiny and/or approval, banks using the internal ratings based approach (IRB) for credit risk may re-optimize their risk-weighted assets (RWAs) by adjusting the parameters of their internal models. Banks may also shift lending to riskier real estate exposures to compensate for higher costs or transfer risks off-balance sheet. If measures are not applied to all transactions, loans can be shifted to other financial institutions in less regulated sectors, or, in the case of local subsidiaries, loans can be rebooked to foreign parent banks not subject to the local capital requirements. The risk of cross-border leakages depends on existing reciprocity rules.

Cross-border effects. In building up the resilience of the domestic financial system, macro-prudential policy measures are likely to have significant positive effects on other countries as financial crises are prevented or mitigated. Measures aimed at banks' balance sheets may in certain circumstances also have negative effects, for example if countries are in different stages of the credit cycle and banks affected by a measure in one country cut back lending in other countries as well (see Chapter 11 of the Handbook).

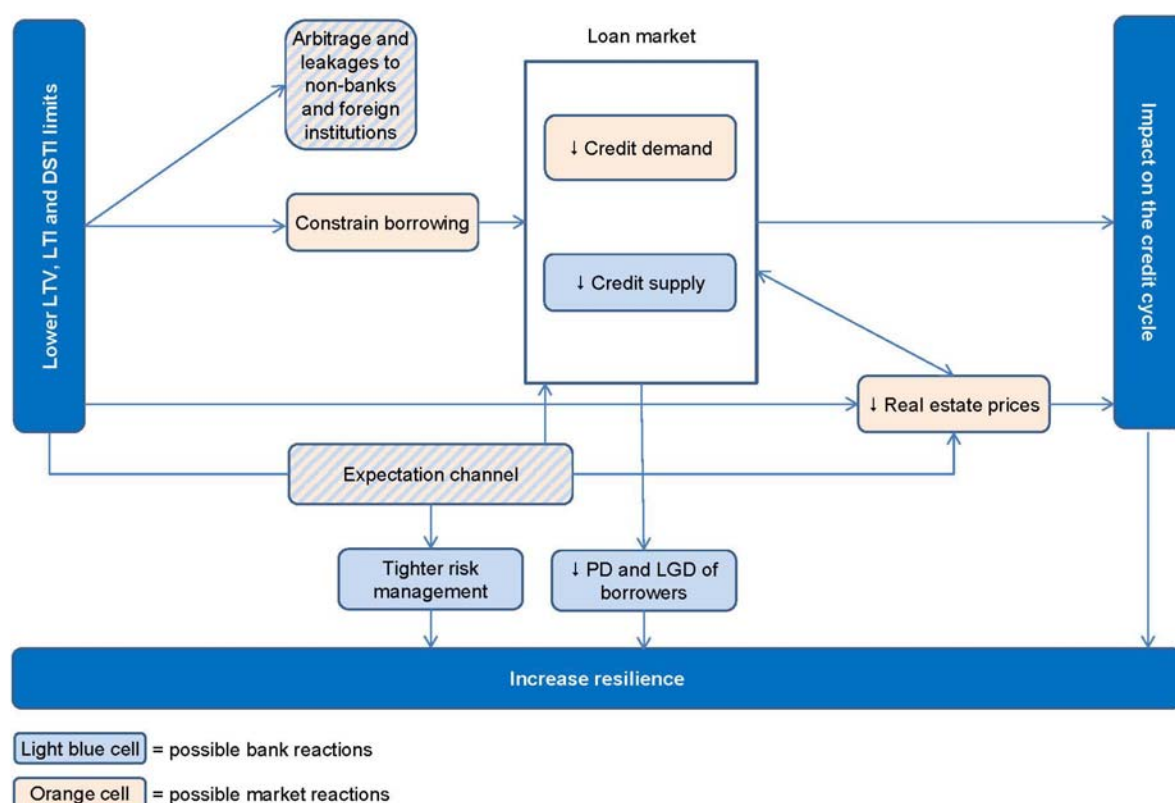
Mitigation of unintended domestic and cross-border effects. The incentives for re-optimising RWAs can be reduced if tighter capital restrictions are implemented through or accompanied by limitations concerning parameter adjustments in IRB models. In general, the

scope for arbitrage can be reduced by increasing the regulatory perimeter and through greater regulatory reciprocity. Active monitoring of the financial sector by macro-prudential authorities is instrumental to prevent risks shifting to other institutions inside or outside the regulatory perimeter. Arbitrage and leakages can also be reduced by exploring the complementarities between instruments (for example by combining capital requirements with LTV, LTI and/or DSTI caps). On-site assessments conducted by the micro-prudential authority could also play a role in supporting policy enforcement.

b) Instruments targeting borrowers

Instruments that target borrowers restrict the amount that can be borrowed relative to the value of the collateral or income of the borrower and thereby curb credit growth in the real estate sector. In addition, they enhance the resilience of both the banks and their borrowers. The discussion below focuses on LTV, LTI and DSTI caps. These instruments are distinct from the other the instruments used for macro-prudential purposes in that they are directed towards the contract between the bank and the borrower.

Figure 3.2: Transmission channels of a tightening of the LTV, LTI and DSTI limits



Source: Adapted from CGFS (2012).

Impact on resilience. LTV, LTI, and DSTI caps increase the resilience of both borrowers and banks (see Box 2 for country experiences). Broadly speaking, LTV limits reduce the potential loss of the bank in case the borrower defaults (lower LGD), while LTI and DSTI limits reduce the probability that the borrower will default (lower probability of default or PD).



Box 3.2: Empirical evidence on the effect of LTV, LTI and DSTI limits

Evidence from European countries on the effectiveness of LTV, LTI and DSTI caps is relatively scarce, as in most cases they have been implemented only recently. For example, Swedish authorities report that the residential LTV cap in force since October 2010 has made lending standards more conservative, thus contributing to the resilience of the banking sector (Finansinspektionen, 2013).

Some Asian economies have a somewhat longer history of operating such caps. In almost all instances, these are used for residential (and not CRE) lending. The results of several studies suggest that the caps have been effective in moderating the credit cycle and increasing resilience.

Evidence from **Korea** finds that tightening of residential DSTI and especially LTV criteria significantly lowers transaction activity and price appreciation in the housing market owing to a decrease in expected house price growth and lower speculative activity (Igan and Kang, 2011). During the release phase, little evidence has been found that relaxing lending standards stimulates credit growth. **In Hong Kong**, a tighter residential LTV may have helped reduce household leverage and sensitivity of defaults to changes in property prices (Craig and Hua, 2011, Wong, Fong, Li and Choi, 2011). In September 1998 the mortgage delinquency ratio remained relatively low and Hong Kong banks remained well-capitalised, despite a 40% year-on-year fall in property prices. **China** has varied LTV caps extensively with policy tightening in response to the growth in house prices and house sales. For example, house price growth fell from 90% to around 0% after the central bank tightened the LTV cap to 70% in June 2006.

Cross-country studies find that lower residential LTV and DSTI caps have contributed to restraining credit growth during the past decade. Furthermore, the use of LTV caps tends to have a decelerating effect on real estate price growth and appears to strengthen bank capital buffers and bank performance (Wong, Fong, Li and Choi, (2011), Ahuja and Nabar (2011), Maddalonia and Peydró (2013)). Based on a panel of 57 countries, Kuttner and Shim (2013) conclude that out of LTV, LTI and DSTI caps, only the latter has had a significant and robust impact on housing credit growth, with no discernible effect on housing price growth.

A larger body of literature provides evidence for the supposed transmission mechanism for LTV, LTI and DSTI caps. IMF (2012) finds that LTV ratios have potent effects on credit growth, house prices and economic output. Residential house prices are typically found to be more sensitive to income shocks when households are highly leveraged (Lamont and Stein (1999), Almeida, Campello and Liu (2006), Benito (2006)) and household consumption is found to be more volatile when household debt levels are high (Isaksen et al. (2011)). Such volatility in house prices and consumption, which can magnify boom-bust cycles, suggests a role for LTV and LTI caps. Similarly, U.S. house prices were found to be influenced by the loosening and subsequent tightening of banks' residential mortgage lending standards during the boom-bust cycle of the past decade, suggesting that a binding LTV or LTI cap could have moderated the credit boom ((Duca, Muellbauer and Murphy (2011), Mian and Sufi (2009), Mian and Sufi (2011)).

Impact on the credit cycle. LTV, LTI and DSTI caps are intended to curb excessive credit growth and leverage, thus smoothing the credit cycle. They reduce the funding available to borrowers by imposing a limit on the loan, either in relation to the value of the underlying collateral (LTV) or the disposable income of the borrower (LTI, DSTI). Since these instruments are aimed directly at restricting the quantity of credit, they are likely to contribute to a decrease in the credit-driven demand for real estate and to potentially lower or decelerating real estate prices. The tightening could be reversed as systemic risks recede. In fact, lowering LTV, LTI and DSTI caps during a downturn of the real estate cycle might increase credit availability to the sector and reduce the likelihood of a credit crunch.

Expectation channel. Expectations might reinforce the impact of the limits since banks may step up their risk management practices in anticipation of policy tightening. At the same time, expectations may also play a destabilising role by providing incentives to frontload credit activity, thereby further fuelling real estate prices and credit growth. This risk seems greater for instruments that target borrowers (for example, LTV, LTI and DSTI) that are typically applied to flows of new loans rather than stocks. In practice, however, it is likely that LTV, LTI and DSTI



limits will be changed only infrequently. The risk of frontloading seems lower for sectoral capital requirements, such as RWs and LGDs, which can be effective from their announcement and are typically applied to stocks rather than flows.

Leakage and arbitrage. Leakage may occur as borrowers take out mortgage loans in parts or when additional unsecured (consumer) financing is used and the limits do not account for this. Banks may also become more lax in the valuation of the collateral or the determination of the borrower's income. If the caps are not applied to all domestic transactions, other financial institutions, the less regulated sector or institutions from abroad might take the place of the banks that have reduced their lending. Loans originated by local subsidiaries could also be rebooked to foreign parent banks. In such cases, the absence of reciprocity requirements might increase the risk of cross-border leakages.

Cross-border effects. In building the resilience of the domestic financial system, macro-prudential policy measures are likely to have positive effects on other countries as the risk of financial crises is reduced. Measures that target the terms and conditions of domestic lending are unlikely to have any negative effects on other countries.

Mitigation of unintended domestic and cross-border effects. Leakages and arbitrage can be reduced if limits apply to all domestic transactions rather than a specific group of institutions or through voluntary reciprocity arrangements. This minimises the potential for households to circumvent the limits through other financial institutions, such as non-banks or branches of foreign banks. A clear and comprehensive definition of both the numerator and the denominator of the ratios can further mitigate unintended effects. Clear criteria for the valuation of the collateral and the assessment of the borrowers' income are required to enhance the effectiveness of the instruments.

2.2 Interaction with other policy areas

The effectiveness of the instruments also depends on their interaction with other areas of economic policy-making, in particular monetary, fiscal or micro-prudential policy, highlighting the need for coordination.

Monetary policy. Monetary policy decisions have a bearing on developments in credit and real estate markets, thereby affecting financial conditions. The use of macro-prudential real estate instruments affects credit growth, leverage and real estate prices, variables that are also relevant for monetary policy.⁴⁷ Although real estate instruments and monetary policy can reinforce each other, conflicts may arise when there are diverging developments in the economic and financial cycles. For example, this would be the case when the risk of a real estate-related credit boom occurs in a setting of low inflation and subdued economic activity. In this scenario, macro-prudential authorities would want to restrict credit growth and leverage to safeguard financial stability, while monetary authorities may want to take an accommodative stance to bolster the economy and maintain price stability.

⁴⁷ House prices as such are not part of the HICP used by the ECB to assess price stability for monetary policy purposes.



Fiscal policy. Real estate-related taxes, such as stamp duties, transaction taxes, capital gains or property taxes can discourage speculative transactions when implemented during a boom. Kuttner and Shim (2013) find that housing-related taxes are the only policy tool with a discernible impact on real estate price appreciation. Conversely, tax relief and subsidies can support real estate prices during a bust, thus supporting macro-prudential objectives. A potential conflict of interest may arise from a favourable tax treatment of debt-financed home ownership through the (partial) tax-deductibility of interest payments on mortgage loans. This creates a debt bias and may fuel credit and real estate booms. Macro-prudential authorities may want to counter such biases in order to mitigate financial stability risks.

Micro-prudential policy. The activation and calibration of real estate instruments for macro-prudential purposes should be based on an assessment of risks to the financial system as a whole, rather than on the risk profile of individual institutions. That said, in some countries, the instruments are available primarily for micro-prudential or consumer protection objectives.

The use of macro-prudential real estate instruments and micro-prudential policy are usually aligned in the upswing of the credit cycle, where there is a need to strengthen the resilience of individual institutions and the system as a whole. Tensions are most likely to arise in the downswing. In the face of increasing losses and expectations of further credit quality deterioration, a strict micro-prudential perspective would be to tighten the capital requirements for individual institutions. At the system-wide level, however, this may lead to deleveraging, asset fire sales and a credit crunch, further exacerbating adverse macro-financial feedback loops. To prevent such a scenario, macro-prudential policy should aim to relax measures that unnecessarily tighten credit supply.

3. Features of the instruments

This section looks at each of the instruments in greater detail based on the following standard set of key features (see Sections 3.1-3.3): (i) description of the instrument; (ii) its objective, nature and impact; (iii) pros and cons related to its use; (iv) any relevant operational issues; and (v) any relevant legal or institutional issues (e.g. whether measures are subject to maximum harmonisation and the extent of national discretion). Comparing the instruments according to these standard features allows the following general conclusions to be drawn.

Different balance of objectives. Both strengthening resilience and smoothing the credit cycle are relevant goals, but the appropriate balance between the two goals differs between instruments. Sectoral capital requirements increase banks' resilience and may also help in moderating the credit cycle. Instruments that primarily target the terms and conditions of loans (such as LTV, LTI and DSTI limits) impact more directly on the availability of credit and would therefore be more effective in dampening the credit cycle. At the same time, they also increase the resilience of both borrowers and banks. It should be noted that these latter instruments fall outside the scope of the CRD/CRR and are therefore implemented according to national discretion.

Time-varying use of instruments. The instruments can be used to address both structural and time-varying risks. However, there are differences between the instruments in terms of the drawbacks associated with frequent changes in the use of the instrument. While it may be easier in practical terms to make time-varying use of instruments targeting banks, frequent

changes to LTV, LTI or DSTI limits may risk destabilising the market by creating incentives to frontload loans in anticipation of tightening measures. Such frontloading is less of a concern for measures like changing RWs and LGDs, which typically apply to the stock of outstanding loans. In addition, LTI and DSTI limits would contribute to smoothing the credit cycle even without any time-varying element, since they become more binding during credit booms when real estate prices and credit tend to grow at a faster pace than income. For a fixed or time-invariant LTV limit, the required equity down-payment would increase in booming real estate markets, but there would still be scope for more lending as real estate prices increase.

Combining instruments. Given the differences in objectives and impact, the instruments complement each other, so that there may be merit in having both types of instrument in place. Combining instruments also reduces the risk of leakage and arbitrage. Even within the class of instruments targeting borrowers, the different instruments can be seen as complementary. LTI/DSTI caps complement LTV caps in the sense that they help to address procyclicality, given their properties as automatic stabilisers during credit booms, as well as to address potential leakages, given their coverage of unsecured loans that are not covered by LTV caps. These instruments are also complementary in the way they increase resilience. Broadly speaking, LTV caps lower the potential LGD for borrowers and banks, while LTI/DSTI caps lower the PD.

Leakages and arbitrage. The risk of leakage and arbitrage exists for each instrument, but this can be addressed at the domestic level through close cooperation between macro-prudential and micro-prudential supervisors (e.g. on-site inspections to check bank behaviour in response to the measures). At the cross-border level, the risk calls for as much reciprocity as possible, even where it is not required legally. Cooperation on reciprocity might also be relevant for the instruments targeting borrowers. An alternative to reciprocity for the latter instruments would be to apply measures to all domestic transactions.

Commercial versus residential real estate. For both economic and legal reasons, it may be more challenging to implement policy measures targeting the commercial real estate (CRE) sector than to implement those targeting the residential real estate (RRE) sector. For instruments targeting borrowers, calculations of income and collateral valuation would typically be more complex for CRE than for RRE transactions. Furthermore, where new construction of CRE is financed, no current income streams can be assessed and future income streams are hypothetical. By contrast, LTI/DSTI limits for households would typically be assessed on existing stable household income streams. As policy measures targeting borrowers directed towards the CRE sector are relatively complex to implement, it would be more difficult to affect sectoral credit developments.

Regarding instruments targeting banks, indirect sectoral capital requirements can be implemented for RRE and CRE retail exposures of IRB banks through LGD floors under Article 164 of the CRR. Since the large majority of CRE exposures are not classified as retail exposures, this measure may not be very helpful for this segment, making it necessary to take measures under Pillar II or Article 458 of the CRR (known as “national flexibility measures”)

instead.⁴⁸ Such measures could also be effective, but there are also potential disadvantages in terms of less transparency and more complex procedural requirements, respectively.

National versus regional measures. Given the heterogeneity of national real estate markets, policy-makers should consider measures to address regional developments in real estate markets that may develop into systemic risk concerns. Also in the light of the costs associated with macro-prudential instruments, regulators might consider applying measures on a regional basis before a local real estate bubble (for example one occurring only in major cities) spreads to the rest of the country. In this spirit, Article 124 of the CRR allows for the regionally-curbed application of RWs for RRE and CRE under the standard approach. A similar regional application is not provided for the IRB banks' minimum LGD under Article 164 of the CRR. Finally, Article 458 of the CRR can also be used, subject to the conditions that apply for this article.

⁴⁸ See Chapter 7 of the Handbook for more details.



3.1 Sectoral capital requirements

Description: Additional capital requirements for bank exposures to the real estate sector. Can be imposed either directly or indirectly (through parameters that influence the capital requirements, in particular RWs and LGD floors).

Objective, nature and impact: Increasing banks' resilience by means of additional buffers for credit losses in the real estate sector. Possibly affecting the credit cycle through the price of real estate credit.

Pros:

- Instrument specifically targeted at (certain segments of) the real estate sector (in contrast to the CCB).
- Clear effect on banks' resilience.
- RWs can be applied to regional real estate markets.

Cons:

- Reduced effect if banks choose to meet the requirements through existing capital surplus by reducing their voluntary buffers.
- Can lead to unintended "crowding out" effects, as the bank might reduce its other assets in order to release capital for real estate loans.
- Possibility of some circumvention by IRB banks via optimisation of RWAs (for direct sectoral capital requirements and LGDs).
- Uncertain effect on credit growth.
- OFIs or less regulated sectors or institutions from abroad to which the requirement may not apply, might step in and take the place of the banks that have reduced their lending; loans originated by local subsidiaries can be rebooked to foreign parent banks.

Relevant operational issues:

- Can be applied to both the stock of existing loans and flow of new loans.
- Possibility of significant transmission lag.
- Less effective when the boom is already well developed and profit opportunities outweigh capital considerations.
- Limited to regulated domestic credit institutions (but reciprocity is possible).
- Setting higher RWs for exposures secured by mortgages on real estate in accordance with Article 124(2) of the CRR has an impact on the calculation of the large exposure limit under Article 395 of the CRR: for the large exposures calculation, the market or mortgage lending value of the property concerned can no longer be deducted.

Relevant legal/institutional issues:

a) Direct sectoral capital requirements

Legally, there are three possible ways for national authorities to implement such direct capital requirements:

- *Pillar I – systemic risk buffer (Article 133 of the CRD):* applied by the competent or designated authority to a set of SA (standardised approach) and IRB banks in case of long-term non-cyclical systemic or macro-prudential risks otherwise not covered by the CRR. Can potentially be motivated by real estate risks, but the CRD does not specify whether the SRB can have only the real estate exposures as its basis for calculation (as is the case for RWs or LGDs). It requires a notification to the European Commission, ESRB, EBA and competent/designated authorities of the Member States/third countries concerned. An opinion, implementing act or recommendation from the European



Commission (together with a Recommendation by the ESRB) is required for buffers exceeding a certain threshold. The ESRB and EBA issue opinions for buffers exceeding a certain threshold. Reciprocity is allowed.

- *Pillar I – higher own funds requirement – national flexibility measures (Articles 458 and 92 of the CRR)*: applied by the competent or designated authority to (a set of) SA and IRB banks. Can potentially be motivated by real estate risks, but the instrument does not have only real estate exposures as its basis for calculation (in contrast to RWs or LGDs). It can only be applied in a very restricted set of cases (subsidiarity requirement) and, as a rule, following a procedure with an implementing act by the European Commission/Council. Reciprocity is allowed.

- *Pillar II (Article 103 of the CRD)*: applied by the competent authority to SA and IRB banks with a similar risk profile. Requires a notification to the EBA. The EBA is tasked with monitoring supervisory practices and issuing guidelines. Development of a common view of risks in supervisory colleges is strongly encouraged.

b) Indirect sectoral capital requirements: the case of RWs

Legally, there are three possible ways to implement higher RWs:

- *Pillar I (Article 124(2) of the CRR)*: the competent authority may require SA banks to apply higher RWs (or stricter criteria) for exposures on particular property segments that are fully and completely secured by mortgages on residential or commercial property. This has to be on the basis of financial stability considerations, taking into account an assessment regarding the loss experience and forward-looking markets developments. It further requires a consultation of the EBA. The EBA shall publish the higher RWs (or stricter criteria). The EBA has been given a mandate to develop regulatory technical standards (RTS) to specify the conditions applying for such higher RWs. It should be noted that since Article 124 of the CRR only applies to SA banks, the instrument would only affect a small part of the market in many Member States and may therefore not have the intended effect. Reciprocity is compulsory.

- *Pillar I – national flexibility measures (Article 458 of the CRR)*: the competent or designated authority can temporarily increase RWs to target asset bubbles in the residential and commercial real estate sector. In principle, the general conditions/procedure under Article 458 of the CRR need to be followed, but when the increase is below a certain threshold, it is sufficient to meet the notification requirements set out in the said article. Reciprocity is allowed.

- *Pillar II (Article 103 of the CRD)*: the competent authority requires banks with a similar risk profile to apply higher RWs. Requires a notification to the EBA. The EBA is required to monitor supervisory practices and issue guidelines. Development of a common view of risks in supervisory colleges is encouraged.

c) Indirect sectoral capital requirements: the case of LGDs

Legally, there are two possible ways to implement higher LGDs:

- *Pillar I (Article 164(5) of the CRR)*: the competent authority may require IRB banks to apply a higher exposures-weighted LGD floor for retail exposures secured by residential or commercial property than is normally allowed under the CRR. This has to be on the basis of financial stability considerations, taking into account an assessment regarding the loss experience and forward-looking market developments. This measure would not be very helpful for addressing the CRE sector since the large majority of CRE exposures are not classified in the retail exposures class. It requires notification to the EBA. The EBA is to publish the LGD values. The EBA has a mandate to develop RTS to specify the conditions to be taken into account when determining such higher LGD floors. Reciprocity is compulsory.

- *Pillar I – national flexibility measures (Article 458 of the CRR)*: see the case of RWs. RWs can be changed, for instance, by putting a floor on the LGDs in the RW formula, subject to the procedure set out in that article.

- *Pillar II (Article 103 of the CRD)*: applied by the competent authority to banks with a similar risk profile. Requires a notification to the EBA. The EBA is tasked with monitoring supervisory practices and issuing guidelines. Development of a common view of risks in supervisory colleges is encouraged



3.2 LTV limit

Description: Cap on the ratio of the value of the loan relative to the value of the underlying (real estate) collateral. As a rule, this cap applies at the time of origination of the loan.

Objective, nature and impact: It affects the credit cycle by restricting the borrower's share of debt-financing using real estate as collateral. It increases the resilience of both banks and their borrowers by lowering LGDs and possibly also PDs.

Pros:

- Effect on both the credit cycle and banks' resilience.
- Easy to explain in public communication.
- Can be applied to all domestic transactions (including by foreign banks, insurance firms and shadow banks), depending on the way the cap is introduced (e.g. through consumer protection rules or rules of general conduct, reciprocity arrangements).
- There is some existing experience with instrument.
- Lower risk of "crowding out" of other bank assets compared with the use of sectoral capital requirements.

Cons:

- Lack of data hinders its use in a number of countries.
- No common definition, which is less of a problem for applying the measure at the national level, but complicates a cross-country evaluation of early-warning properties of LTV as an indicator as well as any reciprocity arrangements.
- Banks might have an incentive to overvalue property.
- A time-invariant limit still allows for more lending in booming real estate markets; however, when the down-payment accounts for a fixed percentage of the house price the equity down-payment also increases.
- Possibility of perverse incentive (frontloading of loans in anticipation of the measure).
- Politically sensitive, as it may prevent certain borrowers from entering the housing market and have an effect on the rental versus ownership relationship (this concern can be addressed by applying the limit to only a part instead of all newly originated loans or by differentiating the cap according to the type of borrower).
- Possible leakage in the form of unsecured financing if not combined with LTI limit.
- Possible leakage to other financial institutions if the limit is not applied to all domestic transactions. The less regulated sector or institutions from abroad might then step in to take the place of the banks that have reduced their lending; loans originated by local subsidiaries can be rebooked to foreign parent banks.

Relevant operational issues:

- Typically applied to (a segment of) the flow of RRE loans, but also possibly to CRE.
- Can be time-invariant (constant through the credit cycle) or time-varying (according to financial stability conditions). A time-invariant limit implies that the maximum allowed loan is a linear function of housing prices, making the measure less effective in addressing a boom. A time-varying limit could instead limit procyclicality, i.e. increase the LTV's effectiveness, but at the cost of greater operational complexity, including the risk of perverse incentives. It might also be more effective to (additionally) implement LTI/DSTI limits as income does not usually increase as fast as prices.
- The numerator needs to be comprehensively defined to avoid circumvention (e.g. splitting up loans, or topping up with non-secured loans).



- Valuation issues related to the denominator (e.g. reference price, reliability, incentives for overvaluation).
- Complements LTI/DTSI limits in addressing procyclicality.
- Observed forms of implementation include caps for all or a share (e.g. 80%) of newly originated loans, comply or explain measures, or measures targeting RWs (differentiate RWs according to LTV level).
- More intrusive instrument than additional capital requirements as it restricts lending directly.

Relevant legal/institutional issues:

- Instrument not harmonised under the CRD/CRR, and is therefore implemented at national discretion.
- LTV can be used for different purposes (e.g. as a macro-prudential instrument, in capital requirement rules, covered bonds legislation or consumer protection legislation) and the definition may change accordingly.
- Can be used as a Pillar II measure (Article 104(1)(f) of the CRD), also applied in a similar or identical way to banks with a similar risk profile (Article 103 of the CRD).
- Article 125 of the CRR (mortgages on residential property) and Article 126 of the CRR (mortgages on commercial immovable property) refer to the LTV in the context of the use of a favourable RW under SA.
- Article 129(1)(d)(f) of the CRR refers to LTV in the context of covered bonds.
- Less prone to leakages by non-banks and foreign banks if applicable to all regulated products (e.g. if applied through consumer protection rules or rules of general conduct), although it may not capture all products.
- Recital 24 of the proposed Mortgage Credit Directive refers to LTV (European Commission, 2011).
- EBA Opinion on good practices for responsible mortgage lending refers to LTV (EBA, 2013c).
- Reference to LTV in the ESRB's Recommendation on intermediate objectives and instruments of macro-prudential policy.
- Reference to LTV in the ESRB's Recommendation on foreign currency lending.
- Liikanen report (2012) advises that an LTV cap be introduced.



3.3 LTI and DSTI limits

Description:

LTI limit: Cap on the value of the loan (or a set of a borrower's loans) relative to the disposable income of the borrower (usually measured on a yearly basis).

DSTI limit: Cap on the debt servicing cost relative to the disposable income of the borrower (usually measured on a monthly or yearly basis).

Sometimes the concepts are used in different ways. LTI might be understood as referring to a loan servicing cost (instead of loan size) or total debt (instead of an individual loan).

Objective, nature and impact: It affects the credit cycle by restricting the real estate loans available to borrowers and increases the resilience of both banks and borrowers. It lowers the PDs of borrowers.

Pros:

- Effect on both the credit cycle and banks' resilience.
- Simple to explain in public communication.
- Can be applied to all domestic transactions (including by foreign banks, insurance firms and shadow banks), depending on the way the cap is introduced.
- It acts as an automatic stabiliser in the sense that it becomes more binding during credit booms, when real estate prices grow faster than incomes.
- May encompass unsecured credit, thereby restricting overall indebtedness.
- (Some) existing experience with the instrument.

Cons:

- Lack of data hinders its use in a number of countries.
- No common definition, which is less of a problem for applying the measure at the national level, but which complicates a cross-country evaluation of the early-warning properties of LTI and DSTI as indicators as well as any reciprocity arrangements.
- Income data may not be regularly updated; the sustainability of the income is relevant.
- Possibility of destabilising expectations (frontloading of loans in anticipation of measure).
- Possible leakage by increasing the maturity of the loans (for the DSTI cap).
- It is politically sensitive, as it may prevent certain borrowers from entering the housing market and has an effect on the rental versus ownership relationship (this concern can be addressed by applying the limit to only a part instead of to all new loans or by differentiating the cap according to the type of borrower).
- If it is not applied to all transactions, other financial institutions, the less regulated sector or institutions from abroad might step in and take the place of the banks that have reduced their lending; loans originated by local subsidiaries can be rebought to foreign parent banks.

Relevant operational issues:

- Typically applied to the flow of RRE loans.
- A time-invariant limit improves the resilience of banks and borrowers on a structural basis and contributes to smoothing the credit cycle.
- Numerator: need for a comprehensive view of the debt service cost, including all the borrower's loans, and potentially under different interest rate scenarios.
- Denominator: difficulty in determining the income for certain borrowers (e.g. self-employed); assessment concerns (incentive for overstatement).



- It complements LTV in addressing procyclicality (given its properties as an automatic stabiliser during credit booms; as a rule, income does not grow as fast as real estate prices) and potential leakages (given the coverage of unsecured loans not covered by the LTV cap).
- It can be combined with RWs (different RWs depending on LTI/DSTI level).
- More intrusive instrument than additional capital requirements as it restricts lending directly.

Relevant legal/institutional issues:

- Instrument not harmonised under the CRD/CRR, and is therefore at national discretion
- Article 125(2)(b) of the CRR refers to LTI in the context of exposures fully and completely secured by mortgages on residential property.
- Article 129(1)(e) of the CRR refers to LTI in the context of covered bonds.
- It can be used as a Pillar II measure (Article 104(1)(f) of the CRD), also in a similar or identical way to banks with a similar risk profile (Article 103 of the CRD).
- Less prone to leakages by non-banks and foreign banks if applicable to all regulated products (e.g. if applied through consumer protection rules or rules of general conduct), although it may not capture all products.
- Recital 24 of proposed Mortgage Credit Directive refers to LTI (European Commission, 2011).
- The EBA Opinion on good practices for responsible mortgage lending refers to LTI.
- Reference to LTI in the ESRB's Recommendation on intermediate objectives and instruments of macro-prudential policy.
- Reference to DSTI in the ESRB's Recommendation on foreign currency lending.
- Liikanen report (2012) advises the introduction of an LTI cap.

4. Possible indicators for the use of the instruments

4.1 Selecting the indicators

Potential indicators for the use of real estate instruments can be identified drawing on the relevant literature (see Box 3) and country experiences. A distinction can be made between volume-based indicators, price-based indicators and other indicators (e.g. terms and conditions of lending). Furthermore, it is useful to look into a number of regional indicators, if available, as real estate developments may differ substantially across a country's regions (for example developments in urban as compared with rural areas). As a result of data limitations, such regional data were not considered in the analysis below. Indicators from national accounts can also be useful (for example, investments in the real estate sector). Finally, bank balance sheet indicators should also be taken into consideration, particularly those specific to the real estate instruments (such as average RWs for RRE/CRE mortgage loans).

Considerations regarding the release phase of real estate-specific instruments are similar to those for general instruments such as the CCB. The stance of sectoral instruments might be eased back to their regulatory minimum when threats to the resilience in that particular sector have receded, for example when sectoral credit growth or asset prices have normalised or during a downturn. However, different indicators may be needed for the tightening and loosening phases and market-based indicators such as spreads are likely to be especially useful when capital has to be released (Drehmann et al. (2011)). It is likely that judgment will play a more important role during the loosening phase. In circumstances where threats are receding, it is also important to look at market-based indicators to understand to what extent stress has already materialised. Releasing capital buffers when the solvency of the banking system is in question is unlikely to be effective. Information on the development of banks' non-performing loans and losses on real estate exposures would also be useful in assessing banks' resilience and the phase of the credit cycle.

The ESRB collected available time series for many of these indicators across Member States and investigated them using a graphical analysis ("butterfly analysis"). The analysis compared the behavior of indicators 20 quarters before and after the start of banking crises related to RRE and/or CRE to that in countries that did not experience similar RE-related banking crises. The analysis is based on the "mean" or "median" of indicators across the sample of crisis and non-crisis Member States

Annex 3.1 shows the butterfly analysis for six indicators, three for RRE and three for CRE: household credit-to-GDP gap, nominal house price gap, year-on year percentage change in house price-to-income growth, non-financial credit-to-GDP gap, CRE property price gap (deviation from long-term trend) and investment in other buildings (as a percentage of GDP). The figures shown in the annex are for illustrative purposes.

The results of this graphical analysis suggest that many indicators show material changes ahead of and during such banking crises and may therefore be helpful in signaling emerging vulnerabilities. However, developments are not always markedly different from those in

Member States that did not experience such a crisis, suggesting a common component in house price and credit cycles. Indicators where the difference between crisis and non-crisis Member States is widest before the crises have the strongest signaling power and would therefore be preferred for activating the instruments (see Annex 3.1(c) for Ireland and Spain).

Box 3.3: Review of the literature on potential real estate indicators

Starting with **volume-based indicators**, Beck et al (2012) and Büyükkarabacak et al (2010) study the impact of the sectoral allocation of credit on financial stability and growth using a cross-country panel. The former study finds that, while lending to companies is positively associated with economic growth, lending to households is not. Büyükkarabacak et al. find that lending to households grew more rapidly than to corporates ahead of most crises in their sample. Logit estimations confirm this finding and suggest that the marginal impact of an increase in the household credit-to-GDP ratio is both larger and more robustly estimated than an increase in the business credit-to-GDP ratio.

Mian and Sufi (2009, 2011) highlight the importance of household debt in the US financial crisis, finding that areas in the United States with a high share of sub-prime borrowers experienced very rapid house price appreciation and growth in mortgage debt before the crisis and very high default rates during the crisis. Drehmann and Juselius (2012) find that the debt service ratio tends to peak just before systemic banking crises occur and that, around one year before the start of a crisis, the quality of the debt service ratio as an early warning signal seems to be more accurate than that provided by the credit-to-GDP gap.

As regards **price-based indicators**, typically house prices have been good indicators of forthcoming financial crises (Barrell et al. (2010), Borio and Drehmann (2009), Drehmann et al. (2010), Claessens et al. (2011a), Mendoza and Terrones (2008) and Riiser (2005)). They tend to signal emerging vulnerabilities well in advance and turn somewhat before quantity-based measures such as the credit-to-GDP gap. However defining the equilibrium level of house prices may be difficult. Measures used in the literature include statistically derived residential and commercial property price gaps, affordability indices, such as house price-to-income ratios, and simple asset pricing frameworks, such as a house price-to-rent ratio. Claessens et al. (2011a) find that there is a strong link between credit and housing cycles: when credit cycles are accompanied by housing cycles, the crisis typically lasts longer and is more pronounced.

Regarding the **conditions and terms** of lending, a combination of high LTV ratios and increasing asset prices can be a sign of a credit-driven asset price boom. A higher LTV ratio for residential mortgage borrowers signals a higher level of indebtedness, making them more vulnerable to changes in interest rates, collateral valuations and loan refinancing conditions. Easy credit in anticipation of collateral appreciation could create a self-fulfilling cycle of higher asset prices and indebtedness, fuelling a credit boom (Kyotaki and Moore (1997), Honohan (1997)). When the shock occurs, the value of the collateral adjusts, leaving banks overexposed. Almeida et al (2006) find that, in countries where households can obtain loans with higher LTV ratios, housing prices and new mortgage credit are more sensitive to income shocks. The IMF (2011) shows that the LTV ratio has an effect on the severity of house price busts: where ratios are high, busts are deeper on average. Crowe et al (2011) confirm the positive relationship between LTV at origination and the subsequent price appreciation using state level data in the United States.

Lending spreads on mortgages or corporate loans (for example, CRE) can provide further information on the build-up of systemic risk. During a credit boom, high spreads may indicate demand-driven credit expansion, whereas low credit spreads indicate greater credit supply. Rising lending spreads during a downturn may highlight the need to release the capital buffer to maintain lending. Surveys of credit conditions may be a useful complement to empirical measures.

Any cross-country analysis has several caveats and should therefore be taken as preliminary guidance and as being complementary to country-specific analysis. Definitions and data availability of indicators may differ between Member States. Furthermore, an indicator may have desirable properties in a cross-country analysis, but break down at the level of individual Member States. In addition, former transition economies may have special features related to financial deepening.

Table 1 identifies a list of promising indicators that can be monitored by national authorities. These indicators were selected on the basis of the following criteria: (i) their signalling and discriminatory power between crisis and non-crisis Member States well before the start of the crisis; (ii) a sufficiently high coverage of Member States; and (iii) sufficiently long time series.

Table 3.1: List of promising indicators

General	Aggregate credit: as a percentage of GDP Value added construction (normalised) : as a percentage of GDP
Residential real estate	Household credit: as a percentage of GDP, in terms of level and/or as a gap Household debt-to-income (only a short history is available) Nominal house prices: as a percentage of growth or as a gap House price to income : as a percentage of growth House price-to-rent: as a percentage of growth Investment in dwellings (normalised): as a percentage of GDP
Commercial real estate	Credit to non-financial corporations: as a percentage of GDP, in terms of level, growth rate and/or as a gap CRE prices: as a gap or as a percentage of growth Investment in other buildings (normalised): as a percentage of GDP

Preliminary findings from a more formal statistical analysis broadly support the conclusions from the graphical analysis. In particular, RRE and CRE volume and price-based indicators are found to be useful as early-warning indicators, both individually and in combination, even controlling for other macro-financial variables. This is in line with previous empirical studies (for example by Dell’Ariccia et al. (2012)). Possible follow-up work by the ESRB could also derive thresholds, signalling a possible need for policy action based on assumptions about policy-makers’ preferences.

Finally, there are also some other indicators that are potentially promising, but for which there are more concerns related to data coverage and quality (see below). Based on the preliminary analysis of indicators with weaker data coverage and quality, the set of real estate-related indicators from Table 3.1 should be complemented with the following indicators to the extent that data are available.

Spreads on new lending. This data might be useful in determining when to loosen the instruments, since spreads increase in a timely manner during a downturn. When used in combination with other indicators, spreads might be useful during upswings in understanding

whether a boom is driven by supply or demand, with spreads likely to be low when supply of credit is ample.

Fixed versus floating rate mortgage loans. The share of floating rates in new mortgages increases before real estate crises relative to non-crisis cases. The time series of the data is short and this may also reflect structural differences between housing markets. Nevertheless, there appears to be a case for monitoring this series.

LTV and LTI ratios. These ratios can be used both as instruments in the form of caps, as well as indicators in the form of realised values for actual loans. When used as indicators, they should in principle capture a lot of information on the risk associated with real estate crises. However, a lack of data makes it difficult to assess their capacity for signalling real estate crises (see Box 4). Cross-country comparisons are also hampered by different definitions and methodologies. This highlights an important data gap that should be filled as soon as possible – ideally data on the distribution of both original and current LTV and LTI ratios should also be collected on a regular basis. It is unclear how LTV or LTI ratios used as instruments could be appropriately calibrated let alone enforced when data on distributions or even averages are not available. The ratios should also be useful in setting capital requirements for real estate exposures, for example if this is targeted, in particular, at high LTV or LTI mortgages.

Debt service ratio. Drehmann and Juselius (2012) find that a private sector debt-service ratio is a good predictor of banking sector distress. A visual analysis of this indicator for European countries as well as its discriminatory power suggest that a rapid increase in the indicator increases the likelihood of a subsequent real estate-related crisis. For example, the indicator increases sharply ahead of the crises in the Nordic countries and in the United Kingdom in the early 1990s, as well as for numerous countries ahead of the current crisis. Possible follow-up work under the auspices of the ESRB could include a more thorough analysis of this type of indicator.

RRE and CRE risk weights. Analysing RWs will be important, either because they can be directly used as an instrument or because other instruments (LTV, LTI and DSTI limits) have an indirect impact on them. Moreover, a time series of banks' RWs for RRE and CRE exposures might show patterns over time: a decrease, for example, could be suggestive of lower risk-taking or of model changes and should therefore be investigated. Data availability is, however, an issue, as is a consistent definition of RRE and CRE exposures. EBA data show considerable variation in RWs both within and across Member States.



Box 3.4: Considerations regarding LTV ratio data availability

Recent surveys by the Banca d'Italia⁴⁹ and a dedicated data collection for the purposes of this chapter, suggest a substantial degree of dispersion of average LTV ratios for new residential mortgage loans among EU Member States (see table). Moreover, according to an earlier survey by the ESRB on the LTV levels in the outstanding national mortgage book, Ireland, Poland⁵⁰ and the Netherlands have the largest share of high LTVs (above 100%).

Cross-country comparisons are difficult owing to data heterogeneity since definitions and aggregation methods differ substantially across Member States. In particular, three different definitions of LTV ratio can be identified ("stock" LTV ratio, original LTV ratio based on new mortgage loans and LTV ratio based on new loans for first-time home owners). Moreover, there are differences in how the collateral is valued (at original cost; at actual current market value; at estimated market value according to a real estate price index; or on the basis of the bank's own appraisals). A further element of heterogeneity is the treatment of additional (personal) guarantees. Differences among Member States exist also in the aggregation methodology. The most common method of aggregation is a weighted average by market share, although some countries include only loans disbursed by the main banks or use an average weighted by classes of LTV ratio.

Finally, the analysis of LTV ratios is constrained by the difficulty in obtaining data. A preliminary information collection shows that some countries collect regular data (such as the United Kingdom), while others rely on surveys (for instance Belgium, Italy, Finland, France and Romania); some Member States have no reporting on LTV ratios (Austria and Germany).

LTV ratio for residential mortgage loans (per cent)⁽¹⁾

		2006	2007	2008	2009	2010	2011	2012
euro area	NL	101	101	101	101	101	101	
	FI		81					87
	AT		84					84
	FR	78	77	75	77	79	81	79
	IE	81	77	83	89	81	75	74
	CY		80				80	
	MT	76	73	73	74	73	73	70
	GR		73				73	
	SK					67	70	71
	PT	72	73	71	72	69	64	67
	BE	71	67	65	65	64	63	63
	IT	69	64	65	62	61	60	59
	EE						60	
	ES	64	64	61	57	58	58	58
	SL				54	58	70	69
non-euro area	LU		87					
	DE		70					
	BG				62	63	62	62
	CZ				56	56	57	57
	HU	61	59	67	70	63	49	51
	LV						76	77
	PL	63	70	78	63	63	63	66
	RO		73	68	66	71	78	82
	UK	83	78	73	74	74	75	75

(1) Average LTV ratio on new loans for first time home buyers or alternatively on new residential mortgage loans.

Source: based on surveys by the Banca d'Italia and the ESRB.

⁴⁹ For more details, see Banca d'Italia, Financial Stability Report, No.5, 2013.

⁵⁰ The main factor behind the high share of loans with LTV>100 % is the sharp depreciation of the Zloty against the Swiss franc in the period 2008-2011.

4.2 Using the indicators

The indicators can be used in accordance with a rules-based or discretionary approach, with various options in between (see Chapter 9 of the Handbook for a general discussion on guided discretion). Given differences in housing markets across Member States, it appears unfeasible to establish binding thresholds based on cross-country analysis. A discretionary element is important because some drivers of housing and mortgage markets are probably difficult to embed in a rule (such as fiscal policies). In addition, several indicators may need to be interpreted in a state-dependent manner (for example debt service ratios in a low interest rate environment) or in a holistic way (for example there may be trade-offs between debt service ratios and loan maturities at origination in loans with constant annuities). However, if more than one indicator breaches its threshold, the signal to act might be considered stronger.

5. Legal and institutional framework

5.1 Overview

For the decision-making process and procedures related to the use of the instrument, it is useful to start with a broad orientation. For the instruments targeting banks, the applicable decision-making process and procedures are set out in the CRD/CRR. Despite the CRD being a directive, room for national discretion is restricted, since generally speaking the CRD pursues maximum harmonisation, especially as regards Pillar I measures. By contrast, procedures for instruments targeting borrowers are dependent on genuine national regulations which vary substantially across Member States.

When the use of an instrument falls under the CRD/CRR, it can be either a Pillar I or a Pillar II measure. This distinction determines, among other things, the authority responsible for the use of the instrument. Furthermore, for Pillar I measures, a distinction has to be made between cases that are explicitly accounted for in the CRD/CRR, such as the permitted increase in RWs and LGDs in a number of prescribed cases, and the application of stricter national measures under the regime of Article 458 of the CRR (“national flexibility measures”); the latter implies a more restrictive and procedurally heavier process.⁵¹

The authority responsible for the use of instruments that fall under the CRD/CRR will be either the national competent authority or the designated authority to be appointed by the Member State, or both. The **national competent authority** is the authority in charge of banking supervision under the CRD/CRR. For a number of well-defined areas (for example the application of stricter national measures under Article 458 of the CRR), the Member State can make the **designated authority** responsible. In most Member States, the designated authority will be the central bank, but in a significant minority of cases, it will be a separate macro-prudential authority (as per the ESRB’s Recommendation of 22 December 2011 on the macro-prudential mandate of national authorities). In some Member States, the designated authority will be the banking supervisor or a government ministry. For the

⁵¹ See Chapter 7 for a more detailed discussion on the conditions regarding the use of Article 458 of the CRR.

instruments that do not fall under the CRD/CRR, Member States are free to determine the responsible authority.

It should be noted that the Member States of the **Single Supervisory Mechanism** (SSM) are subject to additional rules ensuring an ex ante and ex post coordination with the European Central Bank (ECB).

First, the SSM Regulation⁵² provides that the national authorities of participating Member States need to notify the ECB of their intention to implement measures aimed at addressing systemic or macro-prudential risks (Article 5.1). The ECB can object to these measures; this objection is not legally binding, but there is a general duty of cooperation that applies to the national authorities and the ECB (Article 6.2).

Second, the ECB may, if deemed necessary, apply higher requirements for capital buffers and apply more stringent measures aimed at addressing systemic or macro-prudential risks than the ones established by the national competent or designated authorities (“topping-up power” under Article 5.2). The SSM Regulation specifies that the ECB shall apply all relevant EU legislation, and where this EU law is composed of directives, the national legislation transposing those directives (Article 4.3). Such an obligation to notify the ECB or topping-up power would not apply to instruments implemented at national discretion, such as LTV, LTI and DSTI caps.

Annex 3.2 summarises the key elements of the decision-making process and procedure for each of the real estate instruments identified in Section 3 and which are discussed in greater detail below.

5.2 Direct sectoral capital requirements

Direct sectoral capital requirements take the form of an increase in own funds ratios through additional capital buffers. Imposing higher direct capital requirements on banks with high real estate exposures can be pursued as a Pillar I or a Pillar II measure. As a **Pillar I** measure, there is the possibility in certain cases of imposing a systemic risk buffer (SRB) under Article 133 of the CRD, or of applying stricter national measures under the residual case of Article 458 of the CRR. Since both measures are covered in other chapters of the Handbook, they are not discussed in detail here.

The **SRB** aims at addressing long-term, non-cyclical systemic or macro-prudential risks otherwise not covered by the CRR. The SRB can be implemented in a differentiated manner for single banks or sets of banks. Its introduction can potentially be motivated by real estate risks and therefore not only real estate exposures. To the extent that real estate risks are cyclically-related, the SRB would not be an appropriate instrument. However, real estate risks can also result from large, common exposures of the banking sector concentrated on the real estate sector. Common exposures are not addressed by the micro-prudential rules. Given that historically many banking crises are associated with problems in the real estate sector, it can

⁵² Council Regulation (EU) No 1024/2013 of 15 October 2013 conferring specific tasks on the European Central Bank concerning policies relating to the prudential supervision of credit institutions.



be argued that a banking sector with structurally high exposure on the real estate sector may pose higher systemic risk and is not adequately covered by the CRR.

The application of **Article 458 of the CRR** requires the case where a number of micro-prudential and macro-prudential measures available under CRD/CRR are assessed to be not adequate to address the systemic risk identified. Given the large scope of Article 458 of the CRR, the Member State setting these measures is subject to a higher burden of proof and to a heavier procedure involving the notification and opinions of EU institutions and bodies (including the ESRB) and possible recommendations. It should further be noted that Article 458 of the CRR explicitly provides for the case of indirectly imposing capital requirements via RWs higher than in the case of Section 5.3 (i.e. higher than 150%).

Under **Pillar II**, the national competent authority can apply the Supervisory Review and Evaluation Process (SREP) in a similar or identical manner to institutions that are, or might be, exposed to similar risks or pose similar risks to the financial system (Article 103 of the CRD). This may include high common exposures on the real estate sector.

Under the SREP, the competent authority may require such institutions to take certain measures, including additional capital requirements when the risks are not sufficiently covered by available capital (Article 104(1)(a) of the CRD). When taking Pillar II measures, the competent authority is subject to a lighter procedure that consists of notifying the EBA.

The EBA is required to monitor such Pillar II practices and issue guidelines in order to ensure consistency across the EU. On a general note, Pillar II measures are part of the institution-specific SREP, on which there are no explicit reciprocity provisions in the CRD/CRR. However, under the SREP, the college of supervisors is strongly encouraged to develop a common understanding of a banking group's risks so, in that sense, there are clear possibilities for reciprocity.

5.3 Indirect sectoral capital requirements: the case of RWs

Indirect sectoral capital requirements take the form of an increase of own funds ratios through one of the components used in the calculation of the ratio, such as RWs or LGDs.

Article 124(2) of the CRR explicitly provides for the case under **Pillar I** where the national competent authority for financial stability reasons can set RWs up to 150% or apply stricter criteria for certain real estate exposures of SA banks than normally provided for in the CRD/CRR. This has to be on the basis of financial stability considerations, taking into account an assessment regarding the loss experience and forward-looking market developments. It concerns exposures fully secured by mortgages on residential or commercial property and one or more property segments of such exposures, for instance based on geographical area, which are preferentially risk-weighted at 35% (RRE) or 50% (CRE). The stricter criteria mentioned can, for example, concern stricter LTV limits for the preferential RWs than prescribed by the CRD/CRR (see Section 5.5).

The EBA should be consulted before applying the higher RWs and there must be a six month transition period before the higher RWs apply to the banks. The EBA shall publish the RWs and criteria. The EBA is further requested to develop RTS in this area. One advantage of



following this particular procedure is that other Member States need to reciprocate the measure, which increases its effectiveness.

While using Article 124.2 CRR should in principle be the preferred route to increase RWs under the SA, when the measure cannot adequately address the systemic risk identified, the national competent authority or designated authority may also apply RWs above 150% under the requirements and procedure of **Article 458 CRR** (see Section 5.2). In case the route of Article 458 CRR is taken, reciprocity by other Member States is voluntary. Article 458.10 CRR provides also for the possibility to bypass the usual opinion and recommendation procedure in case of RW increases that are moderately higher (by 25%) than the standard RWs provided that this does not last more than two years.

Finally, it is also possible under **Pillar II** to indirectly require that banks with a higher exposure on the real estate sector to hold more capital via higher RWs (see 5.2 above).

5.4 Indirect sectoral capital requirements: case of LGDs

Article 164.5 CRR explicitly provides for the case under **Pillar I**, where the national competent authority can, within certain limits and for financial stability reasons, set higher minimum exposures-weighted average LGDs for exposures of IRB banks secured by property in their territory. This has to be on the basis of financial stability considerations, taking into account an assessment regarding the loss experience and forward-looking markets developments. In contrast to the RWs mentioned under 5.3 above, no upper limit is imposed. EBA must be notified of any changes to the minimum LGDs and to publish their values. EBA is further requested to develop regulatory technical standards in this area. One advantage of following the avenue of Article 164(5) of the CRR is that other EU Member States need to reciprocate the measure, which increases its effectiveness. The drawback, however, is that the article applies only to retail exposures and might not therefore be of much of help in addressing concerns related to CRE lending.

In case Article 164(5) of the CRR cannot adequately address the systemic risk identified, the national competent authority or designated authority may also use the earlier discussed **Article 458 of the CRR** (see Section 5.2 and Section 5.3) to increase RWs. This can be done, for instance, by putting a floor on the LGDs used in the RW formula for retail exposures (Article 154 of the CRR). The implementation is subject to the procedure of Article 458 of the CRR.

Finally, in principle, it is also possible under **Pillar II** to indirectly require banks with a higher exposure on the real estate sector to hold more capital via higher LGDs (see Section 5.2).

5.5 LTV, LTI and DSTI limits

As a rule, LTV, LTI and DSTI limits are exclusively subject to **national rules and procedures**. The limits are currently operational in a number of EU Member States, but implementation differs substantially across Member States (see Annex 3.3 for LTV limits). LTV limits may be imposed as a binding or “comply or explain” constraint on all borrowers or a specific group of credit institutions. The level of the limit also varies, from 45% in Hungary for loans denominated in currencies other than Hungarian forint and euro to 105% in the Netherlands. Alternatively, limitations on the LTV for mortgages used as collateral in widely



used funding instruments (e.g. covered bonds) may indirectly constrain lending practices, but do not necessarily limit the total amount of the loan relative to the value of the property. Annex 3.3 provides a more detailed overview of the different ways in which LTV limits are implemented.

The value of LTV and LTI limits as macro-prudential instruments is confirmed by the High-level Expert Group on reforming the structure of the EU banking sector (2012). In its report, the Group states that national regulation to allow authorities to set up LTV and LTI limits should be a priority in the further development of an effective set of macro-prudential instruments. In addition, EU-level harmonisation of the actual definition and use of such restrictions should also be pursued.

Two factors are of central importance to facilitate the effective implementation and operation of LTV and LTI limits in EU Member States. First, national regulation should allow authorities to implement such limits if they deem this to be appropriate. Given the large current cross-country variation in regulation between Member States, the identification of current best practices by the ESRB could provide guidance as to the potential design of such regulation.

Second, the monitoring of actual LTV and LTI ratios should be harmonised and improved. These indicators convey important information on mortgage lending practices and provide invaluable guidance to policy-makers when considering implementation of limits or changes to existing limits. The current availability and comparability of data is insufficient for macro-prudential policy purposes (see Box 4 in Section 4.1). This data gap should be addressed in all Member States as a matter of priority. The ESRB could explore ways to improve the availability and comparability of data on actual LTV and LTI ratios, as well as the data on other indicators related to the terms and conditions for loans and the data on commercial real estate developments.

Regarding governance issues, some Member States have granted these instruments directly to the competent or designated authority or are considering doing so. Others have decided to give a specific macro-prudential authority guiding powers for these instruments over the competent or designated authority in case they are different authorities.

Following the ESRB's Recommendation of 4 April 2013 on intermediate objectives and instruments of macro-prudential policy, the ESRB should be informed in advance of the application of any instrument in case significant cross-border effects on other EU Member States or the single market are expected. This applies not only to instruments under EU legislation, but also to national instruments such as LTV, LTI and DSTI limits although significant cross-border effects are less likely for those instruments.

There is one case, where the CRD/CRR explicitly refers to LTV limits, namely to obtain a favourable risk weighting under the SA for exposures fully and completely secured by mortgages on CRE and RRE (**Articles 125 and 126 of the CRR**):

- 35% RW for RRE exposures: LTV condition of max (80% market value of the property, or 80% mortgage value of the property);
- 50% RW for CRE exposures: LTV condition of max (50% market value of the property, or 60% mortgage value of the property)

In Section 5.3, it was mentioned that national competent authorities can apply stricter criteria for banks to benefit from these beneficial RWs, which can include the use of higher LTVs than those mentioned.

Finally, LTV, LTI and DSTI limits can also be used as **Pillar II** measures (see also Section 5.2 above). Indeed, under the SREP, the national competent authority has the power to require the bank to reduce the risk inherent in its activities, products and systems (Article 104(1)(f) of the CRD). This is not restricted to instruments covered by the CRD/CRR and therefore applies potentially also to the use of national instruments such as LTV, LTI and DSTI limits. Again, the use of Pillar II can be combined with Article 103 of the CRD (i.e. the application of the SREP in a similar or identical way to institutions with similar risk profiles).

5.6 Coordination issues

General issues of coordination between different authorities, both domestically and across borders, are discussed in greater detail in the Handbook's horizontal note on securing financial stability domestically and across the EU. As regards real estate instruments, the following specific points need to be flagged:

- **Interaction with micro-prudential authorities.** Micro-prudential decisions concerning banks' real estate exposures can reinforce the macro-prudential measures or run counter to them. For example, on-site inspections by the micro-prudential supervisor could be a strong deterrent against elusive behaviour on the part of banks. There are also potential tensions between the micro-prudential and macro-prudential perspectives, especially in the downswing of the cycle. Independent of the fact of whether the same authority has both the macro-prudential and micro-prudential mandate, coordination between the two areas is therefore of the essence. When the mandates are split between different authorities, a framework needs to be in place to ensure coordination.
- **Interaction with fiscal authorities.** Coordination with the ministry of finance is needed to check for other possible changes in conditions on the real estate markets concerning fiscal and structural policies (e.g. tax treatment of mortgage interest payments, housing subsidies). Any policy measures in place or planned in these areas could potentially distort the impact of the macro-prudential policy action. LTV, LTI and DSTI limits could also be implemented for consumer protection purposes, which would require consultation with the competent government bodies and consumer representatives.
- **Interaction with foreign authorities.** With regard to the use of real estate instruments for macro-prudential purposes, cross-border coordination is warranted if home supervisors do not only target domestic operations, but also: (i) the banks' consolidated position (e.g. RWs at the consolidated level); or (ii) the banks' cross-border capital flows (e.g. LTV, LTI or DSTI limits on cross-border loans); or (iii) if host supervisors target the subsidiaries of foreign banks. One of the main incentives for such coordination is to reduce the scope for international arbitrage that may otherwise undermine the effectiveness of national policies. Cross-border links and the resulting need for coordination are likely to be more important for sectoral capital requirements than for instruments targeting borrowers.



Chapter 4

Tools addressing systemic banks and structural systemic risks⁵³

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Executive Summary

The CRD contains a broad set of capital buffers to address systemic bank and structural systemic risks by raising banks' loss-absorbing capacity. Buffers for global systemically important institutions (G-SIIs) and other systemically important institutions (O-SIIs) are aimed at banks which pose systemic risks because they are perceived to be “too big to fail”. The systemic risk buffer (SRB) is an instrument to target structural systemic risks. The SRB can be used to limit direct and indirect concentration of exposures and mitigate and prevent excessive leverage.

The Pillar 2 additional own funds requirements address systemic risks related to specific banks. As such they can be used as an “add-on” to the other buffers.

For the application of the buffers for systemically important institutions, the CRD prescribes to a great extent the indicators and the size of the buffers, consistent with the global framework.

For the application of the SRB and the Pillar 2 additional own funds requirements, the CRD provides authorities with more flexibility. This Handbook suggests using a variety of indicators for triggering the SRB and Pillar 2 additional own funds requirements, including indicators of the probability and size of shocks to the financial system, indicators of amplification potential, indicators of the importance of the financial sector to the real economy and indicators of individual systemic importance.

Careful implementation of these capital buffers is warranted, both in terms of timing and phasing-in and -out. These capital-based instruments also affect leverage levels, asset prices and the price of credit and thereby the financial cycle. This can be intended and unintended. In addition, any potential unintended impact, both domestic and cross-border, should be taken into consideration when deciding on the application of these buffers, including risk and capital shifts, leakages to shadow banks and, in the case of inaction, cross-border contagion of crises. Strong cross-border coordination and reciprocity agreements can minimise these effects.

The key policy messages of the chapter are the following.

- **The CRD capital buffers targeting systemically important banks and structural systemic risks are essential to increase the resilience of the banking sector.** They reduce the losses to society arising from financial crises.
- **The O-SII buffer is capped at 2%.** The O-SII buffer rate is expected to vary according to country-specific circumstances. However, some Member States consider this cap to be too tight and that it would not adequately cover losses in the event of a financial crisis. The SRB may be used as an alternative to increase the capital requirements applicable to systemic banks.



- **The SRB may be used to address a broad set of structural risks, such as those related to common exposures and the structure of the banking sector.** Moreover, the procedural requirements are not onerous for a capital buffer of up to 3% (notification).
- **When applying these capital buffers, there is a need for cross-border coordination to avoid unintended consequences** (e.g. pro-cyclicality, regulatory arbitrage and leakages). Here the ESRB has a key role to play.

1. Introduction

This chapter provides guidance on the use of a range of capital buffers to address systemic risks: buffers for G-SIIs; buffers for O-SIIs and the SRB. Moreover, competent authorities can increase capital charges for specific banks under Pillar 2 (additional own funds requirements, see Chapter 6). These capital-based instruments provide a broad toolbox which authorities can use to address structural systemic risks. They complement the other capital requirements and (macro-prudential) buffers (see Figure 1.5).

The first section briefly describes the instruments. The second discusses the objectives, transmission mechanism and potential unintended domestic and cross-border effects. The third section focuses on the relevant indicators and the fourth on how to use these indicators for (de)activating the instruments. Finally, the fifth section gives details on the relevant procedures to follow when (de)activating the instruments. Annex 4.1 provides instrument overviews in tabular form for ease of reference.

1.1 Buffers for global systemically important institutions and other systemically important institutions

As of 1 January 2016 G-SIIs and, subject to national discretion, O-SIIs are subject to supplementary requirements concerning CET1 capital that they must hold. The G-SII buffer is mandatory and addresses the potential negative impacts that G-SIIs may have on the international financial system, i.e. in order to compensate for the higher risk that G-SIIs represent and the potential impact of their failure on society. The (optional) O-SII buffer is aimed at banks which are considered “too big to fail” from a domestic perspective.

For identifying G-SIIs, allocating them to the appropriate sub-category and determining the required buffers the CRD is consistent with the BCBS global framework.⁵⁴ The identification criteria are size, interconnectedness, complexity, lack of substitutability of services or financial infrastructure provided by the group, and cross-border activity. From 2016 the rates are stepped up annually and will be implemented in full in 2019, varying from 1% to 3.5% of RWAs. The G-SII surcharge entails an element of discretion, however, as competent or designated authorities may re-allocate a G-SII from a lower to a higher sub-category, or allocate G-SII status to an institution which is not identified as a G-SII on the basis of the

⁵⁴ BCBS (2013). Note that the BCBS identifies global systemically important banks and domestic systemically important banks, whereas the CRD focuses on global systemically important institutions and other systemically important institutions. The CRD also applies to investment firms.



quantitative criteria alone. The EBA is required to draft technical standards on the identification and assignment of G-SIIs to sub-categories.

The O-SII buffer follows a more principle-based approach, allowing greater scope for national discretion. This should accommodate the different structural characteristics of individual countries. According to the BCBS framework, national authorities should establish a methodology for assessing the degree to which banks are systemically important in a domestic context.⁵⁵ The identification of O-SIIs and the size of the surcharge depend on at least any of the following criteria: the bank's size, interconnectedness, cross-border activities and importance for the economy of the EU or of the relevant Member State. The EBA is required to publish guidelines on the identification process by 1 January 2015. The rates for the O-SII buffer vary between 0% and 2% of RWAs.

1.2 Systemic risk buffer

The SRB is a macro-prudential instrument that aims to address systemic risks of a “long-term, non-cyclical” nature, which are not covered by the CRR.⁵⁶ The SRB translates into an additional CET1 capital requirement for all banks or a subset of them. The CRD, however, does not specify whether the SRB can be applied to a sectoral subset of exposures. The SRB level may vary across institutions or sets of institutions (depending on their respective contribution to the specific structural systemic risk and on the geographical location of their exposures).

Unlike for the SII buffers, the CRD does not provide specific criteria (size, cross-border activities, etc.) for determining the SRB level applicable. However, it is specified that the application of the buffer must not entail disproportionate adverse effects on the whole or parts of the financial system of other Member States or of the EU as a whole forming or creating an obstacle to the functioning of the internal market. Furthermore, the competent or designated authority must review the SRB at least every second year. There is no maximum limit for the SRB level. However, depending on the level of the buffer and the impact on other Member States, authorisation from the European Commission may be required.

2. Objectives, transmission mechanisms and effects

2.1 Macro-prudential objectives

The main objective of using capital-based instruments is to strengthen the resilience of institutions.⁵⁷ By increasing their loss-absorption capacity, the resilience of the financial system as a whole is strengthened. The financial system is better able to withstand both institution-specific and sector-wide shocks.

Different capital tools pursue different intermediate objectives. Capital tools directed at systemic banks, in particular the SII buffers, aim primarily at fulfilling the intermediate objective of limiting the systemic impact of misaligned incentives with a view to reducing moral

⁵⁵ BCBS (2012).

⁵⁶ Article 133(1) CRD.

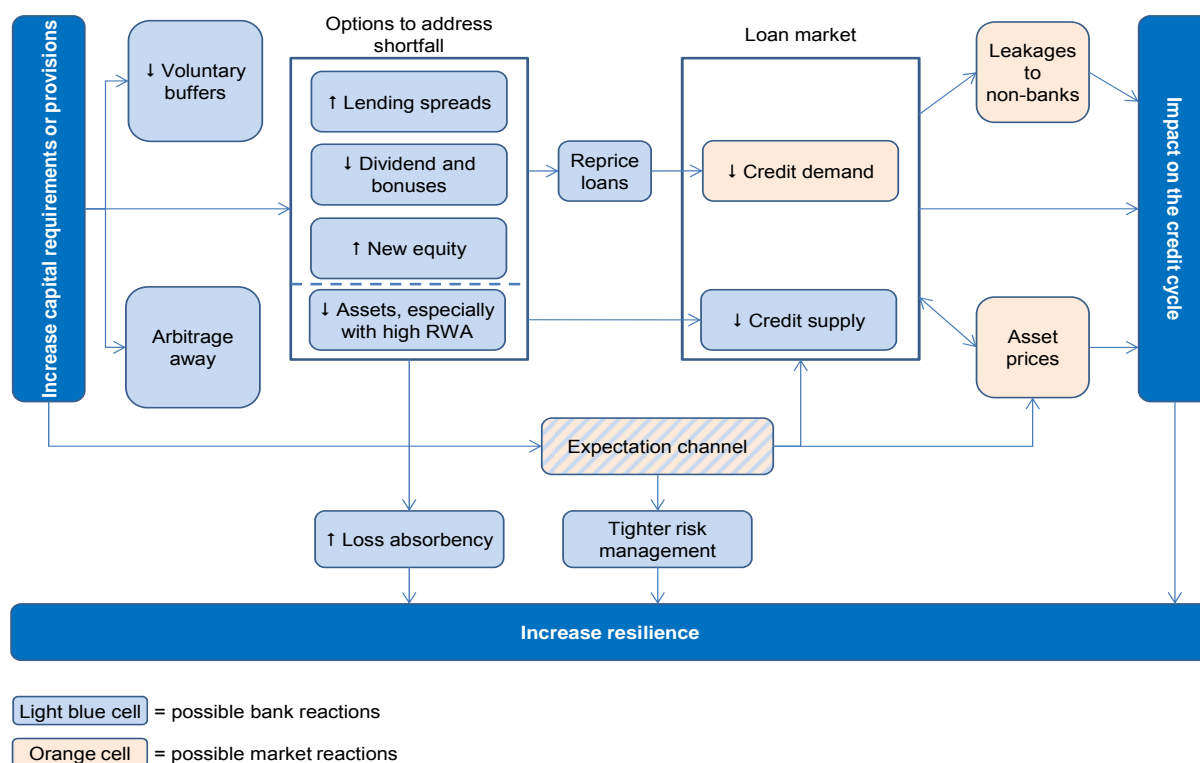
⁵⁷ Article 1 CRD defines institutions collectively as “credit institutions and investment firms”, irrespective of their position in a group.

hazard (ESRB Recommendation on intermediate objectives and instruments of macro-prudential policy). The other capital tools targeting structural systemic risks, namely the SRB and Pillar 2 additional own funds requirements, can also fulfil the intermediate objectives of limiting direct and indirect concentration of exposures and mitigating and preventing excessive leverage.⁵⁸ The market failures targeted include externalities related to interconnectedness (intra-financial contagion) and fire sales, as well as excessive risk-taking owing to bailout expectations when institutions are perceived as systemically important (moral hazard and “too big to fail”).

2.2 Transmission mechanism

Capital-based instruments prompt the institution to (i) raise equity (e.g. by issuing new stocks or retaining earnings), and/or (ii) reduce its RWAs, thereby raising its loss-absorbing capacity.⁵⁹ There is also an impact on the credit cycle, in particular during the phase-in period, as the implementation of the capital requirements limits the credit supply and lowers asset prices, both through capital constraints and the expectations channel.

Figure 4.1: Transmission map of raising capital or provisioning requirements



Source: Adapted from CGFS (2012).

⁵⁸ Capital-based instruments may also be used to mitigate and prevent excessive maturity mismatch and market illiquidity (e.g. higher capital requirements for less liquid assets may provide incentives to hold more liquid asset types). However, these risks may be addressed more efficiently using other more specific instruments. The use of the capital-based instruments to achieve this intermediate objective is, therefore, outside the scope of this chapter.

⁵⁹ When using capital-based instruments, the institutions concerned are required to increase the ratio of capital to risk-weighted assets. Banks may react by changing the numerator (capital) and/or the denominator (RWA). In addition, Pillar 2 allows competent authorities to require institutions to decrease their holdings of certain assets.

The effects depend on the size of voluntary buffers and the banks' decision on what to do with them. Often institutions hold voluntary buffers, for instance, as an additional safeguard against breaching their capital requirements. Institutions may choose to meet any increased capital buffer requirements by reducing voluntary capital buffers instead of raising/retaining capital or decreasing risk-weighted assets. In this case, a higher requirement locks more capital in the system but the overall capital level remains the same. The decrease of voluntary buffers may be partly a consequence of an intended effect: when higher capital buffers increase the resilience of the banking sector overall, voluntary buffers may be released because of increased market tolerance in a more resilient banking sector environment. Figure 4.1 depicts the transmission channels of an increase in capital requirements.

When lowering capital requirements, the transmission mechanism works, to an extent, the other way around. This is not without its difficulties, however, as a decrease in capital requirements may lead institutions to reduce their capital buffers (e.g. by a debt-funded increase in assets) or increase their voluntary buffers. Their choice is largely driven by institution-specific considerations, taking account of market perception of their resilience and shareholder interests (return on equity). Thus, while imposing a buffer rise is feasible, at least for some institutions, it is harder to compel institutions to release a buffer, if market forces prompt them to maintain their capital levels.

Releasing the buffers may decrease resilience or reflect a lower level of risk. In general, resilience decreases with a decrease in capital buffers. However, when specific risks targeted by the buffers disappear, releasing the buffers may not necessarily reduce resilience. Capital-based instruments aimed at structural systemic risks can also influence the credit cycle. Scarce capital can be an active constraint on balance sheet expansion. This secondary effect can be intended or unintended.

It is important that the cyclical aspects of structural capital buffers are taken into account at the time of their activation or release. For instance, SII surcharges have a structural dimension as their application depends on the systemic character of the institution(s). Therefore, they bring benefits throughout the cycle.⁶⁰ When crises cause capital shortfalls, buffers should be rebuilt as part of the recapitalisation plan, not necessarily immediately but with due consideration of the (short-term) impact of rebuilding on the business cycle during the adjustment phase.

Lastly, structural capital buffers should change less often than cyclical buffers. The SII buffers, the SRB and additional capital requirements under Pillar 2, when constraining, have both short and long-term impacts. As mentioned above, in the short term, i.e. the adjustment stage, it is important to consider not only any structural impact but also the impact on the business cycle. For instance, the impact on the price of capital will depend in part on the timing and phasing-in of the buffers' implementation. Structural capital buffers may therefore "interfere"

⁶⁰ In boom periods, when risks accumulate, this capital surcharge can put pressure on the volume of RWAs, in particular where capital is scarce. The requirement that a bank hold an increased amount of capital could discourage banks from engaging in unsustainable credit operations both in terms of volume and risks, which has the potential to moderate or even keep under control credit bubbles and price bubbles. From this perspective, using SII buffers as a macro-prudential instrument could reduce ex ante the probability of a crisis and/or the scale of its effects. In stressed periods, the higher capital requirements for SIIs ensure a more appropriate level of CET1 capital relative to their assets and therefore a higher capacity to absorb losses. This will better allow SIIs to provide financing to the real economy during the downside of the business cycle, thus avoiding a high volatility of GDP.

with the countercyclical capital buffer and indeed the transmission of monetary policy. In the long term the structural impact dominates.

2.3 Unintended effects of capital-based instruments

Unintended consequences can follow both from the activation of capital buffers and release. The section below discusses some potential unintended consequences of rises in capital requirements.

Excessive deleveraging and higher lending costs: To meet higher capital requirements banks may excessively reduce their balance sheet instead of raising new capital or retaining profits. Banks are also likely to pass at least some of the increased cost of funding on to their customers and raise lending costs. These effects could contribute to lower levels of aggregate credit.

These unintended effects on credit supply can also have an impact across borders. Banks may deleverage more in foreign countries than at home. Countries in which the banking sector is dominated by foreign banks are particularly vulnerable to this unintended cross-border effect, especially if domestic credit sources are not able to offset reductions in credit supply from foreign banks.

Appropriate timing and phasing-in of implementation should mitigate these possible unintended effects on the credit cycle. First, deleveraging pressures can be minimised by introducing the buffers in the “benign” phase of the financial cycle, when raising new capital is relatively cheap and deleveraging pressure is low. Second, in a downturn, a sufficiently long phasing-in period of the buffers can help to avoid such unintended consequences. Where deleveraging does take place, authorities may wish to tighten the leverage ratio requirement in order to maintain its function as a binding backstop.

Search for yield-related risk-taking: Higher capital requirements may lead credit institutions to invest in riskier assets to improve profitability and ensure that returns on equity remain acceptable to stockholders. This search for yield may ultimately reduce banks’ resilience. Such risk shifting may be prevented by applying general capital requirements to all RWAs instead of taking a sectoral approach. The leverage ratio should also serve as a safeguard against an increase of exposures in risky assets.

Intragroup risk shifting and capital flight: Cross-border banks may evade capital buffers by shifting risks or capital across borders instead of raising new capital or retaining profits. Recent research⁶¹ shows that cross-border banks have increased their risk-taking in host countries to compensate for the reduced ability to take risks in their home country. Alternatively, cross-border operating banks may meet their increased capital requirements at home by repatriating voluntary buffers from their foreign subsidiaries, thereby decreasing the resilience of the latter.

Cross-border coordination, when setting capital buffers, is crucial to prevent such unintended effects. This coordination is in part mandatory, e.g. when a supervisory college takes a joint

⁶¹ Ongena, Popov and Udell (2012).



decision to require additional own funds under Pillar 2 to address systemic risks. In many cases, however, coordination is limited to notification (see Section 5). In those cases the ESRB has an important role to play foster further coordination.

Leakages and shadow banking: Leakages take different forms, both within countries and across borders. The capital buffers addressing systemic risks may be partly avoided by leakages (migration) to financial sectors which are less prudentially regulated (so-called shadow banking). This leakage may occur, for example, via securitisation or the creation of special purpose vehicles.

Because shadow banking is closely linked to the banking sector, disruptions in the shadow banking sector are expected to have spillover effects and transmit risk to the banking sector. This issue is of particular importance for SIs, which carry out most of the operations between the banking industry and shadow-banking entities (investment and commercial banks active in securitisation, banks acting as dealers and prime brokers, etc.).

Adjustments of internal ratings-based models: In order to compensate for the higher capital requirements, banks may “optimise” their internal ratings-based models to artificially reduce their risk exposures. Floors on risk weights as well as strengthened disclosure requirements can help to prevent this.

Perception of SIs as “too big to fail”: Identification of an institution as systemically important may reinforce market perception that authorities consider the institution to be “too big to fail”, leading to expectations of a bailout. As a result, SIs may enjoy an implicit subsidy in the form of lower cost of funding.

3. Indicators

3.1 G-SII buffer

The CRD provides the identification methodology for G-SIs based on a number of categories and indicators. The EBA is to develop regulatory technical standards specifying the methodology to be used for identifying G-SIs, defining sub-categories and allocating G-SIs to them based on their systemic significance.⁶² These standards must be developed “taking into account any internationally agreed standards”, i.e. the methodology developed by the BCBS (Table 4.1).⁶³

As the FSB currently uses the BCBS methodology to identify global systemically important financial institutions, the EBA is likely to rely on the same.

⁶² Article 131(18) CRD. The draft standards should be submitted to the European Commission by mid-2014.

⁶³ BCBS (July 2013).



Table 4.1: Categories and indicators suggested by the BCBS to identify global systemically important banks (G-SIBs)

Category (and weighting)	Individual Indicator	Indicator Weighting
Cross-jurisdictional activity (20%)	Cross-jurisdictional claims	10%
	Cross-jurisdictional liabilities	10%
Size (20%)	Total exposures as defined for use in the Basel III leverage ratio	20%
Interconnectedness (20%)	Intra-financial system assets	6.67%
	Intra-financial system liabilities	6.67%
	Securities outstanding	6.67%
Substitutability/financial institution infrastructure (20%)	Assets under custody	6.67%
	Payments activity	6.67%
	Underwritten transactions in debt and equity markets	6.67%
Complexity (20%)	Notional amount of OTC derivatives	6.67%
	Level 3 assets	6.67%
	Trading and available-for-sale securities	6.67%

3.2 O-SII buffer

The identification methodology for O-SIIs allows more scope for national discretion. The CRD stipulates that the systemic importance of O-SIIs is to be judged on the basis of “at least any of” the following four criteria:⁶⁴

1. size;
2. importance for the economy of the EU or of the relevant Member State;⁶⁵
3. significance of cross-border activities;
4. interconnectedness of the institution or group with the financial system.

“At least any” means that assessing systemic importance must take into account at least one of the above four criteria but may also take into account any other criterion deemed relevant by the identifying authority. This flexible approach is justified by the differences in national banking sectors.⁶⁶

To help authorities in setting the O-SII buffer, the EBA, in consultation with the ESRB, is to publish guidelines by January 2015. These guidelines should take into account relevant international frameworks as well as European and national specificities.⁶⁷ Unlike the regulatory technical standards for the G-SII buffer, however, the guidelines for the O-SII buffer

⁶⁴ Article 131(3) CRD.

⁶⁵ It is not clear whether, in practice, an authority will have sufficient incentives to apply O-SII buffers to domestic banks based on their importance for the EU economy as a whole.

⁶⁶ The O-SII methodology for assessing systemic importance and buffer activation, as specified in the CRD, is in line with the methodology developed by the BCBS (see Article 131(3) CRD). The CRD text, however, is slightly different: (i) the CRD replaces “complexity” with “significance of cross-border activities”, which is similar but narrower; and (ii) the CRD replaces “substitutability” with “importance for the economy”, which is similar but broader.

⁶⁷ Article 131(3) CRD.



will not be legally binding – instead authorities must “comply-or-explain” (i.e. comply or give reasons for not so doing).

National authorities can apply their own indicators. For instance the criteria *size* and *importance for the economy* can be measured not only by the indicators of *size* and *substitutability/financial institution infrastructure* in Table 4.1, but also by total assets and/or indicators of market share in significant markets or in financial infrastructure (e.g. volume of transactions in specific payment systems). All indicators should have an EU/regional/domestic rather than a global scope.

It is suggested to disclose the quantitative criteria applied and the indicators used (See also Section 4.1.1). This maximises banks’ incentives to become less systemic and sends signals to those institutions which are not yet identified as systemically important.

Initiatives aimed at identifying O-SIIs and implementing the buffers have been introduced in Austria,⁶⁸ Belgium, the Czech Republic, Denmark,⁶⁹ Germany, the Netherlands,⁷⁰ Norway, Sweden⁷¹ and the United Kingdom. A brief description of these initiatives including the criteria applied and indicators used as well as results is provided in Annex 4.2.

3.3 SRB

Compared with the SII buffers, the CRD is less prescriptive regarding the indicators to be used for activating or releasing the SRB. It is therefore important to identify the scope of the SRB first.

3.3.1 The scope of the SRB

There are three limitations as regards the scope of the SRB:

- the SRB is intended “to prevent and mitigate long term non-cyclical systemic or macro-prudential risks ...;
- ... in the meaning of a risk of disruption in the financial system with the potential to have serious negative consequences to the financial system and the real economy in a specific Member State”;
- the risk addressed by the SRB is not already covered by the CRR.⁷²

The application of the SRB is complicated by the inherent uncertainty about what constitutes a *non-cyclical systemic risk*. Cyclical risk factors should, in principle, be dealt with by the CCB (see Section 3.3.2). The absence of a clear definition and robust indicators of structural systemic risk may lead to divergent practices among national macro-prudential authorities with regard to the SRB thereby increasing the risk of regulatory arbitrage and policy

⁶⁸ Oesterreichische Nationalbank and Finanzmarktaufsicht (2012).

⁶⁹ The Committee on Systemically Important Financial Institutions in Denmark (2013).

⁷⁰ De Nederlandsche Bank (2012).

⁷¹ Sveriges Riksbank (2011).

⁷² Article 133(1) CRD. In addition, when notifying the measure pursuant to Article 133(11) it is necessary to justify why none of the existing CRR/CRD measures (excluding the national flexibility measures and CRR 459) are sufficient to address the identified risk.



uncertainty in the banking sector.⁷³ Furthermore, exposures to a common shock and potential channels of intra-financial contagion are likely to vary over the cycle. Because pro-cyclicality tends to magnify systemic risks, the structural and the cyclical dimension of systemic risk may not be easily distinguishable.

Serious negative consequences to the financial system are caused by large exogenous shocks, but also by normal-sized shocks when their impact on the system is amplified. There are three broad amplification channels for structural risks.

- Common exposures. Financial institutions' common exposures to similar economic sectors, counterparty types, asset types, funding sources, geographical areas or currencies.
- Interconnectedness. Direct (e.g. interbank lending) or indirect (e.g. asset fire sales, information contagion) interconnectedness between institutions such that losses to a single or a few financial institutions propagate through contagion to substantial parts of the rest of the financial system.
- Concentration of the financial sector in terms of the number of institutions performing its main tasks. Distress in a single significant institution may have an impact on the financial system similarly to distress in a large number of small institutions. In other words, in more concentrated sectors, the effects of common exposures and interconnectedness occur to a larger extent inside the institutions rather than across them.

The *potential to have serious negative consequences to the real economy* relates to:

- The importance of the financial system to the functioning of the real economy. The greater the importance, the larger the negative impact on the economy of large disruptions in the financial sector.

The SRB can, in principle, also be used to deal with the systemic importance of individual institutions. Some of the drivers of structural systemic risk, such as interconnectedness and importance of the financial system, are strongly related to the criteria used for determining an institution's systemic importance. Furthermore, as the SII buffers are applicable only from 2016 onwards, the SRB can be used where an authority wishes to apply a buffer earlier than 2016. In addition, since the O-SII buffer is capped at 2%, the SRB can be used should an authority wish to apply a buffer higher than 2% to an identified O-SII.⁷⁴

Finally, the SRB should address long-term structural systemic risks not covered by the CRR. This means that the SRB should only be used to address risks that are not already captured in Pillar 1 own funds requirements (i.e. relating to "entirely quantifiable, uniform and standardised elements of credit risk, market risk, operational risk and settlement risk").⁷⁵ As

⁷³ For example, there is a considerable difference if the external debt of a country is mostly composed of short-term foreign deposits and "hot money" flowing into the stock exchange rather than long-term government debt.

⁷⁴ The European Commission confirms this approach in its responses to frequently asked questions on the CRD/CRR: "The O-SII buffer is applicable from 2016 onwards but Member States wanting to set higher capital requirement for certain banks earlier can use the systemic risk buffer." (European Commission, 2013).

⁷⁵ Article 1 CRR.

most macro-prudential risks are difficult to standardise and quantify, this limitation will not restrict the use of the SRB, provided that macro-prudential authorities can explain why none of the existing CRD/CRR measures (excluding “national flexibility measures”⁷⁶ and CRR Article 459) are sufficient to address the identified risks.

The risks in the real estate sector serve as an example of the interplay between the CRR requirements and the SRB. Some credit and market risks in the real estate sector are quantifiable, uniform and standardised and are, therefore, captured by the CRR, which provides instruments to address them. Other real estate risks, however, in particular the macro-prudential risk of large common exposures to the real estate sector, are not covered by the CRR. The SRB can therefore contribute to addressing this macro-prudential risk in the real estate sector.

3.3.2 *Indicators for activating or deactivating the SRB*

Four types of indicators may be considered to capture the scope of the SRB.

1. Indicators of probability and size of shocks to the financial system. The focus should be on structural risk factors, as cyclical risk factors should, in principle, be dealt with by the CCB.
2. Indicators of amplification channels which increase the financial system’s ultimate losses owing to these shocks.⁷⁷ The significance of these amplification channels depends on structural characteristics of the financial system, in particular, as already pointed out, (i) the commonality of institutions’ exposures, (ii) intra-financial contagion via interconnections, and (iii) the level of concentration of the financial sector.⁷⁸
3. Indicators of the importance of the financial sector to the real economy, reflecting mainly the size of the financial sector.
4. Indicators of systemic importance, reflecting the institutions’ potential to amplify shocks in the financial sector and their importance for the real economy.

In general, for the first three types of indicators, data at the financial sector level should be used whereas the fourth indicator should be assessed at the institution level. Institution-level data may also be required when macro-prudential authorities aim to apply the SRB to a subset of institutions that are the most exposed to particular assets, that are highly interconnected or that contribute substantially to the financial sector’s impact on the real economy. Thus the indicators used for identifying SII and the indicators used to determine

⁷⁶ Article 458 CRR.

⁷⁷ For the conceptualisation of financial instability owing to amplification by the financial system, see Borio and Drehmann (2009).

⁷⁸ Rather than considering the (intra-financial) exposures themselves, market-based indicators, such as joint or conditional probabilities of bank default or systemic risk contributions or measures (e.g. CoVaR, conditional value at risk) capturing co-movements in financial institutions’ asset prices, may be used for assessing multiplication channels. While it may be difficult to disentangle common exposure effects from contagion effects, these market-based indicators give information on the market’s perception of the institutions’ similarity and/or interconnectedness, without requiring banking sector balance sheet data. These measures are usually volatile and may contain model and estimation mistakes. The measures should arguably only be used as an additional information source when exercising expert judgement in a constrained discretion framework. Moreover, these indicators will contain sufficient information only in those Member States where capital markets are deep enough and where each relevant financial institution participates in these markets intensively enough.



the scope of application of the SRB overlap. The first three types of indicators are discussed below. For the fourth type of indicator, see Sections 3.1 and 3.2.

Indicators of probability and size of shocks to the financial system

Structural risk factors that determine the probability and size of shocks to the financial system relate to structural vulnerabilities of economies. While it is difficult to separate the structural and cyclical dimensions of systemic risk, the focus should be on structural vulnerabilities rather than cyclical changes.

Experience of episodes of financial distress around the world in recent decades suggests that the spectrum of indicators which may determine such distress is very broad. They include (cyclically-adjusted) measures of domestic non-financial sector indebtedness, current account and other cross-border macroeconomic imbalances, structural vulnerabilities of important markets or activities (such as residential property prices, share of limited recourse loans, and the unemployment rate). Risks may also stem from the shadow banking sector, from foreign-owned banks and foreign banks' branches, etc. Such indicators may be considered not only at the domestic level, but also in foreign countries where domestic banks have substantial exposures.

It is obviously not possible to provide a set of "universal" indicators with a view to determining the timing of application, scope and size of the SRB. Specific structural risk indicators should stem from the structure and current state of the particular economy and financial sector in question.

Indicators of amplification channels

a) Commonality of institutions' exposures

The degree of exposure to particular assets can be measured either in levels (relative to total assets, credit or capital) or in terms of asset class concentration (Table 4.2). High levels of asset class concentration may indicate a risk of large losses to the financial system.

Table 4.2: Indicators of common exposures

Risk driver	Indicator	Sources
Sector/asset classes	Mortgages/total assets	COREP/FINREP + ECB/BSI
	Domestic and foreign general government debt/total assets	FINREP + ECB/BSI
	Asset-backed securities/total assets	Dealogic data/BSI or CBD
	Herfindahl Index of sectors/asset classes	NA
Geographical area	Cross-border claims/total assets	BIS + FINREP
	Claims on single most important foreign country/total assets	RDB 1.5 + FINREP
	Herfindahl Index of geographical area	NA
Currency	Share of forex loans/total loans	RDB 3.2 + FINREP/CBD (denominator)
	Single most important foreign currency/total assets	Will be part of RDB
	Share of households' loans in foreign currency/total loans	ECB/BSI and RDB 3.2b
	Herfindahl Index of currency exposures	NA
Activity	(Proprietary) trading book/total assets	FINREP (proxy) + CBD

Note: Dealogic refers to Dealogic DCM Analytics data (Statistical Data Warehouse).



b) Intra-financial sector contagion

Information on how institutions are interconnected and how shocks may propagate from one institution to the rest of the system can be based on various sources and methods (Table 4.3). Sector-level balance sheet data may provide an overall picture and assessment of direct channels of interbank contagion. Firm-specific data on interbank exposures give further detail and enable network analysis or bank default simulations to be performed to assess the resilience of the interbank networks.

Table 4.3: Indicators of intra-financial contagion

Risk driver	Indicator	Source
Balance sheet	Intra-financial assets/total assets Intra-financial assets by type of asset/total assets (loans, covered bonds ⁷⁹)	FINREP + BIS
Network effects	Mean geodesic distance (shortest path) between banks as a measure of “proximity” of banks in the network ⁸⁰	Network analysis
Bank default	Number of banks failing due to contagion Probability of a simultaneous default by two or more large and complex banking groups Banking sector-wide losses/banking sector capital	Bank default simulation RDB 1.2 FINREP + COREP (denominator)

c) Financial sector concentration

In addition to traditional concentration measures, indicators of financial sector concentration may include a measure of the importance of SIs for the financial system. Market concentration may be measured in terms of total assets or a particular market segment or activity (Table 4.4).

Table 4.4: indicators of financial sector concentration

Risk driver	Indicator	Source
Concentration	Herfindahl Index of total assets	ECB/SSI
	Herfindahl Index of banks' turnover in particular markets	Bloomberg/Reuters
	Market share of SIs related to the balance sheet of the banking sector or to the aggregated lending to the private sector	FINREP for total balance sheet of institutions identified as SIs. Additional source for total balance sheet of banking sector is needed such as the ECB's CBD

Note: SSI refers to structural statistical indicator.

⁷⁹ Sveriges Riksbank (2011).

⁷⁹ For more network indicators see Alves et al. (2013).



3. Indicator of importance of the financial sector to the real economy

Such measures range from general indicators of size of the financial sector relative to the real economy to more specific indicators, such as an institution's contribution to or market share in important economic functions, e.g. the provision of credit (Table 4.5).

Table 4.5: Indicators of importance of the financial sector to the real economy

Risk driver	Indicator	Source
Importance of the financial sector or individual institutions	Total domestic assets/GDP	FINREP + Eurostat + ECB/BSI
	Total assets worldwide/GDP	FINREP + Eurostat + CBD + new RDB
	Total bank credit/total credit	ECB/BSI + ECB/IEAQ
	Total retail deposits/GDP	FINREP + Eurostat + CBD
	Resolvability	Resolution plans

Note:

BSI refers to balance sheet items; IEAQ refers to integrated euro area accounts.

It is emphasised that this list is not exhaustive. Other structural risks may also need to be considered within the above-mentioned categories. In addition, qualitative judgement and financial sector evolutions, such as financial innovation and changes in (financial) regulation, should take into account when setting the SRB. Annex 4.3 provides empirical evidence on the relevance of the concentration and the size of the financial sector as indicators.

4 Activating/deactivating instruments

There are many ways to use the above indicators in the context of implementing the O-SII buffer and the SRB. The EBA, in consultation with the ESRB, will publish guidelines by January 2015 on setting the O-SII buffer. They will aim at harmonising practices across Member States, while preserving some degree of flexibility.⁸¹ This chapter does not discuss how to operationalise the G-SII buffer, as the EBA is to develop detailed (binding) regulatory technical standards on the identification of G-SIIs, definition of the G-SII sub-categories and allocation to them.

4.1 O-SII buffer

4.1.1 Combining and interpreting indicators

Authorities must first decide which criterion, or combination of criteria, they will use to designate an O-SII. These criteria could be based on the four criteria discussed in Section 3.2 and/or on others; the identification methodology for O-SIIs allows more scope for national discretion. Moreover, as mentioned above, the EBA is required to publish guidelines on the identification process by 1 January 2015. Reliance on a set of criteria instead of a single criterion is likely to bring more robust results. This does not mean, however, that the criteria should be given equal weights. Equal weights would imply that institutions, in order to be classified as an SII, should score high on most or all of the criteria. That said, it may be possible to identify an institution as an SII if it scores sufficiently high on a single criterion.

⁸¹ Česká národní banka provides a recent example of O-SII identification and related buffer rate setting (Skořepa and Seidler (2013)).

Authorities can apply criteria in different ways, from an entirely qualitative assessment with full discretion to a purely quantitative and mechanic assessment. The advantage of the first approach is its flexibility whereas the advantage of the second is its transparency and predictability. In line with the G-SII identification, it is advised to apply quantitative thresholds, while retaining some room for manoeuvre (discretion and expert judgement).

As most criteria are evaluated on the basis of a set of indicators, aggregation issues may arise. In general, it is appropriate to calculate the value of the criteria as a function (e.g. as an average) of the values of the individual indicators. The specific aggregation function depends on whether some of the indicators are considered superior (more representative, reliable, etc.) compared with the others.

The next question is how to judge when a single indicator is giving a “signal” of systemic importance. What are the relevant indicator thresholds that should be reached or exceeded in order for an institution to be considered systemically important?

There are several ways to obtain indicator thresholds. Some examples are given below.

- Applying a statistical clustering method to the indicators and grouping institutions according to their scores for each indicator. The thresholds are set where institutions in one cluster are considered more systemically important than those in other clusters. This method is accurate but purely statistical and therefore may not reflect economic intuition. Furthermore, the SII ranking obtained is relative. For example, a doubling of all institutions’ indicator value would not change the score of individual institutions, even though their systemic importance has increased.
- Defining indicator thresholds as a specific multiple (e.g. two or three times) of the industry average of the indicator. This method does not overcome the relativity issue.⁸²
- Setting fixed absolute thresholds based on empirical evidence and expert judgement. This approach avoids the problem of relative indicator thresholds and may be combined with one of the two approaches above.⁸³

It is important to leave scope for the use of expert judgement. This allows authorities to add an institution to (or remove it from) the O-SII list or to move an institution to another category of systemic importance when deemed necessary, even if the relevant indicator threshold has not been reached or exceeded.

4.1.2 Determining buffer size

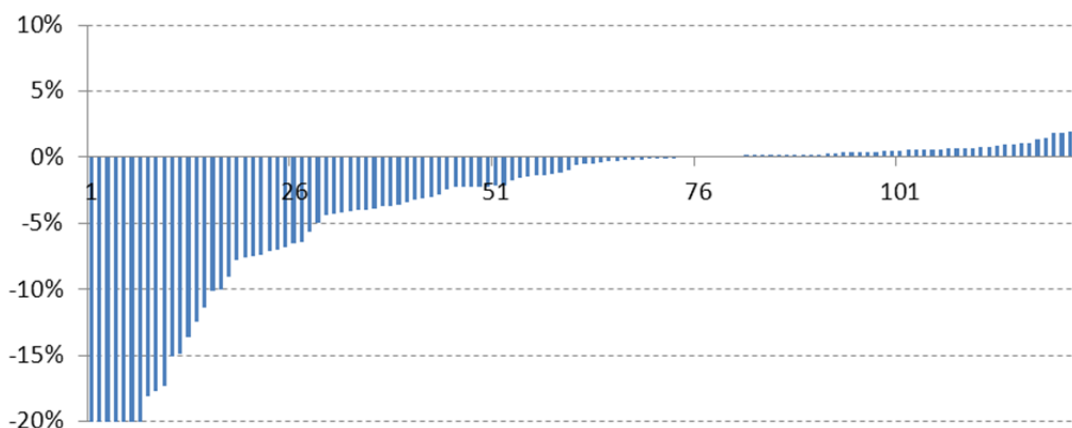
The 2% cap on the O-SII buffer laid down by the CRD is considered to be too low by some Member States. Authorities in at least five countries consider the 2% cap to be a constraint (Annex 4.2). By contrast, the BCBS framework for domestic systemically important banks

⁸² Note that the BCBS approach to determining global systemically important banks also leads to a combination of relative absolute thresholds.

⁸³ The choice of a relative or an absolute interpretation of indicators affects their information content. For example, total assets for measuring “size” and the ratio of total assets to GDP as a measure of “importance for the economy” would give exactly the same message in a relative setting. However, if the absolute level of the indicators is also considered, then total assets and total assets to GDP do have different information content.

does not provide for caps. When assessing the systemic importance of O-SIIs, macro-prudential authorities should focus on the extent to which an O-SII may adversely affect the domestic or EU economy. A domestic perspective may differ from the global perspective and therefore may call for buffer rates different from those applied to G-SIIs. As shown in Figure 4.2, bank losses in financial crises can be large and a 2% O-SII buffer would not have been sufficient to adequately absorb the losses of large O-SII banks during the recent crisis.⁸⁴

Figure 4.2: Bank losses as share of risk-weighted assets (2008-12)



Source: ECB, based on SNL Financial data

Notes: The sample includes 116 banks from the EU28 whose total assets exceeded EUR 30 billion in any year during the period 2008-12. The figure presents the aggregated losses in consecutive years for a bank (or, where there were no losses, the least profitable year) in relation to the bank's risk-weighted assets at the beginning of the period when losses started occurring.

In practice, as mentioned above, macro-prudential authorities may apply the SRB to impose a higher than 2% capital surcharge on their O-SIIs. However, this is considered to be a sub-optimal solution by a majority of Members, as the dedicated instrument for O-SIIs is the O-SII buffer.

Other than the cap, the legal framework for the O-SII buffer provides macro-prudential authorities with room for manoeuvre. Unlike for G-SIIs, no bucketing approach is prescribed for O-SIIs. However, national authorities (or the EBA) may develop a similar bucket/sub-category system for O-SIIs and assume similar powers for allocating O-SIIs to the buckets as they do for G-SIIs.

There are various possible approaches to determine the size of the O-SII buffer. The simplest one relies on scores, calculated on the basis of the O-SII criteria mentioned in Section 3.2 above. Based on these scores, the O-SIIs are then allocated to different buffer rate buckets. The O-SIIs with the highest scores are allocated to the higher bucket with, e.g. an O-SII buffer of 2%, while the O-SIIs with the lowest scores are allocated to the lower buckets with, e.g. an O-SII buffer of 1%.

Another intuitively appealing but more complicated method is based on the principle of "equal expected impact". This approach is used by the BCBS to calibrate the additional capital

⁸⁴ Applying the maximum O-SII buffer of 2%, a bank would have to hold 9% CET1 capital. However, 17 of the 116 banks in Figure 4.1 display losses of more than 9% of RWAs.



requirements for global systemically important banks. The expected impact of distress (failure or near-failure) of any given bank is equal to the product of the economic/social cost of distress which the bank would cause and the probability of the bank being in distress. Given that the failure of an O-SII will have a bigger economic impact than that of a non-SII, the probability of distress of an O-SII should be lower than the probability of distress of a non-O-SII in order for an O-SII and a non-SII to have an equal expected impact.

This approach consists of the following steps.

1. Determine the relative economic impact of an SII in distress compared with that of a (reference) non-SII in distress. One should rely on the SII indicators and directly use institutions' SII score as a proxy for their economic impact. As regards the choice of a reference non-SII, one may reasonably consider a – hypothetical – institution which falls just under the SII qualification threshold.
2. Determine the probability of distress of a (reference) non-SII. Several approaches are possible, such as using the historical distribution of the ratio of income to RWAs (return on RWA, or RORWA) or Merton model-based methods.⁸⁵
3. Based on the information obtained in steps 1 and 2 and the “equal expected impact” principle, determine the required probability of distress of an SII.
4. Based on the information obtained in step 3, determine the amount of additional capital needed by the SII to reduce its probability of distress to the required level. The higher the economic impact of the SII in distress (as determined in step 1), the larger the O-SII buffer the SII needs to hold. Various approaches can be used to calculate this additional capital requirement and several assumptions need to be made. As in step 2, one possibility is to use the historical RORWA distribution. See Annex 4.4 for more on the RORWA approach.

With this approach, the outcome is likely to be sensitive to underlying assumptions. It is therefore essential that macro-prudential authorities perform robustness checks to test both the underlying assumptions and the general soundness of the approach taken. A purely mechanistic approach to setting the O-SII buffer size is not recommended. Expert judgement is considered crucial in this respect.

4.2 SRB

4.2.1 Combining and interpreting indicators

As explained in Section 3, there is scope to apply an SRB when risk indicators signal:

- a high probability of (large) shocks;
- significant amplification channels;

⁸⁵ See, e.g. Kealhofer and Kurbat (2002).

- a high degree of importance of the financial sector to the real economy.

First, the SRB should be introduced on the basis of potentially large conditional losses, rather than the probability of a large shock, which is more difficult to assess. However, it is generally appropriate to take the probability of a shock into account so that the SRB is only applied when risk is material, in terms of both probability and magnitude. That said, sources of shocks and their size are difficult to predict. One could argue that the presence of significant amplification channels (common exposures, interconnectedness, etc.) and/or a large importance of the financial sector to the real economy are sufficient conditions for using the SRB. If so, an SRB should be applied where *conditional* losses to the financial sector and/or the real economy are large, regardless of the size of *expected* losses (which depend on the probability of a shock). The choice of approach depends essentially on the authority's risk aversion.

Second, the SRB can be used where there are large amplification channels. Such channels include common exposures, interconnectedness and concentration, as discussed in Section 3.3.1. Indicators capturing such amplification channels should be measured over the cycle to prevent pro-cyclicality. For instance, setting an SRB during a downturn might worsen the economic situation.

Third, the SRB should be applied when distress in the financial sector could have serious negative consequences to (the financial system and) the real economy in a specific Member State. It follows that the SRB should not be applied when such consequences are likely to be absent or limited. A large impact on the real economy could be considered as a sufficient condition for applying the SRB, regardless of the risks in the financial sector (i.e. regardless of the presence of structural risk factors and/or amplification channels).

Finally, an indicative threshold should be derived for each indicator. To help define such thresholds, the structural systemic risk indicators discussed in Section 3.3.2 can be linked to a binary variable (taking the value 1 when a country experiences a financial crisis and 0 otherwise, as in standard early warning models), and/or a variable measuring the cost (in terms of bank losses or GDP growth) of financial crises. Statistical approaches⁸⁶ allow then to measure systemic risk (in terms of probability of crisis and/or potential crisis losses) as a function of the indicator level(s) and to derive critical indicator thresholds. However, given the complexity of most risk drivers, expert judgement should remain an important factor in the selection. The quantitative assessment should be accompanied by a qualitative judgement.

4.2.2 Determining buffer size

Stress testing is a very useful method of assessing the amount of potential losses stemming from structural systemic risks. Stress scenarios should be selected on the basis of the structural risk factors or amplification channels that the macro-prudential authority aims to mitigate. For example, in order to assess the potential risks of excessive exposures to a particular currency, the stress test scenario might consider the impact of a severe exchange rate shock. Similarly, a particular loss rate could be assumed for risky asset exposures. In

⁸⁶ Univariate or multivariate models, among which the signalling approach and logit/probit models can be utilised.



addition, an analysis of second-round effects in stress tests may reveal the presence of amplification channels such as interbank market interconnectedness or asset fire sales.

Estimated losses under a stress scenario may serve as a basis for determining the size of the SRB. The question arises as to how stress test losses should be mapped into an SRB rate. Given that institutions already hold capital against many structural risk factors, e.g. specific exposures, it is important to avoid the double-counting of risks. However, when stress tests indicate the presence of contagion through the interbank market and/or asset fire sales, the losses generated through these amplification channels are not covered by other capital charges and should therefore be reflected in the SRB rate. Such losses are measured at the system-wide level and should be assigned to those institutions that generate most of these externalities.

In addition to performing stress tests, macro-prudential authorities may also refer to experience with historical financial crises. The losses during the recent crisis can be related to the indicators underlying the SRB decision. In a *crisis probability framework*, these indicators can be used to predict the probability of a financial crisis and then capital requirements should be increased to bring this probability down to the desired level.⁸⁷ This system-wide increase should then be applied to individual institutions. In a *crisis losses framework*, systemic risk indicators are used to predict institutions' losses. Sufficient capital should be held to cover these losses. After the systemic risk indicators are linked to crisis losses at a system-wide level, increased capital requirements should be applied to individual institutions.

When applying the SRB to systemic risks posed by SII, the decision on the size of the buffer may also be based on the method(s) used for determining the size of the O-SII buffer, as discussed in Section 4.1.2.

Ultimately, it is important that macro-prudential authorities assess the robustness of their results and rely also on expert judgement when setting the SRB rate.

4.3 Accumulation of instruments

Different capital-based instruments should not be used to cover the same risk. For instance, if a bank is required to hold more capital against risk A through higher risk weights, it should not be required to hold extra capital against the same risk A through the SRB as well, unless risk A (or elements of risk A) are not fully addressed by the increased risk weights. Similarly, capital that is held for SRB purposes should not be counted as capital for Pillar 2 purposes.

If an instrument does not suffice to fully address a risk, a set of instruments (both capital buffers and other instruments) can be used jointly, provided that they have different transmission mechanisms. For instance, an SRB can be applied to banks with common exposures to the real estate sector, even if real estate risks are already covered by increased risk weights, since the first addresses systemic risks of the common exposures in real estate, which might not be covered by the second.

⁸⁷ Lo Duca and Peltonen (2011).

The CRD restricts the combination of a G-SII-buffer, an O-SII-buffer and an SRB in order to prevent excessive accumulation.⁸⁸ The CRD also provides for a minimum combined buffer requirement at individual institution level, possibly in order to ensure a level playing field between subsidiaries of a group and individual, independent institutions. These articles seem redundant, however, since they only confirm the maximum accumulation rules.⁸⁹

At a consolidated level the G-SII buffer or the O-SII buffer is applicable, but not both. The G-SII buffer is applied at a consolidated level (or at an individual level if the G-SII has no subsidiary).⁹⁰ The competent or designated authority in the Member State of the consolidated group is responsible for applying the buffer. The O-SII buffer can be applied at a consolidated, sub-consolidated or individual level, even if the subsidiary is part of a group. It is for the competent or designated authority of the subsidiary and of the parent institution to apply the O-SII buffer at the appropriate level. However, whenever a group is subject to both a G-SII buffer and an O-SII buffer at consolidated level, the higher of the two buffers applies. Its subsidiaries can also be identified as O-SIIs.

The CRD provides that whenever an SRB is applicable along with an O-SII or G-SII buffer at the same level, the highest buffer applies. (There is an exception to this, however, see below.) This means that the SRB cannot be used as an “add-on” to complement the SII buffers. For example, the SRB cannot be used to top-up an O-SII buffer if the maximum rate (2% cap) is considered too low: it can only replace the O-SII buffer. Neither can the SRB be used in addition to the SII buffers if structural risks other than those related to SIIs (e.g. common exposures) need to be addressed. This limits the SRB’s scope and effectiveness as authorities cannot impose both an SII buffer and an SRB to address different systemic risks. The exception is where the SRB targets only domestic exposures, in which case the SRB is cumulative with the SII buffer.

Table 4.6: Accumulation rules of SII buffers and the SRB

	G-SII buffer	O-SII buffer	SRB
Level of application	At consolidated level or at individual level	At consolidated, sub-consolidated or individual level	At consolidated, sub-consolidated or individual level
Maximum (rule 1)	<p>The higher of the G-SII buffer and O-SII buffer at consolidated level</p> <p>A banking group can be subject to both a G-SII buffer (at consolidated level) and an O-SII buffer (at sub-consolidated or subsidiary level).</p>		Not applicable
Maximum (rule 2)	<p>Where the SRB applies at the same level (consolidated, sub-consolidated or individual level) as an SII buffer, and the SRB covers domestic and cross-border exposures, the higher of the two applies.</p> <p>Where the SRB applies at the same level (consolidated, sub-consolidated or individual level) as an SII buffer, and the SRB covers only domestic exposures, both the SRB and the SII buffer apply.</p>		

⁸⁸ Article 131(14)-(15) and Article 133(4)-(5).

⁸⁹ Article 131(16)-(17) and Article 133(6)-(7).

⁹⁰ Article 131(1) CRD and Article 6 CRR.



5 Decision-making, coordination and communication⁹¹

5.1 G-SII and O-SII buffers

The following steps can be identified:⁹²

1. Member States must designate a competent authority/designated authority to be in charge of identifying the systemic institutions which have been authorised under their jurisdiction. Member States may designate more than one authority.⁹³
2. The competent authority/designated authority must notify the names of the G-SIIs and O-SIIs and the respective sub-category to which each G-SII is allocated to the European Commission, the ESRB and the EBA. It is not necessary to consult them or request their opinion.⁹⁴ Notification should be timely, clear, complete and comparable. It is recommended to use the ESRB's standard notification template (Annex 4.5).
3. The competent authority/designated authority must disclose to the public the names of the identified SIIs and – in the case of G-SIIs – the sub-category to which each G-SII is allocated.
4. Before setting or resetting an O-SII buffer, the competent authority/designated authority must notify the European Commission, the ESRB and the EBA as well as the competent and designated authorities of the Member States concerned at least one month before the publication of the decision requiring an O-SII buffer to be maintained. There are several elements to the notification (listed in Article 131(7) CRD).
5. The competent authority/designated authority must review every year the identification of SIIs and the G-SII allocation into the respective sub-categories and report the result to the SIIs concerned, to the European Commission, the ESRB and the EBA. The updated information must be disclosed to the public.

5.2 SRB

The following steps can be identified.⁹⁵

1. A Member State may choose whether to implement the relevant SRB provisions in its national law. Otherwise said, it can decide whether or not it wants to have the possibility to use this instrument. According to an ESRB survey mid 2013, virtually all Member States intended to implement SRB provisions in their national law.
2. Where a Member State decides to implement SRB provisions in its national law, the Member State must designate a competent authority/designated authority in charge of

⁹¹ Chapter 6 gives guidance on decision-making, coordination and communication for Pillar 2 measures.

⁹² Article 131 CRD.

⁹³ The rationale behind the possibility to designate more than one authority is that certain G-SIIs and O-SIIs may carry out non-banking activities which are also considered to be systemically important. For instance, a bank managing an important payment system, or acting as a central securities depository or a central counterparty clearing house may be supervised by several types of authorities.

⁹⁴ However, they are not prevented from providing an opinion on an informal basis.

⁹⁵ Article 133 CRD.



setting the SRB and of identifying the sets of institutions to which it applies. Given the interplay between and overlap with the SII buffers, this Handbook suggests that Member States allocate the tasks of setting the SRB and the SII buffers to one and the same authority.

3. Before setting or resetting an SRB, the competent/designated authority must notify the European Commission, the ESRB, the EBA and the authorities of other Member States concerned. This notification must take place at least one month before the publication of the decision announcing the setting of the SRB. One of the elements to be included in the notification is the justification for why none of the other measures in the CRD and the CRR (except for the national flexibility measures) are sufficiently effective to address the identified systemic risk. Notification should be timely, clear, complete and comparable. It is suggested to use the ESRB's standard notification template.
4. Further coordination requirements depend on the timing, intended level and the geographic location of exposures covered by the SRB. Until 2015 an SRB above 3% requires authorisation from the Commission after the ESRB and perhaps the EBA have provided an opinion. From 2015 onwards, the same authorisation is required for an SRB of above 3% on exposures in other Member States and for an SRB of above 5% on domestic and third-country exposures. A buffer rate between 3% and 5% on domestic and third-country exposures applied to a subsidiary of a parent in another Member State may be subject to a binding mediation procedure carried out by the EBA. It should be noted that, in the case of multiple SRBs targeted at different systemic risks, the individual rates of all SRBs should be combined for each bank to arrive at the SRB level applicable to it. This aggregate level is used to check whether or not the thresholds in the table below are exceeded.
5. The competent authority/designated authority must announce the setting of the SRB by publication on an appropriate website. The information must include at least the buffer rate, the institutions to which it applies, the justification for the SRB (although this information should not be included if publication could jeopardise financial stability), the date from which it is applicable and the names of the countries with exposures recognised in the buffer. Any communications on the SRB should be timely, clear, complete and comparable.
6. Other Member States may decide to recognise and apply the SRB to their domestic institutions for the exposures located in the Member State setting the buffer. The Member State setting the buffer may ask the ESRB to issue a recommendation to one or more Member States to recognise the SRB. In the case of a significant market share of foreign-owned banks, the competent authority/designated authority setting the SRB should ask the authorities in other relevant Member States, possibly through an ESRB recommendation, to follow suit and apply the SRB to the exposures located in the Member State setting the SRB as well. In the absence of such reciprocity, the SRB risks being a less effective tool. The same procedures apply for (re)setting the SRB by the other Member States.



Table 4.7: Procedures relevant to the SRB

SRB level	Procedure (referring to the relevant sub-paragraph (§) of Article 133 CRD)
Domestic (local) exposures and exposures to third countries	
Before 1 January 2015	
Up to 3%	Notification only (see step 3 above) (§ 11)
Above 3%	1. Notification (§ 12)
	2. ESRB (and perhaps EBA) opinion to European Commission (§ 15)
	3. Commission decision on adopting implementing act authorising the competent authority/designated authority to apply the SRB (§ 15)
After 1 January 2015 (§13)	
Up to 3%	Notification only (see step 3 above) (§ 13 and §11)
Between 3% and 5% where the entity is not a subsidiary of a parent established in another Member State	1. Notification (§13 and §11)
	2. European Commission opinion (§ 14)
	3. Competent authority/designated authority “complies or explains” (§ 14)
Between 3% and 5% where the entity is a subsidiary whose parent is established in another Member State	1. Notification (§13 + §11)
	2. Recommendation from European Commission and the ESRB respectively (§14)
	3. If authorities of concerned Member States disagree and if both recommendations are negative, can request EBA binding mediation (§14)
Above 5%	1. Notification (§13+ §12)
	2. ESRB (and perhaps EBA) opinion to European Commission (§15)
	3. Commission decides on adopting implementing act authorising the competent authority/designated authority to apply the SRB (§15)
Exposures to other Member States	
Up to 3%	1. Notification (§11)
	2. No authorisation, but the buffer must be set equally on all exposures located within the EU (§8 + §18)
Above 3%	1. Notification (§12)
	2. ESRB (and perhaps EBA) opinion to European Commission (§8 + §15 following §12)
	3. Commission decides on adopting implementing act authorising the competent authority/designated authority to apply the SRB (§ 15)

Chapter 5

Liquidity instruments⁹⁶

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Executive summary

This chapter provides high-level guidance to ESRB member organisations on the use of liquidity instruments for macro-prudential purposes in particular in the light of implementation of the CRD/CRR.

Macro-prudential policy is an area at an early stage of development; this is even more as regards the use of instruments to address systemic liquidity risk for which there is relatively little country experience to draw on. Moreover, some of these instruments, such as the LCR (liquidity coverage ratio) and the NSFR (net stable funding ratio), are still in the process of being finalised by the international supervisory community and their implementation is only scheduled in the medium term.

Compared with the work on other macro-prudential instruments, this chapter therefore provides essentially conceptual and exploratory information rather than concrete operational guidance. There is a need to continue working in this area. As more data become available during the observation phase of the internationally agreed liquidity standards, their macro-prudential dimension can be investigated in much greater detail.

This chapter is structured into four main parts. First, it discusses the externalities related to liquidity risk, the transmission mechanism through which the liquidity instruments address these externalities, and possible unintended effects related to their use. Second, it reviews the individual instruments, distinguishing between volume-based instruments (LCR, NSFR, loan to deposit (LTD) or loan to stable funding (LTSF) limits) and price-based instruments (general liquidity surcharge and liquidity surcharge for systemically important institutions). Some of these instruments, including the LCR and the NSFR, can also be designed as time varying. Third, it lists potential indicators that authorities can employ to support policy decisions on the (de)activation and adjustment of liquidity instruments. These include both higher frequency market data and lower frequency balance sheet data. Finally, the last part of the chapter discusses relevant legal (procedural) and institutional issues related to the use of these instruments.

For practical reasons, the chapter focuses on the above-mentioned narrow set of instruments in the context of CRD/CRR implementation. The chapter therefore does not aim to be comprehensive and it is acknowledged that other liquidity instruments could be (or are already) used for macro-prudential purposes, such as reserve requirements, restrictions on funding in foreign currencies and on short-term wholesale funding. Their usefulness in the EU or euro area context should be explored in more detail in further analyses.

The main analytical findings and policy messages of the chapter are the following.

- **Systemic liquidity risk manifests itself in situations in which banks' normal funding and refinancing channels fail, which may prompt the central bank to act as lender of last resort.** This risk is crucial for understanding the recent financial crisis. With hindsight, it could be said that banks neglected systemic liquidity risk and "underpriced" it by not internalising the related externalities.
- **Liquidity risk was not sufficiently addressed by regulators and supervisors** as, for example, reflected in the lack of internationally agreed liquidity standards comparable to the Basel capital ratios as well as the important gaps in data for identifying and monitoring



the build-up of risk. International initiatives are under way to address this, but it will take time before they are fully implemented and their effects can be observed.

- **Liquidity risk is usually addressed by policies mitigating traditional bank runs by (retail) depositors. This, however, is insufficient to comprehensively address all externalities**, as a large part of funding and refinancing is now provided by wholesale markets or bilaterally between financial institutions. Other mechanisms are therefore needed to capture these new sources of risk. While solvency and liquidity are intertwined, the recent crisis has also demonstrated that solvency regulation alone is not enough and that liquidity-related vulnerabilities may be best targeted by using dedicated liquidity instruments.
- **Banks should internalise the externalities related to liquidity risk so that the socialisation of losses (public insurance) becomes truly a last resort and is priced accordingly.** This is part of the ambitious effort that is under way to reduce explicit and implicit reliance on public support for banks.
- **While the international liquidity standards currently being developed (the LCR and NSFR) address some of the externalities of liquidity, as presently designed they are not sufficient to do so comprehensively.** A case can therefore be made for additional macro-prudential liquidity regulation. As the LCR and NSFR are still in the process of being finalised, the ESRB can only give conceptual and exploratory guidance on the use of macro-prudential liquidity instruments at this stage.
- **A structural funding ratio is the preferred instrument for mitigating excessive maturity mismatch – the key intermediate macro-prudential objective relevant for systemic liquidity risk.** Achieving a well-designed NSFR, also for macro-prudential purposes, would contribute significantly to addressing structural liquidity risk and should therefore be a priority. In addition to a new minimum standard, a time-varying use of the NSFR would allow banks to adjust their resilience to liquidity risk over the financial cycle (similarly to the CCB) and would also enable longer-term (structural) changes to be addressed. If the NSFR is implemented as a minimum requirement, a time-varying add-on of the ratio, including the possibility of deviating from (or “going below”) the minimum prudential buffer in stressed situations, would help to reduce pro-cyclicality. But the macro-prudential use of the NSFR would be challenging at this juncture as the international standard has not yet been finalised.
- **The CRD/CRR offers the possibility to introduce macro-prudential liquidity instruments**, including a (time-varying) structural funding ratio such as the NSFR, via the national flexibility measures (Article 458 CRR) and Pillar 2.
- **A number of market-based and balance sheet indicators are identified that can guide the use of macro-prudential liquidity instruments.** Regarding the activation of the instruments, a combination of indicators and expert judgement is necessary for the build-up phase, while market-based indicators (for instance the ECB’s financial market liquidity indicator) could play a greater role in guiding the release phase.
- **Authorities considering using the instruments should exercise caution both in the overall setting of the instruments and with regard to the information used to guide**



their decisions, given the general uncertainty on the effectiveness of the instruments in practice, the significant data gaps and the ongoing finalisation of the international liquidity standards.

1. Macro-prudential objectives

A **systemic liquidity stress** can be defined as any situation in which banks' normal funding and refinancing channels fail and which may prompt the central bank to act as lender of last resort. Refinancing difficulties at one or a few systemically important institutions can be the beginning of a systemic liquidity stress. Such stresses can seriously disrupt the financial intermediation process and, as a consequence, they may have a severe adverse impact on the provision of credit to the real economy, even causing or amplifying a recession. Macro-prudential policies related to liquidity aim at avoiding such stresses by reducing systemic liquidity risk.

Liquidity risk can materialise either in the form of **market liquidity risk** (inability to sell assets quickly with little or no impact on prices) or **funding liquidity risk** (inability to issue new debt or roll over existing debt). These two forms of risk may be linked and reinforce one another in a feedback loop.⁹⁷ Market and funding liquidity risks can be further distinguished by their type of emergence – **structural, cyclical or liquidity crisis**. Section 4.1 of this chapter provides definitions and further explanations of these conceptual distinctions.

The ultimate objective of macro-prudential policy is to contribute to safeguarding financial stability by strengthening the resilience of the financial system and decreasing the build-up of systemic risks in order to protect the overall economy from significant output losses. In its Recommendation on intermediate objectives and instruments of macro-prudential policy, the ESRB identified a number of intermediate objectives as operational specifications to this ultimate objective. One intermediate objective, which is particularly relevant for systemic liquidity risk, is **the mitigation and prevention of excessive maturity mismatch and market illiquidity**. This objective is in turn closely linked to the intermediate objective of mitigating and preventing excessive credit growth and leverage, as strong credit growth is often associated with an increased reliance on short-term and more volatile sources of funding.

Externalities motivating liquidity regulation in general

The aim of liquidity regulation is to ensure that banks are able to refinance themselves when their liabilities become due. High levels of maturity mismatch and low holdings of liquid assets increase the potential for runs on various types of bank liabilities. While banks' financial intermediation role is intrinsically linked with maturity and liquidity transformation, the level of mismatch may be excessive from a social viewpoint because of negative externalities.

A bank may choose not to improve its liquidity structure because it does not fully internalise the benefits of doing so. There are three main externalities which arise in such cases. First, in

⁹⁷ Brunnermeier and Pedersen (2009).



a period of stress, a bank may suddenly become unable to meet withdrawal requests and margin calls requiring liquid collateral. Rapid asset sales to meet such requests may have an impact on other banks via market prices. As a rule, banks do not internalise the system-wide impact of their actions and individual funding fragilities.⁹⁸ Second, authorities may decide to initiate rescue plans when a system-wide liquidity crisis occurs. These “bail outs” entail costly distortions, e.g. taxpayer support and/or exceptional monetary policy measures. Banks may expect such a rescue to be launched every time a system-wide stress occurs and this expectation generates moral hazard.⁹⁹ Third, collective exuberance may lead banks to rapidly grow their balance sheets with unstable sources of funding in an attempt to meet performance benchmarks.¹⁰⁰

These externalities justify having specific liquidity regulation in place. The BCBS has developed a proposal for internationally harmonised liquidity standards, namely the LCR and the NSFR. These standards are a key step towards establishing a liquidity regulation framework, but may not be sufficient to comprehensively address all externalities. While liquidity and solvency are intertwined, the recent crisis has demonstrated that solvency regulation alone is not sufficient and that liquidity-related vulnerabilities may be best targeted using dedicated liquidity instruments.

Liquidity buffer requirements mitigate the first type of externalities as they enable a bank to survive a stress period for a few weeks, i.e. strengthening their short-term resilience. This provides authorities with time to assess the situation and prepare an appropriate reaction. Examples of such requirements are the LCR and the liquid assets ratio (LAR).

Stable funding requirements identify stable liabilities and relatively illiquid assets and introduce a balance sheet constraint that compels banks to fund a proportion of the latter with some amount of the former. This addresses the other externalities by making funding more stable and/or by reducing the maturities of assets for every bank in the system. Examples of such requirements are the NSFR, a core funding ratio (CFR), the LTD and the LTSF. Stable funding requirements are the most appropriate type of instrument to mitigate and prevent excessive maturity mismatch and market illiquidity since they reduce the need for frequent refinancing of banks. Therefore, the international supervisory community should give the highest priority to reaching a sound agreement on the NSFR.

Specific goals of a (time-varying) macro-prudential liquidity policy

The internationally harmonised minimum liquidity requirements developed by the BCBS are based on stress scenarios. These common minimum requirements function as backstops to ensure banks’ resilience against idiosyncratic and market-wide shocks. The LCR and the NSFR are intended to be essentially mandatory but static minimum requirements during normal times, although banks would be allowed to deviate from the minimum LCR during periods of stress.

⁹⁸ Morris and Shin (2008). This externality may also comprise the problem of liquidity chains, where small maturity mismatches at the level of the single institution compound to large system-wide maturity mismatches.

⁹⁹ Farhi and Tirole (2012).

¹⁰⁰ Aikman et al. (2013).

These requirements may therefore need to be supplemented with a macro-prudential liquidity policy. This implies addressing both the structural and cyclical dimension of liquidity risk. Achieving well-designed prudential liquidity ratios also for macro-prudential purposes would contribute significantly to addressing structural liquidity risk. In addition, the possibility to adjust the policy over time would enable developments to be taken into account such as changes in the financial cycle and other sources of cyclical risk, including those related to global liquidity.¹⁰¹ The analogy can be made here with the countercyclical capital buffer under the CRR, where a macro-prudential time-varying capital buffer complements the binding minimum capital requirements to address systemic imbalances resulting from excessive credit developments.

More specifically, a time-varying macro-prudential liquidity policy is needed for a number of reasons. First, the liquidity requirements may potentially exhibit pro-cyclicality. This results from the fact that they have not been calibrated taking the financial cycle into account,¹⁰² that their parameters are fixed in time, and that they make use of credit ratings that may also exhibit pro-cyclicality.

Second, in the expansion phase of the financial cycle, mechanisms and imbalances may build up with the potential to magnify and spread the costs of future crises. As intra-financial activities and leverage intensify, interconnectedness increases, intermediation chains lengthen and banks may be led to take similar risks – overlooking the possibility of a collective failure.

Third, tightening liquidity requirements can at times limit the build-up of systemic risk. Financial crises may appear to be triggered by specific shocks but their causes are often endogenous. For example, a credit boom may be fuelled by cheap foreign bank funding and securitisation. The funding decisions of each individual bank have little impact on the size of the overall imbalances, but the joint actions of all banks create risks of massive cross-border outflows or a sudden drying up of the securitisation market.

Finally, under different sets of circumstances, the macro-prudential authority may judge that the externalities have become less severe, meaning that the build-up of imbalances has reversed and the risks subsided. If this is the case, it may be advisable to loosen the macro-prudential requirements, especially where banks face tough conditions in the wholesale funding market or limitations on the new deposits they can attract.

Turning to the case of the LCR, macro-prudential requirements would complement the minimum prudential requirements.¹⁰³ During times of stress (which can be institution specific

¹⁰¹ CGFS (2011) and Eickmeier et al. (2013). Ample global liquidity, reflected in large capital flows, may provide cheap and easily available funding for banks, bringing about an increased reliance on short-term wholesale funding. It is a key source of excessive credit expansion.

¹⁰² Liquidity requirements dampen the tendency to resort to cheap short-term financing in an upturn, but may aggravate funding stress in a downturn when stable long-term funding becomes more expensive. Note also that while the original Basel III proposals stated that institutions would have to maintain an LCR above 100% on a continuous basis, the 2013 revisions allow banks to use their stock of HQLA in both idiosyncratic and systemic stress events (BCBS (2013)).

¹⁰³ In contrast to specific macro-prudential requirements, minimum prudential requirements often serve both a macro- and micro-prudential purpose. Examples are the Basel III liquidity standards, the LCR and the NSFR. They are not explicitly calibrated to take the financial cycle or an institution's specific systemic relevance into account, but they nevertheless contribute to a safer financial system.

or market wide), institutions are allowed to draw on their prudential liquidity buffers¹⁰⁴ (i.e. they can “go below” the 100% level otherwise required). The national competent (micro-prudential) authority evaluates ex post whether a given institution is indeed in a stress situation and, using the range of measures at its disposal, can ask the bank to restore its liquidity buffers if appropriate.¹⁰⁵ Time-varying macro-prudential requirements could be added on top of the minimum prudential requirements during upturns and released during a downturn. Similarly, add-ons for systemically important institutions may be envisaged.

While this chapter focuses on banks, in practice macro-prudential authorities should also monitor other financial institutions that engage in maturity transformation (shadow banks). Similar considerations to those expressed above would apply to these institutions. It is important that a comprehensive macro-prudential monitoring covers any potential for maturity transformation migrating to the shadow banking sector after the introduction of regulatory changes (leakage).¹⁰⁶

2. The instruments, their transmission and effects

2.1 Transmission mechanism

There are two main types of volume-based liquidity instruments that can also be used for macro-prudential purposes: **liquidity buffer requirements** and **stable funding requirements**. Assessing their transmission mechanism is complex. Very little empirical investigation exists, all the more so because, with a few exceptions, the LCR and NSFR have not yet been implemented. The stylised transmission map¹⁰⁷ in Figure 5.1 illustrates in a high-level way the qualitative effects that are expected when tightening liquidity requirements. In normal circumstances price-based liquidity instruments such as liquidity surcharges have a similar transmission mechanism as volume-based ones. Indeed, macro-prudential policies can, in principle, use either volume or price-based instruments to achieve the same change in banks’ balance sheets.

Tighter standards improve the **resilience** of the banking system because they reduce the need for every bank to refinance itself frequently. This in turn reduces the risk of forced asset sales on possibly disadvantageous terms that may result in adverse funding conditions for all market players. When a liquidity requirement is tightened, banks adjust their balance sheets towards holding more liquid assets and relying on more stable and longer-term funding sources. If longer-term funding sources are marginally more costly, these adjustments to the banking sector’s aggregated balance sheet tend to reduce the intermediation to the real economy and may dampen the **financial cycle**.

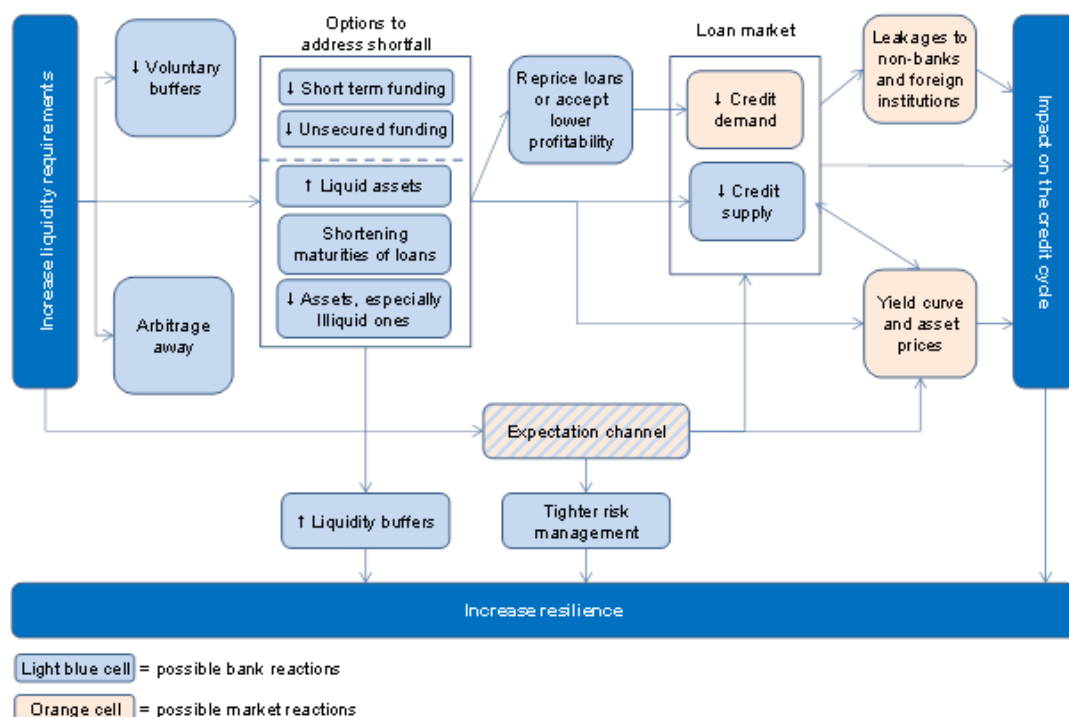
¹⁰⁴ In the case of the LCR, cf. Article 412 CRR. See also BCBS (2013).

¹⁰⁵ The institution under stress should submit a plan for the timely restoration of compliance with the liquidity requirements. Until such compliance is restored, the institution is subject to liquidity reporting with a higher frequency and shorter delays.

¹⁰⁶ European Commission (2013).

¹⁰⁷ Note that the map does not aim to fully represent all transmission channels. The transmission may also vary depending, for example, on the interest rate environment and market conditions.

Figure 5.1: Stylised transmission map for the use of liquidity instruments



Source: Adapted from CGFS (2012).

The transmission of liquidity buffer requirements

If the minimum liquidity buffer, defined as liquid assets over short-term net outflows, is increased banks can meet this requirement by increasing the maturity of their funding. They can also rebalance their assets, i.e. buying highly liquid assets and selling illiquid ones. Both methods of compliance will entail certain costs since the return on highly liquid assets will normally be lower than that of more illiquid assets and long-term funding may be more expensive.

Nevertheless, the potential costs associated with higher requirements can be expected to be limited by the fact that macro-prudential tightening should take place in the upswing of the financial cycle, that is when long-term borrowing and safe assets are not overly expensive. Also, the cost for banks could be counterbalanced by other factors. For example, higher buffers reduce the liquidity risk which, in turn, should reduce banks' funding costs. This effect should at least partly mitigate the concern that liquidity tightening might affect banks' willingness to finance the real economy and the passing-through of costs to borrowers thereby potentially reducing loan demand.

In the case of a smooth turning of the financial cycle, authorities could gradually loosen the requirements. This would have positive effects on banks' net interest income and their willingness to provide loans to the real economy, or result in an increased demand for loans because of the resulting lower interest rates.

There are various ways in which the additional macro-prudential requirements could be used in a stress situation. For instance, the framework could allow institutions to draw on the additional buffers under the same conditions as the minimum prudential buffers (i.e. no prior



approval needed), or require a decision on release by the macro-prudential authority at the banking-system level.¹⁰⁸ The release of the macro-prudential buffer could help to ensure the usability of the minimum prudential buffers by reducing the potential “stigma” associated with drawing on the buffers. Fully releasing the macro-prudential liquidity buffer at the onset of a systemic liquidity event will make it clear to the market that banks are not acting in isolation in a reaction to an idiosyncratic situation, but rather that they are using their buffers in response to a systemic shock. Nevertheless, potential unintended effects related to a public announcement should be taken into account (see below).

The transmission of stable funding requirements

Stable funding requirements aim at controlling the gap between the stable funding available to a bank and its illiquid assets. What constitutes truly stable funding and truly liquid assets may change over time and across jurisdictions. Macro-prudential policy should be flexible enough to accommodate for such changes.

The introduction of a stable funding requirement can contribute to smoothing the financial cycle in the upswing, even if the requirement remains fixed in time. More generally, time-varying adjustments of the funding requirement can contribute to such smoothing by limiting or relaxing banks’ medium-term maturity and liquidity transformation. In the upswing phase of the cycle, tighter funding requirements can help to limit excessive credit growth by increasing the cost of borrowing. In the downswing, a relaxation of the requirements can help to reduce or absorb (potentially higher) funding costs, thus supporting the provision of credit to the real economy. In the case of a financial crisis, fully releasing the macro-prudential requirement will free resources which can then be used to sustain the supply of credit to the real economy.

Expectations

As in the case of monetary policy, expectations can be a part of the transmission mechanism of liquidity requirements. If banks understand macro-prudential liquidity policy and believe it is credibly based on the use of a few transparent indicators, they are likely to modify their balance sheets preceding the actual tightening.

Unintended effects

Attention should be paid to any unintended effects of a tightening of liquidity policy, such as possible shifts to the shadow banking sector, disintermediation and regulatory arbitrage, in particular during credit booms. Authorities should seek to address such leakages as they have the potential to reduce the effectiveness of the liquidity policy and negatively affect other areas.

- **Liquidity buffer requirements.** The effectiveness of (higher) buffer requirements can be hampered if banks decide to comply by reducing their voluntary buffers compared to the minimum requirements. If, on the other hand, these buffers are maintained as a safety margin that allows banks to remain comfortably above the regulatory minimum, they should

¹⁰⁸ In practice, it may be difficult to justify why a bank may draw on the minimum prudential buffer but not on the macro-prudential buffer if it is affected by liquidity stress. This would especially be the case if an SII is affected by idiosyncratic liquidity stress.



not affect the transmission of the liquidity requirements. In addition, the buffer requirements may contribute to shifts in the demand and supply of assets and higher concentration risk as they create incentives for banks to invest in the same types of liquid assets. Macro-prudential authorities and supervisors should seek to avoid that the requirement to hold these assets contributes to a decrease in their market liquidity thereby affecting in the process the liquidity of other asset classes as well. This can be achieved, for example, by ensuring that the buffer is sufficiently diversified and truly usable in stress situations. Other possible effects relate to banks' increased recourse to secured financing (e.g. impact on asset encumbrance, haircuts and cliff effects, and ranking of depositor claims).

- **Announcement effects of buffer release.** An important unintended effect is the potential feedback effect that the announcement of a buffer release might have on the financial system. The announcement itself may be considered as tantamount to an official declaration of a systemic event. One approach could be to make the release decision a quasi-automatic process based on the triggering of publicly observed market indicators (market spreads, a fall in trade volumes, etc.). This approach reduces the risk that the announced decision is interpreted as reflecting the supervisor's own private negative observations, and thereby the probability of causing panic. As a possible alternative, banks could draw on the buffer when they experience a stress event, similar to what is envisaged for the LCR. This would not require any official announcement but still ensure the usability of the buffer.
- **Stable funding requirements.** Time-varying liquidity requirements additional to static minimum requirements should enable macro-prudential authorities to avoid the risks of excessive deleveraging and mitigate the negative consequences that may arise when stable funding is most expensive or scarce. Indeed, decreased availability of long-term wholesale funding may lead to an increase in banks' demand for customer deposits and the associated increase in price competition may result in a decrease in profitability and render deposits more volatile.
- **Cross-border dimension.** Authorities should take cross-border effects into account when evaluating the appropriate macro-prudential policy action. For example, a tightening of liquidity requirements may increase the resilience of the banking sector both domestically and abroad, because the interconnectedness of financial systems does not stop at national borders. Some policies may require coordination and reciprocity agreements between jurisdictions in order to maximise their effectiveness. Coordination also aims at addressing situations where, for example, home bias results in some banking groups deleveraging more in host countries, amplifying the instruments' effects and, in the worst case, causing a "credit crunch" in countries with large foreign ownership of the banking sector.



2.2 Interaction with monetary policy¹⁰⁹

Macro-prudential liquidity regulation may contribute to the smooth transmission of monetary policy. Indeed, one of its aims is to set the right conditions *ex ante* so that banks do not unduly rely on the central bank's function as lender of last resort. To the extent that macro-prudential liquidity regulation reduces the probability of systemic liquidity crises, it should also reduce the need for exceptional monetary policy measures *ex post*.

The interaction between liquidity requirements and monetary policy may also lead to some unintended effects. Stable funding requirements, such as the NSFR, may render banks less sensitive to changes in the monetary policy stance. Liquidity buffer requirements, like the LCR, affect banks' incentives to hold different types of assets and therefore may have an impact on the implementation of monetary policy.¹¹⁰ Possible areas of impact are as follows.

- **Interbank market.** The LCR provides banks with incentives to lengthen the maturity of their funding. This could result in a possible steepening of the yield curve, although it is difficult to assess the magnitude of such potential effects. The introduction of the LCR is likely to increase the demand for certain types of secured funding which could lead to a widening of the spread between secured and unsecured rates. Indeed, this has already been observed since the beginning of the financial crisis. The decoupling of developments in secured and unsecured rates and the decrease in liquidity in short-term money markets could pose some challenges to the implementation of monetary policy. In particular, as argued in Bech and Keister (2012) and Schmitz (2011), the use of a short-term unsecured rate as a target rate may no longer be the best option.
- **Central bank lending.** Under the LCR, central bank funding backed by non-high-quality liquid assets (non-HQLA) is considered to be a more stable funding source than the market. Moreover, the set of assets eligible as collateral for central bank funding is wider than that for LCR compliance purposes. Taken together, these features are likely to lead to a higher demand for central bank liquidity using non-HQLA as collateral. To mitigate the resulting higher risk exposure, central banks may adjust haircuts, narrow the set of collateral eligible for central bank operations and impose limits on central bank funding. The BCBS has made some revisions to the LCR framework, enabling central banks to provide a restricted-use committed liquidity facility (RCLF), even in jurisdictions with no structural shortage of HQLA. Under a RCLF, banks would be able to purchase a commitment from the central bank to grant liquidity against collateral and in exchange for a fee. Even when undrawn, banks would be able to recognise the RCLF liquidity in the pool of HQLA, although subject to a range of conditions and limitations. The Swedish experience of implementing the LCR (Annex 5.1), however, has not revealed any negative impact on the Swedish money or repurchase (repo) market, nor on Sveriges Riksbank's monetary policy operations. Overall, it is important to distinguish between the potential one-off effects when implementing measures such as the LCR and the potential effects of

¹⁰⁹ It should be noted that the use of macro-prudential liquidity instruments might also interact with other macro-prudential instruments, but this is not considered further in this chapter.

¹¹⁰ This is an issue that is being investigated in greater detail at the international level by the Eurosystem (i.e. the ECB and the national central banks of those Member States that have adopted the euro), the EBA and the BCBS.

using the liquidity regulation for additional macro-prudential reasons. The latter effects will probably be smaller and differ depending on whether the use relates to the activation or deactivation of the measure.

3. Description of the instruments

Conceptually, liquidity instruments used for macro-prudential purposes can be broadly grouped into volume and price-based instruments. **Volume-based instruments** impose minimum requirements in terms of short-term liquidity buffers that banks have to hold (liquidity buffer requirements) or impose restrictions on banks' maturity mismatches (stable funding requirements). **Price-based instruments** target the cost of illiquidity and maturity mismatches, thereby closing the gap between the relevant social and the private marginal costs. One such example is a surcharge for reliance on certain funding sources, such as short-term wholesale funding, which reflects the increased systemic risk and externalities associated with their use. Both classes of instruments can either be fixed in time or vary over time depending on changing financial stability conditions.

This section considers in greater detail some of the instruments that can be used to address systemic liquidity risk: (i) a (time-varying) LCR, (ii) a (time-varying) NSFR, (iii) (time-varying) LTD and LTSF limits, (iv) a general liquidity surcharge, and (v) a liquidity surcharge for SII. A number of general conclusions can be drawn from this overview.

- **Importance of the NSFR.** A structural funding requirement is a promising instrument for addressing systemic liquidity risk as it focuses on the core of financial intermediation, namely structural liquidity and maturity transformation. If the NSFR is implemented as a minimum requirement, a time-varying use of the instrument in the form of an additional macro-prudential buffer (including the possibility of “going below” the minimum requirement as for the LCR) would be helpful in addressing pro-cyclicality concerns. But the macro-prudential use of the NSFR would be challenging at this juncture as the international standard has not yet been finalised. Under the CRD/CRR, the so-called national flexibility measures (Article 458 CRR) and Pillar 2 (e.g. Articles 103 and 104 CRD) offer the possibility to use liquidity instruments for macro-prudential purposes.
- **Simpler variants of the NSFR.** The (time-varying) LTD and LTSF limits are simpler variants of the (time-varying) NSFR that have the advantage of being less data intensive, easier to calibrate and easier to communicate to the wider public. At the same time, they do not capture the maturity and liquidity transformation of banks completely since they only focus on certain elements of a bank's balance sheet. Nevertheless, a number of countries, some in the EU, have used these simpler liquidity instruments with success. The LTD and LTSF are outside the scope of the CRD/CRR and are therefore left to national discretion.
- **Role for liquidity surcharges.** Liquidity surcharges (prices) are easier to adjust than liquidity buffers (quantities) so they are less prone to “stickiness” and are therefore less pro-cyclical. Liquidity risk surcharges can be challenging to implement, however, mainly owing to the lack of experience with their use and their fiscal or quasi-fiscal nature. Interpreting the surcharges as analogous to a risk-sensitive deposit insurance premium – in this case a systemic liquidity risk insurance premium – could lessen some of these challenges. Thus, the surcharges might accrue to a resolution or crisis support fund (or



even get rebated back to the banks on a flat rate basis once the fund reaches a certain target size).

Annex 5.1 contains an overview of countries that have used liquidity instruments for macro-prudential purposes. Several countries already have an LCR-type prudential liquidity instrument in place, but an NSFR-type instrument is much less common. There are also examples of simpler variants of the LCR and NSFR that focus on particular sub-classes of assets or liabilities. In a number of Member States, the liquidity ratios differentiate between domestic and foreign currency, or deposits held by residents and non-residents. Monetary policy instruments used by (formerly) non-euro area Member States for macro-prudential purposes include reserve requirements. Funding sources that are considered to be more volatile and risky, such as non-domestic and/or foreign currency funding, can in that respect be subject to specific reserve requirements.

3.1 LCR

Description: The LCR promotes the short-term resilience of a bank's liquidity risk profile by ensuring that it has an adequate stock of unencumbered HQLA that can be converted into cash easily and immediately in private markets to meet its liquidity needs for a 30-calendar day liquidity stress scenario.

In its simplest form, a (time-varying) LCR for macro-prudential purposes could be implemented as a (time-varying) macro-prudential buffer over the minimum LCR. Under this specification a generic (time-varying) LCR would take the form of: $LCR_{macro} = \alpha * LCR$, where LCR_{macro} is the (time-varying) macro-prudential liquidity buffer, LCR is the minimum prudential requirement and α is a multiplicative (time-varying) positive scalar. Authorities can adjust this α thereby tightening or relaxing the macro-prudential requirement. As a result, the total LCR buffer would be the sum of the prudential buffer and the macro-prudential buffer: $LCR_{total} = (1 + \alpha) * LCR = LCR + \alpha * LCR = LCR + LCR_{macro}$. This specification is comparable to the CCB under the capital requirements, as the CCB builds on the micro-prudential ratio of capital over total risk-weighted assets.

Alternatives: A simple (time-variant) liquidity ratio of highly liquid assets over total assets could be used as a backstop measure to the (time-varying) LCR. Such a measure would focus on the proportion of highly liquid assets in relation to total assets rather than on in their matching with stressed net outflows in a standardised scenario – like the LCR. Different horizons for the liquidity stress scenario could be envisaged. In addition, haircuts and regulatory factors (e.g. run-off and roll-over rates) in the numerator and denominator of the LCR could be adjusted in order to focus on particular assets, funding sources or sectors.

Objective, nature and impact: Mitigate the negative effects stemming from market illiquidity and, to a lesser extent, from an excessive short-term maturity mismatch.

Advantages

- Builds on an internationally harmonised regulatory instrument that is partly micro-prudential but also serves a macro-prudential role, designed to mitigate liquidity risk.
- Increases banks' resilience to short-term liquidity risk in a flexible way over the financial cycle.
- Can be easily adjusted and updated as the understanding of risks evolves (through the haircuts and regulatory factors applied to the assets and liabilities in the ratio).
- A prompt and timely deactivation of the time-varying macro-prudential buffer may facilitate the use of the LCR buffer during a liquidity stress scenario.
- Harmonised data will be available under a uniform reporting format from 2015 onwards (Article 415(3) CRR), thereby facilitating comparability across institutions and countries.



Disadvantages

- Definition of LCR under CRD/CRR will most likely be finalised in 2014 and phased in gradually from 2015 onwards.
- Complexity resulting from the calibration of an additional, (time-varying) macro-prudential layer, and which may be challenging to communicate.

Relevant operational issues

- The (time-varying) macro-prudential buffer could be activated in periods of excessive market liquidity characterised by unusually high values of assets used as collateral, compressed spreads and low volatility. The (time-varying) buffer could be used in parallel with the minimum prudential buffer in circumstances of idiosyncratic bank and market-wide stress (e.g. a sudden dry-up of market liquidity), or progressively adjusted in the case of a more gradual change in macro-financial conditions.
- Interaction with monetary policy should be considered.

Relevant legal/institutional issues

- Article 412 CRR: introduces a general prudential liquidity coverage requirement.
- Article 412(3) CRR: allows a bank to use its liquid assets to meet its obligations under stressed circumstances.
- Article 412(5) CRR: a Basel III-like LCR could be implemented before a minimum LCR is specified and fully introduced in the EU.
- A national competent authority could in principle also use Article 103 CRD (Pillar 2) to impose a time-varying LCR to institutions with a similar liquidity risk profile.
- National flexibility measures under Article 458 CRR (in particular Article 458(2)(d)(v)): procedure with a European Commission/Council implementing act, the competent or designated authority can adopt stricter national measures when justified because of changes in the intensity of macro-prudential or systemic risk with the potential to have serious negative consequences in a Member State. Reciprocity is allowed.

3.2 NSFR

Description: The NSFR measures the proportion of long-term assets which are funded by long-term, stable funding. It requires a minimum amount of funding that is expected to be stable over a one-year time horizon based on liquidity risk factors assigned to assets and off-balance sheet liquidity exposures.

In its simplest form, a (time-varying) NSFR for macro-prudential purposes could be implemented as a (time-varying) macro-prudential buffer over the minimum NSFR. The specification would be equivalent to using the (time-varying) LCR for macro-prudential purposes but with the NSFR as a basis (see Section 3.1). By limiting/relaxing the firm's medium-term maturity and liquidity mismatches between assets and liabilities at different stages of the financial cycle, a time-varying NSFR could contribute to preventing excessive credit expansions or contractions.

Alternatives: A simple (time-varying) CFR of the amount of stable funding over total liabilities could be used as a backstop measure to the (time-varying) NSFR. Such a measure would focus on the proportion of stable funding in terms of total liabilities rather than on the matching with stressed available stable funding in a standardised scenario – similar to the NSFR. Alternatively, the CFR could be calculated as stable funding over loans and advances, a ratio recently introduced by the Reserve Bank of New Zealand.

Different horizons for the standard could be envisaged. In addition, the regulatory factors (such as the



factors reflecting the available and required funding) in the numerator and denominator of the NSFR could be adjusted in order to focus on particular assets, funding sources or sectors.¹¹¹ As with the other regulatory factors embedded in the macro-prudential liquidity instruments – and particularly those that build on the BCBS standards – adjusting factors in the NSFR would in practice require proper calibration and would be subject to the relevant CRD/CRR provisions implementing the internationally agreed regulatory standards in the EU.

Objective, nature and impact: To mitigate negative effects stemming from an excessive maturity and liquidity mismatch.

Advantages

- Focuses on the central processes of financial intermediation that are key in the dynamics of banking crises, namely structural liquidity and maturity transformation.
- Full balance sheet measure of maturity transformation.
- Builds on an internationally harmonised future regulatory instrument that is partly micro-prudential but also serves a macro-prudential purpose.
- Can be easily adjusted and updated as the understanding of risks evolves (through the ratio's regulatory factors that are applied to most of the balance sheet).
- Can be relaxed to help banks meet the total requirement (harmonised minimum + macro-prudential add-on) in circumstances where liquidity is scarce or expensive.
- Increases the resilience of banks to liquidity risk in a flexible way over the financial cycle.
- Conceptually powerful and in line with academic literature in the field.¹¹² [- Harmonised data will be available under a uniform reporting format from 2015 onwards (Article 415(3) CRR), thereby facilitating comparability across institutions and countries.

Disadvantages

- Definition of NSFR under the CRD/CRR will most likely only be finalised and implemented by 2018.
- Additional complexity resulting from the calibration of an additional (time-varying) layer, and which may be challenging to communicate.

Relevant operational issues

- Could be activated in periods of excessive maturity and liquidity transformation usually characterised by high reliance on volatile sources of funding in proportion to the total amount of liquid assets in the system. It could be lowered in times of stress allowing institutions to draw on additional or different funding sources. The buffer could also be relaxed progressively when the amount of excessive maturity and liquidity transformation in the system gradually diminishes.

Relevant legal/institutional issues

- Article 413 CRR: introduces a general prudential stable funding requirement.
- A national competent authority could, in principle, also use Article 103 CRD (Pillar 2) to impose a (time-varying) NSFR to institutions with a similar liquidity risk profile.
- National flexibility measures under Article 458 CRR (in particular Article 458(2)(d)(v)): procedure with a European Commission/Council implementing act, the competent or designated authority can adopt stricter national measures when justified because of changes in the intensity of macro-prudential or systemic risk with the potential to have serious negative consequences in a Member State. Reciprocity is allowed.

¹¹¹ The LTD and LTSF ratios can be seen as variants of the NSFR.

¹¹² See, for example, Brunnermeier, Krishnamurthy and Gordon (2012).



3.3 LTD and LTSF limits

Description: Limit (cap) on customer loans over customer deposits (LTD). The denominator can be expanded by including also other sources of stable funding such as longer-term debt, equity and other elements depending on a jurisdiction's specific features (LTSF). Similarly, the definition of the numerator can be broadened so as to include other illiquid assets, such as illiquid securities with features which are not substantially different from loans. While conceptually more attractive, these more comprehensive definitions may be more challenging to implement in a harmonised way with the information which is currently available. By adding a time-varying component, the ratios can be calibrated to address the cyclical risk attached to excessive maturity and liquidity transformation in a similar way to the time-varying NSFR buffer.

Objective, nature and impact: Limit over-reliance on short-term, less stable wholesale funding that fuels excessive credit growth and leverage. Can be used both as a structural and a cyclical instrument. May reduce pro-cyclicality as it contains credit growth in the upturn.

Advantages

- Simple
- Low data needs
- Easy to communicate

Disadvantages

- Certain business models (e.g. institutions with significant investment banking activities) might find it harder to comply with the ratio.
- May constitute an entry barrier for newly created banks that are building up their deposit base.
- Does not consider all elements of the balance sheet.

Relevant operational issues

- LTD and LTSF ratios can be seen as NSFR variants as they focus on particular sub-classes of assets or liabilities. A CFR ratio can be regarded as an inverted LTSF ratio.
- Can complement the LCR and the NSFR.
- Need for an encompassing definition of loans and deposits to avoid regulatory arbitrage; securitisations, impairments and write-offs may influence the ratios.
- Need to assess the interaction with other liquidity instruments and instruments that impact credit growth and leverage.
- Can be applied on a consolidated as well as an individual basis. The latter has the advantage that it sets an incentive for subsidiaries to strengthen their local funding base and become less dependent on parent funding, and therefore increases overall resilience during stress periods. Disadvantages are that banks' treasury management may be less efficient and that it may contribute to market fragmentation.

Relevant legal/institutional issues

- Instruments that are outside the CRD/CRR and therefore left to national discretion.
- A national competent authority could, in principle, also use Article 103 CRD (Pillar 2) to impose (time-varying) LTD and LTSF limits to institutions with a similar liquidity risk profile.



3.4 General liquidity surcharge

Description: A general liquidity charge can take the form of a Pigouvian levy¹¹³ in relation to a bank's liquidity risk (e.g. as measured by its reliance on short-term funding or its NSFR).¹¹⁴ The charge would decrease as a bank's funding maturities get longer, asset maturities are shortened or more stable sources of funding are used.

Objective, nature and impact: Discourage excessive reliance on short-term market funding that fuels excessive credit growth and leverage by internalising the related negative externalities.

Advantages

- Instrument that through the use of prices compels the bank to internalise the externalities resulting from its contribution to systemic liquidity risk.
- Owing to potentially lower adjustment costs compared with quantity requirements, possible reduction of pro-cyclical effects that, in the case of buffer-type requirements, may be associated with the switch from binding to non-binding constraints or with a sudden move in one of the relevant quantities.
- Surcharge can contribute to financing the general government budget or a bank resolution fund.

Disadvantages

- Limited practical experience with instrument.
- May create incentives for increased risk-taking by banks in search of strategies which are profitable enough to compensate for the cost of the surcharge.

Relevant operational issues

- The surcharge could be increased in periods when banks' incentives to rely on (cheaper) short-term wholesale funding markets are higher and reduced when these incentives recede. They could also be lowered in times of stress and when institutions draw on additional or different funding sources. The surcharge could be relaxed progressively when the excessive reliance on unstable sources for fuelling loans expansion diminishes.
- The surcharge could be used as a transition instrument to provide an incentive for smooth convergence to the new NSFR liquidity standards.
- Different definitions of unstable funding and maturity horizons could be envisaged.
- Possible use of the surcharge to finance part of the general government budget or a bank resolution fund.

Relevant legal/institutional issues

- Article 105 CRD (Pillar 2): the competent authority can impose a prudential charge related to the disparity between the actual liquidity position of a bank and any liquidity and stable funding requirements at national or EU level.

Other specific issues: The liquidity charges could be designed as a cross-sectional liquidity instrument (i.e. applicable to all banks) or, analogous to capital surcharges for SII, only apply to large banks based on their contribution to systemic risk (see also Section 3.5). Alternatively, liquidity charges could apply to all banks in a risk-adjusted way so that those that contribute more to systemic liquidity risk (through their interconnectedness or through their possible impact on the financial system) pay proportionately more.

¹¹³ A Pigouvian levy (or tax) is applied to a market activity in order to address the negative externalities generated by it (costs incurred by parties not engaging in the activity).

¹¹⁴ For example, as described in Perotti and Suarez (2009, 2011).



3.5 Liquidity surcharge for SII

Description: In its simplest form this instrument could be designed as a liquidity charge adapted to banks' contributions to systemic liquidity risk. It could be structured as a buffer on top of the minimum requirement for the LCR or the NSFR.

Objective, nature and impact: Address negative externalities or spillovers stemming from excessive liquidity risk or maturity transformation by SII, including moral hazard.

Advantages

- Instrument that through the use of prices compels the SII to internalise the externalities resulting from its contribution to systemic liquidity risk.
- Takes into account the differences in banks' contribution to systemic risk.

Disadvantages

- No practical experience with instrument.

Relevant operational issues

- Different methods have been suggested to measure banks' possible contribution to systemic liquidity risk (see, for example, IMF (2011)). Alternatively, a purely indicator-based measurement approach – such as for the capital surcharges for systemically important banks (BCBS) – could be envisaged.
- Different methods of measuring banks' contribution to systemic liquidity risk could deliver different allocation mechanisms for the liquidity (or capital) surcharges. For example, liquidity stress tests may be used to measure banks' liquidity shortfall and the impact on systemic market and funding liquidity, thereby identifying a bank's contribution to systemic liquidity risk.

Relevant legal/institutional issues

- FSB (2010) raises the possibility of a liquidity surcharge for SII.
- Article 105 CRD (Pillar 2): the competent authority can impose a specific liquidity requirement to capture liquidity risks to which an institution is (or might be) exposed taking into account, among others, the business model of the institution and the systemic liquidity risk.



4. Possible indicators for the use of the instruments

4.1 Potential indicators

The indicators on which authorities will base the use of liquidity instruments for macro-prudential purposes should reflect the intermediate policy objectives, namely the mitigation and prevention of excessive maturity mismatches and market illiquidity.¹¹⁵ More granular intermediate objectives could be relevant as well if systemic liquidity risks were to arise in relation to specific developments, for example in the case of lending and borrowing mismatches in foreign currency or excessive asset encumbrance. The indicators need to capture the different possible manifestations of systemic liquidity risk which, in practice, may overlap.

Structural liquidity risks

Structural risks can arise from financial innovation and changes in regulation, taxation, saving and investment patterns and the overall structure of the financial system (e.g. interconnectedness and size of the system). They may be the result of long-term trends which at first sight may not present a risk to the financial system. Such risks call for indicators that signal structural weaknesses gradually building up over an extended period, e.g. indicators that reflect changes in business models, funding strategies and asset or market activities. In addition, surveys, market intelligence and supervisory information could be helpful to timely capture such risks.

Cyclical liquidity risks

Cyclical liquidity risks relate to the business cycle and/or the lower frequency financial cycle.¹¹⁶ For example, increasing leverage in an upturn might be funded by short-term wholesale funding. In a downturn, by contrast, banks tend to reduce their leverage and maturity mismatches. This pro-cyclical behaviour reinforces liquidity risk cycles, thus creating externalities. Liquidity cycles can have varying periodicities depending on the market in which banks are active. They can also be asymmetric with upturns lasting longer than downturns.¹¹⁷ Thus, indicators capturing liquidity cycles may signal the need for tightening in an upturn and release in a downturn. They should therefore measure time-varying market conditions, thereby acting like a barometer. These market conditions could be reflected in price-based indicators (e.g. deposit or loan rates), or quantity-based metrics (such as volume indicators of stocks and flows). The indicators could be complemented by soft information, such as surveys and market intelligence.

Liquidity crises

Liquidity crises emerge as abrupt corrections of unsustainable trends or cycles in liquidity conditions. Corrections may be driven by shifts in risk appetite or shocks in confidence.

¹¹⁵ Liquidity instruments may also help to limit excessive credit growth, for example by raising the cost or limiting the amount of short-term funding which may be fuelling an over-expansion of banks' balance sheets.

¹¹⁶ Borio (2012). Financial cycles, which are longer than business cycles, can cover credit, leverage, housing and equity market cycles, which are at the core of financial intermediation and thus directly affect financial intermediaries.

¹¹⁷ In line with what has been shown by Claessens, Kose and Terrones (2011) for financial cycles.

Increased risk aversion can hit trading volumes in market segments and cause market liquidity to dry up. A confidence shock may cause funding withdrawals and bank runs. Such shocks can be systemic owing to contagion. Risk indicators capturing liquidity crises should measure stress conditions preferably in real time and thereby act like a thermometer. These stress conditions are most likely to be reflected in price-based indicators, such as market liquidity indices or funding spreads.

Systemic liquidity risk can manifest itself in complex and changing forms, and so careful monitoring of hard and soft information is required. Even key indicators might become outdated or non-significant under specific market circumstances and therefore authorities should be aware of the need to revise the indicators' signalling efficiency on an ongoing basis.

In order to compile a list of relevant and useful indicators, an extensive survey was carried out by the ESRB of systemic liquidity risk indicators used by central banks, regulators and international organisations. A broad list of possible indicators was drawn up based on the survey results, distinguishing between the three manifestations of liquidity risk mentioned above.

In a second step, the broad list was narrowed down on the basis of indicator relevance, simplicity and data availability in order to make it more manageable for the data collection process and empirical work. At least one indicator for each type of liquidity risk was retained.

Table 5.1 provides a classification grid of the shortlist of indicators – some of them with their generic specifications – that was used for the empirical assessment. The table maps the indicators according to their main objective and type of manifestation of systemic liquidity risk. Going forward, the possible role of global liquidity indicators (e.g. changes in international capital flows) could also be assessed, although the effects of global liquidity are expected to be captured already to a certain extent by some of the indicators listed.

Table 5.1: Classification grid of the selected liquidity indicators

	Structural	Cyclical	Crisis
Market illiquidity	<ul style="list-style-type: none"> • Medium/long-term averages of market liquidity metrics, e.g. bid-ask spreads, turnover, trade volumes and/or securities issuance 	<ul style="list-style-type: none"> • Market liquidity metrics, e.g. bid-ask spreads, turnover, trade volumes, and/or securities issuance. • Standard deviation of market liquidity metrics, correlation between market liquidity metrics and CDS index for banks • Bank funding indicator capturing breakdown of issuance of secured vs. unsecured borrowing • CDS spreads (large banks) • Interbank interest rate spreads, including LIBOR-OIS spread 	<ul style="list-style-type: none"> • ECB financial market liquidity indicator (FMLI) and its components, e.g. for equity and bond markets • Market liquidity metrics, e.g. bid-ask spreads, turnover, trade volumes, and/or securities issuance. • Standard deviation of market liquidity metrics, correlation between market liquidity metrics and CDS index for banks • CDS spreads (large banks) • Interbank interest rate spreads, including LIBOR-OIS spread
Maturity mismatch (funding risk)	<ul style="list-style-type: none"> • Central bank lending • Weighted average maturity of assets and liabilities • LTD and/or LTSF (e.g. deposits + capital + long-term debt) • Simple generic core funding ratio: [deposits + capital + long-term debt]/total liabilities (or loans) • Simple generic asset liquidity ratio: liquid assets/total assets 	<ul style="list-style-type: none"> • Weighted average maturity of assets and liabilities • LTD and/or LTSF (e.g. deposits + capital + long-term debt) • Simple generic core funding ratio: [deposits + capital + long-term debt]/total liabilities (or loans) • Simple generic asset liquidity ratio: liquid assets/total assets • Bank funding indicator capturing breakdown of issuance of secured vs. unsecured borrowing 	<ul style="list-style-type: none"> • Central bank lending • Bank funding indicator capturing breakdown of issuance of secured vs. unsecured borrowing
Liquidity/cash hoarding	<ul style="list-style-type: none"> • Central bank lending 		<ul style="list-style-type: none"> • Interbank interest rate spreads, including LIBOR-OIS spread • Central bank lending
Concentration risk	<ul style="list-style-type: none"> • Composition of bank funding 	<ul style="list-style-type: none"> • Composition of bank funding 	
Currency mismatch	<ul style="list-style-type: none"> • Net open position in foreign currencies/total assets; alternatively foreign currency liabilities/total assets, foreign currency swap rates 	<ul style="list-style-type: none"> • Net open foreign currency position/total assets; alternatively foreign currency liabilities/total assets, foreign currency swap rates 	<ul style="list-style-type: none"> • ECB financial market liquidity indicator – foreign currency component • Exchange rate volatility • Foreign currency swap rates volatility

4.2 Assessing the performance of the indicators

Strategy for the empirical analysis

The empirical work in this section draws mainly on available ECB data sources and especially on the ESRB risk dashboard. The ESRB collected data for the shortlist of indicators listed in Table 5.1 (Section 4.1) and established a database for performing empirical analyses of the indicators.

The empirical strategy consists of assessing the ability of the different liquidity indicators (the so-called right-hand side, or RHS, variables) in explaining or anticipating periods of systemic liquidity crises (the so-called left-hand side, or LHS, variable).

Systemic liquidity crisis events are identified by using two key **stress indicators** that reflect the main intermediate macro-prudential objectives, namely preventing and mitigating market illiquidity and excessive maturity mismatches. These crisis events can then be used as **LHS variables** in the further empirical analysis. **Market illiquidity** is captured by the ECB's financial market liquidity indicator (FMLI), which is a composite indicator that reflects stress in various market segments. **Maturity mismatch risk (or funding risk)** is captured by the use of central bank funding. The underlying rationale is that stress in funding markets opens up

financing gaps in banks with large maturity mismatches – gaps that eventually have to be filled by central bank funding as last resort.

However, it should be kept in mind that although the FMLI or central bank funding captures liquidity stress, this stress is not necessarily systemic in terms of financial stability.¹¹⁸ Moreover – owing to data constraints – the analysis focuses on EU-wide stress events; it does not analyse country-specific episodes, which may differ from EU-wide developments and should be investigated in further studies.

The cyclical and structural liquidity risk indicators on the shortlist can signal stress events and can be used as **RHS variables**. These **signalling indicators** may show a build-up of liquidity risk over a certain horizon prior to a crisis. It is likely that several indicators will convey the same signal. Graphical inspection can indicate the lead time of the indicators preceding the crisis and can indicate potential threshold values. More advanced signalling approaches (like AUROC) are less suitable at this stage. First, data availability – particularly cross-country data – constrains the empirical analysis. Second, systemic liquidity crises are rare events, which limits the number of LHS outcomes. Third, liquidity risk typically has non-linear features, which makes econometric analysis challenging. Therefore, the indicators are only used to obtain an overall impression of the conditions that are likely to be associated with systemic liquidity crises.

The left-hand-side variable: periods of systemic illiquidity

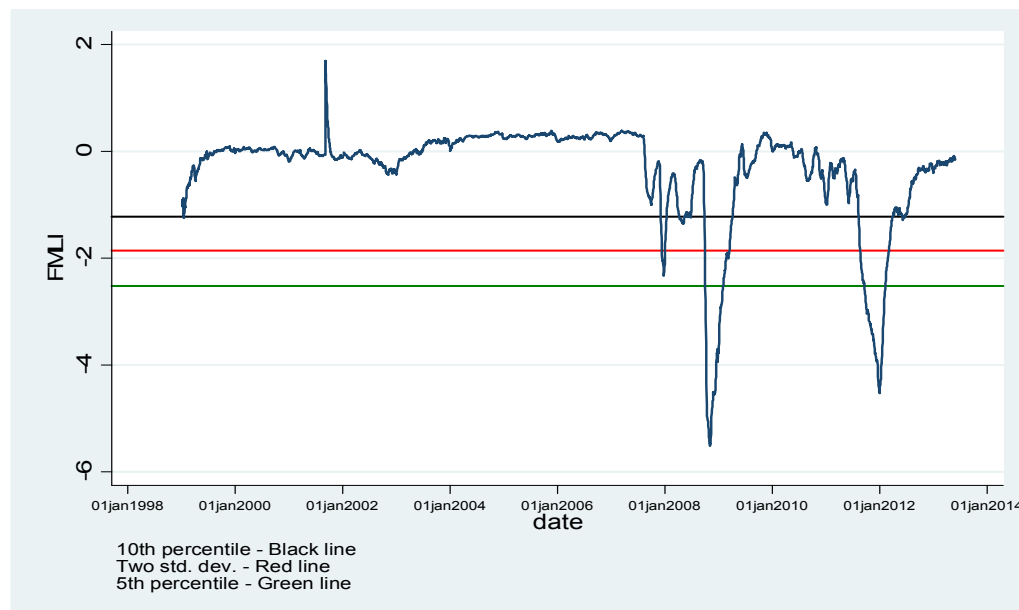
The ECB's FMLI is used to assess **market illiquidity risk**. The FMLI is a composite indicator of individual market liquidity measures in the forex, equity, bond and money markets¹¹⁹ and consists of daily data for the period from January 1999 to May 2013 (see Figure 5.2). It is important to capture tail events in the distribution of the FMLI which last for a minimum amount of time in order to distinguish them from short-lived liquidity jumps. A fifth percentile threshold is therefore used to determine whether or not a systemic liquidity crisis has occurred, which identifies the following two periods: period 1 from 6 October 2008 to 2 February 2009 and period 2 from 26 September 2011 to 8 February 2012.

The first period identified starts in October 2008, approximately one year after the onset of the sub-prime crisis, and leads to a dry-up of liquidity particularly in short-term wholesale funding markets. The second period starts in September 2011 and coincides with increasing tensions in the sovereign debt markets prompting a “flight to safety” and straining the collateralised funding markets.

¹¹⁸ IMF (2011) defines systemic liquidity risk as the risk of simultaneous liquidity difficulties at multiple financial institutions. It proposes three indicators: (i) a systemic liquidity risk index (SLRI) to gauge a systemic tightening in market and funding liquidity; (ii) a systemic risk-adjusted liquidity (SRL) model that calculates the joint probability of simultaneous liquidity shortfalls and the marginal contribution of a financial institution to systemic liquidity risk; and (iii) a macro stress-testing model, which includes a systemic liquidity component. The link between the three indicators and systemic liquidity risk is assumed but not formally and empirically established.

¹¹⁹ Further information can be found in the ECB's Financial Stability Review, June 2007 and in Box 2 entitled “Financial market liquidity” of the Bank of England Financial Stability Report, April 2007. The FMLI provides a useful aggregate picture of market liquidity although some open questions remain as regards the data at the level of the individual FMLI components.

Figure 5.2: Identifying periods of systemic illiquidity using the ECB's FMLI



Sources: ECB financial market liquidity indicator and own calculations

It is questionable whether the two periods represent distinct crisis events as they both originate from the financial crisis starting in 2007. The empirical analysis will accordingly target this particular financial crisis. Thus, there is a risk that the indicators selected on the basis of the above analysis will be too focused on this single crisis event and will not signal any other potential future liquidity crises. Furthermore, as the two liquidity crisis events are closely related, the slow-moving RHS variables (balance sheet indicators) might bring little added value to the second stress period.

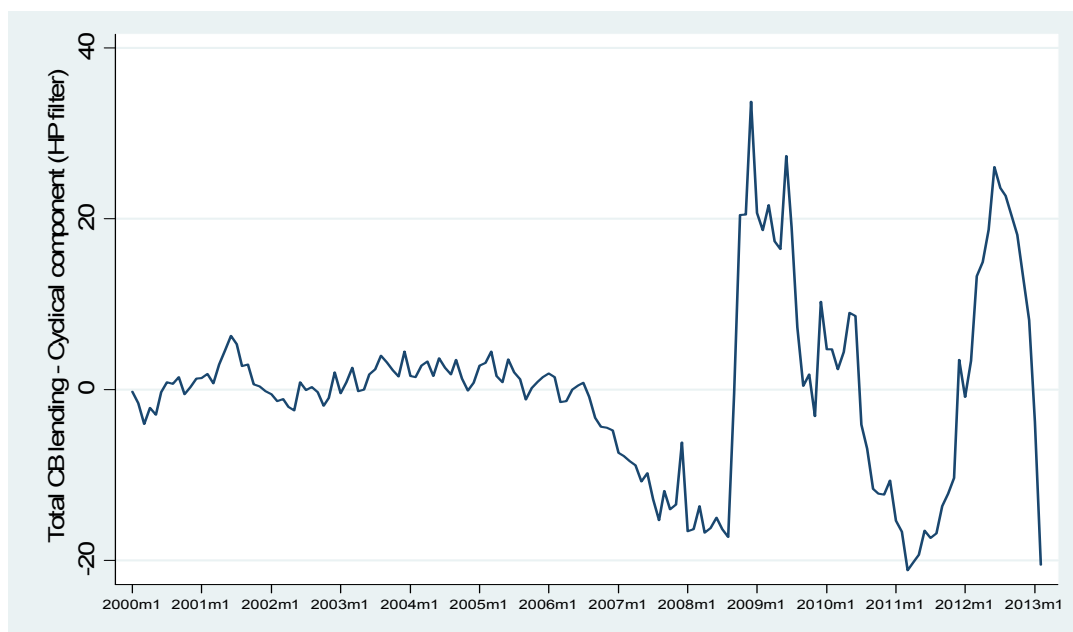
Turning to the **maturity mismatch risk** or **funding risk**, this is better captured by indicators such as dependency on central bank funding. Total central bank lending in the EU is used as a proxy for system-wide funding distress in the EU. As the original series of this indicator shows an upward trend for the period covered, Figure 5.3 below shows the cyclical component of the series after applying a Hodrick-Prescott filter to facilitate the analysis.

The figure shows two peaks. The first one starts around September/October 2008 and lasts until October 2009. A second peak starts around December 2011 and lasts until December 2012. This shows starting periods similar to those identified by the FMLI, but the duration of the stress periods is longer for the total central bank lending indicator. This difference could be the result of comparing a price-based indicator with a quantity-based indicator, but further investigation is needed.

Given the close coincidence in signalling the starting point of the two stress periods previously identified and given the frequency available for some of the RHS indicators, the two FMLI stress periods are used for the further empirical analysis.¹²⁰

¹²⁰ The observed evolution in both the FMLI and central bank lending tends to confirm the high correlation between market and funding illiquidity, particularly in stress periods, as documented in previous studies such as Drehmann and Nikolaou (2009). These authors

Figure 5.3: Identifying periods of systemic illiquidity using total central bank lending



Sources: ECB and own calculations

The right-hand-side variables: descriptive statistics

The charts in Annex 5.2 show the evolution of the previously identified indicators in the period before and after the two **FMLI** stress events (Chart 1). The time-windows used are (i) three years (or when data start) ahead of the crisis until two years after the crisis for the stress period starting in October 2008; and (ii) from the end of the first crisis period until the last observation in the series for the stress period starting in September 2011.

The figures show that some indicators, particularly those based on **higher frequency market data**, are coincident with the FMLI, which is partly a result of the FMLI's construction. The figures also suggest that these indicators are more suited to signalling the release of macro-prudential liquidity instruments rather than their activation. In general, their predictive power is relatively low. Nevertheless, the observed increase in the volatility of some market-based indicators, such as interbank interest rate spreads (Chart 5) and forex markets (Chart 4), and of the FMLI itself is a certain leading signal to guide the use of the liquidity instruments. Long periods of very low volatility are worrisome as they are associated with underpricing of risk and changes in risk perception.

Indicators based on **balance sheet data** change more slowly. Harmonised cross-country data are only available two years before the first stress period and there is little variation

study the bidding behaviour of market participants in central banks' open market operations, using the spread between the weighted average bid rate and the policy rate or the marginal bid rate to measure funding stress.

concerning mean and median values of liquid asset ratios and funding composition (Chart 7 and following). However, some information can be obtained by looking at the development of minimum and maximum values. For instance, minimum ratios of liquid assets to short-term liabilities started to decline approximately 16 months prior to the stress period (Chart 8), while maximum values and the 75th percentile of the distribution of the share of central bank funding in credit institutions' liabilities increased after the stress period (Chart 12). This may be explained by (some) banks reducing their voluntary buffers before turning to the central bank. In addition, liquidity flows, such as money market and non-retail funding, seem to have some predictive power with funding from these sources shrinking in the run-up to the stress episode (Chart 10).

Overall, the short time series of available country-level balance sheet data is an important drawback to meaningful cross-country empirical analysis. To gain further insights from longer time series, evidence from other data sources and studies is presented in Annex 5.3. Future work may explore the use of other data sources (e.g. non-harmonised supervisory or central bank data, commercial databases of banks' balance sheets) in order to exploit the cross-sectional information for the liquidity indicators.

In **conclusion**, the tentative empirical analysis shows that data availability, especially for balance sheet data on a harmonised and consolidated basis, is an important constraint. Nevertheless, some preliminary conclusions can be drawn.

- In times of stress, market and funding liquidity risks are highly correlated.
- Fast-moving coincident indicators, such as composite indicators of market liquidity risk, are useful indicators to signal the timing of systemic liquidity events, their duration and intensity.
- Although market-based indicators are often coincident with liquidity stress indicators, volatility tended to increase prior to the recent financial crisis.
- The degree of dependence on unstable sources of funding, a higher and increasing level of maturity/liquidity transformation (e.g. approximated by the LTD ratio and the CFR, and the amount of reserves of liquid assets to absorb shocks in times of stress) are associated with growing aggregate imbalances.
- Balance sheet data are available with a much lower periodicity and change more slowly over time than market data, highlighting the need for longer time series to capture the build-up of financial imbalances.
- LTD ratios are promising indicators (Annex 5.3), which seem to have some predictive power. However, varying data availability and definitions make cross-country comparison difficult.
- While system-wide measures are important, risks emerging in single SII or parts of the financial/banking system should also be monitored, as they may be masked by aggregate figures.

Data gaps

While standard measures of market liquidity are commonly available (especially price-based indicators), at least for broad indexes of securities, measures of maturity mismatch and funding illiquidity are generally more difficult to obtain. The crisis revealed major information gaps concerning linkages between institutions, as well as common exposures and liabilities to financial sectors and national markets. Data on securities lending and repos were missing or incomplete both at the transaction and firm level, there was insufficient monitoring of new funding instruments, and disclosures and regulatory reporting on banks' funding plans were not always adequate. More generally, compiling long series of balance sheet information on key liquidity items across countries is a challenging task. This complicates the calculation and comparison of more detailed aggregate liquidity ratios.

Work is currently under way to close these identified data gaps. At the international level, the BIS is overhauling its international banking statistics (IBS) which will also increase the information available on bank funding. The enhanced IBS will also feed into the G20 data gaps initiative (FSB and IMF).

Given the rise in secured financing in the run-up to the crisis and the role it played at the onset of the crisis, data availability on securities lending and repos should be significantly enhanced. The FSB has published recommendations, calling on authorities to collect granular data on these activities carried out by large international financial institutions. Moreover, the FSB encourages the establishment of trade repositories to collect transaction data and it plans to coordinate a set of market-wide surveys by national authorities.

At the European level, the ESRB is conducting a specific survey on the re-use of collateral (first data due by June 2013). The ESRB has also identified data gaps regarding the monitoring of bank funding plans, the development of new funding structures, and the evolution of uninsured "deposit-like" instruments. To close this gap, the ESRB asked the EBA in its Recommendation on funding of credit institutions to develop guidelines on harmonised data templates.¹²¹ These templates will provide comparable data with respect to the changes in banks' funding profiles. Macro-prudential authorities will find these data useful for assessing systemic liquidity risk and calibrating liquidity instruments for macro-prudential purposes.

4.3 Linking the indicators to the instruments

From the empirical analysis in Section 4.2 it is clear that there is much work still to be done to develop fully fledged policy rules to guide decisions on the use of liquidity instruments for macro-prudential purposes. Against this background, the analysis should be seen as a first step towards gradually operationalising the instruments in the EU. Given the general uncertainty on the effectiveness of the instruments in practice and the significant data gaps identified, authorities considering using the instruments are advised to exercise caution with

¹²¹ Recommendation of the ESRB of 20 December 2012 on funding of credit institutions (ESRB/2012/2), OJ C 119, 25.4.2013, p.1. The reporting deadlines for this Recommendation were subsequently extended by up to twelve months.

regard to both the overall setting of the instruments and the information used to guide their decisions. Another observation is that the behaviour and predictive power of the indicators may change once they are used for the (de)activation of policy instruments.

Against this background, some preliminary guidance will be provided on how the liquidity indicators can be linked to the use of the instruments.

Time-varying instruments – the build-up phase

Systemic liquidity risk typically builds up over a prolonged period before suddenly materialising into financial instability upon the occurrence of a trigger event. The evolution over time of different ratios capturing liquidity and maturity transformation are useful indicators to identify cyclical patterns in banks' balance sheets. Such patterns could trigger or amplify market-wide liquidity shocks and may fuel credit booms. Sharp and steady increases in securities issuance and unsecured lending may point to a liquidity-driven credit boom and a gradual deterioration of banks' funding position. Changes in the observed patterns of such indicators that coincide with signals of excessive market liquidity provide stronger signals for policy action using the time-varying instruments. In particular, a prolonged period of compressed spreads and low volatility in the composite indicators of market illiquidity, interbank and bid-ask spreads, and exchange rates, together with steadily increasing trade volumes provide further supporting evidence of growing imbalances at the system level.

Time-varying instruments – the release phase

Composite indicators – such as the FMLI – and use of central bank funding appear to provide reliable guidance regarding liquidity stress events (including sudden stops) pointing to a release of the time-varying liquidity instruments. The intensity of the liquidity stress event could also be assessed through the use of additional market-based indicators, such as interbank interest rate spreads, bid-ask spreads and turnover/trade volume. The standard deviation of the indicators and the index of banks' CDS provide further insight into the intensity and progression of a liquidity event. These indicators would be helpful in formulating a stepwise approach to releasing liquidity buffers and could assist in identifying whether the liquidity situation has stabilised, meriting no further action.

Cross-sectional instruments

Cross-sectional instruments include general liquidity surcharges and liquidity surcharges for SIIIs. The allocation of charges could follow a simple indicator-based approach as in the BCBS framework for SIIIs where the proportion of banks' short-term or unstable funding is used to determine the level of penalty in terms of liquidity charges.

5. Legal and institutional framework

Clarity on the applicable legal and institutional framework is a necessary pre-condition for using the instruments. This framework will determine how the instrument can be used effectively, which authority will be in charge, and what rules and procedures apply. Authorities will have to assess whether a threat to financial stability might materialise (and if so, when), whether an instrument should be activated (and if so, when), which instrument(s) should be

used and what its appropriate level should be. Further work needs to be undertaken before practical guidance can be provided here.

5.1 General framework

For the decision-making process and procedures related to the use of the instruments, it is useful to begin with some general comments (see also Annex 5.4 and Chapter 1). The applicable process and procedure, as well as relevant responsible authority, will depend on whether or not the use of the instrument in question is covered by the CRD/CRR. If so, the national margin for manoeuvre will be more restricted by EU rules, in particular because of the maximum harmonisation approach. In the event the use of the instrument **does not fall under the CRD/CRR**, however, such as the LTD and LTSF caps, it will be left to national discretion.

In accordance with the Basel III framework, the EU rules introduce liquidity requirements – the LCR (called liquidity coverage requirement under CRD/CRR) and the NSFR (called stable funding requirement) – both to be further specified over a transition period. To the extent that national rules overlap with the European liquidity requirements already in place, the national rules would be inapplicable. In particular, national authorities should not adopt a national liquidity requirement that is in fact a national version of the LCR or which affects the LCR in a significant way when the LCR is effectively in place.

The liquidity instruments **under the CRD/CRR** encompass either the **express liquidity requirements** (i.e. the liquidity coverage requirement and the stable funding requirement) or **Pillar 2 measures**.

In the first case, under the **national flexibility measures (Article 458 CRR)** national authorities have the possibility to introduce stricter national liquidity measures in response to changes in the intensity of macro-prudential or systemic risks with the potential to have serious negative consequences to the financial system and the real economy in a Member State. Other Member States may then recognise the measure. However, relying on this article entails a more demanding procedure: notification, submission of relevant evidence, etc.¹²²

In the second case (Pillar 2), two provisions are particularly relevant. First, **Article 103 CRD** allows national competent authorities to apply the Supervisory Review and Evaluation Process (SREP) to institutions with similar risk profiles in a similar or identical manner when they “are or might be exposed to similar risks or pose similar risks to the financial system”. Accordingly, the assessment of systemic risk is included in the list of technical criteria evaluated through the SREP (Article 98(1)(j) CRD).

Once such a risk is identified, competent authorities have the power to impose **specific liquidity requirements**, including restrictions on maturity mismatches between assets and liabilities (Article 104(1)(k) CRD), to a group of institutions. Article 103 CRD requires that competent authorities notify the EBA, which must monitor supervisory practices and issue guidelines to ensure a consistent application of this provision throughout the EU.

¹²² See Chapter 7 of the Handbook for a more detailed discussion on the use of Article 458 CRR.

The second relevant provision is **Article 105 CRD**. It enables competent authorities to impose **liquidity surcharges** based on the difference between the actual liquidity position of a bank and any liquidity and stable funding requirements required (at national or EU level). As a Pillar 2 measure, liquidity surcharges may be applied in a similar or identical manner to a group of institutions with similar risk profiles pursuant to Article 103 CRD.

One of the operational challenges in this respect is how to avoid possible overlap between micro-prudential and macro-prudential measures, which calls for a close coordination between micro-prudential and macro-prudential authorities.

On a general note, Pillar 2 measures are applied following from the SREP and are not subject to express reciprocity provisions. However, in the context of the SREP, the college of supervisors is strongly encouraged to develop a common understanding of a banking group's risks. The college is further required to do everything in its power to reach a joint decision on measures related to liquidity (Article 113(1)(b) CRD). In that sense, there are clear possibilities for reciprocity.

The authority responsible for the use of instruments that fall under the CRD/CRR will be the so-called national competent authority and/or the designated authority, both to be appointed by the individual Member States. The **national competent authority** is in charge of banking supervision under the CRD/CRR. For a number of well-defined areas (e.g. application of stricter national measures under Article 458 CRR), the Member State can make a separate national authority responsible, the so-called **designated authority**.¹²³ (Member States may designate more than one authority for the purposes of identifying G-SIIs and O-SIIs.)

Finally, additional procedural rules apply to the countries that will be part of the **Single Supervisory Mechanism** (SSM). Under the SSM Regulation,¹²⁴ the national authorities of participating Member States must notify the ECB of their intention to implement measures aimed at addressing systemic or macro-prudential risks (Article 5(1)). The ECB can object to these measures. Similarly, the ECB is required to notify the national authorities (Article 5(4)) of its intention to apply higher capital buffers than already applied by the national authorities or more stringent measures to address systemic or macro-prudential risks (Article 5(2), "topping up" power). The national authority may object to the measures. These objections, expressed by means of opinions, are not legally binding, but there is a general duty of cooperation in good faith that applies to the national authorities and the ECB (Article 6(2)).

The SSM Regulation specifies that for the purpose of carrying out its tasks under the SSM Regulation the ECB shall apply all relevant EU legislation, and where this EU law is composed of directives, the national legislation transposing those directives (Article 4(3) SSM). The notification obligation and topping-up power would therefore not apply to exclusively national instruments, such as the LTD and LTSF caps.

¹²³ In most Member States, the designated authority under the CRD/CRR will be the national central bank, but in a significant minority of cases, it will be the (sometimes still to be established) macro-prudential authority (see the ESRB Recommendation on the macro-prudential mandate of national authorities). In a few Member States where the central bank is not exclusively responsible for banking supervision, the designated authority will be the banking supervisor or a government ministry. For the instruments that are not regulated under the CRD/CRR, Member States are free to determine the responsible authority.

¹²⁴ Council Regulation (EU) No 1024/2013 of 15 October 2013 conferring specific tasks on the European Central Bank concerning policies relating to the prudential supervision of credit institutions. OJ L 287, 29.10.2013, p.63.

5.2 Liquidity coverage requirement

There is a **liquidity coverage requirement** in terms of a general obligation on institutions to hold liquid assets to cover their outflows under stressed conditions over a period of 30 days and which applies immediately with the entry into force of the CRD/CRR (Article 412(1) CRR). A more specific quantitative requirement in the form of a ratio will be phased in as of 2015 by a Commission delegated act. Banks are allowed to use the liquid assets to meet their obligations under stressed circumstances (Article 412(3) CRR). These can be bank-specific but may also be of a wider, market-related nature, or both. Member States have the option to introduce or maintain national liquidity requirements before the LCR is specified and fully introduced in the EU (Article 412(5) CRR). This provision could possibly be applied in combination with Pillar 2 measures (Article 103 CRD).

A **liquidity reporting** requirement applies immediately as of the day of entry into force of the CRD/CRR, but the scope of the reporting obligation could be adjusted in 2015 with the introduction of the binding LCR requirement (Article 415(1) CRR). Since 2011, however, the EBA has been collecting data on its own initiative through a voluntary LCR data collection exercise. In 2013 this exercise was broadened to include NSFR data.

A **(time-varying) LCR buffer** is a potential macro-prudential instrument that can take the form of a (time-varying) buffer be introduced over and above the minimum prudential requirement (see Section 3.1). There are two possible ways to apply the buffer. First, the competent or designated authority could for reasons of macro-prudential or systemic risk use the procedure under **Article 458 CRR** (national flexibility measures). This article should only be used where Pillar 2 liquidity measures are deemed ineffective and inadequate to address the systemic liquidity risk.¹²⁵ Second, the national competent authority could in principle also use **Article 103 CRD** (Pillar 2) to impose a time-varying LCR on institutions with a similar liquidity risk profile.

5.3 Stable funding requirement

There is a **stable funding requirement** in terms of a general obligation on institutions to ensure that long-term obligations are adequately met with a diversity of stable funding instruments under both normal and stressed conditions (Article 413(1) CRR) and which applies from 2016 (Article 521(2)(b) CRR). A more specific requirement on stable funding in the form of a ratio might be introduced following a legislative proposal by the Commission no earlier than 2017. Similarly to the liquidity coverage requirement, the CRR provides Member States with the option to introduce or maintain national provisions in the area of stable funding requirements before binding minimum standards are specified and fully introduced in the EU (Article 413(3) CRR). This provision could possibly be applied in combination with Pillar 2 requirements (Article 103 CRD). In contrast to the liquidity coverage requirement, however, there is no comparable possibility for the bank to go below the minimum stable funding requirement without supervisory approval.

¹²⁵ The requirement that Pillar 2 measures are considered before having recourse to Article 458 CRR, however, does not concern the cases where the stricter national measures of Article 458 address the whole banking sector.

A **stable funding reporting** requirement applies immediately as of the day of entry into force of the CRD/CRR.

A **(time-varying) NSFR buffer** is a potential macro-prudential instrument that, just like a (time-varying) LCR, can take the form of a (time-varying) macro-prudential buffer over and above the minimum prudential buffer (Section 3.2. See also the comments in Section 5.2 which apply here as well).

5.4 LTD and LTSF limits

(Time-varying) LTD and LTSF limits as described in Section 3.3 are possible **national instruments** that fall outside the scope of the CRD/CRR and are therefore left to national discretion. However, if such limits are introduced as a macro-prudential measure under Pillar 2 using Article 103 CRD, the EBA would need to be involved in the way described in Section 5.1.

Following the ESRB Recommendation on intermediate objectives and instruments of macro-prudential policy, prior to the application of such measures at the national level, the ESRB will need to be informed in the event that significant cross-border effects on other Member States or the single market are expected. Moreover, if an authority is of the view that reciprocity is needed it should notify the ESRB and the national macro-prudential authorities of the Member States concerned.

5.5 General liquidity surcharge

A Pigouvian-type liquidity surcharge as described in Section 3.4 could be introduced on the basis of **Article 105 CRD**. This article provides for the application of administrative penalties or other administrative measures, including prudential charges, reflecting the difference between the actual liquidity position of a bank and any liquidity and stable funding requirements established at national (e.g. LTD or LTSF limits) or EU level (e.g. the LCR, NSFR).

However, there are a number of interpretation issues in relation to this article. First, it is ambiguous whether the measures mentioned are intended only for a transition period until the new liquidity and stable funding requirements are implemented at EU level (Recital 102 CRD) or whether they would also apply beyond this period as the general wording of the last paragraph of Article 105 CRD would seem to suggest.

Second, Article 105 CRD also relates to the **Pillar 2** requirements since its first paragraph refers to the SREP. Accordingly, the competent authority will, for the purpose of determining the appropriate level of liquidity requirements, assess whether any specific liquidity requirements are necessary in order to capture liquidity risks to which an institution is or might be exposed, taking into account, among others, systemic liquidity risk that threatens the integrity of the financial markets of the Member State concerned. The use of Article 105 CRD under Pillar 2 also opens up the possibility of combining it with **Article 103 CRD**, i.e. applying it in a similar or identical way to institutions with a similar risk profile.

5.6 Liquidity surcharge for SIs

A liquidity surcharge could also be envisaged for SIs, in particular systemically important banks as a subset of all banks in a Member State. (See the comments in Section 5.5, which also apply here).

Chapter 6

Pillar 2 and its macro-prudential use¹²⁶

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Executive summary

Pillar 2 provides a broad toolbox to address firm-specific systemic risks. The tools include, among others, additional own funds, specific treatment of assets, limitation of operations, tightening of liquidity requirements and additional disclosure. These tools can be used as a targeted “add-on” to the other macro-prudential instruments.

The Supervisory Review and Evaluation Process (SREP) evaluates whether a bank contributes to systemic risks, as identified by macro-prudential authorities. The competent authorities can use Pillar 2 measures to prevent or mitigate these risks and should do so when they offer the most effective and efficient solution.

Pillar 2 has the advantage of offering different tools to address systemic risks. It can target specific banks and specific exposures.

The main disadvantages are the potential lack of transparency and coordination between micro- and macro-prudential authorities. Pillar 2 measures should be used on their own merits to address systemic risk and not as a means of circumventing the coordination and disclosure requirements related to the other macro-prudential instruments.

These disadvantages can be overcome in two ways.

- It is recommended that the competent authority coordinates with the national macro-prudential authority when evaluating systemic risks under the SREP and when addressing systemic risks by using Pillar 2 measures.
- It is recommended that competent authorities require bank disclosure of applied Pillar 2 measures addressing systemic risks, where it is considered that disclosure would be beneficial for financial stability and without prejudice to the disclosure level of microprudential Pillar 2 measures.

1. Pillar 2 as a macro-prudential tool

The aim of Pillar 2 is twofold: to address (elements of) risks that are not sufficiently covered by Pillar 1 and to provide incentives for banks to enhance risk management. To this end, Pillar 2 is based on the SREP and enables Member States to impose requirements aiming to improve the internal procedures, controls and risk management of banks. This chapter, however, focuses on the macro-prudential use of other measures including additional own funds, the strengthening of liquidity requirements, and additional disclosure (Section 2).

The CRD allows Pillar 2 to be used for macro-prudential purposes.¹²⁷ It requires competent authorities to take systemic risks into account when carrying out SREPs. Indeed, competent authorities should take into account not only the risks to which the institutions are or might be exposed but also the risks that an institution poses to the financial system.

Where national authorities previously were able to address a systemic risk through national regulation, this risk may now be covered through Pillar 2. Before the current CRD/CRR came into force, authorities in Member States could address a systemic risk through national regulation “topping-up” the Pillar 1 or Pillar 3 requirements (minimum harmonisation rules

¹²⁷ Articles 97 and 98 CRD.

under the previous CRDs). By contrast, the current CRD/CRR contains maximum harmonisation rules. Only pre-defined and delimited requirements may be set within Pillar 1 and Pillar 3, while Pillar 2 allows more flexibility. Hence, if the requirements in Pillar 1 and Pillar 3 are deemed insufficient or inadequate, competent authorities may apply Pillar 2 to address systemic risks.

Furthermore, the CRD provides that Pillar 2 measures can be applied to a group of institutions with similar risk profiles. Systemic importance is a possible criterion justifying such group measures.¹²⁸ This means that the *same* measure can be applied to different banks with similar profiles, but they need to be applied on an *individual* basis, because Pillar 2 measures are entity specific.

Box 6.1: Pillar 2: ICAAP, SREP and stress tests

Pillar 2 is not merely a simple capital adequacy assessment. It combines institutions' Internal Capital Adequacy Assessment Process (ICAAP) and supervisors' Supervisory Review and Examination Process (SREP). Pillar 2 measures can only be applied once conclusions have been drawn from the SREP, which also involves assessing the ICAAP, accompanied by supervisory stress tests. In principle, the bank and the competent authority have similar incentives to identify and assess risks that the bank itself is exposed to, but the bank has no incentive to identify and assess systemic risks which it poses to the system itself.

Competent authorities should therefore pay special attention to systemic risks which the bank poses to the system, e.g. by including this assessment in an annual stress test. The CRD requires the EBA to draft guidelines to further specify common procedures and methodologies for the SREP. The identification and assessment of systemic risk based on the bank's potential systemic impact should be part of these guidelines.

A stress test is a useful tool to assess systemic risks and the results can be used as a basis for applying Pillar 2 measures. Stress tests of individual banks have been used regularly as a supervisory tool by micro-prudential supervisors in order to identify risks and potential capital absorbency needs. Coordinated stress tests that cover large parts of the banking system are more recent. When used for micro-prudential purposes they provide a valuable tool to benchmark banks and the results of various stress tests performed by banks. For macro-prudential purposes, they provide valuable information by revealing how significant economic or financial shocks would affect the banking system as a whole.

Stress tests and most macro-prudential instruments share a common objective, namely building resilience. They are not substitutes but complements: the indicators used to implement macro-prudential tools can be useful in designing the stress test scenarios, while the capital losses or liquidity strains revealed by the stress test can help calibrate macro-prudential tools.

¹²⁸ The EBA is mandated to monitor supervisory practices in that respect. The EBA must also issue guidelines specifying how similar risks should be assessed and how to ensure that Article 103(1) CRD on the application of supervisory measures to institutions with similar risk profiles is consistently applied.

2. Macro-prudential instruments under Pillar 2

There are many different instruments available to competent authorities under Pillar 2.¹²⁹ Although the CRD provisions on Pillar 2 expressly mention systemic risk in relation to additional own funds requirements, the range of Pillar 2 measures for macro-prudential purposes is much broader. They include at least the following measures.

- Additional own funds requirements. The use of this is mandatory where risks or elements of risks are not covered by the capital requirement under Pillar 1.¹³⁰ The size of the required additional own funds can be calculated, for example, by assuming an increase of the applicable risk weights for the relevant portfolio.
- Requirements to reinforce internal capital adequacy assessment and internal governance arrangements, as well as establishing recovery and resolution plans.
- Requirement for the bank to present a plan to restore compliance with supervisory requirements.
- Requirement to apply a specific provisioning policy or treatment of assets (i.e. specific weighting of assets in the calculation of own funds requirements, re-classification/valuation of assets according to their risk profile); requirement to limit certain business and/or operations or to reduce risks. These tools are well suited to address sectoral systemic risks.
- Restrictions on variable remuneration, requirements to use net profits to strengthen own funds, restrictions on (or prohibition of) distributions or interest payments to shareholders and other own fund providers.
- Specific liquidity requirements. The competent authority must take several elements into account, including systemic liquidity risk threatening the integrity of the financial markets.
- Additional reporting or disclosure requirements.

This list is non-exhaustive. Member States may empower their competent authorities to use other tools deemed useful for Pillar 2. Note however that Member States cannot use Pillar 2 to loosen the requirements below the Pillar 1 (or CRR) minimum applicable to all institutions.

Most of the tools under Pillar 2 complement the macro-prudential instruments in Pillar 1 and Pillar 3. Their economic impact is therefore transmitted through the same channels. Pillar 2 measures can work both as price instrument (by increasing the capital requirements) or as a volume instrument (by limiting certain exposures). They can also be used to enhance transparency by requiring additional reporting or public disclosure. The macro-prudential use of the additional own funds requirement under Pillar 2 can be based on the risk drivers and indicators identified for the SRB (Chapter 4). However, since the Pillar 2 measures are firm specific, the indicators also need to be applied at the level of the individual entity, rather than to the entire sector.

¹²⁹ Articles 104 and 105 CRD list the powers that competent authorities can use under Pillar 2. In this handbook these powers are referred to as Pillar 2 tools or Pillar 2 instruments.

¹³⁰ Article 104(2)(b) CRD.

One difference between other macro-prudential instruments and Pillar 2 measures concerns eligible capital. The buffers for systemically important institutions and the SRB can only be met by CET1 capital. Under the CRD, however, Pillar 2 additional capital requirements can be met by regulatory own funds that are lower quality, at the discretion of the competent authority.¹³¹

Another difference concerns the supervisory consequences in the event of a breach of the requirements.¹³² Failure to meet the macro-prudential buffers will be sanctioned by a restriction on distributions of profits and the requirement to draw up a capital conservation plan. If this plan is rejected by the competent authority, other necessary measures will be imposed. By contrast, in the event of a breach of Pillar 2 requirements, the competent authorities can take the immediate supervisory measures deemed necessary, just as in the case of a failure to meet the minimum capital requirements under Pillar 1.

3. The interplay between Pillar 2 and other measures

In contrast to Pillar 1 requirements, Pillar 2 measures are firm specific. The decisions taken under Pillar 2 are individual decisions applicable only to an institution or to a specific list of institutions. Consequently, Pillar 2 measures can target individual institutions or a group of institutions with a similar risk profile and can thereby be tailored to fit a particular situation. By contrast, Pillar 1 measures apply to all banks.

There is an economic as well as a legal basis for using Pillar 2 measures when certain systemic risks may not be addressed by other macro-prudential instruments as effectively as by Pillar 2 measures. Ideally systemic risks are first addressed through general provisions, such as the CCB. Pillar 2 measures must take those general provisions into account but can then complement them in order to increase the effectiveness of macro-prudential policy and address the systemic risks of individual banks.

In practice Pillar 2 measures may be the first to be applied when targeting systemic risks. The reason for this is that firm-specific decisions may be easier and quicker to adopt than implementing general provisions. This is especially relevant in the case of a risk which materialises suddenly. Nevertheless, these Pillar 2 measures addressing systemic risk need to be revised if general measures under Pillar 1 are adopted thereafter.

Certain Pillar 2 measures, if used for macro-prudential purposes, overlap with the national flexibility measures.¹³³ The scope of the Pillar 2 measures (own funds, large exposures, public disclosure, liquidity and risk weights) is largely the same as the national flexibility measures under Article 458. Their scope of application is also similar as they can both be applied to a group of banks. As mentioned above, the national flexibility measures are only to be applied by the competent or designated authority after other measures, including Pillar 2 measures, have been considered.

¹³¹ Principles for setting additional own funds requirements based on the SREP outcomes and the question of the quality of own funds to be eligible for such purposes will be addressed by the EBA in the guidelines on common procedures and methodology for the supervisory review and evaluation process.

¹³² Articles 102, 141 and 142 CRD.

¹³³ Article 458 CRR.

4. Advantages and disadvantages of using Pillar 2

The advantages of Pillar 2 measures are related to its flexibility. There are three main advantages for using Pillar 2 to address systemic risk.

1. Pillar 2 provides a broad set of supervisory tools. In particular, Pillar 2 measures can be used to impose capital requirements on certain portfolios of banks which are considered to be the root of the systemic risk. For instance, capital surcharges through assumed increases in risk weights can be implemented on specific segments of the mortgage market, targeting only new credits or specific high-risk segments such as high LTV mortgages.¹³⁴ Another example is the capital requirement addressing the risk of forex lending to unhedged borrowers, as recommended by the ESRB.¹³⁵ This enables the competent authorities to increase capital requirements on this specific part of the loan portfolio (i.e. those loans that are denominated in foreign currency) instead of applying the increase to all types of loans.
2. Pillar 2 allows the competent authority to address the source of systemic risks. The only constraint is that the competent authority should demonstrate – through its SREP or supervisory stress test – that a specific systemic risk is linked to the bank to which the Pillar 2 measure is to be applied. Pillar 2 can be used when an emerging systemic risk concerns only a group of banks and requires rapid intervention of the competent authority, for instance in the case of a sudden build-up of an unbalanced trading book in a few large banks.
3. Pillar 2 measures are not bound by pre-defined limits. The competent authority can therefore adapt the measure and determine the appropriate size of the capital surcharge. An example is the risk weight floor on mortgages introduced in the framework of Pillar 2 by the Swedish supervisor Finansinspektionen in 2013. It set a capital add-on equivalent to a risk weight floor of 15% for Swedish mortgages, thereby tripling the capital requirement for mortgages applicable to Swedish banks using an IRB model. At this juncture, this would be more difficult to achieve using Pillar 1 measures.¹³⁶

However, there are three disadvantages to using Pillar 2 measures to address systemic risks. These shortcomings are related to the micro-prudential nature of Pillar 2.

1. Pillar 2 measures typically lack transparency. They are unlikely to be disclosed because they may reveal confidential information. In the vast majority of Member States the publication of Pillar 2 decisions is governed by rules of professional secrecy. Although this may constitute a strength in the micro-supervision context, as it enhances the exchange of information between banks and competent authorities, it does not facilitate

¹³⁴ Note that this is achieved by the competent authority requiring additional own funds to be held under Pillar 2, equivalent to what the additional Pillar 1 requirement would have been if the risk weights were changed.

¹³⁵ Recommendation of the ESRB of 21 September 2011 on lending in foreign currencies (ESRB/2011/1), OJ C 342, 22.11.2011, p.1.

¹³⁶ The introduction of the risk weight floor amounted to SEK 20 billion of extra capital, thereby tripling the capital requirement for mortgages applicable to banks using an IRB model. Achieving the same effect, i.e. tripling the capital requirement for mortgages at the targeted banks, using, for instance, the CCB, would have required the buffer to be set at 21%. This buffer level would have had an unacceptable effect on other exposure classes, since the CCB cannot be limited to just one exposure class. It would also have affected other banks as well, rather than just the targeted ones.

the conduct of macro-prudential policy. Macro-prudential policy in general benefits from public disclosure owing to its signalling effects. This is also why the disclosure of Pillar 1 macro-prudential measures is required by law.

This shortcoming may be partially overcome however. The CRR promotes transparency by requiring institutions to disclose upon demand from the competent authority the results of their ICAAP, including the composition of the additional own funds requirements based on the SREP.¹³⁷ Thus, competent authorities can request disclosure of additional own funds requirements under Pillar 2 without having to disclose them themselves. They are recommended to do so for macro-prudential purposes, however, where disclosure is considered beneficial for financial stability.

2. Coordination with macro-prudential authorities is not required under the CRD with respect to Pillar 2 measures. The involvement of macro-prudential authorities is therefore limited, which may lead to an unbalanced solution in the event of a conflict of interest between micro- and macro-prudential supervision. When Pillar 2 measures are used for macro-prudential purposes, full transparency towards and coordination with macro-prudential authorities is beneficial to macroprudential policy. Section 5 discusses how to achieve this.
3. Unlike Pillar 1 requirements, Pillar 2 measures are firm specific. Pillar 2 measures are therefore more likely to be contested in discussions with supervisors and ultimately in court. Moreover, the bank concerned may put pressure on the competent authority to soften the measure.

In conclusion, Pillar 2 provides a broad and flexible toolbox to address systemic risks offering the possibility of tailor-made solutions. Competent authorities should choose Pillar 2 on its own merits and not use it in order to circumvent the coordination and disclosure requirements related to alternative macro-prudential instruments. Competent authorities should coordinate as far as possible their macro-prudential Pillar 2 measures with the relevant national macro-prudential authorities. In addition, competent authorities are recommended to require banks to disclose applied Pillar 2 measures addressing systemic risks, where disclosure would benefit financial stability and without prejudice to disclosure level of microprudential Pillar 2 measures.

5. Institutional issues

There is no legal obligation in the CRD to inform or consult the ESRB or a national macro-prudential authority on the use of Pillar 2 for macro-prudential purposes. When a supervisory review shows that an institution poses a systemic risk, the competent authority is required to inform the EBA about the results of the review. Notification to the EBA is also required when the competent authority decides to apply Pillar 2 measures to a group of institutions with similar risk profiles. Where the measure is addressed to individual institutions, only general communication procedures between competent authorities and the EBA apply.

¹³⁷ Article 438(b) CRR.

As mentioned above, it is recommended that competent authorities coordinate with macro-prudential authorities when evaluating systemic risks under the SREP and when considering Pillar 2 measures to address these risks. Indeed, input from macro-prudential authorities in the context of the SREPs can aid and facilitate the competent authorities' assessment of systemic risks. Furthermore, by adopting Pillar 2 measures to prevent or mitigate systemic risks, the competent authority affects the overall systemic risk, which is relevant to the macro-prudential authority. Even without a legal basis in the CRD/CRR this cooperation is beneficial and recommended both at the national and European level.¹³⁸

One way of achieving this cooperation could be for the ESRB to issue a recommendation to competent authorities and the EBA in relation to the use of Pillar 2 measures to address a certain systemic risk. The ESRB can provide warnings and issue recommendations. Thus, the ESRB can recommend that national competent authorities apply Pillar 2 measures and that the EBA issue guidelines harmonising the implementation of the recommended Pillar 2 measures by the national authorities. An example of this is the ESRB Recommendation on lending in foreign currencies, which was followed by EBA guidelines.¹³⁹

Finally, coordination between different competent authorities is facilitated by the colleges of supervisors. Most Pillar 2 decisions addressing systemic risks are applied to banking groups for which a college of supervisors has been established. The college must try to reach agreement on the conclusions of the SREP, including the evaluation of systemic risks, and any additional own funds and liquidity requirements under Pillar 2 to address these risks.¹⁴⁰ In the absence of a joint decision, the competent authorities may take individual decisions on the entities they supervise, but only after every effort has been made to reach an agreement, unless the EBA takes a binding decision after a mediation process. The consolidating supervisor, chairing the college, may invite the relevant macro-prudential authorities as observers in the college.

¹³⁸ Article 56(b) CRD provides for the exchange of information between the competent authorities and the authorities responsible for maintaining the stability of the financial system in the Member State through the use of macro-prudential rules.

¹³⁹ Recommendation of the ESRB of 21 September 2011 on lending in foreign currencies (ESRB/2011/1), OJ C 342; The EBA published guidelines on capital measures for foreign currency lending to unhedged borrowers under the SREP on 20 December 2013 (EBA/GL/2013/02).

¹⁴⁰ Article 113 CRD. Note that a joint decision is not required for other Pillar 2 measures to address systemic risks, such as increased disclosure or limits on the distribution of profits.

Chapter 7

National flexibility measures under Article 458 CRR¹⁴¹

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Executive summary

Article 458 CRR includes “national flexibility measures” that allow national authorities to impose stricter prudential requirements to address systemic risks subject to strict legal requirements and a notification/approval procedure. The instruments in Article 458 CRR serve different purposes and target different dimensions of systemic risk. They may be applied by the competent or designated authorities for up to two years, with possibility of extension. The aim of this chapter is to provide operational guidance on the use of the following measures (instruments) for the purpose of macro-prudential policy.

- **Own funds requirements** may be increased above the level laid down in the CRR, that is a Common Equity Tier 1 capital ratio of 4.5% of risk-weighted assets, a Tier 1 capital ratio of 6% of risk-weighted assets and a total capital ratio of 8% of risk-weighted assets.
- **The capital conservation buffer** may be increased above the level laid down in the CRD, that is a common equity Tier 1 ratio of 2.5% of risk-weighted assets.
- **Measures concerning intra-financial sector exposures** which may include a tightening of, in principle, all CRR prudential measures for intra-financial sector exposures. This Handbook focuses on risk weights, capital buffer add-ons and tightening of large exposure limits on risk exposures to other banks, investment firms, insurers, a range of investment funds and other regulated and unregulated financial institutions. Alternatively, these measures may target securitisation, covered bonds and other financial sector exposures.
- **Measures concerning large exposure requirements** which may include tightening the limits on single-exposure concentrations or the less stringent limits that trigger intensive supervision and monitoring. Alternatively, currently existing exemptions for certain sets of exposures may be removed.
- **Public disclosure requirements** may include requiring institutions to disclose at a higher frequency, at a more granular level, or using specific formats.

Additional instruments provided for in Article 458 CRR target liquidity and real estate-related systemic risks and are described in the separate thematic chapters in this Handbook.

The key policy messages of this chapter are as follows.

- **Application of the national flexibility measures under Article 458 CRR is limited in scope and subject to a series of both procedural (regulatory) and substantive conditions.** National authorities may only use these instruments if they can justify that they are necessary to address particular systemic risks and that these risks cannot be adequately addressed by a specified list of other instruments, e.g. Pillar 2. Furthermore, the use of the instruments provided for in Article 458 CRR is subject to a demanding notification/approval process, involving notification by the national authority, the provision of opinions by the ESRB and EBA, a proposal from the European Commission and a European Council decision.
- **In the context of the notification/approval process, national authorities will need to provide clarity about the intended objectives of the planned measures, the expected**

benefits and whether they envisage potential unintended consequences and cross-border spillovers.

- **The ESRB plays an important role in the approval process**, as the CRR requires the ESRB to submit an opinion to the European Commission on the appropriateness of using the instruments notified under Article 458 CRR. More broadly, the ESRB also has a key role to play in advising how national macro-prudential policies can be designed to mitigate any material unintended consequences and cross-border spillovers. The ESRB will focus on the overall benefits of macro-prudential measures from a financial stability perspective considering both domestic and cross-border effects. As countries gain more experience with macro-prudential policy and learn about its implications, the ESRB will play a key role in improving the collective understanding of its effects, domestic and cross-border, and of how different instruments interact with each other and with other policies.

1. National flexibility measures under Article 458 CRR

Article 458 CRR provides for “national flexibility measures” that enable national authorities to impose stricter prudential requirements to address systemic risks subject to strict legal requirements. In particular, measures may only be applied pursuant to Article 458 CRR if the national authority can justify that the identified systemic risk cannot be adequately and effectively addressed by other instruments. Furthermore, they are subject to a notification and approval process, involving opinions from the ESRB and EBA on the envisaged national measures, a possible proposed implementing act of the European Commission and a final decision by the European Council.

Article 458 CRR provides for a broad set of possible measures (instruments) concerning the level of own funds, large exposure limits, public disclosure requirements, the level of the capital conservation buffer, liquidity requirements, risk weights for the residential and commercial property sector, and intra-financial sector exposures.

This chapter outlines the main characteristics of these instruments with the exception of those related to liquidity and real estate systemic risks, which are described in separate thematic chapters.

2. Overview of instruments and transmission mechanism

National flexibility measures can be used to mitigate both cyclical and structural aspects of systemic risk. A short overview of the instruments and their transmission mechanisms is given below. More detailed discussion on specific instruments can be found in Section 3.

Own funds requirements and the capital conservation buffer

Higher own funds requirements and capital conservation buffers reduce broad-based systemic risk by increasing banks’ resilience and their capacity to absorb future potential losses when existing levels of minimum requirements are considered insufficient. Like other capital instruments, they can also help to excessive credit growth and leverage insofar as they

increase the internal cost of providing loans. The macro-prudential measures related to own funds and the capital conservation buffer requirements entail increasing the level above the minimum micro-prudential requirements (Pillar 1).

Measures for intra-financial sector exposures

These measures are aimed at reducing risks arising from excessive or underpriced intra-financial sector exposures. They can also be used to reduce concentrations of exposures within the financial sector and interconnectedness. The category encompasses a broad range of macro-prudential measures which can be applied to risk exposures to other banks, investment firms, insurers, a range of investment funds and other regulated and unregulated financial institutions. These risk exposures may include securitisation, covered bonds and other financial sector exposures. The macro-prudential measures include increasing risk weights, imposing capital buffer “add-ons” and tightening large exposure limits. Other measures might be adopted when macro-prudential authorities have gained more experience with risks in the financial sector and how to tackle them.

Large exposure requirements

Large exposure requirements can be tightened to address systemic risk arising from high counterparty concentration and interconnectedness (and the associated potential for contagion). In some cases, tightening can also have indirect effects on the intermediate objective of mitigating and preventing excessive credit growth. The micro-prudential regime for large exposures sets strict limits on single-exposure concentrations and other less stringent limits that trigger intensive supervision and monitoring. An authority could make these limits stricter using Article 458. Quantitative limits could be set at higher levels for particular subsets of institutions and current exemptions for specific sets of exposures could be removed.

Public disclosure requirements

This instrument complements other requirements and measures by facilitating public scrutiny of financial institutions. As a result, it strengthens the resilience of the financial system. Possible macro-prudential measures include requiring institutions to disclose information at a higher frequency, at a more granular level, or using specific formats. Increased public disclosure can boost market discipline, reduce information asymmetries and enhance comparability of information across different institutions.

3. Description of instruments

3.1 Own funds requirements and capital conservation buffer

Macro-prudential goal

To reduce broad-based systemic risk when other capital measures or buffers are considered insufficient.

Micro-prudential regime

The own funds requirement sets a minimum level of a Common Equity Tier 1 capital ratio of 4.5% of RWA, a Tier 1 capital ratio of 6% of RWA and a total capital ratio of 8% of RWA. The capital conservation buffer is a common equity Tier 1 “add-on” of 2.5% of RWA that provides additional loss-absorption capacity in stressed periods.

Macro-prudential measures

- Increase the level of own funds requirements (no upper limit).
- Increase the capital conservation buffer above 2.5% of CET1 (no upper limit).

Advantages

- Increase resilience against losses.
- Incentive to reduce excessive or under-valued exposures.
- Limitations on distributions (e.g. dividends) until institutions meet the requirement in full, which indirectly builds further capital and resilience.

Disadvantages

- Potential incentive for banks to lend to riskier borrowers.
- Deactivation might be delayed and inadvertently create a credit crunch.

Level of application of the measure

Consolidated or individual.

Scope of application

All domestically authorised institutions or a subset of them.

Institutional aspects

Description

Applying stricter macro-prudential measures means either increasing the level of own funds requirements above their minimum levels or raising the capital conservation buffer above the 2.5% level.

There is an important difference between the two instruments. Own funds requirements must be complied with at all times. However, institutions can comply with the capital conservation buffer requirements progressively, provided that they limit their earnings distributions. Thus, increases in capital conservation buffers might be preferable to raising the level of own funds requirements if institutions’ resilience can indeed be built up progressively in this way.

Intended objectives and impact

Rationale

Increases in own funds requirements or the capital conservation buffer effectively increase the minimum capital requirement for banks and can be considered as a response to broad-based

systemic risk. In particular, an increase in systemic risk might be expected in the following cases, insofar as financial stability is threatened.

- A deterioration in the risk profile of all or of a subset of banks exposed to similar risks.
- An excessive supply of credit that might amplify the business cycle.¹⁴²
- An excessive concentration of risks to a specific sector of the real economy when sectoral measures are not sufficient.

Impact

There are two main channels through which these instruments affect systemic risk.

- Increase in resilience against losses. This can be done either through raising additional capital or organically through retained earnings and limitations on distributions (e.g. dividends).
- Incentive to reduce excessive credit growth or to restructure portfolios in favour of lower risk assets.

Unintended domestic effects

First, higher capital requirements might increase the internal cost of providing loans and reduce the flow of credit to the real economy.¹⁴³ Recent studies, such as the report by the Basel Macroeconomic Assessment Group, have analysed the quantitative impact of an increase in capital requirements on banks' lending behaviour.¹⁴⁴ Most find that an increase in regulatory capital requirements generates a modest tightening in credit conditions.

Second, higher capital requirements might generate undesired effects when systemic risk (e.g. excessive lending) is concentrated in certain economic sectors or activities. Increasing the amount of capital across the whole balance sheet might encourage banks to reduce the provision of credit to sectors with sustainable growth and low profitability while continuing or increasing credit supply to higher-growth, higher-risk activities. This could occur in the absence of a commensurate increase in risk weights and have a negative effect on healthy parts of the economy without reducing systemic risk.

Third, negative effects on lending might also arise if deactivation of the instruments is unduly delayed. Requiring a higher own funds ratio than is needed might hamper credit supply and limit the potential of the real economy.

Complementarity and substitutability with other capital instruments

The transmission mechanism of own funds requirements and the capital conservation buffer is similar to that of other capital requirements and capital buffers provided for in the CRD/CRR. The key differences are as follows.

- Unlike the CCB, these two measures can directly and uniformly apply to all exposures, not only domestic exposures.

¹⁴² Please note that this risk could also be addressed by the CCB.

¹⁴³ In certain circumstances, however, slower growth in credit will be an intended effect.

¹⁴⁴ See, for an overview of the empirical literature, CGFS (2012) and Macroeconomic Assessment Group (2010).

- Unlike the SRB, which must be at least 1%, there are no restrictions on the calibration of these instruments.
- Unlike Pillar 2 measures, these measures are transparent and help anchor financial markets' expectations on the macro-prudential stance.

Cross-border spillovers

An increase in own funds requirements or the capital conservation buffer at the national level can have both positive and negative spillovers on the financial system of other countries.

Positive cross-border spillovers include:

- A lower risk of contagion for other countries and a lower probability of a systemic crisis by improving the resilience of the domestic banking system and reducing the probability and impact of potential defaults.
- Signals an increase for specific risks, also at a cross-border level.
- Contributes to containing an excessive supply of credit that might amplify the financial cycle and threaten financial stability in countries with synchronous financial cycles.

Negative cross-border spillovers include:

- A shift of voluntary capital buffers from other entities in the group, reducing their resilience to a possible stress and their ability to extend credit and support economic activity.
- A reduction of cross-border lending which, in the case of countries with asynchronous cycles, could (in the absence of alternative funding sources) damage potential economic growth.
- A sudden change in market sentiment if the measures are perceived as reflecting concerns as to the soundness of a banking system. This could threaten financial stability in banking systems with similar characteristics and business models, leading to a generalised loss of confidence.

Cross-border coordination regarding, for instance, reciprocity and the appropriate phase-in of measures could mitigate negative cross-border spillovers.

3.2 Measures for intra-financial sector exposures

Macro-prudential goal

To reduce systemic risk from exposures towards the financial sector (or sub-sectors) by changing the prudential requirements on risk exposures to other banks, investment firms, insurers, a range of funds and other regulated and unregulated financial institutions.

Micro-prudential regime

Risk weights or capital buffers applied to institutions, securitisation, covered bonds, etc. but the range of permissible measures is wide.

Macro-prudential measures

In principle all (Pillar 1) CRD/CRR prudential measures are available. Measures could include (on stock/flows):

- Increasing micro-prudential capital requirements (e.g. via floors in the Standardised Approach (SA) or multipliers/parameter floors in the Internal Ratings-Based (IRB) approach).
- Tightening the large exposures limit.

Advantages

- Increasing capital requirements enhances resilience against losses.
- Increasing the cost of funding for financial entities and signalling their riskiness may create incentives to reduce excessive or underpriced exposures.
- Tightening large exposure requirements reduces interconnectedness.

Disadvantages

- Regulatory arbitrage.
- May also affect banks' decisions on lending to real economy.

Level of application of the measure

Consolidated or individual.

Scope of application

All domestically authorised institutions or subsets of them; all exposures at those institutions or a subset of them.

Institutional aspects

Description

This tool comprises measures to change the prudential requirements with respect to intra-financial sector (or sub-sector) exposures. Its purpose is to target sectoral risks which are likely to pose a threat to financial stability. The measures can be used in a countercyclical manner, e.g. to counter excessive credit growth within the financial sector and absorb related losses during a downturn, but also to address structural developments (e.g. excessive exposures to certain types of financial entities).

Threats to financial stability include the concentration of risk within the financial sector or towards a small number of counterparties (e.g. monoline insurers) or excessive risk-taking and leverage fuelled by intra-financial sector credit. The network of intra-financial sector exposures may also increase the potential for contagion via counterparty risk. Shocks to one or more institutions also pose liquidity risks.

National flexibility measures to change the capital requirements for intra-financial exposures can take several forms. For example, the micro-prudential sectoral risk weights could be increased by applying a multiplicative scalar (either to the IRB parameters or to the IRB outcome directly) or by raising risk weights for certain exposures (for banks using the SA).¹⁴⁵ More specifically, for IRB banks, this could include introducing, or increasing if already existing, floors to specific parameters (e.g. PD, LGD, AVC¹⁴⁶) or adding a multiplicative scalar or capital buffer add-ons to the IRB capital charge (K_{IRB}). An additional measure could be to tighten the large exposure limit.

Intended objectives and impact

Rationale

If exposures in the intra-financial sector are judged to be excessive (in absolute terms or relative to real economy lending) or underpriced and to create threats to financial stability, macro-prudential authorities may seek to mitigate this vulnerability by increasing banks' capital requirements with respect to intra-financial sector exposures. This will have the effect of increasing banks' resilience to potential losses on these exposures by requiring them to hold extra capital against them. It will also discourage new lending in the sector by making these exposures more costly to fund. An example is the temporary increases in risk weights and provisions in India in 2005-07. This tool might have been useful, in retrospect, in the United Kingdom between 2003 and 2007, when bank and other financial corporate debt rose sharply accompanied by increasing reliance on unstable, short-term wholesale funding (such as deposits from MMFs).¹⁴⁷

Impact

Raising capital requirements for intra-financial sector exposures pursuant to Article 458 increases the amount of capital that banks must have when holding exposures to other financial sector entities, relative to the baseline set by the micro-prudential regime. Typically, prudential requirements with respect to these exposures are computed as part of the frameworks for credit risk, counterparty credit risk and market risk. Macro-prudential authorities may want to use this measure when it is considered that lending within the financial sector poses a threat to financial stability, with the ultimate goal of reducing the likelihood and severity of financial crises.

Raising capital requirements for intra-financial sector exposures aims at reducing systemic risk via the following channels.

- By requiring banks to hold an additional buffer of capital against intra-financial sector exposures, it increases a bank's resilience and its capacity to absorb losses, which may be greater than anticipated under the credit risk measured by the normal micro-prudential regime.

¹⁴⁵ See Annex 5 of CGFS (2012).

¹⁴⁶ The asset value correlation (AVC) is the correlation between an obligor's creditworthiness and the general state of the economy and reflects interconnectedness between borrowers.

¹⁴⁷ Bank of England (2011).

- By raising the cost of providing credit in the financial sector (both in absolute terms and relative to other sectors), this measure provides an incentive for banks to rein in excessive or underpriced exposures.
- By reducing lending to the financial sector, this tool mitigates systemic risk by containing interconnectedness within the financial system and the possibility of contagion effects between institutions.

Empirical evidence on the impact of these measures is not yet available. Credit institutions' size and business models as well as the prevailing economic conditions will affect how they respond to the policy measure. Also, the speed of transmission of these measures will depend on whether they are applied to the stock of existing exposures, to new lending or both – these options all appear to be permitted under Article 458 CRR.

Unintended domestic effects

First, banks might attempt to circumvent tighter regulation, which would create leakages in implementation. For example, banks might do this by (i) modifying other model parameters to offset the macro-prudential increase in capital requirements – supervisors should endeavour to monitor this; (ii) continuing to carry out the same activity but through a different legal entity not subject to the requirements; and (iii) by using derivatives to generate a synthetic exposure to a given asset rather than a formal exposure subject to risk weights. Also, institutions such as hedge funds might be difficult to define precisely, since they fall within other IRB categories (in this case, the corporate asset class).

Second, changes in capital requirements for intra-financial sector exposures might affect lending to the real economy as banks reassess their lending activities. Banks might either lend more to sectors of the real economy because they become relatively cheaper to fund or, conversely, they could reduce lending to the real economy if banks want to maintain intra-financial sector exposures unchanged as a share of their portfolio and do not intend raise new capital.

Cross-border spillovers

Setting higher capital requirements for or limits to intra-financial sector exposures could have similar spillover effects to those caused by increasing own funds requirements and large exposure limits. Such effects are likely to extend beyond national borders given the high degree of interconnectedness of the European financial system. However, the spillover effects may be less significant than those of own funds requirements, as limiting intra-financial exposures is a targeted measure.

Positive spillovers include:

- A lower risk of contagion and consequently a lower probability of a systemic crisis in countries with interconnected financial systems.
- Reduced risks to financial stability stemming from an excessive supply of credit where banks rely on cross-border funding and countries are in the same phase of a financial cycle.

Negative spillovers include:

- Constraining intra-financial sector credit in one country could limit the extension of credit to the real sector and thereby affect economic activity in another country where banks' supply of credit is heavily dependent on the availability of cross-border funding.
- If limits to intra-financial sector exposures are perceived as a concern over the soundness of banks or the financial system, it may contribute to a sudden shift in market sentiment against banking systems with similar characteristics.

Banks may also substitute intra-financial sector lending with direct cross-border lending to the real sector, thus supporting real sector activity. This could be considered as either positive or negative, depending on the business cycles of the respective countries. Cross-border coordination between authorities regarding reciprocity and the appropriate phase-in of measures could mitigate negative cross-border spillovers.

3.3 Large exposure requirements

Macro-prudential goal

To reduce systemic risk from concentration and interconnectedness.

Micro-prudential regime

A counterparty exposure incurred by a bank is defined as "large" if its value is equal to or exceeds 10% of the bank's eligible capital. Meeting this definition triggers additional monitoring, control and reporting requirements. The limit for large exposures is 25% of the bank's eligible capital. For exposures to other banks, the value shall not exceed 25% of the bank's eligible capital or EUR 150 million, whichever is the higher under certain conditions.

Macro-prudential measures

- Reduce threshold for labelling counterparty exposures as "large".
- Reduce the limit or remove exemptions for large exposures.
- Apply more severe account of risks in computing exposures.

Advantages

- Put upper bound on losses from counterparty default and from network effects.
- Mitigate the risk of contagion posed by interconnectedness in the financial system.

Disadvantages

- Might affect small banks relatively more than larger banks and lead to shift of credit demand and therefore risk concentration to larger banks.
- Could introduce more synchronous shocks across banks through increase of exposures to common counterparties.
- Might drive banks away from interbank funding and towards central bank and market funding.

Level of application of the measure

Consolidated or individual.

Scope of application

All domestically authorised institutions or subsets of them; all exposures at those institutions or a subset of them.

Institutional aspects

Description

Large exposure micro-prudential requirements aim to intensify the supervision of exposures to single counterparties when they reach critical levels and to restrict them beyond certain levels. The ultimate aim is to reduce the risk of concentration and contagion linked to counterparty default.

In the micro-prudential framework, an exposure is defined as large if its value is equal to or exceeds 10% of the lending bank's eligible capital.¹⁴⁸ The "large exposure" label triggers additional monitoring, control and reporting requirements with respect to the exposure. The size of a large exposure to a client or a group of connected clients is capped after taking into account the effect of credit risk mitigation techniques.¹⁴⁹ A number of exposures are exempted (e.g. central governments) and the regime allows for some national discretion (e.g. to fully or partially exempt covered bonds).

Macro-prudential measures could include:

- reducing the 10% threshold for labelling counterparty exposures as "large" or the 25%/EUR 150 million cap for counterparties, or groups of connected counterparties;
- removing exemptions included in the CRR (e.g. on exposures to central counterparties);
- adapting the method of calculating the exposure by mandating more severe models and mitigation techniques.

Under the national flexibility measures, national authorities may tighten the large exposure limit by a maximum of 15% for a period of up to two years following a simplified procedure (i.e. provided that justification and notification requirements are met).

Intended objectives and impact

Rationale

Tightening large exposure requirements pursuant to Article 458 is a quantity-based measure aimed at mitigating concentration risk and the risk of propagation of shocks through the financial system. While other policy measures can also be used to this end, policy-makers may sometimes prefer to rely, at least in part, on measures such as these rather than on price-based measures that affect the cost of credit, e.g. capital requirements.¹⁵⁰ Situations where a more stringent large exposure restriction may temporarily be activated are:

- an increase in interconnectedness between financial institutions, which increases the risk of systemic contagion via direct counterparty losses or via indirect exposures through other financial institutions;

¹⁴⁸ Eligible capital for large exposure requirements includes Tier 1 and Tier 2 capital.

¹⁴⁹ Shadow banks are to be dealt with separately. The EBA will issue guidelines setting aggregate or individual limits for exposures to shadow banking entities which carry out banking activities outside a regulated framework. By end-2015, the Commission will assess the appropriateness and the impact of imposing such limits and will submit a report to the European Parliament and the Council, together, if appropriate, with a legislative proposal on exposure limits (Article 395(2) CRR).

¹⁵⁰ On the choice between the two types of instruments, see Chapter 8.

- an increase in the sectoral concentration of banks' portfolios which is deemed to pose a systemic threat (e.g. concentration in a sector with only a few counterparties).

Impact

Large exposure restrictions, when applied to the individual exposures, mitigate contagion by limiting the maximum loss incurred in the event of counterparty default. Similarly, a tightening of large exposures aimed at a specific sector puts an upper bound on the losses from individual defaults in the sector. By applying large exposure limits to sub-sectors, e.g. shadow banks, limits may also help offset regulatory arbitrage.

Exposures tend to increase in financial cycle upswings, partly because exposure limits are set relative to capital. A tighter large exposure restriction compels banks to diversify their counterparty base thereby reducing the risk posed should a hub becomes financially distressed. Large exposure limits can also be used to contain exposure to specific sectors, e.g. if institutions cannot diversify their counterparties because substitutes do not exist.

There are very few empirical studies¹⁵¹ on the effects of this instrument. Large exposure restrictions have so far been applied only as a micro-prudential tool and mainly as a backstop to the capital requirements. This results in considerable uncertainty on the intended as well as the unintended effects of large exposure limits on intra-financial and real economy lending.

Unintended domestic effects

The tightening of large exposure requirements is a quantity-based measure that can reduce the financial system's maximum capacity to lend and transact with an individual counterparty. If the impact on the cost of credit and liquidity is more significant than anticipated, negative consequences on lending to the real economy and intra-financial sector lending may follow. For example, limiting the amount of credit supplied to a particular economic sector or to large firms may inhibit growth in areas of the economy in which a country has a comparative advantage. Furthermore, stricter large exposure limits can lead to a shift of credit demand from smaller to larger banks.

Finally, large exposure limits applied to interbank exposures might drive banks away from interbank funding and towards central bank and market funding, with potential unintended consequences for payment systems and the implementation of monetary policy.

Cross-border spillovers

Stricter limits on large exposures can be met through an increase in the level of capital held by a bank and/or through a reduction in the exposures to individual counterparties or groups of connected counterparties.

In the first case, any cross-border spillovers will be similar to those associated with higher requirements for own funds and the capital conservation buffer. The second case implies a cross-border shift of assets to banks operating abroad. Positive cross-border spillovers include diversification of certain risks (e.g. country risk). Negative cross-border spillovers

¹⁵¹ There are some private sector impact studies on changes to large exposures regimes, e.g. The Clearing House (TCH) (2011), but which are less relevant in this context.

include contagion risk and synchronicity of shocks faced by banks through exposures to common counterparties.

It is emphasised, however, that these are the positive and negative spillovers of sound policy decisions. An inappropriate tightening of large exposure limits could lead to further negative cross-border spillovers, including excessive deleveraging manifested through a credit crunch or fire sales and sudden changes in market sentiment which may be detrimental to financial stability and economic growth. A proper risk assessment and impact analysis of tightening large exposure limits as well as cross-border coordination could minimise the potential for and impact of negative cross-border spillovers.

3.4 Public disclosure

Macro-prudential goal

Discourage excessive risk-taking and increase transparency to market participants when systemic risks are high.

Micro-prudential regime

Yearly (at least) disclosure of capital levels, buffers, requirements and exposure to various risks.

Macro-prudential measures

- Higher frequency of disclosure; higher granularity, e.g. by sector or location of exposures; requiring comparable formats for disclosure or disclosure on readily accessible media.

Advantages

- Creates incentive for banks to take risks with appropriate safeguards in view of the necessity of disclosure.
- Decreases uncertainty among investors.

Disadvantages

- Risk of disorderly reactions in acute crisis.
- May increase stress in weaker banks.

Level of application of the measure

Individual.

Scope of application

All domestically authorised institutions or subsets of them; all exposures at those institutions or a subset of them.

Institutional aspects

Description

The public disclosure requirements are a complement to the regulatory and supervisory requirements. Their aim is to increase market discipline by reducing information asymmetries. The micro-prudential regime requires disclosure of a broad range of items, mostly on (at least) an annual basis.¹⁵² Some micro-prudential disclosure requirements are particularly relevant

¹⁵² For example, information relating to risk management objectives and policies; scope of application; level of own funds; capital requirements; exposure to counterparty credit risk; capital buffers; credit risk adjustments; use of External Credit Assessment

from a macro-prudential perspective, such as capital buffer disclosures along with the geographical distribution of exposures, indicators of global systemic importance (as mentioned in Article 131(2) CRD¹⁵³), asset encumbrance and market risks.

Intended objectives and impact

Rationale

The aim of macro-prudential disclosure requirements is to reduce the probability of market failure associated with informational asymmetries: a “market for lemons”¹⁵⁴ and related phenomena like bank runs and liquidity spirals. Disclosure requirements give banks an incentive to anticipate and adjust their risk-taking policies and adopt sound risk management practices.¹⁵⁵

More and high-quality disclosure can help mitigate systemic risk both during a crisis and during a boom. In particular, there are two roles for disclosure.

- When systemic risk is building up: increased disclosure could discourage excessive risk-taking in the light of possible scrutiny by supervisors and market participants.
- When systemic risk is high: by obliging banks to disclose more information about the risks to which they are exposed, supervisors help investors to better understand the financial conditions (risk profile) of each bank. This is likely to reduce uncertainty about which banks are viable and which need restructuring or resolution. Increased disclosure requirements, coupled with decisive action to clean up the banking industry, are believed to have accelerated the recovery in the Swedish financial crisis in the 1990s.

Stricter disclosure requirements under Article 458 can be more effective if accompanied by a financial stability report giving a narrative of the facts to be disclosed and explaining the systemic risk that they are intended to mitigate.

Stricter disclosure requirements are also likely to reinforce the effects of other instruments by informing the public, investors/market participants and other banks of risks as well as of the regulatory actions taken to mitigate them. In this sense stricter disclosure requirements can be a useful complement to virtually all other instruments.

In addition to national flexibility measures, European bodies such as the EBA or the ESRB can facilitate coordination across countries and enable comparability of additional disclosure requirements.

Institutions (ECAIs); exposure to market risk and operational risk; exposures in equities not included in the trading book; exposures to interest rate risk on positions not included in the trading book; exposure to securitisation positions; remuneration policy; and leverage.

¹⁵³ Article 131(2) CRD requires disclosure of five categories of indicators of global systemic importance: size of the group; interconnectedness; substitutability of the services or the financial infrastructure provided by the group; complexity; and cross border activity.

¹⁵⁴ For example, in Akerlof’s analysis, a market may altogether disappear (the most extreme form of illiquidity) if information is sufficiently asymmetric.

¹⁵⁵ However, effective market discipline requires that (i) disclosure is meaningful and consistent across time and banks; and (ii) investors are able to process the information effectively and have the incentive and ability to rein in banks’ risk-taking, which may be weak if the bank is considered “too important to fail”. Sowerbutts and Zimmerman (2013).

Impact

Macro-prudential authorities have recently started to use public disclosure as a macro-prudential instrument.¹⁵⁶ Experience in terms of the effectiveness of disclosure as a macro-prudential instrument for financial stability purposes has been varied. Market participants valued the disclosure exercise that accompanied the 2012 European and US stress tests which reduced information opacity and is thought to have contributed to reducing prevailing market stress.¹⁵⁷ Similarly, the disclosure associated with the 2012 Spanish banks' stress test, which released information on their loan books, allowed investors to form a better opinion both at the individual and sector level. On the other hand, market participants' reaction to the information disclosed destabilised banks' share prices. After the 2011 EBA stress test results were publicised, European banks' stocks fell and banks' CDS prices rose (although it is difficult to separate the effect of the announcement from that of other economic developments).

Unintended domestic effects

While there is general agreement that market discipline (Pillar 3) is overall beneficial, it may also result in negative externalities for financial institutions and for the financial system as a whole.¹⁵⁸

A number of potential unintended effects can arise, linked to the time consistency of the desirability of disclosure, pro-cyclicality, distributional effects, and risks of disorderly reactions in acute crises.

- At times of general market uncertainty, financial markets cannot distinguish strong from weak banks. This means that there is in effect a cross-subsidisation from less risky to riskier banks. In times of acute crisis and contagion, removing cross-subsidies between banks can cause sudden shifts in market sentiment towards some banks.
- At times of general market uncertainty and high risk aversion, disclosure can trigger adverse market reactions. Depositors may overreact to disclosure that reveals financial problems and cause a bank run despite the bank being solvent. Similarly, investors may force the bank's share price down. Both reactions would be inefficient insofar as they threaten the viability of the bank and would not have happened in the absence of disclosure. Individual failures could, in turn, have systemic implications if they trigger contagion in the financial system. When requiring additional disclosure at such times, authorities should have credible supervisory backstops in place for weak banks, including recovery and resolution plans.

¹⁵⁶ Examples include the ESRB Recommendations on funding of credit institutions (ESRB/2012/2, OJ C119, 25.4.2013, p.1) and on money market funds (ESRB/2012/1, OJ C146, 25.5.2013, p.1); the Financial Policy Committee recommendations in 2011 on disclosure of Basel III leverage ratios and in 2012 on greater consistency and comparability of UK banks' Pillar 3 disclosures; and the Swiss National Bank recommendation in 2012 on disclosure of risk-weighted assets.

¹⁵⁷ See Bank of England (2011) and Petrella and Resti (2013). Other empirical studies on stress tests include Ellahie (2012) and Bischof and Daske (2012).

¹⁵⁸ For an overview of the unintended consequences of banking regulation and supervision from a European perspective, see, e.g. Nouy (2013) and Tadesse (2006).

- One theme in the theoretical literature argues that disclosure can distort institutions' incentives and lead banks to make sub-optimal choices. For example, in order to pass the stress tests and send a positive signal, banks may choose sub-optimal portfolios or inefficient asset sales that reduce economic efficiency, or decide to sacrifice long-term objectives to meet short-term goals.¹⁵⁹

Cross-border spillovers

Positive cross-border spillovers of increased disclosure include:

- Providing/setting comparable benchmarks across jurisdictions, thus improving resource allocation and promoting the supply of funds to sound institutions.
- Building incentives to increase voluntary capital buffers, to contain excessive risk-taking and to adopt best practices.

These positive effects are strengthened when disclosure practices tend to converge across countries, thus allowing for meaningful comparisons between institutions and increased market discipline.

Negative cross-border spillovers include:

- Potentially contributing to a sudden change in market sentiment with the potential to threaten financial stability also at the cross-border level given the high interconnectedness of the financial system.
- Increased disclosure requirements at a national level may also result in a shift of assets or liabilities to other jurisdictions that have not adopted equivalent disclosure requirements.

To limit any negative effects, authorities should consider whether increased disclosure under national flexibility measures should be accompanied by measures to boost confidence (for example, in the case of stress tests revealing a capital shortfall, the introduction of backstops or efficient resolution mechanisms if not already existing). Negative spillovers could also be mitigated through cross-border coordination between authorities in order to achieve consistent disclosures by the institutions exposed to the same risk.

4. Indicators and activation

This section suggests a number of indicators that can help guide the use of the macro-prudential instruments covered in this chapter. These indicators can be mostly built using Common Reporting (COREP) and Financial Reporting (FINREP) data sources once they become available, which will minimise the need for ad hoc data collection and ensure comparability across countries. It should be noted, however, that national flexibility measures cannot be introduced on the basis of indicators alone, as Article 458 CRR provides for a specific procedure to be followed (notification, justification and other conditions).

¹⁵⁹ See Goldstein and Sapra (2012).

At this stage, the proposed indicators can be considered alongside a wider set of information, including market and supervisory intelligence, to guide the use of the instruments. Over time, once COREP data sources become available, further work should be done to assess their effectiveness in contributing to the identification of systemic risk (e.g. whether there are key thresholds indicating the build-up of risk) and whether they should be used more actively to guide the activation of policy instruments.

Annex 7.1 provides details on how to construct the indicators.

4.1 Suggested indicators

a) Indicators for own funds requirements and the capital conservation buffer

Authorities are asked to refer to indicators guiding the use of other own funds-based instruments, such as the systemic risk buffer and, if the source of risk is considered to be time varying, the countercyclical capital buffer. Indicators might relate to banks' balance sheets (e.g. leverage, average risk weights) or the quality of their assets (e.g. valuations of assets, average and marginal LTV ratios, financial conditions of banks).

b) Indicators for measures for intra-financial sector exposures

The combination of indicators of credit growth and leverage in the intra-financial sector, as well as information on asset price growth (such as equity prices) can be effective in signalling the build-up of systemic vulnerabilities. Indicators may include the following.

Ratio of financial corporate debt (including debt of banks and other financial corporates) to GDP:

- When this ratio deviates from its long-term trend or from equivalent ratios in other sectors (e.g. non-financial corporate debt, government debt and household debt) it may suggest exuberance in the financial sector.

Intra-financial activity versus real economy lending:

- Compares banks' total intra-financial sector exposures with total banking book and total bank assets. If intra-financial activity is serving an economic purpose, growth in this sector should not significantly outpace that seen in the real economy. The separate elements of the data should be available in COREP and countries' lending data.

Breakdown of intra-financial activity by transaction type:

- Considers the mix of banks' exposures as well as the year-on-year growth rate by transaction type (e.g. interbank lending, repo-style transactions, OTC derivatives, other). Growth in the financial sector that is concentrated around particular types of transactions may need further monitoring or policy action. Supervisors may collect these data on major banks as part of recovery and resolution plans.

Largest exposures to financial sector entities over the same financial sector entities' highest quality capital (as a measure of intra-financial large exposures):

- Concentration of lending activity in the interbank markets or payment systems may highlight structural vulnerabilities. Information on cross-institutional exposures is needed

to assess the potential for domino effects. From a macro-prudential point of view, exposures to systemically important institutions may be of particular interest.

Funding gap¹⁶⁰:

- The proportion of customer loans¹⁶¹ not covered by customer deposits.¹⁶² It measures the reliance on interbank and other wholesale market funding and the degree of intra-financial sector linkages. Despite this indicator's conceptual simplicity, it has some shortcomings: computing the funding gap involves methodological choices that can affect the results; the data available for most countries do not allow the ratio to be computed properly; and it may need to take into account structural differences across countries, e.g. in some countries the share of savings invested in deposits versus market instruments is lower than others.

c) Indicators for large exposure requirements

Possible indicators of the need to activate large exposure instruments are:

The ratio of large exposures to total credit, in aggregate and by sector:

- This indicator of the degree of concentration in credit growth shows whether a limit on large exposures would have a significant impact on total credit.
- The threshold above which stricter large exposure limits might be activated would depend on what is considered to be excessive growth, e.g. involving some form of comparison of current to historical growth rates. Banks' leverage and other measures of banks' riskiness should also be considered – the higher the leverage, the higher the risk of busts following credit booms.¹⁶³

The ratio of banks' large exposures to a sector relative to bank capital:

- Numerator: the sum of banks' large exposures to a sector of economic activity, e.g. commercial real estate; denominator: bank capital.
- This indicator is meant to capture whether the banking system as a whole is excessively exposed to a specific economic sector. It can be complemented by indicators on the soundness of the sector under consideration, e.g. the price-to-rent ratio for commercial real estate, the loan-to-value ratio of exposures to the sector.
- The threshold above which stricter large exposure limits might be activated would depend on the degree of diversification of banks' portfolios, the health of the sector and banks' general level of risk, measured, for example, by leverage.

The ratio of the ten largest exposures to unregulated financial entities over these institutions' equity:

¹⁶⁰ New versions of the ESRB risk dashboard will include a loan-to-deposit ratio depicting total loans to households and non-financial companies over total deposits from these sectors.

¹⁶¹ Loans and advances held for trading, designated at fair value through profit or loss, available for sale loans and receivables, held to maturity.

¹⁶² Deposits other than from credit institutions, held for trading, designated at fair value through profit or loss, measured at amortised cost.

¹⁶³ See, among others, Schularick and Taylor (2012).

- This indicator, built from data on banks' counterparties, captures whether the largest counterparties of major banks at a consolidated or sub-consolidated level are well capitalised. This indicator can be complemented by indicators of leverage at these unregulated financial institutions, or other measures of risk.
- The threshold above which stricter large exposure limits might be activated, assuming it is deemed to be an effective instrument, would depend on whether banks' exposures to these nodal financial institutions are deemed high and how risky they are assessed to be.

d) Indicators for public disclosure

Because of the very broad scope of the possible measures to increase disclosure requirements under Article 458, it is difficult to construct meaningful quantitative indicators for activating this instrument. Supplementary requirements for macro-prudential purposes have so far been developed ad hoc for specific situations. Going forward, a framework could be developed to identify situations that might benefit from additional disclosure (e.g. exposures to cyclical sectors). The competent or designated authority could publish an assessment and related evidence of a specific systemic risk or vulnerability within the banking sector and seek additional disclosures from domestically authorised institutions in its jurisdiction. The authorities (as well the ESRB) could also consider whether it would be desirable and/or feasible to start a coordinated disclosure exercise across other Member States to obtain comparable data across countries.

5. Decision-making and coordination

5.1 Authorities responsible for using instruments

Under the CRR, every Member State must designate an authority to be in charge of applying national flexibility measures under Article 458 CRR. This can be the authority in charge of micro-prudential banking supervision (competent authority) or another authority designated for that purpose (designated authority). Member States therefore have the option to assign micro- and macro-prudential supervision of banks under the CRD/CRR to different authorities.

5.2 Legal requirements for coordination

The application of the macro-prudential measures available under Article 458 CRR is subject to a procedure at European level comprising prior notification (to the European Commission, the European Parliament, the European Council, the ESRB and the EBA) and non-objection (by the Council, based on a recommendation by the Commission, taking into account the ESRB and EBA opinions). If the Council does not reject the proposed measure, the Member State may apply the measure for a period of up to two years. The measure can be extended for one year at a time, following the same procedure.

Article 458(10) CRR grants national authorities some limited discretion, notwithstanding the procedure for adopting national flexibility measures. Authorities may increase the risk weights for real estate and intra-financial sector exposures by up to 25% as well as tighten the large exposure limit by up to 15% for a period of up to two years following a simplified procedure. Full notification together with supporting information (explanation/justification) is required,

however, in accordance with Article 458(2) CRR. It should also be noted that measures applied under Article 458 are not subject to mandatory reciprocity.

Article 458 CRR requires the notifying national authority to submit relevant quantitative or qualitative evidence of the changes in the intensity of macro-prudential or systemic risk, the reasons why such changes could pose a threat to financial stability at national level and an explanation as to why the proposed measure(s) are deemed necessary (“suitable, effective and proportionate”) by the national authority. Article 458 CRR also requests the notifying national authority to justify why other CRD/CRR measures (e.g. Pillar 2) cannot adequately address the macro-prudential or systemic risk identified, taking into account the relative effectiveness of those measures. Finally, Article 458 CRR requires the notifying authority to assess the likely positive or negative impact of the draft measure(s) on the internal market, based on the information which is available to the Member State concerned. The ESRB has designed a template for Article 458 notifications, covering all these aspects.

Section III: Implementation

Chapter 8

Selecting macro-prudential instruments¹⁶⁴

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Executive Summary

Authorities in EU Member States have a wide range of macro-prudential instruments at their disposal to address systemic risk, especially since the entry into force of the CRD/CRR. This chapter offers general advice on selecting macro-prudential instruments.¹⁶⁵ The four main messages are as follows.

- Authorities must have a clear view on the intermediate objective(s) of macro-prudential policy they want to achieve. If the objective is clearly identified, the list of potential instruments can be significantly narrowed down.
- In selecting instruments, macro-prudential authorities should consider both the economic and legal aspects, and favour instruments with high effectiveness in the light of the desired objective(s) and low social costs.
- In practice, this means favouring instruments that, individually or in combination, target the type, nature and source of risk; are proportionate to the level of systemic risk; provide limited arbitrage opportunities; foster market discipline through transparency; and cause limited negative distortions to the financial system and cross-border spillovers.
- The legal aspect relates to the various conditions set out in the CRD and CRR. Somewhat simplified, authorities are required to consider using the instruments available under the CRD (e.g. Pillar 2) before applying national flexibility measures of Article 458 CRR.

The remainder of the chapter is outlined as follows:

- Section 1 provides an overview of how different sets of macro-prudential instruments provided for by the CRD/CRR can be used to target specific intermediate objectives.
- Section 2 contains a general discussion on the economic aspects to consider when selecting instruments, including their positive features and the potential advantages of using combinations of instruments.
- Section 3 focuses on the legal considerations to be taken into account in selecting macro-prudential instruments (CRD/CRR).
- Annex 8.1 provides an overview of the various economic and legal features of the macro-prudential instruments covered in this chapter.

¹⁶⁵ The chapter also covers a number of instruments of national competence outside the scope of the CRD/CRR.

1. Selecting instruments based on intermediate objectives

Authorities in EU Member States have a wide range of macro-prudential instruments at their disposal. This chapter offers a framework for choosing instruments. By outlining a number of key aspects to consider, the framework is intended to be widely applicable and sufficiently flexible to accommodate for idiosyncratic circumstances.

The starting point is the intermediate objectives of macro-prudential policy specified by the ESRB.¹⁶⁶ Once authorities have identified a particular systemic risk and assigned it to one or several of these objectives, the list of potential instruments can be significantly narrowed down. Table 8.1 lists the macro-prudential instruments that are suitable for each intermediate objective.¹⁶⁷

Table 8.1: Intermediate objectives and the corresponding appropriate macro-prudential instruments

Intermediate objective	Suitable macro-prudential instruments (legal reference)
1. Mitigate and prevent excessive <u>general</u> credit growth and leverage	Countercyclical capital buffer (Article 130; Articles 135-140 CRD) Systemic risk buffer (Articles 133-134 CRD) Increased capital conservation buffer (Article 458 CRR) Increased own funds requirements (Article 458 CRR) Leverage ratio (national law)
1*. Mitigate and prevent excessive <u>sectoral</u> credit growth and leverage (e.g. real estate) ¹⁶⁸	Sectoral RWs (Article 124 CRR for real estate or Article 458 CRR) Sectoral LGD floors (Article 164 CRR for retail real estate or Article 458 CRR) Sectoral LTV limits (national law) Sectoral LTI or DSTI limits (national law)
2. Mitigate and prevent excessive maturity mismatch and market illiquidity	Liquidity charges (Article 105 CRD) LTD limits (Article 103 CRD) Liquidity buffers (Article 458 CRR) NSFR (Article 458 CRR) Other stable funding requirements (national law)
3. Limit direct and indirect exposure concentrations	Systemic risk buffer (Articles 133-134 CRD) Large exposure requirements (Article 458 CRR) Increased own funds requirements (Article 458 CRR) Measures for intra-financial sector exposures (Article 458 CRR)
4. Limit the systemic impact of misaligned incentives with a view to reducing moral hazard	Capital buffers for G-SIIs (Article 131 CRD) Capital buffers for O-SIIs (Article 131 CRD) Systemic risk buffer (Articles 133-134 CRD) Increased capital conservation buffer (Article 458 CRR) Increased own funds requirements (Article 458 CRR)

¹⁶⁶ ESRB Recommendation of 4 April 2013 on intermediate objectives and instruments of macro-prudential policy (ESRB/2013/1).

¹⁶⁷ The macro-prudential use of disclosure requirements is omitted from this table. For a discussion on how disclosure can be used for macro-prudential purposes, see Chapters 2 to 7.

¹⁶⁸ This row lists the additional instruments that may be used if excessive general credit growth and leverage is attributable to a particular sector.

In selecting which instrument(s) to use from this broader list, macro-prudential authorities should consider both the economic and legal aspects. These aspects are closely interrelated, as an instrument's effectiveness is influenced by its legal boundaries (i.e. in terms of levels, scope of application, etc.)

2. Economic considerations

Macro-prudential authorities should strive to use those instruments which will bring the highest net benefits to society.¹⁶⁹ In practice, this means assessing an instrument's effectiveness in relation to the desired objective and the social costs it may entail through imposing restrictions on entities and activities (a cost-benefit analysis).

Macro-prudential authorities should favour instruments that limit negative spillovers by targeting the type, nature and source of risk; are proportionate to the level of systemic risk; provide limited arbitrage opportunities; foster market discipline through transparency; and generate limited cross-border spillovers.¹⁷⁰ Each of these desirable characteristics is discussed separately below. (Tables 1-5 in Annex 8.1 provide an overview of the key features of the different instruments with respect to the intermediate objectives.)

The legal framework surrounding each instrument has a considerable bearing on these characteristics. It is also important to note that for any given macro-prudential instrument, authorities are likely to face "trade-offs" between the characteristics and any additional ones authorities might deem important. Assigning different weights to different characteristics is thus a key policy choice.

Following the discussion on the various desirable characteristics below, a number of cases are considered where a combination of instruments may outperform any single instrument.

2.1 Desirable characteristics of macro-prudential instruments

i) *Targeting the type and nature of systemic risk*

From an economic perspective, the more an instrument is targeted to what the authority wants to achieve, the lower the associated costs.¹⁷¹ There are several dimensions to whether an instrument is targeted or ^{not}. One way to conceptualise this is to contrast the *nature*, *type* and *source* of systemic risk.

Type of systemic risk relates to the particular objective(s) that the authority seeks to address through using the instrument, whereas *nature of systemic risk* relates to whether the systemic risk is predominantly cyclical or structural. Most instruments typically target primarily one (or a few limited) macro-prudential intermediate objective(s). Also, certain instruments are often better suited to addressing either structural or cyclical risk. This is also reflected in the legal conditions applicable to certain instruments, which may expressly require them to be used to

¹⁶⁹ For an overview and discussion, see Arregui et al. (2013).

¹⁷⁰ The list of characteristics is non-exhaustive.

¹⁷¹ For a discussion on targeted versus broad-based instruments, see Lim et al. (2011).

address cyclical or structural systemic risk. For example, the SRB is designed to mitigate long-term non-cyclical risk whereas G-SII/O-SII buffers are intended to address structural problems relating to systemic banks.

In principle, choosing an instrument that is targeted to the type and nature of systemic risk reduces the extent and likelihood of spillovers. That said, the (de)activation of most (if not all) macro-prudential instruments will influence the financial system to some extent and lead to spillovers on either its structural or cyclical dimensions.

Such spillovers may be either desirable or undesirable. Introducing higher capital buffers applicable to systemically important banks is a good example. While the buffers are primarily structural, the increased requirements may also have a dampening effect on the credit cycle.¹⁷² Whether or not that spillover is desirable is situation specific. If excessive credit growth is a concern for authorities, the dampening effect is desirable. If, on the other hand, authorities fear a credit crunch, it is not.

Authorities should therefore consider the potential spillovers when selecting macro-prudential instruments. Where spillovers are desirable, they increase the overall effectiveness of an instrument. Undesirable spillovers can be reduced by appropriate calibration, timing of (de)activation and phasing in/out of instruments.

ii) *Targeting the source of systemic risk*

Another dimension is whether the instrument addresses the *source of systemic risk*. The *source of systemic risk* depends on whether risk is primarily attributable to banks or their clients; to all or just a subset of banks; and to banks in general or merely to particular (sectoral, geographical or individual) exposures or activities. Just as for the type and nature of systemic risk, an instrument that is targeted to the source of systemic risk is likely to be more effective and lead to fewer spillovers.

By way of example, in the case of an unsustainable demand-driven real estate boom, it may be more effective and less costly to select instruments that primarily target bank borrowers (such as LTV or LTI limits) rather than bank-oriented measures (such as higher capital requirements on mortgages through minimum RWs or LGD floors).¹⁷³

Targeting an instrument to the source of systemic risk means considering the appropriate scope of application. In certain cases, systemic risk may be attributable to a mere subset of a banking system, or even individual banks. When the legal framework of an instrument allows it to be applied solely to the bank(s) in question, it is likely to be less costly. This also applies to instruments that can differentiate between banks in terms of their contribution to systemic risk (such as the SRB).

Similar reasoning applies to situations in which banks generally contribute to (or are exposed to) systemic risk, or whether risk arises from their involvement in certain sectors or even sub-sectors. In the latter case, instruments which can be applied to a subset of exposures may be

¹⁷² This dampening effect may occur in at least two ways. First, higher capital costs may transmit into higher lending rates, which may reduce demand for credit. Second, banks may reduce their supply of credit in order to meet the higher capital requirements.

¹⁷³ Instruments that raise the cost of providing real estate credit for banks may not be able to curb strong inelastic borrower demand.

less costly. For example, authorities can use Pillar 2 to apply capital surcharges to specific parts of the loan book, such as for loans in foreign currency.¹⁷⁴ A related matter concerns whether instruments can be applied to the whole entity or only to the entity's domestic exposures.

iii) Proportionate to the level of systemic risk

The ability to adjust the levels of restrictions or requirements imposed by an instrument is key to increasing effectiveness. This is typically not problematic in cases where systemic risk is low and authorities wish to introduce correspondingly low restrictions or requirements.

However, some instruments provided for under the CRD/CRR are subject to limits as to the levels of requirements and restrictions that can be imposed. For instance, authorities are not permitted to freely impose OSII-buffers above 2% of RWA and applying SRB buffers above 3%.¹⁷⁵ This curbs authorities' ability to impose proportionate restrictions or requirements in cases where systemic risk is deemed to be very high.

iv) Limiting arbitrage opportunities

Macro-prudential instruments restrict or impose costs on certain activities which gives the banks to which they are applied an incentive to circumvent them. Other market participants will also have an incentive to substitute these activities with alternatives outside the scope of the instrument. If arbitrage opportunities exist, the effectiveness of the instrument will be affected, since systemic risk may arise through substitution or originate from other entities (leakage).¹⁷⁶

Authorities should therefore select instruments that offer relatively few arbitrage opportunities. The availability of such opportunities not only depends on the design of the instrument, but also on the ability of authorities to monitor and address risks in other parts of the financial system. For instance, using macro-prudential instruments that target activities, as opposed to (all or a subset of) banks, reduces the probability of risky activities migrating to other entities. By way of example, curbing excessive credit growth in real estate by imposing restrictions that apply to all borrowers through activity-based regulation is one potential way to limit leakages to shadow banking.

Another important determinant is the degree and quality of coordination between authorities in different countries, including whether there are reciprocity agreements in place. Reciprocity can avoid situations where branches of foreign banks replace domestic banks in conducting an activity for which the latter face restrictions or additional requirements. For the use of certain instruments under the CRD/CRR, such reciprocity is mandatory.¹⁷⁷

¹⁷⁴ This is not the case for the SRB which cannot be applied to a subset of sectoral exposures.

¹⁷⁵ The cap on the discretionary use of the SRB varies depending on whether it is applied to domestic, EU or third-country exposures.

¹⁷⁶ For a discussion on such leakages, including country experiences, see Arregui et al. (2013).

¹⁷⁷ For a discussion on cross-border aspects, see Chapter 11.

v) *Fostering market discipline and expectations through transparency*

The effectiveness of a macro-prudential instrument can be strengthened where the influence of borrowers, investors and other market stakeholders influence banks to meet the requirements. Such market discipline hinges on market participants having a clear understanding of the purpose and design of the instrument and easy access to sufficient information to be able to assess compliance.

This implies that authorities should favour instruments whose purpose and design can be easily communicated and explained.¹⁷⁸ It also implies favouring instruments for which there are no significant hurdles to the disclosure of information on compliance. In this respect, those Pillar 2 measures for which rules of professional secrecy hinder disclosure may be less appropriate.¹⁷⁹

vi) *Limiting negative spillovers on other countries*

The use of macro-prudential instruments is likely to have positive net effects even outside the Member State in question, since the risk of negative financial or macroeconomic spillovers to other countries is reduced. However, this does not apply in all circumstances.

For instance, if capital requirements are raised to limit excessive credit growth domestically, banks with international lending activities may opt to cut back their supply of credit in other countries as well. If credit cycles are synchronised across countries, this would be welcome. But if other countries are in a different stage of the credit cycle, increasing capital requirements to address domestic risks might contribute to weaker credit growth or even a credit crunch abroad. To the extent possible, macro-prudential authorities should favour instruments for which such negative spillovers are limited.¹⁸⁰

2.2 Increasing effectiveness by combining macro-prudential instruments

When systemic risk calls for macro-prudential intervention, authorities can choose to either activate a single instrument or use a combination of instruments. In principle, using a single instrument has the benefit of being easier to calibrate and communicate. It may also be easier to assess its effects. However, in certain circumstances, using multiple instruments may more appropriate than using a single instrument.¹⁸¹

One such circumstance relates to situations in which systemic risk is both structural and cyclical or involves several types of systemic risk. In such situations, it may be appropriate to apply a singly instrument, especially where that instrument generates positive spillovers the types of systemic risk or across its structural or cyclical dimension.

¹⁷⁸ Over the longer term, this may also increase the effectiveness of macro-prudential policy generally by shaping expectations. For an extended discussion on communicating macro-prudential policy, see Chapter 10.

¹⁷⁹ For a discussion on the advantages and disadvantages of macro-prudential use of Pillar 2, see Chapter 6.

¹⁸⁰ For an extended discussion on cross-border issues, see Chapter 11.

¹⁸¹ See also Lim et al. (2011) for a discussion on how different macro-prudential instruments can complement each other.

However, such situations might also call for a combination of instruments. For example, consider a situation where there is a prolonged phase of excessive credit expansion fuelled by systemically important banks enjoying cheap financing supported by implicit state guarantees. Here, authorities might wish to address moral hazard owing to systemic importance while simultaneously increasing the banks' ability to sustain credit supply in case the boom turns into bust. One potential combination of instruments could be the CCB to address cyclical risks and raising own fund requirements through Pillar 2 to re-align incentives and increase resilience.

Another reason for using a combination of instruments concerns situations in which one instrument is inadequate in relation to the level of systemic risk. Since some instruments are subject to limits (caps) with regard to the requirements and restrictions that can be imposed, several instruments may be necessary for macro-prudential policy to be proportionate to the level of systemic risk. For example, authorities may wish to introduce capital requirements under Pillar 2 to complement the capital buffers on systemic banks.¹⁸²

Combining instruments may increase their overall effectiveness when systemic risk is driven by both demand and supply. One such example could be a real estate boom fuelled by both lenders and borrowers. In this situation, authorities may wish to consider combining instruments that affect borrowers with instruments that dampen the supply of loans by banks.¹⁸³ Also, it may be necessary to complement the price-based instruments (such as higher risk weights) with quantity-based instruments (such as LTI/DSTI/LTV limits).

Combining instruments can also limit arbitrage opportunities. For instance, activating increased capital requirements together with conduct-based restrictions on borrowers would limit the scope for the less-regulated sector to step in and substitute banks as a source of credit.

3. Legal considerations

Selecting instruments should also reflect the various legal conditions set out in the CRD IV and CRR. For instance, certain instruments require authorities to consider, before making use of them, the sufficiency of other instruments according to a predefined process. These instruments are the SRB and the instruments foreseen under Article 458 CRR.¹⁸⁴ In particular:

- Before setting or re-setting an SRB, authorities must consider why the existing instruments under the CRD/CRR (excluding Articles 458 and 459 CRR) are insufficient, individually or in combination, to address the identified systemic risk. Such considerations must take the relative effectiveness of those instruments into account.¹⁸⁵

¹⁸² Somewhat simplified, the GSII and OSII buffers are capped at 3.5% and 2% of RWA respectively, and the discretionary use of the SRB depends on its level and on its scope (whether it is applied to domestic, EU or non-EU country (third-country) exposures).

¹⁸³ See the annex to the ESRB Recommendation on intermediate objectives and instruments of macro-prudential policy, (ESRB/2013/1).

¹⁸⁴ These include the level of own funds, large exposure requirements, public disclosure requirements, level of the capital conservation buffer, liquidity requirements, risk weights for targeting asset bubbles in the residential and commercial property sector, and measures for intra-financial sector exposures.

¹⁸⁵ Consideration needs to be given to the other legal requirements that have to be met before setting or re-setting the SRB (Article 133 CRD).

- Similarly, before applying any of the national flexibility measures provided under Article 458 CRR, authorities must consider whether any of the following instruments could adequately address the systemic risk instead, taking into account their relative effectiveness: risk weights and LGDs targeting real estate risks, Pillar 2 measures, the systemic risk buffer or the countercyclical capital buffer.¹⁸⁶

Furthermore, the notification procedures and information requirements vary depending on the instrument in question. For instance, for the G-SII buffer, notification to the European Commission, the ESRB and the EBA is required, whereas the requirements associated with the SRB become more demanding the higher the buffer rate. For national flexibility measures under Article 458 CRR, the notification procedures and information requirements are particularly strict. Tables 1-5 in Annex 8.1 provide information on the level of procedural requirements attached to each instrument under the CRD/CRR.

The economic considerations of effectiveness and social costs discussed above are closely linked to the legal considerations. These are key to determining whether the minimum requirements in CRD/CRR need to be complemented by using instruments through Pillar 2 or national flexibility measures of Article 458 CRR.

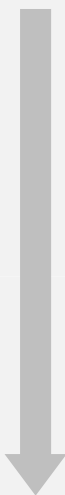
For each of the intermediate objectives specified by the ESRB, Table 8.2 below presents a sequence – based on the legal considerations relating to each instrument – which authorities can use in selecting instruments.¹⁸⁷ The ranking provided in the table does not reflect the economic considerations discussed in Section 2 of this chapter.

¹⁸⁶ Similarly, there are other requirements that need to be met before applying national flexibility measures. A simplified procedure is laid down for some of the measures under Article 458(10) CRR.

¹⁸⁷ See the ESRB Recommendation on intermediate objectives and instruments of macro-prudential policy (ESRB/2013/1).



Table 8.2: Sequencing of macro-prudential instruments according to the CRR/CRD

Intermediate objectives of systemic risk				
	<i>Mitigate and prevent excessive credit growth and leverage</i>	<i>Mitigate and prevent excessive maturity mismatch and market illiquidity</i>	<i>Limit direct and indirect exposure concentrations</i>	<i>Limit the systemic impact of misaligned incentives with a view to reducing moral hazard</i>
<p>Consider first</p> 	CCB (Article 136 CRD)	Liquidity charges (Article 105 CRD)	All CRD/CRR instruments, excluding Articles 458 and 459 CRR	G-SII (Article 131 CRD) O-SII (Article 131 CRD)
	All CRD/CRR instruments, excluding Articles 458 and 459 CRR	Pillar 2 (Articles 101, 103, 104 and 105 CRD), SRB (Article 133 CRD)		All CRD/CRR instruments, excluding Articles 458 and 459 CRR
			SRB (Articles 133-134 CRD), CCB (Article 136 CRD)	
	SRB (Articles 133-134 CRD)			SRB (Articles 133-134 CRD)
Consider last		Liquidity buffers (Article 458 CRR)	Increased large exposure requirements (Article 458 CRR)	
	Increased own funds requirements (Article 458 CRR)	NSFR (Article 458 CRR) Liquidity charges (Article 458 CRR)	Increased own funds requirements (Article 458 CRR) Measures for intra-fin. sector exposures (Article 458 CRR)	Increased own funds requirements (Article 458 CRR) Increased conservation buffer (Article 458 CRR)

Note: LTV and LTI limits fall under national competence and therefore do not influence the sequencing of the CRD/CRR instruments.

Chapter 9

Overcoming inaction bias: the use of indicators in guiding policy¹⁸⁸

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¹⁸⁸ The chapter was prepared by a team led by Ola Melander (Sveriges Riksbank) and comprising Julia Giese (Bank of England) and Christian Glebe (Deutsche Bundesbank). Support was provided by Frank Dierick from the ESRB Secretariat in the function of Secretary.

Executive summary

This chapter explores how indicators can be used to guide macro-prudential policy and in particular to overcome inaction bias. The costs of policy action (e.g. forgoing profitable opportunities, incurring compliance costs) apply in the short term and are quickly visible while its benefits (higher and more stable economic growth, lower fiscal costs) only accrue in the medium to long-term and are less obvious.

Inaction bias could be overcome by embedding indicators signalling a need for policy intervention in a strong institutional framework. Under such a framework of guiding or presumptive indicators, the need for a tighter policy stance would be presumed when indicator values exceed indicative thresholds. In this way, the burden of proof would shift to those arguing in favour of an unchanged policy stance.

However, data availability and conceptual considerations determine the appropriateness of the framework for different macro-prudential objectives and instruments. Judgement and country-specific circumstances must continue to play an important role. A loosening of the policy stance in particular requires more room for discretion as indicators are typically less robust in terms of signalling the need for release or deactivation of instruments. More generally, policy-makers should be willing to act on the basis of qualitative risk assessments even if indicators are not showing unambiguous signals for such action. Making statistical signals a requirement for policy action could risk worsening inaction bias instead of alleviating it.

The ESRB can make a significant contribution by providing guidance on the general principles for using indicators in macro-prudential policy. Such guidance could include pursuing further cross-country analytical work on indicators and thresholds, and using a guided discretion approach in its own monitoring of systemic risks.

1. Decision-making process of a macro-prudential authority

An authority that is in charge of preventing and mitigating systemic risks by applying macro-prudential instruments typically has to assess whether systemic risks are building up, whether an instrument should be activated and, if so, which one, when and at what level. If an instrument is already active, the authority has to decide whether to increase or decrease its level (calibration). Finally, when risks to financial stability have receded or, alternatively, during periods of financial stress, the authority has to decide whether to loosen the instrument or deactivate it. Therefore, the decision-making process (activation, calibration and deactivation) is based on ongoing surveillance/analysis.

A question arises for policy-makers whether to embed policy guidance or rules in their decision-making process, or whether to act purely on the basis of discretion (expert judgement). Policy-makers can draw on monetary policy experience: both monetary and macro-prudential policies are confronted with short-term costs (forgoing profitable transactions, incurring compliance costs, etc.) and long-term gains (higher and more stable economic growth, lower fiscal costs). Faced with public pressure in response to the short-term costs, a natural bias might exist against tightening macro-prudential policy or in favour of premature deactivation (so-called **inaction bias**). Authorities responsible for national macro-prudential supervision and policy may also have a tendency to leniency towards domestic

institutions for several reasons. These can include an interest in protecting national champions, regulatory capture and public pressure.

A clear framework outlining when policy-makers should act might help to overcome this inaction bias. For example, Goodhart (2011) suggests a framework of **presumptive indicators** (see Section 2.3). If these flag a rising systemic risk, there would be a presumption in favour of policy action. However, taking this further into a requirement for policy action may not be desirable given uncertainty about the signalling ability of indicators, the varying nature of risks and the limited knowledge about how macro-prudential policy is likely to affect the real economy. The exercise of caution is therefore recommended.

2. Rules vs. discretion

2.1 Addressing the inaction bias problem

In principle, a framework for using macro-prudential instruments could combine both rules-based and discretionary elements to try to maximise the advantages and minimise the disadvantages. Such a combined, or “guided discretion”, approach could be especially relevant for time-varying instruments. A **guided discretion** approach formulates certain presumptions as to when action can be expected in response to the development of key indicators (see Section 2.3). A distinction can be made between bounded discretion and conditional rules. Under **bounded discretion**, discretionary judgement can be applied within given limits. **Conditional rules** reflect the notion that rules can be overridden in a discretionary way. Such mixed approaches seem to be the ones already adopted in a number of countries (see Section 3).

Arguments **in favour of discretion** stem from the consideration that macro-prudential policy is a relatively new area and that financial markets evolve over time. Therefore, learning effects play a more prominent role than in other policy areas. Indicators that worked well in predicting past crises may fail for new crises.¹⁸⁹ A discretionary element is important because some drivers of financial markets are probably difficult to embed in a rule (e.g. fiscal policies) and quantify (e.g. market and supervisory intelligence). Indicators should be interpreted in a state-dependent way which requires judgement. For example, debt-servicing indicators should be interpreted taking into account the prevailing interest rate environment. It may also be necessary to interpret several indicators jointly, for example high debt service ratios may be less of a concern where they are combined with low loan maturities at origination.

On the other hand, the risk of inaction bias is an argument **in favour of rules** in the decision-making process. The costs of applying a macro-prudential measure are likely to appear relatively soon, but the benefits of successful mitigation of systemic risk may accrue only in the future (and to different entities) and be difficult to measure. Therefore, the combination of a rules- and discretion-based approach in macro-prudential decision-making is central in avoiding inaction bias.

¹⁸⁹ Agur and Sharma (2013).

Establishing a clear mandate and objective for macro-prudential policy is essential to avoiding such bias. For Member States, the basis for this has been provided by the ESRB Recommendation on the macro-prudential mandate of national authorities (ESRB/2011/3), the ESRB Recommendation on intermediate objectives and instruments of macro-prudential policy (ESRB/2013/1), a set of policy instruments under the CRD/CRR, as well as additional instruments that are available under national discretion. A clear mandate and objective for macro-prudential policy as well as sufficient operational independence for the macro-prudential authority would help to address any potential credibility problems resulting from the exercise of discretion. Accountability may be further strengthened by requiring the macro-prudential authority to explain a decision not to act where indicators signal a possible need for policy measures.

The institutional set-up at the **national level** can have an influence on the decision-making process: the higher the number of participants in the process, the higher the number of views which need to be coordinated in order to reach a policy decision, and therefore the greater the risk of inaction bias.¹⁹⁰ For countries participating in the Single Supervisory Mechanism (SSM), the ECB's topping-up power¹⁹¹ is a further tool which can be used to avoid inaction bias.

At the **European level**, it is important to avoid complex, formal procedures that risk strengthening the inaction bias. The ESRB could play an important role in developing such a guided-discretion approach by providing guidance in terms of general principles and compiling best practices based on country experience. It could also help by providing further cross-country analysis to guide the practical use of specific instruments at the national level, focusing in particular on the role of indicators, thresholds and calibration. The ESRB could use such an approach in its own monitoring of systemic risks in Member States, based on cross-country analytical work, but taking into account country-specific circumstances. This could entail using indicative thresholds from cross-country analysis as a starting point for the analysis of country-specific risks, while bearing in mind data issues and country-specific circumstances more generally.

2.2 Taxonomy of rules vs. discretion

The respective roles of rules and discretion can be identified in the macro-prudential authority's decision-making process. Depending on the frequency of reviewing the rules and the frequency of allowing exceptions to those rules, several cases are possible. At one end of the spectrum is a set of fixed rules, based on (a core set of) indicators, which must always be complied with; these indicators can be published or not. At the other end of the spectrum is complete discretion but with an explanation of the decisions taken. There are several possibilities in between these two extremes. For example, the rules might be fixed but

¹⁹⁰ See also Agur and Sharma (2013), p. 14-16. This argument should not be misunderstood as being in favour of the single institution approach: a higher number of participants also means that views can be collected from different fields of expertise. But a well-defined and clear mandate for decision-making is essential.

¹⁹¹ The SSM Regulation provides that the ECB may, if deemed necessary, apply higher requirements for capital buffers and more stringent measures aimed at addressing systemic or macro-prudential risks than the ones established by the national competent or designated authorities.

reviewed periodically (e.g. every year) or exceptions may be allowed (with or without explanation), either on a discretionary basis or under pre-determined circumstances. Another possibility is for sets of indicators to be published but with no requirement to follow them within strict rules – instead the indicators are complemented by the use of judgement and additional information.

The choice, or balance, between rules and discretion in decision-making as well as the set of relevant indicators may differ in the build-up (tightening) and release phases. Furthermore, a distinction has to be made for different baseline scenarios: the appropriate approach may be different in a situation where measures have already been taken as opposed to a situation where policy action is being considered for the first time.

2.3 Role of indicators

Indicators are at the core of a guided discretion approach to the use of macro-prudential instruments. Considerations concern not only the choice and combination of indicators (single indicator or a set of indicators), but also the link between indicators and macro-prudential objectives and instruments (including thresholds and calibration). Different objectives and instruments may require different (sets of) indicators. The link between indicators and objectives/instruments comprises the following aspects:

- choice of indicators;
- combining indicators (set of indicators, core set, complementary set);
- weighting of indicators;
- mapping of indicators to objectives/instruments;
- decision on (a combination of) instruments;
- decision on the scope of the instrument;
- decision on the activation of the instrument(s), lower indicative threshold;
- calibration of the instrument(s);
- decision on the deactivation of the instrument(s).

To apply the indicators for policy decisions, it is necessary first to determine the level of the indicator at which the intermediate objective of macro-prudential policy is in danger. For forward-looking guidance, indicator “danger zones” could be specified at which there would be a presumption for policy action to mitigate and prevent systemic risks (see also the methodology for CCBs, Chapter 2). The “danger zones” can be based on indicative thresholds for the indicators, as derived from formal statistical evaluation, but also be influenced by the literature, historical distributions, cross-sectional averages, etc.¹⁹² The set of indicators or speed of action would in many cases be likely to differ between the build-up (tightening) and the release phase. The role for judgement would typically be larger in the release phase than in the build-up phase as the indicators for the release or deactivation of instruments are generally less robust.

¹⁹² CGFS (2012) provides in Annex 3 a methodological framework for the statistical assessment of risk indicators helpful in identifying vulnerabilities in the household sector. The thresholds are set at a level to minimise the noise-to-signal ratio while retaining the capacity of the indicators to identify at least two-thirds of the crises (see also Borio and Drehmann (2009) for a detailed discussion of the issue).

In practice, policy decisions should be supported by the combined information provided by the selected indicators vis-à-vis their indicative thresholds, as well as general timing considerations and judgement. Goodhart (2011) advocates “**presumptive indicators**”. When two or three of such presumptive indicators signal rising vulnerabilities, i.e. have crossed a lower threshold, the authority would have to act or explain publicly why it chooses not to. Put differently, the burden of proof would be shifted from those arguing that a tighter policy stance is warranted to those arguing that no change to the policy is appropriate. It is possible to calculate lower thresholds for individual or combinations of indicators from cross-country data. By contrast, deriving upper thresholds and providing a full-fledged calibration would be a much more complex task.

Whether thresholds are communicated to the public or used internally in policy-making institutions is also an area for debate. Developing guides for internal use would enable lessons to be learned from initial experience in applying macro-prudential policy, at least in the early stages, although communication to the public would increase transparency, build credibility and strengthen the expectation channel of policy. That said, given the need to supplement indicator analysis with judgement when deciding on policy action, and the fact that the analytical framework surrounding the use of macro-prudential tools is still in its infancy, such disclosure may lead to confusion and misunderstandings over when policy instruments are likely to be activated. This risk should be weighed against the potential benefits of extensive disclosure in these areas.

Signals provided by various indicators could be combined to guide a policy decision in several ways: either formally by using empirical analysis or less formally through a simple weighting scheme (e.g. with equal weights for each indicator). For example, assume four indicators have been linked to a particular objective and a given indicative threshold has been identified for each of them. The macro-prudential authority could then apply the following response function: (i) as soon as one of the indicators reaches the threshold, a closer monitoring is initiated, complemented by intensified analysis of soft information; (ii) if a second indicator reaches its threshold, the authority carefully considers the merits of policy tightening, retaining discretion on whether or not to act; and (iii) if the threshold of a third indicator is concurrently breached then the authority is bound to act with limited room for discretion.¹⁹³ Such a **ladder approach** has a number of advantages.

- It reduces the importance of specific indicator thresholds, mitigating the risk of “false alarms” and partly addressing identification problems and potential Lucas critique¹⁹⁴ considerations.
- It provides a framework for constrained/guided discretion allowing the combination of expert judgement and a rules-based approach. Warning signals from indicators tend to act as triggers for deeper analysis, allowing qualitative information to be taken into account. It also reduces the impact of uncertainty related to the measurement of a particular indicator.

¹⁹³ A similar approach is envisaged by the Committee on the Global Financial System (CGFS (2012)).

¹⁹⁴ The “Lucas critique” refers to the fact that in economic analysis empirical relationships are estimated from periods where people have particular expectations based on the prevailing policy framework; once the policy framework and expectations change, the estimated empirical equations also change, making them useless for predicting the results of policy action.

- It facilitates communication with other authorities and the public.

The disadvantage of the ladder approach is that it may delay policy activation as it relies on several indicators. Applying policy measures at the right time is clearly of great importance. However, the costs of delayed and early intervention are asymmetric: delayed action resulting in a costly financial crisis is generally more expensive than premature intervention. Moreover, delay may reduce the effectiveness of macro-prudential policy, in particular in the build-up phase of vulnerabilities. This would argue in favour of relatively early policy intervention, also taking into account other (qualitative) information, even if the statistical indicators do not provide statistically unambiguous signals for policy action.

Using indicators in a guiding or “presumptive” way could help mitigate inaction bias, but there is still an important **role for judgement**. For example, the setting of the baseline instrument is essential when determining the possible need for further policy action. If a country has already implemented several tightening measures, the need for further policy tightening in response to a signal from a given indicator is not as urgent as it would be in the absence of any measures. Another example of the important role of judgement is that indicators cannot be expected to send the right signals in all cases and so policy-makers must be willing to act based on qualitative assessments of systemic risk, including market and supervisory intelligence, even if statistical indicators are not providing clear signals to act. In particular, policy-makers should not put too much faith in the ability of statistical trends to capture equilibrium levels. Making statistical signals a pre-condition for policy action would risk worsening inaction bias instead of alleviating it.

Country-specific considerations also need to be taken into account. Country-level data can be widely heterogeneous in terms of availability, definitions, aggregation and range of the series (see for example Box 3.4 in Chapter 3 on the LTV). This makes it difficult to establish hard rules because a cross-country comparison is preferable to understand whether an indicator is useful from an empirical point of view, in particular if the aim is developing guidance at the European level. More generally, given the different national economic, political and fiscal environments, a one-size-fits-all decision-making process or set of indicators cannot reflect the characteristics of individual countries.

Moreover, indicators are likely to be used in different ways for different instruments with the appropriate balance between rules and discretion likely to vary. While indicators may be derived and assessed with relative ease for overall risks related to credit growth or time-varying risks emanating from the housing market, it may be harder to derive indicators for other structural instruments owing to data availability constraints as well as conceptual considerations.

3. Country experiences

The results of an ESRB survey on the designated authority and macro-prudential instruments suggest that Member States use neither strict rules, nor complete discretion, but rather take a mixed approach. The case studies presented in the box (both EU and third country) have similar findings.



Box 9.1: Case studies on the use of rules vs. discretion

Hardly any EU country or country on which information is publicly available has so far opted for a decision-making process that fully relies on either rules or discretion, most choosing a mixed approach. These approaches are called “guided discretion” (Swiss National Bank (2013)), “constrained discretion” (Bank of England (2009)), or “conditional rules”. This is in line with the BCBS guidance on CCBs where the credit-to-GDP gap is intended to be a reference point in taking buffer decisions along with other relevant indicators, leaving an important role for judgement.

Sectoral capital requirements/risk weights

- **Switzerland:** The Swiss National Bank (SNB) can make proposals on setting the CCB on residential real estate exposures in Switzerland. It follows a guided discretion/ladder approach (SNB (2013)). Guidance stems from the analysis of a set of key indicators (domestic mortgage volume and house price indicators) and additional indicators (risk-taking measures of banks, alternative housing credit and price indicators, and general economic environment indicators). The more homogeneous the picture the key indicators convey, the more heavily the SNB will be influenced by the guidance, but exact indicators or thresholds are not communicated publicly. The discretionary element is justified by the need for flexibility in policy-making and lack of experience using the instrument. The implementation period can vary between three and 12 months depending on the severity of imbalances and the strength of dynamics.
- **UK:** The Financial Policy Committee (FPC) is expected to regularly review two lists of indicators when taking decisions on the CCB and sectoral capital requirements (SCR) (Bank of England (2013)). Both changes in indicators and their absolute level will be taken into account. It is noted that “the greater the degree of imbalance as measured by the core indicators, the more homogeneous the picture that the different indicators convey, and the more consistent that picture is with market and supervisory intelligence, the more likely it is that the FPC will adjust the CCB and SCRs in response”. A clear role is also given to judgement, which accounts for other indicators and market or supervisory intelligence.
- **Norway:** Norges Bank bases its advice to the Ministry of Finance on setting the CCB on four main indicators. Norges Bank’s analysis is published in the quarterly “Monetary Policy Report with financial stability assessment”. However, the central bank will also take into account other factors when determining the appropriate size of the buffer, especially in the release phase. Furthermore, Norges Bank will not only analyse developments relative to statistical trends, but will also compare current levels with historical averages. The appropriate size of the buffer will be viewed in the light of other requirements applying to banks, particularly when new requirements are introduced.
- **The BCBS guidance for national authorities operating the CCB:** More generally, the BCBS suggests a guide for setting the CCB which is based on the deviation of the credit-to-GDP gap from its long-term trend. A linear function is used by way of example for mapping the credit-to-GDP gap to the CCB rate.¹⁹⁵ The guide is only intended to be an indicative relationship, not an automatic rule, leaving an important role for judgement. A similar approach has been adopted in the CRD (see Article 136 of the CRD).

Loan to value /loan to income caps

- **Korea:** The Korean authorities began to use LTV and LTI caps in 2002 and 2005 respectively.¹⁹⁶ The instruments were differentiated according to loan type and geographical region, following a discretionary approach.¹⁹⁷ Different caps are relevant in different regions and for different types of borrowers. Tighter limits apply in so-called speculative zones. Whether a region belongs to a speculative zone follows a formal definition. Therefore, the decision whether an instrument in a certain region is applied follows a rule, but the level of the instrument is set using the authority’s discretion.
- **Europe (from an ESRB survey):** In Sweden the Finansinspektionen decides on the level of the LTV cap. Even if there is no established procedure for altering the cap, the effect and the level of the cap are assessed through an extensive data collection exercise once a year. In Finland the cap is a constant non-binding recommendation by the Finanssivalvonta. In Norway the cap is implemented by the Finanstilsynet. The cap is altered on the basis of evaluations of developments in the housing market, households’ debt levels and other macro-prudential/systemic risk considerations.

¹⁹⁵ See BCBS (2010).

¹⁹⁶ See Igan and Kang (2011), p. 23-24.

¹⁹⁷ The definitions of the LTV and DTI ratios for Korea can be found in Lee (2013), p. 8.

4. Conclusions

Experience, also in the light of the recent financial crisis, shows that there is a natural tendency towards inaction in macro-prudential decision-making given the visible short-term costs and the less obvious longer-term benefits. A framework of presumptive or guiding indicators could contribute to mitigating this inaction bias. It would need to be combined with the appropriate institutional set-ups at the national and European levels to minimise the risk of such bias.

In a framework of guided discretion combining elements of a rules-based approach and the need for judgement, indicator values above indicative lower thresholds would initiate further surveillance or policy action. The balance between reliance on indicators and discretion has to reflect conceptual differences between instruments, data availability and country-specific circumstances. Importantly, given that quantitative indicators can never capture all aspects of systemic risks, policy-makers need to be willing to act based on qualitative information and assessments of the level of systemic risk even in the absence of statistical signals for such action.

The ESRB could play an important role in the development of a guided-discretion framework by providing general guidance to Member States and by carrying out further cross-country analytical work on indicators. It could also use a guided-discretion approach in its own monitoring, taking country-specific circumstances into account.

Chapter 10

Macro-prudential policy communication¹⁹⁸

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Executive summary

This chapter focuses on macro-prudential policy communication. It discusses the purpose and content of communication, provides strategies on how to address different audiences and gives advice on how best to manage a number of potential challenges. The chapter ends with a brief overview on how Member States have communicated macro-prudential policies so far.

The main messages of this chapter are the following.

- The main objectives of macro-prudential policy communication are to foster accountability, enhance market discipline and manage expectations.
- The targeted audience is varied and includes regulated institutions, markets, politicians, the general public and other relevant authorities.
- There are three main components to macro-prudential communication.
 - i. The institutional framework: by communicating information on their mandate, objectives, governance, decision-making processes and instruments, authorities increase accountability and manage expectations.
 - ii. Risk assessments: macro-prudential authorities should regularly communicate on risk assessments and their policy stance.
 - iii. Immediate and future policy action: authorities should disclose the operational features of activated instruments, the risk assessment that justifies action, and how the identified objectives are to be attained. The communication of potential future actions may also be considered.
- The specific content and form of communication (e.g. press releases, speeches etc.) should differ depending on the target audience and the purpose of communication.
- The key challenges for effective communication on macro-prudential policies concern the “right” timing, the degree of transparency and coordination between multiple authorities.

1. Content of macro-prudential policy communication

The main purposes of macro-prudential policy communication are to foster accountability, enhance market discipline and manage expectations.

In terms of content, communication on macro-prudential policy can be categorised into three types: communication on the institutional framework, communication on the assessment of systemic risk, and communication on the activation of macro-prudential instruments and (possibly) future action.

1.1 The institutional framework

A sound understanding of the institutional framework of macro-prudential policy among regulated institutions, markets and other audiences strengthens accountability and manages expectations. For this reason, authorities should communicate on their:

- mandate and objectives (overall and intermediate);
- governance and the decision-making process (i.e. who chooses the instruments and decides on their (de)activation, how the decision-making process is structured, how coordination between the different authorities is organised, and to whom they are accountable);
- powers and available instruments.

1.2 The assessment of systemic risk

Communication on the assessment of systemic risk also strengthens accountability and manages expectations. Authorities are advised to communicate regularly on their assessment of risk, independent of whether macro-prudential measures have been taken or not.

Regular communication signals that the macro-prudential authority is determined to fulfil its mandate. By shaping expectations it reduces uncertainty regarding potential future policy actions.

When systemic risk is increasing, authorities may consider including information on potential future macro-prudential measures when communicating on the assessment of risk.¹⁹⁹ This may even alleviate the need for policy intervention by promoting market discipline. It also makes macro-prudential policy more predictable.

In this respect, the disclosure of guiding indicators and indicative thresholds may serve as commitment devices for taking macro-prudential action.²⁰⁰ However, given the need to supplement indicator analysis with judgement when deciding on policy action, and the fact that the analytical framework surrounding the use of macro-prudential tools is still in its infancy, such disclosure may lead to confusion and misunderstandings over when policy instruments are likely to be activated. This risk should be weighed against the potential benefits of extensive disclosure in these areas (see further Section 3.2).

¹⁹⁹ This could also include recommendations issued by the macro-prudential authority where it does not have the suggested instrument at its disposal.

²⁰⁰ The disclosure of certain indicators is mandatory in some cases (e.g. the countercyclical capital buffer, Article 136 CRD). Macro-prudential authorities may establish disclosure policies or additional communication requirements in national rules.

1.3 The activation of macro-prudential measures

Communication on macro-prudential measures serves to justify actions and manage expectations. Authorities should communicate the key operational features of the measures. This includes their scope of application, level, timing, phasing-in arrangements and, when appropriate, likely duration. Authorities are required to publicise information on some of these features for a number of instruments under the CRD/CRR.²⁰¹ Authorities should also disclose the rationale for activating macro-prudential measures, in line with their mandate and objective (see Section 1.1).

Moreover, such communication should include the systemic risk identified, the reason why it needs to be addressed and how the measure is expected to mitigate it. The communication could be framed using intermediate objectives as a basis. Where several intermediate objectives are pursued, authorities may consider providing information on the relative ranking of their objectives in terms of importance.

Communication on the rationale for activation may be limited to a simple narrative. At the other end of the spectrum, communication could encompass all principles, analyses, indicators, including indicative thresholds for activation (tightening) policy or deactivation (loosening), and possible rules for calibrating instruments.

1.4 Content of communication summarised

Table 10.1 below outlines the main elements that authorities should cover in their communications about macro-prudential policy. The table shows that the three categories of communication described so far are closely interconnected and overlap. In particular, authorities should consider including relevant information from the other categories in their communications, for example, information on the institutional framework (e.g. mandate and objectives) when communicating on the assessment of risk and the activation of measures.

Table 10.1: Content of macro-prudential communication

Institutional framework	Systemic risk assessment	Activation of measures
<ul style="list-style-type: none"> ▪ Mandate ▪ Objectives – overall and intermediate ▪ Governance ▪ Decision-making ▪ Powers and available instruments 	<ul style="list-style-type: none"> ▪ Risk identification and assessment ▪ Principles of guided discretion (possibly) ▪ Guiding indicators (possibly) ▪ Indicative thresholds (possibly) ▪ <i>Institutional framework (selected content)</i> 	<ul style="list-style-type: none"> ▪ Operational features <ul style="list-style-type: none"> - Scope of application - Level - Timing and phasing-in - Likely duration (possibly) ▪ Rationale and transmission channel ▪ <i>Systemic risk assessment (selected content)</i> ▪ <i>Institutional framework (selected content)</i>

²⁰¹ This includes, for instance, the countercyclical buffer and the systemic risk buffer. For additional information on these requirements and on how to communicate them effectively, see Chapters 2 and 4.

2. Target audiences and forms of communication

The form and specific content of macro-prudential communication should be tailored to the target audience. Messages to the broader public and borrowers (where borrowers are specifically targeted by a macro-prudential measure) should be short, concise and easy to understand. Here, communication could take the form of press releases, press conferences or media appearances. This basic information could be supplemented by more complex and technical details for more sophisticated and knowledgeable audiences, such as regulated institutions and market participants through, for example, financial stability reports, analytical papers, meeting minutes or speeches.

3. Challenges in macro-prudential communication

While communication may increase accountability, provide justification for actions and manage expectations, it also poses a number of challenges for macro-prudential authorities. These include the timing of macro-prudential communication, the degree of transparency, and coordination.

3.1. Timing

The timing of the announcement of the activation (or deactivation) of macro-prudential instruments may pose a challenge. There are at least two dimensions to this. One dimension concerns the period from the moment the activation of a measure is announced until the time when the measure actually comes into force. In certain cases, a short period is warranted. For example, when activating instruments that only apply to new loans (e.g. LTV limits), a short period may be necessary to avoid frontloading.²⁰² In other cases, a longer period may be required, e.g. to give the regulated institutions time to fulfil the requirements.

Another dimension concerns the prevailing financial stability circumstances at the time an authority has decided to activate (or tighten) or deactivate (or loosen) a macro-prudential measure. If the authority's communication on risk assessments or policy changes coincides with market stress, there is the risk that it may destabilise markets even further. In such precarious situations, authorities may refrain from communicating openly about potential "market-moving" decisions, and decide to postpone communication until after the systemic risk has diminished.

When taking such a decision, however, authorities should consider that not enough communication can also aggravate market stress, in the sense that the mere fact of communicating might then have an overly dramatic impact. If market participants and the public in general are accustomed to regular communications from the authority on the risk assessments and potential future actions, this may indeed reduce the risk of a communication destabilising markets. However, a careful balance must be struck between too much detailed disclosure and too little (see below). Since communication challenges are more pronounced in times of crisis, it is advisable that authorities design specific communication strategies and scenarios in advance.

²⁰² See Chapter 3.

3.2. Transparency

While transparency in macro-prudential policy communication is desirable in that it may enhance understanding, market discipline and accountability, it also poses challenges.

Some risk assessments will be based on confidential data. Where such assessments have contributed to the decision to take policy action, authorities will need to consider the best way to communicate the reasons for their action without compromising the confidential nature of the information on which the decision was based.

There are also potential issues regarding how much information it is useful to provide, in particular on the risk assessment process and how future potential policy decisions will be reached, for example in terms of indicative thresholds.

As experience with macro-prudential policy is limited, the empirical evidence available on the impact of macro-prudential measures is also limited. Moreover, consensus on how best to assess systemic risk has not yet been reached. In these circumstances, too much and overly detailed disclosure may limit the effectiveness of policy communication, as audiences may lack the analytical tools to make sense of the data. This is likely to lead to confusion over the focus of macro-prudential concerns and, potentially, misunderstandings about when policy is likely to be activated.

Until a sound and robust analytical framework is sufficiently developed, authorities may find it helpful to focus their communications on providing a clear and concise narrative, supported by key indicators, to explain their latest risk assessment and to justify any policy action taken. As understanding of and experience with macro-prudential policy increases, the amount of information disclosed could increase in tandem.

3.3 Coordination

Another challenge for macro-prudential policy communication may arise when multiple (national or international) authorities are involved in macro-prudential policy.

In such situations, one option is to coordinate communication between authorities, perhaps even expressing one common message with a single voice. This provides clarity to target audiences and certainty to the extent that it reduces the risk of conflicting and inconsistent messages. This may be particularly important in times of market stress. Also, speaking with one voice may reduce criticism and pressure in favour of inaction.

However, such a coordinated approach may limit the scope for an authority to publicly express its own view on macro-prudential issues. This in turn may restrict accountability, diversity of opinion in the assessment, and the debate on appropriate policy stances.

4. Country experiences with macro-prudential policy communication

This section provides an overview of communication by macro-prudential authorities in the EU. It includes a number of examples of communication on the activation of macro-prudential policy measures and one example of communication on the institutional framework of macro-prudential policy (Annex 10.1 provides further details).

4.1. Examples of communication on macro-prudential measures

Several examples are available of communication on planned or activated macro-prudential measures (see Annex 10.1). For the most part, authorities combined various forms of communication, such as issuing a press release together with a background note or holding a press conference. Also, in terms of content, authorities provided information on key components of the measure (the objective/purpose, scope, transmission channel, etc.) in almost all cases. However, it was less common for authorities to publicise details of empirical assessments or specific indicators for activation and potential release. In fact, authorities only included indicators in the communication when the instrument in question was the CCB (for which publication of indicators is mandatory) and the sectoral capital requirements. In almost all cases, communication took place shortly after the decision on policy action. In many cases, additional communication took place at the actual time of activation of the measure.

4.2. Example of communication on the institutional framework

The UK's Financial Policy Committee (FPC) has communicated extensively on its macro-prudential policy framework, including its mission and powers. The FPC has also communicated on the motivation, transmission and analytics underlying two specific instruments (CCBs and sectoral capital requirements), including a broad list of indicators for each of these instruments. The FPC has relied on a wide range of communication forms, including policy statements, meeting minutes, discussion papers, financial stability reports and media events. Communication occurs both on an ad hoc basis and regularly after meetings.

Chapter 11

Cross-border considerations: issues to be covered by ESRB opinions²⁰³

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²⁰³ This chapter was prepared by a team led by Silvia Pezzini (Bank of England) and comprising Jean-Luc Thevenon (Autorité de contrôle prudentiel et de résolution) and Tomasz Gromek (Narodowy Bank Polski). Support was provided by Timo Kosenko and Carmelo Salleo from the ESRB Secretariat. It builds on previous work led by Alexander Schulz (Deutsche Bundesbank).

Executive summary

This chapter outlines a method for the ESRB to assess the impact of proposed macro-prudential measures including cross-border spillovers, and to prepare ESRB opinions as mandated by the CRD/CRR. Macro-prudential policy measures pursuant to Article 458 CRR (national flexibility measures) and certain measures under Article 133 CRD (setting or resetting an SRB above 3%) specifically require both the ESRB and the EBA to provide an opinion prior to the introduction of such measures.²⁰⁴ In the case of national flexibility measures, the European Commission must then, taking utmost account of these opinions, assess “if there is robust, strong and detailed evidence that the measure will have a negative impact on the internal market that outweighs the financial stability benefits”, in which case the Commission may propose that the Council reject the measure. The process to be followed by the ESRB with regard to issuing its opinion will be covered in a decision of the General Board of the ESRB on the coordination framework.

In forming its opinion on the proposed measure, the ESRB may use the following.

- A review of three main types of effects: effects on financial stability, effects on lending and economic growth, and effects on intra-banking group behaviour that might adversely affect banking system resilience in other countries. This would ensure that consideration is given to both long-term benefits for financial stability and potential short-term costs associated with policy measures.
- A policy framework for capital measures. When considering other policy measures, the ESRB would rely on the description of instruments in this Handbook to identify the relevant transmission channels and can use the three categories above as a guide to assessing net domestic and cross-border effects.
- A set of information related to the proposed measure and to country linkages. This includes the country’s own assessment of the effects of the measure, information that other countries may want to add, data to assess whether cross-border effects are likely to be material, the transmission mechanisms identified for each instrument in this Handbook, and empirical estimates of the effects of policy measures in past episodes that bear similarities to the situation being examined.

As a first step, the ESRB would [make an overall judgement on the likely benefits for financial stability arising from the proposed measure, as well as their appropriateness and advise whether the proposed national measure should be approved.

As a second step, if the ESRB identifies material negative spillovers to other countries as a result of applying the proposed measure, the ESRB would play a key role in advising how these could be mitigated (through, for example, issuing a recommendation). To this end, the ESRB may suggest amendments to the measure notified so that the benefits for financial stability are maintained but negative spillovers are reduced or eliminated.

²⁰⁴ According to Article 133 (15) the EBA may provide an opinion on setting an SRB.

The ESRB should encourage Member States/macro-prudential authorities to:

- i. mitigate negative effects, where possible;
- ii. consider if the measure can be replaced by another one with similar benefits and fewer and/or less harmful negative spillovers;
- iii. take the necessary macro-prudential measures, where Member States remain inactive in the face of a build-up of systemic risk;
- iv. adopt similar policy responses to similar risks;
- v. reciprocate national measures when and where appropriate;
- vi. reframe policies to preserve the objective of increasing resilience in one jurisdiction in such a way that does not cause contractions in lending or capital shifts to other jurisdictions;
- vii. not adopt the proposed policy measure, if the cross-border effects are material and cannot be mitigated.

1. Costs and benefits of proposed national measures

1.1 Arguments for unified vs. “cross-border only” assessment

This chapter proposes a methodology for the ESRB to consider the domestic and cross-border effects of a measure from a financial stability perspective, i.e. carrying out a unified as opposed to “cross-border only” assessment. This methodology satisfies the need to duly consider macro-prudential policy’s effects on financial stability, typically over long horizons, alongside its shorter-term effects on the financial sector.²⁰⁵

Macro-prudential policy can have material positive spillovers to other countries by reducing the build-up of systemic risk and the probability and impact of systemic crises. Such positive effects on financial stability are difficult to assess along the cross-border dimension alone. Nevertheless, the assessment of such cross-border effects should not be avoided simply because they are difficult to observe and quantify. In macro-prudential policy, costs and benefits of policy measures tend to occur along different time horizons. Changes in lending tend to happen quickly and can be measured to a large extent. Benefits to financial stability, conversely, tend to be perceived over longer time horizons and are difficult to quantify. While risks to financial stability are difficult to quantify *ex ante*, the recent financial crisis, during which financial instability propagated from one country to another, clearly showed significant costs *ex post*.

Thus, a narrow cross-border cost-benefit assessment carries the risk that measures are rejected simply because the long-term benefits of macro-prudential measures cannot be quantified both at the time of activation and deactivation of macro-prudential instruments.

1.2 Organising framework that could be used for capital instruments

How can a unified assessment of domestic and cross-border costs and benefits be performed?

²⁰⁵ Over time, the ESRB could choose to extend this approach to assess the likely effects of a broader set of tools. See also Giese et al (2013).

We consider, as a starting point, the case of a policy measure aimed at raising minimum capital requirements (a measure on which the ESRB would need to provide an opinion pursuant to Article 458 CRR). For other policy measures, the ESRB should consider transmission mechanisms outlined in the other chapters of the Handbook and could use the categories set out below to guide the assessment of net domestic and cross-border effects.

Typically, macro-prudential authorities raise capital requirements for one or both of the following reasons: to increase the resilience of institutions by increasing their ability to withstand losses; and to create incentives for banks to reduce lending, if it is considered excessive or underpriced.

A policy measure's effects depend crucially on how banks react to it, i.e. on whether they choose to:

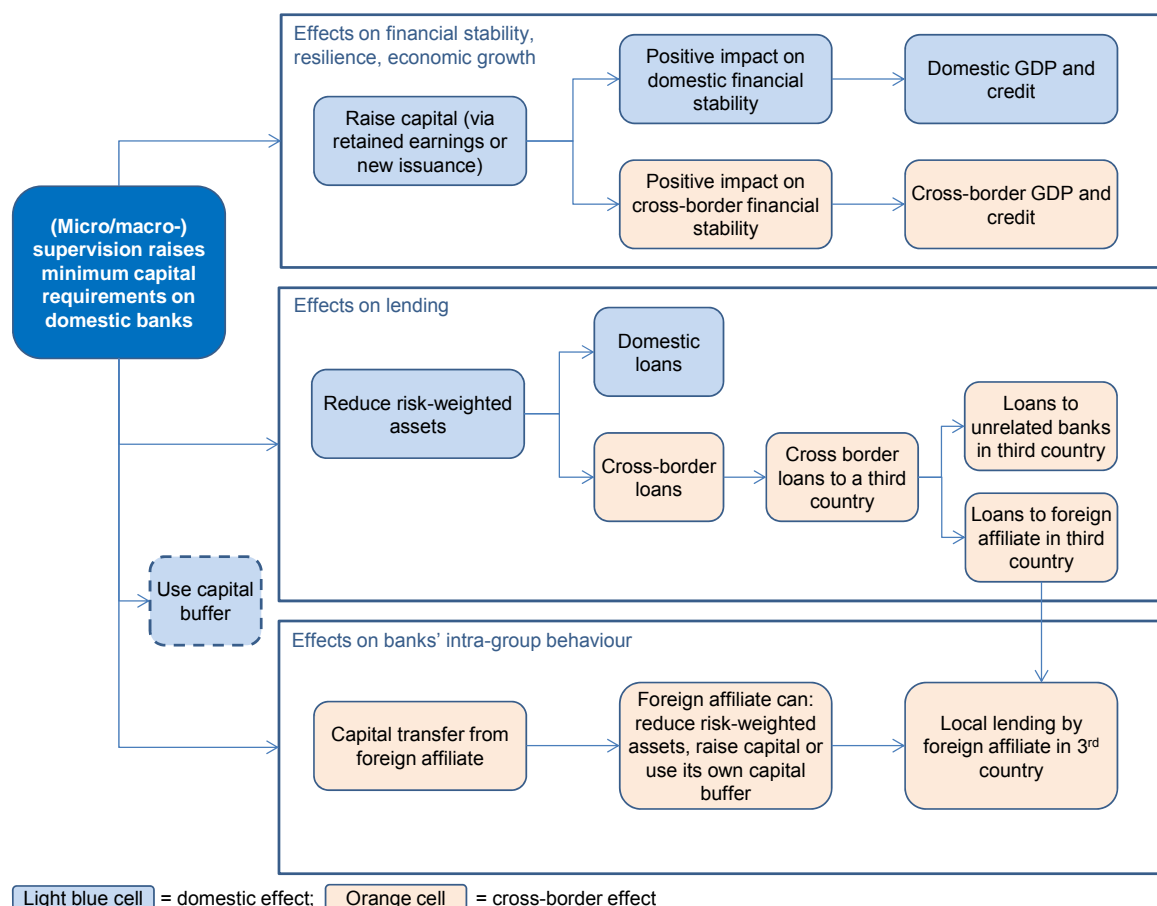
- raise new capital or retain profits (rather than distributing them as dividends);
- reduce risk-weighted assets either by scaling back lending, changing their asset structure or transferring risk to other intermediaries,²⁰⁶ which mechanically improves their capital ratio;
- absorb the rise by using existing capital buffers, if prevailing voluntary buffers allow for it;
- transfer capital within the group (when possible);
- any combination of the above.

Depending on how banks react, the net balance, domestically and cross-border, of benefits and spillovers may be affected in different ways. Figure 11.1 describes the stylised chain of possible reactions to a macro- or micro-prudential rise in minimum capital requirements and, depending on how banks choose to respond to it, the various channels of direct impact (feedbacks are not mapped).²⁰⁷

²⁰⁶ Other possible channels include securitisation and risk transfer via derivatives, or transfers to less regulated entities in other jurisdictions.

²⁰⁷ For example, reductions in risk-weighted assets in the middle panel might also have long-term effects on financial stability, resilience and economic growth in the first panel. We abstract from these feedback loops because of the further degree of uncertainty and complexity as to their magnitude and direction.

Figure 11.1: International transmission of changes in domestic capital requirements



Source: Adapted from CGFS (2012)

Top panel: effects on financial stability, financial system resilience and economic growth

Effects: positive or neutral, both domestic and cross-border

When higher minimum capital requirements lead banks to raise new capital, their ability to withstand losses is strengthened. Collectively, this improves the resilience of the financial system, both domestically and in financial systems that are interconnected (positive spillovers). A number of studies provide estimates of this benefit.²⁰⁸

Middle panel: effects on lending, both domestic and cross-border

Likely net effects: negative or neutral, both domestic and cross-border

Where banks respond to higher minimum capital requirements by reducing assets, they may do so by changing their business strategy and reducing lending, either in their home country or in other countries in which they provide credit, or in both. This may adversely affect economic growth in the short term.

Banks may favour domestic lending (although it becomes more expensive to fund) and reduce cross-border lending as a result, or conversely choose to maintain cross-border

²⁰⁸ See Basel Committee on Banking Supervision (2010) and Miles, et al. (2011).

lending (as it becomes relatively cheaper) and reduce domestic lending. Empirical studies suggest that banks tend to reduce lending to similar extents domestically and abroad.²⁰⁹

If the Member State raises capital buffers with the aim of mitigating and preventing credit growth (the first intermediate objective listed in the ESRB's Recommendation on intermediate objectives and instruments of macro-prudential policy), a reduction in credit is intended and desirable. Otherwise it is a short-term cost to be borne and weighed against longer-term financial stability benefits. For foreign countries, whether this effect is desirable or not depends on two conditions.

- a) One is the materiality of lending interconnections between the two countries, in absolute and relative terms. These can be considerable if a large share of credit in the foreign country is provided by non-domestic banks.
- b) The second is whether or not other countries are in a similar phase of the financial cycle. If neighbouring countries are in the same phase of the financial cycle and face similar financial stability risks, they are likely to benefit if the proposed measures curb credit growth in their own country. If, however, domestic banks reduce credit supply towards a country which is already in a downturn, this may be unwelcome, although in some cases the impact can be mitigated by a different formulation of the policy (see Section 3).

Bottom panel: effects on banking groups' intragroup behaviour that might adversely affect banking systems' resilience in other countries (cross-border)

Likely net effects: positive or negative, both domestic and cross-border.

The application of measures that increase minimum requirements on capital, liquid assets or stable funding can lead banking groups to reorganise their operations with a view to meeting requirements in one country by merely reducing voluntary buffers held in others, i.e. by shifting capital (or liquidity/funding) between institutions in different jurisdictions within the same group. Such intragroup shifts can have negative effects across borders if the capital shifts increase resilience in the Member State increasing the requirements, but reduce it in those with lower requirements (zero sum game). The effects can be neutral or positive if intragroup movements of regulatory capital strengthen weaker banks through the reduction of excess (voluntary) buffers held in other jurisdictions.

2. Information requirements for an ESRB opinion

To prepare its assessment of the likely effects of the policy measure, the ESRB should have a range of information at its disposal, including both ad hoc information on the specific measure and regular information on the materiality of financial stability interlinkages across borders.

2.1 Background information available at all times

a. A dataset on the magnitude of cross-border linkages

Such a dataset should include data on:

²⁰⁹ See Aiyar, Calomiris and Wieladek (2013) and Aiyar et al. (2013).

- cross-border lending flows (absolute levels; scaled by the receiving country's GDP; sectoral breakdown by household/commercial/intra-financial lending);
- Member States' reliance on credit supply from banks regulated in other countries.

The ECB Statistical Data Warehouse (MFI (monetary financial institutions) balance sheets section) and BIS data on bilateral exposures could be relevant for this purpose.

b. Classification of policy instruments according to the main channels of intended effects, unintended domestic effects and cross-border effects

This is covered in other chapters of the Handbook.

c. Empirical estimates of the effects of macro-prudential policies on other jurisdictions, including breakdowns of direct and cross-border effects, where available

To refine its assessment, the ESRB should, over time, collect evidence on the effects of measures enacted by individual countries and on their effectiveness in promoting financial stability domestically and abroad. This might be conducted in conjunction with the IMF, which shares similar interests.

2.2 Ad hoc information on the proposed measure

a. Information on risks and expected impact of the proposed policy measures provided by the Member State planning to use them

As part of the CRD/CRR notification process (involving the ESRB, EBA, the European Commission, the European Council and European Parliament) prior to adopting policy measures under Article 458 CRR or (a subset of) Article 133 CRD, Member States must provide their own assessment of whether the planned measures are suitable, effective and proportionate to tackle the identified systemic risk, along with an assessment of the likely positive or negative impact of the draft measures on the internal market. This information will be collected via templates that the ESRB is developing in parallel to this work.

b. Information that other countries want to contribute to the assessment (most likely on cross-border effects)

The ESRB Secretariat should develop a process by which other countries can raise concerns on proposed national measures.

3. Mitigating negative spillovers to other countries

The second step of the ESRB's opinion assessment concerns situations where a proposed policy measure entails more benefits than costs (and should arguably be adopted from a domestic perspective) but imposes material cross-border costs on other countries. The ESRB can play a key role in devising ways to mitigate negative spillovers while preserving the benefits of the measure.

In particular, the ESRB should draw on its central role among Member States to encourage dialogue between relevant authorities on macro-prudential policy.²¹⁰ The ESRB should encourage macro-prudential authorities, perhaps via a recommendation, to:

- i. mitigate negative effects where possible;
- ii. consider if the measure can be replaced by another one with similar benefits and fewer and/or less harmful negative spillovers;
- iii. take the necessary macro-prudential measures where Member States remain inactive in the face of a build-up of systemic risk;
- iv. adopt similar policy responses to similar risks;
- v. reciprocate national measures when and where appropriate;
- vi. reframe policies in such a way to preserve the objective of increasing resilience in one jurisdiction but not causing contractions in lending or capital shifts to other jurisdictions;
- vii. not adopt the proposed policy measure if the cross-border effects are material and cannot be mitigated.

The ESRB could also aim to foster, via its publications, a shared and public understanding of the systemic risks faced and the policy tools available to reduce them.

²¹⁰By creating such a dialogue, the Vienna Initiative 2 reduced potential deleveraging in eastern European countries during the recent crisis.

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Annex 3.1: Figures on selected real estate indicators

a) Residential real estate

Figure 1: Household credit-to-GDP gap (BIS)

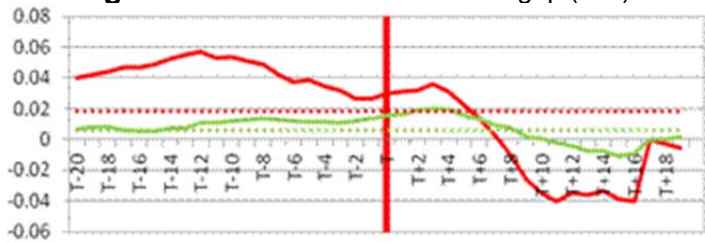


Figure 2: Nominal house price gap

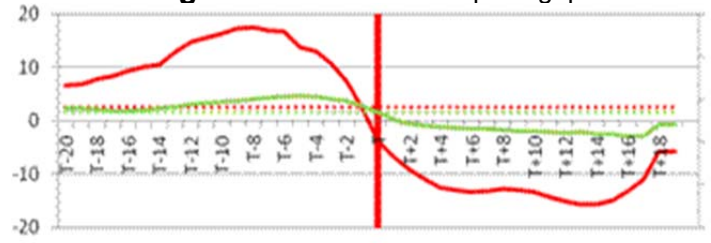
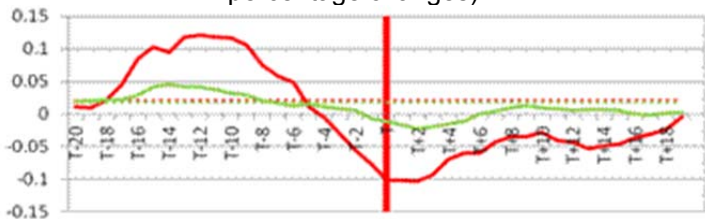


Figure 3: House price-to-income growth (year-on-year percentage changes)



Source: ESRB.

█ start crisis
— mean around own crises
⋯ mean outside own crises
— mean around other countries' crises but outside own crises
⋯ mean outside own and other countries' crises

b) Commercial real estate

Figure 4: NFC credit-to-GDP gap

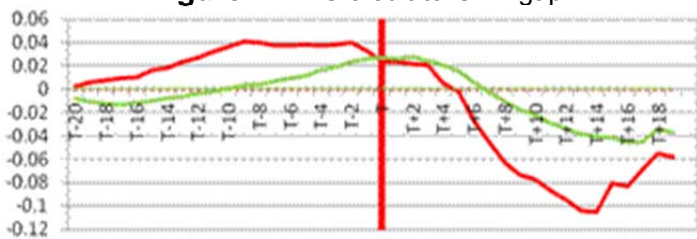


Figure 5: Commercial property prices gap

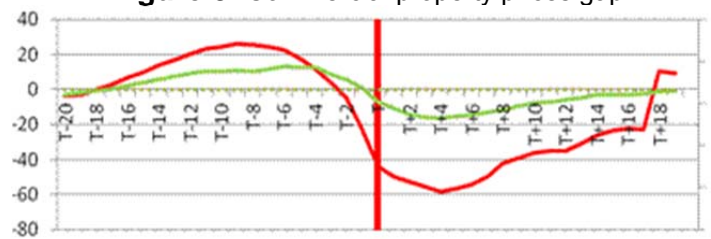
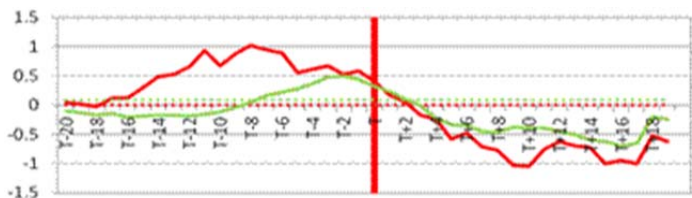


Figure 6: Other buildings investment-to-GDP (with normalised national data)



Source: ESRB.

█ start crisis
— mean around own crises
⋯ mean outside own crises
— mean around other countries' crises but outside own crises
⋯ mean outside own and other countries' crises

c) Country-specific examples for Spain and Ireland compared with butterfly results

Figure 7: Household credit as a percentage of GDP (BIS)

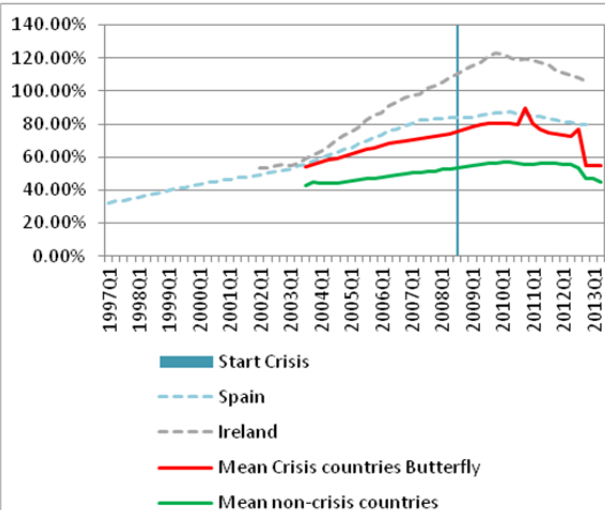


Figure 8: Nominal house prices gap

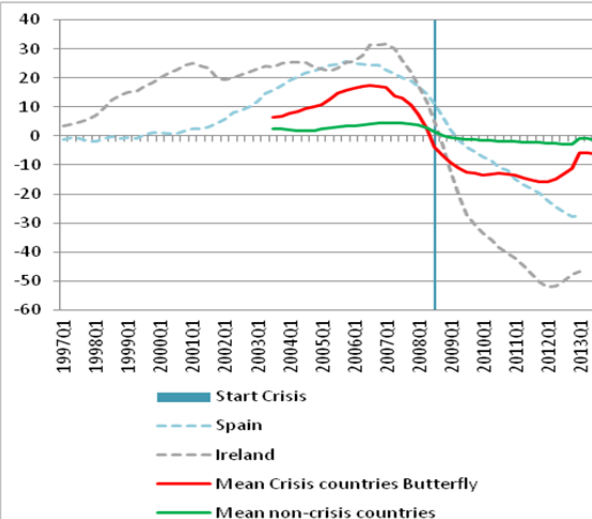


Figure 9: NFC credit to GDP

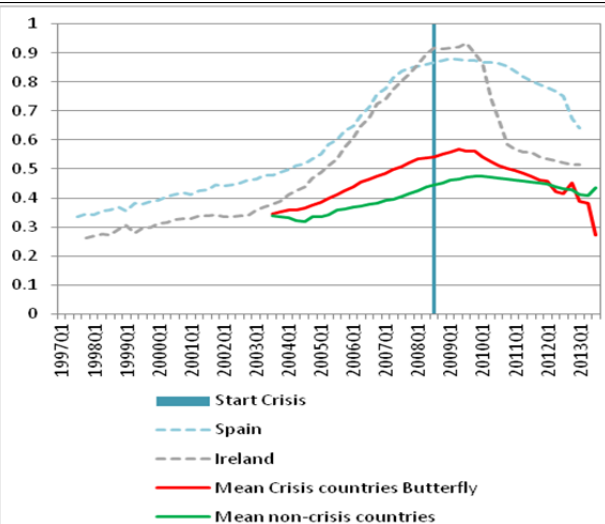
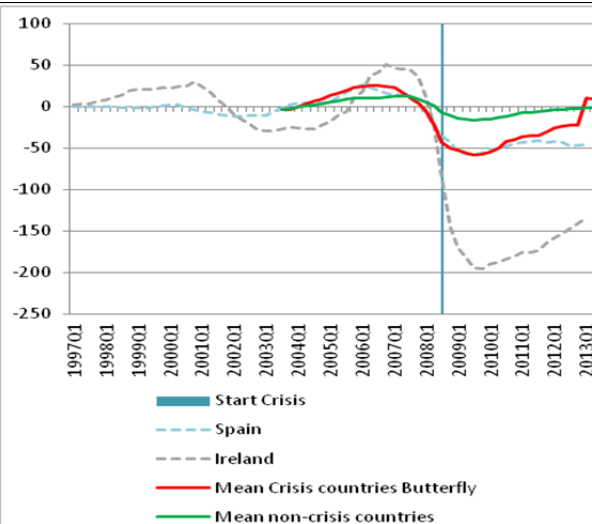


Figure 10: Commercial real estate prices gap



Source: ESRB.

Annex 3.2: Overview of legal/institutional aspects of real estate instruments

	Legal basis	Responsible authority	Procedural aspects	Reciprocity
Sectoral capital buffer	Article 133 of the CRD (Pillar I - systemic risk buffer)	Competent or designated authority	<ul style="list-style-type: none"> - Notification to the European Commission, the ESRB, EBA, and competent or designated authorities of the Member States/third countries concerned. - Commission opinion, implementing act or recommendation (together with an ESRB recommendation) needed for buffer above certain threshold. - ESRB and EBA opinions for buffers exceeding a certain threshold. 	Allowed
	Article 458 of the CRR, Article 92 of the CRR (Pillar 1 – national flexibility)	Competent or designated authority	See Chapter 7.	Allowed
	Article 103 of the CRD (Pillar 2)	Competent authority	<ul style="list-style-type: none"> - Notification to the EBA. - EBA to monitor supervisory practices and issue guidelines. 	Development of a common view of risks in supervisory colleges encouraged
RW	Article 124(2) of the CRR (Pillar 1)	Competent authority	<ul style="list-style-type: none"> - Prior consultation of the EBA and publication by the EBA of RWs/criteria. - Six-month transitional period for banks. - EBA is to publish the higher RWs (or stricter criteria) - EBA to develop RTS 	Compulsory
	Article 458 of the CRR (Pillar 1 – national flexibility)	Competent or designated authority	<ul style="list-style-type: none"> - Subsidiarity requirement for RWs over 150%. - Subject to the procedure of Article 458 of the CRR; only notification requirement applies in case of a RW increase of 25%. - See also Chapter 7. 	Allowed
	Article 103 of the CRD (Pillar 2)	Competent authority	<ul style="list-style-type: none"> - Notification to the EBA. - EBA to monitor supervisory practices and issue guidelines. 	Same as for Article 103 of the CRD above
LGD	Article 164(5) of the CRR (Pillar 1)	Competent authority	<ul style="list-style-type: none"> - Notification to the EBA. - EBA to publish LGD values. - EBA to develop RTS. 	Compulsory
	Article 458 of the CRR (Pillar 1 – national flexibility)	Competent or designated authority	See Chapter 7.	Allowed
	Article 103 of the CRD (Pillar 2)	Competent authority	<ul style="list-style-type: none"> - Notification to the EBA. - EBA to monitor supervisory practices and issue guidelines. 	Same as for Article 103 of the CRD above
LTV	Outside of the CRD/CRR	National competence	<ul style="list-style-type: none"> - National competence. - Prior notification of the ESRB in case of expected significant cross-border effects. 	National competence
LTI/DSTI	Outside of the CRD/CRR	National competence	<ul style="list-style-type: none"> - National competence. - Prior notification of the ESRB in case of expected significant cross-border effects. 	National competence

Annex 3.3: LTV limits currently in place in EU Member States

Based on the outcome of dedicated ESRB surveys in 2013, it can be concluded that regulation regarding an explicit LTV limit is currently in place in nine Member States (CY, FI, HU, LT, LV, NL, PL, RO and SE). Additionally, in AT and DE, there is an 80% LTV limit which is relevant only for mortgages provided by building societies and which is considered rather as the de facto limit in both countries. Ten Member States (AT, CZ, DE, DK, ES, FR, IT, SE, SI and SK) mentioned that they have LTV limits on mortgage loans included in the pool for covered bonds, ranging between 40% and 100% depending on the type of the collateral.²¹¹

Country		Explicit LTV limit	Application of explicit LTV limit ¹³	De facto LTV covered bonds
Austria	AT	80% ¹	building societies	60%
Belgium	BE			
Bulgaria	BG			
Cyprus	CY	70% ²	banks supervised by the central bank	
Czech Republic	CZ			70%
Germany ³	DE			60%
Denmark	DK			40%–80% ⁴
Estonia	EE			
Spain	ES			60%;80% ⁵
Finland	FI	90% ⁶	banks	
France	FR			60%; 80%; 100% ¹⁴
Greece	GR			
Croatia	HR			
Hungary	HU	45%–80% ⁷	institutions providing financial services in Hungary	
Ireland	IE			
Italy	IT			60%; 80% ⁸
Lithuania	LT	85%	banks incl. foreign branches, credit unions	
Luxembourg	LU			
Latvia	LV	90%	lenders granting mortgages to households	
Malta	MT			
Netherlands	NL	104% ⁹	financial institutions under supervision	
Poland	PL	95%;75% ¹⁰	banks	
Portugal	PT			
Romania	RO	60%–85% ¹¹	banks, non-bank financial institutions	
Sweden	SE	85%	credit institutions providing mortgages	60%–75% ¹⁵
Slovenia	SI			60;80% ¹²
Slovakia	SK			70%
United Kingdom	UK			

Source: ESRB survey. Table may be incomplete.

²¹¹ The implicit application of LTV in the form of a preferential RW in the capital requirements calculation is not being considered in this box. Note that LTV limits for mortgage loans included in the pool for covered bonds only place constraints on the financing through covered bonds rather than on the total loan relative to the value of the property. The extent to which such LTV limit for covered bonds is restrictive depends on the importance of covered bonds as a source of financing in a particular country.

¹80% cap applies for building society loans.

²Exception: 80% limit for primary permanent residence.

³Building society Act which only applies to building societies: mortgage must not exceed 80% of the lending value without sufficient additional security (de facto cap).

⁴Danish mortgage banks may choose between three types of bond to fund their loans: (i) traditional mortgage bond; (ii) covered mortgage bond; and (iii) covered bond. The maximum LTV on all three types of bond are between 40% and 80% of the mortgaged property depending on the type of property. In the case of traditional mortgage bonds, the LTV limit is applicable only at the time of issuance. In the case of covered and covered mortgage bonds, the LTV limit must be applicable throughout the loan term. In general, the LTV limits by property category are: 80% for owner-occupied housing, 60% for commercial properties, 60% for summer cottages and 40% for undeveloped sites. The LTV limit for commercial properties can be extended to 70% if the lender submits additional capital as collateral.

⁵80% for residential and 60% for commercial mortgages. The limit of 80% may be increased up to 95% under certain circumstances if the exposure has a bank guarantee from an institution different from the bank granting the loan.

⁶Non-binding recommendation by the Finnish FSA of maximum 90% LTV.

⁷80% for local currency (HUF) loans, 60% for euro loans, 45% for other currency loans.

⁸80% for residential and 60% for commercial mortgages.

⁹The cap will be gradually lowered by 1 percentage point each year until it reaches 100% in 2018.

¹⁰Banks were supposed to establish and implement maximum LTV levels internally until 2013. The 95% LTV limit for household real estate valid from 2014 will gradually decrease to 80% in 2017 and the 75% LTV limit for commercial real estate will apply from July 2014. Higher LTV limits will apply (90% for household real estate and 80% for commercial real estate) provided that the borrower insures the part of exposure surpassing the basic LTV limit or provides additional collateral in the form of a bank account deposit or PLN-denominated securities issued by the Treasury or Narodowy Bank Polski.

¹¹LTV 85% for local currency loans, 80% for foreign exchange loans for hedged borrowers, 75% for unhedged euro borrowers and 60% for unhedged borrowers in other currencies, no LTV restriction on mortgages supported by national programme "Prima Casa".

¹²80% for residential mortgages and 60% for commercial mortgages.

¹³The information is related to column "Explicit LTV limit".

¹⁴Bonds issued by sociétés de crédit foncier (real estate credit companies) or sociétés de financement de l'habitat (housing loan companies) are legally subject to LTV caps depending on the type of property or guarantee.

¹⁵60% for office or commercial collateral, 70% for agricultural collateral and 75% for residential collateral.

The explicit LTV limits vary both across types of loan within a country as well as across Member States. The LTV limit in individual Member States is usually related to the type of loan (commercial versus residential) and currency of the loan (domestic versus foreign currency) with foreign currency mortgages usually being subject to stricter LTV limits (for example in Hungary and Romania).

The heterogeneity among Member States also stems from differences in the coverage of institutions to which the explicit LTV limit is applied. The most complex coverage of an explicit LTV limit is in Hungary, where all the institutions providing financial services in Hungary are covered, in Latvia where the LTV limit applies to all lenders granting mortgages to households and in Romania, where it applies to both banks and non-bank financial institutions. In the Netherlands, the limit applies to all financial intermediaries subject to code-of-conduct supervision. In other Member States (CY, FI, LT, PL and SE) the LTV limit applies mainly to credit institutions/banks.

Annex 4.1: Overview of instruments for systemic risks

Table 1: Overview of the SII-buffers

<p>Description: The G-SII buffer and O-SII buffer are CET1 buffer requirements on total risk exposures for a set of pre-defined banks which are deemed “too big to fail” in the international or national context respectively. Both are applicable from 2016. The G-SII buffer is calibrated in buckets of 1%, 1,5%, 2%, 2,5% and 3,5%. The O-SII buffer is calibrated between 0 and 2%.</p>
<p>Objective: To increase resilience of individual banks and the banking sector. The intermediate objective is to limit the systemic impact of misaligned incentives with a view to reducing moral hazard.</p>
<p>Advantages</p> <ul style="list-style-type: none"> - Broad-based buffer related to all risk exposures. - Based on international framework (BCBS). - Clarity on indicators, thresholds and buckets for the G-SII buffer. - Flexibility in application of O-SII buffer allows national specificities to be taken into account. - Both buffers leave room for expert judgement.
<p>Disadvantages</p> <ul style="list-style-type: none"> - O-SII buffer is capped at 2% which is thought to be too low. - Potential leakage/arbitrage to less-regulated and non-regulated entities. - In the case of an O-SII buffer, possible cross-border spillovers to other countries in which the bank operates. - Risk of strengthened perception of “too big to fail”. - Buffers do not always accumulate with SRB.
<p>Relevant operational issues</p> <ul style="list-style-type: none"> - In the build-up phase buffers also affect the financial cycle. Implementation should take into account the importance of appropriate timing and phasing-in. - For application of the O-SII buffer, authorities need to decide which indicators to use and which weighing to allocate to each indicator. - For the application of the O-SII buffer, calibration can be based on the principle of “equal expected impact”, but this is not straightforward.
<p>Relevant legal/institutional issues</p> <ul style="list-style-type: none"> - The G-SII buffer is mandatory (EBA technical standards will apply). - The O-SII buffer is optional (EBA guidelines will be available). - Member States must designate a competent or a designated authority to be in charge of the SII buffers. - The SIIs and the buffer rates must be notified to the European Commission, the ESRB and the EBA one month before publication of the decision. There is no obligation to consult them or request their opinion. - SIIs and their allocated buffer rates are disclosed to the public. - The identification of the SIIs and the buffer rates applied shall be reviewed every year. This review shall also be notified to the Commission, the ESRB and the EBA and disclosed to the public. - The ESRB provides standard notification templates.



Table 2: Overview of the SRB

Description: The SRB is an optional CET1 buffer requirement on total risk exposures for all or a subset of banks to address structural systemic risks otherwise not covered by the CRR. It is applicable from 2014 and its rate is at least 1%.
Objective: To increase resilience of individual banks and the banking sector. The intermediate objectives can be to limit the systemic impact of misaligned incentives with a view to reducing moral hazard, to limit direct and indirect concentration of exposures and to mitigate or prevent excessive leverage.
Advantages <ul style="list-style-type: none">- Broad range of structural risks can be targeted.- It allows differentiating between banks.- Flexible as buffer rates lower than 3% only require notification but the procedural requirements are more demanding for higher SRB rates.- The level is, in principle, unlimited. Only the coordination and procedural (authorisation) requirements increase along with the intended level and cross-border impact.
Disadvantages <ul style="list-style-type: none">- In the absence of a clear-cut definition and indicators of structural systemic risk, potential diverging practices between authorities, scope for regulatory arbitrage and policy uncertainty for the banking sector.- It may not accumulate with the SII-buffers.- Authorities need to justify why other macro-prudential instruments (except for national flexibility measures) do not suffice to address the identified systemic risk.
Relevant operational issues <ul style="list-style-type: none">- In the build-up phase, the SRB buffers also affect the financial cycle. Implementation should take into account the importance of appropriate timing and phasing-in.- Calibration can be based on the outcome of stress tests, but this is not straightforward.
Relevant legal/institutional issues <ul style="list-style-type: none">- Member States need to first decide whether to implement the SRB in national law.- Member States must designate a competent or a designated authority to be in charge of the SRB.- Up to 3%, the SRB must be notified to the European Commission, the ESRB and the EBA one month before publication of the decision. There is no obligation to consult them or request their opinion.- The ESRB provides standard notification templates.- The SRB is disclosed to the public.- The SRB must be reviewed at least every second year.



Table 3: Overview of the Pillar 2 additional own funds requirement

Description: The Pillar 2 additional own funds requirement enables competent authorities to address firm-specific systemic risks which are otherwise not covered by Pillar 1 buffers. The systemic risks should be considered through the SREPs. The measure may involve not only an additional CET1 requirement but also a lower quality of capital. It may apply to a subset of exposures.
Objective: To increase resilience of individual banks. The intermediate objectives can be to limit the systemic impact of misaligned incentives with a view to reducing moral hazard, to limit direct and indirect concentration of exposures and to mitigate or prevent excessive leverage.
Advantages <ul style="list-style-type: none">- The measure can be tailored to specific exposures.- It is bank specific and therefore targeted at the source of the systemic risk.- The level is, in principle, unlimited.- It is a flexible buffer, coordination is only required within the college of supervisors.
Disadvantages <ul style="list-style-type: none">- Disclosure is not mandatory.- Coordination with macro-prudential authorities is not mandatory.- Pillar 2 measures are individual decisions that are more likely to be contested in court and in discussions between supervisors and banks.
Relevant operational issues <ul style="list-style-type: none">- Competent authorities must consider systemic risks through the SREP. The EBA should provide guidance to this end.- Calibration can be based on the outcome of stress tests, but this is not straightforward.
Relevant legal/institutional issues <ul style="list-style-type: none">- Pillar 2 measures fall under the mandate of competent authorities.- Competent authorities need to reach a joint decision in the college of supervisors on the conclusion of the SREP.- It is recommended that competent authorities coordinate with macro-prudential authorities in evaluating systemic risks under the SREP for systemically important banks and in any decisions to impose additional own funds under Pillar 2 to address systemic risks.- It is recommended that competent authorities require banks to disclose the additional own funds requirement under Pillar 2.

Annex 4.2: National practices identifying O-SIIs and setting buffers

In **Austria**, the Austrian supervisory authorities (Finanzmarktaufsicht) issued in 2012 supervisory guidance on strengthening the sustainability of the business models of large internationally active Austrian banks. Three large internationally active Austrian banks have been identified so far, based on their size, systemic relevance and complexity of business models (e.g. in the case of numerous subsidiaries). The approach relies on supervisory judgement. No explicit thresholds have been determined and the approach is of a qualitative rather than quantitative nature. The additional capital surcharge currently stands at a maximum of 3% and will be applied from 2016 onwards. It is as yet uncertain whether this surcharge will be applied through Pillar 2 or another capital buffer.

In **Belgium**, the Nationale Bank van België/Banque Nationale de Belgique developed in 2011 a methodology for identifying financial institutions that are systemically important at the domestic level (D-SIFIs). This methodology makes use of quantitative indicators relating to size, substitutability and interconnectedness. The reference point is the domestic financial system. The substitutability indicators reflect Belgian banks' shares of different activities within the Belgian financial system. The interconnectedness indicators are used to judge the degree to which financial institutions are significantly interconnected with respect to their domestic counterparts. The difficulty of measuring systemic importance and the inadequacies of certain data mean that additional supervisory judgement is required. If the central bank considers that the identified D-SIFI has an inappropriate risk profile or if a strategic decision is likely to have a negative impact on the stability of the financial system, it may impose specific measures on that bank, such as a capital surcharge.

In the **Czech Republic**, Česká národní banka is in the process of applying the SRB buffer to O-SIIs. The buffer application and size depend on the domestic systemic importance of selected banks and their contribution to systemic risk. The systemic importance of each bank is determined as a weighted average of approximately 20 indicators related to size, complexity, substitutability and interconnectedness. The importance of banks is relative in the sense that the banking sector-wide sum is always 100%. Banks that are twice as systemically important as the average of the banking sector are considered O-SIIs and banks above this threshold are subject to an extra buffer. The buffer sizes are proportionate to the degree of systemic importance of a given bank exceeding the threshold. The buffer sizes are calculated such that the BCBS' principle of "equal expected impact" is observed (based on the RORWA historical distribution). Buffer sizes can also reflect other considerations, such as the nature and structure of a bank's subsidiaries.

In **Denmark**, D-SIFIs are identified on the basis of the following quantitative criteria: balance sheet size equivalent to more than 6.5% of Denmark's GDP; loans comprising more than 5% of total sector loans; and deposits comprising more than 5% of total sector deposits. The bank must meet one of these criteria for two consecutive years in order to be considered a D-SIFI. The identification process will begin in mid-2014. The buffer size ranges from 1% to 3% of risk-weighted assets and is based on the above criteria. The SRB will probably be used, given the cap on the O-SII buffer. Based on current data, seven institutions are likely to be identified as D-SIFIs in 2014. The buffer will be phased in gradually during the period from 2015 to 2019. The intention is that the Danish D-SIFI buffer is on a par with the requirements set in other comparable European countries. The final level of the Danish buffer will be assessed no later than 2017.

In **Germany**, Deutsche Bundesbank and the supervisory authority BaFin (Bundesanstalt für Finanzdienstleistungsaufsicht) have developed an approach for identifying potentially systemically important credit institutions. Criteria used for the identification include size, complexity, substitutability and interconnectedness. The approach distinguishes two groups of potentially systemically important credit institutions. This bucketing approach is in line with the BCBS framework for global systemically important banks. The first group encompasses institutions that are systemically important based on the above-mentioned criteria (group I institutions). The second group comprises institutions which are less systemically important but may still have systemic “knock-on” effects on the financial market in Germany, notably during “tense” market situations (group II institutions). No additional capital surcharges on these O-SIIs are planned. Institutions in both groups must draw up recovery plans and BaFin draws up resolution plans. If BaFin deems the institution unresolvable, it may require the group structure to be changed, set targets for risk limits, require assets to be sold, stop or limit business activities and request additional loss-absorbing capacity. For group I institutions, stricter rules for members of the supervisory board and reporting requirements apply.

In **the Netherlands**, De Nederlandsche Bank uses both quantitative and qualitative criteria to identify O-SIIs. The quantitative criteria are size, interconnectedness (including contagion through the deposit guarantee system), substitutability and resolvability. For each criterion, several indicators are applied which are similar to the G-SII indicators. The qualitative criteria are “time-dependent” factors (referring to the behavioural reaction of the bank itself) and “reputational contagion” (referring to the behaviour of third parties). There are six buckets to which banks can be assigned in accordance with their systemic importance. De Nederlandsche Bank plans to impose an additional capital buffer (using the bucketing approach) of 1%-3% on O-SIIs. Four banks so far have been identified as O-SIIs. For those banks that will be assigned a buffer higher than 2% the SRB will be applied given the cap on the O-SII buffer.

In **Norway**, Finanstilsynet recently consulted on criteria for identifying systemically important financial institutions (SIFI) and on capital and other requirements for these institutions. An institution is considered to be an SIFI if it meets one or more of the following criteria: i) the institution’s total assets constitutes 10% or more of GDP or the aggregated total assets in the Norwegian banking sector; ii) the institution’s lending to the general public constitutes 5% or more of all lending to the general public in the Norwegian market; iii) the institution’s lending to the corporate sector constitutes 10% or more of the aggregated lending to the corporate sector in one or more regions; and iv) the institution holds a critical position in the financial infrastructure. These criteria are complemented by qualitative assessments. Applying the proposed criteria, eight Norwegian banks would be considered to be SIFIs. The SIFI capital buffer is not differentiated across SIFIs. It will be phased in from 1 July 2015.

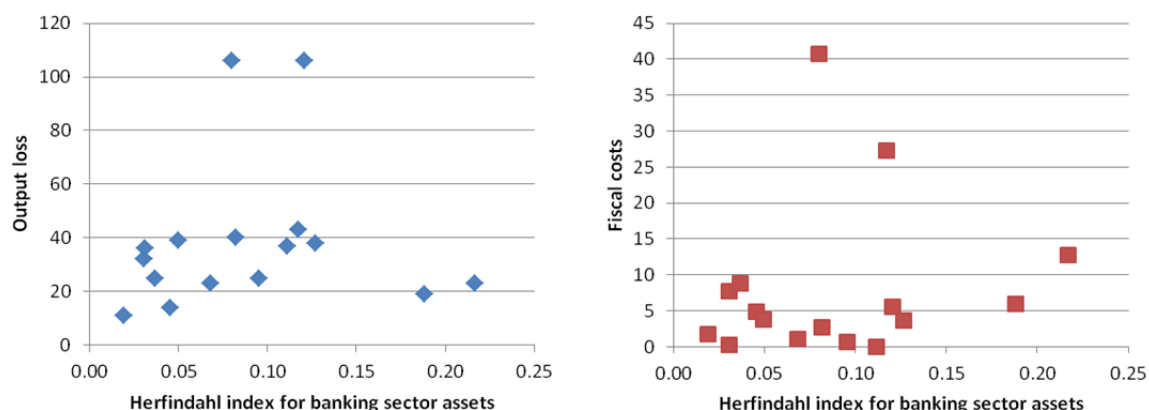
In **Sweden**, the authorities expressed the view in November 2011 that higher capital requirements should apply to the major Swedish banks. This is motivated by the size of the banks relative to the size of the Swedish economy, their dependence on market funding in both domestic and foreign currencies, and their extensive cross-border operations. The requirements are expected to apply to large banks with international operations. This means that at least the four largest Swedish banks will be affected, but more banks may be included at a later stage. The surcharge will be 3% by 2013 and 5% by 2015.

In the **United Kingdom**, in 2011, the UK's Independent Commission on Banking published its recommendations on reform of the UK banking sector, which included ring-fencing measures and higher loss absorbency requirements for large and systemic banks. This regime will provide some of the context for the future O-SII regime in the United Kingdom. According to the draft legislation, the Prudential Regulation Authority will identify systemic institutions based on the Basel framework for domestic systemically important banks. Loss absorbency shall also be increased by “bail-in-able” debt. In deciding an institution's level of loss-absorbing debt, the PRA will consider (among other metrics): the degree of its systemic importance based on the Basel framework, the amount of core deposits held and balance sheet size. Large ring-fenced banks will be subject to an equity surcharge of up to 3% of RWAs.

Annex 4.3: Concentration and size of the financial sector as indicator

The figures below show the relevance of the concentration and the size of the financial sector for the costs of the recent banking crisis for fifteen euro area Member States.

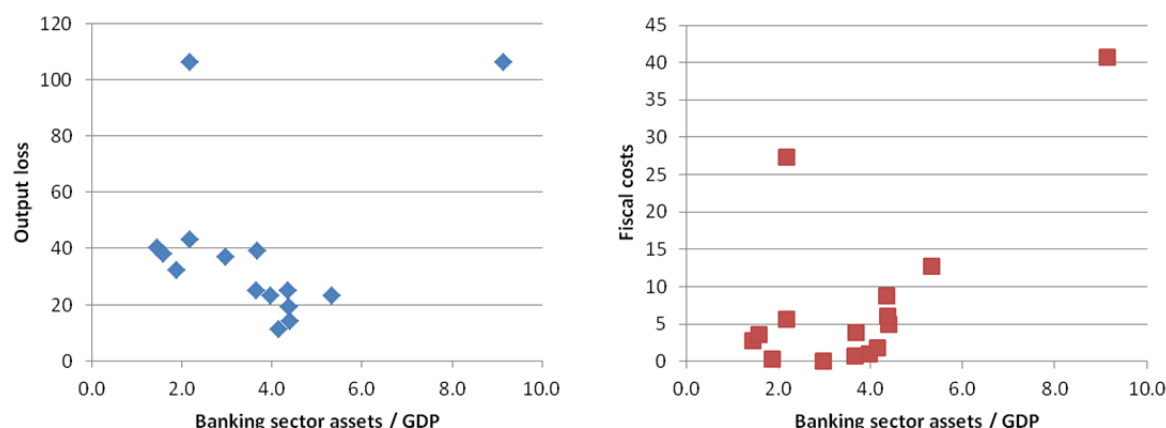
Figure 1: The relevance of financial sector concentration for the impact of financial crises



Sources: Laeven and Valencia (2013), ECB.

Notes: the horizontal axis measures concentration in terms of the Herfindahl index applied to banks' assets in 2008, as reported by the ECB. The vertical axis measures output loss and fiscal costs in respectively the left-hand and the right-hand panel (as a percentage of GDP), as estimated by Laeven and Valencia to be due to the banking crisis in a given country.

Figure 2: The relevance of financial sector size for the impact of financial crises



Sources: Laeven and Valencia (2013), ECB.

Notes: the horizontal axis measures the size of the banking sector in terms of the banks' assets in 2008, as reported by the ECB. The vertical axis measures output loss and fiscal costs in respectively the left-hand and the right-hand panel (as a percentage of GDP), as estimated by Laeven and Valencia to be due to the banking crisis in a given country.

Although the small number of observations does not allow formal statistical analysis, data in both panels of Figure 1 seem to support a finding that concentration is among the determinants of the overall macroeconomic impact of distress in the banking sector. In Figure 2 the output loss as a result of the crisis is unrelated to the size of the banking sector relative to the whole economy.²¹² There seems however to be a relationship between the fiscal costs and the size of the banking sector.

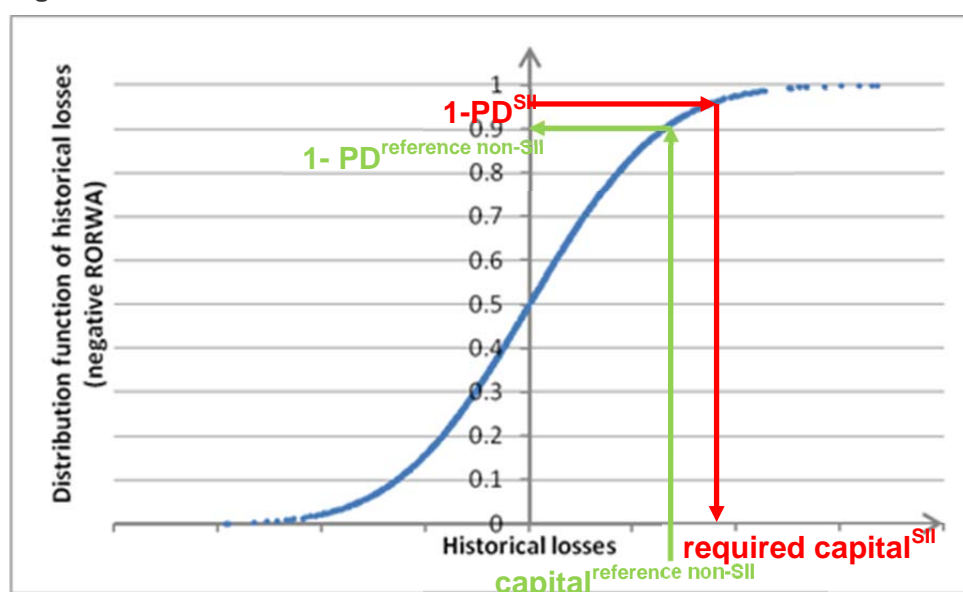
²¹² The macroeconomic costs may have been mitigated by other factors related to the size of the banking sector. For example, countries with larger banking sectors may have applied, on average, higher capital requirements to their banks via Pillar 2 measures before the recent banking crisis.

Annex 4.4: Explaining the RORWA approach

The “equal expected impact” approach requires the calculation of the probability of default of a reference non-SII and the required capital ratio for the SII. The “return on risk-weighted assets” (RORWA) approach provides these calculations. In contrast to Merton model-based methods, which assume that the equity of a given institution is publicly traded, the RORWA approach is applicable more generally.

The RORWA approach relies on observations of institutions’ historical losses relative to RWA. As a hypothetical illustration, Figure 1 below plots the cumulative distribution of historical losses relative to RWA. The horizontal axis plots institutions’ historical losses and the vertical axis denotes the probability with which a given loss level is not exceeded based on the historical loss distribution. Hence, one minus this probability would be the probability that losses do exceed the given level.

Figure 1: Historical RORWA distribution



The probability of default of the reference non-SII ($PD^{\text{reference non-SII}}$) is obtained as follows. First, assume a capital ratio for the reference non-SII (e.g. 7 % of RWA) and a capital ratio below which institutions are assumed to fail (e.g. 4.5% of RWA). Denote the difference between these two capital ratios as $\text{capital}^{\text{reference non-SII}}$ (which, in this example, equals 7% - 4.5% = 2.5%). The reference non-SII fails if the amount of losses relative to RWA exceeds this capital cushion, $\text{capital}^{\text{reference non-SII}}$. The distribution function of historical losses can then be used to find the probability with which losses will not be larger than $\text{capital}^{\text{reference non-SII}}$ (the green arrows). One minus this probability will then be the implied probability of default for the reference non-SII: $PD^{\text{reference non-SII}}$.

Given an (assumed) relative economic impact of the failure of the reference non-SII to that of the failure of the SII (relative impact^{non-SII}), the probability of default of the SII (PD^{SII}) is obtained by multiplying $PD^{\text{reference non-SII}}$ with relative impact^{non-SII} (“equal expected impact” principle). The required capital ratio (above the level below which the institution is assumed to fail) for the SII (required capital^{SII}) is then obtained by applying the inverse historical loss distribution function again to $(1 - PD^{\text{SII}})$ (the red arrows).



Annex 4.5: The ESRB template on the O-SII and G-SII buffer²¹³

1. Notifying national authority (If several designated authorities, please mention all of them)	
1.1 Name of the notifying authority	
2. Buffer levels and the institution to which they apply	
2.1 Categorisation of measures	Which measure do you intend to implement? <ul style="list-style-type: none">- G-SII- O-SII
2.2 Concerned institution or group of institutions	On which institution is the measure applied? <ul style="list-style-type: none">a. Name of the individual institutionb. Name of the parent company of the institutionc. Name of the subsidiaries of the institutiond. If parent institution, are subsidiaries notified as O-SII?
2.3 Level of the buffer applied	What is the level of the buffer (in %) applied to the institution?
2.4 Firm level at which the buffer is applied	Is the buffer set on a: <ul style="list-style-type: none">- Consolidated level- Sub-consolidated level- Individual level

²¹³ To be filled in and submitted for each O-SII/G-SII.



2.5 Information on other buffers already in application	<p>Is the institution subject to a systemic risk buffer?</p> <p>If yes, please provide the following information:</p> <ul style="list-style-type: none"> a. What is the level of the systemic risk buffer (in %) applied to the concerned institution b. Is the systemic risk buffer applied to all exposures located in your Member State only?
2.6 Annual review of the G-SII or O-SII (Articles 131.6 and 131.12)	<p>This box is to specify the outcome of the annual review of the G-SII or O-SII. What are the new levels?</p> <ul style="list-style-type: none"> - Maintained - Move in between G-SII buckets - Change of level of O-SII buffer - Changed from O-SII to G-SII - Changed from G-SII to O-SII - Cancellation of SII buffer
3. Rational for activation of the G-SII and O-SII buffer	
3.1 Description of the G-SII (Article 131.2)	<p>If notification as a G-SII, please provide information on the following categories:</p> <ul style="list-style-type: none"> a. size of the group; b. interconnectedness of the group, with the financial system; c. substitutability of the services or the financial infrastructure provided by the group; d. complexity of the group; e. cross border activity of the group, including cross border activity between Member States and between a Member State and a third country
3.2 Description of the O-SII (Article 131.3)	<p>If notification as a O-SII, please provide information on the criteria used:</p> <ul style="list-style-type: none"> a. size b. importance for the economy of the EU, or relevant Member State c. significance of cross-border activities d. interconnectedness of the institution or group, with the financial system e. other criteria used
3.3 Indicators used for designation of the G-SII (Article 131.2 and 131.9)	<p>Please provide information on:</p> <ul style="list-style-type: none"> a. which overall score is attributed to the G-SII b. which quantifiable indicators were used for each category described under line 3.1 above c. which score reached each category d. what qualitative supervisory judgement has been taken into account?
3.4 Indicators used for designation of the O-SII (Article 131.3)	<p>Please provide information on:</p> <ul style="list-style-type: none"> a. which of the criteria mentioned under 3.2 was used to qualify the institution as an O-SII b. whether and how you followed the EBA guidelines



3.5 In case of O-SII: Suitability, effectiveness and proportionality of measure (Article 131.7)	Please provide: a) the justification for why the O-SII buffer is considered likely to be effective and proportionate to mitigate the risk; b) an assessment of the likely positive or negative impact of the O-SII buffer on the single market, based on information which is available to the Member State.
3.6 In Case of O-SII, Assessment of likely impact on the internal market (Article 131.6)	Please motivate set out the assessment showing that the O-SII buffer requirement may not entail disproportionate adverse effects on the whole or parts of the financial system in other Member States or of the EU as a whole forming or creating an obstacle to the functioning of the internal market.
4. Combinations and timing of the G-SII or O-SII notified	
4.1 combinations between G-SII and OSII buffers (Article 131.14)	In case both G-SII and O-SII criteria applied to the same institution at the consolidated level, which of the two buffers is the highest?
4.2 Combinations with SRB buffers (Article 131.14 + Article 133.5)	a. In case an SRB was also applicable to the same institution, which of the SRB buffer or the G-SII or the O-SII buffer was the highest? b. Is there a possibility of accumulation with SRB?
4.3 Combined buffer requirement (Article 131.16 and Article 131.17)	a. Does the combined buffer requirement apply to the institution? b. Is the combined buffer requirement above the sum of the buffers described in Article 131-16 and Article 131-17?
4.4 Timing of the measure	What is the intended date of activation (i.e. as of which date shall the measure be applicable)?
4.5 Review of the measure	What is the envisaged duration of the measure? What are conditions for its deactivation? a. How often will the G-SII buffer be reviewed (maximal periodicity of 1 year)? b. How often will the O-SII buffer be reviewed (maximal periodicity of 1 year)?
5. Miscellaneous	
5.1 Disclosure	Where do you disclose the SII-buffer to the public?
5.2 Contact person(s) at notifying authority	Contact person(s) for further inquiries (name, phone number and e-mail address)
5.3 Any other relevant information	

Annex 5.1: Country experiences on the use of liquidity instruments for macro-prudential purposes

Case study on the LTD ratio: Portugal

Against the background of increased difficulties in banks' access to market funding and excessive leverage of the private and public non-financial sectors, and in the context of the programme of economic and financial assistance agreed in 2011, Banco de Portugal established a set of measures aimed at converging to a more balanced funding profile for the banking system. These measures included an indicative target of 120% for the LTD ratio of the eight largest banking groups to reach by 2014, corresponding to an average decrease of around 40% compared with end-2010. The ratio is defined on a consolidated basis and the definition of loans is net of impairments, includes securitised non-derecognised loans and excludes interbank loans. The denominator includes mostly customer deposits but also stable funding lines from parent companies, qualifying shareholders or multilateral institutions.

The purpose of using this instrument was to allow for an orderly and gradual deleveraging of the banking system and the non-financial sector, without excessively constraining economic agents' access to bank financing. The measure was effective in that it allowed for a significant decrease in the LTD and most of the adjustment has occurred through an increase in deposits.

Complementary measures included guidance for gradually decreasing the dependence on ECB funding and the introduction of a deduction from Core Tier 1 capital which was based on the amount of deposits with interest rates that exceeded a certain threshold above the EURIBOR rate. The purpose of the latter measure was to avoid an excessive increase in interest rates for deposits that could augment their volatility and hamper banks' profitability, as well as have a negative impact on other agents relying on household savings (e.g. insurance corporations, mutual funds and pension funds). Banks were required to report more detailed information on a daily basis (including data on deposits) and quarterly information on their funding and capital plans (current position and plans for convergence towards a more balanced position over the medium term).

Case study on the LTD ratio: South Korea

In the years leading up to the recent financial crisis, the Korean banking sector experienced an increase in LTD ratios, peaking at 140% in 2008 owing to an extensive build-up in short-term external debt. As the financial crisis hit, Korean banks were unable to roll over their maturing short-term external liabilities as global liquidity conditions worsened. The Korean authorities introduced a series of macro-prudential measures in the aftermath of the financial crisis to deal with large and volatile capital flows. One of the measures was a mandatory 100% cap on banks' LTD which came into force end-2012 and which was largely felt in intra-financial lending. Other macro-prudential instruments used to increase banks' liquidity position were a levy on short-term debt (ranging from 2 to 20 basis points according to debt maturity) and other caps and limits on foreign currency (forex) denominated transactions and derivative positions. The combination of the various measures had an immediate effect after their announcement. LTD ratios decreased significantly owing to an increase in deposits exceeding loan growth. Short-term external borrowing was reduced to roughly 30% below pre-crisis levels.²¹⁴

²¹⁴ Lim et al. (2011) and JPMorgan (2013).

Case study on the LTSF ratio: Austria

The sustainability package (published in March 2012) provides for the monitoring of stock and flow loan-to-local stable funding ratios (LLSFRs) at the subsidiaries of Austria's three largest banks,²¹⁵ as well as the supervision of the risk-adequate pricing of intragroup liquidity transfers to their subsidiaries. These measures are based on the Austrian supervisors' experience that banking subsidiaries which entered the recent financial crisis with high (i.e. above 110%) stock-LLSFRs were significantly more likely to exhibit higher loan loss provisioning rates than other banking subsidiaries that had a more conservative and balanced business and growth model. Therefore, banking subsidiaries with stock-LLSFRs above 110% are considered to be "exposed" and the sustainability of their new business has been closely monitored, starting with data from end-2011.

The exact definition of the LLSFR and its components (in the stock) is: volume of loans to non-banks after provisioning divided by the local stable funding (i.e. deposits from non-banks + supranational funding + capital from third parties + the total outstanding volume of debt securities with original maturities of one year or more issued by the subsidiary to investors outside their consolidated group). The flow ratio is defined using the year-on-year changes in the stock of these components, i.e. flow-LLSFR = (stock of loan portfolio in (t) - stock of loan portfolio in (t-1))/(stock local stable funding in (t) - stock local stable funding in (t-1)).

End-2012 most subsidiaries were not exposed, since they had a stock-LLSFR below 110%, while all but one subsidiary above the early warning threshold exhibited sustainable trends in their new business. These findings are updated quarterly and shared and discussed with the affected banks and their host and home supervisors.

Given that the LLSFR (as well as the LTD) has anti-cyclical properties, its monitoring only started in 2012 and that most of the addressed subsidiaries are located in markets with currently subdued loan growth, there is too little experience to comment on the instruments' effectiveness. The acid test for its effectiveness will rather come in boom times and/or in regions with dynamic lending growth.

Case study on core funding and maturity mismatch ratios: New Zealand

In the years preceding the financial crisis, New Zealand's banking sector was characterised by high dependence on short-term wholesale cross-border funding. The share of non-resident funding had grown to about 40% of total funding, 60% of which had residual maturities of less than three months. The banks experienced difficulties rolling over their short-term debt when international markets were impaired after the collapse of Lehman Brothers. In the light of this, the Reserve Bank of New Zealand (RBNZ) introduced, inter alia, two quantity-based macro-prudential liquidity measures to deal with these structural risks. The proposals were presented in October 2008 and came into effect in April 2010:

A one-year core funding ratio (CFR), defined as core funding over total loans and advances. Core funding broadly includes all wholesale funding with a maturity above one year, including subordinated debt, plus retail deposits and Tier 1 capital. The minimum CFR requirement (which has been implemented gradually, from 65% in 2010, 70% in 2011 and 75% in 2013) aims to ensure that banks hold sufficient retail and long-term wholesale funding in order to lower the vulnerability of the banking system to any major shock. The impact of this measure is expected to be stronger during booms,

²¹⁵ Erste Group Bank, Raiffeisen Zentralbank and Unicredit Bank Austria.

when banks resort to short-term foreign currency funding to support credit growth. It is expected that banks will rely and compete more for retail deposits and to borrow with longer maturities, which will increase lending rates and in turn reduce excessive credit growth. In this case, the RBNZ may not need to raise its monetary policy rate during a credit expansion to the same extent as in a situation without the CFR requirement.

A one week and a one month mismatch ratio (similar to the LCR) to reduce the risk that an individual bank is affected by a short-term loss of confidence. It is defined as the mismatch dollar amount over total funding, where the mismatch dollar amount comprises primary liquid assets after haircuts plus contractual inflows minus contractual outflows due within the relevant period. To meet the minimum requirement (not less than 0% at the end of each business day), a bank needs to hold a sufficient stock of liquid assets to be able to fill the projected mismatch between cash inflows and outflows. The implementation of these ratios had a rapid effect, even before they were formally implemented, as banks began to lengthen their wholesale funding structure immediately after the announcement of the new requirements. New Zealand's short-term external debt dropped continuously from 68% of GDP in December 2007 to 51% in December 2011. The share of non-resident funding dropped from 40% in 2009 to 36% in 2011, reaching 30.6% in 2013.

Case study on the LCR: Sweden

In January 2013 Sweden implemented the LCR based on the BCBS agreement of December 2010. An LCR of at least 100% is required for all currencies combined, as well as in euro and USD separately. This implementation was motivated by the fact that the Swedish banking system is large and highly concentrated. Problems in an individual bank can thus quickly spread and become systemic. The largest banks are also highly dependent on wholesale funding, with LTD ratios of around 200%. Their structural maturity mismatch, as measured by the NSFR, is high as well. In addition, short-term wholesale funding is largely provided by foreign investors. Some of these foreign investors, such as US money market funds, have proved to retreat more and faster than domestic investors in times of stress. To comply with the standards, the banks have mainly issued senior unsecured debt in the market and placed the proceeds with central banks leading to an increase in their LCR ratios. The banks have also rebalanced their liquidity buffers, from lower to higher quality, and termed out their funding which also contributed positively to their LCR.



Annex 5.2: Selected figures of liquidity indicators

Chart 1

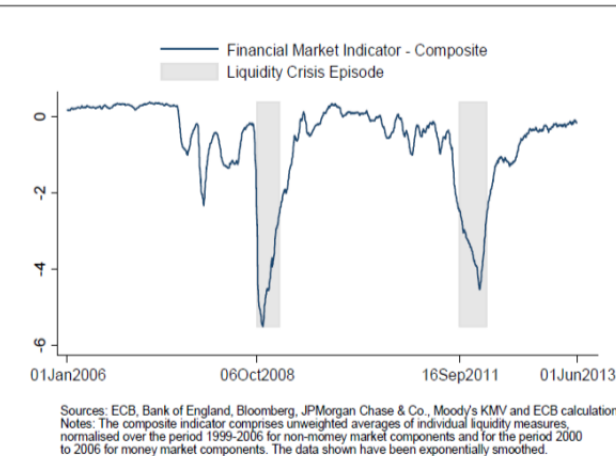


Chart 2

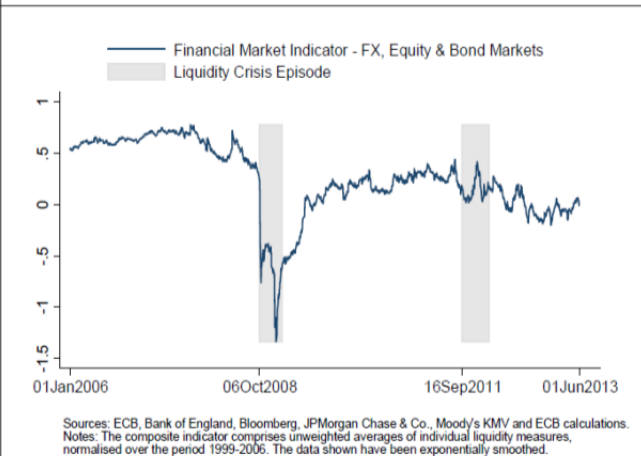


Chart 3

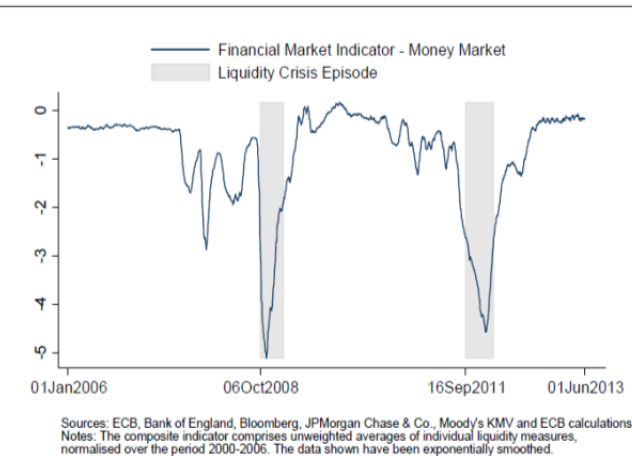


Chart 4

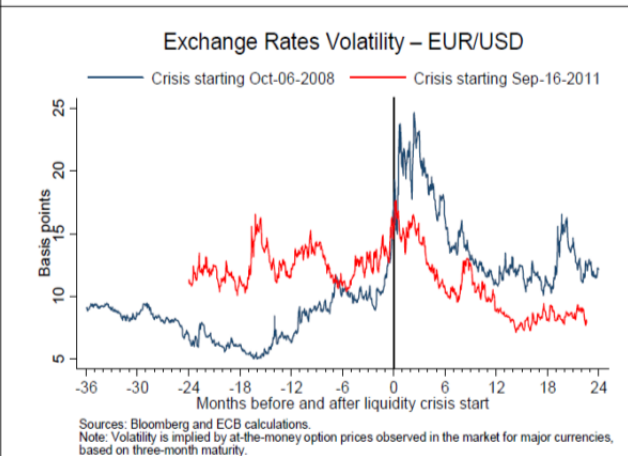


Chart 5

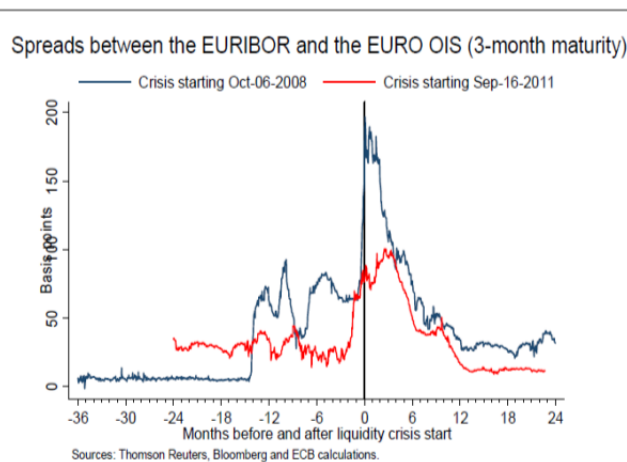


Chart 6

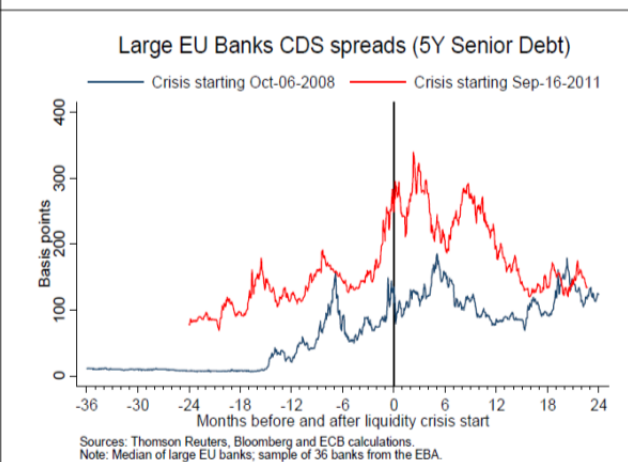




Chart 7

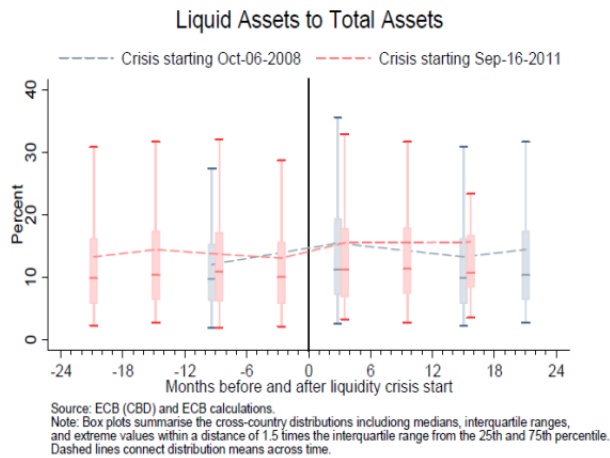


Chart 8

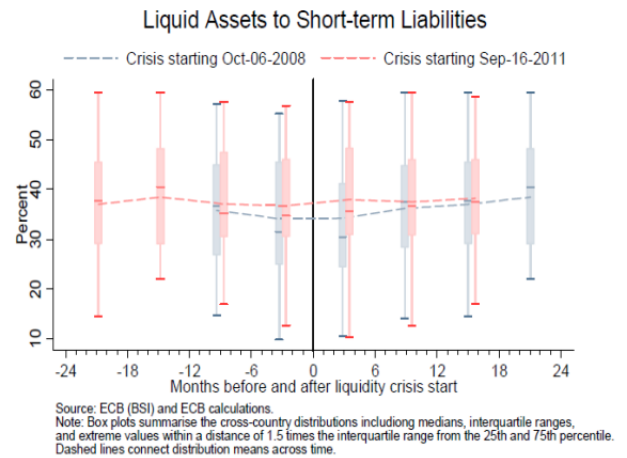


Chart 9

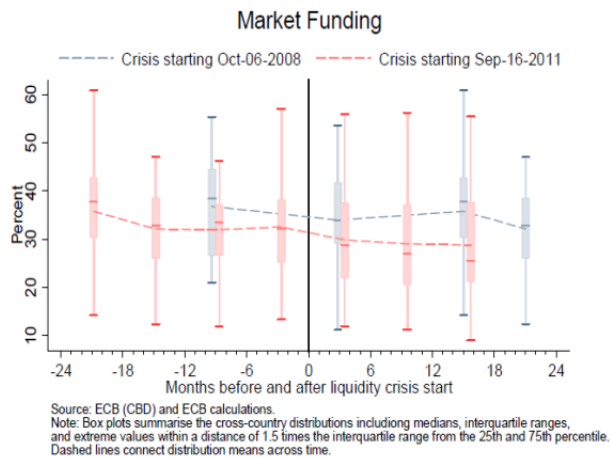


Chart 10

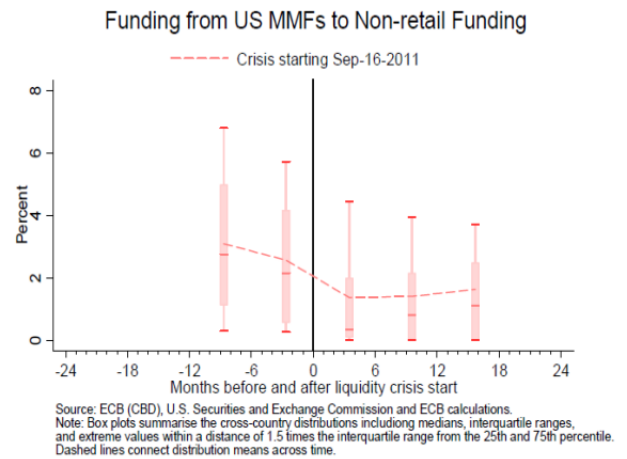


Chart 11

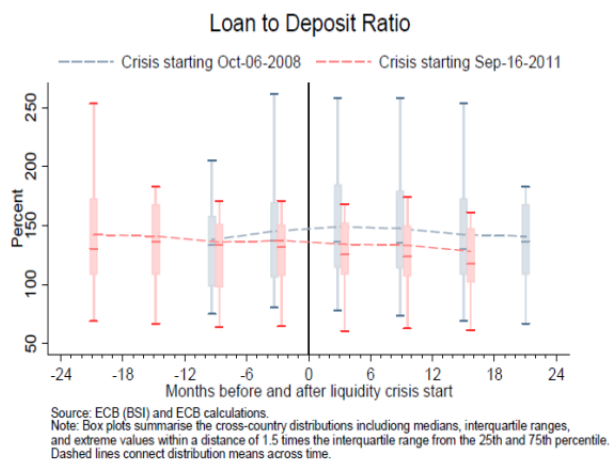
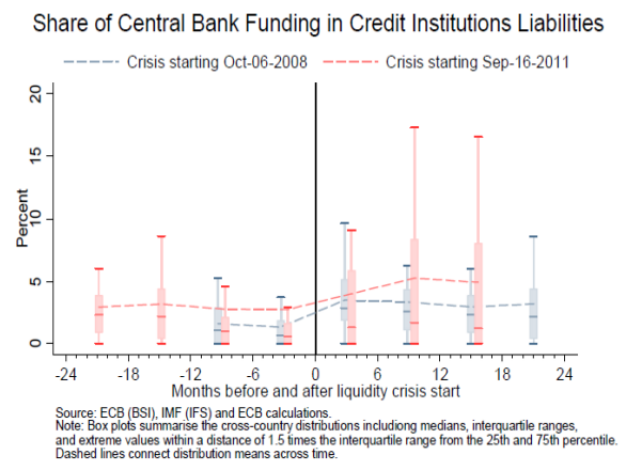


Chart 12



Annex 5.3: Review of evidence on the predictive value of liquidity indicators

For balance sheet data, longer time series are available for some countries. Recent analysis has focused especially on LTD ratios or the development of core funding, and evidence indicates that these measures can predict stress events.

In Italy, the Netherlands and Slovenia, LTD ratios increased in the decade prior to the recent global financial crisis, pointing to the accumulation of funding vulnerabilities in the financial system.²¹⁶ Similar developments were evident in many countries in the run-up to past financial crises, and not only the recent one. Bank of England (2013) and Aikman et al. (2013, Banco de España) provide an overview of different countries and stress episodes (Figure 1). Part of the increase in LTD ratios during the last decade may be related to the strong growth of repo funding, which is usually short term and fragile (Gorton and Metrick (2012)).

Bologna (2013) finds evidence that not only is the LTD ratio a significant factor in predicting bank failures in the United States, but also that it remains significant if tested with a higher number of lags. This seems to confirm the inertia in banks' balance sheets, meaning that focusing on the years immediately preceding the stress event may not reveal the same signal. Bologna (2013) also argues that the relevant policy messages stemming from his findings on the LTD can be extended to the banking stability impacts of the Basel III structural funding regulation.

A high and increasing dependence on wholesale short-term funding can also be observed in New Zealand, with the share of core funding in total funding falling in the years prior to the global financial crisis (Ha and Hodgetts (2011)). This induced the Reserve Bank of New Zealand to introduce a CFR to reduce banks' aggregate rollover risk and strained credit supply (Bloor et al. (2012)) (Figure 2, Ha and Hodgetts (2011); see also Annex 5.1).^{217 218}

Hahm, Shin and Shin (2012) provide empirical evidence showing that measures of non-core liabilities (i.e. liabilities which are not retail deposits) have significant predictive power for currency crises and credit crises. The non-core liability ratio remains significant even when including the credit-to-GDP ratio in the empirical specification, showing its independent prediction power over one of the main indicators of excessive credit growth.

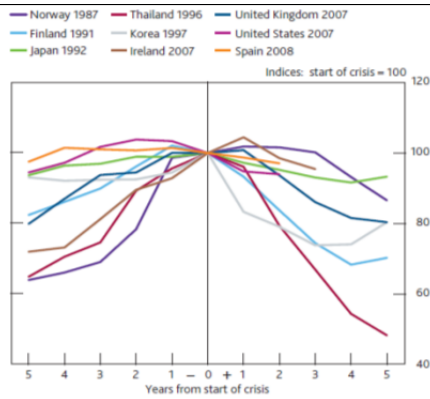
²¹⁶ Evidence based on data from national central banks. Some studies show that retail savings are a clear mitigating factor for liquidity stress and destabilising bank reactions. See, e.g. Cornett et al. (2011) and Loutschina (2011).

²¹⁷ The one-year core funding is defined as all funding with residual maturity longer than one year, and (i) 50% of any tradable debt securities issued by the bank with original maturity of at least two years, and residual maturity (at the reporting date) between six months and one year, (ii) "non-market funding" that can be withdrawn at sight or with residual maturity up to one year, where the percentage to be included decreases with size band, and (iii) Tier 1 capital. See IMF (2013).

²¹⁸ Further, greater reliance on non-core funding may reflect excessive credit growth. Since retail deposits, the main part of banks' core liabilities, grow in line with the aggregate wealth of the private sector and thus are slow moving, the pool of retail deposits is not sufficient to fund the rapid credit expansion in a boom. Other sources of funding, non-core liabilities, must then be tapped to fund the expansion. See IMF (2011).



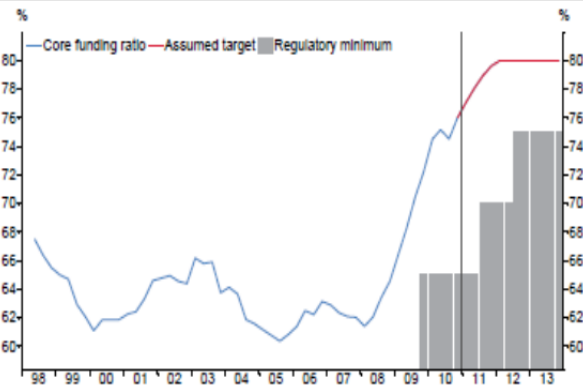
Figure 1: LTD ratios before and after major crises (a) (b)



Sources: World Bank, published accounts and Bank calculations.

- (a) The years beside the country names give the dates of the first year of a banking crisis, based on Reinhart and Rogoff (2009).
(b) The UK measure is major UK banks' customer lending as a percentage of customer funding, where customer refers to all non-bank borrowers and depositors. Where disclosed, repurchase agreements are excluded from loans and deposits. The measure for all other countries is the 'bank credit to bank deposits' series from the World Bank Global Financial Development database. In their measure of credit, the World Bank include the financial resources provided to the private sector by domestic money banks.

Figure 2: The core funding ratio of the banking system in New Zealand



Annex 5.4: Overview of the legal/institutional aspects of liquidity instruments

	Legal basis	Responsible authority	Procedural aspects	Reciprocity
(Time-varying) LCR	Article 458 CRR (in particular Article 458(2)(d), (v)) (national flexibility)	Competent or designated authority	See Chapter 7	Allowed
	Article 104(1)(k) and Article 103 CRD (Pillar 2)	Competent authority	- Notification to EBA - EBA to monitor supervisory practices and issue guidelines	Not expressly provided for
(Time-varying) NSFR	Article 458 CRR (in particular Article 458(2)(d), (v)) (national flexibility)	Competent or designated authority	See Chapter 7	Allowed
	Article 104(1)(k) and Article 103 CRD (Pillar 2)	Competent authority	- Notification to EBA - EBA to monitor supervisory practices and issue guidelines	Not expressly provided for
(Time-varying) LTD and LTSF limits	Outside scope CRD/CRR	National competence	- National competence - Prior notification of ESRB in the case of expected significant cross-border effects - Notification of ESRB/national macro-prudential authorities where reciprocity is needed	National competence
	Article 104(1)(k) and Article 103 CRD (Pillar 2)	Competent authority	- Notification to EBA - EBA to monitor supervisory practices and issue guidelines	Not expressly provided for
General liquidity charge	Article 104(1)(k), Article 103 and Article 105 CRD (Pillar 2)	Competent authority	- Notification to EBA - EBA to monitor supervisory practices and issue guidelines	Not expressly provided for
Liquidity surcharge SII	Article 104(1)(k), Article 103 and Article 105 CRD (Pillar 2)	Competent authority	- Notification to EBA - EBA to monitor supervisory practices and issue guidelines	Not expressly provided for

Annex 7.1: How to construct the proposed indicators for measures under Article 458 CRR

Instrument	Indicator (ratio, level and/or growth rate)	Numerator	Denominator
Large exposures	Large exposures over total credit	Exposures to domestic borrowers exceeding 10% of capital	Total credit to domestic borrowers
	Sectoral exposure over capital	Banks' exposure to a sector of economic activity, e.g. commercial real estate	Bank capital
	Largest exposures to institutions (u.e.) over these institutions' (u.e.) equity	Banks' ten largest exposures to institutions (u.e.), aggregated by institutions (u.e.); then institutions (u.e.) are ranked and the top 10 are kept	Equity of these institutions (u.e.)
Intra-financial exposures	Financial corporate debt over GDP	Financial sector debt	Country's GDP
	Financial corporate debt over GDP of which short term	Short-term financial sector debt	Country's GDP
	Non-bank financial (NBFi) debt to GDP	Non-bank financial sector debt	Country's GDP
	Non-bank financial (NBFi) debt to GDP of which short term	Short-term non-bank financial sector debt	Country's GDP
	Activities in shadow banking sector	Issuance of securitized products (e.g. ABS, CDO and of other SBS products (e.g. synthetic ETF) and AuM of certain SBS entities (e.g. MMF and credit HF).	
	Banking sector size over domestic GDP broken into domestic banks versus foreign branches/subsidiaries (by country)	Banks' total assets (domestic banks/foreign subsidiaries)	Country's GDP
	OFI and MMFs assets under management over EU GDP (by country)	OFI + MMFs assets under management	EU GDP
	Intra-financial activity over banks' total banking book	Intra-financial exposures	Banks' total banking book
	Intra-financial activity over banks' total assets	Intra-financial exposures	Banks' total assets
	Intra-financial sector activity: Interbank lending	Loans to credit institutions	
	Intra-financial sector activity: Interbank borrowing	Deposits from credit institutions and debt securities	
	Intra-financial sector activity: Repo-style transactions	Reverse repurchase loans	
	Intra-financial sector activity: OTC derivatives	OTC derivatives	
	Intra-financial sector activity: Derivatives (notional amount)	Derivatives	
	Largest exposures to financial sector entities over the same entities' highest quality capital	Exposures to financial sector entities	CET1 capital
	Funding gap or Loan-to-deposit ratio (KRI 34)	Customers' loans and advances held for trading, designated at fair value through profit or loss, AFS, Loans and receivables, HTM	Customers' deposits other than from credit institutions and other forms of retail fundraising (such as retail bonds), held for trading, designated at fair value through profit or loss, measured at amortised cost.

(*) This approach consolidates data of resident financial institutions with those of their branches and subsidiaries (if any) resident in the domestic economy.

(**) This approach consolidates data of domestically controlled and incorporated financial institutions with their branches (domestic and foreign) and subsidiaries (domestic and foreign).

Notes: u.e. refers to unregulated entities; ABS refers to asset-backed securities; CDO refers to collateralised debt obligations; SBS refers to shadow banking sector, ETF refers to exchange-traded fund; AUM refers to assets under management; HF refers to hedge-fund; OFI refers to other financial intermediary; KRI refers to key risk indicator; AFS refers to available for sale; and HTM refers to held to maturity.



Annex 8.1: Key economic and legal features of macro-prudential instruments²¹⁹

Table 1: Key features of instruments aimed at mitigating and preventing excessive general credit growth and leverage

<i>Instrument</i>	<i>CCB (Article 130, 135-140 CRD)</i>	<i>SRB (Articles 133-134 CRD)</i>	<i>Own funds (Article 458 CRR)</i>	<i>Conserv. buffer (Article 458 CRR)</i>	<i>Leverage ratio (national law)</i>
Nature of systemic risk	Cyclical	Structural	Cyclical or structural	Cyclical or structural	Cyclical or structural
Target population	All	All or subset	All or subset	All or subset	All or subset
Scope of application: all or subset of exposures	All domestic and/or third-country exposures	All exposures (within and/or outside Member State) ²²⁰	All or subset of exposures	All or subset of exposures	All or subset of exposures
Caps on restrictions or requirements (proportionality)	No caps	Max 5% of RWA ²²¹	No caps	No caps	No caps
Reciprocity (limiting regulatory arbitrage)	Mandatory (up to 2.5% of RWA), then voluntary	Voluntary	Voluntary	Voluntary	Voluntary
Transparency (fostering market discipline)	High	High	Low	High	High
Legal/ procedural requirements	Low	Level dependent	Low	High	Low

²¹⁹ The tables in this annex omit the use of Pillar 2 for macro-prudential purposes. The instruments available under Pillar 2 are numerous and can be applied in a flexible way, including to targeted exposures or assets (Chapter 6).

²²⁰ The CRD does not specify whether an SRB can be applied to a sectoral subset of exposures.

²²¹ Member States can impose a higher SRB with prior authorisation from the European Council.



Table 2*: **Key features of instruments aimed at mitigating and preventing excessive sectoral credit growth and leverage**

<i>Instrument</i>	<i>Sectoral capital requirements (Article 124 CRR for real estate or Article 458 CRR)</i>	<i>Sectoral LGD floors (Article 164 for real estate or Article 458 CRR)</i>	<i>Sectoral LTV (national law)</i>	<i>Sectoral LTI or DSTI (national law)</i>
Nature of systemic risk	Cyclical or structural	Cyclical or structural	Cyclical or structural	Cyclical or structural
Target population	All (Article 124); all or subset (Article 458)	All	All (Borrowers)	All (Borrowers)
Scope of application: all or subset of exposures	All or subset of domestic real estate exposures under SA (Article 124); all or subset of domestic real estate or intra-financial exposures (Article 458)	All or subset of domestic retail real estate exposures under IRB	All or subset of domestic real estate exposures	All or subset of domestic real estate exposures
Caps on restrictions or requirements (proportionality)	Up to 150% (Article 124) Over 150% (Article 458)	No caps	No caps	No caps
Reciprocity (limiting regulatory arbitrage)	Mandatory (Article 124) Voluntary (Article 458)	Mandatory	Voluntary	Voluntary
Transparency (fostering market discipline)	Medium	Medium	High	High
Legal/procedural requirements	Medium for Article 124 and high for Article 458 CRR.	Low	Low	Low

Table 3: Key features of instruments aimed at mitigating and preventing excessive maturity mismatch and market illiquidity

<i>Instrument</i>	<i>Liquidity buffers (Article 458 CRR)</i>	<i>NSFR (Article 458 CRR)</i>	<i>Other stable funding (national law)</i>	<i>Liquidity charges (Article 105 CRD)</i>	<i>LTD (Article 103 CRD)</i>
Nature of systemic risk	Cyclical or structural	Cyclical or structural	Cyclical or structural	Cyclical or structural	Cyclical or structural
Target population	All or subset	All or subset	All or subset	All or subset	All or subset
Scope of application: all or subset of exposures	All assets and liabilities	All assets and liabilities	All or subset of assets and liabilities	All assets and liabilities	All assets and liabilities
Caps on restrictions or requirements (proportionality)	No	No	No	No	No
Reciprocity (limiting regulatory arbitrage)	Voluntary	Voluntary	Voluntary	Voluntary	Voluntary
Transparency (fostering market discipline)	High	High	High	High	High
Legal/procedural requirements	High	High	Low	Low	Low

Table 4: Key features of instruments aimed at limiting direct and indirect exposure concentrations

<i>Instrument</i>	<i>SRB (Articles 133-134 CRD)</i>	<i>Large exp. reqs. (Article 458 CRR)</i>	<i>Own funds (Article 458 CRR)</i>	<i>Measures for intra-fin. sector exps. (Article 458 CRR)</i>
Nature of systemic risk	Structural	Structural	Cyclical or Structural	Cyclical or Structural
Target population	All or subset	All or subset	All or subset	All or subset
Scope of application: all or subset of exposures	All exposures (within and/or outside Member State) ²²²	All or subset of exposures to individual or group of connected clients	All or subset of exposures	All or subset of intra-financial exposures
Caps on restrictions or requirements (proportionality)	Max 5% of RWA ²²³	Max 15% below restriction in Art 395 CRR.	No caps	No caps
Reciprocity (limiting regulatory arbitrage)	Voluntary	Voluntary	Voluntary	Voluntary
Transparency (fostering market discipline)	High	Medium	Low	Medium/Low
Legal/procedural requirements	Level dependent	High	Low	Low

²²² The CRD does not specify whether an SRB can be applied to a sectoral subset of exposures.

²²³ Member States can impose a higher SRB with prior authorisation from the European Council.

Table 5: Key features of instruments aimed at limiting the systemic impact of misaligned incentives with a view to reducing moral hazard

<i>Instrument</i>	<i>G-SII buffer (Article 131 CRD)</i>	<i>O-SII buffer (Article 131 CRD)</i>	<i>SRB (Articles 133-134 CRD)</i>	<i>Own funds (Article 458 CRR)</i>
Nature of systemic risk	Structural	Structural	Structural	Cyclical or Structural
Target population	Individual (G-SIIs)	Individual (O-SIIs)	All or subset	All or subset
Scope of application: all or subset of exposures	All exposures	All exposures	All exposures (within and/or outside Member State) ²²⁴	All or subset of exposures
Caps on restrictions or requirements (proportionality)	Max 3.5% of RWA	Max 2% of RWA	Max 5% of RWA ²²⁵	No caps
Reciprocity (limiting regulatory arbitrage)	Voluntary	Voluntary	Voluntary	Voluntary
Transparency (fostering market discipline)	High	High	High	Low
Legal/procedural requirements	Low	Medium (EBA guidance)	Level dependent	Low

²²⁴ The CRD does not specify whether an SRB can be applied to a sectoral subset of exposures.

²²⁵ Member States can impose a higher SRB with prior authorisation from the European Council.

Annex 9.1: Theoretical background on rules vs. discretion

Both the risk assessment and decisions on macro-prudential instruments can be based on rules or on discretion, or a combination of both (guided discretion). When relying on rules, a (mechanical) rule indicates when to activate an instrument and how to set its level. When discretion guides the decisions, the authority bases its actions on subjective assessment and qualitative criteria. Both a rules-based approach and a discretion-based approach have their advantages and drawbacks (the arguments are summarised in the table below).

When macro-prudential policy is based on rules, the policy can be made consistent, credible, accountable, as well as transparent and communicable to the public *ex ante*. Since the success of a policy intervention and the rationale for doing so are arguably difficult to assess even *ex post* (CGFS (2010)), a transparent and accountable rules-based element in macro-prudential policy-making appears attractive. Furthermore, a clear rule-based approach can act to control the exercise of discretion and thus limit potential inaction bias). A policy rule can be built on economic theory and empirical evidence, and allow for a high degree of predictability. Predictability reduces uncertainty for market participants and thereby costs. The macro-prudential authority can use a rules-based approach to build up a positive reputation.

Literature on monetary policy such as Kydland and Prescott (1977) points out that rules-based policy can help to overcome the time inconsistency of discretionary monetary policy when policy-makers are faced with the short-term costs and long-term benefits of policy action. In a similar vein, the main reason for introducing an element of rules in macro-prudential policy-making would be to mitigate possible inaction bias arising from such a discrepancy between short-term costs and long-term gains. Borio (2010) states that the advantage of having rules is that case-by-case decisions and justifications are not needed. An argument in favour of a rules-based approach by Kowalik (2011) in his analysis of countercyclical capital requirements is that an authority would not be able to follow secondary goals (such as fostering short-term growth) when relying on rules.

Rules-based policies can be distinguished between “instrument rules” on the one hand and “target rules” on the other. The application of instruments under **instrument rules** is guided by indicators in a purely mechanical manner, thereby being relatively inflexible. **Target rules** are geared to an intermediate objective and therefore allow different instruments to be applied. In general, however, rules are inflexible whereas discretion allows policy-makers to react faster and in a more targeted way to changing circumstances.

Given the lack of knowledge about indicators and the transmission mechanism of macro-prudential instruments at this early stage, flexibility would appear to be important as it allows policy-makers to develop knowledge further and react to the effects of policy over time. Discretionary policy also allows policy-makers to take qualitative information into account, e.g. market and supervisory intelligence.

Macro-prudential policy based on rules/indicators may be subject to the Lucas critique as the data-generating process can change after a policy change. Thus, a variable can no longer serve as a reliable indicator for the underlying risks once it is targeted under regulation, thereby losing its information content (Bank of England (2013), see also Goodhart’s law²²⁶). An example of this might be an instrument that constitutes a cap or a lower bound on a variable (e.g. an LTV cap or minimum requirements for liquid assets), which would then truncate the distribution of the variable. Moreover, the behaviour of market participants may be influenced by other policy areas, such as fiscal policy or sector-specific structural policies, for which rules may not provide the optimal response.

²²⁶ “Goodhart’s law” states that when an indicator becomes a policy target, it loses its information value as an indicator.

The macro-prudential authority also has to decide about the scope of the instrument, e.g. whether it is to be applied only to banks or also to non-bank institutes (Borio (2009)). Although this decision will in most cases be made in accordance with the underlying law, the authority may see scope for discretionary judgement.

Table: Advantages and disadvantages of rules vs. discretion

<i>Rules</i>	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Transparent • Predictable • Easy to communicate • Relies on quantitative data • Macro-prudential authority can build up reputation (time consistency) • Eases expectation formation • Rules can act as automatic stabiliser • No need for continual justification or express decisions 	<ul style="list-style-type: none"> • May be hard to design appropriate rules given inherent uncertainty • Rather static concept • Allows no discretion (may only achieve second-best) • Little experience with macro-prudential instruments (new experience may make it difficult to respect the rule) • Data may not be available, or available too late; lack of experience on choosing indicators • Indicators are influenced by policy areas other than macro-prudential policy (e.g. fiscal policy) • Difficult to measure success in achieving the ultimate objectives of macro-prudential policy, including the prevention and mitigation of systemic risks
<i>Discretion</i>	
Advantages	Disadvantages
<ul style="list-style-type: none"> • Flexible tool, can be tailored to current situation • Can rely on qualitative data • Can allow decision-makers to learn from interactions between macro-prudential policy, the financial system and the economy over time • Ensures ability to react to unforeseen consequences 	<ul style="list-style-type: none"> • Subjective judgement, less transparent • Risk of inaction bias • Discretionary policy can be time inconsistent • Can be open to pressure from outside



Annex 10.1: Country experiences in macro-prudential communication

Country	Subject	Content of communication	Form of communication	Timing of communication
Austria	Introduction of net new loan to local stable funding ratio (LLSFR)	<ul style="list-style-type: none"> ▪ Description, scope, level, aim, motivation and transmission of the instrument; reference to underlying empirical analysis ▪ Impact assessment 	<ul style="list-style-type: none"> ▪ Press release ▪ Background notes 	<ul style="list-style-type: none"> ▪ Consultation process with stakeholders ▪ After adoption of decision
	Introduction of capital surcharge for large banking groups	<ul style="list-style-type: none"> ▪ Timing and range of levels of the instrument ▪ Reference to G-SIBs framework 	<ul style="list-style-type: none"> ▪ Press release ▪ Background notes 	<ul style="list-style-type: none"> ▪ Consultation process with stakeholders ▪ After adoption of decision
Denmark	Establishment of Systemic Risk Council and its meetings	<ul style="list-style-type: none"> ▪ Tasks, composition, powers, meeting schedule, rules of procedure ▪ Topics discussed at the meetings 	<ul style="list-style-type: none"> ▪ Website ▪ Press 	<ul style="list-style-type: none"> ▪ After establishment of Council ▪ Following Council meetings
	Recommendation on the phasing-in of capital requirements	<ul style="list-style-type: none"> ▪ Description and motivation 	<ul style="list-style-type: none"> ▪ Press release 	<ul style="list-style-type: none"> ▪ After adoption of recommendation
Netherlands	LTV	<ul style="list-style-type: none"> ▪ Description, scope, level, timing, motivation of the instrument 	<ul style="list-style-type: none"> ▪ Website 	<ul style="list-style-type: none"> ▪ After adoption of decision
Norway	Activation of CCB	<ul style="list-style-type: none"> ▪ Description, scope, aim, motivation and transmission of the instrument ▪ Governance of the CCB framework ▪ Reference to four key indicators and potential additional indicators for the build-up phase ▪ Reference to potential release indicators ▪ Reference to methodology and performance of the indicators ▪ Interaction of CCB with monetary policy and other capital requirements 	<ul style="list-style-type: none"> ▪ Press release ▪ Speeches ▪ Background papers 	<ul style="list-style-type: none"> ▪ Before activation
Sweden	Introduction of capital surcharge for large banking groups	<ul style="list-style-type: none"> ▪ Description, scope, level, timing, aim, motivation and transmission of the instrument 	<ul style="list-style-type: none"> ▪ Press release ▪ Press conference ▪ Background note ▪ Q&A 	<ul style="list-style-type: none"> ▪ After adoption of decision
	Introduction of mortgage cap (LTV)	<ul style="list-style-type: none"> ▪ Description, scope, level, timing, aim, motivation and transmission of the instrument ▪ Ex post impact assessments of the measure 	<ul style="list-style-type: none"> ▪ Press release ▪ Press conference ▪ Background notes 	<ul style="list-style-type: none"> ▪ After adoption of decision



	Introduction/increase of RW floor on mortgages	<ul style="list-style-type: none"> ▪ Description, scope, level, aim, motivation and transmission of the instrument 	<ul style="list-style-type: none"> ▪ Regular risk assessments ▪ Press release ▪ Website ▪ Background notes ▪ Regular risk assessments ▪ Financial stability report ▪ Meeting minutes 	<ul style="list-style-type: none"> ▪ Before activation ▪ Consultation with stakeholders ▪ After adoption of decision
	Introduction and disclosure of (currency-specific) LCR	<ul style="list-style-type: none"> ▪ Description, scope, level, timing, aim, motivation and transmission of the instrument 	<ul style="list-style-type: none"> ▪ Website ▪ Regulatory proposal ▪ Background note ▪ Financial stability report ▪ Meeting minutes 	<ul style="list-style-type: none"> ▪ Before activation ▪ Consultation with stakeholders ▪ After adoption of decision
Switzerland	No activation of CCB	<ul style="list-style-type: none"> ▪ Motivation ▪ Period for which no activation was expected 	<ul style="list-style-type: none"> ▪ Press release 	<ul style="list-style-type: none"> ▪ After adoption of decision
	Introduction and activation of sectoral CCB	<ul style="list-style-type: none"> ▪ Description, scope, level, timing, aim, motivation and transmission of the instrument ▪ Governance of the sectoral CCB framework ▪ Reference to key indicators and additional indicators for the build-up ▪ Broad reference to release indicators ▪ Broad reference to methodology and performance of the indicators 	<ul style="list-style-type: none"> ▪ Press release ▪ Extract of SNB proposal to Federal Council for CCB activation ▪ Background note ▪ FAQ 	<ul style="list-style-type: none"> ▪ After adoption of decision
United Kingdom	Establishment and functioning of Financial Policy Committee (FPC)	<ul style="list-style-type: none"> ▪ Objectives of macro-prudential policy ▪ FPC mission, composition, governance, powers and instruments ▪ Description, aim, transmission and broad list of indicators for CCB and sectoral capital requirements ▪ Outline of FPC's assessment on the outlook of systemic risk relevant to the UK and advised policy actions/responses 	<ul style="list-style-type: none"> ▪ Policy statement ▪ Meeting record ▪ Discussion papers ▪ Financial stability report ▪ News releases ▪ Press conferences ▪ Speeches 	<ul style="list-style-type: none"> ▪ After establishment of FPC ▪ Regular communication (after meetings and ad hoc)

Annex A: Instruments Working Group Members

Aerdts Houben	De Nederlandsche Bank (Chair)
David Liebeg	Oesterreichische Nationalbank
Sergio Materazzi	Finanzmarktaufsicht
Stijn Ferrari	Nationale Bank van België/Banque Nationale de Belgique
Elisaveta Pravova	Българска народна банка (Bulgarian National Bank)
Sashka Asparouhova	Bulgarian Financial Supervision Commission
Joseph Theodorou	Central Bank of Cyprus
Zlataše Komárková	Česká národní banka
Jakub Seidler	Česká národní banka
Alexander Schulz	Deutsche Bundesbank
Benjamin Nink	Bundesanstalt für Finanzdienstleistungsaufsicht
Mads Peter Pilskær Harmsen	Danmarks Nationalbank
Emilio Hellmers	Finanstilsynet
Aurore Schilte	European Banking Authority
Juan Zschiesche Sánchez	European Insurance and Occupational Pensions Authority
Jean-Baptiste Haquin	European Securities and Markets Authority
Balazs Zsamboki	European Central Bank
Andreas Strohm	European Commission (DG MARKT)
Alienor Margerit	European Commission (DG ECFIN)
Ulla Tischler	Eesti Pank
Christian Castro	Banco de España
Elena Rodriguez De Codes	Banco de España
Jouni Timonen	Suomen Pankki – Finlands Bank
Juha Savela	Finanssivalvonta
Taryk Bennani	Banque de France
Anne-Laure Kaminski	Autorité de contrôle prudentiel et de résolution
Nikolaos Stavrianou	Bank of Greece

Mirna Dumcic	Hrvatska narodna banka
Anikó Szombati	Magyar Nemzeti Bank
Ólafur Ólafsson	Central Bank of Ireland
Niamh Hallissey	Central Bank of Ireland
Silvia Vori	Banca d'Italia
Giuseppe Napoletano	Banca d'Italia
Vaidotas Tamulėnas	Lietuvos bankas
Jean-Baptiste Gossé	Banque centrale du Luxembourg
Dace Antuža	Latvijas Banka
Velga Vilne	Financial and Capital Market Commission of the Republic of Latvia
Graziella Gatt	Central Bank of Malta
Peter Wierds	De Nederlandsche Bank
Olga Szczepanska-Maciejuk	Narodowy Bank Polski
Fátima Silva	Banco de Portugal
Diana Bonfim	Banco de Portugal
Hugo Sousa	Instituto de Seguros de Portugal
Bogdan Moinescu	Banca Națională a României
Christina Nord Berntsson	Sveriges Riksbank
Matilda Gjirja	Finansinspektionen
Andreja Bandelj	Banka Slovenije
Stefan Rychtarik	Národná banka Slovenska
Julia Giese	Bank of England
Anna Jernova	Prudential Regulation Authority
Francesco Mazzaferro	European Systemic Risk Board
Andrea Maechler	European Systemic Risk Board
Evangelia Rentzou	European Systemic Risk Board (Secretary)
Timo Kosenko	European Systemic Risk Board
Hans Borchgrevink	Norges Bank (Observer)

References

Chapter 1

Borio, C. and Drehmann, M. (2009), "Assessing the risk of banking crises – revisited", *BIS Quarterly Review*, Bank for International Settlements, March.

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

Enoch, C. and Ötcher-Robe, I. (2007), "*Rapid Credit Growth in Central and Eastern Europe: Endless Boom or Early Warning?*", Palgrave Macmillan, New York, p. 373

ESRB (2014). "ESRB Flagship Report on Macro-prudential Policy in the Banking Sector", January.

Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012. OJ L 176, 27.6.2013, p. 1

Reinhart, C.M. and Rogoff, K.S. (2009), "*This Time is Different: Eight Centuries of Financial Folly*", Princeton University Press, Princeton, New Jersey.

Chapter 2

Alessi, L. and Detken, C. (2011), "Quasi-real time early warning indicators for costly asset price boom/bust cycles: A role for global liquidity", *European Journal of Political Economy*, 27(3), September, pp. 520-533.

Alessi, L. and Detken, C. (2013), "A Random Forest Trigger for Countercyclical Capital Buffers", European Central Bank, mimeo.

Bank of England (2013), "The Financial Policy Committee's powers to supplement capital requirements: A Draft Policy Statement", Bank of England, January.

Basel Committee on Banking Supervision (2010), "Guidance for national authorities operating the countercyclical capital buffer", December.

Barrell R., Davis, E.P., Liadze, I. and Karim, D. (2010), "Does the Current Account Balance Help to Predict Banking Crises in OECD Countries?", NIESR and Brunel University, mimeo.

Behn, M., Detken, C., Peltonen, T. and Schudel, W. (2013), "Setting countercyclical capital buffers based on early warning models: Would it work?", *ECB Working Paper Series*, No 1604, European Central Bank, Frankfurt am Main.

Berge, T.J. and Jordà, Á. (2011), "Evaluating the classification of economic activity into recessions and expansions", *American Economic Journal: Macroeconomics*, 3(2), pp. 246-277.

Borio, C. and Drehmann, M. (2009), "Assessing the risk of banking crises – revisited", *BIS Quarterly Review*, March, pp. 29-46.

Borio, C. and Lowe, P. (2002), "Assessing the risk of banking crises", *BIS Quarterly Review*, December, pp. 43-54.

Candelon, B., Dumitrescu, E.-I. and Hurlin, C. (2012), "How to Evaluate an Early-Warning System: Toward a Unified Statistical Framework for Assessing Financial Crises Forecasting Methods", *IMF Economic Review*, 60(1), pp. 75-113.

Committee on the Global Financial System (2012), "Operationalising the selection and application of macro-prudential instruments", *CGFS Papers*, No. 48, December.

Davis, E.P. and Karim, D. (2008), "Could Early Warning Systems Have Helped to Predict the Sub-Prime Crisis", *National Institute Economic Review*, 206(1), October, pp. 35-47.

Demirgüç-Kunt, A. and Detragiache, E. (1999), "Monitoring banking sector fragility: A multivariate logit approach with an application to the 1996-97 banking crises", *World Bank Policy Research Working Paper*, No 2085.

Drehmann, M., Borio, C., Gambacorta, L. Jiménez, G. and Trucharte, C. (2010), "Countercyclical capital buffers: exploring options," *BIS Working Papers*, July, No 317.

Drehmann, M., Borio, C. and Tsatsaronis, K. (2011), "Anchoring Countercyclical Capital Buffers: The Role of Credit Aggregates", *International Journal of Central Banking*, 7(4), December, pp. 189-240.

Drehmann, M. and Juselius, M. (2012), "Do debt service costs affect macroeconomic and financial stability?", *BIS Quarterly Review*, September, pp. 21-35.

Drehmann, M. and Juselius, M. (2013), "Evaluating early warning indicators of banking crises: Satisfying policy requirements", *BIS Working Papers*, No 421, August.

Edge, R.M. and Meisenzahl, R.R. (2011), "The Unreliability of Credit-to-GDP Ratio Gaps in Real Time: Implications for Countercyclical Capital Buffers", *International Journal of Central Banking*, 7(4), December, pp. 261-298.

Fisher, I. (1933), "The Debt-Deflation Theory of Great Depressions," *Econometrica*, 1(4), pp. 337-357.

Hanley, J.A. and McNeil, B.J. (1982), "The Meaning and Use of the Area under a Receiver Operating Characteristic (ROC) Curve", *Radiology*, 143(1), pp. 29-36, April.

Hanley, J.A. and McNeil, B.J. (1983), "A Method of Comparing the Areas under Receiver Operating Characteristic Curves Derived from the same Cases", *Radiology*, 148(3), pp. 839-843, September.

Hardy, D.C. and Pazarbasioglu, C. (1998), "Leading Indicators of Banking Crises; Was Asia Different?", *IMF Working Paper*, No 98/91, June.

Ingves, S. (2011), "Challenges for the design and conduct of macro-prudential policy", *BIS Papers*, No 60.

Jordà, Ò. (2011), "Discussion of "Anchoring countercyclical capital buffers: the role of credit aggregates", *International Journal of Central Banking*, 7(4), pp. 241-259.

Kaminsky, G.L. and Reinhart, C.M. (1999), "The twin crises: The Causes of Banking and Balance-of-Payments Problems", *American Economic Review*, 89(3), pp. 473-500.

Kiyotaki, N. and J. Moore (1997), "Credit Cycles", *Journal of Political Economy*, University of Chicago Press, 105 (2), pp 211-248, April.

Lund-Jensen, K. (2012), "Monitoring Systemic Risk Based on Dynamic Thresholds", *IMF Working Paper*, 12/159, June.

Modigliani, F. and Miller, M.H. (1958), "The Cost of Capital, Corporation Finance and the Theory of Investment", *American Economic Review*, Vol. 48, pp. 261-297.

Norges Bank (2013), "Criteria for an appropriate countercyclical capital buffer", *Norges Bank Papers*, No. 1 2013.

Swiss National Bank (2012), "Implementing the Countercyclical Capital Buffer in Switzerland: Concretising the Swiss National Bank's Role", Fact Sheet, June 2012.

van Norden, S. (2011), "Discussion of "The Unreliability of Credit-to-GDP Ratio Gaps in Real Time: Implications for Countercyclical Capital Buffers", *International Journal on Central Banking*, 7(4), pp. 299-303.

Chapter 3

Agur, I. and Sharma, S. (2013), "Rules, Discretion, and MacroPrudential policy", *IMF Working Paper*, No WP/13/65, March.

Ahuja, A. and Nabar, M. (2011). "Safeguarding Banks and Containing Property Booms: Cross-Country Evidence on Macroprudential Policies and Lessons from Hong Kong SAR", *IMF Working Paper*, No WP/11/284, December.

- Almeida, H, Murillo, C. and Liu, C. (2006), “The Financial Accelerator: Evidence from International Housing Markets”, *Review of Finance*, No 10, pp. 321-352.
- Arregui, N., Beneš, J., Krznar, I., Mitra, S. and Oliveira Santos, A. (2013), “Evaluating the Net Benefits of Macroprudential Policy: A Cookbook”; *IMF Working Paper Series*, No WP/13/167.
- Banca d’Italia (2013), “Financial Stability Report”, No 5, April.
- Bank of England (2009), “The role of macro-prudential policy”, Discussion Paper.
- Bank of England (2013), “The Financial Policy Committee’s powers to supplement capital requirements, a draft policy statement”.
- Barrell, R, Davis, E.P., Karim, D. and Liadze, I. (2009), “Bank regulation, property prices and early warning systems for banking crises in OECD countries”, *NIESR Discussion Paper*, No 330.
- Basel Committee on Banking Supervision (2010), “Guidance for national authorities operating the countercyclical capital buffer”, December.
- Beau D., Clerc. L. and Mojon B. (2012), “Macro-prudential policy and the conduct of monetary policy”; *Working Paper*, Banque de France, No 390.
- Beck, T, Büyükkarabacak, B., Rijoa, F. and Valev, N.T. (2012), “Who gets the credit? And does it matter? Household vs. firm lending across countries”, *BE Journal of Macroeconomics*, Vol. 12(1).
- Benito, A. (2006) “How does the down-payment constraint affect the UK housing market?”, *Working Paper*, Bank of England, No 294, March.
- Bank for International Settlements (2011), “Key issues for the success of macro-prudential policies”, *BIS Papers*, No 60 on Macro-prudential Regulation and Policy, January, pp. 129-135.
- Bank for International Settlements (2013), “Regulatory consistency assessment programme – Analysis of risk-weighted assets for credit risk in the banking book”; July.
- Borio, C. (2010), “Implementing a macro-prudential framework: blending boldness and realism”, keynote address for BIS-HKMA research conference on “Financial stability: towards a macro-prudential approach”, Hong Kong SAR, 5-6 June.
- Borio, C and Drehman, M. (2009), “Assessing the risk of banking crises – revisited”, *BIS Quarterly Review*, March.
- Borio, C. and Shim, I. (2007), “What can (macro-)prudential policy do to support monetary policy?”, *BIS Working Paper*, No 242.
- Büyükkarabacak, B, and Valev, N.T. (2010), “The role of household and business credit in banking crises”, *Journal of Banking and Finance*, Vol. 34(6), pp. 1247-1256.
- Claessens, S, Kose, M.A. and Terrones, M.E. (2011a), “Financial cycles: What? How? When?”, *IMF Working Paper*, WP/11/76.
- Claessens, S, Kose, M.A. and Terrones, M.E. (2011b), “How do business and financial cycles interact?”, *IMF Working Paper*, WP/11/88.
- Committee on the Global Financial System (2010), “Macro-prudential instruments and frameworks: a stocktaking of issues and experience”, *CGFS Paper*, No 38.
- Committee on the Global Financial System (2012), “Operationalising the selection and application of macro-prudential instruments”, *CGFS Paper*, No 48.
- Craig, R.S. and Hua, C. (2011). “Effectiveness of policies in restraining property prices: lessons from Hong Kong”, BOK-IMF Workshop “Managing real estate booms and busts”.
- Crowe, C, Dell’Ariccia, G., Igan D. and Rabanal, P. (2011), “How to deal with real estate booms: lessons from country experience”, *IMF Working Paper*, WP/11/91.

- Davis, E.P., Fic, T.M. and Karim, D. (2011), “Housing market dynamics and macro-prudential tools”, *Brunel University Working Paper*, No 11-07, May.
- Dell’Ariccia, G., Igan, D. Laeven, L. and Tong, H. with Bakker, B. and Vandenbussche, J. (2012), “Policies for macrofinancial stability: how to deal with credit booms”, *IMF Staff Discussion Note*, SDN 12/06, June.
- Drehmann, M, Borio, C., Gambacorta, L., Jiménez, G. and Trucharte, C. (2010), “Countercyclical capital buffers: exploring options”, *BIS Working Paper*, No 317.
- Drehmann, M, Borio, C. and Tsatsaronis, K. (2011), “Anchoring countercyclical capital buffers: the role of credit aggregates”, *International Journal of Central Banking*, Vol. 7, No 4.
- Drehmann, M and Juselius, M. (2012), “Do debt service costs affect macroeconomic and financial stability?”, *BIS Quarterly Review*, September.
- Duca, J.V., Muellbauer, J. and Murphy, A. (2011), “House prices and credit constraints: making sense of the US experience”, *The Economic Journal*, Vol. 121, pp. 533-551.
- European Banking Authority (2013a), “Interim results of the EBA review of the consistency of risk-weighted assets – top-down assessment of the banking book”, February.
- European Banking Authority (2013b), “Interim results update of the EBA review of the consistency of risk-weighted assets – low default portfolio analysis”, August.
- European Banking Authority (2013c), “Opinion of the European Banking Authority on good practices for responsible mortgage lending”, June.
- European Central Bank (2012), “Report on the first two years of the macro-prudential research network”, October.
- European Central Bank (2013a), “Exploring the nexus between macro-prudential policies and monetary policy measures”, ECB Financial Stability Review, special feature A, May, pp. 99-111.
- European Central Bank (2013b), “Evaluating differences in banks’ credit risk weights”, ECB Financial Stability Review, Box 4, May, pp. 53-55.
- European Commission (2011), “Proposal for a Directive of the European Parliament and of the Council on credit agreements relating to residential property”, COM(2011) 142 final.
- European Systemic Risk Board (2013b), “Recommendation on intermediate objectives and instruments of macro-prudential policy”, 4 April (ESRB/2013/1) + annex.
- Finansinspektionen (2013), “The Swedish mortgage market 2013”, retrieved from http://www.fi.se/upload/43_Utredningar/20_Rapporter/2013/bolan_2013eng_2.pdf.
- Galati, G. and Moessner, R. (2011), “Macro-prudential policy: a literature review”, *BIS Working Paper*, No 337.
- Giese, J., Andersen, H., Bush, O., Castro, C., Farag, M. and Kapadia, S. (2013), “The credit-to-GDP gap and complementary indicators for macro-prudential policy: evidence from the UK”, *International Journal of Finance and Economics*, forthcoming.
- High-level Expert Group on reforming the structure of the EU banking sector (2012), final report (“Liikanen Report”), October.
- Honohan, P (1997), “Banking system failures in developing and transition countries: diagnosis and prediction”, *BIS Working Paper*, No 39.
- Igan, D. and Kang, H. (2011), “Do loan-to-value and debt-to-income limits work? Evidence from Korea”, *IMF Working Paper*, WP/11/297.
- International Monetary Fund (2011), “Housing finance and financial stability – back to basics?”, *Global Financial Stability Report*, Chapter 3, April.
- International Monetary Fund (2012), “The interaction of monetary and macro-prudential policies – background paper”, 27 December.
- International Monetary Fund (2013a), “Key aspects of macro-prudential policy”, SM/13/145; June.

International Monetary Fund (2013b), “Key aspects of macro-prudential policy – background paper”, SM/13/145 – Sup. 1, June.

International Monetary Fund (2013c), “The interaction of monetary and macro-prudential policies”, *IMF Policy Paper*, January.

International Monetary Fund (2013d), “The interaction of monetary and macro-prudential policies – background paper”, *IMF Policy Paper*, January.

International Monetary Fund (2013e), “Evaluating the net benefits of macro-prudential policy: a cookbook”.

Isaksen, J., Kramp, P.L., Sørensen, L.F. and Sørensen, S. (2011), “Household balance sheets and debt – an international country study”. *Danmarks Nationalbank Monetary Review*, 4th Quarter 2011, pp. 47-58.

Kiyotaki, N and Moore, J. (1997), “Credit cycles”, *Journal of Political Economy*, University of Chicago Press, Vol. 105(2), April, pp. 211-248.

Koo, R (2008), “*The holy grail of macroeconomics: lessons from Japan’s great recession*”, Wiley.

Kuttner, K.N. and Shim, I. (2013), “Can non-interest rate policies stabilize housing markets? Evidence from a panel of 57 economies”, *BIS Working Paper*, No 433, November.

Kydland, F.E. and Prescott, E.C. (1977), “Rules rather than discretion: the inconsistency of optimal plans”, *Journal of Political Economy*, Vol. 85. pp. 473-492.

Lamont, O. and Stein, J.C. (1999). “Leverage and house-price dynamics in U.S. cities”, *RAND Journal of Economics*, Autumn (Vol. 30(3), pp. 498-514.

Lee, K.L. (2013), “The operation of macro-prudential policy measures: the case of Korea in the 2000s”, *BOK Working Paper*, No 2013.

Maddalonia, A. and Peydró, J.L. (2013). “Monetary policy, macro-prudential policy, and banking stability: evidence from the Euro Area”. *International Journal of Central Banking*, Vol. 9.1, pp. 121-169.

Mendoza, E and Terrones, M. (2008), “An anatomy of credit booms: evidence from macro aggregates and micro data”, *NBER Working Paper*, No 14049.

Mian, A and Sufi, A. (2009), “The consequences of mortgage credit expansion: evidence from the US mortgage default crisis”, *Quarterly Journal of Economics*, No 124, pp. 1449-96.

Mian, A and A. Sufi (2011), “House prices, home equity-based borrowing and the US household leverage crisis”, *American Economic Review*, No 101, pp. 2132–56.

Norges Bank (2013), “Criteria for an appropriate countercyclical capital buffer”, *Norges Bank Papers*, No 1, 2013.

Riiser, M (2005), “House prices, equity prices, investment and credit – what do they tell us about banking crises? A historical analysis based on Norwegian data”, *Norges Bank Economic Bulletin*, May, third quarter, pp. 145-154.

Stein, J., Kashyap, A. and Rajan, R. (2008), “Rethinking capital regulation”, Paper prepared for Federal Reserve Bank of Kansas City Symposium on “Maintaining stability in a changing financial system” on August 21-23.

Swiss National Bank (2013), “Implementing the countercyclical capital buffer in Switzerland: concretising the Swiss National bank’s roles”, February.

Wong, T.C., Fong, T., Li, K.F. and Choi, H. (2011), “Loan-to-value ratio as a macro-prudential tool – Hong Kong’s experience and cross-country evidence” in *Systemic Risk, Basel III, Financial Stability and Regulation 2011*.

Chapter 4

Alves, I. et al. (2013), “The Structure and Resilience of the European Interbank Market”, *ESRB Occasional Paper Series*, No 3, September.

Basel Committee on Banking Supervision (2012), *A framework for dealing with domestic systemically important banks*, October.

Basel Committee on Banking Supervision (2013), *Global systemically important banks: updated assessment methodology and the higher loss absorbency requirements*, July.

Borio, C. and Drehmann, M. (2009), "Towards an operational framework for financial stability: "fuzzy" measurement and its consequences", *BIS Working Paper*, No 284, June.

Claessens, S. et al. (2012), Shadow Banking: Economics and Policy, *IMF Staff Discussion Note*, SDN/12/12, December.

Committee on the Global Financial System (2012), "Operationalising the selection and application of macroprudential instruments", *CGFS Papers*, No 48, December.

De Nederlandsche Bank (2012), *Annual Report 2011*.

European Banking Authority (2013), *Interim results of the EBA review of the consistency of risk-weighted assets – top-down assessment of the banking book*, February.

European Commission (2012), *Green Paper – Shadow Banking*, COM(2012)102 final, March.

European Commission (2013), *Capital Requirements – CRDIV/CRR – Frequently Asked Questions* (MEMO/13/690), July.

Kealhofer, S. and Kurbat, M. (2002), "The default prediction power of the Merton approach, relative to debt ratings and accounting variables", *KMV LLC, mimeo*

Laeven, L. and Valencia, F. (2013), "Systemic Banking Crises Database", *IMF Economic Review*, Vol. 61, No 2, pp. 225-270.

Lo Duca, M. and Peltonen, T. (2011), "Macro-financial vulnerabilities and future financial stress assessing systemic risks and predicting systemic events", *Working Paper Series*, No 1311, ECB, March.

International Monetary Fund (2012), "Austrian authorities supervisory guidance on the strengthening of the sustainability of the business models of large internationally active Austrian banks", *IMF Country Report*, No 12/251.

Ongena, S., Popov, A. and Udell, G. (2012), "When the cat's away the mice will play – does regulation at home affect bank risk taking abroad?", *Working Paper Series*, No 1488, ECB, November.

Skořepa, M. and Seidler, J. (2013), "An additional capital requirement based on the domestic systemic importance of a bank", *Czech National Bank Financial Stability Report 2012-2013*, pp.96-102.

Sveriges Riksbank (2011), *Higher capital requirements for the major Swedish banking groups*, Memorandum, November.

The Committee on Systemically Important Financial Institutions in Denmark (2013), *Systemically important financial institutions in Denmark: Identification, requirements and crisis management*, March.

Vienna Initiative (2013), *CESEE Deleveraging Monitor*, April.

Chapter 5

Aikman, D., Haldane, A.G. and Kapadia, S. (2013), "Operationalising a macroprudential regime: goals, tools and open issues", *Financial Stability Journal*, No 24, Banco de España, May.

Aikman, D., Haldane, A.G. and Nelson, B. (2013), "Curbing the credit cycle", Bank of England mimeo.

Bank of England (2007), *Financial Stability Report*, Issue No 21, April.

Bank of England (2013), *The Financial Policy Committee's powers to supplement capital requirements – A draft Policy Statement*, January. Basel Committee on Banking Supervision (2013), *Basel III: the liquidity coverage ratio and liquidity risk monitoring tools*, January.

Bech, M. and Keister, T. (2012), "On the liquidity coverage ratio and monetary policy implementation", *BIS Quarterly Review*, December.

Bloor, C., Craigie, R. and Munro, A. (2012), "The macroeconomic effects of a stable funding requirement", Reserve Bank of New Zealand, *Discussion Paper Series*, DP2012/05.

Bologna, P. (2013), "Structural funding and bank failures – Does Basel 3 net stable funding ratio target the right problem?", *Journal of Financial Services Research*, September.

- Borio, C. (2012). "The financial cycle and macroeconomics: What have we learnt?", *BIS Working Papers*, No 395, December.
- Borio, C. and Drehmann, M. (2009), "Assessing the risk of banking crises – revisited", *BIS Quarterly Review*, March, pp. 29-46.
- Brunnermeier, M. et al. (2009), "The fundamental principles of financial regulation", *Geneva Reports on the World Economy 11*, June.
- Brunnermeier, M. and Pedersen, L. (2009), "Market liquidity and funding liquidity", *Review of Financial Studies*, Vol. 22(6), pp. 2201-2238, June.
- Brunnermeier, M., Krishnamurthy, A. and Gorton, G. (2013). "Liquidity mismatch measurement", in *Risk Topography: Systemic Risk and Macro Modelling, NBER Chapters*, No 12514.
- Claessens, S., Kose, A. and Terrones, M. (2011), "How do business and financial cycles interact?", *IMF Working Paper*, No 11/88, April.
- Committee on the Global Financial System (2011), "Global liquidity – concept, measurement and policy implications", *CGFS Publications*, No 45, November.
- Committee on the Global Financial System (2012), "Operationalising the selection and application of macroprudential instruments", *CGFS Publications*, No 48, December.
- Cornett, M.M., McNutt, J.J., Strahan, P.E. and Tehranian, H. (2011), "Liquidity risk management and credit supply in the financial crisis", *Journal of Financial Economics*, Vol. 101, Issue 2, August, pp. 297-312.
- Drehmann, M. and Nikolaou, K. (2009), "Funding liquidity risk: definition and measurement", *Working Paper*, No 1024, ECB, March.
- Eickmeier, S., Gambacorta, L. and Hofmann, B. (2013), "Understanding global liquidity", *BIS Working Papers*, No 402, February.
- European Central Bank (2007), *Financial Stability Review*, June.
- European Commission (2013), "Communication from the Commission to the Council and the European Parliament: Shadow Banking – Addressing new sources of risk in the financial sector", COM(2013) 614 final, September.
- Farhi, E. and Tirole, J. (2012), "Collective moral hazard, maturity mismatch, and systemic bailouts", *American Economic Review*, Vol. 102(1), pp. 60-93, February.
- Financial Stability Board (2010), *Reducing the moral hazard posed by systemically important financial institutions*, October.
- Gai, P., Haldane, A. and Kapadia, S. (2011), "Complexity, concentration, and contagion", *Journal of Monetary Economics*, Vol. 58(5), pp. 453-470.
- Gorton, G. and Metrick, A. (2012), "Securitized banking and the run on repo", *Journal of Financial Economics*, Vol. 104, Issue 3, pp. 425-451.
- Ha, Y. and Hodgetts, B. (2011), "Macro-prudential instruments for New Zealand: a preliminary assessment", paper prepared for *Reserve Bank Workshop on Macro-prudential Policy*, RBNZ, March.
- Hahm, J.H., Shin, H.S. and Shin, K. (2012), "Non-core bank liabilities and financial vulnerability", *NBER Working Paper*, No 18428, September.
- International Monetary Fund (2011), *Global Financial Stability Review*, April.
- International Monetary Fund (2013), *Key aspects of macroprudential policy – Background paper*, June 2013.
- JPMorgan (2013), "Asia focus: trends in loan-to-deposit ratios", *Economic Research*, May.
- Loutskina, E. (2011), "The role of securitization in bank liquidity and funding management", *Journal of Financial Economics*, Vol. 100, Issue 3, June, pp. 663-684.
- Lim, C., Columba, F., Costa, A., Kongsamut, P., Otani, A., Saiyid, M., Wezel, T. and Wu, X. (2011), "Macroprudential policy: what instruments and how to use them? Lessons from country experiences", *IMF Working Paper*, WP/III/238, October.

Morris, S., and Shin, H.S. (2008), “Financial regulation in a system context”, *Brookings papers on economic activity*, pp. 229-274.

Perotti, E. and Suarez, J. (2009), “Liquidity risk charges as a macroprudential tool”, *CEPR Policy Insight*, No 40, November.

Perotti, E. and Suarez, J. (2011), “A Pigovian approach to liquidity regulation”, *International Journal of Central Banking*, December.

Quagliariello, M. and Libertucci, M. (2010), “Rules vs. discretion in macroprudential policies”, Vox column, February, available on the Vow website at <http://www.voxeu.org>

Schmitz, S. (2011), “The impact of the Basel III liquidity standards on the implementation of monetary policy”, *Working Paper*, Oesterreichische Nationalbank, May.

Chapter 7

Bank of England (2011), *Instruments of macro-prudential policy – A discussion paper*, December.

Bischof, J. and Daske, H. (2012), “Can supervisory disclosure mitigate bank opaqueness and reduce uncertainties during a financial crisis? Evidence from the EU-wide stress-testing exercises”, Working paper, University of Mannheim, February.

Committee on the Global Financial System (2012), “Operationalising the selection and application of macro-prudential instruments”, *CGFS Publications*, No 48, December.

Ellahie, A. (2012), “Capital market consequences of EU bank stress tests”, Working paper, London Business School, July.

Goldstein, I. and Sapra, H. (2012), *Should Banks’ Stress Test Results be Disclosed? An Analysis of the Costs and Benefits*, April.

International Monetary Fund (2011), “UK: Spillover Report for the 2011 Article IV Consultation and Supplementary Information”, *IMF Country Report*, No 11/225, July.

Macroeconomic Assessment Group (FSB/BCBS) (2010), *Final Report: assessing the macroeconomic impact of the transition to stronger capital and liquidity requirements*, Bank for International Settlements, December.

Nouy, D. (2013), “Banking regulation and supervision in the next 10 years and their unintended consequences”, *Economic and Financial Discussion Notes*, Autorité de contrôle prudentiel, May.

Petrella, G. and Resti, A. (2013), “Supervisors as information producers: Do stress tests reduce bank opaqueness?”, *Journal of Banking and Finance*, Vol. 37, Issue 12, pp 5406-5420.

Schularick, M. and Taylor, A.M. (2012), “Credit booms gone bust: monetary policy, leverage cycles and financial crises, 1870-2008”, *American Economic Review*, Vol. 102, Issue 2, April, pp. 1029-61.

Sowerbutts, R., Zimmerman, P. and Zer, I. (2013), “Banks’ disclosure and financial stability”, *Quarterly Bulletin*, Bank of England, Vol. 53, No 4, pp.326-335.

Tadesse, S. (2006), “Banking Fragility & Disclosure: International Evidence”, *Working Paper*, No 874, William Davidson Institute at the University of Michigan, September.

The Clearing House (TCH) (2012), “Single Counterparty Credit Limits: The Clearing House Industry Study”, July.

Chapter 8

Arregui, N., Beneš, J., Krznar, I., Mitra, S. and Santos, A.O. (2013) “Evaluating the Net Benefits of Macro-prudential Policy: A Cookbook”, *IMF Working Paper*, WP/13/167, July.

Lim, C., Columba, F., Costa, A., Kongsamut, P., Otani, A., Saiyid, M., Wezel, T. and Wu, X. (2011) *Macroprudential Policy: What Instruments and How to Use Them? Lessons from Country Experiences*, *IMF Working Paper*, WP/11/238, October.

Chapter 9

Agur, I. and Sharma, S. (2013), “Rules, discretion, and macro-prudential policy”, *IMF Working Paper*, WP/13/65, March.

Bank of England (2009), *The role of macroprudential policy – A discussion paper*, November.

Bank of England (2013), *The Financial Policy Committee's powers to supplement capital requirements – A draft policy statement*, January.

Basel Committee on Banking Supervision (2010), *Guidance for national authorities operating the countercyclical capital buffer*, December.

Borio, C. and Drehmann, M. (2009), "Assessing the risk of banking crises – revisited", *BIS Quarterly Review*, March, pp. 29-46.

Borio, C. (2010), "Implementing a macroprudential framework: blending boldness and realism", keynote address for the BIS-HKMA research conference on *Financial Stability: Towards a Macroprudential Approach*, Hong Kong SAR, 5-6 July.

Committee on the Global Financial System (2010), Macroprudential instruments and frameworks: a stocktaking of issues and experiences, *CGFS Publications*, No 38, May.

Committee on the Global Financial System (2012), "Operationalising the selection and application of macroprudential instruments", *CGFS Publications*, No 48, December.

Goodhart, C.A.E. (2011), "The macroprudential authority: powers, scope and accountability", *OECD Journal: Financial Market Trends*, Vol. 2011, Issue 2.

Igan, D. and Kang, H. (2011), "Do loan-to-value and debt-to-income limits work? Evidence from Korea", *IMF Working Paper*, WP/11/297.

Kowalik, M. (2011), "Countercyclical capital regulation: Should bank regulators use rules or discretion?", *Federal Reserve Bank of Kansas City Economic Review*, Q2, pp. 63-84.

Kydland, F.E. and Prescott, E.C. (1977), "Rules rather than discretion: The Inconsistency of Optimal Plans", *The Journal of Political Economy*, Vol. 85, Issue 3, June, pp. 473-492.

Lee, J. K. (2013), "The operation of macroprudential policy measures: The case of Korea in the 2000s", in *Dealing with the challenges of macro financial linkages in emerging markets*, *World Bank study collection*, January.

Norges Bank (2013), "Criteria for an appropriate countercyclical capital buffer", *Norges Bank Papers*, No 1, 2013.

Swiss National Bank (2013), *Implementing the countercyclical capital buffer in Switzerland: concretising the Swiss National bank's role*, February.

Chapter 11

Aiyar, S., Calomiris, C. and Wieladek, T. (2013), "Does Macro-Pru leak? Evidence from a UK policy experiment", forthcoming, *Journal of Money, Credit and Banking*.

Aiyar, S., Calomiris, C., Hooley, J., Korniyenko, Y. and Wieladek, T. (2013), "The International Transmission of Bank Capital Requirements: Evidence from the UK", forthcoming, *Journal of Financial Economics*.

Basel Committee on Banking Supervision (2010), *An assessment of the long-term economic impact of stronger capital and liquidity requirements*, August.

Giese, J., Meller, B., Schulz, A. and Söbbecke, E. (2013), "Cross-border Spillovers from Macro-Prudential Policy", mimeo.

Miles, D., Yang, J. and Marcheggiano, G. (2011), "Optimal bank capital", *Discussion Paper*, No 31, Bank of England External MPC Unit, April.