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Using the countercyclical capital buffer to build resilience early in the cycle

Joint ECB/ESRB report on the use of the positive neutral CCyB in the EEA

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Contents

Executive summary

In recent years, a "positive neutral" approach to the setting of the countercyclical capital buffer (CCyB) has gained traction among EEA countries as one way to increase resilience over the financial cycle and enhance financial stability. Since 2017, an increasing number of EEA macroprudential authorities have revised their strategies for setting the CCyB. This has led to a positive buffer rate being set early in the financial cycle when cyclical systemic risks are not yet elevated. Such strategies are often described as "positive neutral CCyB" (PN CCyB) approaches. In the years following its inception in the European macroprudential framework in 2014, the CCyB was used to mitigate cyclical systemic risks linked to the domestic credit cycle, with its accumulation contingent on indicators signalling excessive credit growth. However, at the onset of the COVID-19 pandemic in 2020, the majority of EU Member States had only built up a limited amount of CCyB or maintained it at 0%.[1] As a result, the idea of applying a PN CCyB, as one way to use the CCyB more proactively and increase the availability of releasable macroprudential buffers, gained further popularity. At the time of writing, 17 EEA jurisdictions have implemented such an approach, which ensures that sufficient buffers are available to be released in times of stress, to absorb losses and allow credit institutions to fulfil their key economic functions during downturns.

The concept, taken in a wide sense, has been applied in different ways across the EEA. Most EEA jurisdictions that use the concept have chosen an explicit target rate of between 0.5% and 2% for the CCyB, in an environment where cyclical systemic risks are neither subdued nor elevated. A small number of other member countries use the approach without any reference to a target rate. The use of the CCyB 'in general' to address cyclical systemic risks is well established and the conditions guiding its implementation are commonly understood. By contrast, there is a considerable degree of heterogeneity between EEA jurisdictions regarding the operationalisation of the positive neutral concept.

This report reviews the information available and experience gained to date on implementing a PN CCyB, to promote peer learning and foster a shared understanding of its use. Building on an extensive survey conducted among all ESRB member institutions, this report describes the experiences of jurisdictions having implemented (or considering the implementation of) a PN CCyB as well as the views of those that have not implemented it. This allows for a deeper understanding of different perspectives and identification of potential obstacles to the use of a PN CCyB approach. The report covers several aspects of the implementation strategies adopted by member jurisdictions. This includes looking at the rationale for adopting a PN CCyB approach, or for choosing not to adopt it. The report also considers perceived benefits and costs, implications for setting the CCyB

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1 At the end of 2019 the aggregate CCyB amounted to only 0.3% of RWA in the EU, which is low compared to a combined buffer requirement that amounted to 4.0% of RWA (ESRB 2022).

through the cycle, calibration methods, interactions with other capital instruments, buffer usability and reciprocity considerations.

There can be many different motivations for adopting a PN CCyB approach, often co-existing. They mostly relate to (i) considerations on the need to build up the CCyB in a timely manner (to address lags or uncertainty in the identification of systemic risks but also to ensure that releasable capital buffers are available in the early stages of the financial cycle); (ii) allowing for a more gradual (and therefore less costly) build-up of the buffer; and (iii) increasing the amount of buffers available for release, including for increasing resilience against a wider spectrum of potentially large shocks.

This report crucially finds several elements of commonality in the approaches undertaken by EEA countries in implementing a PN CCyB. These common elements are important in understanding why and how a PN CCyB could be beneficial, notwithstanding country-specific differences which are also covered in this report.

- **First and foremost, there seems to be broad agreement on what a positive neutral approach means and what it is useful for.** A positive neutral rate is not a new buffer, but rather an earlier activation of the CCyB in an environment where cyclical systemic risks are neither subdued nor elevated.

- **Further, in most jurisdictions, the adoption of a PN CCyB approach is not expected to yield higher CCyB requirements at the peak of the cycle, when cyclical systemic risks become elevated.** This is consistent with the objective of building up the CCyB early in the cycle. Such an early activation approach translates only into a more gradual build-up of the buffer in the upward phase of the financial cycle. This implies that activation starts at lower levels of cyclical systemic risk with a further build-up remaining conditional on the evolution of cyclical systemic risk indicators. It is important to note that favourable conditions in the banking sector and macro-financial environment are considered key factors for determining the right timing to activate the PN CCyB.

- **There is also broad consistency in the conditions that would guide authorities' decisions to release the CCyB.** A gradual decline in cyclical systemic risks, reflected in the evolution of cyclical systemic risk indicators, would motivate a reduction of the CCyB rate, while remaining above the PN rate. Conversely, observed or expected significant tightening of bank credit supply and/or materialisation of credit risk are considered the most important conditions to trigger a release of the CCyB below the PN rate.

- **For a majority of jurisdictions, the introduction of a PN CCyB does not need to be offset by a reduction in other capital requirements.** Consistent with the risk-based nature of the CCyB and the objective of increasing resilience in the early stages of the financial cycle, a majority of jurisdictions do not consider it important to offset the introduction of a PN CCyB by reducing other capital requirements. In particular, most countries deem that a capital-neutral implementation could only be justified in specific circumstances, most notably to avoid double-counting of risks.

- **Clear and transparent communication is perceived as a key element in the introduction and use of a PN CCyB approach.** Clear and transparent communication also emerges as a very important element, not only upon the introduction of a revised CCyB strategy but also when releasing the CCyB. Effective and exhaustive communication when introducing a PN CCyB is considered key to fostering acceptance by the banking sector and the public, by ensuring better predictability of the buffer rate. Similarly, it is crucial to have transparent communication on the conditions driving CCyB releases and the subsequent replenishment of the buffer to the positive neutral level. This serves to steer banks' expectations and incentivise them to use the released capital.

The report also describes the challenges and obstacles to implementing a PN CCyB approach as they are perceived by the surveyed authorities, and potential avenues for overcoming them.

- **Potential overlaps with the objective of the Systemic Risk Buffer (SyRB) constitute a source of concern for the majority of authorities that have not adopted a PN CCyB approach.** These overlaps mostly relate to the possible use of both the SyRB and the PN CCyB to increase resilience against exogenous shocks. Some jurisdictions consider the SyRB the most appropriate instrument to achieve this objective. This suggests that drawing a better distinction between the objectives of these two instruments would improve clarity and reduce potential overlaps.

- **Furthermore, some jurisdictions view a lack of clarity in EU legislation as an obstacle to adopting a framework for the use of a PN CCyB rate.** In this context, the majority of countries would welcome a targeted revision of EU legislation to clarify the possible use of the CCyB in a more proactive manner. This would be achieved, most notably, by reducing the prominence of the credit-to-GDP gap and other credit indicators to guide the setting of the CCyB.

- **ESRB member institutions also broadly support the promotion of a more consistent implementation of the CCyB (including its use early in the cycle) in the EU, while maintaining a degree of national discretion to account for national specificities.** Specifically, several countries signal a need to reach a shared understanding of the objectives of a PN CCyB approach, especially concerning the risks it is meant to cover and the implications for the use of the CCyB through the cycle. In this context, most ESRB member institutions support an update of Recommendation ESRB/2014/1,[2] also to provide the authorities that wish to implement a positive neutral approach with a common frame of reference for setting and calibrating the CCyB when cyclical risks are not elevated. It is beneficial to foster the consistent implementation of the CCyB across the EU and ensure a level

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2 ESRB Recommendation of 18 June 2014, "On guidance for setting countercyclical buffer rates", ESRB/2014/1.

playing field. However, such revised guidance should continue to allow for a sufficient degree of national discretion, to account for country specificities.

1 Introduction

Financial stability is a precondition for the financial system to be able to perform its key economic functions reliably. Periods of financial instability are typically characterised by sharp contractions in the provision of credit. This can impede the ability of households and firms to borrow. Financial instability can also weaken the balance sheets of key financial intermediaries. If these intermediaries or the system as a whole are not sufficiently resilient, it can lead to the failure of financial institutions and the need for substantial public support to mitigate the consequences of such failures. Macroprudential policy contributes to financial stability by increasing the overall resilience of the financial system to shocks.[3] Given that banks continue to represent 59% of total loan and debt funding by EU financial institutions to the global economy, it is of utmost importance to ensure their stability, including through macroprudential capital buffers.[4] As described by the Basel Committee on Banking Supervision (BCBS), "[regulatory capital] buffers enable banks to bear the impact of unexpected losses and continue to lend without breaching minimum capital requirements".[5]

The CCyB is a key macroprudential instrument for proactively ensuring resilience across banks. The CCyB is designed to be built up in the upward phase of the financial cycle and released during downturns. Releasing the buffer in times of crisis provides capital relief to banks, allowing them to continue to perform their key economic functions and, in particular, to continue to provide credit to the real economy without impediment. As mentioned in the ESRB's 2022 Concept Note, although the crisis related to the COVID-19 pandemic was an unexpected shock, most countries released the CCyB to support their economies.[6] However, the majority of EU Member States had only built up a limited amount of CCyB or maintained it at 0% before the COVID-19 pandemic hit.[7] As a result, whilst prudential relief measures freed up €140 billion in the euro area at the beginning of the pandemic crisis, only €20 billion came from macroprudential buffer releases, of which €12 billion from CCyB releases.[8]

Both the ECB and ESRB have signalled that it is desirable that the banking sector holds additional releasable buffers. This would ensure that sufficient buffers are available to be released in times of stress to absorb losses. It would also allow credit institutions to fulfil their key economic functions during downturns and mitigate buffer usability concerns. It may be easier for banks to choose to use buffers to support lending in times of stress, when those buffers are explicitly releasable by

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3 Also see: ESRB, November 2024: A system-wide approach to macroprudential policy: ESRB response to the EU Commission targeted consultation on macroprudential policy for NBFIs.

4 Data source: ECB Quarterly sector accounts, Q1 2024

5 See the Basel Committee's newsletter of 5 October 2022.

6 See ESRB, March 2022: Review of the EU Macroprudential Framework for the Banking Sector: A Concept Note.

7 At the end of 2019 the aggregate CCyB amounted to only 0.3% of RWA in the EU, which is low compared to a combined buffer requirement that amounted to 4.0% of RWA (ESRB 2022).

8 See the ECB's Financial Stability Review, May 2020.

authorities.[9] Both the ECB and ESRB define releasable buffers as being made up of the CCyB and the SyRB. Work conducted by both the ECB and the ESRB in 2021 and 2022 extensively examined the issue of whether sufficient releasable capital is available. This ultimately supported the case for additional releasable macroprudential buffers in the banking union and in the EEA. The ECB's and ESRB's work included an examination of policy options to increase the availability of releasable buffers.[10]

Among these options, a more flexible, forward-looking use of the CCyB has gained traction among EEA countries. First introduced by the UK – the first jurisdiction worldwide to implement it[11] – a PN CCyB approach was adopted by an increasing number of EEA jurisdictions. Italy, however, has opted to implement the SyRB to increase releasable macroprudential buffers. Seventeen EEA countries to date have set a positive rate for the buffer, even when cyclical systemic risks are judged to be neither subdued nor elevated. This is consistent with the supportive position expressed by the Basel Committee with regard to the ability of authorities to set a positive neutral countercyclical capital buffer rate on a voluntary basis, to smooth the impact of internal and external shocks, including those that are unrelated to the credit cycle.[12] The Basel Committee also noted that circumstances may vary across jurisdictions, including macroeconomic conditions and the range of macroprudential tools available. Some EEA jurisdictions have chosen an explicit target rate for the CCyB in an environment where systemic risk is neither subdued nor elevated (commonly called a positive neutral CCyB rate, henceforth PN CCyB rate), while others have opted for a flexible approach to the setting of the CCyB without a pre-defined target rate. While acknowledging such differences, in what follows the term "positive neutral CCyB rate" is used, for the sake of brevity, to designate any approach involving the setting of a positive rate of the CCyB independently of the emergence of heightened cyclical systemic risks.

While the use of the CCyB through the cycle is comparable to a certain extent across EEA countries, the PN CCyB has been implemented heterogeneously. Target PN CCyB rates vary across countries. These range from between 0.5% and 2%, reflecting the different methodologies used for their calibration, country-specific characteristics and policymakers' preferences. The conditions for activation of a non-zero CCyB rate also differ, with some jurisdictions relying on a concept of a "neutral" or "standard" risk environment, where cyclical systemic risks are not yet elevated. A more harmonised approach towards the use of the CCyB across EEA countries would seem desirable in the medium term, in order to enhance consistency and effective policymaking. However, a deeper understanding of the reasons

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9 See the aforementioned newsletter of the Basel Committee of 5 October 2022.

10 See the report from the Drafting Team of the Steering Committee of the Macroprudential Forum Enhancing macroprudential space in the banking union, March 2022 and the ESRB issues note Removing disincentives for the use of macroprudential buffers, March 2021 and the aforementioned ESRB Concept Note Review of the EU Macroprudential Framework for the Banking Sector, March 2022.

11 See Bank of England, May 2016 (updated May 2022): The Financial Policy Committee's approach to setting the countercyclical capital buffer.

12 See the aforementioned newsletter of the Basel Committee of 5 October 2022. Three non-EEA Basel members have implemented a positive neutral CCyB rate: the UK, Hong Kong and Australia.

underpinning the existing approaches, and an appreciation of their similarities and differences, is a necessary precondition for this.

This report reviews the experience available to date on the implementation of a PN CCyB, to foster a shared understanding of its use. This report builds on the conceptual discussions and findings of previous ECB and ESRB fora. It complements them with a practical perspective that is focused on the actual implementation experience. The information presented in this report draws from an extensive survey conducted among ESRB member institutions, covering several aspects such as (i) purpose and institutional framework; (ii) benefits and costs, and methods to assess them; (iii) timing and conditions for activation, release and subsequent replenishment, including relevant reference indicators and thresholds; (iv) calibration approaches and (v) impact on overall macroprudential policy strategy, interactions with other capital instruments, buffer usability and reciprocity considerations. The survey builds on and considerably expands a questionnaire with a similar purpose conducted by the BCBS in 2023.

The report strives to highlight the reasoning underlying different national macroprudential authorities' approaches. Throughout the report, dedicated boxes and a more technical appendix on calibration methods aim to explore countries' experiences in greater detail, in the spirit of peer learning. Furthermore, the report describes ESRB member institutions' views on the merits and ways of achieving a more consistent approach, for those countries that wish to implement a PN CCyB, while retaining room for flexibility in addressing cross-country heterogeneity.

The report is structured as follows. **Section 2** provides an overview of the levels of adoption and varying definitions of the PN CCyB rate across jurisdictions. It also considers rationales for adoption, along with perceived benefits and costs. **Section 3** explores the different methods countries used for calibrating the PN CCyB target rate, and the conditions and indicators guiding its build-up and release. **Section 4** describes the implications of having a PN CCyB in place for the overall setting of the CCyB through the cycle. It also considers implications for capital neutrality, overlaps with other instruments and reciprocity. **Section 5** concludes.

2 Objectives, costs and benefits of positive neutral CCyB rates[13]

2.1 Implementation of the positive neutral CCyB rate in the EEA: state of play

Based on the broad definition used in this report, more than half of the 30 EEA member countries surveyed currently have a PN CCyB rate in place. At the time of writing, 17 out of 30 EEA countries (CY, CZ, DK, EE, ES, GR, HU, IE, IS, LT, LV, NL, NO, PL, PT, SE, SI) have already implemented a PN CCyB rate (see **Chart 2.1**, panel a).[14] Of the 13 jurisdictions with no such framework in place, six are open to potentially introducing it in the future or are at an early stage of the assessment process. The other seven are not considering it. Among the latter, one country notes that its current national framework is sufficiently flexible and forward-looking to allow for a timely build-up of the CCyB. The majority of surveyed EEA jurisdictions introduced a framework for the PN CCyB in the post-COVID-19 period (i.e., from 2021). However, countries such as DK, LT, IE and CZ had pioneered approaches to a more flexible use of the CCyB much earlier, in 2017 (DK and LT), 2018 (IE) and 2019 (CZ) (**Box 1**).

Most countries with a PN CCyB rate have implemented it in the form of a target rate in a standard risk environment. However, the exact implementation varies across countries. The majority of jurisdictions with a PN CCyB rate set a minimum (CY, IS) or a target rate for the PN CCyB rate (CZ, EE, ES, GR, HU, IE, LT, LV, NL, PL, PT, SE, SI), while two countries have adopted an "early and gradual" approach with no target rate (DK, NO, see **Box 2**). Two countries with a PN CCyB rate (EE, LV) define their CCyB as comprising a cyclical risk component on top of a fixed "base rate" component, with the latter corresponding to the target PN CCyB rate.

A "standard" or "neutral" risk environment is broadly defined as a situation where cyclical systemic risks are neither subdued nor elevated. Such an environment is characterised by positive and sustainable credit growth, moderately growing asset prices with no strong indications of valuations being stretched, recovering banks' and borrowers' balance sheets, and a profitable banking sector. This corresponds, for example, to a situation where the economy has recovered from a downturn, the financial cycle is picking up and cyclical systemic risk is at a low or moderate level. Some countries do not use the term "neutral" in their framework, to avoid implying the absence of cyclical systemic risk. For instance, the recently revised CCyB framework in ES refers instead to a standard cyclical systemic risk environment. This describes a situation where cyclical systemic risks are considered to be moderate, based on the historical values of a set of macro-financial and banking sector indicators (see **Box 4**). Countries adopting an "early and gradual"

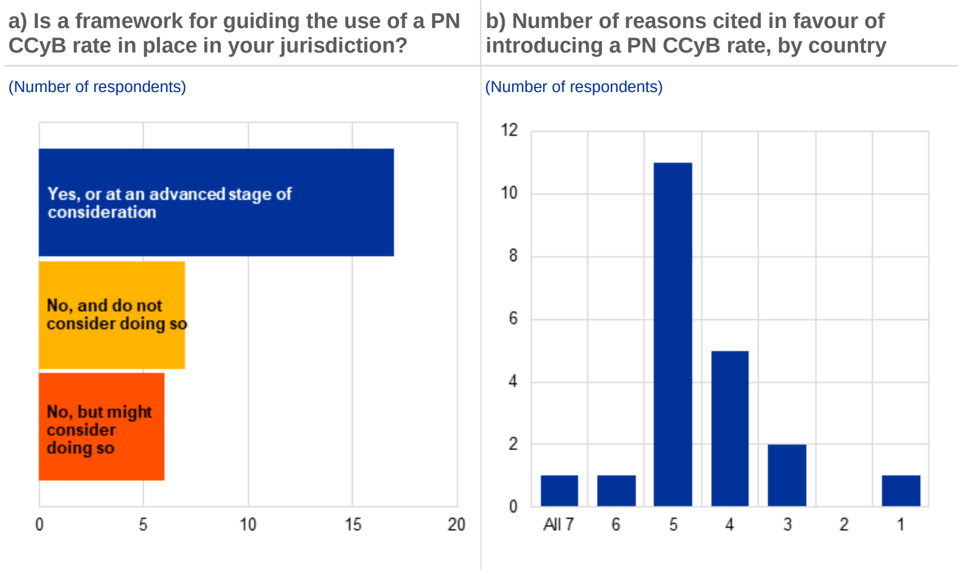
[13] Prepared by Konstantinos Kanellopoulos (coordinator), Michal Dvořák, Corina Weidinger Sosdean, Sebastian Löhe, Manuel Buchholz, Samu Kärkkäinen, Maddalena Galardo and Massimo Molinari.

[14] DK and NO adopted an early and gradual approach to the setting of the CCyB.

approach without a target PN CCyB rate do not refer to the concept of "positive neutral" rates. However, their frameworks rely on the overarching principle that a positive CCyB rate should be set in the early phases of the financial cycle when vulnerabilities start building up. In effect, this corresponds broadly to what is described above as a standard or neutral risk environment (**Box 2**).

Chart 2.1

More than half of the surveyed EEA countries have implemented a PN CCyB rate



Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.
Note: "Countries with a PN CCyB" also include countries "at an advanced stage of consideration [of the PN CCyB] and planning to announce it by the end of 2024".

Box 1

Early journeys towards setting a positive neutral CCyB rate: Lithuania and the Czech Republic

Prepared by Milda Stankuvienė and Štěpán Pekárek

Lithuania

Lietuvos bankas introduced a PN CCyB rate in 2017 to tackle uncertainty in cyclical systemic risk assessments and build up resilience in the early stages of financial and economic upturns. The uncertainty in risk assessments stems from discrepancies between signals given by credit-to-GDP gap and those from other credit market indicators. This highlights the need for a more comprehensive approach to capturing evolving credit market dynamics, especially given Lithuania's low overall indebtedness and the absence of other financial imbalances. Additionally, risk-averse policymakers saw the need to increase resilience against unforeseen economic, financial or external shocks. This would be achieved by increasing the amount of releasable capital buffers in times of favourable economic conditions and when the credit market is active, thereby mitigating the risk of delayed interventions.

Despite the challenges associated with implementing a new approach to the use of the PN CCyB, a consensus emerged on the importance of building up resilience. The challenges encountered at the time of implementation in 2017 mainly related to the lack of international precedents and absence of scientific literature on the use of CCyB early in the financial cycle. Extensive internal discussions were held to tackle these challenges. These discussions focused on the conditions under which the PN CCyB should be activated, the financial indicators to be used to most accurately assess these conditions and the methods used to calibrate the target rate. The resulting methodology is universal in the sense that it is consistent with the international and euro area approach to the CCyB overall as it stands today, and unique in that it is tailored to the Lithuanian context.

The practical implementation of the PN CCyB was smooth. The transposition of CRD requirements into national law did not create any legal uncertainty about the possibility of implementing the PN CCyB in the Lithuanian CCyB framework. This is because the framework imposes no constraints on introducing the CCyB early in the financial cycle. While no cyclical imbalances were detected at the time of introduction, the financial cycle was nonetheless in an upswing and some indicators suggested increasing risks, thereby justifying an early introduction of the CCyB. Moreover, market participants did not significantly challenge the new approach, likely due to their heightened risk aversion following lessons learned from the Great Financial Crisis. They also have a positive stance overall towards enhancing resilience when economic and financial conditions are favourable. Clear communication regarding the rationale, target rate and conditions for PN CCyB implementation helped provide clarity to market participants, enabling a smooth increase to the 1% target rate through a gradual two-step approach that was complemented with forward guidance.

Czech Republic

A PN CCyB was introduced in the Czech Republic’s CCyB framework in 2019, to help ensure the resilience of the banking sector though a timely build-up of capital buffers. The motivations outlined for the introduction of the PN CCyB were twofold. First, it ensures a timely activation of the CCyB in the transition of the financial cycle, namely at the beginning of the expansion phase (after a financial cycle contraction). In this phase, the banking sector has restored its profitability trajectory and new cyclical risks linked with rising lending activity and gradually relaxing credit standards are building up in the financial system. Second, it allows for a gradual build-up of the capital buffer and avoids the need to sharply adjust the CCyB rate later in the cycle, when cyclical risks have already become elevated. Both motivations are underpinned by the inherent potential uncertainty in identifying cyclical systemic risk in the early expansion phase of the financial cycle.

The PN CCyB approach was initially introduced during an expansion phase of the financial cycle, with the CCyB set above the PN CCyB target rate. Its implementation was further supported by ongoing and transparent communication of the CCyB framework adjustment to market participants. The PN CCyB was implemented in an environment of elevated cyclical systemic risks that warranted a 2% CCyB rate, therefore above the 1% PN CCyB target rate. Since the PN CCyB is treated in the Czech framework as applicable only during the early expansion phase of the cycle, its introduction did not affect the setting of the level of the CCyB rate at the implementation date, since the cyclical risks were elevated at that time and the financial cycle was past its early expansion phase. A positive CCyB rate, higher than the PN CCyB target rate, was therefore already in place. Hence, the new approach was to be applied in the early expansion phase of the next cycle. The implementation of the PN CCyB was accompanied by transparent communication of the PN CCyB concept, calibration of the target rate, activation and build-up approach. Despite the limited international experience available at the time, the introduction of the revised CCyB framework ran smoothly with no material policy or legal uncertainty. The updated publicly-communicated methodology for calibrating the CCyB was further supplemented by the publication of the PN CCyB underlying principles and quantitative calibration approach, with the aim of facilitating a good understanding of the PN CCyB strategy.

The PN CCyB has become an integral element of the CCyB framework, supporting the communication on setting the CCyB during the transition phase of the financial cycle. In addition to the aforementioned advantages, the existence of a framework for the PN CCyB helps to communicate the setting of the CCyB rate in the transition phase of the cycle, by making the intended capital buffer build-up over time transparent and predictable. This enables market participants to better understand the forward guidance on the timing and pace of the buffer replenishment towards the PN CCyB target rate. In turn, this minimises potential negative effects on the supply of credit to the real economy.

Box 2
"Early and gradual" approaches to the setting of the CCyB: Denmark and Norway

Prepared by Ianna Yordanova and Nina Larsson Midhjell

Both Denmark and Norway follow a strategy of "early and gradual" setting of the CCyB, sharing several common features.[15] Neither country has an explicit target rate for the CCyB. Rather, the strategy reflects the notion that the CCyB should be built up in good times. This creates a buffer that can be released in case of an economic shock, thereby lowering the risk that the financial system will amplify an economic downturn. Furthermore, due to the uncertainty in assessing systemic risks, both frameworks rely on a broad set of indicators that signal developments in cyclical systemic risks and thus the position of the economy along the financial cycle.

In Norway, the "early and gradual" approach helps ensure that banks hold a capital buffer that corresponds to the level of cyclical vulnerabilities in the financial system Norges Bank's implementation of the early and gradual build-up of the CCyB is based on three principles. First, the CCyB should reflect Norges Bank's assessment of cyclical vulnerabilities in the financial sector. Second, banks should as a main rule hold a positive CCyB and it should, in principle, be set in the upper part of the 0-2.5% range. The CCyB rate should not be reduced automatically even if there are signs that cyclical vulnerabilities are receding. It can be reduced if cyclical vulnerabilities recede substantially over time and the outlook for financial stability is good. If cyclical vulnerabilities reach a particularly high level, the CCyB rate can be set above 2.5%. Third, if a downturn will or could cause a marked reduction in credit supply, the CCyB rate should be partially or fully lowered.

In Denmark, the "early and gradual" approach gives the option of a timely activation and build-up of the CCyB prior to a crisis, even if indicators based on credit and credit-to-GDP gaps are lagging. The framework is implemented through indicators reflecting the position of the economy in the financial cycle. The aim is to activate the CCyB *early* in the financial cycle, as cyclical vulnerabilities start building up. When the buffer is activated, forward guidance is used to signal the expected path for the buffer rate. The strategy is to build up the buffer before the cycle turns and developments

[15] Both Denmark and Norway have revisited the CCyB frameworks twice since the implementation of CRD/CRR. The first revision introduced the early and gradual strategy for setting the CCyB in Denmark (2017) and provided a more elaborate description of the strategy in Norway (2019). The second revision drew on the experiences from the COVID-19 pandemic and elaborated on the release strategy for the buffer (2022 in Norway and 2023 in Denmark).

reverse. The *gradual* build-up of the buffer means that the rate increases incrementally, as cyclical risks build up. The buffer is expected to be released when institutions' lending capacity comes under pressure, i.e., earnings are low, capital headroom is diminishing and they are experiencing loan losses. The revision of the framework in 2017 was partly aimed at reducing inaction bias: the original framework relied largely on credit development indicators to guide the activation and build-up of the CCyB. These are lagging developments in the financial system and only reflect the build-up of systemic risk late in the financial cycle, when it might be too late to activate the buffer. The "early and gradual" approach was deemed well suited to reduce concerns about inaction bias and a delayed activation of the CCyB.

2.2 Arguments for and against the adoption of a positive neutral CCyB rate

Frameworks guiding the use of a PN CCyB rate are broadly motivated by considerations related to better timing of the build-up of the buffer and increasing the amount of releasable buffers. There is a high degree of consistency across countries regarding the motivations for including a PN CCyB rate in their frameworks. At the same time, many countries cite a wide range of reasons for introducing the framework (see **Chart 2.2**, panel a). Specifically, five factors are mentioned by a large majority of countries that have already adopted or are considering adopting a framework for the PN CCyB.

First, 17 out of 30 EEA countries identify uncertainty surrounding the identification of cyclical systemic risks, which may lead to a potential under-calibration of the CCyB, as the main motivation. Such uncertainty may be related to the difficulty in correctly identifying emerging cyclical systemic risks. This is not only because of its inherent complexity, but also in light of data lags which may delay the information available to macroprudential authorities. Furthermore, "novel" risks or risks that have not yet been captured by the established risk indicators, owing to data lags or gaps, may occur in any phase of the cycle.

Second, the need to ensure a timely activation of the CCyB (17 respondents) and to allow for a more gradual build-up of the buffer (15 respondents) are amongst the most frequently cited motivations for introducing a PN CCyB rate. Increasing capital buffers takes time, especially if it is done in a way that minimises costs to banks (via internal capital generation rather than issuing equity). Building up the CCyB early ensures that (i) capital requirements can be built up gradually, thereby avoiding (potentially costly) large adjustments of the buffer rate when cyclical systemic risks become elevated, and (ii) the required level of bank resilience is in place when needed. This is especially relevant, bearing in mind the standard 12-month time lag between a decision to increase the CCyB and its entry into force, as enshrined in EU legislation.

Third, the need to ensure the availability of releasable capital buffers, also in the early stages of the financial cycle, is deemed very important too. Adverse shocks with potentially negative repercussions on the banking sector and ensuing disruptions in the financial intermediation function can happen at any stage of the financial cycle. An early activation of the CCyB is therefore considered advantageous, as it ensures the availability of buffers that can be released to provide relief to the banking sector if shocks occur even where there are no domestic credit imbalances. ES highlights the desirability of increasing the banking sector's resilience against cyclical systemic risks when these are at standard/intermediate level. This would make credit provision more resilient against their materialisation and reduce the overall volatility of the macroprudential cycle.

Fourth, PN CCyB rate frameworks were introduced or are under consideration to increase the banking sector's resilience against a wider spectrum of potentially large shocks (15 respondents). Despite being unrelated to the domestic credit cycle, health emergencies such as the COVID-19 pandemic, as well as natural disasters, wars and shocks arising from climate change, political events or technological disruptions, may have negative repercussions on the banking sector and lead to disruptions in the financial intermediation function. While the majority of jurisdictions have implemented or are considering implementing a PN CCyB rate to increase resilience against such large, exogenous shocks, IT has introduced the SyRB for the same purpose.

Some countries, such as EE and IE, mention advantages that arise from relying on one instrument such as the CCyB rather than combining it with other instruments such as the SyRB. This reduces complexity in the macroprudential capital framework, while enabling the banking system to better support the economy when it is hit by shocks (**Box 3**).

Finally, two countries mention inaction bias as a motivation to introduce a PN CCyB rate framework. In one country, a PN CCyB framework is considered beneficial to counter potential inaction resulting from relying excessively on the credit-to-GDP gap indicator to guide the activation of the CCyB.

While broadly consistent, the motivations for introducing a PN CCyB rate vary in importance across countries. Some countries, such as NO and DK, emphasise building up the CCyB early in the financial cycle. This allows the buffer to reach a certain level at the peak of the cycle, before risks materialise. In other countries, such as SE, the framework is centred around the usable capital buffers that can be lowered to ease the requirements on banks when both credit cycle-related and exogenous shocks occur, and thereby provide scope for stabilising the supply of credit. In this vein, the Swedish authorities aim to maintain a buffer rate at relatively higher levels during normal periods, even when credit growth is not (yet) associated with elevated systemic risks.

One of the most frequently cited reason for not introducing a PN CCyB rate framework is the view that other instruments are more suitable for covering risks that are unrelated to the financial cycle, notably the SyRB (see Chart 2.2, panel b). Seven countries deem that other instruments, in particular the SyRB, are more suitable than the CCyB to increase the amount of releasable buffers. IT recently implemented the SyRB for this purpose (**Box 4**). The flexibility of the SyRB, which can be used to address any macroprudential risk, whether cyclical or structural, not already addressed by other buffer requirements or other macroprudential measures, is cited as a main reason to prefer this instrument. FR finds that the combination of the SyRB and CCyB allows authorities to deal with both cyclical risk (through an early and gradual build-up of the CCyB) and exogenous shocks (through the SyRB).

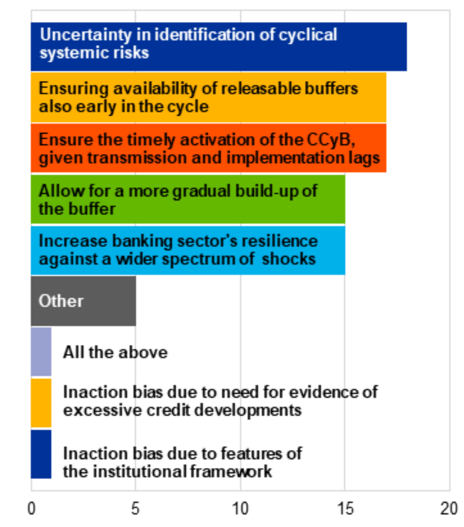
Other reasons most frequently cited for not introducing such a framework relate to legal uncertainty and a lack of an internationally agreed framework guiding the use of the PN CCyB. Seven countries consider legal uncertainty to be an obstacle to adopting a framework guiding the use of a PN CCyB rate (see **Chart 2.2**, panel b). This is due to the perceived lack of clarity in EU legislation regarding the setting of a positive CCyB rate when cyclical systemic risks are not yet elevated. In three countries, the legal obstacles are also related to the national transposition of the CRD, which links the activation of the CCyB to credit indicators. Furthermore, eight countries mention the lack of an internationally agreed framework guiding the use of the PN CCyB among the reasons for not introducing it in their jurisdictions.

Chart 2.2

Motivations and counterarguments for a PN CCyB rate framework

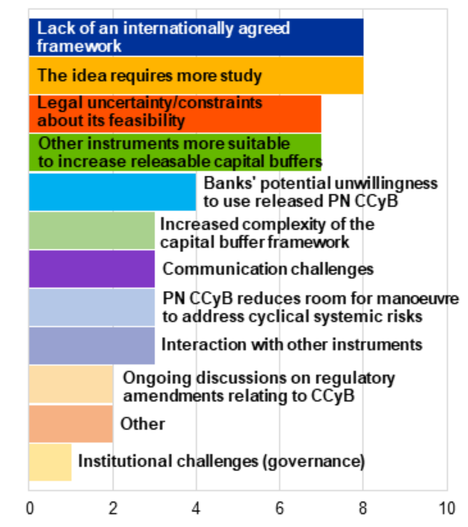
a) If a PN CCyB rate framework has been introduced/is being considered in your jurisdiction, what were/are the key motivations for implementing or considering it?

(Number of respondents)



b) If a PN CCyB rate framework is not in place, please state up to five main reasons for not having it in place.

(Number of respondents)



Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.

For countries with a PN CCyB rate framework, legal uncertainty has either not been perceived as an obstacle to its introduction or these obstacles have been overcome by designing the framework accordingly. None of the jurisdictions that have introduced a PN CCyB rate framework see the current European legislation as an obstacle. This is also the view of five of the countries that have not adopted a PN CCyB framework. In ES, legal obstacles prevented a positive CCyB rate from being set up in the absence of cyclical systemic risks. Its revised CCyB framework therefore allows the CCyB rate to be activated when cyclical systemic risks are at moderate levels (**Box 4**).

Nonetheless, some jurisdictions are still considering the introduction of a PN CCyB rate framework. Overall, six jurisdictions need to explore the idea of a PN CCyB rate more thoroughly and conduct cost-benefit analyses of its potential use.

Box 3
From the SyRB to the CCyB: Estonia, Netherlands and Ireland

Prepared by Anita Suurlaht-Donaldson, Ties Busschers and Eoin O'Brien

Estonia

At the start of the COVID-19 pandemic in spring 2020, Eesti Pank cut the prevailing systemic risk buffer (SyRB) rate from 1% to 0%. It was an exceptional and temporary measure aimed at supporting banks' capacity to lend to the economy during the crisis. As the pandemic subsided, Estonian economic activity rebounded strongly and the cyclical risks started to pick up. Eesti Pank considered various ways of reinstating the buffer requirement in autumn 2021. A decision was made to use a single instrument – the CCyB, rather than a combination of the CCyB and the SyRB. This was to safeguard resilience against general macro-financial risks, whether structural or cyclical, stemming from the nature of the Estonian economy.[16] According to the new approach, the CCyB requirement would consist of a PN rate and a cyclical requirement, the latter being set according to the evolution of cyclical systemic risks. The rationale for setting a PN rate came from the vulnerabilities specific to the Estonian economy and its financial sector. As a small, open economy, Estonia faces greater downside macro-financial risks compared to larger, more diversified economies. Additionally, the Estonian banking sector has significant exposure to risks in the real estate market. By establishing a base CCyB requirement, an increase in the CCyB that might come too late due to delays in the detection of emerging systemic risks may also be avoided. The systemic risk buffer requirement had previously been applied to cover risks stemming from the general macro environment. However, that role is now played by the base requirement of the countercyclical capital buffer. Eesti Pank will retain the systemic risk buffer requirement as a tool in the framework, which it can use if its risk assessments suggest the emergence of additional systemic risks.[17]

Three reasons underpinned Eesti Pank's decision to use the CCyB. First, the amendments to CRD V meant that it became possible to also use the SyRB to address cyclical risks in instances where these were not covered by the CCyB. After the introduction of this amendment, Eesti Pank considered the SyRB as an instrument not exclusively dedicated to addressing systemic risks of a structural nature. At the same time, these amendments made it possible to use the SyRB in a more targeted manner. Eesti Pank therefore considers that this instrument can now be reserved to address risks in specific sectors, making the communication on the choice of the measures easier and more understandable. Second, Eesti Pank considers it reasonable to address risks with the minimum level of complexity necessary to achieve its goals. The CCyB was considered particularly

16 As of 2021, the growth in the debt of the non-financial sector had not been persistently faster than long-term growth in the economy for more than 10 years and the CCyB requirement remained at zero since it was first introduced in 2016.

17 See Appendix 1 of the Eesti Pank's Financial Stability Review, 2/2021.

useful as the procedure for notifying relevant authorities. Additionally, reciprocity for the CCyB is more straightforward than reciprocity for the SyRB. Third, CCyB decisions are easier to communicate, as this instrument is well understood and accepted within the international community.

Netherlands

During the COVID-19 pandemic, De Nederlandsche Bank released the existing SyRB and replaced it, after the pandemic, with a PN CCyB rate. Under the applicable law at that time, the CCyB was the only tool that could be released and De Nederlandsche Bank wanted to increase the proportion of releasable capital. At the start of the pandemic, the Netherlands had a 3% SyRB in place, applicable to its three largest banks. De Nederlandsche Bank decreased it by 0.5-1.5% at the onset of the pandemic to provide relief to the affected banks, before reducing the rate to 0% at year-end 2020. At the same time, De Nederlandsche Bank committed to setting a 2% CCyB when the crisis had sufficiently subsided. This capital-neutral macroprudential action provided Dutch banks with the necessary capital to sustain lending during the pandemic, while the new buffer calibration was also deemed to better reflect the relative systemic importance of each bank. The main reason for De Nederlandsche Bank's decision to switch to the CCyB was to increase the share of releasable buffers for Dutch banks. De Nederlandsche Bank had previously judged the calibration of macroprudential buffers that had prevailed before as appropriate, given the inherent risk characteristics of the Dutch banking sector. However, at that time, almost all of this capital was structural and not immediately releasable. The switch to the CCyB was to provide extra flexibility in case of unexpected exogenous shocks. Further, the CCyB was the preferred instrument due to its mandatory reciprocity and because its use is well recognised beyond European borders.

Ireland

In 2019, the Central Bank of Ireland announced its intention to introduce a SyRB. The calibration of the buffer had yet to be determined at that time. A 1% CCyB rate was in place then, in line with the Central Bank of Ireland's approach of setting a positive buffer early in the cycle. However, the outbreak of the COVID-19 pandemic led to a change in stance, whereby the Central Bank of Ireland released the CCyB and forwent the plan to introduce the SyRB while the overall framework for macroprudential capital was being reviewed. In 2022, in the context of updating the overall framework, the Central Bank of Ireland outlined that it would rely on a single instrument (the CCyB) rather than a combination of CCyB and SyRB, as had previously been envisaged. The objective here was to safeguard resilience against macro-financial risks, including those stemming from the small and globalised nature of the Irish economy. The small and open nature of the Irish economy is a structural characteristic, which manifests itself through greater cyclical macro-financial volatility relative to European peers. The new approach was informed by two particular aspects from the Irish and European experience in implementing macroprudential policy. First, the choice of a single instrument rather than a combination of instruments was borne out of a desire to achieve macroprudential objectives while minimising complexity. Second, the countercyclical design of the CCyB, whereby it is expected to vary over the cycle and to be released where required, in response to a materialisation of systemic risk, was a key element in deeming it the most effective instrument to achieve the intended macroprudential objectives. The approach was informed by the emerging lessons from the COVID-19 pandemic experience and the benefits of releasable capital. The SyRB is not being used to mitigate the macro-financial risks stemming from the small and open nature of the Irish economy. However, as the calibration of the intended SyRB prior to the pandemic had not been established, the introduction of the 1.5% PN CCyB rate did not involve a specific offset in this regard. The SyRB remains part of the Central Bank of Ireland's macroprudential toolkit and is available should additional systemic risks that are not covered by other buffers be identified in the future.

Role of country specificities

The openness of the economy and related vulnerability to external shocks are the most frequently cited country specificities justifying a PN CCyB rate framework. Twelve countries consider a PN CCyB rate useful for increasing macroprudential space to address vulnerabilities to external shocks. These may have a stronger impact in countries with specific structural characteristics, such as a high degree of openness and interconnectedness. In GR, the significant current account deficit, which suggests a reliance on foreign capital to finance domestic consumption, and the economic importance of tourism, a sector that is highly sensitive to various factors such as geopolitical tensions and global health crises, are seen as the two main drivers of this vulnerability. IE mentions the highly interconnected nature of the economy as a factor exposing it to greater downside macro-financial risks compared to larger, more diversified economies. This characteristic can lead it to experience greater cyclical macro-financial volatility.

Institutional and banking sector specificities also play a role. With regard to banking sector characteristics, the high concentration of real estate loans in banks' portfolios, banking sector concentration and the strong presence of foreign subsidiaries are mentioned as important factors. Two countries mention potential inaction bias in the CCyB decisions, due to the institutional framework governing the setting of the rate as a relevant factor.

However, some countries find a PN CCyB approach beneficial, regardless of country specificities. Six out of 30 EEA countries state that there were no country specificities relevant to the adoption of the framework. More specifically, some countries point rather to the importance of having strong resilience in the financial sector and releasable buffers that could mitigate the impact from systemic risks or external shocks that affect the financial sector and the economy. Some others consider a PN CCyB rate to be a universal feature of a CCyB framework, enabling countries to build up the CCyB early in a cycle. In turn, that would allow for a more gradual increase and timely implementation to ensure the banking sector's resilience.

Box 4
Overcoming obstacles to the build-up of releasable buffers: the experiences of Italy and Spain

Prepared by Maddalena Galardo, Massimo Molinari and Jorge Galán

Italy

Banca d'Italia has recently implemented a SyRB to build up macroprudential buffers with the objective of strengthening the ability of the Italian banking system to support households and firms in case of adverse events, including those unrelated to the economic and financial cycle. A SyRB has been identified as the most appropriate instrument to achieve this objective. This is due to its purpose, as outlined in the CRD, to address any macroprudential risk, whether cyclical or structural, that is not already addressed by other buffer requirements (i.e., CCyB, CCoB, G-SII and O-SII) or other measures under the CRR. This family of risks includes severe disruptions to the financial system due to exogenous shocks. These are indeed residual with respect to the risks covered by all other instruments and are therefore better addressed with a SyRB. In Banca d'Italia's view, the use of the CCyB to address a non-cyclical shock and its accumulation when risks are neither subdued nor elevated (i.e., the introduction of a PN CCyB rate) would need to be clarified in the European legislation. Finally, while a decision on a CCyB rate must be announced, in normal circumstances, 12 months before it becomes effective, the SyRB can be accumulated in a more flexible manner. The decision to implement the SyRB was published on Banca d'Italia's website, together with a paper describing the supporting analysis (Catapano et al., 2024). In addition, Banca d'Italia submitted the proposed measure to a public consultation before taking the final decision.

Spain

Banco de España's view is that evidence of emerging cyclical systemic risk is required to justify introducing a positive CCyB rate. Thus, Banco de España avoided using the concept of "normal times", broadly used in other countries' PN CCyB frameworks, and usually referred to as a phase of the cycle when cyclical risks are neither elevated nor subdued, as the term could be wrongly interpreted as an absence of cyclical systemic risks. Instead, Banco de España referred to the concept of "standard cyclical systemic risk", which refers to periods of the financial cycle when cyclical systemic risk is considered moderate, based on the historical values of a set of macro-financial and banking sector indicators.[18] In this context, the use of the CCyB is warranted by the existence of a certain, albeit moderate, level of cyclical systemic risk at the moment of activation. This is complemented by an analysis of the benefits of activating the buffer early in the cycle, before cyclical risk becomes elevated. The reduced costs of implementing it under this scenario relative to the significant benefits of its release in adverse phases of the cycle were also analysed. Therefore, the measure activated in Spain is referred as a CCyB rate for a standard cyclical systemic risk environment. This new concept and the use of the buffer in this scenario was published by Banco de España as a modification of the CCyB framework, which was accompanied by a technical occasional paper (Estrada et al., 2024), and involved a public consultation held with banks and all interested parties.

[18] The set of indicators monitored in Spain to determine a standard cyclical systemic risk stage comprises economic growth, output gap, unemployment rate, credit growth, house price growth and banking sector variables, such as profitability, capital adequacy, liquidity, and non-performing loans.

2.3 Costs and benefits of a positive neutral CCyB[19]

Out of the 30 respondents to the questionnaire, 17 reported having conducted a cost-benefit analysis of the PN CCyB. A cost-benefit analysis was conducted by the majority of countries that have implemented a PN CCyB framework. It was also undertaken by two out of the seven countries that did not develop a framework but might consider doing so, as well as by two out of the seven countries that are not considering developing a PN CCyB framework. While most analyses were qualitative, seven countries reported having conducted a model-based analysis (**Table 1**). DSGE models are the most common method used, but jurisdictions also relied on empirical methods, such as factor-augmented vector autoregressive models, GDP-at-risk models and optimal capital approaches to estimate the impact of the CCyB on real macro-financial variables. These models were mainly used to assess the costs of introducing a PN CCyB in terms of forgone lending and negative impact on GDP, and the benefits, by quantifying to what extent the resilience built through a PN CCyB would lower the impact of adverse shocks (see **Appendix A** for a description of the methods). Although only 17 jurisdictions reported having conducted a qualitative or quantitative analysis, 23 identified some costs and benefits that they associate with the PN CCyB. Therefore, the following paragraphs draw conclusions based on answers provided by 23 respondents.

Table 1
Model-based methods to assess the costs and benefits of the PN CCyB

Method	Country
Dynamic stochastic general equilibrium (DSGE) models	ES, FI, FR, LT, SI, PT
Factor-augmented vector autoregressive (FAVAR) models	LT, LV
Other	IE, ES

Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.

A variety of benefits are associated with a PN CCyB, foremost an increase in the availability of releasable buffers (see Chart 2.3). Almost all respondents (21 out of 23) share the view that a PN CCyB increases the availability of releasable buffers throughout the financial cycle. Eleven respondents also consider that this releasable buffer can be available to address exceptionally large shocks. According to 19 respondents, the PN CCyB can increase the availability of releasable buffers to address a wider spectrum of shocks. However, two respondents state that the CCyB is not the relevant instrument for covering risks other than excessive credit growth (i.e., non-cyclical risks) and that the SyRB is a better option. Seventeen respondents see the PN CCyB as a potential solution for addressing inaction bias and uncertainty regarding the assessment of risks. Implementing the PN CCyB allows for a gradual build-up of the buffer, with the macroprudential authority raising the PN CCyB to its target rate in at least two separate steps. This is also largely perceived as a benefit, since it lowers the costs of building the buffer. The PN CCyB specifically is not

19 Prepared by Fleurilys Virel (coordinator), Jorge Galán, Alexandr Palicz, Anita Suurlaht-Donaldson and Domenica Di Virgilio.

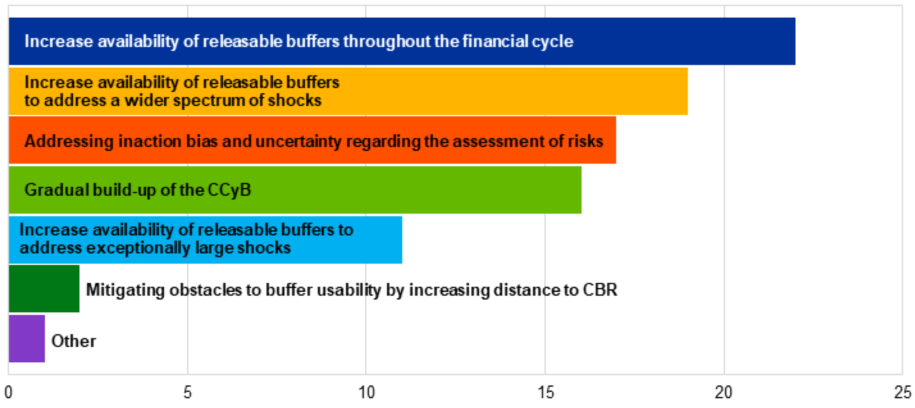
broadly seen as useful in mitigating obstacles to buffer usability, as this benefit pertains to any increase in the CCyB or another capital buffer (see **Section 4**).

Chart 2.3

The main benefits associated with the introduction of a PN CCyB

If you have conducted a cost-benefit analysis (either qualitative or quantitative) or an internal reflection on the topic, what do you consider to be the main benefits associated with a (potential) introduction of a PN CCyB?

(Number of respondents)



Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.\

The main benefits of a PN CCyB approach, compared to the traditional use of the CCyB, mostly relate to its flexibility. Respondents that identify specific benefits of a PN CCyB approach, compared to the traditional use of the CCyB, mention the possibility to activate the buffer early, allowing for a larger releasable buffer available throughout the financial cycle, greater resilience of the banking system to unexpected shocks, and a decrease in the risk of potential under-calibration of the overall CCyB. Some respondents also identify its gradual build-up toward its target rate, meaning that the macroprudential authority decides to activate or increase the CCyB rate up to its target rate in at least two separate steps, as a specific benefit of the PN CCyB. Compared to the overall CCyB, a PN CCyB is also identified as being able to cover a wider spectrum of shocks, which are not necessarily related to the accumulation of domestic imbalances resulting from excessive credit growth. One respondent notes that the benefits of a PN CCyB approach depend on the flexibility of the existing general CCyB framework. Specifically, if the latter does not allow for the timely recognition of cyclical risks and early build-up of the CCyB, then the PN CCyB is beneficial to increase resilience to possible shocks. Some respondents also state that the benefits of building up releasable capital buffers are the same in terms of bank resilience, regardless of whether achieved under a PN CCyB approach.

Increased complexity of the framework, communication challenges and a negative impact on the banking sector are the main potential costs identified. The majority of respondents (14 out of 23) do not see any difference between costs associated with the PN CCyB and those associated with the overall CCyB. Nine respondents identify at least some costs as specific to the PN CCyB. Most of the costs identified by the majority of countries are deemed non-quantifiable (see **Chart**

2.4). The PN CCyB is specifically associated with greater complexity of the framework, which poses communication challenges for market participants and the public's understanding and acceptance (see **Section 4.3**). Another category of costs frequently associated with a PN CCyB is a potentially negative impact on the banking sector, in the form of reduced lending activity and impact on the cost of funding and on profitability. These can also translate into macroeconomic costs, as identified by five respondents, since a higher cost of lending and reduced credit supply can weigh on economic growth. Some respondents also flag a potential issue related to banks' potential unwillingness to use the buffer when released, based on their expectations with respect to its replenishment after the release.

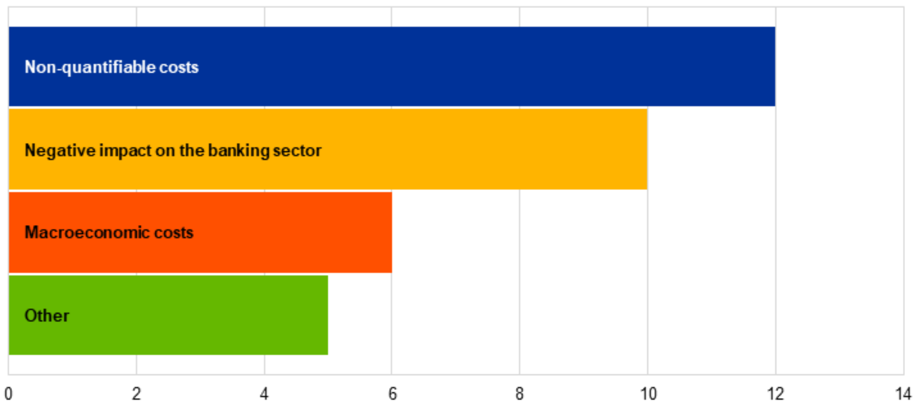
However, several jurisdictions consider that macroeconomic costs can be mitigated if the PN CCyB is activated at an appropriate time, when the cyclical risks are considered not elevated and the state of the banking sector is favourable. According to survey responses, a favourable state of the banking sector is characterised by (i) the capacity of banks to easily increase their capital and at rather low costs compared to a stress situation and/or (ii) high profitability and relatively high management buffers. These insights are in line with theoretical and empirical studies that have confirmed the importance of capital headroom and strong bank profitability in mitigating the procyclical effects of the increased capital requirements on lending (see ECB, 2020, Lang and Menno, 2023, Herrera, Scalone and Pirovano, 2024).[20]

Chart 2.4

Main costs associated with the introduction of a PN CCyB

If you have conducted a cost-benefit analysis (either qualitative or quantitative) or an internal reflection on the topic, what do you consider to be the main costs associated with the (potential) introduction of a PN CCyB?

(Number of respondents)



Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.

Banking sector conditions, the structure of overall capital requirements, country size and openness influence the appreciation of the costs and benefits

20 See Box 9 A macroprudential perspective on replenishing capital buffers in the ECB's Financial Stability Review, November 2020; Lang, J.H. and Menno, D. (2023), The state-dependent impact of changes in bank capital requirements, ECB Working Paper No. 2828; Herrera, L., Pirovano, M., Scalone, V., 2024, The importance of being positive: costs and benefits of a positive neutral rate for the Countercyclical Capital Buffer, Macroprudential Bulletin, Issue 24, European Central Bank.

associated with the PN CCyB. National specificities can either increase or decrease a country's perception of the costs of a PN CCyB. The banking sector's situation is broadly seen as a possible mitigating factor regarding the costs of activating a PN CCyB. Specifically, high profitability and high voluntary capital reserves are reported to mitigate potential negative side effects that could stem from new capital requirements. Regarding the benefits, countries refer to the small size and openness of their economy as factors increasing the desirability to enhance the resilience of their banking sector, as they are by nature more vulnerable to external shocks.

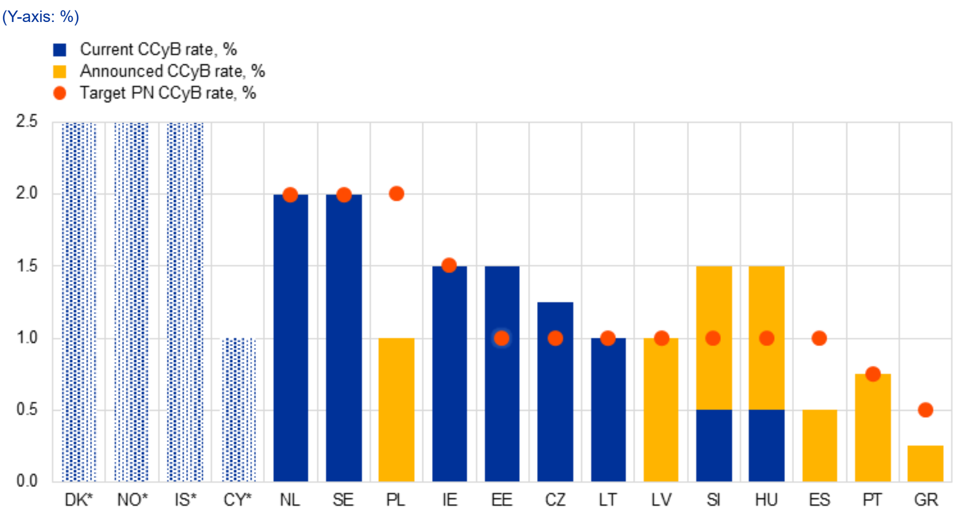
3 Design considerations

3.1 Target rate and calibration methods[21]

Most countries with a PN CCyB framework have set a target PN rate, ranging between 0.5% and 2%. Thirteen out of the 17 countries with a PN CCyB have adopted a target positive neutral rate. Target rates vary from 0.5% to 2%, with 1% being the most common choice (CZ, EE, ES, HU, LT, LV, SI) (see **Chart 3.1**). Four countries (IS, NL, PL, SE) set the minimum or target PN CCyB rate at 2%. In jurisdictions where PN CCyB rates have already entered into force, the CCyB rate is currently at or above the target rate. Exceptions are some countries where the PN CCyB has been only recently announced and will be phased in gradually (ES, GR, PL). Four jurisdictions do not use a target rate in their PN CCyB approach: the authorities in CY and IS aim to set a *minimum,* rather than a target PN CCyB rate (of 0.5% and 2% respectively) in a standard risk environment, implying that a higher PN CCyB rate is also possible. DK and NO opted for an "early and gradual" approach for the setting of the CCyB, without setting a target rate (see **Box 2**).

Chart 3.1

Announced target PN CCyB rates and currently applicable CCyB rates



Note: The chart includes only countries having implemented a PN CCyB rate. *DK and NO do not specify a target PN rate, while CY and IS set a minimum PN CCyB rate of 0.5% and 2% respectively. LV has publicly announced a 1% CCyB rate, which will come into effect in the second quarter of 2025. PL has publicly announced a 1% CCyB rate, which will come into effect in September 2025. ES and GR have announced the gradual introduction of a PN rate for the CCyB, with CCyB rates initially set to 0.5% and 0.25%, respectively, applicable as of October 2025 and then further increasing towards the announced PN target rates of 1.0% and 0.5%, respectively, as of October 2026. PT has publicly announced a 0.75% target PN CCyB rate, which will come into effect in January 2026.

Setting a target rate is seen as enhancing predictability for the banking sector, transparency in policymakers' decisions and clarity in communication. Countries with an explicit target rate considered three elements as equally important in motivating their choice. First, an explicit target rate provides the banking system

21 Prepared by Eoin O'Brien, Max Larsson (coordinators), Ilze Vilka, Ianna Yordanova, Milda Stankuvienė and Karol Zeleňák.

with clear insights into the authority's objectives and intentions. Second, it allows the banking system to plan ahead and thereby enhance its ability to manage risks effectively. Third, it fosters clarity of communication with the wider public, which should facilitate a smoother adjustment in market expectations and in investor sentiment. In DK, where a target rate is not set, these objectives (communication, transparency and predictability) are achieved through the use of forward guidance.

The target PN CCyB rate is not meant to be frequently reassessed. Only three countries envisaged a specific, two to three-year timeframe for reassessing the calibration of the target PN rate. Two countries noted that the calibration of the target rate would be reassessed on the basis of circumstances such as major structural changes in the economic or financial environment, or methodological advancements and changes in international practices/guidelines. While countries' frameworks are silent on the issue of reassessment, the expectation in most cases is that this would not occur regularly. LT notes that the stability of the target rate simplifies communication and ensures predictability for market participants.

The most popular methods used to calibrate the target PN CCyB rate include stress testing, DSGE models and analyses of historical bank losses, but expert judgement retains a key role. Stress testing is the most frequently used quantitative approach to inform the calibration of the target PN rate (ES, IE, LV, LT, PT, SI) (see **Table 2**). A number of countries also rely on analyses of historical bank losses (CY, CZ, EE, HU, NL). Some jurisdictions (LV, NL) take into account their experience of previous crises (the Great Financial Crisis or the COVID-19 pandemic) to gain insights into the level of capital required during a downturn. In many cases, more than one quantitative approach fed into calibration considerations, with expert judgement ultimately playing a key role in the determination of the target PN rate (see **Appendix B** for a detailed description of the methodologies).

Table 2

Calibration methods for the target PN rate

Calibration method	Country
Expert judgement	CY, EE, IE, SE, LV, NL, SI, PT, HU
Historical bank losses	CY, CZ, EE, NL, HU
Stress test models	EE, ES, IE, LT, LV, PT, SI
Empirical macroeconomic models	CZ, IE
Other	PL, LV, NL, SI, HU

Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.

Stress testing approaches calibrate the PN CCyB rate by estimating the capital shortfall resulting from a mildly adverse scenario that would be consistent with a standard risk environment. Stress testing approaches assess the ability of financial institutions to withstand adverse economic conditions. To calibrate the PN CCyB rate, stress testing methods used by national authorities in the EEA rely on scenarios that are not overly severe, in order to capture losses that could stem from shocks occurring in a neutral or standard risk scenario (e.g. IE, LT and PT). In ES, Banco de España adopted a macroprudential stress testing approach, which involves the simulation of different scenarios. These scenarios vary according to the origin of the shock (i.e., internal, external or both) and to its severity (mild, medium and severe). The calibration of the PN CCyB was then informed by the outcome of those scenarios that focused on mild internal and external shocks. In PT, the calibration of the target rate is obtained by estimating the unexpected losses the buffer is expected to cover and by comparing losses arising in a neutral risk environment to those occurring in an adverse scenario.

Calibration approaches based on historical losses estimate the amount of capital that would be needed to cover losses incurred in previous crises. In NL, for example, one of the methods used to inform the calibration relied on the estimation of the capital that would have been required to cover the accumulated losses of Dutch banks between 2007 and 2016. The ECB has developed a methodology to disentangle the share of historical bank losses associated with cyclical systemic risk from those that are not necessarily related to the financial cycle and could be covered by a PN CCyB rate.

Other approaches rely on the historical evolution of cyclical systemic risk to inform the calibration of the target PN CCyB rate. In SI, for example, the PN target rate is computed on the basis of the average value of the indicators used in the CCyB buffer guide over a twenty-year period. In PL, the calibration of the PN CCyB rate aims to yield additional capital to reduce the crisis signals derived from a set of early-warning models. The ECB developed a methodology based on a multivariate time series model, which is aimed at calibrating the CCyB rate in different phases of the cycle (i.e., including the PN rate), according to the prevailing levels of cyclical systemic risk.

Country specificities related to the domestic banking sector and to national cyclical dynamics play an important role in calibrating the target PN CCyB rate. Some two-thirds of countries considered country specificities when calibrating the target PN rate. Five countries explicitly referred to structural features of their domestic banking sector. These features relate to profitability and capitalisation, the historical performance of the banking sector or the necessary level of capital to mitigate unexpected shocks and/or the provision of credit facilitated through the release of buffers in their jurisdiction. ES and IE referred to the relative volatility of the national cycle, while CZ noted the importance of the residential real estate market and mortgage financing in the financial cycle.

Authorities generally view the calibration of the target PN rate as distinct from the regular calibration of the CCyB rate. The target PN CCyB rate, informed by the quantitative approaches described above, aims to provide a level of resilience considered appropriate when cyclical risks are neither elevated nor subdued. On the other hand, authorities take regular decisions on the prevailing CCyB rate on the basis of indicators of cyclical systemic risk and based on expert judgement. While IE and ES note that analytical frameworks such as stress testing could also be used to inform the calibration of the CCyB through the cycle, this has not been done in practice to date.

When calibrating the target PN CCyB rate, authorities generally take into account interactions with other prudential requirements in a qualitative

manner.[22] So far, nine of the countries with a target PN CCyB rate have taken into account other prudential requirements when calibrating the PN CCyB target rate (**Table 3**). However, the specific prudential requirements considered in different jurisdictions vary significantly. One country has adopted the broadest approach when calibrating the minimum PN rate, acknowledging both micro and other macroprudential buffers as well as MREL requirements. In two cases, the approaches have been more targeted and considered only other macroprudential buffers. Other countries tend to lie somewhere in between. In general, these interactions are ultimately acknowledged in a qualitative manner based on expert judgement. The six remaining countries have not taken account of interactions with other prudential requirements.

Table 3

Other prudential requirements acknowledged in the calibration of the target/minimum PN CCyB rate

Prudential requirement	Number of countries
Pillar 2 requirement	4
Pillar 2 guidance	6
Capital conservation buffer	7
Other macroprudential buffers in place	9

Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.

3.2 Activation and build-up of the positive neutral CCyB[23]

Favourable conditions in the banking sector and macro-financial environment are key factors in determining the right timing to activate the PN CCyB. Fifteen countries report that favourable banking sector conditions are among the most important conditions to guide the activation of the PN CCyB (see **Chart 3.2**, panel a). Most of them also indicate a stable or recovering macro-financial environment as one of the main conditions for activation (see **Chart 3.2**, panel a). The importance of these conditions might reflect authorities' concerns about the potential procyclical effects of activating the CCyB in an environment where risks are not elevated or emerging. Consistent with this, a considerable number of countries also indicate sufficient bank capital headroom and sound financial conditions of the non-financial private sector as the most important conditions for activation (see **Chart 3.2,** panel b). These findings are in line with the role of favourable banking sector conditions in mitigating the macroeconomic costs of the activation of the PN CCyB (see **Section 2.3)**. Six countries indicate expectations of emerging cyclical risks as important for triggering the activation of a PN CCyB (see **Chart 3.2,** panel a) and also link the PN CCyB to the concept of moving early in the cycle (see **Chart 3.2**, panel b). Consistent with this, the same six countries also indicate that building up resilience

22 Please note that Section [4.2] deals with interactions of the PN CCyB with other requirements at a conceptual level.

23 Prepared by Giorgia De Nora (coordinator), Alexei Alupoaiei, Antoaneta Amza, Štěpán Pekárek, Artur Rutkowski and Diogo Serra.

early in the cycle and timely activation of the CCyB are key objectives of a PN CCyB approach (see **Section 2.2**).

Chart 3.2

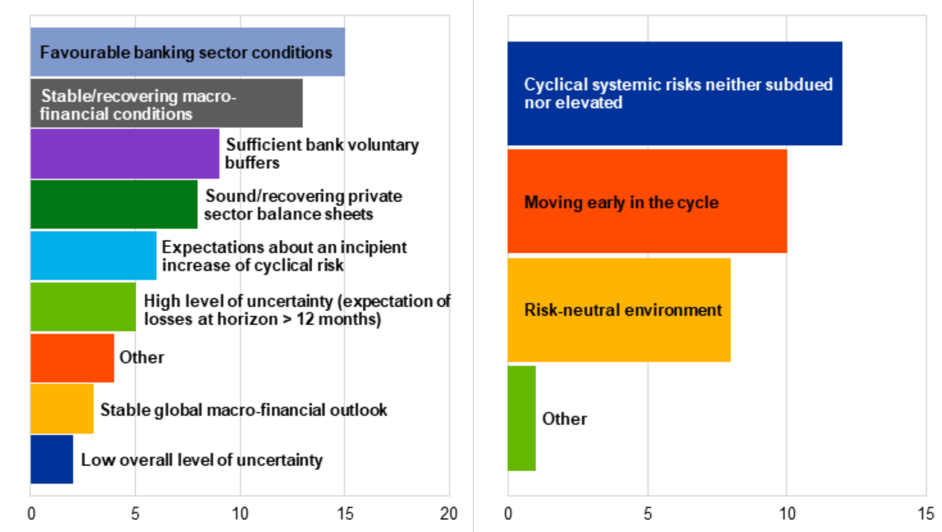
Stable macro-financial environment and a strong banking sector are the most important conditions for the activation of the PN CCyB

a) In your jurisdiction, what are the (maximum) five most important conditions to guide the activation of the PN CCyB?

(Number of respondents)

b) In your framework, is the PN CCyB linked to any of the following concept(s)?

(Number of respondents)



Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.

In most countries, decisions on the activation and build-up of the PN CCyB rate are informed by indicator frameworks, complemented by expert judgement. Ten out of the 17 jurisdictions that have implemented a PN CCyB rate have also developed indicator frameworks. The indicators included in such frameworks are usually selected based on academic literature or considering national specificities. In fewer cases, indicators are selected based on their early-warning properties, learning from approaches of other countries or based on the ESRB recommendation on setting CCyB rates.[24] However, discretion remains an important element of the decisions to activate and build up the PN CCyB: in eight jurisdictions, decisions are based more on discretion than on the direct application of quantitative rules, while seven report that rules and discretion have equal importance in the decision. Only one country bases its decisions on activation and build-up mostly on quantitative rules rather than on discretion.

In most cases, the activation of the PN CCyB rate does not depend on quantitative thresholds but rather on a qualitative assessment of the indicators relative to their historical performance. Out of 11 respondents, five set thresholds to guide the activation of the PN CCyB rate. These thresholds are mostly based on the indicators' historical distributions. In SI, PL and PT, the authorities identify the

24 ESRB Recommendation of 18 June 2014, On guidance for setting countercyclical buffer rates, ESRB/2014/1.

neutral risk environment on the basis on the values of the composite indicators of cyclical systemic risk/financial cycle used to support the calibration of the CCyB. Specifically, the neutral risk environment is defined as a period where the indicator of cyclical systemic risk assumes values consistent with low or standard cyclical systemic risks (see **Appendix C**).

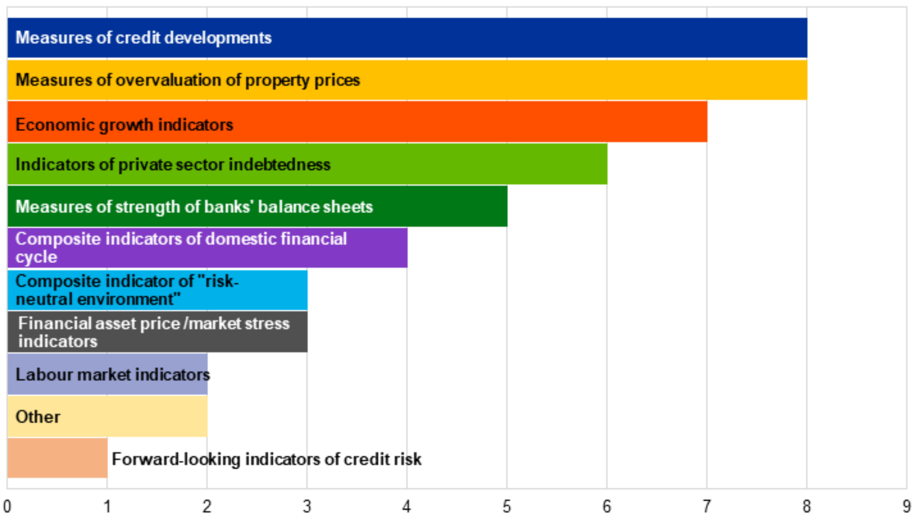
The same categories of indicators are used to inform both the activation and the build-up of the PN CCyB, while banking sector indicators are mostly considered in the activation phase. Respondents broadly indicate that indicators used to guide the activation of the PN CCyB are the same as those used to determine the subsequent build-up of the buffer. Specifically, such indicators relate to credit developments, overvaluation of real estate prices, macroeconomic performance and private sector indebtedness (see **Chart 3.3**). In contrast, only a few countries that see banking sector conditions as critical for the activation also focus on bank balance sheet strength for the build-up of the buffer. Taken together, these answers suggest that the main conditions for guiding the activation are similar to these considered for the build-up, except for banking sector conditions.

Chart 3.3

The setting of the PN CCyB appears to be driven by a multitude of indicators

What are the main categories of quantitative indicators guiding the activation/build-up of the PN CCyB?

(Number of respondents)



Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.

Consistent with the objective of building up the CCyB early in the cycle, in nearly all cases the indicators guiding the setting of the PN CCyB are the same as those informing the setting of the CCyB in general. This holds for nine out of 17 jurisdictions having introduced a PN CCyB rate. Only NL weighs indicators differently according to whether they are used for setting the CCyB in a risk-neutral environment or when risks are elevated. Specifically, while economic growth and bank balance sheet indicators are considered relatively more important for setting the PN CCyB rate, indicators of credit developments and overvaluation of property prices are deemed relatively more important for setting the CCyB in general. Overall, this suggests that the same indicators are used to guide the setting of the CCyB in different phases of the cycle. **Appendix C** illustrates how this approach is implemented in SI, where the CCyB is calibrated at or above the PN rate according to the values of a composite indicator of cyclical systemic risk.

Following a decision to activate the buffer, a gradual implementation of the PN CCyB rate is the preferred approach by most jurisdictions, principally to minimise negative consequences for lending supply. Most countries having implemented a PN CCyB rate opted for a gradual phasing-in of the PN CCyB rate. In HU, a 0.5% CCyB had been announced prior to the introduction of the 1% target PN CCyB rate. The target rate was therefore reached with an additional 0.5 percentage point increase. SE emphasises the importance of gradually building up the buffer, especially after a release during a crisis. Ensuring that buffers are not replenished too quickly after a release is considered important to increase the likelihood that banks will use the released capital. In the case of CY, the 0.5% minimum PN CCyB rate was implemented in one step. Since then, the authorities increased the PN CCyB rate further to 1% in light of favourable macroeconomic conditions. Among the countries implementing a gradual phasing-in, seven relied on the same indicators to guide the speed of the build-up as those used to inform the activation of the PN CCyB rate.

3.3 Release of the positive neutral CCyB and subsequent replenishment[25]

Overall, different conditions and indicators guide the release of the CCyB depending on whether the buffer rate is intended to remain above or fall below the PN rate. Specifically, in the EEA countries having adopted a PN CCyB framework, the release of the CCyB below the PN rate is expected to occur when the banking sector needs immediate relief, whereas a reduction of the rate while remaining above the PN target rate reflects lower cyclical risks in the absence of capital constraints. Consistent with this reasoning, the conditions and the related indicators considered by authorities to guide the release of the CCyB differ if the buffer is reduced to levels above or below the PN rate.

Observed or expected credit tightening and bank losses are the main factors driving releases of the CCyB below the target PN rate. Observed or expected significant tightening of bank credit supply driven by bank capital constraints and materialisation of credit risk are the main conditions informing a release of the CCyB below the PN rate (see **Chart 3.4,** panel a). According to respondents with a PN CCyB in place, these conditions could be signalled respectively by indicators of credit growth and credit quality such as NPLs. Most authorities would release the PN CCyB below the target rate in the event or expectation of credit losses stemming from shocks that are related and unrelated to domestic financial imbalances. One

[25] Prepared by Giorgia De Nora (coordinator), Alexei Alupoaiei, Antoaneta Amza, Štěpán Pekárek, Artur Rutkowski and Diogo Serra.

jurisdiction only considers losses stemming from shocks unrelated to domestic financial imbalances as relevant. Six jurisdictions would also release the CCyB below the target PN rate if there were signs that the financial cycle has entered a downturn phase. For most of these countries, real estate indicators play a significant role in guiding a release, most likely due to the prominent role of real estate markets for financial stability. Furthermore, some authorities rely on high-frequency financial market indicators, which are deemed to convey early signs of distress. Two institutions (SI, ECB) have developed quantitative approaches to inform the release of the CCyB (**Appendix D**).

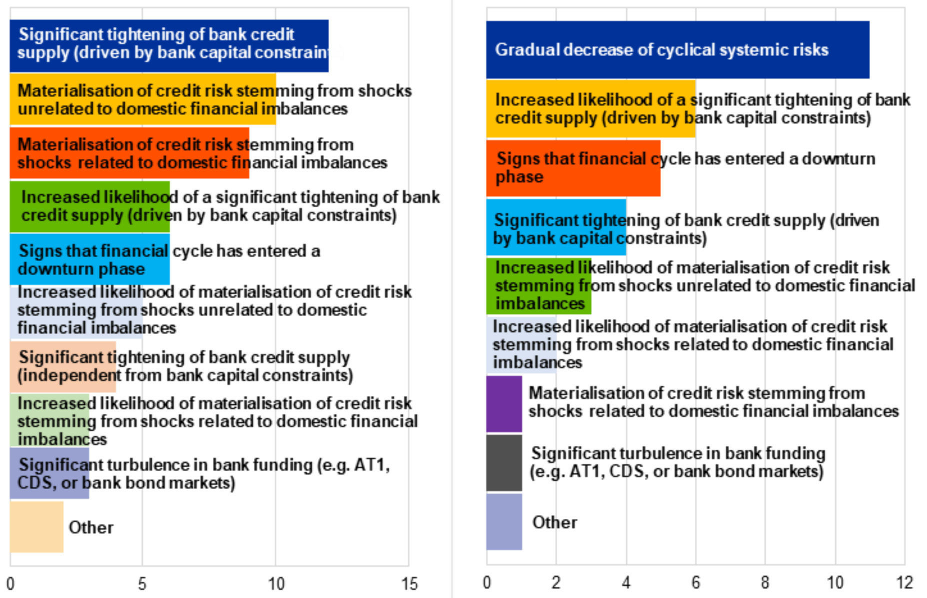
Gradual decreases in cyclical risks drive reductions of the CCyB that remain in the area above the PNR. Gradual decreases in cyclical systemic risks, reflected in the evolution of indicators of credit growth and in economic growth, are the most common indicators guiding the release of the CCyB, while remaining above the target PN CCyB rate (see **Chart 3.4**, panel b). In this case, indicators reflecting the materialisation of credit risk, credit supply constraints and financial markets indicators play a minor role, emphasising the slower and gradual nature of the dynamics driving the release of the CCyB above the PN rate. Some authorities also consider observed or likely tightening of bank lending, due to capital constraint and signs of a financial cycle downturn, as relevant conditions for releasing the CCyB, while remaining above the target PN rate.

After a release, the period where no increases in the CCyB are expected is mostly contingent on the prevailing banking sector and macroeconomic conditions. While most countries have an ex ante reference period of one year, this period is fixed in only two countries. In the case of PL, the period should be at least two years, while SI considers higher transparency and predictability the main benefits of a fixed replenishment period. Some authorities do not envisage the no-replenishment period for the PN rate as being necessarily different from that of the CCyB to address cyclical systemic risk, as the former cannot be established ex ante. In some cases, the no-replenishment period is instead foreseen to be shorter than that for the CCyB to address elevated cyclical systemic risk. This is based on the concept that a standard risk environment will precede a period of heightened risk environment. Some jurisdictions highlight the important role of transparency in the communication of conditions for replenishment to incentivise banks to use the released buffer.

Chart 3.4

Conditions for release vary depending on whether the CCyB stays above or below the PN CCyB

a) Please indicate up to five most important conditions to guide the (full or partial) release of the CCyB below the positive neutral level (release of both the PN rate and the CCyB to address emerging cyclical systemic risks).	b) Please indicate up to five most important conditions that guide the (partial) release of the CCyB, while remaining above the positive neutral rate (release of only the CCyB to address emerging cyclical systemic risks, but not of the PN rate).
(Number of respondents)	(Number of respondents)



Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.

After the no-replenishment period, nearly all countries approach the replenishment of the PN CCyB rate by following the evolution of relevant indicators. Among the 17 respondents with a framework in place for the PN CCyB, 12 indicated that the replenishment of the PN rate would follow the evolution of the indicators that are considered relevant. Almost all the respondents also reported that they would communicate the timing and modalities of the replenishment to the public and banks, including the relevant indicators and considerations that would guide the replenishment path.

Box 5

The Danish experience with the release and replenishment of the CCyB

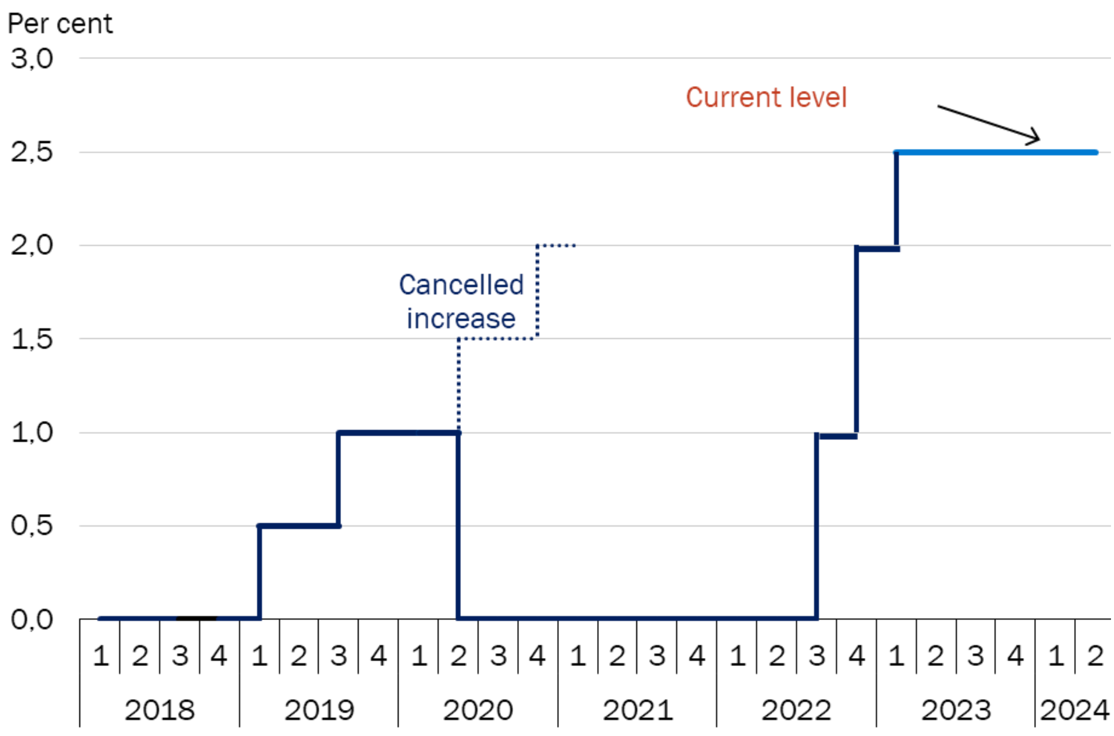
Prepared by Ianna Yordanova

The Danish approach to the release and replenishment of the CCyB emerged in part from practical experience. When the Danish CCyB was released in March 2020 in response to the COVID-19 related crisis, it was accompanied by forward guidance regarding the expected future level of the CCyB. The release happened against the background of an unexpected external shock with high uncertainty about the extent of the potential negative impact, both for the Danish economy and the banking sector (**Chart A**). At the time of the release, the Systemic Risk Council also communicated that it did not expect to recommend an increase of the buffer rate until 2021 at the earliest. The statement stressed that the timing of replenishing the CCyB would depend on developments in systemic risks and that it might be necessary to rebuild the countercyclical capital buffer at a faster pace, should economic recovery speed up.

The replenishment of the buffer happened in large steps over a short period of time, reaching 2.5% over three quarters between September 2022 and March 2023 (see **Chart A**). Overall, the assessment was that cyclical systemic risks remained at pre-COVID-19 levels, commanding a higher level of CCyB. The assessment was based on indicators of cyclical systemic risk (asset prices, volatility, economic developments) as well as lending conditions and banks' financial soundness indicators (FSIs). As risks of larger losses due to the COVID-19 crisis did not materialise and bank profitability remained sound, there were no signs of credit constraints. Based on the experience gained during COVID-19, the method for releasing the CCyB was subsequently revised, putting more weight on indicators of institutions' lending capacity i.e., whether earnings are low or capital headroom is diminishing, and specific signs of loan losses.

Chart A

Release and fast replenishment of the CCyB in Denmark



Sources: Danish Systemic Risk Council.
Notes: The chart shows the path of the CCyB in Denmark. The CCyB was released in March 2020, following the outbreak of COVID-19 and the shutdown of large parts of the economy. The CCyB was replenished over three quarters up to the current level of 2.5%. In June 2021, the Systemic Risk Council recommended an increase of the buffer by 1% and gave forward guidance on an expected an additional one percentage point increase.

4 Integrating positive neutral CCyB approaches in overall macroprudential policy strategies[26]

4.1 Capital neutrality and use of the CCyB through the cycle

Consistent with the risk-based nature of the CCyB, a majority of jurisdictions do not consider it important to offset the introduction of a PN CCyB by reducing other capital requirements (see Chart 4.1, panel a). Capital neutrality is generally understood to mean implementing changes to the mix of capital-based measures without altering the overall level of capital requirements imposed on financial institutions. Six authorities explicitly state that a capital-neutral implementation of the PN CCyB would contrast with its intended objective to increase resilience over the cycle. Further, eight jurisdictions indicate that a capital-neutral implementation would imply taking an outcome-based approach rather than a risk-based perspective, i.e., assessing the appropriateness of total capital requirements without taking the level of systemic risk into account. Under a risk-based approach, the build-up of capital requirements should reflect the evolution of the risk they are intended to cover.

However, capital neutrality could be relevant under specific circumstances. Some countries deem capital neutrality as not being an important condition for the possible introduction of a PN CCyB in their jurisdiction. However, it could be justified by the prevailing policy mix, potential overlaps with other requirements and double counting of risks. One country considers capital neutrality to be an important issue when examining the relevance of a possible implementation of the PN CCyB, if the existing, overall capital requirements are considered appropriate.

In 14 out of the 17 jurisdictions with a PN CCyB (all except EE, IS and NL), the implementation of a PN CCyB increased capital requirements at the time of its introduction. In two jurisdictions (EE, NL), the SyRB that had been implemented prior to the COVID-19 pandemic was released during the COVID-19 crisis and subsequently replaced with a PN CCyB rate. This led, in effect, to a capital-neutral implementation (see **Box 3**). In IS, a framework for the PN CCyB rate was introduced when a 2.5% CCyB rate was already applicable. Finally, SI introduced the PN CCyB while simultaneously reducing the SyRB due to eased systemic risk in the residential real estate market. Nonetheless, this still resulted in an overall increase in capital requirements.

The total capital impact (in RWA) of the PN CCyB differs between countries and is larger in smaller countries with internationally active banks. Such heterogeneity is mainly driven by the different PN CCyB rates implemented across

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[26] Prepared by Ties Busschers, Evelyn Herbert (coordinators), Brendon Cassar, Gottfried Gruber, Lana Ivičić and Alexandre Reginster.

countries (see **Sections 2 and 4**). In addition, in general the applicable domestic CCyB is proportional to the share of domestic exposures. This implies that the impact of the applicable PN CCyB is smaller in jurisdictions with a predominance of internationally active banks than in those with banks with a more domestic focus.

In practice, a PN approach affects the timing of the CCyB activation, but not the level of the CCyB at the peak of the cycle. Theoretically, the introduction of a PN CCyB might impact how a CCyB is used in three ways: the timing of its activation, its level at the peak and its average level through the cycle. Jurisdictions (e.g. DK, EE, IS, NL) indicate that their implementation of PN CCyB resulted in earlier activation of the buffer in the financial cycle. While the PN CCyB does not increase CCyB requirements at the peak of the financial cycle in most jurisdictions (see **Chart 4.1**, panel b and **Box 6**), such an approach will entail a higher average level of capital over the financial cycle.

Chart 4.1

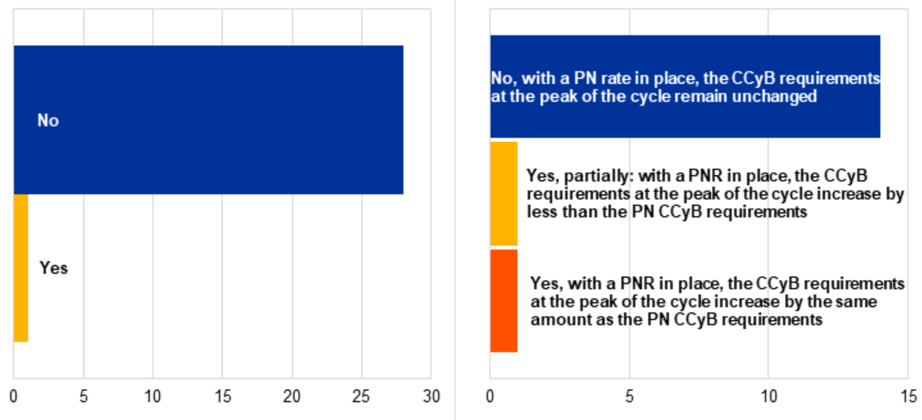
Capital neutrality and implications of a PN CCyB for the overall CCyB requirements at the peak of the cycle

a) In your view, is capital neutrality an important condition for the introduction of the PNR in your jurisdiction?

(Number of respondents)

b) Will the introduction of a PN CCyB rate affect the overall level of CCyB requirements at the peak of the cycle in your jurisdiction?

(Number of respondents)



Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.

Box 6
Implications of a PN CCyB rate for the CCyB at the peak of the cycle

Prepared by Milda Stankuvienė, Max Larsson, Ties Busschers, Artur Rutkowski, Anita Suurlaht-Donaldson and Ilze Vilka

Lithuania

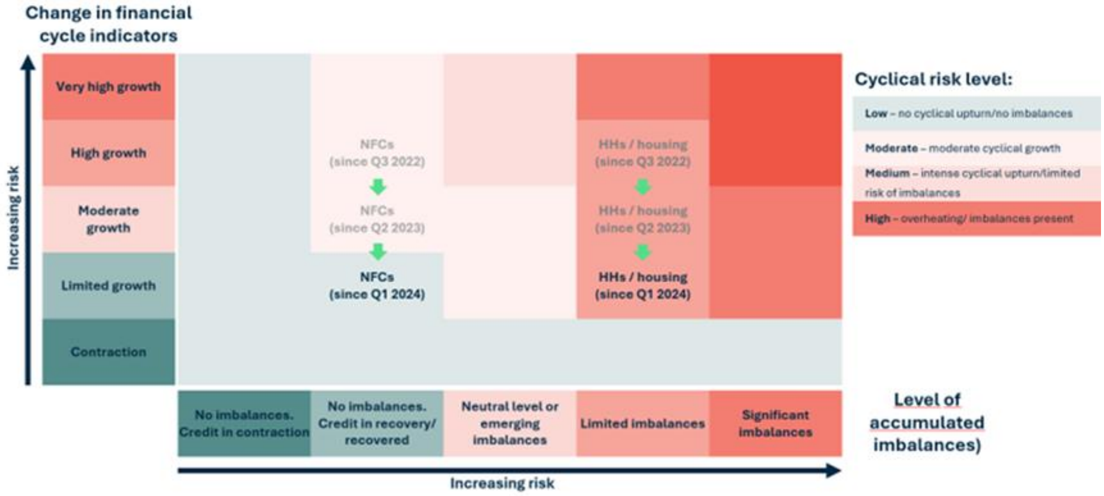
In Lithuania, the PN CCyB does not affect the overall level of CCyB requirements at the peak of the cycle. In the Lithuanian CCyB framework, the evaluation of the level of cyclical systemic risks is structured along two dimensions: the change in the financial cycle and the level of accumulated imbalances. The interrelation between these two dimensions warrants a joint assessment, especially in the Lithuanian context, where the development of variables along these two dimensions can vary greatly. For example, after a prolonged period of contraction and stagnation following the financial crisis in 2008 and 2009, Lithuania experienced periods of strong credit and house price growth while, at the same time, indebtedness and the overall level of financial imbalances remained low. In these circumstances, systemic risks were considered to be rising, with an increased likelihood of future imbalances building up.

Taking into account country specificities and expert judgement, a cyclical risk assessment matrix was developed and is currently used to inform the decisions on the setting of the CCyB rate based on the level of cyclical systemic risks (see **Chart A**). The change in financial cycle indicators and level of accumulated imbalances, and the resulting level of cyclical systemic risk for each sector, is determined based on an underlying indicator heatmap. Using expert judgement, the indicator heatmap insights are summarised in each quarter to provide information on the overall change in the financial cycle. Information is provided separately on the level of financial imbalances for NFC and HH sectors.

According to the framework, the CCyB rate is increased up to a 1% target PN CCyB rate when cyclical systemic risks reach moderate levels. This phase is characterised by active credit and real estate markets, but no accumulated imbalances. The CCyB rate is further increased above the 1% positive neutral rate, consistent with the change in the level of cyclical risk and should reach at least a rate of 2.5% in an environment of high cyclical risks, when a significant level of accumulated imbalances is observed. The final decision on the appropriate CCyB rate is met using the matrix as a starting point, and further complementing it with qualitative information and expert judgement. It should be noted that the matrix does not inform the CCyB release decisions.

Chart A

A cyclical risk assessment matrix is used to assess the level of cyclical systemic risk for NFC and HH sectors in Lithuania on a quarterly basis



Source: Lietuvos bankas

The CCyB rate is set on the basis of broad-based cyclical risk, while the remaining sector-specific cyclical risks are covered by more targeted measures. Using the matrix (see **Chart A**), the level of cyclical risks is determined for NFC and HH sectors separately due to the different characteristics of these sectors. More targeted measures, for example a sectoral SyRB or risk weight measures, would be then additionally applied to the sector that exhibits the highest level of cyclical systemic risks.

Sweden

In Sweden, the PN CCyB does not affect the overall level of CCyB requirements at the peak of the cycle. The Swedish Financial Supervisory Authority, Finansinspektionen, applies a 2% PN CCyB rate when systemic risks are neither elevated nor subdued. As a consequence, the CCyB rate could be higher than 2% over the financial cycle due to systemic risk building up. However, Finansinspektionen will only raise the rate above the neutral level when the assessment of systemic risks justifies it, i.e., when cyclical systemic risks are significantly elevated. If systemic risks are high or growing significantly faster than what is sustainable in the long run, it may be necessary to implement a buffer rate higher than 2.5%. In such cases, Finansinspektionen will request reciprocity from affected foreign authorities. Hence, the 2.5% threshold for automatic reciprocity is not seen as a cap on the buffer rate.

Poland

In Poland, the PN CCyB does not affect the overall level of CCyB requirements at the peak of the cycle. This strategy reflects the recognised difficulty in identifying emerging risks in the early phases of the cycle. In the Polish methodology, the PN CCyB is meant to account for these unidentified (unobserved) risks, which may be concealed by noisy data. Therefore, to avoid double counting of risks, the PN CCyB's calibration is not additive to the CCyB that addresses cyclical systemic risks.

The introduction of the PN CCyB in Poland has resulted in an overall increase in capital requirements throughout the financial cycle. The PN CCyB is perceived as a forward-looking way of setting the CCyB and is binding for banks when cyclical systemic risks are at standard risk levels, which is the case during most of the financial cycle. With the exception of crisis periods, when the CCyB may be partially or fully released, the CCyB rate will not be reduced below the recommended PN CCyB.

The Netherlands

In the Netherlands, the PN CCyB does not affect the CCyB requirements at the peak of the cycle. The aim of De Nederlandsche Bank's CCyB strategy is to take into account the inherent uncertainty in measuring cyclical systemic risks that arises due to the great complexity of the financial system. An ostensibly standard risk environment may harbour growing cyclical risks that would significantly impact institutions even if they are not directly observed in the data and therefore difficult to detect. When risks start to rise slightly above the standard risk environment, De Nederlandsche Bank might not immediately increase the CCyB above its PN target rate. This is because its relatively high target rate of 2% already captures some of these additional risks. However, if one of De Nederlandsche Bank's four cyclical risk dimensions were to start signalling high cyclical risk, a rate between 2-2.5% will be considered. The CCyB may also be set at a rate above 2.5%, if multiple risk dimensions show (very) high cyclical risk levels. As such, the Dutch CCyB requirement might increase above the 2.5% mandatory reciprocity cap, but only in instances where cyclical systemic risks are very high. In such cases, De Nederlandsche Bank would ask the ESRB to issue a recommendation to reciprocate its CCyB in full.

Estonia

In Estonia, the PN CCyB does not affect the overall level of CCyB requirements at the peak of the cycle. The overall CCyB requirement consists of the PN CCyB and a cyclical component. A PN CCyB was deemed necessary to address the structural vulnerability of the Estonian economy and the financial sector. Except during crises and the ensuing recovery phase, the PN will always be set at 1%, a level considered sufficient to cover the possible negative impact of unexpected shocks.

Eesti Pank assesses the credit cycle in Estonia using two main indicators: the change in indebtedness, and the gap between the growth in debt and the growth in long-term nominal GDP. Eesti Pank considers increasing the cyclical requirement of the CCyB when the assessment of cyclical risk indicates that risks are increasing, and the buffer guide that is calibrated using the gap between the growth in debt and the growth in long-term nominal GDP exceeds the threshold calculated. The cyclical component is raised in 0.5 percentage point steps. The cyclical component can also be raised if the cyclical risks remain high and credit growth is deemed to be elevated during the two quarters following the application of higher cyclical rates. Fast credit growth, even if not excessive, could mean that risks are accumulating and that larger capital buffers are needed.

Latvia

In Latvia, the PN CCyB does not affect the overall level of CCyB requirements at the peak of the cycle. When cyclical risks start to increase, the CCyB requirement is increased proportionally to the level of risk, starting from the PN CCyB rate of 1%. The 1% PN CCyB rate is calibrated to provide sufficient room to increase the CCyB before the cap on mandatory reciprocity is reached. A CCyB increase above the PN CCyB rate may happen under one of the following two conditions: (i) cyclical systemic risks are increasing (usually signalled by an acceleration of lending and asset (in particular, real estate) prices as well as growing private sector debt) and (ii) risk appetite is increasing, lending standards are being loosened and risks may not be properly estimated. Signs of overheating may be observed in the domestic economy and/or external macro-financial environment.

4.2 Overlaps with other requirements

Most members do not see overlaps between the PN CCyB and other capital requirements. However, those who do mainly refer to overlaps with the SyRB. Overlaps occur when the same type and level of risk is addressed with different capital requirements. Views on whether a PN CCyB could overlap with other capital requirements, and how, differ markedly across institutions (see **Chart 4.2**). About half of the jurisdictions see no overlap between other capital requirements and the PN CCyB, but others identify potential conceptual overlaps, mainly with the SyRB. Only a few authorities identify a potential overlap with the CCoB or the P2G. One authority notes that a partial overlap with the P2G could arise due to the cyclical element of the stress testing methodology. This is also referred to in the EBA Guidelines governing the Supervisory Review and Examination Process (SREP). These guidelines state that, in exceptional cases, competent authorities should offset the P2G on a case-by-case basis against the CCyB, based on considering the risks covered by the buffer and those factored into the design of the scenarios used for the stress tests.[27] No members see overlaps with the O-SII/G-SII or the P2R.

[27] EBA/GL/2022/03, paragraph 435

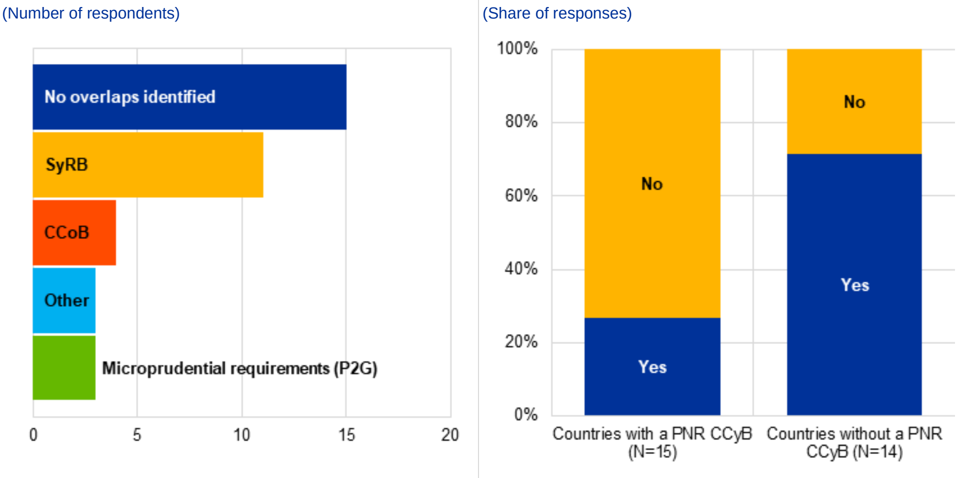
Countries with and without a PN CCyB have strikingly different views on potential overlaps between the PN CCyB and other capital requirements (see Chart 4.1). About 70% of those jurisdictions without a PN CCyB see a potential overlap between a PN CCyB and other requirements. This percentage is around 25% for countries with a PN CCyB in place. This could imply that a jurisdiction's view on the existence of potential overlaps partially determines the willingness to adopt a PN CCyB (see **Section 2.2**). Further, countries without a PN CCyB that see conceptual overlaps with other requirements may choose to apply other buffers like the SyRB as alternatives to the PN CCyB. Countries with a PN CCyB, however, are of the view that they have calibrated all their capital requirements in a way that avoids these overlaps.

The wide range of views on potential overlaps between the PN CCyB and the SyRB suggest that a better distinction between the objectives of these instruments would improve clarity. The potential overlap is mostly identified in the possibility of using both the SyRB and the PN CCyB to address exogenous shocks. Two countries conclude that both instruments could be appropriate in order to achieve this objective. However, other jurisdictions see an overlap when the PN CCyB is used to cover non-cyclical risks. In some jurisdictions, the implementation of a PN CCyB would create de facto overlaps given the design of the SyRB. For example, introducing a PN CCyB would create overlaps in AT and IT, as the currently applicable SyRBs in these countries target similar risks. In addition, there could be overlaps with the sectoral SyRB depending on its scope and calibration, as indicated by HR. Overall, these findings suggest that a better distinction between the objectives of the two instruments could help reduce potential overlaps.

Chart 4.2

Countries with and without a PN CCyB have strikingly different views on potential overlaps with other requirements

Have you identified potential overlaps between the PN CCyB and other prudential requirements (other capital buffers or any other prudential requirements)? If you have identified overlaps, please indicate the overlapping prudential requirements.



Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.

4.3 Considerations on buffer usability and willingness to use buffers

Banks may be unable or unwilling to use the capital freed up in the event of a CCyB release, which could impede the effectiveness of the instrument. The regulatory framework for banks is characterised by a set of parallel constraints. That is, the same unit of capital can be used to meet simultaneously the requirements of the risk-weighted and leverage ratio framework, as well as some of the requirements stemming from the resolution framework (Minimum Requirement for Own Funds and Eligible Liabilities – MREL).[28] A CCyB release (i.e., a decrease in the buffer requirement of the risk-weighted framework) should effectively increase the amount of capital available for use by banks within the risk-weighted framework. However, that could in turn mean that minimum requirements under the leverage or the resolution framework become binding instead, hampering the ability to fully use the released capital. Effective buffer usability can therefore be defined as the proportion of the combined buffer requirement (CBR) that can be used without breaching the leverage ratio and MREL minimum requirements. It was lower in the pre-pandemic period and increased thereafter (ECB, 2023).

By increasing total capital requirements, a PN CCyB can alleviate constraints to buffer usability stemming from parallel requirements. Most members (17 out of 30) answered that a PN CCyB, in theory, promotes buffer usability simply because it increases the amount of buffers in the risk-weight framework. Mechanically, a PN CCyB might elevate the CBR above the leverage ratio minimum requirement and therefore render a higher portion of the CBR effectively usable. The same logic applies to MREL requirements – those expressed as a percentage of the total leverage ratio exposure measure (MREL-LR) and the total liabilities and own funds (TLOF) requirement. However, for MREL expressed as a percentage of the total risk exposure amount (MREL-TREA), the introduction of a PN CCyB does not affect the relative bindingness of the CCyB and MREL-TREA (although it does reduce the available excess capital). This is because the amount of capital needed to meet buffer requirements in both frameworks increases by the same amount: the PN CCyB increases the CBR in the RWA framework; it also increases the CBR-M in the MREL-TREA framework, as the CBR-M sits on top of the MREL-TREA minimum requirements.

However, benefits in terms of increased buffer usability are not unique to the PN CCyB. As indicated by some jurisdictions, the effect is not inherent to the PN CCyB, but would occur with any increase in the CCyB. However, one jurisdiction also notes that the PN CCyB framework generally promotes early activation of the CCyB. Therefore, in principle the PN CCyB increases buffer usability more frequently than a non-PN CCyB framework. Further, some members indicate that the PN CCyB has an edge over other buffers in terms of promoting usability of excess capital, as it does not increase MREL-TREA minimum requirements while other buffers do. For a

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[28] See the ESRB's Report of the Analytical Taks Force on the overlaps between capital buffers and minimum requirements, December 2021.

full explanation of how this works, please see **Box 7**. Other members answered that, in practice, the effect of the PN CCyB on buffer usability could be small.

The impact of the PN CCyB on banks' willingness to use released buffers is influenced by banks' expectations regarding future replenishment. Quite a few jurisdictions believe that a PN CCyB can increase the willingness to use released buffers. However, even more maintain that a PN CCyB does not have any impact on it. The remaining members argue that the matter requires more study. On the one hand, a PN approach to the CCyB results in a more active use of the buffer over the cycle, implying higher average capital requirements. This can create a larger capital distance to the minimum requirements, possibly reducing the fear of stigma and thereby increasing a bank's willingness to use buffers.[29] On the other hand, the very same more active use of the buffer over the cycle could also reduce banks' willingness to use it, due to expectations of early replenishment. Therefore, clear, credible and transparent communication on the timing and conditions of the CCyB's replenishment are crucial to incentivise banks to use buffers (see **Section 3.3** and **Box 7**). One jurisdiction indicated that the timing of the buffer release has an impact on banks' willingness to use the released buffer. Specifically, when a buffer release takes place after significant risk materialisation, i.e., when large-scale losses have already occurred, banks may be forced to use the released capital. By contrast, in a situation where a buffer release takes place before systemic risks have fully materialised, banks may be less willing to use the released capital at that stage, for example, to support borrowers through forbearance measures, if they would expect the PN CCyB rate to be replenished sooner.

Box 7
Interaction of the CCyB and the SyRB with MREL-TREA requirements

Prepared by Evelyn Herbert

A CBR increase because of an increase in the CCyB or the SyRB raises the Maximum Distributable Amount (MDA) threshold in the risk-weighted capital requirements framework. The MDA threshold is crossed when banks dip into their combined buffer requirements. When this happens, different capital conservation measures (e.g., restrictions on distributions) apply to banks.

An increase in the CBR also increases the amount of capital needed to comply with the overall requirements in the MREL-TREA framework. This is because the CBR "stacks" on top of MREL-TREA requirements; this is referred to as CBR-M (see **Chart A**, middle panel). Therefore, the increase in the CBR also raises the MDA threshold in the MREL-TREA framework (M-MDA threshold), i.e., the capital needed to comply with the CBR-M. As a result, excess capital is reduced, and the M-MDA threshold can be breached earlier than the MDA threshold, if no excess MREL-eligible resources other than CET1 are used to meet the requirements in the MREL-TREA framework. This impact is the same, regardless of whether the CBR increases via an increase in the CCyB or an increase in the SyRB. Breaching the M-MDA threshold may lead to restrictions on

[29] See also BCBS, 2022, Buffer usability and cyclicality in the Basel framework, Bank for International Settlements.

distributions. However, this is not automatic because the resolution authority, after consulting the competent authority, assesses whether to exercise this power in case of a breach.[30]

In addition, the increase of some capital buffers not only affects the CBR on top of MREL-TREA requirements but also the MREL-TREA requirements themselves. The MREL-TREA is composed of three components: (i) the loss absorption amount (LAA), set for all banks to cover losses relating to the failure of a bank; (ii) an additional recapitalisation amount (RCA) that applies to all banks for which resolution is necessary in order to ensure compliance with regulatory capital requirements following resolution and (iii) a market confidence charge (MCC) that is applied where warranted to ensure that a bank sustains market confidence post-resolution. The MCC is generally calculated as the CBR minus the CCyB. This means that while increasing the CCyB will not lead to a change in the MCC, increasing any other component of the CBR, such as the SyRB, will raise the MCC and thus the MREL-TREA requirements.

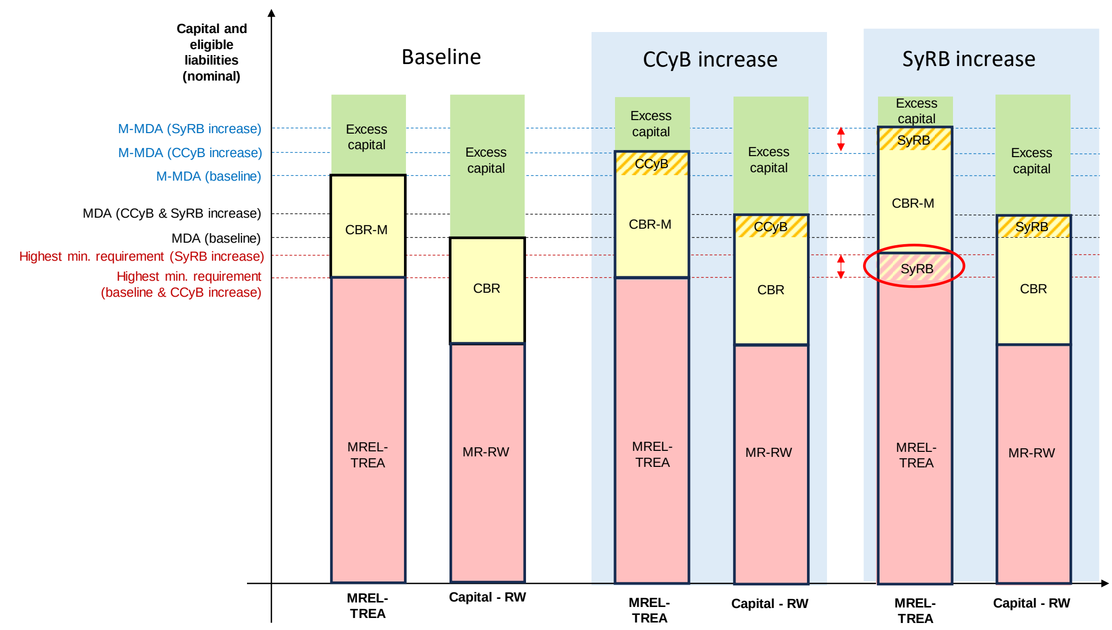
Therefore, increasing the SyRB instead of the CCyB leads to a larger increase of the M-MDA threshold (see **Chart A**). In the MREL-TREA stack, an increase in the CCyB will only increase the CBR. However, an increase in the SyRB affects the MREL-TREA stack twice: once as an increase in the MREL-TREA minimum requirements and a second time as an increase in the CBR-M. This does not impact the usability of the CBR per se, as both the SyRB and the CCyB can still be used in the MREL-TREA framework without breaching the MREL-TREA minimum requirements, and a release of both buffers would fully free up this capital in both frameworks. However, a breach of buffer requirements on top of the MREL-TREA may then arise earlier when the SyRB is increased than if the CCyB would have been increased because ceteris paribus there is less excess capital.

Therefore, the CCyB and also the PN CCyB have an advantage in terms of implying lower capital demand and thus promoting usability of excess capital. This is because they do not increase MREL-TREA minimum requirements while other buffers do. It should be noted, however, that for banks that are constrained by leverage ratio requirements or MREL-LR, an increase in MREL-TREA minimum requirements may actually increase buffer usability, since it pushes up the capital stack on top of which the CBR is placed. In other words, the higher the MREL-TREA, e.g., via the activation of a SyRB, the larger part of the CBR may move above the LR and MREL-LR requirements.

[30] Article 16a BRRD.

Chart A

Stylised interaction between buffer requirements and the MREL-TREA in case of a CCyB and an SyRB increase



Source: ESRB Secretariat

Notes: All components in the RW stack are expressed in CET1 terms. MR-RW = risk-weighted minimum requirements (risk-weighted capital stack) comprising Pillar 1 + Pillar 2 and the AT1/T2 gap, MREL-TREA = MREL expressed as a percentage of the total risk exposure amount, CBR = combined buffer requirement, CBR-M = combined buffer requirements on top of MREL-TREA, MDA = maximum distributable amount threshold, M-MDA = maximum distributable amount threshold based on MREL The figure simplifies from possibly different consolidation levels and MREL-TREA is the highest minimum requirement.

4.4 Reciprocity considerations[31]

Most jurisdictions deem that automatic reciprocation up to at least 2.5% should apply to the CCyB. Most members deem it appropriate to maintain the current reciprocity rules for the CCyB, independently of the adoption of a PN CCyB approach, with only three authorities disagreeing. The most cited reason for automatic reciprocity is that the PN CCyB is not a different instrument, therefore the CCyB’s reciprocation framework, establishing the mandatory reciprocity of CCyB rates up to 2.5%, should apply. In addition, reciprocity up to 2.5% also supports the level playing field between domestic and foreign banks. However, other jurisdictions cite the similar nature of the PN CCyB to the SyRB, for which voluntary reciprocity applies, and the fact that the reciprocity framework was designed for the CCyB covering emerging cyclical risks as arguments against automatic and mandatory reciprocity for the PN CCyB.

Half of the jurisdictions believe that the cap of 2.5% for mandatory reciprocity should remain as is, while the other half supports either a higher cap or reciprocity in all cases. This distribution holds among members with PN CCyB as

[31] Prepared by Ties Busschers, Evelyn Herbert (coordinators), Brendon Cassar, Gottfried Gruber, Lana Ivičić and Alexandre Reginster.

well as for those without. One of the arguments cited by three out of the 16 authorities supporting the current 2.5% threshold relates to the benefits of ensuring a level playing field at the international level by remaining aligned with the Basel framework. Furthermore, one jurisdiction considers it desirable to have the 2.5% cap as a backstop, as there is currently no common, EU-wide definition of a PN CCyB and there might be definitions that are very close to or overlapping with risks addressed by other instruments in other Member States. On the other hand, seven countries are in favour of raising the threshold in the range between 3% and 5%, while seven are in favour of removing it. These views to either increase or remove the threshold are motivated by the perception that domestic authorities are in a better position to assess domestic risks than foreign ones. Also, according to one authority, the increase or removal of the reciprocation threshold would encourage the national authorities to increase the CCyB rate above 2.5% (which in some cases is currently perceived as a cap to the CCyB rate) when needed. However, no CCyB rate above 2.5% has been set in any of the EEA countries yet.

Lack of reciprocation of CCyB rates above 2.5% may jeopardise the level playing field. This is especially relevant for jurisdictions with a PN CCyB close to the 2.5% automatic reciprocation threshold. Most countries (around 75%) indicate that the reciprocation for CCyB rates above 2.5%, in light of wider adoption of the PN CCyB concept, would be assessed on a case-by-case basis. A number of factors might play a role in such decisions, e.g. whether other macroprudential capital requirements are in place, the justification for and the calibration of the PN CCyB, and the materiality of exposures to the country, as is the case for the voluntary reciprocation of other measures. Seven authorities would stand ready to reciprocate CCyB rates above 2.5% in all cases, as they believe financial stability in the EEA is best served by automatic reciprocity.

4.5 Communication strategies[32]

Most countries with a PN CCyB in place experienced limited reactions from the banking industry when it was introduced and, in some, it was well accepted. Among 11 respondents, four received no particular feedback from the banking industry, three received no pushbacks or concerns and one describes negative reactions as being limited. In some jurisdictions, the PN CCyB strategy was well accepted by industry. Authorities attributed this either to the fact that it replaced other buffers or that it was introduced at a time of favourable banking sector conditions. Such conditions include high credit and real estate market activity, economic growth close to, or above, its potential growth, a banking sector operating profitably, and banks holding ample voluntary capital buffers above requirements.

However, some countries experienced challenges when communicating the decisions to introduce a PN CCyB to the public and most countries without a PN CCyB are concerned by potential communication challenges. Among 11 respondents that introduced a PN CCyB, three experienced communication

[32] Prepared by Fleurilys Virel (coordinator), Jorge Galán, Alexandr Palicz, Anita Suurlaht-Donaldson and Domenica Di Virgilio.

challenges. Most countries without a PN CCyB identify potential challenges with communicating a PN CCyB to the public. These stem from explaining the legal feasibility or situations where the national legislation must be changed before a PN CCyB can be introduced, a lack of international guidance and EU-wide harmonisation, the perceived semi-structural nature of the PN CCyB and the use of the CCyB to cover non-cyclical risks. Nevertheless, for three countries these factors would not dissuade them from implementing a PN CCyB. For some jurisdictions, the communication challenge was to formulate the appropriate narrative related to the PN CCyB. One country stated that the change in the CCyB strategy has required more elaborate and detailed communication compared to earlier CCyB decisions. In one country, defining the narrative related to the PN CCyB was deemed challenging. This is because the international practice regarding the use of CCyB has evolved since its inception, but this evolution is not reflected in ESRB Recommendation 2014/1.

Defining the appropriate communication ahead or when introducing a PN CCyB is key to fostering acceptance by the banking sector and the public. SE and NO attributed the limited reactions received from the industry and the public to clear and detailed communication strategies (see **Box 8**). Effective communication helps steer the expectations of the banking sector on the intended path of the buffer rate. In the release phase, transparent communication on the conditions for CCyB releases and its subsequent replenishment incentivises banks to use buffers. It also addresses some concerns about buffer usability (see **Section 4.3**). Moreover, one respondent without a PN CCyB indicates that communication would be required before introducing a PN CCyB. This communication would need to describe the entire framework as well as using forward guidance to specify exactly at which stage of the financial cycle and in how many steps the PN CCyB would be replenished.

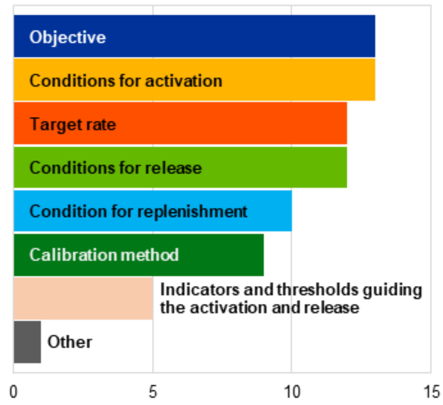
Most countries communicated on the objective of the PN CCyB, its target rate and the conditions for its activation, release and replenishment when it was introduced (see **Chart 4.3**, panel a). Out of the 12 respondents that communicated on the introduction of a PN CCyB framework, all explained the objective and conditions for activation of this instrument. Most countries opted to include in their communication the evolution of selected indicators over time, such as cyclical risk indicators and composite indicators. Two other popular choices are dashboards of selected indicators to include a wide choice of indicators and heat maps. Other characteristics often included in the communication documents are the target rate (11 respondents), the conditions for release (11 respondents) as well as for replenishment (nine respondents) and the calibration method (eight respondents). Six respondents also communicated on specific indicators (with thresholds or without) guiding the activation and release.

Chart 4.3

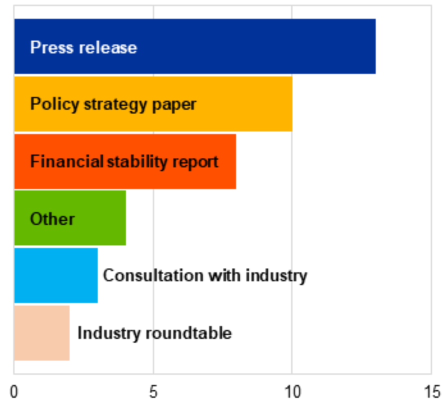
Design features of the PN CCyB communicated to stakeholders and to the public

a) If you introduced a PN CCyB framework or rate, please elaborate on what type of information was published when communicated to stakeholders and to the public.	b) If you introduced a PN CCyB rate, please elaborate on how the decision was communicated to stakeholders and to the public.

(Number of respondents)



(Number of respondents)



Sources: ECB/ESRB survey on the use of the PN CCyB rate in the EEA.

Press releases were usually supported by at least one other mode of communication (see Chart 4.3, panel b). Press releases are universally the preferred vehicle used by jurisdictions that introduced a PN CCyB framework to communicate this decision to stakeholders and to the public. Most jurisdictions also relied on policy strategy papers (nine respondents) or on their Financial Stability Reports (eight respondents). A few respondents conducted consultations or roundtables with the industry. Some of the other communication methods reported are research papers, explanatory articles, presentation of the proposed approach to the respective Ministries of Finance and finance associations, and letters to banks.

Box 8
Experiences on communicating the replenishment of a (positive neutral) CCyB after a release – Norway and Sweden

Prepared by Nina Larsson Midhjell and Max Larsson

Norway

In March 2020, Norges Bank advised the Ministry of Finance to reduce the CCyB rate from 2.5% to 1.0%. The release was motivated by a sharp fall in Norwegian economic activity related to the COVID-19 pandemic-related confinement measures implemented to contain the spread of the coronavirus. Norges Bank clearly stated that it did not expect to advise the Ministry of Finance to increase the buffer rate again until the first quarter of 2021 at the earliest. It also stated that the implementation of such an increase would not normally be effective until the first quarter of 2022 at the earliest. Norges Bank reiterated these messages in the following quarters, reassuring the banking sector that it was committed to the communicated replenishment strategy. During this time of uncertainty, Norges Bank also clearly stated that it would consider a further reduction of the CCyB rate should higher bank losses lead to clearly reduced access to credit.

Prior to the reduction in March 2020, the buffer was set at 2.5% due to a build-up of cyclical vulnerabilities in the financial system over an extended period. The cyclical vulnerabilities were still present during and after the pandemic, and Norges Bank's assessment was therefore that the buffer rate should return to 2.5% when economic conditions improved. The replenishment of the CCyB took place in three 0.5 percentage point steps. During this phase, Norges Bank adopted a clear and detailed communication policy to help manage the expectations of the banking sector. Approaching the end of the communicated low buffer period, Norges Bank stated in the fourth quarter of 2020 that it would advise increasing the buffer in the course of 2021 and that it expected the buffer to return to 2.5% in the period ahead. Norges Bank kept to its previously communicated replenishment strategy until the final step was implemented in the first quarter of 2022, with the buffer rate returning to 2.5%. Throughout the replenishment period, Norges Bank clearly communicated that the advises were given based on the current assessment of economic developments, and prospects for bank losses and lending capacity. Staying committed to a detailed and clearly communicated replenishment strategy optimised the bank's predictability during a phase of increased risk and uncertainty.

Sweden

The objective of the Swedish Financial Supervisory Authority, Finansinspektionen , is to be transparent about the considerations that guide the authority's assessments for the CCyB. Each decision on the CCyB rate is based on an overall assessment of the specific conditions at the relevant point in time. However, there is also value in communicating general principles for how Finansinspektionen intends to act. This makes it easier for banks to understand how Finansinspektionen will use the buffer, which in turn will make it function more efficiently. Finansinspektionen therefore choses to present the considerations that guide the authority's assessments regarding the CCyB in its updated framework for the buffer, which includes a stance on the target PN rate of 2%. The framework was published in March 2021. Since then, Finansinspektionen has raised the CCyB in two steps to 2%.[33]

During and immediately after the CCyB has been lowered, which would correspond to a situation when there is a need to ensure the supply of credit to the economy, Finansinspektionen will clearly communicate its risk assessment and provide guidance on future increases. Clarity about the intended path for the replenishment of capital buffers increases the likelihood that banks will consider the capital made available through releasing the buffer as usable, thus facilitating a sustained credit supply. The framework clearly states that, after a crisis, the CCyB will normally be replenished incrementally and at a rate that is in line with normal profitability. This assumes that the situation has stabilised in the banking system or the economy as a whole. Even in such a situation, it may be relevant for Finansinspektionen to communicate a plan about future decisions. If the plan is to raise the CCyB incrementally to a certain target such as the PN rate, Finansinspektionen may communicate the target and a plan for future decisions in conjunction with the decision on the first increase. Finansinspektionen's target level for the requirement depends on what type of crisis caused the buffer to be lowered. If the crisis entailed a materialisation of the systemic risks identified at an earlier stage, Finansinspektionen will gradually raise the CCyB to its neutral level. The gradual increase is a way of encouraging the banks to actually use the buffers that are being

[33] Between 2015 and 2020, FI gradually raised the CCyB to a level of 2.5%. At the onset of the COVID-19 crisis in March 2020, FI decided to reduce the CCyB from 2.5% cent to 0%. In autumn of 2021, FI then decided to raise the buffer rate to 1% and communicated that it was the first step in a gradual increase towards the neutral level of 2%. In summer of 2022, FI raised the buffer rate to 2%, which was applied one year later.

released in a crisis situation, knowing that there will be time to rebuild them in the next upswing of the financial cycle. If the return to the positive neutral rate is too quick and not gradual, it could make banks less prone to using the buffer in times of crisis.

5 Conclusion

Compared to the rest of the world, the PN CCyB approach is already widely adopted in the EEA. To date, 17 of the 30 EEA countries have adopted a positive neutral rate approach, defined in a wide sense. As reported in the "Range of practices in implementing a positive neutral countercyclical capital buffer" published by the BCBS in November 2024, only three countries outside the EEA have adopted such an approach at the time of writing: the UK (which pioneered the approach), Australia and Hong Kong. This report is designed to offer an in-depth description of the implementation experiences across EEA countries since 2017, which could serve as a useful reference for countries within and outside the region that are considering adopting such an approach. It may also provide useful information to regulatory bodies that are looking at providing further guidance on PN CCyB approaches.

One of the key findings from the report is that there can be many different motivations for the adoption of a PN CCyB approach, often co-existing. These motivations mostly relate to three areas. The first area is considerations on the need to build up the CCyB in a timely manner, to address uncertainty in the identification of systemic risks, but also to ensure that releasable capital buffers are available in the early stages of the financial cycle. The second is allowing for a more gradual and therefore less costly build-up of the buffer. The third is increasing the amount of releasable buffers, also to increase resilience against a wider spectrum of potentially large shocks. This ensures that releasable capital buffers are available also in the early stages of the financial cycle.

The report also highlights important common elements in the PN CCyB approaches adopted by EEA countries:

- **First and foremost, there seems to be broad agreement across EEA countries on what a positive neutral approach means and what it is useful for.** It is not a new buffer, but rather an earlier activation of the CCyB in an environment where cyclical systemic risks are neither subdued nor elevated.
- **Further, in most jurisdictions the adoption of a PN CCyB approach is not expected to yield higher CCyB requirements at the peak of the cycle, when cyclical systemic risks become elevated.** This is consistent with the objective of building up the CCyB early in the cycle. Importantly, favourable conditions in the banking sector and macro-financial environment are considered key factors determining the right timing to activate the PN CCyB.
- **For a majority of jurisdictions, a PN CCyB does not need to be offset by a reduction in other requirements.** Consistent with the risk-based nature of the CCyB and the objective of increasing resilience over the cycle, the majority of jurisdictions do not consider that the introduction of a PN CCyB should be conditional upon a capital-neutral implementation (i.e., offsetting its introduction by reducing other capital requirements). In particular, most countries deem that

a capital-neutral implementation could only be justified in specific circumstances, most notably to avoid double counting of risks.

- **Clear and transparent communication is perceived as a key element in the introduction and use of a PN CCyB approach.** Effective and exhaustive communication when introducing a PN CCyB is considered key to fostering acceptance by the banking sector and the public, as it makes the buffer rate more predictable. In particular, transparency regarding conditions driving the replenishment of the buffer to the positive neutral level after a release is crucial for steering banks' expectations and incentivising them to use the released capital.

The report also describes the challenges and obstacles to the implementation of a PN CCyB approach as perceived by the surveyed authorities, and potential avenues to overcome them.

- **Authorities not having adopted a PN CCyB approach often noted overlapping objectives of the SyRB and PN CCyB, as both may be used to increase resilience to exogenous shocks.** This suggests that improved clarity on the objectives of these two instruments could alleviate concerns and reduce potential overlaps.

- **Furthermore, several jurisdictions would welcome a targeted revision of the EU legislation, to clarify the possible use of the CCyB in a more proactive manner.** This would be achieved, most notably by reducing the prominence of the credit-to-GDP gap and other credit indicators to guide the setting of the CCyB.

- **ESRB member institutions also broadly support the promotion of a more consistent implementation of the CCyB (including its use early in the cycle) in the EU, while maintaining a degree of national discretion to account for national specificities.** In this context, most ESRB member institutions support an update of Recommendation ESRB/2014/1, also to provide the authorities that wish to implement a positive neutral approach with a common frame of reference for setting and calibrating the CCyB when cyclical risks are not elevated.

Appendix A – Model-based methodologies for assessing the costs and benefits of the positive neutral CCyB[34]

Macroprudential authorities in the EEA used a wide range of analytical models to assess the costs and benefits of a potential introduction of a PN CCyB. These encompassed DSGE models, factor-augmented VAR models, optimal capital approaches and at-risk models. The costs of introducing a PN CCyB are usually assessed in terms of forgone lending and/or lower economic activity. Benefits are mostly quantified in terms of a lower impact of adverse shocks on economic growth.

Finland

Suomen Pankki has conducted some preliminary calculations based on a DSGE model to assess how adjusting banks' capital requirements on the basis of the signals given by early warning indicators affects the responses of macroeconomic and financial variables to exogenous shocks.[35] As part of the analysis, the potential benefits from introducing a capital requirement framework resembling a PN CCyB were considered.

In the model, the baseline regime features a capital requirement that remains at its steady state level throughout. This is meant to replicate the current situation in Finland, where the CCyB has remained at 0% since its implementation in 2015 and the SyRB (currently at 1%) is not intended to be released. In turn, the PN CCyB case is understood as a regime where the steady state level of the capital requirement is one percentage point higher than in the baseline and the requirement is adjusted countercyclically based on a set of early warning indicators. The benefits/costs are quantified as the increased/decreased ability of certain macroeconomic and financial variables to recover from shocks under a PN CCyB regime, as well as the increased/decreased volatilities of these variables compared to the baseline regime.

The results suggest that in the long run, a PN CCyB would smooth the financial cycle, as measured by the volatility of the loan stock. By providing additional resilience in the face of exogenous shocks, a PN CCyB would support bank lending in a downturn, thus mitigating the negative impact of shocks on credit and allowing for a quicker recovery. This can be seen, for instance, when considering the responses of the total loan stock and GDP to an exogenous shock that erodes bank

[34] Prepared by Samu Kärkkäinen, Aurélien Espic, Eoin O'Brien, Domenica di Virgilio, Mara Pirovano, Valerio Scalone, Jorge Galán, Milda Stankuvienė and Ilze Vilka.

[35] The results presented here are based on Koponen, H. & Nyholm, J. (2024) "Calibrating the CCyB with a DSGE model for Finnish economy". Suomen Pankki. Mimeo.

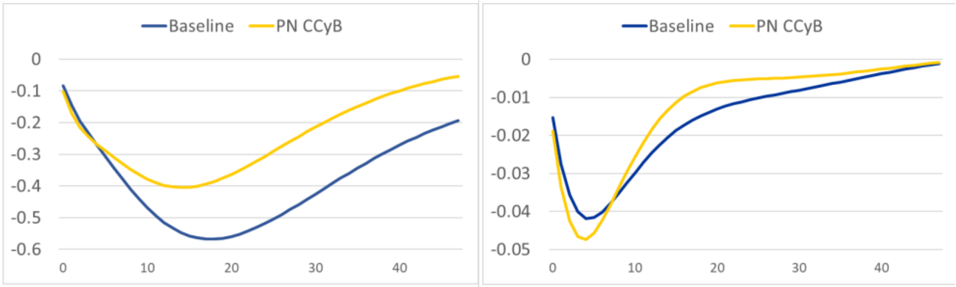
capital (see **Chart A.1**). However, the model is subject to some caveats. For example, it does not feature defaults of banks, firms or households. Also, no rigorous welfare analysis is conducted, so that the results should be interpreted with some caution.

Chart A.1

Responses of total loan stock and GDP to a bank capital shock under different capital requirements regimes for Finland

Impulse response of total loan stock | **Impulse responses of GDP**

Y-axis: percentage deviations from steady state; x-axis: quarters. | Y-axis: percentage deviations from steady state; x-axis: quarters.



Sources: Suomen Pankki.
Notes: The baseline case refers to a regime with a static capital requirement, i.e. the capital requirement does not adjust endogenously in response to early warning indicators. PN CCyB refers to a regime where the steady state level of capital requirement is 1 percentage point higher than in the baseline. In addition, the macroprudential authority adjusts the capital requirement around its steady state based on the developments in indicators. The purpose of this scenario is to mimic a situation where the CCyB can adjust downwards in response to negative exogenous shocks.

ECB

The ECB has performed an analysis of the costs and benefits of a positive neutral rate for the CCyB, using a slightly amended version of the DSGE model with three layers of default developed by Mendicino et al. (2024), calibrated to the euro area using data from 2001 to 2019.[36]

In the model, borrowing households, entrepreneurs and banks may all default on their liabilities. Capital regulation forces banks to hold a larger fraction of equity (more expensive than debt) to fund their loan portfolios. However, higher regulatory capital increases banks’ resilience (i.e., lowers their probability of default). This, in turn, reduces the social costs of bank defaults and the premium required by depositors to hold bank deposits. The CCyB rule implies that the CCyB is built up (released) when credit growth is positive (negative). To reflect the countercyclical nature of the CCyB, we focus on the short-term (four to eight quarters) impact of its activation on GDP, where we examine the role of bank profitability and a gradual build-up of the buffer in shaping the activation costs. To assess the benefits of a PN CCyB rate, we compare the impact on GDP of shocks occurring in the early stages of the financial cycle, under different levels of accumulated CCyB. Furthermore, we examine how larger releasable capital buffers can provide relief to the banking sector in the event of (potentially large) shocks. The model only considers risk-weighted

[36] For further details, please see Herrera, L., Scalone, V. and Pirovano, M. (2024), The importance of being positive: costs and benefits of a positive neutral rate for the countercyclical capital buffer, Macroprudential Bulletin, European Central Bank, Vol.24, June 2024.

capital requirements and does not account for constraints on buffer releases relating to other prudential requirements.

To assess how banking sector conditions shape the transition costs of introducing a PN CCyB rate, we allow for different costs of equity issuance in the model. The higher the cost of equity is, the higher the cost of increasing capital requirements will be. In our version of the model, we introduce the possibility for saving households to directly issue additional equity to the banks, subject to a transaction cost. Equity is transferred from saving households to the bankers who own the banking sector's net worth and, in turn, channel the available equity to both types of banks. This cost determines the importance of the equity channel and, consequently, the costs that banks face when adjusting their equity to comply with capital requirements over the financial cycle.

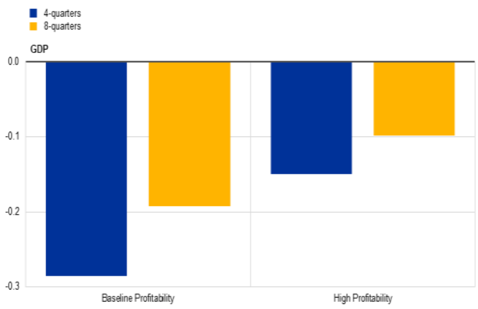
The results show that the economic costs of increasing capital requirements, including through setting a PN CCyB rate, decrease when banking sector conditions are favourable (see **Chart A.2**, panel a). The more profitable banks are, the easier it is for them to satisfy the additional requirements with retained earnings, reducing their need for deleveraging. Furthermore, a PN CCyB rate allows for a more gradual build-up of the buffer in the early stages of the financial cycle. This reduces economic costs compared with a situation where the CCyB is increased less gradually, such as when cyclical systemic risks warrant its swift activation (see **Chart A.2**, panel a). Essentially, a gradual build-up allows banks more time to increase capital through retained earnings. Building up macroprudential space early in the cycle also ensures that the banking system is resilient enough to respond to any adverse shocks unrelated to the domestic credit cycle that may occur in the early phases of the cycle (see **Chart A.2**, panel b).

Chart A.2

A gradual activation of the CCyB early in the cycle is less costly and allows the financial sector to remain resilient even in the early phase of the financial cycle

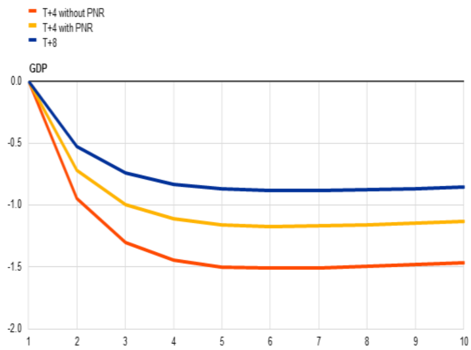
a) Impact on GDP of a 250 basis point increase in capital requirements over four vs eight quarters (positive neutral rate) under different levels of bank profitability

(y-axis: percentage deviations from the steady state)



b) Impact on GDP of an adverse shock occurring in the early (t+4) or mature (t+8) phase of the financial cycle for different levels of CCyB available

(y-axis: percentage deviations from the steady state; x-axis: quarters)



Sources: ECB.
Notes: Panel a) shows the peak effects of gradual activations of capital requirements. Two phased-in periods for the positive neutral rate (PNR) of four quarters (blue bars) and eight quarters (yellow bars) are considered. In the baseline profitability scenario, the cost of equity issuance is equal to 1.5 in line with the baseline calibration. In the high profitability scenario, the parameter is set to 0.5. In panel b), a bank risk shock causing a 10 percentage point increase in bank defaults materialises in the eighth quarter (blue line) and fourth quarter (yellow and red lines) of the phased-in periods. The timing of the GDP response is normalised to period 1, i.e. the time when the shock occurs. In the case of “t+4 without a positive neutral buffer rate (PNR)”, the capital ratios are equal to 13.3% in line with the baseline calibration. In the case of “T+4 with PNR”, the capital ratio is 1 percentage point higher than the baseline calibration. In the case of “t+8”, the capital ratio is 2.5 percentage points higher than the baseline calibration. The x-axis represents quarters since the time when the shock occurs.

France

Banque de France assesses the costs and benefits of capital-based measures in terms of GDP and welfare notably through a version of the 3D DSGE model developed by Espic et al. (2024).[37] The model features defaults for non-financial firms, borrowing households and banks, as well as nominal rigidities. The central rigidity is depositors’ myopia to banks’ individual risk profiles, which makes capital requirements socially beneficial up to a point. The PN CCyB is modelled as an additional and permanent buffer of 1% of RWA, in addition to Basel III minimum requirements (10.5% of RWA). Assessing its effects requires taking a view on the shocks affecting the economy. Of course, negative bank-level shocks make the PN CCyB beneficial, but this may not be the case when it comes to other shocks. For instance, the transition to a greener economy may lead to higher demand for credit from firms, which would be more difficult to meet with a PN CCyB in place.

We estimate the model between 2002 and 2023 and obtain estimates of eleven structural shocks.[38] Among the considered shocks are a ‘bank risk shock’, which

37 Espic, A., Kerdelhue, L. & Matheron J., Capital Requirements in Light of Monetary Tightening, Banque de France working paper no.°947, 2024.

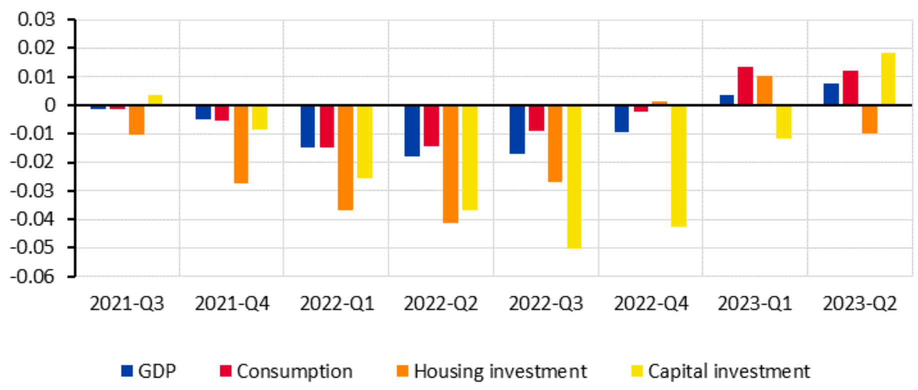
38 These shocks affect the following parameters: total productivity, labour productivity, mark-up, housing adjustment cost, capital adjustment cost, monetary policy, government spending, preference, firms’ risk, households’ risk, banks’ risk.

increases banks' probability of default, and an 'investment shock', which involves an increase in firms' credit demand. We then perform a counterfactual exercise, in which all shocks hit, but the macroprudential authorities have activated a PN CCyB. We find that, in the period from 2021 to 2023, the PN CCyB would have had no strong effect on the transmission of most shocks but could have significantly affected the transmission of the bank risk shock and the investment shock. We find that compared to a situation where only the Basel III minimum capital requirements are in place, a PN CCyB would have smoothed the impact of both the positive bank risk shock associated with post-COVID-19 recovery, as well as the negative bank risk shock associated with the Russian invasion of Ukraine. In addition, a PN CCyB would have mitigated the effects of the positive investment shock by restraining credit supply. Although the overall impact of a PN CCyB is ambiguous, it is in any case minor (see **Chart A.3**), so that the costs of a 1% PN CCyB outside periods of severe financial stress appear limited.

Chart A.3

Differential impact of estimated shocks with a 1% PN CCyB rate

(y-axis: percentage point deviation from realised growth rates)



Sources: Espic et al. (2024)
Note: The chart compares a situation with and without a 1% PN CCyB rate, by plotting the differential impact of all estimated structural shock. Two shocks account for most of this dynamic: the bank risk shock and the shock on capital adjustment costs.

Slovenia

Banka Slovenije considered several complementary factors to inform the calibration of the PN CCyB. On the one hand, the calibration of the PN CCyB rate should make the resulting combined buffer requirement (including the CCoB, SyRB and sSyRB, O-SIIs and PN CCyB) sufficient to cover the average capital losses over simulated stress scenarios, without breaching the minimum capital requirement. The results of the stress test analysis indicate a 1% rate as sufficient for this purpose. On the other hand, Banka Slovenije also recognised that a tightening of the capital requirements entails both costs and benefits, even beyond the perimeter of the banking sector. Therefore, the macroprudential authority might opt for a value of the capital buffer rate which is slightly different from the one suggested by the stress test exercise.

This would allow a better balance to be achieved between the costs and benefits of the implemented measure.

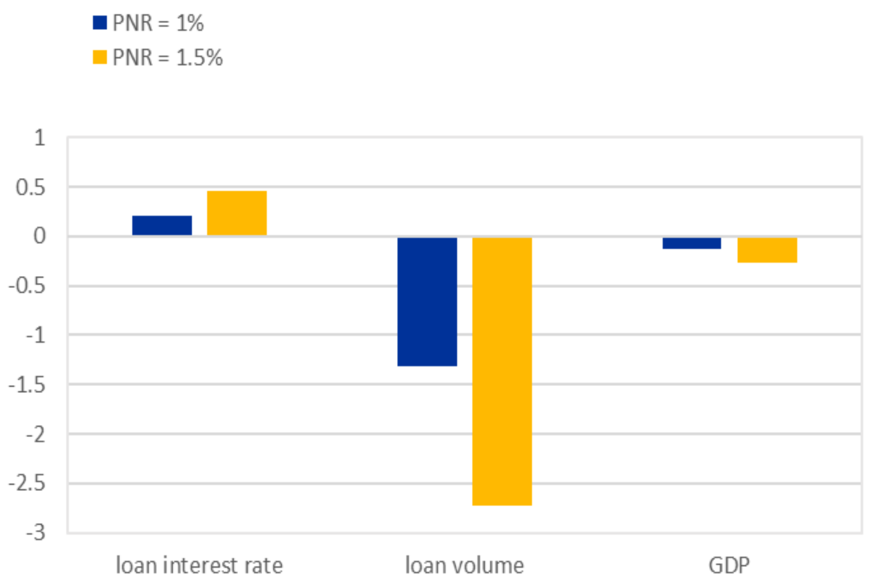
Accordingly, Banka Slovenije assessed the costs and benefits associated with two different PN CCyB rates, namely 1% and 1.5%. These are based on the DSGE model with three layers of default developed by Mendicino et al. (2015) and calibrated for Slovenia: the two considered PN CCyB rates would have entailed the transition to a higher combined buffer requirement by 0.5% and 1%, respectively, compared to a previously announced increase in CCyB of 0.5%. Given the favourable levels of bank profitability at the time of the decision and the need to act in advance of a possible materialisation of risks, the analysis focused only on the possibility of a four-quarter phase-in period. Banka Slovenije measured the simulated costs in terms of contractionary effects on credit and GDP during the phase-in period of the PN CCyB by the increase in the loan interest rate spreads over the deposit interest rate and by the contraction in loan volume. The benefits of a more resilient banking system encompassed the mitigation effects on the credit cycle, GDP and bank default probability associated with higher capital requirements in the case of several simulated adverse shocks. A comparison of these costs and benefits led Banka Slovenije to conclude that a PNR of 1% would be more appropriate than the alternative 1.5% rate (see **Chart A.4**).

Chart A.4

The introduction of a 1% PN CCyB rate, while sufficient to cover the average capital losses over simulated stress scenarios, would entail significantly lower costs compared to the alternative 1.5% rate, indicating that a 1% PN CCyB is currently more appropriate for Slovenia

Effect on credit and GDP of the introduction of higher capital requirements.

(y-axis: percentage deviation from the steady state without PN CCyB)



Source: Banka Slovenije.

Ireland

The Central Bank of Ireland employed an analytical framework that assesses the societal macroeconomic benefits and costs of bank capital. In the modelling framework, which is outlined in McInerney et. al. (2022),[39] the macroeconomic benefits of additional capital arise from the associated lower probability of a systemic banking crisis, which leads to a reduction in the expected macroeconomic banking crisis-related costs. The macroeconomic costs of additional capital are attributable to higher lending interest rates, which eventually dampen consumption and investment levels, and lead to relatively lower economic growth. Balancing these two elements, the framework allows for, with a given set of assumptions, an estimation of the level of capital at which the net macroeconomic benefits are maximised:

$$\text{NetMargBen} = (\Delta\text{CrisisProb} * \text{CrisisCost}) - \Delta\text{CapitalCost}$$

The left-hand panel of **Chart A.5** indicates the variation in the estimated level of appropriate capital, depending on the modelling assumptions employed. In this regard, choices must be made regarding the duration of crisis effects (e.g. permanent or temporary), the discount factor used to estimate the present values of lost future GDP and allowing T1 capital costs to be offset via the Modigliani Miller (MM) channel.

The marginal benefits of capital relate to two dimensions – crisis probability and the expected crisis cost. A pooled logit model (following O'Brien and Wosser (2018)) is used to estimate systemic banking crisis probabilities. To estimate the marginal effect of higher capital on crisis probability, crisis probabilities are estimated for each value of the Tier 1 capital ratio, while keeping other variables in the model constant at their sample medians. The fitted crisis probabilities then allow the marginal contribution of each additional percentage point of Tier 1 capital to be estimated. The cost of crises is estimated as the difference between actual GDP in the five years following the onset of a systemic banking crisis and a pre-crisis linear projection of GDP over the same period.

39 Central Bank of Ireland, Research Technical Paper, Vol. 2022, No.4.

Chart A.5

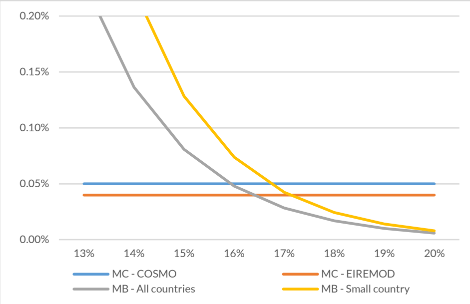
Estimated appropriate level of capital.

Level of capital at which marginal benefits are maximised varies under different assumptions

	MM offset (%)	Discount factor	Crisis effects	Appropriate Tier 1 capital
Benchmark	0	3	Permanent	16
Scenario A	0	3	Temporary	12
Scenario B	50	3	Permanent	17.5
Scenario C	50	5	Permanent	16.8
Scenario D	50	5	Temporary	14

Marginal benefits of capital are larger for small countries

Y-axis: Tier 1 capital ratio; x-axis: GDP impact .



Sources: Adapted from McInerney et al. (2022) – Rightsizing Bank Capital for Small, Open Economies, Central Bank of Ireland, RTP, Vol. 2022 No.4.
Notes:

The macroeconomic costs of higher capital stem from the lower growth in consumption, investment and GDP as a result of the increase in interest rates relative to the scenario in which capital requirements remain unchanged. These are quantified applying two macroeconomic models (COSMOS and Eiremod) used by the Central Bank of Ireland in the analysis of the Irish economy. The transmission channel of higher capital requirements occurs via the increase in banks’ funding costs. These costs arise from the additional capital requirement, which leads to higher interest rates on loans to firms and households. The framework is also used to understand the role that macro-financial, structural characteristics (e.g. economic size, trade and financial openness, and dependency on inward foreign direct investment) may play in influencing the point at which the net macroeconomic benefit is maximised.[40]

Spain

Banco de España relied on a suite of methods to assess the costs and benefits of a positive CCyB rate when cyclical systemic risks are at standard level, including at-risk models, a model to estimate the equilibrium capital ratio and a DSGE model.

At-risk models

Higher capital buffer requirements may dampen credit growth, ultimately affecting the pace of economic growth. Nonetheless, if these buffers are effective in mitigating

40 See Central Bank of Ireland, Research Technical Paper, Vol. 2022, No.3.

systemic risk, this should also be reflected in a reduction of the downside risk of economic growth.

Consistent with this idea, it is possible to estimate the impact of changes in buffer requirements across the GDP growth distribution. This would allow observation of the impact on (i) the median level of GDP growth, representing (the most likely pace of economic growth) and (ii) the impact on the left tail of the distribution, which represents growth-at-risk. This is namely the rate of GDP growth that would be observed under the materialisation of adverse events that may trigger systemic crises, even if their probability of occurrence is relatively low.

The identification of these effects is carried out through quantile regressions, where the impact of variations in the combined buffer requirement (CBR) on the 10th and 50th percentiles of GDP distribution is estimated. The specification proposed by Galán (2020)[41] for estimating the impact of macroprudential policy on growth-at-risk is used as the basis for the analysis, and modified to include the CBR and its interaction with macro-financial variables instead of macroprudential indexes.[42] The results point to limited negative effects from the accumulation of the CCyB during standard cyclical risk scenarios on median GDP growth (see **Chart A.6**, panel a). In contrast, when the CCyB is released under systemic risk materialisation scenarios, the benefits on the left tail are high and almost immediate (see **Chart A.6**, panel b). The model is also modified to estimate the impact on the credit growth distribution instead of GDP. This gives very similar results in terms of limited costs on median growth and large benefits on credit-at-risk (see Estrada et al., 2024). These results confirm the benefits of implementing capital buffers early in the financial cycle, when cyclical systemic risk is at standard levels, in order to address financial shocks.

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41 Galán, Jorge E. (2020). The Benefits are at the Tail: Uncovering the Impact of Macroprudential Policy on Growth-at-Risk, Journal of Financial Stability, 100831.

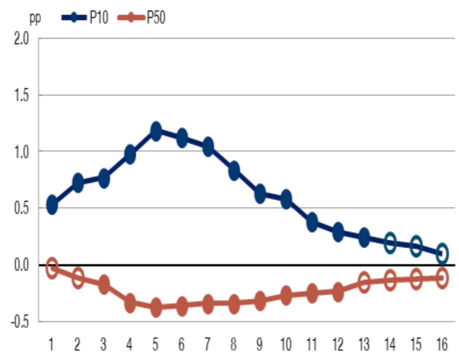
42 This work extends the study by Adrian et al. (2019), who use quantile regressions to predict growth-at-risk based on financial conditions, by adding macro-financial cyclical variables and macroprudential policy. Due to the short data on the CBR, the method of moments (Machado and Santos Silva, 2019) is used for the panel fixed effects quantile estimations. The sample comprises quarterly data on the 27 European countries and the UK from 2013 to 2019. See details in Estrada et al. (2024).

Chart A.6

Impact of the increase of the CCyB under a standard risk scenario and its release in episodes of materialisation of risks on the median (P50) of the GDP growth distribution and growth-at-risk (P10)

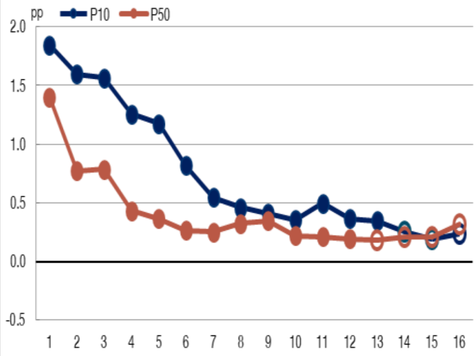
a) Impact of a 1 percentage point CCyB increase in a standard risk scenario

(y-axis: percentage points; x-axis: quarters)



b) Impact of a 1 percentage point CCyB release in a systemic risk materialisation scenario

(y-axis: percentage points; x-axis: quarters)



Sources: Banco de España.
Notes: The lines represent the impact in percentage points of a 1 percentage point increase (Panel a) or release (Panel b) in the CBR on the 10th and 50th percentiles of the annualised GDP growth distribution between the period when the CBR varies and different horizons (ranging from 1 to 16 quarters). The filled circles represent that the estimated coefficient is significantly different from 0 at a 95% confidence level. The horizontal axes represent the quarters elapsed since the increase in the CBR. At time 0, values for GDP growth and financial risk are those corresponding to a standard cyclical risk scenario (Panel a) and a scenario of materialisation of systemic risk (Panel b), based on the historical distributions of these variables in Spain from 1999 to 2019. For details on the definition of the scenarios and the estimated specifications, see Estrada et al. (2024).

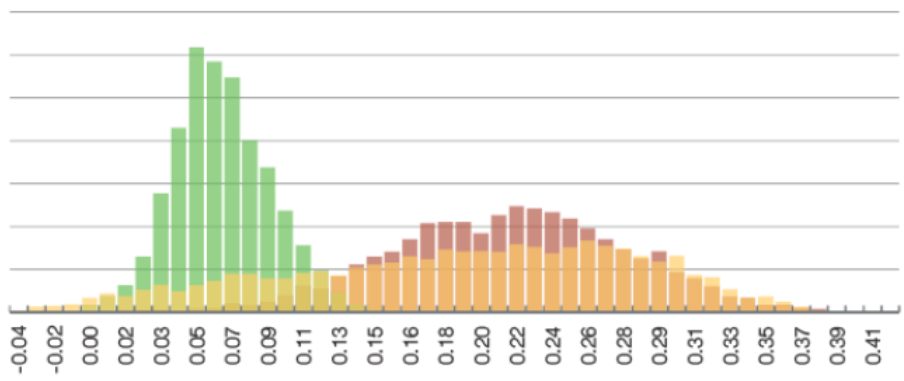
Sensitivity to changes in capital ratio with respect to its equilibrium level

This approach aims at estimating an equilibrium capital ratio, which is used to identify how deviations from this equilibrium, induced by variations in capital buffers, affect economic growth. The justification to estimate an equilibrium capital ratio is that variations of these ratios could be the result of internal bank decisions to deal with changes in their activity. These are anticipated with voluntary buffers and are not necessarily the result of changes in perceived or materialised risks.

The estimation of the target capital ratio is performed based on its historical evolution, micro and macroprudential requirements, and different macro-financial and banking variables. The analysis is carried out in aggregate terms for all Spanish banks and is based on multivariate time series analysis techniques using Bayesian methods. The available regulatory and financial data allows the model to be estimated at quarterly frequencies using a sample covering the years 1995-2023. The sensitivity of GDP growth to changes in the difference between the capital ratio and its equilibrium level is then estimated, taking into account the different phases of the financial cycle. The results show that increasing the capital buffers in periods of expansion is associated with significantly lower costs (in terms of GDP growth) than the benefits of releasing these buffers in adverse cyclical phases. A financial position of the banking sector consistent with a standard level of cyclical systemic risks is also associated with a lower cost (in the form of a slowdown on GDP growth) of increasing capital buffers (see **Chart A.7**).

Chart A.7

Coefficients of the relationship between capital buffers, economic activity and the state of the banking system



Sources: Banco de España.
Notes: The green histogram corresponds to periods of GDP expansion with a banking system under normal conditions (the banking indicator below the 80th percentile). The yellow histogram corresponds to periods of GDP expansion with a banking system in a clearly expansionary situation (the banking indicator above the 80th percentile). The red histogram refers to periods of recession. For details, see Estrada et al. (2024).

DSGE model

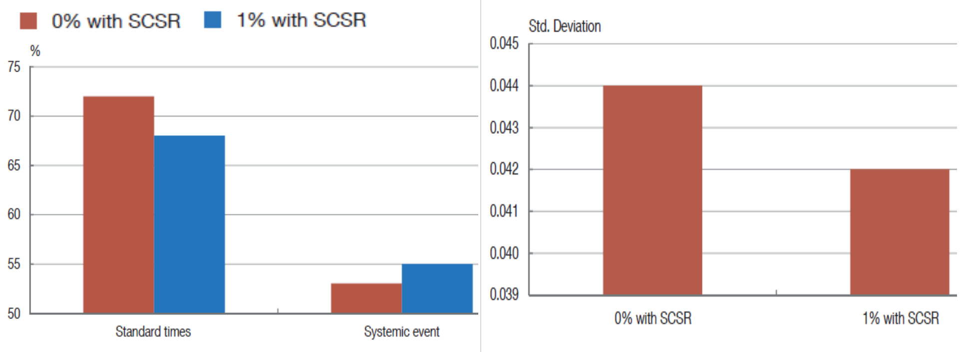
A DSGE macroeconomic model is calibrated to the Spanish economy. In the model, banks endogenously decide their exposure to a source of cyclical systemic risk, which can be interpreted as a choice over the amount of loans provided to more volatile economic sectors and involving higher risks to growth. This decision on cyclical systemic risk-taking is affected at every moment of time by capital requirements and the prevailing phase of the macro-financial cycle, among other factors. The calibrated model is able to reproduce the empirical magnitudes observed for a number of macroeconomic and financial variables in the Spanish economy during the last decades, especially those related to the impact of the global financial crisis. This model incorporates moral hazard in the decisions of banks to take systemic risk, while allowing the dynamic reaction of the economy to changes in bank capital requirements and to different shocks to be studied. Furthermore, within the assumptions of the model, it allows for the evaluation of different bank capital requirement policies, in terms of social welfare, as well as their effect on the level and volatility of economic activity and consumption.

The results of the calibrated model show that the activation of the CCyB at a level of standard cyclical systemic risk (SCSR) effectively reduces the negative impact on the economy during adverse cyclical phases. In particular, it dampens the negative effect on the supply of credit, increasing banks' cyclical systemic risk-taking and, as a consequence, allowing a higher level of economic activity (see **Chart A.8**, panel a). This leads to a reduction in the volatility of the Spanish business cycle (see **Chart A.8**, panel b). However, part of this lower volatility also stems from the presence of costs arising from its activation, in the form of lower exposures in situations with a standard level of cyclical systemic risk, in which the CCyB is activated (see **Chart A.8**, panel a).

Chart A.8

Effect on systemic risk exposure and output volatility of variations in the CCyB level in a standard cyclical systemic risk (SCSR) scenario

Impact on bank systemic risk exposures	Impact on output volatility
Y-axis: %	Y-axis: standard deviations



Sources: Banco de España.
Notes: The baseline case with fixed capital requirements of 12% in a situation of standard cyclical systemic risks is labelled as 0% with SCSR. The alternative scenario with a CCyB of 1% in a situation of standard cyclical systemic risks is labelled as 1% with SCSR. In panel a, the bars on the left represent the values of the stochastic steady state of the economy for each scenario, whereas the bars on the right show the values right after the materialisation of a systemic event. For more details, see Estrada et al. (2024).

Lithuania

Lietuvos bankas assessed the potential costs of increasing the CCyB to the target PN CCyB rate using three different methodologies, namely a 3D DSGE model, a small open economy DSGE with financial sector and a factor-augmented FAVAR model. The results obtained from these models complement each other. In line with the literature, the ex-ante assessment showed that the negative impact of the introduction of a PN CCyB on loan interest rates and lending growth would have been small at the time of its implementation (Q3 2017) (see **Table A.1**).

Table A.2

Impact of a 1% PN CCyB introduction in Lithuania evaluated through three different approaches

	FAVAR		3D DSGE		SoE DSGE	
	Short-term	Long-term	Short-term	Long-term	Short-term	Long-term
GDP (%)	[-0.12; -0.06]	[-0.18; -0.16]	-0.06	-0.01	-0.02	-0.04
Credit level (%)	[-1.33; -0.98]	[-2.22; -2.20]	-1.58	-0.38	-0.07	-0.15
Cost of credit (bp)	[1 bp; 2 bp]	1 bp	15 bp	6 bp	12 bp	8 bp

Source: Lietuvos bankas

FAVAR model

The factor-augmented vector autoregression (FAVAR) model used for the impact assessment is based on the model developed by Budnik et al. (2019).[43] Similar FAVAR model specifications were estimated individually for 11 euro area economies (including Lithuania), to identify structural shocks. This approach allowed for an assessment of key vulnerabilities of national banking systems and an estimation of short-run economic costs of increasing banks' capital requirements.

The FAVAR model is estimated using a rich set of individual bank-level data and key macroeconomic aggregates, such as GDP and residential property prices. The advantage of this model is its ability to summarise the information from a large dataset of bank-level variables into a parsimonious number of common factors. These factors are then used in the estimation of the VAR model, resulting in a limited increase in the number of estimated parameters. Thus, the FAVAR approach allows for detailed modelling of the banking system while getting around the "curse of dimensionality".

The cost of increasing the CCyB to a PN CCyB rate of 1% was assessed using a FAVAR model, which included four aggregate variables describing the dynamics of the banking system: total banking sector credit, lending margins, capital ratio and banks' funding costs (interest rate on deposits). Three structural shocks were identified utilising sign restrictions: credit demand, credit supply and bank capital. A bank capital shock was associated with credit prices and volumes going in the opposite direction, and a decrease in funding costs. Lastly, assuming that the capital increase is permanent, the Waggoner and Zha (1998) algorithm for conditional simulations was applied and the results calculated as deviations from the baseline that would have prevailed without shocks. The results show small costs associated with the introduction of a 1% PN CCyB rate on loan interest rates and lending growth (first and second column in Table A.1).

Small open economy DSGE model

The small open economy DSGE model developed by Ramanauskas and Karmelavičius (2019)[44] is a basic DSGE framework, representing an open, flexible-price economy with savers and borrowers, and a simple bank with an explicit balance sheet.

The model economy comprises three sectors – households, firms and banks – and engages in economic and financial transactions with the rest of the world. Households earn wages, are entitled to the dividend stream of firms and do not borrow. Their bank deposits earn a market-determined interest income. The firms' sector is a net borrower and takes loans from the bank. Notably, firms do not have

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[43] Budnik, K.B., et al., "The benefits and costs of adjusting bank capitalisation: evidence from euro area countries" (2019).

[44] For further details, please see Karmelavičius, J., & Ramanauskas, T. (2019). Bank credit and money creation in a DSGE model of a small open economy. *Baltic Journal of Economics*, *19*(2), 296–333. https://doi.org/10.1080/1406099X.2019.1640958.

access to bank deposits but they adjust their outstanding loan balances instead. A competitive representative bank takes deposits from households, extends loans to firms and intermediates the domestic economy's borrowing from (or lending to) the rest of the world. The bank is subject to capital requirements and aims to hold a capital buffer above the minimum requirement. The bank's objective is to maximise the utility derived from the stream of bank dividend payouts, which are consumed abroad. Importantly, bank deposits are used both to settle transactions and to allow for accumulating savings in the economy. Accounting relationships in the general equilibrium setting ensure that an increase in bank loans results in a contemporaneous rise in deposits, accompanied by stronger domestic demand and inflationary pressures.

To obtain quantitative predictions of the Lithuanian economy's response to the introduction of positive neutral CCyB, the minimum bank capital requirement is permanently increased by 1 percentage point (this is equivalent to the target positive neutral CCyB rate in Lithuania). The shock slightly hampers economic activity, which permanently declines by 0.1% from the baseline in the long-run and creates mild and temporary deflationary pressures. In the long term, loan rates permanently increase by less than 0.1 percentage points, whereas the short-term impact is several times higher. Corporate investment and bank deposits are among the variables to bear the largest impact of the shock – over the long term, real investment could decline by 0.3% from the baseline, whereas the stock of deposits could be negatively affected by 1.5%. Overall, the model finds small costs associated with a 1% PN CCyB rate (last two columns in **Table A.3**).

3D DSGE model

The 3D DSGE model is based on a Banque de France working paper by Clerc et al. (2015)[45] and a quantitative version of the model developed by Mendicino et. al. (2018).[46] The model was calibrated using data from individual countries, including Lithuania, in collaboration with other national central banks (NCBs) working under a DSGE modelling workstream within the Task Force for Operationalising Macroprudential Research. The cost analysis using the 3D model calibrated on Lithuanian data was performed by estimating the long-run and the short-run effects of CCyB increase. The long-run effects of raising capital requirements to the desired level were computed taking into account the difference between the values of the variables of interest at the calibrated steady state and at the new steady state. The short-run effects were calculated as the difference between the first period IRF from a bank risk shock under calibrated policy and the first period IRF under desired

45 For more details, please see Laurent Clerc & Alexis Derviz & Caterina Mendicino & Stephane Moyen & Kalin Nikolov & Livio Stracca & Javier Suarez & Alexandros P. Vardoulakis, 2015. Capital Regulation in a Macroeconomic Model with Three Layers of Default, International Journal of Central Banking, International Journal of Central Banking, vol. 11(3), pages 9-63, June.

46 For more details, please see Caterina Mendicino & Kalin Nikolov & Javier Suarez & Dominik Supera, 2018. Optimal Dynamic Capital Requirements, Journal of Money, Credit and Banking, Blackwell Publishing, vol. 50(6), pages 1271-1297, September.

policy. The results show small costs associated with the introduction of a 1% PN CCyB rate on GDP and lending growth (third and fourth column in **Table A.1**).

Latvia

Latvijas Banka used the factor-augmented vector autoregressive (FAVAR) model developed by Budnik et al. (2019)[47] to assess the impact on lending from introducing a PN CCyB rate. The model is estimated using key macroeconomic and banking sector indicators. The results show that a 100 basis point increase in the capital buffer requirement leads to a 2.7% reduction in lending after two years, when the requirement is phased in 25 basis point steps per quarter. Lending declines by 2.8% when the requirement is introduced fully in one step (**Table A.2**). In addition, the credit spread increases by 30 basis points and the deposit spread decreases by 25 basis points.

The model results suggest that the impact of a gradual increase in capital requirements on bank lending is somewhat smoother. In order to assess the impact of the 1% PN CCyB rate, the impact of an 80 basis point increase in the capital ratios (1% PN CCyB rate corresponds to 0.8% of TREA) was also tested. According to the FAVAR, a gradual increase of the capital requirement by 80 basis points can reduce lending by 1.7% over one year and by 2.1% over two years. Overall, the results confirm that the increase in the capital requirements is expected to have a small negative impact on lending in the short term. However, for most Latvian credit institutions, the level of voluntary capital buffers is sufficient to mitigate the potentially negative impact.

Table A.2

Cumulative impact assessment of the increase in the capital requirements

	Domestic loans (%)		
Horizon	100 bp without phase-in	100 bp gradually	80 bp gradually
After 1 quarter	-1.7	-0.6	-0.5
After 1 year	-2.5	-2.2	-1.7
After 2 years	-2.8	-2.7	-2.1

Notes: The table shows the impact on the whole banking sector. "without phase-in" in the table means that the capital requirement is raised by 100 bp in the first quarter; "gradually" means that the capital requirement is raised over four quarters, each quarter by ¼ of the total rate.

47 Budnik, K.B., et al. (2019) "The benefits and costs of adjusting bank capitalisation: evidence from euro area countries"

Appendix B – Analytical methods to inform the calibration of the positive neutral CCyB rate[48]

Czech Republic

Česká národní banka's concept of the PN CCyB rate is based on the principle that the CCyB should start to be accumulated soon after the acute phase of a cyclical contraction has subsided. The aim of the PN CCyB rate is to gradually build up the CCyB, following a clear, predefined target, to ensure the timely availability of capital buffers and to avoid sharp adjustments in the CCyB rate when cyclical systemic risks become elevated. In Česká národní banka's view, the PN CCyB is intended as an early and gradual process of accumulating the buffer. This should occur when banks are sufficiently profitable to build up capital buffers without incurring the risks of procyclical effects.

Česká národní banka relied on two approaches to estimate the target PN CCyB rate and identify the right time to start its build-up. The first calibration approach is based on the values of the financial cycle indicator, while the second aims to determine the CCyB rate in relation to the concept of sustainable credit growth. Both methods apply a pragmatic approach rather than relying on sophisticated structural models. The approaches are tailored to the Czech economy and are consistent with the intention to base the activation of the CCyB in the early phase of the financial cycle on historical experience concerning the phase of the cycle, rather than on the values of risk indicators, which may fail to signal cyclical risk in such a phase of the financial cycle.

The first approach relies on Česká národní banka's financial cycle indicator (FCI),[49] which is used to assess the cyclical position of the domestic economy and inform the setting of the CCyB rate on a regular basis.[50] The PN CCyB rate is determined based on the value of the FCI in the relevant phase of the cycle. Assuming that the historical median of the FCI sub-indicators corresponds to a "normal" situation, where the financial cycle is neither in a trough nor significantly overheating, a rate close to 1% can be regarded as the optimum target rate for a "standard" level of risk. This definition can be roughly identified with the situation where cyclical financial risks are at their usual levels.

The second approach is based on the evaluation of the sustainable level of credit growth. Although it is not perfect for the Czech economy, the ratio of total credit to the non-financial private sector to nominal GDP is used as the baseline

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48 Prepared by Štěpán Pekárek, Giorgia De Nora, Valerio Scalone, Eoin O'Brien, Ilze Vilka, Milda Stankuviene, Ties Busschers, Artur Rutkowski, Črt Lernarčič and Jorge Galán.

49 Plašil, M., Seidler, J., Hlaváč, P., (2016), "A new measure of the financial cycle: application to the Czech Republic", Eastern European Economics 54(4), pp. 296-318.

50 See Česká národní banka, 2023, The CNB's approach to setting the countercyclical capital buffer.

measure of leverage in the economy. The long-run equilibrium nominal GDP growth rate is compared to the target, sustainable, long-term trend credit-to-GDP ratio. This serves to identify the sustainable change in the stock of credit to nominal GDP that represents the usual level of cyclical risks in the economy. These credit dynamics also ensure that the credit-to-GDP ratio converges in the long term (15-20 years) to a final level of around 90% (historical estimation) and is not explosive. Finally, to translate credit growth into potential credit losses, the identified sustainable level of credit growth is matched with the benchmark recession loss rate to estimate the volume of losses on the loans that will be granted in the new cycle. The outcome represents the capital buffer required to cover these losses on the projection horizon. Based on the last calibration, the estimated capital buffer required corresponds to a 1 percentage point capital ratio, in line with the estimate of the first approach.[51]

ECB

Losses-to-Buffer approach

The Losses-to-Buffer (LtB) approach proposes a calibration of the PNR for the CCyB using the estimated coefficients of time fixed effects in a quantile regression model of banks' return on assets (ROA), based on a representative sample of 318 euro area banks during the years 2005-2019.[52] The aim of the method is to distinguish the share of historical bank losses (i.e., negative values of ROA) associated with cyclical systemic risk (quantified with the domestic systemic risk indicator by Lang and Forletta (2019)) from those related to unobserved risk factors (captured via country-specific and time fixed effects) not necessarily related to the financial cycle, while controlling for bank-specific characteristics and macroeconomic developments. Bank losses due to cyclical systemic risks are used to compute the additional capital needed to cover these risks and to calibrate the CCyB rate in the upturn of the cycle when systemic risk is elevated. The positive neutral CCyB rate is calibrated using the losses at different percentiles of the ROA distribution that are left unexplained by the variables in the model (and thus less likely to be captured by the calibration of already existing prudential instruments). Specifically, the influence of unobserved factors on historical losses is quantified, in a given year, using the coefficients of the time fixed effects of the estimated model. These coefficients account for any time-specific effects that are otherwise not captured by the regression. **Chart B.1** (left panel) shows the buffer rate that would have been needed to cover the 50th, 25th and 10th percentile of unexplained ROA realisations.[53] We do not consider lower percentiles of ROA (corresponding to

51 Plašil, M., (2019), "The countercyclical capital buffer rate for covering the usual level of cyclical systemic risks in the Czech Republic", Thematic article on Financial Stability 2/2019 Česká národní banka.

52 De Nora, G., Pereira, A., Pirovano, M., Stammwitz, F. (forthcoming), "From losses to buffer – Calibrating the positive neutral CCyB rate in the euro area".

53 The time effects resulting from the models estimated on the three percentiles of interest are then rescaled by the average risk-weights, in order to translate them from units of ROA into units of the regulatory capital ratio.

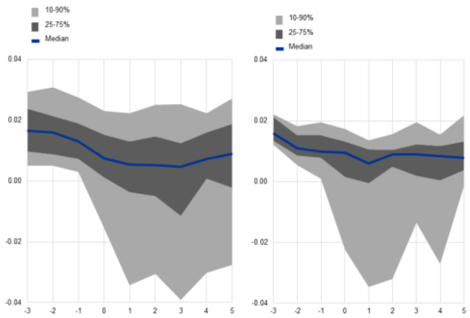
severe losses) to avoid overlaps with the calibration of P2G, as this is based on the losses stemming from adverse scenarios. The share of unexplained bank losses, and hence the required buffer to cover them, depends on the severity of losses the policymaker wishes to target. For the euro area, the preliminary results indicate that a positive neutral CCyB rate of 1% would have been sufficient to cover up to the 25th percentile of ROA realisations, while a buffer rate of 1.5% would have been needed to cover losses up to the 10th percentile.[54]

Chart B.1

Historical losses and the Losses-to-Buffer-approach

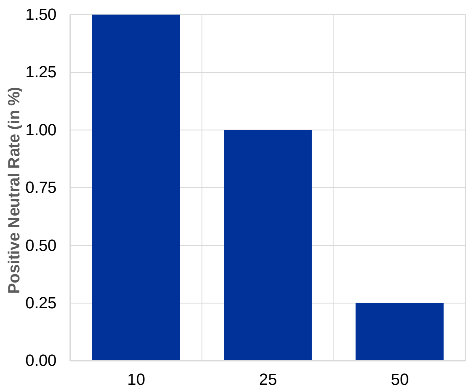
a) Distribution of the return on RWA around crisis periods for different levels of systemic risk

(y-axis: net income before tax over risk-weighted assets; x-axis: years before, after the crisis)



b) Losses to Buffer – CCyB calibration

(y-axis: CCyB rates (in %). X-axis: percentiles of the ROA distribution)



Sources: ECB calculations.
Notes: Panel A: the blue line and shaded areas represent the return on RWA distribution over time for euro area banks. Panel B: the bars represent the different PN CCyB rates resulting from the estimation of the quantile model on the 50th, 25th and 10th percentiles of historical losses.

Risk-to-buffer approach

The Risk-to-Buffer (RtB) approach calibrates the CCyB rate in different phases of the cycle, according to the prevailing levels of cyclical systemic risk, quantified using the domestic systemic risk indicator (d-SRI) by Lang and Forletta (2019). In a first step, an empirical non-linear macroeconomic model (called Cyclical Amplifier, see Couailler and Scalone (2024)) is used to estimate the impact on GDP of shocks occurring under different cyclical systemic risk regimes, resulting in more severe macroeconomic outcomes under scenarios with higher cyclical systemic risk. We estimate a multivariate smooth transition regime switching model via local projections. The model is at the crossroad between the original local projection model presented in Jorda (2005) and Tenreyro and Thwaites (2016):

$$y_{t+h} = F(z_t)(A_h^1 + B_h^1 y_t) + (1 - F(z_t))(A_h^2 + B_h^2 y_t) + L_h^2 y_{t-1} + \cdots + u_t$$

[54] The PN CCyB rates obtained from the model are rounded in steps of 0.25 percentage points, consistently with the setting of the CCyB according to the CRR/CRD.

$$F(z_t) = \frac{1}{1 + \exp\left(-\frac{\theta(z_t - c)}{\sigma_z}\right)}$$

where y_{t+h} denotes the vector of endogenous variables, namely GDP, inflation, monetary policy rate, spread between 10 years sovereign bond and the risk-free rate, lending and house prices; u_t is the vector of error terms and z_t is the state variable, namely the Systemic Risk Indicator (Lang and Forletta, 2020), a composite indicator measuring the evolution of cyclical systemic risks. We assume that the economy transitions between two states of the economy: one in which cyclical systemic risk is at low levels and one in which it is high[55]. A_h^1, B_h^1, L_h^1, A_h^2, B_h^2, L_h^2 are the matrices of coefficients associated to the different states of the world (state 1 and state 2). The dynamics of the model result from the weighted average between these two extreme cases with the weights depending on $F(z_t)$, i.e., the transition function used to ensure that the state variable is included between 0 and 1. The smoothness of the transition from one state to another depends on the parameter Θ. The model is estimated on aggregate data for the euro area over the period from the first quarter of 2001 to the fourth quarter of 2019.[56] The structural identification of shocks is obtained via the Choleski decomposition, using the variance-covariance matrix computed with the reduced-form errors estimated in the first horizon estimation of the local projection.[57] For illustration, **Chart B.2 (panel a)** shows that the impact of a housing shock, i.e. an exogenous decrease in house prices, on GDP is three to four times larger under high risk (100th percentile of the historical SRI distribution, yellow lines) than under median risk (50th percentile of the historical SRI distribution, blue lines). Even if the degree of amplification can vary across different shocks, the model consistently illustrates that, overall, higher cyclical systemic risks amplify economic fluctuations. In a second step, the risk-dependent impacts of shocks on GDP are mapped into CCyB buffer rates. Losses occurring when cyclical systemic risk is high are used to calibrate the CCyB rate at the peak of the cycle, while the positive neutral CCyB rate is calibrated to absorb losses occurring under median systemic risk.

Macro-financial shocks tend to be amplified under high-risk environments and a higher amplification of macroeconomic shocks calls for higher capital requirements. In **Chart B.2** (panel b) three macroeconomic scenarios are simulated for low, median and high cyclical systemic risk levels. These levels correspond to the 1st, 50th and 100th percentiles of the cyclical systemic risk distribution respectively. In each scenario, the same sequence of recessionary shocks hits the economy for the first four periods. All the variables of the model (GDP, inflation, policy rate, spread between 10-year government bond rate and risk-free rate, total lending, housing prices) are shocked at the same time and each shock has the same size (one standard deviation of the respective variable). Compared to a situation where cyclical

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55 In the high (low) state the cyclical systemic risk is at its maximum (minimum) cyclical systemic risk level.

56 The model is also estimated on the country-level data. The national dimension allows us to detect where the non-linearities in the EA are stronger.

57 The Choleski ordering of the endogenous variables corresponds to the one in which they are presented in the text. Structural identification is not necessary for this application, but it can be helpful to interpret the non-linear effects found in the estimated model.

risk is at medium level (yellow line in **Chart B.2**, panel b), the peak effect on GDP under low risk (blue line) is three times smaller, while the peak effect under high risk (red line) is almost double. Similar amplification effects are found for most endogenous variables of the model (e.g. lending). Once these shocks hit the banking sector, they can translate into banks losses and capital shortfall. Since capital requirements are set to help banks to absorb losses, the stronger macroeconomic amplification under higher risk environment will imply higher capital requirements compared to the case in which the same shocks materialise in a low risk environment.

The Risk-to-Buffer approach suggests a positive neutral CCyB rate around 1.3%, depending on the tolerance of the policymaker towards risks. The relative impact of the shock across the different scenarios can provide guidance on the calibration of the CCyB over the cycle, in the [0; 2.5%] interval. The 2.5% "maximum" corresponds to the ceiling for automatic reciprocation, often considered as an informal maximum level for the CCyB rate. Assuming that the GDP impact occurring under the high cyclical risk scenario corresponds to a maximum CCyB rate of 2.5% and that the PNR is associated to the median risk level, the suggested positive neutral rate for the CCyB would then be around 1.3% (yellow bar **Chart B.2**, panel b). The proportions are computed as the ratio between the average impact of the shock on GDP under the medium risk scenarios and the average impact under the "high risk" scenario. This approach can integrate both the calibration of the positive neutral buffer with the more general CCyB calibration, hence avoiding double counting of the same risk. The mapping of the macroeconomic outcomes to the CCyB rates assumes that GDP and bank losses are highly correlated. Specifically, it is assumed in this application that losses under the highest risk level (i.e., at the peak of the cycle) should be covered by a 2.5% CCyB rate. This approach is alternative to the one presented in the original application (Couaillier and Scalone, 2024), where the Risk-to-Buffer integrates the cyclical amplifier with a stress test model, linking the macroeconomic scenarios to banks' capital shortfall under stressed conditions.

Chart B.2

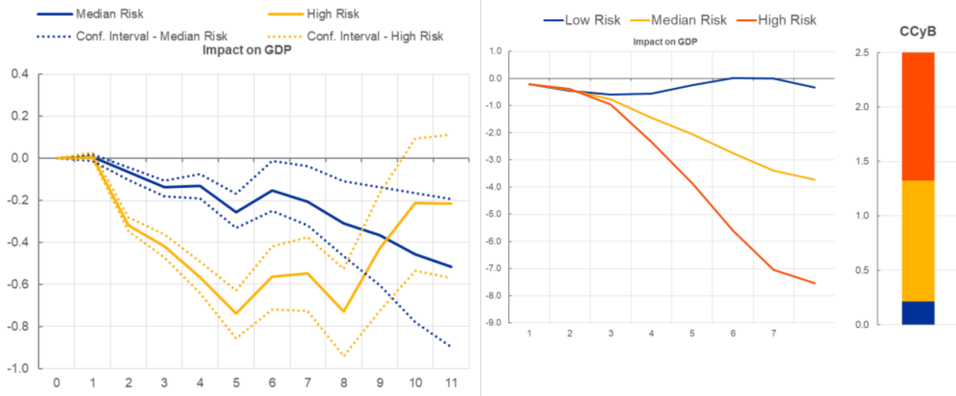
The cyclical amplifier and the Risk-to-Buffer approach

a) Impact of house price shock on GDP

(Y-axis: percentage deviations from the starting point; x-axis: quarters)

b) Risk-to-Buffer – CCyB calibrations

(Y-axis: left-hand side: percentage deviations from the starting point; right-hand side: CCyB rates (in %))



Sources: ECB calculations.
Notes: Left-hand scale: impulse responses from the Cyclical Amplifier – Impact on GDP of a Housing shock under Medium (blue lines) and High Risk (yellow lines). Dotted lines represent the 67% confidence intervals. Right-hand scale: recessions under Low (blue line), median (yellow line) and high risk (red line) simulated via the Cyclical Amplifier. The risk-related recessions are related to the CCyB capital stack via the Risk-to-Buffer approach. Low and median buffers can provide a range for the positive neutral CCyB.

Ireland

A key principle behind the Central Bank of Ireland's CCyB strategy is to seek to ensure the resilience in the banking system is proportionate to the magnitude of the risks that it faces. Stress testing provides a valuable tool to assess the resilience required by banks to be able to absorb potential adverse shocks and maintain the supply of lending. The approach consists of a macroprudential stress test framework and focuses on the role of the banking sector as a whole and its interaction with the wider economy – see Morell et al., 2022 for a comprehensive overview of the model. As such, it provides a useful input to informing the setting of the CCyB.[58]

The model aims to incorporate deleveraging responses by the banking sector, by combining loan-level stress testing models with macroeconomic models, which interact with each other through repeated rounds of feedback effects. In this way, the model captures both the dynamic adjustment of banks to macro-financial developments and the interaction between banks and the real economy. The macroeconomic scenario employed underpins the use of any stress testing framework. The scenario utilised to inform considerations on the appropriate target rate was calibrated to a standard risk environment (defined as one where risk conditions are neither elevated nor subdued). As such, while the scenario represented a significant adverse shock, it is much less severe than was observed, for instance, during the financial crisis. This reflects the fact that a standard risk environment would not see macro-financial imbalances at the levels seen

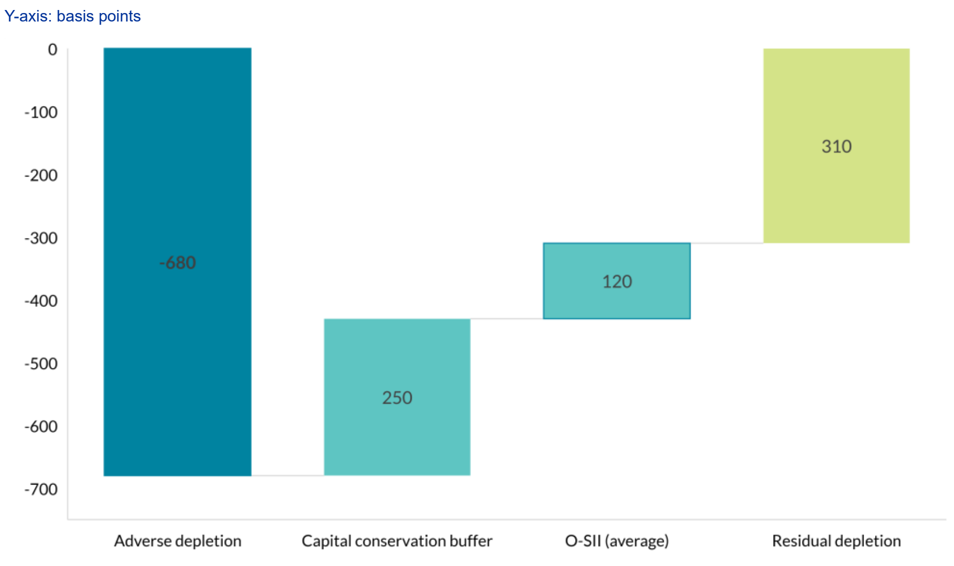
[58] See also, Central Bank of Ireland: framework for macroprudential capital and Financial Stability Review 2022:1, Box F.

immediately prior to the 2008 financial crisis. The output of the macroeconomic scenario for key variables such as the unemployment rate and house prices acts as input into the macroprudential stress test, which in turn estimates the associated level of capital depletion.

In terms of informing the target CCyB rate for when risks were neither elevated nor subdued, the estimated capital depletion from the model was set against other aspects of the regulatory capital framework, which allow the banking system to absorb losses without breaching minimum requirements. This included other macroprudential buffers that are in place such as the capital conservation buffer and the O-SII buffer as well supervisory capital expectations in the form of P2G. Broader considerations regarding the appropriate level of capital for the banking sector as well as interactions of macroprudential buffers with other parts of the prudential regime also served as inputs on the choice of target rate, alongside the quantitative output from the stress test (see **Chart B.3**).

Chart B.3

Capital depletion expressed as a percent of CCyB-relevant RWAs arising from adverse scenarios in a macroprudential stress test relative to buffer requirements

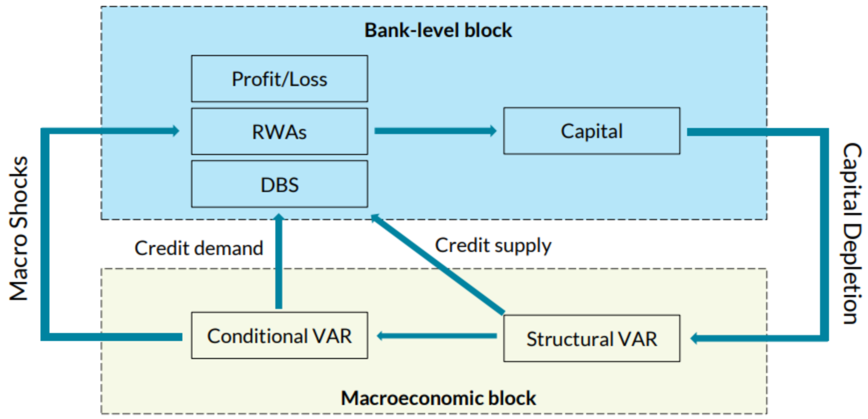


Source: Central Bank of Ireland
Notes: See Financial Stability Review 2022:I, see Box F for further details.

The framework consists of a bank-level block and a macroeconomic block (see Chart B.4). The bank-level block encompasses several satellite modules, which estimate the impact on retained earnings and risk-weighted assets (RWAs) for a given macroeconomic scenario. Additionally, the bank-level block models the evolution of bank balance sheets via the dynamic balance sheet module (DBS). The outputs of the various satellite modules are subsequently aggregated to derive the impact on bank capital. The macroeconomic block maps changes in bank capital (derived from the bank-level block) into changes in key macroeconomic variables that in turn update the initial macro shocks. The updated macroeconomic scenario subsequently affects the satellite modules in the bank-level block. As such, the two blocks are therefore linked via the endogenous response of banks reacting to macroeconomic developments through adjusting their loan volumes and lending rates.

Chart B.4

A stylised representation of the Central Bank of Ireland's Macroprudential Stress Test Model



Source: Morell et. al, 2022 A framework for macroprudential stress testing
Notes: Within the bank-level block, various satellite modules translate a time series of macro shocks into the impact on the banking sector's profit/loss account, the stock of risk-weighted assets and changes in its balance sheet (DBS). These impacts are subsequently aggregated to estimate the impact on capital. The macroeconomic block houses two key macroeconomic models that are pivotal in driving shock amplification in our model.

The model is run iteratively at an annual frequency. Each iteration is initiated by an array of shocks that influence the state of the macroeconomy (macro shocks). In turn, the updated macroeconomic environment interacts with the banking sector, ultimately impacting the sector's capital position. In response to changes in its capital adequacy, the banking system reacts by adjusting its balance sheet through changes in lending volumes and lending rates. Changes in credit conditions are mapped back into the underlying economic conditions (financial sector feedback), which will form a new series of macro shocks that will initiate the subsequent iteration.

Latvia

In Latvia, the 1% target PN CCyB rate decision was based on combining stress testing results, expert judgement and international experience. A credit risk model linking macroeconomic developments to the quality of the banking sector's credit portfolio was developed for macroeconomic stress testing in 2009. It was modified in 2014. In the macroeconomic credit risk model, changes in GDP play an important role as a proxy for borrowers' income and the stage of the business cycle. Since 2023, the stress scenario is designed by estimating the GDP growth rate with the GaR (growth-at-risk) model. Specifically, the GaR model estimates the 5th percentile of the future probability distribution of GDP growth rates, taking into account the latest available values of GDP and the deflated composite cyclical risk indicator (CCRI) developed by Latvijas Banka.[59]

The GaR model is estimated using quantile regression according to the equation:

$$Q_p(Y_{t+h}|I_t) = \alpha^p + \beta_0^p Y_t + \beta_1^p X_t,$$

where $Q_p(Y_{t+h}|I_t)$ denotes the p-th percentile of the GDP growth rate, Y_{t+h} denotes the realisation of GDP growth *h* quarters ahead, conditional on the present information (I_t), and X_t denotes the values of the CCRI indicator adjusted for inflation in period *t*. The 5th percentile is used in the stress test scenario. Higher CCRI values lead to higher capital depletions in the stress test results. To calibrate the PN CCyB rate, the CCRI of the previous four quarters was used. The results of the 2023 stress tests show that the losses not covered by the voluntary capital buffers would be close to 1%.

Lithuania

The calibration of the target PN CCyB rate in Lithuania was conducted through a stress testing exercise where the scenario was calibrated to represent a moderate risk environment. According to Lietuvos bankas' CCyB framework, a moderate level of cyclical systemic risk is characterised by active credit and real estate markets, without the presence of cyclical financial imbalances. In light of these considerations, a cyclical adverse scenario was designed. Assuming that the economy has three cycles, namely the business cycle (estimated by the output gap), the credit cycle (estimated by the credit-to-GDP gap) and the house price cycle (estimated as deviations of house prices from their fundamental value), the stress scenario was calibrated to reflect shocks that can happen when risks in the broader economy, credit and real estate markets are not elevated. While the scenario represented a sufficiently adverse shock, it was notably less severe than the conditions observed during the financial crisis. The estimation of capital depletion under this cyclical adverse scenario was conducted using Lithuania's top-down stress testing framework, assuming a static balance sheet.

Stress test results indicated that the initial banking sectors capital adequacy ratio would decrease by 0.5 to 1 percentage point if shocks occur in a moderate cyclical risk environment. Based on these results and expert judgement, it was concluded that an additional 1% capital buffer is required to enhance the banking sector's resilience to such shocks in a moderate risk environment. This buffer aims to mitigate the impact of unexpected economic shocks and reduce the cyclicality of credit and, consequently, of the economy. Conversely, using the same top-down stress testing framework for a financial crisis scenario demonstrates that financial crises characterised by high levels of imbalances have a more substantial impact on the economy. Therefore, as lending volumes grow

[59] Previously, to compute the stressed GDP, shocks were applied to the Latvian macroeconomic model (LMM) using the Stress Test Elasticities (STE) approach. Each time the LMM was updated, the STE were adjusted accordingly, and the magnitude of the shocks had to be significantly changed to obtain a comparable drop in GDP. This was problematic for the communication of the scenarios.

unsustainably and imbalances accumulate in the financial sector, it is crucial to accumulate an additional CCyB rate above the positive neutral rate of 1%.

Netherlands

The 2% neutral rate in the Netherlands is based on various policy considerations and is primarily calibrated taking into account historical losses and experiences with previous buffer releases. As such, De Nederlandsche Bank calibrated the buffer so that it would be proportional to the peak accumulated losses (PALs) of Dutch banks in previous crises. PALs are the accumulated losses (or profits) over a specific time frame, with the latter set to maximise the value of PALs (or minimise in case of profits). The interval in which PALs are maximised therefore differs from bank to bank and may also include one or more quarters with positive income (see **Chart B.5**). For Dutch banks, De Haan and Kakes (2020)[60] found that the PAL between 2007 and 2016 amounted to €12 billion. The PN CCyB rate was then set so that the required capital would be sufficient to cover these losses.

Other policy considerations were also taken into account when determining the PN CCyB rate. The target PN CCyB rate is set to be high enough for a release to be effective on the one hand, while not imposing a disproportionately high burden on banks on the other. Furthermore, the 2% rate also sufficiently allows for a partial release of the buffer, which gives more flexibility and policy space in crisis situations. De Nederlandsche Bank also took into account the size and effectiveness of its previous buffer reductions in March 2020 in order to determine the appropriate rate. Specifically, De Nederlandsche Bank considered the lending capacity that such a release provided to banks and the amount of credit Dutch banks provide, under normal circumstances, within a year.

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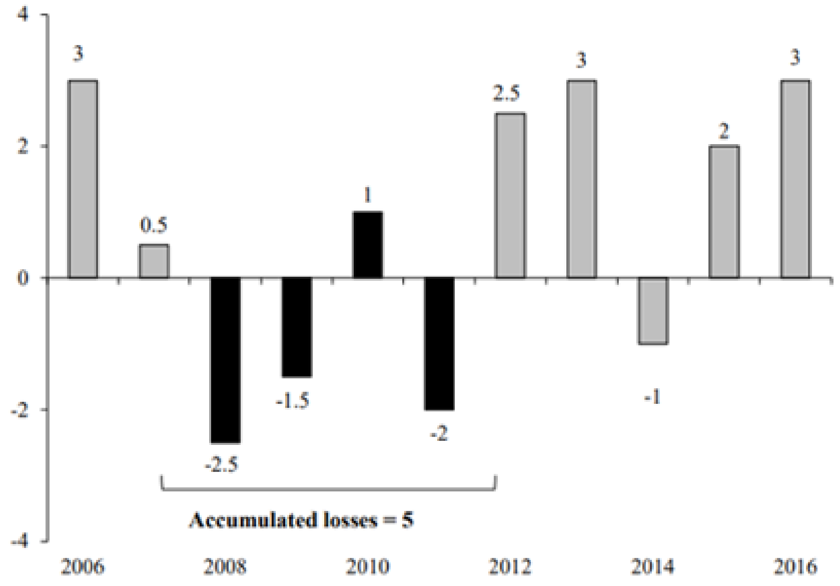
[60] De Haan, L. and Kakes, J. (2018) European banks after the global financial crisis: Peak accumulated losses, twin crises and business models. Working paper.

Chart B.5

Stylised illustration – peak accumulated losses in the Netherlands

Y-axis: euro billions



Source: De Haan and Kakes (2020)

Poland

The PN CCyB rate in Poland is calibrated on the basis of the average historical uncertainty around the measure of cyclical systemic risk. This measure, called Minimum Macroprudential Capital Level (MMCL), is used to calibrate the CCyB.[61] The calibration of the PN CCyB is aimed at addressing the uncertainty surrounding the calibration of the CCyB based on cyclical systemic risk indicators. Early warning models are used to measure the intensity of cyclical systemic risk in Poland. Signals from multiple "small" models are used, each based on information from a set of variables. These are then combined into a single "large" model. This reduces the risk of relying on a single model, which may not be able to capture the complexities inherent in the identification of risks leading to the occurrence of banking crises. Each "small" model is a logit model with four to five explanatory variables, which are designed to predict a banking crisis over a four-year horizon. For every model, a minimum level of the capital ratio that eliminates the crisis signal is determined. This level of capital averaged over all models is referred to as the MMCL (see **Chart B.6**, panel a). Changes in the MMCL reflect changes in the intensity of cyclical systemic risk – an increase in the MMCL means that other variables imply an increase in the

[61] For more details on how the CCyB guide is calculated based on measure of cyclical systemic risk please refer to: Financial Stability Committee (2024), *Methodology for setting the countercyclical capital buffer*.

intensity of cyclical risk, while a decline in the MMCL indicates a decrease in the intensity of risk identified in other variables. It is expressed in the following formula:

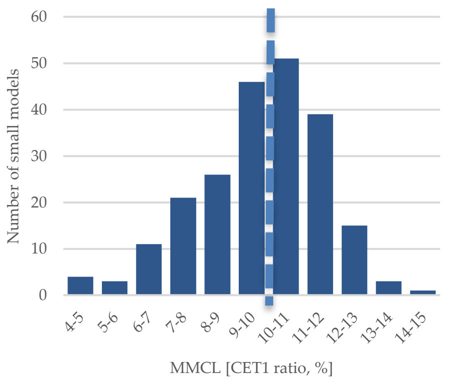
$$MMCL = \sum_{i=1}^{n} \left(\omega_i \cdot min \left[\underset{\kappa}{argmin} \left(f_i(X_i, \kappa | \tau) \right) \right] \right)$$

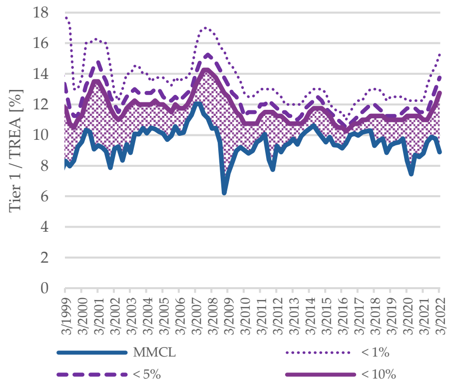
where $f_i(\cdot|\tau)$ is a single small logit model whose predictor is the binary variable $\hat{y}_i \in \{0.1\}$, 0 denotes the absence of a forthcoming crisis and 1 denotes a crisis; τ is a misclassification cost parameter;[62] X_i is the set of independent variables, other than the capital variable; κ is information on the capital ratio and ω_i is the weight assigned to the model $f_i(\cdot|\tau)$.

Chart B.6

Calibration of PN CCyB rate based on a cyclical systemic risk measure

a) Distribution of the MMCL resulting from the estimation of the small early-warning models set for a specific quarter	b) Calibration of the PN CCyB rate
Results for the fourth quarter of 2019	Results over time





Notes: The navy blue dashed line in left-hand panel illustrates the average of the distribution presented, i.e. the MMCL. It constitutes one point on the thick navy line in the right-hand panel.

The PN CCyB rate is calibrated to equal the average difference between the MMCL and the level of the capital ratio which reduces the fraction of "small" models signalling a crisis. This is illustrated in **Chart B.6**, panel b, where the MMCL is shown by a thick blue line. The remaining lines indicate the levels of the capital ratio at which only a certain percentage of models signal the risk of a banking crisis in the prediction horizon. Since higher capital ratio levels are associated with a lower risk of crises, a reduction in the percentage of "small" models signalling a crisis requires, ceteris paribus, an increase in the capital ratio. Therefore, the selection of the percentage of "small" models signalling a crisis affects the calibrated PN CCyB rate. The lower this percentage, the higher the calibrated PN CCyB rate. The threshold for such a percentage of "small" models signalling a crisis was set at 10%, striking a balance between the need to ensure an appropriate level of resilience and,

62 In the chosen parametrisation $\tau = 3$ meaning that cost of false negative is three times the cost of false positive. This is embodies our prudential approach. This results in MMCL on average 2 percentage points higher than if the costs of false negative and false positive were assessed as being equally undesirable.

at the same time, a reduction of model risk resulting from relying on too few models. To ensure the stability of the calibrated PN CCyB rate, the difference between the MMCL and the level of capital, which limits the crisis signal to a set percentage of “small” models in each period, is averaged. This final step is represented by the purple-shaded area in **Chart B.6**, panel b. The average value of the shaded area equals 2%, i.e., the calibrated value for the PN CCyB rate in Poland.

Slovenia

The calibration of the PN CCyB is rather difficult due to the lack of experience this approach for setting the CCyB. Additionally, a large portion of the data dates back to the global financial crisis, which might blur the “correct” PN CCyB rate. Against that backdrop, Banka Slovenije combined information from several approaches to determine the 1.0% PN CCyB rate. The first approach relied on the average expected losses resulting from a set of adverse scenarios of the macro stress test with different severities. According to this approach, the PN CCyB rate was calibrated so that the resulting combined buffer requirement (including the CCoB, sSyRB, O-SIIs and PN CCyB) would be sufficient to cover the aforementioned average losses without jeopardising the banks’ minimum capital requirements. The second approach relied on the average signalling value of the composite indicator as well as the individual indicators used to determine the CCyB rate in the last 20 years, which suggested the need for a 1.0% CCyB rate. Third, a model-based approach was used to assess costs and benefits of different calibrations of the PN CCyB (see **Appendix A**). Finally, expert judgement was also used in setting the PN CCyB rate, which should be high enough to ensure it provides sufficient relief to the banking sector and support to the real economy when released. Equally, it should be low enough to leave sufficient space to further increase the CCyB when cyclical risks start rising above a neutral level.

Spain

The calibration of the CCyB rate for a standard cyclical risk scenario in Spain was performed through stress testing exercises. In particular, multiple simulations of the Spanish economy’s response to various adverse cyclical shocks and the associated capital consumption of the Spanish banking system were carried out. The model used to simulate the effect of adverse cyclical shocks on the Spanish economy was the Quarterly Model of Banco de España (MTBE, Modelo Trimestral del Banco de España).[63] Additionally, the estimation of capital depletion derived from these shocks has been carried out using Banco de España’s stress testing framework, known as FLESB (Forward Looking Exercise on Spanish Banks). The shocks have been classified into three groups depending on their origin: external, internal, or both external and domestic. The domestic shocks can be either real or financial. This set of shocks is motivated by the available evidence, which shows that

63 Arencibia Pareja, Ana, Samuel Hurtado, Mercedes de Luis López and Eva Ortega (2017). New version of the quarterly model of Banco de España (MTBE), Occasional Papers – Banco de España,1709.

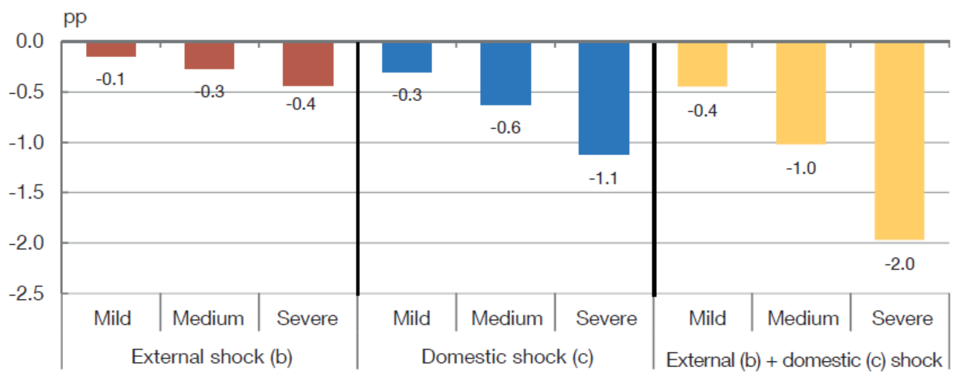
the nature of cyclical systemic risks is broad, and that both financial and real shocks can impact the solvency of the banking system. The severity of the shocks has been calibrated according to historical experience, and classified as mild, medium and severe. Regarding their effects on the Spanish economy, they are calibrated by simulating the isolated impact of each shock, as well as the impact of their joint materialisation. Each of these combinations of shocks consumes a certain amount of CET1 ratio, providing a measure of the intensity of shocks that could be absorbed by the release of an additional capital requirement.

The analysis shows that a combination of mild shocks (both internal and external) would lead to a CET1 ratio depletion that would warrant an additional buffer of 1 percentage point. This buffer would also be able to absorb severe internal or external shocks if they materialise individually rather than in combination (see **Chart B.7**). Overall, the analysis highlights the systemic importance of these shocks for the banking sector due to their materiality, as well as the feasibility of enhancing resilience through the accumulation of the CCyB.

Chart B.7

Sensitivity of the banking system's CET1 ratio to different types of shock and their severity

Aggregate impact of the simulated scenarios on the CET1 ratio (a)



Sources: Banco de España.
Notes: a. Impacts are defined as the differences in the banking system's expected CET1 ratio at the end of the projection horizon (2023-2025) between each scenario and the baseline scenario.
b. External shock stemming from falling global markets and rising international oil and natural gas prices.
c. Domestic shock, combining (i) financial elements: interest rate rises (in short-term reference rates, long-term government debt and bank rates), and declines in credit, stock prices and house prices; and (ii) real elements: negative consumption, housing investment and capital investment shocks.
For more details, see Estrada et al. (2024).

Appendix C – Methods for identifying a “neutral” risk environment[64]

Slovenia

Banka Slovenije defines a “neutral” risk environment as a situation where cyclical risks are neither excessively high nor excessively low. The phases of the financial cycle that best align with a neutral risk environment may be the late recovery period after a downturn or the early expansion phase. The latter is characterised by a positive economic outlook, improvements in the balance sheets of the financial and non-financial sectors, sustainable credit growth and improving bank profitability. A neutral risk environment may also occur after an expansion phase of the financial cycle, when cyclical systemic risk declines without any materialisation of excessive risks.

The methodology to identify a neutral risk environment in Slovenia relies on a composite indicator computed using a multivariate structural time series model (STSM) including three variables, namely GDP, loans to households[65] and residential real estate prices.[66] These variables represent the business cycle, financial cycle and real estate cycle respectively. The model therefore captures the interlinkages between the three cycles (see Lenarčič, 2021; Rünstler and Vlekke, 2018; and Rünstler et al., 2018 in more detail). Each time series is broken down into three main components, namely a trend, a cycle and a residual component. The deviations of the three variables (GDP, loans, and RRE prices) from their estimated trend are then aggregated in a single indicator.

Specifically, the long-term trends of the three variables are estimated in a first step using the structural time series model and normalised to zero.[67] In a second step, the deviations of the actual time series from the estimated trend component of the same variable is computed (see **Chart C.1**). The neutral environment indicator is then computed as a weighted combination of the deviations of the three variables from their trend, with a 60% weight on the deviation of the financial cycle, a 30% weight on the deviation of the real cycle and a 10% weight on the deviation of the residential real estate price cycle. The concept underlying the identification of a neutral environment is that the larger the deviation of the composite indicator is from the normalised estimated trend of 0, the farther away the economy is from the

64 Prepared by Črt Lenarčič, Artur Rutkowsi and Daniel Abreu.

65 The neutral environment indicator methodology was subject to robustness checks with combinations of using loans to NFCs in the calculation. Nevertheless, this does not improve the estimated neutral environment indicator performance, as the loans to NFCs data contains several types of data noises, especially in the form of large one-off loans from abroad, large NFC loans from largest companies as Slovene economy is particularly small and open and thus more susceptible to such dynamics.

66 All variables are expressed in real terms.

67 The deviation from long-term trend is expressed as $\left(\frac{actual\ data}{estimated\ trend} - 1\right) * 100\%$.

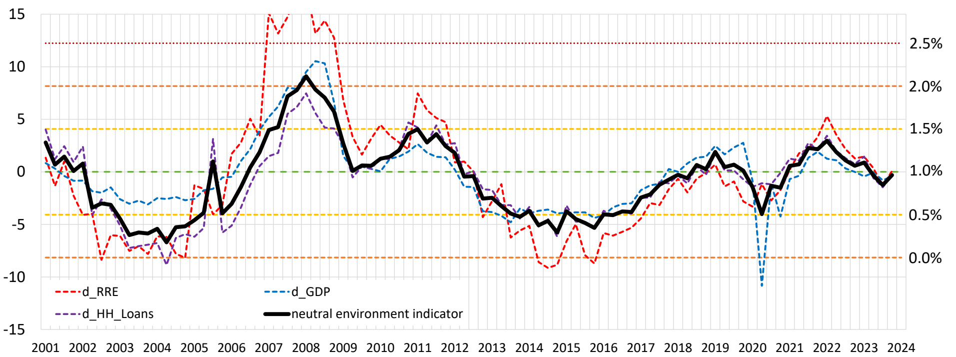
neutral environment (where the CCyB rate is set at its target PN CCyB rate). This, in turn, signals the need to adjust the CCyB rate accordingly.

Finally, to quantify the deviation of the neutral environment indicator from the neutral, 0 value, signalling thresholds of the CCyB rates have to be defined. The neutral environment, where the CCyB rate is set at its target PN rate of 1%, is assumed to lie within a one standard deviation interval of the historical values of the neutral environment indicator. Positive (negative) values of the neutral environment indicator falling between one and two standard deviations would signal a possible increase (decrease) of 0.5 percentage points in the CCyB rate. Consistently positive (negative) values of the neutral environment indicator falling between two and three standard deviations would signal an additional increase (decrease) of 0.5 percentage points in the CCyB rate, while the positive shift exceeding three standard deviations would signal setting the CCyB rate to 2.5%. Currently, the indicator signals a neutral risk environment, so that the CCyB rate is set at its 1% PN rate.

Chart C.1

Neutral environment indicator for Slovenia

Y-axis: percentage points (left-hand scale), CCyB buffer rates (in %) (right-hand scale)



Sources: Banka Slovenije, SORS, own calculations
Notes: For a more detailed explanation of the methodology of real and financial cycles calculation that is based on multivariate structural time series model, see Lenarčič (2021), Rünstler and Vlekke (2018) and Rünstler et al. (2018). The chart depicts the deviations of the GDP (dashed blue line), household loans (dashed purple line) and residential real estate prices (dashed red line) from estimated and normalised trend (left-hand scale). On the right-hand scale the bands of the signalling rate for the CCyB are depicted. At 1.0% the neutral environment indicator signals for CCyB rate to be neutral, i.e. the PN CCyB, since the PN CCyB rate was set to be 1.0%. The bands of the signalling rate for the CCyB are determined with standard deviations of the neutral environment indicator. The neutral environment is determined within a +/- one standard deviation band.

Poland

Narodowy Bank Polski has developed a single index to guide the CCyB rate and measure the intensity of cyclical systemic risk in Poland. This index, referred to as the Minimum Macroprudential Capital Level (MMCL), determines the minimum Tier 1 capital ratio in the banking system that, considering other monitored variables, limits the probability of a financial crisis over a four-year horizon to an acceptably low level.[68] A higher MMCL reflects higher levels of cyclical systemic risk. An increase in

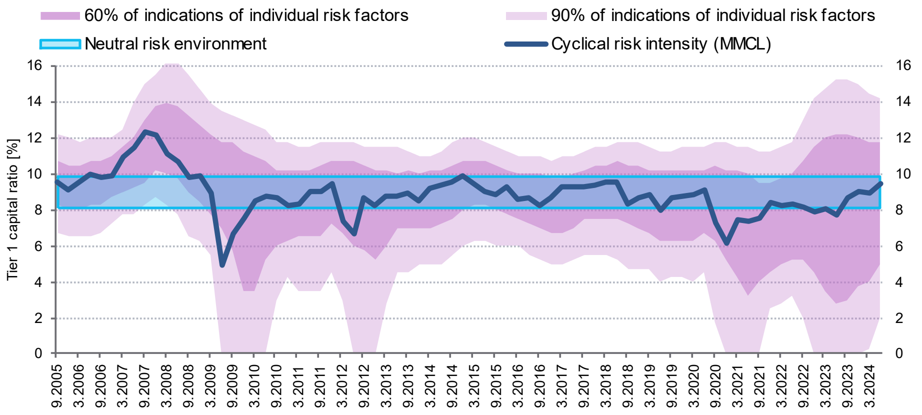
[68] Details regarding calculation of the Minimum Macroprudential Capital Level are available in Appendix C.

the MMCL indicates heightened cyclical risk intensity, while a decrease suggests reduced risk intensity.

The neutral risk environment is identified by excluding historical periods when risk was notably elevated or subdued. This is achieved using two features of the MMCL. First, it reliably increases with rising cyclical systemic risk. Second, the model's assessment of cyclical risk intensity, i.e., the MMCL, decreases during crises as negative shocks correspond to a materialisation of cyclical risk. This causes the forward-looking model to indicate a lower required level of macroprudential capital. The neutral risk environment is thus defined as the range of MMCL values, excluding periods of above-average turbulence in the domestic financial market (see **Chart C.2**). Specifically, the neutral risk environment excludes the following episodes: (i) the rise in cyclical risk intensity prior to the global financial crisis; (ii) the fall in cyclical systemic risk following the global financial crisis; (iii) the decrease in cyclical risk due to the euro area debt crisis; (iv) the reduction in cyclical risk intensity owing to the COVID-19 pandemic and (v) the decline in cyclical risk intensity following the outbreak of the war in Ukraine.

Chart C.2

The CCyB buffer guide (Minimum Macroprudential Capital Level) and a neutral risk environment set based on historical values of the guide



Sources: Narodowy Bank Polski
Notes: The purple ribbons marked 60% and 90% denote the ranges in which 60% and 90% of indications from the individual variables (risk factors) taken into account when determining the MMCL fall, respectively. The broader the ribbons, the greater uncertainty related to the reading of the MMCL.

Portugal

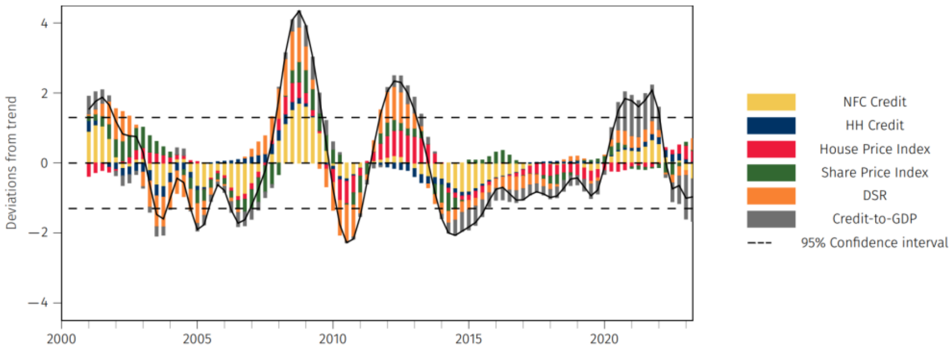
Banco de Portugal measures the financial cycle using a dynamic factor model (DFM), which summarises the evolution of a set of time series into a single factor. The variables included in the DFM encompass credit to households, credit to non-financial corporations, the real house price index, the share price index, the credit-to-GDP ratio and the debt service ratio. All variables are included in the model as two-year growth rates, filtered using the Butterworth filter and standardised to have zero mean and unit variance. The model is estimated with data from the first quarter of 2001 to the second quarter of 2023.

The financial cycle indicator provides a reasonable description of the evolution of systemic risk in Portugal (see **Chart C.3**). It features two marked peaks closely associated with the Great Financial Crisis and the European sovereign debt crisis. Importantly, the build-up of the indicator before these peaks suggests good early warning properties. The indicator settled at negative values from 2014 to 2020, thereby indicating that the financial cycle remained subdued in this period. After the onset of the COVID-19 crisis, the indicator increased markedly before reverting to the zero mean and ultimately settling at negative values after 2022. Overall, the description the financial cycle provided by the DFM aligns well with other indicators for Portugal (e.g. systemic risk indicator).

The analysis of the financial cycle can help to define a standard risk environment, which can be relevant for the calibration of the CCyB. Specifically, a neutral level of cyclical systemic risks can be identified in instances where the financial cycle indicator is at or around its historical average. This neutral level may be consistent with setting a CCyB rate at the target positive neutral rate. Significant deviations of the financial cycle indicator from its average, for example, when it crosses the estimated 95% confidence bands, can signal the need to adjust the CCyB above or below the neutral level. For the most recent period, the indicator suggests that the current phase of the financial cycle in Portugal is consistent with a standard risk environment.

Chart C.3

Financial cycle indicator for Portugal



Sources: Banco de Portugal
Notes: The decomposition is based on the linear regression of the financial cycle indicator on its components. Reported confidence intervals are computed using the asymptotic variance-covariance matrix of the factor estimator.

Appendix D – Quantitative approaches to inform the release of the CCyB[69]

Slovenia

The release of the CCyB in Slovenia depends on the expected materialisation of risks. Some of the main indicators of risk materialisation are a reduction in bank lending volume, an increase in the share of bad loans and a weakening of the solvency of the banking system. To inform the release of the CCyB, Banka Slovenije relies on the same composite cycle indicator used to for assessing the level of cyclical systemic risks and the neutral risk environment (the indicator is described in **Appendix C**), as well as quantitative information provided in Banka Slovenije's Risk and Resilience Dashboard.[70] In addition, Banka Slovenije has developed model-based estimates of crisis probabilities and growth-at-risk (GaR) modelling of the probability of negative growth. These are used as additional factors to inform the release of the CCyB.

The probability of a systemic crisis in the next one-year period is estimated using a real-time early warning model (logit model). If the probability of a financial crisis exceeds the signalling threshold for two, consecutive, quarterly review periods (i.e., daily values for two consecutive quarters on average exceed the signalling threshold), this could be interpreted as an upcoming stress period,[71] which could be used as an additional argument for CCyB easing. The model variables include the debt servicing level of the non-financial private sector (annual change, with a two-quarter lag because of delays in publication), the consumer confidence indicator (European Commission survey, with a one-month lag), government bond spreads (interest rate spread on 10-year government bonds relative to the euro area average), the annual growth of share prices, the realised volatility of share prices over the last month and the gradient of the curve of risk-free return. The identification and dating of systemic financial crises are based on the ECB/ESRB public database of financial crises. The signalling threshold takes into account the trade-off between two types of errors, the first consisting of false crisis warnings and the second related to missed real crisis events, with a higher weight given to this second type of error. It should be noted that the risks estimated by the model are based on the historical characteristics of the data, and the major improvements in the micro- and macroprudential frameworks in Slovenia and in the euro area are only slowly feeding through into the model's estimates, implying conservative estimates of risks.

Banka Slovenije also uses estimates based on a growth-at-risk model as an additional indicator to guide a CCyB release. Analysis of GaR links macro-financial

69 Prepared by Mitja Lavrič, Špela Rozman and Elena Durante.

70 Risk and Resilience Dashboard is included in the Financial Stability Review and Report on bank performance with commentary of Banka Slovenije.

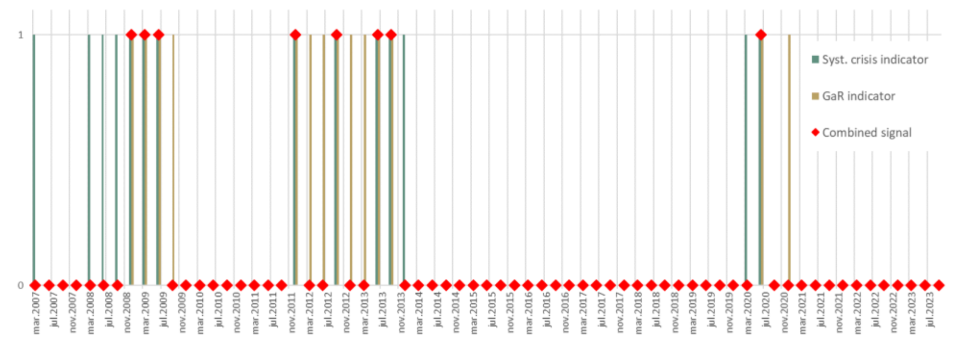
71 A similar sequential condition for more robust signaling of an upcoming crisis is also presented in Blix Grimaldi, M. (2010). Detecting and interpreting financial stress in the euro area (No. 1214). ECB working paper. The sequential condition requires at least four weeks of consecutive signalling.

variables with the probability distribution of future GDP growth, which implies that the distribution, is based on prevailing macro-financial conditions. The macro-financial variables include the financial conditions index (FCI), the systemic risk index (SRI) and the macroprudential policy index (MPI).[72] A worsening of the GaR for two consecutive quarters could be an additional argument for releasing the CCyB below the PNR.

The systemic crisis indicator (see **Chart D.1**) takes the value 1 when the estimated probability of a financial crisis in the next 12 months exceeds the signalling threshold. The GaR indicator takes the value 1 when the estimated probability of negative economic growth one-quarter ahead is above a specified threshold. The combined signal indicator takes the value 1 when the estimated probability of systemic crisis and the estimated probability of negative growth simultaneously surpass the respective thresholds (see **Chart D.1**). Such a circumstance would make it necessary to consider whether the CCyB should be released below the neutral level.

Chart D.1

Combined/simultaneous signalling of indicators assessing the probability of a negative economic growth and the probability of a financial crisis in the next 12 months



Source: Banka Slovenije, SORS

ECB

The ECB has developed a novel model-based indicator to signal the potential need for capital release, complementing existing tools.[73] A timely release of buffers in times of stress can mitigate the risk of a procyclical tightening of credit supply due to bank capital constraints and thus ensure an appropriate flow of credit to the real economy. To complement existing tools used to signal a possible buffer release, the proposed model-based indicator relies on an early warning framework

[72] A description of the basic methodology is given in Drenkovska, M., & Volčjak, R. (2022). Growth-at-risk and financial stability: Concept and application for Slovenia. Banka Slovenije.

[73] Behn, M., Durante, E., Lo Duca, M., forthcoming, “To release or not to release? This is the question”. A model-based indicator to inform the timing of a possible buffer release.

and quarterly bank-level data from the first quarter of 1999 to the second quarter of 2023.

The rationale of the proposed indicator is to predict bank-level deleveraging episodes that, if occurring on a widespread basis, could justify the need for a capital buffer release. For this purpose, a dummy variable taking the value of 1 in the four quarters ahead of a deleveraging episode and 0 otherwise is regressed (via a probit model) on a range of bank-level and macro-financial indicators that may be helpful predictors of such episodes. Bank-level deleveraging episodes are defined as three (or more) consecutive quarters of negative credit growth.[74] The resulting predicted probabilities of deleveraging at bank-level can then be aggregated to obtain measures at the euro area or at the country level, which may then be used to inform buffer release decisions.[75] Specifically, the model may be used to signal the need for a release whenever aggregate probabilities of deleveraging are above a certain threshold.[76]

Weighted average probabilities of deleveraging for euro area banks in the subsequent four quarters are depicted in **Chart D.2** (panel a). As expected, probabilities are well above the euro area median during crisis periods (2008 and 2012-2014). An uptick is also visible in early 2020 during the early stages of the COVID-19 pandemic and in mid-2022 after the outbreak of war in Ukraine. Deleveraging probabilities are low at the current end of the sample, also compared with historical levels. **Chart D.2** (panel b) decomposes predicted deleveraging probabilities into contributions from different factors and shows that, in particular, bank-specific and credit supply factors are driving the results. In addition, the regression results confirm that, among the bank-specific factors, the capital ratio has the strongest impact on the probability of deleveraging,[77] while profitability (ROA) and provisions have the expected sign but seem to play a less important role overall.

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[74] The forecast horizon of four quarters ahead for such episodes is shorter than in traditional early warning models focused on the build-up of vulnerabilities (e.g. Behn et al., 2013, Alessi & Detken 2017, Lang et al., 2018), since the interest is on periods where possible deleveraging is imminent, so that buffers would have to be released immediately.

[75] At this stage, euro area- or country-level probabilities of deleveraging are obtained as a weighted average of the respective bank-level probabilities, using the banks' total assets as a weight.

[76] The selection of the threshold can either be done pragmatically (e.g. as a percentile of the distribution of predicted probabilities), or based on a loss function approach (see, e.g. Sarlin 2013 or Behn at al., 2013).

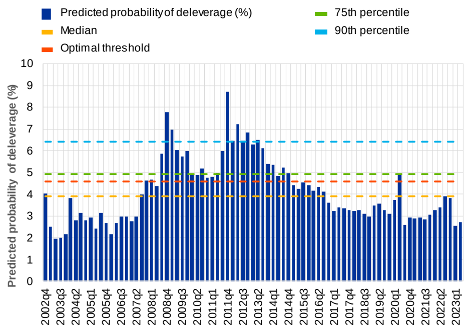
[77] One standard deviation lower capital ratio implies around 1.2 percentage points higher deleveraging probability. While one standard deviation lower ROA implies 0.2 percentage points higher deleveraging probability and one standard deviation higher provisions to income implies 0.2 percentage points higher deleveraging probability.

Chart D.2

Weighted average deleveraging probabilities for the euro area – four quarters ahead (left-hand scale) and decomposition of predicted probabilities by all factors considered in the model (right-hand scale)

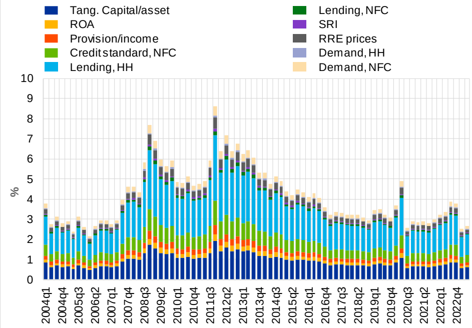
a) Deleveraging probabilities are low at the current end of the sample, also historically.

(Y-axis: predicted deleveraging probabilities, in %)



b) Bank-specific and credit supply factors are driving the predicted deleveraging probabilities.

(Y-axis: predicted deleveraging probabilities, in %)



Sources: Bloomberg and author's calculations.
Notes: Left panel: dashed yellow lines depict different percentiles of the deleveraging probability distribution or the optimal signalling threshold calculated using a loss function approach. The optimal threshold is derived for a policy preference parameter of μ=0.8. A μ larger than 0.5 indicates that the policymaker is more averse against missing a deleveraging event than against issuing a false alarm. Probabilities at bank-level are aggregated using as weight the total asset shares of the bank compared to all banks in the euro area. Right panel: the coloured bars illustrate the decomposition of the predicted probabilities into contributions from different factors. These are calculated by taking the marginal effect of each variable (considering that all other variables are at their mean value) and multiplying this factor by the weighted average predicted probabilities. This calculation is then rescaled by the sum of weighted predictions.

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