



Banc Ceannais na hÉireann
Central Bank of Ireland

Eurosystem

The Central Bank's framework for macroprudential capital CCyB addendum

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Introduction

The Central Bank of Ireland (Central Bank) set out its strategy for the countercyclical capital buffer (CCyB) as part of its [framework for macroprudential capital](#) (the framework), published in June 2022. This document aims to provide further detail regarding the implementation of the Central Bank’s strategy for the CCyB. It looks to outline characteristics that might typically be present across the different phases of the cycle which inform the Central Bank’s CCyB policy stance and some of the information and data that the Central Bank draws upon to inform its judgements in this regard. The role macroprudential stress testing plays as one of the inputs into the process is also discussed. While this paper aims to support understanding about the considerations that the Central Bank takes into account when setting the CCyB, it is important to acknowledge that policymaker judgement remains paramount and will ultimately determine the appropriate CCyB policy stance.

The Central Bank’s CCyB strategy

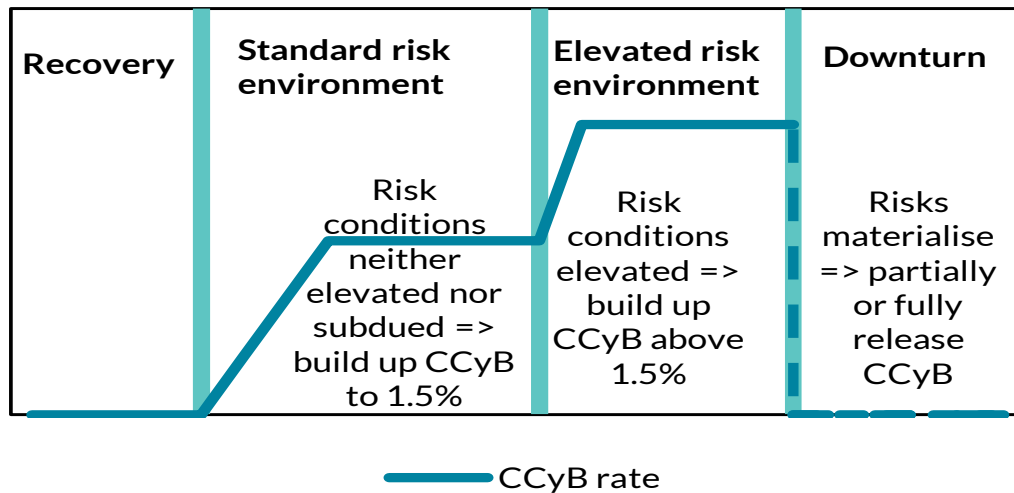
As outlined in [the framework](#), the Central Bank’s CCyB strategy is underpinned by the primary objective of promoting resilience in the banking sector to future adverse shocks – in a manner proportionate to the risk environment - with a view to facilitating a sustainable flow of credit to the economy through the macro-financial cycle. This high-level strategy for the CCyB is presented in Figure 1 which illustrates, in a stylised way, how the CCyB rate would evolve over the course of the cycle in line with the expected systemic risk conditions. The Central Bank’s CCyB strategy seeks to address risks to both the under and oversupply of credit to the economy through the cycle:

- **Recovery** - The period immediately following a stress. Losses have for the most part crystallised and balance sheets are being repaired. The CCyB has been partly or fully released, to facilitate banks maintaining the supply of lending during the period of balance sheet recovery.
- **Standard risk environment** - As the economic and financial cycle improves, the risk environment becomes more balanced where **risks are neither elevated nor subdued**. At this stage, with no significant losses forecast for the banking sector in the central outlook for the economy, the Bank would look to build the CCyB up to a rate of 1.5 per cent.¹

¹ This strategy acknowledges the inherent uncertainty in assessing the degree of risk facing the banking system and the time lags in implementing the CCyB. In addition, by moving early in the cycle, the Central Bank has the scope to implement policy changes in a gradual manner, where necessary and appropriate, with a view to minimising unwanted impacts on the real economy.

- **Elevated risk environment** - Cyclical risk conditions, as reflected by indicators across credit, the domestic economy, asset prices (especially real estate), risk appetite and global conditions reflect emerging imbalances. In line with the forward-looking nature of the CCyB, the rate would be increased above 1.5 per cent when an elevated risk environment is expected.
- **Risk materialisation** - Risks materialise and losses are crystallised. The CCyB is partially or fully released, so that banks can absorb losses and maintain the supply of lending to the economy.

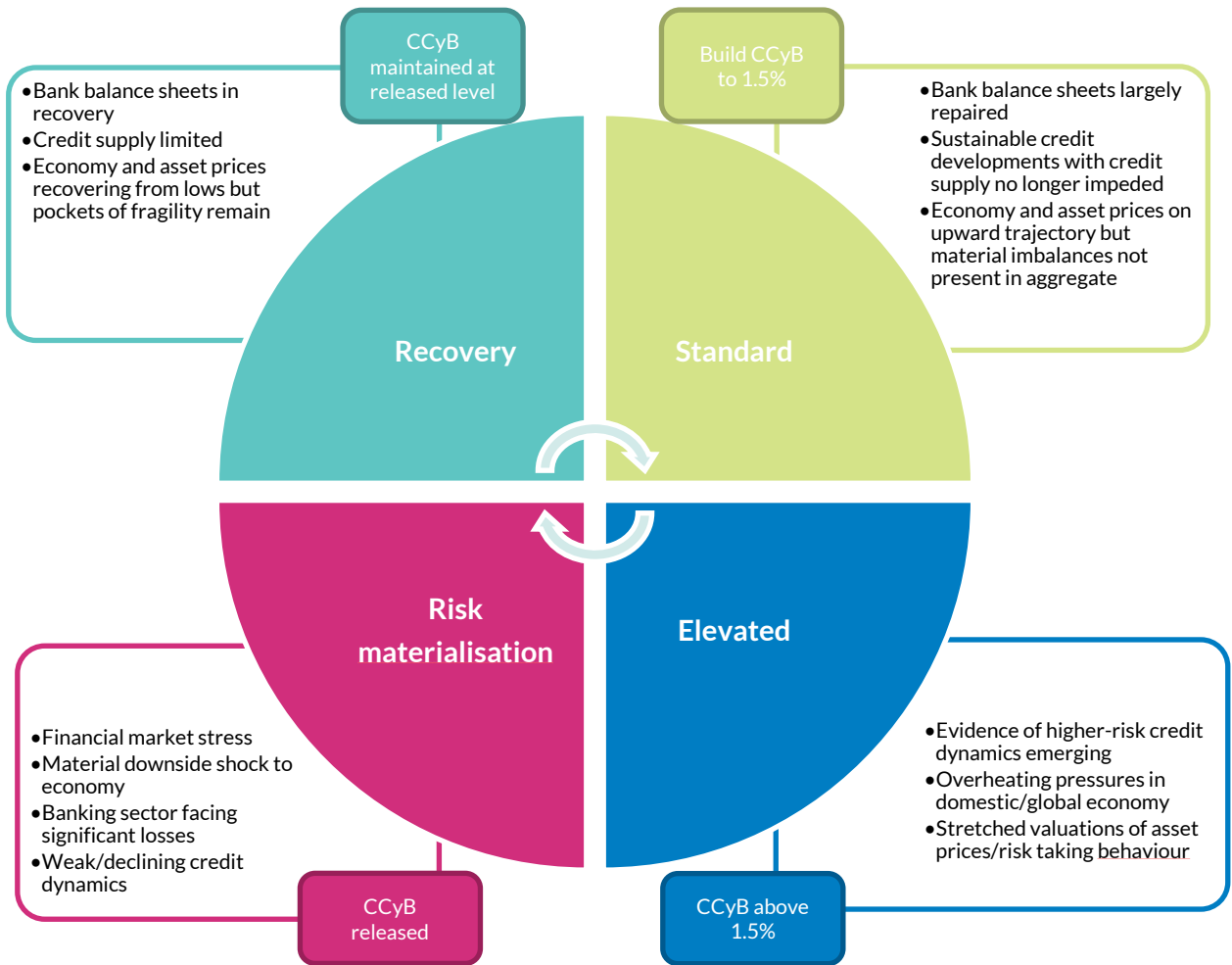
Figure 1: Stylised representation of the Central Bank’s strategy for the CCyB



Describing the risk environment

This section looks to outline macro-financial characteristics that one might expect to observe across different phases of the cycle. The descriptions of the risk environments are stylised in nature. The macro-financial cycle and systemic risk conditions do not always follow a smooth path with clearly defined boundaries between different phases, nor are credit dynamics always the most important driver of potential future risks. Similarly, the transition from one risk environment to another may take place on a continuum as opposed to happening explicitly at a distinct point in time. Further, it will not always be the case that all elements of the macro-financial environment will point to the same phase of the cycle. Given the time lags in the data available to policymakers, the Central Bank considers the macro-financial environment in a forward looking manner where possible. Policymaker judgement will always be required to reach an overall judgement, potentially balancing different and competing signals.

Figure 2: Key characteristics of the risk environments and CCyB policy stance



Recovery phase

- **Typical features one might observe:** Bank balance sheets are in recovery (e.g. troubled loans are being resolved) contributing to a potentially limited credit supply initially. The economy and asset prices are recovering from cyclical lows but pockets of fragility remain.
- **Implications for buffer calibration:** The CCyB, having been released during the risk materialisation phase, would remain at this level to support the provision of credit to the economy and avoid impeding economic recovery.

The recovery phase refers to the post-crisis or post-risk materialisation period which likely follows a period of losses in some or all of the financial sector, NFCs and households. While pockets of fragility are likely to remain and the after effects of the stress may still be evident in certain areas, the material impact of the shock should have passed. Initially, at least, banks may have limited capacity and a low risk appetite for lending in the aftermath of the shock. Additionally, demand for credit may be subdued due to uncertainty stemming from the shock. As the recovery progresses, and bank

balance sheets recover, evident perhaps in a decline in loan impairments and arrears, improving profitability and a strengthening capital position, credit dynamics may be expected to strengthen. Asset prices tend to have reached their cyclical low point at this stage and begin to see an upward trajectory. However during this phase, values may be low relative to historical benchmarks or model based estimates of equilibrium levels, having potentially over-corrected during the period of stress. Similarly, while pockets of vulnerability may still be present, a nascent economic recovery would be underway, feeding through to increasing economic activity and declining unemployment.

Standard Risk Environment

- **Typical features one might observe:** Bank balance sheets have largely recovered with credit supply no longer impeded. The economy and asset prices are on an upward trajectory but material imbalances at an aggregate level are not present.
- **Implications for buffer calibration:** The CCyB would be built up to 1.5 per cent.

Overall, at this stage, domestic systemic risk overall would be neither particularly elevated nor particularly subdued. In this phase, it would be expected that bank balance sheet recovery would have progressed, with the sector able to generate reasonable profits. Sector-wide bank losses related to cyclical developments would not be expected in the central economic outlook. With credit supply no longer materially impeded, sustainable credit dynamics supportive of broader economic growth would be expected. Typically, the central outlook for the economy would be one of increasing economic activity and positive labour market dynamics without creating economy-wide overheating pressures. Likewise, asset prices would be expected to be increasing without strong signs of stretched valuations.

A standard risk environment does not imply the financial system and economy do not face risks and vulnerabilities. The judgement in this case revolves around the aggregate position of domestic cyclical risk conditions and that, on balance, risks are neither particularly elevated nor particularly subdued. This could be the case even if there are particular pockets of risk in certain areas, contrasting cyclical developments from different sectors or certain sources of elevated external risks.

Elevated Risk Environment

- **Typical features one might observe:** Evidence of emerging higher-risk credit dynamics (e.g. rapid or sustained credit growth, deteriorating credit standards), high levels of indebtedness and/or increasingly stretched asset prices. Macro-financial risks could also be evident in terms of broader overheating pressures in the domestic or global economy.

- **Implications for buffer calibration:** The CCyB would be increased above 1.5 per cent. The buffer would be set proportionate to the level of resilience required.

A strong expansionary phase of the financial cycle is underway as the financial system becomes exposed to an elevated level of risks. At this stage, evidence will be emerging that higher risk credit dynamics may be taking place. This could be evident in, for example, rapid or sustained credit growth, potentially leading to an increase in indebtedness. An easing of lending standards could also be a feature at this time, as could the emergence of a credit/asset price spiral. In this phase, asset price dynamics, and in particular property prices, are likely to have evolved beyond those of a standard risk environment and indicate an emerging build-up of risk, evident perhaps through increasingly stretched asset prices. With higher asset prices and risk appetite, risks may be under-priced or underestimated by both investors and financial institutions, reflected through increased leverage or liquidity transformation in the financial system.

Given the nature of the CCyB, credit developments will be an important consideration at this stage although other factors may also drive elevated levels of cyclical risk.

Internationally, research has found periods of excess credit growth have often been associated with the build-up of system-wide risk. Nonetheless, it could be the case that a constellation of other risks, where there is not yet evidence of emerging high-risk credit dynamics, could create a macro-financial environment characterised by elevated levels of risk. Such circumstances, could, for example include strong rates of economic growth where the economy is operating above its potential, real estate or other asset prices materially above values suggested by fundamentals and/or risks emanating from an exuberant global cycle. The CCyB provides an instrument to address such elevated levels of risk with a view to supporting a sustainable flow of credit across the cycle. This may be particularly relevant in the context of a country like Ireland, where historically the amplitude of cyclical variations in macro-financial series has been relatively high compared to other countries.

While strong or exuberant price growth is expected in this phase, signals of the cycle reaching maturity may begin to emerge, such as a flat growth of property prices, a smaller number of transactions and weaker/weakening mortgage lending as the cycle reaches maturity ([ESRB Working Group on Real Estate Methodologies, 2019](#)). These indicators may signal the cycle moving towards the risk materialisation phase. Under the proposed framework, it is expected that the Central Bank would already have moved above 1.5 per cent before these signals emerge.

Risk Materialisation

- **Typical features one might observe:** The banking sector facing material losses arising from a crystallisation of risk and the resulting downturn in the economy and decline in asset values.
- **Implications for buffer calibration:** The CCyB is released (partially or fully).

Risk materialisation can occur either when the financial cycle turns, and the risks and vulnerabilities which have built-up over a period of time crystallise in a period of stress, or when an unanticipated shock (e.g. COVID-19) results in a material deterioration in the macro-financial outlook. The initial materialisation of risk is likely to manifest itself in financial markets where a tightening of financial conditions, declines in financial asset values and heightened volatility may be evident. Financial market stress in itself is not sufficient for the release of the CCyB. Key in this regard is the expected transmission to the real economy and the extent to which banks may face losses that they need to absorb through accumulated capital buffers. Where this is the case, the CCyB would be released to the extent appropriate.

The release of the CCyB aims to support banks continuing to lend sustainably to the economy and thus reduce the magnitude of the downturn. As risk materialisation continues, economic activity would be expected to decline with an increase in unemployment and with asset prices likely to stagnate or fall. In the face of expected losses and wider economic uncertainty, banks may limit the supply of credit, a risk channel that may be amplified if regulatory capital requirements act as an additional source of credit rationing by banks. Releasing the CCyB reduces banks' capital buffer requirements, providing additional space to absorb losses and maintain a sustainable supply of lending to the economy.

Indicators informing the CCyB

The Central Bank's approach to the use of the CCyB takes a broad perspective on systemic risk. As such, each review of the CCyB draws on a wide range of information. This approach is in line with that recommended by the ESRB ([ESRB, 2014](#)). The assessment of macro-financial conditions is informed by both quantitative and qualitative information across a number of areas including credit developments, the macro economy, real estate and the condition of the banking sector, as well as broader global cyclical conditions, given Ireland's open economy. Table 1 outlines in summary form the key themes that are examined as part of quarterly CCyB reviews, as well as a sample of indicators that are regularly assessed.

Table 1: Indicator themes and sample indicators assessed as part of CCyB reviews

Theme	Sub-theme	Sample Indicators
Credit developments	Credit growth	Private sector credit growth
	Credit gaps	Standard credit gap Alternative credit gap
	New lending	New mortgage drawdowns New lending to NFCs/SMEs
	Credit conditions	Interest rates on new lending
Macro economy	Labour market	Unemployment rate
	Inflation	Consumer price index
	Economic growth	Modified domestic demand
	Indebtedness	National credit to GNI* ratio
Real estate	Price dynamics	RRE & CRE price growth
	Valuation	RRE misalignment CRE yields
Banking sector conditions	Capital adequacy	CET1 ratio
	Profitability	Return on equity
	Asset quality	NPL ratio
Market & global conditions	Financial market indicators	Irish composite stress index
	Global indicators	Growth in global indebtedness

In line with the aim of the instrument, indicators related to credit developments are central to CCyB quarterly reviews. Credit growth has been found to be a crucial predictor of financial crises [Bluwstein et. al \(2021, p. 11\)](#) cites Borio and Lowe (2002); Drehmann et al., (2011); Schularick and Taylor (2012); Aikman et al., (2013). Furthermore, new lending with a particular focus on mortgage lending is assessed to provide an insight into market dynamics. [The ESRB working group on real estate methodologies \(2019\)](#) report highlights mortgage growth as a key indicator of growing cyclical risk within an economy.

The Central Bank also assesses macroeconomic indicators that provide important context when assessing macro-financial developments. In the context of Ireland as a small, open economy, the indicators used (e.g. unemployment, modified domestic demand, inflation) look to capture economic activity related to in the domestic real economy. Such indicators provide insights into economic conditions and are important in determining the overall cyclical state of the macro-financial environment. The national credit-to-GNI* ratio provides a measure of indebtedness in the economy which can signal the build-up of system-wide risks.

Real estate indicators capture the movements in RRE and CRE, both of which have a tangible impact on the real economy and financial stability. The importance of the real estate sector for financial stability stems from its central role in the economy, the large fraction of household wealth invested in real estate assets which then acts as collateral for lenders ([ESRB, 2016](#)). Indicators of valuations are useful for gauging the movement between risk environments i.e. are prices fairly valued compared to what either statistical or modelled estimates of house prices would predict and/or price dynamics are growing moderately or are there signs of house prices diverging from statistical/model estimates and what the drivers of this may be.

The Central Bank monitors a range of indicators to understand the strength of bank balance sheets. The CET1 ratio is assessed as a key metric of loss absorbing capacity of the banking system. Indicators that inform asset quality such as the NPL ratio are useful for indicating the build-up of risk or vulnerabilities on bank balance sheets. Profitability metrics including return-on-equity can also inform judgements on the position of the cycle – for instance determining if conditions have normalised after a period of stress whereby the banking sector can cope with a build-up of the CCyB. Periods of high profitability may also be an indicator of conditions where increased risk taking may occur.

Financial market indicators including composite indicators reflect market participants' expectations about the future state of the economy ([Behn et. al, 2013](#)). As noted in the ([ESRB, 2014](#)) Recommendation, empirical findings suggest that, for the majority of Member States, financial market prices displayed the best signalling qualities to indicate a materialisation of risks that warrant a prompt reduction or full release of the CCyB. The Irish Composite Stress Index presents a coincident measure of systemic risk conditions in financial markets for Ireland. Growth in the global indebtedness index provides global insights which is valuable as Ireland is a small and highly-globalised economy, within a monetary union. This has implications for the nature and magnitude of macroeconomic 'tail risks' facing the banking system, so understanding global conditions and the potential emergence of global imbalances is important.

Box 1: Methodological revisions to the calculation of the alternative credit gap

Since the introduction of the CCyB the Central Bank has, in addition to the standardised credit gap, calculated an “alternative” credit gap. This approach is based on the fact that the standardised credit gap suffers from a number of limitations – which are particularly pertinent for the Irish economy (see [O’Brien et al., 2018](#), [O’Brien and Velasco, 2020](#)) – relating to both the prescribed data and the methodological approach.

In terms of data, the alternative credit gap looks to utilise data which is more reflective of conditions in the domestic economy including a narrower version of total credit and modified GNI (GNI*) instead of GDP as a measure of economic activity. Regarding the methodological approach – which has evolved over time – again the aim has been to overcome some of the limitations of the standardised approach such as the estimation of the trend component of the cycle. This box briefly outlines recent methodological revisions made to the estimation of the alternative credit gap.

The alternative credit gap continues to follow the overall methodology outlined in [O’Brien and Velasco, 2020](#). As such, the estimation of the gap utilises information from auxiliary variables (in addition to credit) covering real estate, labour market and financial market dynamics to capture broader cyclical dynamics. Nonetheless, in order to address issues with model volatility and to minimise issues relating to the selection of specific auxiliary variables, two main changes have been implemented:

- The final output is now based on an averaging approach across a number of estimated gaps all of which satisfy certain specified criteria.²
- Estimating a range of gaps allows for different combinations of auxiliary variables to be utilised. This is particularly the case for assessing real estate dynamics where the house price-to-income and house price-to-rent ratio are now both utilised, in combination with the unemployment rate for the labour market and volatility of the ISEQ index for financial market dynamics.

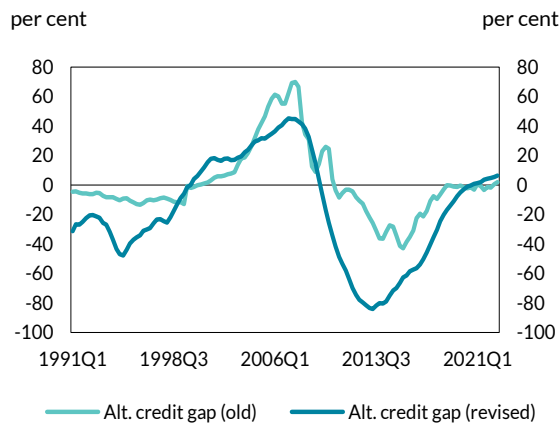
It is also the case that four lags of these input variables rather than two are now used in the model estimation.³

Chart B1 presents the alternative credit gap as calculated in line with this approach alongside the gap as previously calculated. Both series show a similar overall picture, albeit the new approach tends to reflect an upward trend in the cycle at an earlier stage.

² From a historical perspective, estimated gaps need to show a peak in the cycle between Q3 2005 and Q3 2007, i.e. 3 to 1 years before the financial crisis as outlined in Lo Duca et al. (2017) and the low point in the cycle is negative and larger than the peak in absolute terms. Gaps also need to contain early warning properties (as outlined in Lo Duca et al. (2017) and Lang et al. (2019)) and leading credit properties (following the approach of Banbura et al. (2020)).

³ The Akaike Information Criteria resulted to be lowest with a four-lag specification, and the Lagrange Multiplier test confirmed no autocorrelation only from the 4th lag.

Chart B1: The alternative credit gap:
pre and post revision



Source: Central Bank of Ireland

The alternative credit gap is just one of a number of indicators that informs the Central Bank’s judgement regarding the CCyB rate. At this point in time, given the challenges of measuring the cycle in Ireland, the Central Bank does not calculate a buffer guide based on the alternative credit gap.

A CCyB dashboard has been developed as a visual aid to support judgement and communication (Figure 3). The CCyB dashboard does not represent a comprehensive list of indicators assessed, rather it focuses on a number of key indicators with a view to supporting judgements regarding overall macro-financial conditions. The CCyB dashboard is not mechanically linked to CCyB decision-making. A more comprehensive set of indicators is published by the Central Bank in its [Systemic Risk Pack](#) – which forms part of its broader approach to systemic risk identification. It is intended that a CCyB dashboard will be published as part of the CCyB public data file which supports the Central Bank’s communication on the [outcome of its CCyB quarterly reviews](#). It is also envisaged that the CCyB dashboard will evolve over time to include new and different indicators, reflecting changes to the cycle.

Figure 3: Sample CCyB dashboard

Theme	Indicator	Direction for increased risk	Last observation date	Latest observation	12-month change in indicator	Risk level	Historical performance	Minimum	Maximum	Transformation	Time period
Credit Developments	Private-sector credit growth	+	Mar-23	0.5%	0.51 pps	Light Green		-4.4%	32.0%	y-o-y growth	January 2004-present
	SME credit growth	+	Dec-22	0.0%	0.80 pps	Light Green		-12.5%	1.9%	y-o-y growth	March 2011-present
	Standardised credit gap	+	Dec-22	-98.8 pps	-1.71 pps	Light Green		-101.6	84.9	deviation from long run trend	March 1990-present
	Alternative credit gap	+	Dec-22	6.6 pps	2.41 pps	Light Yellow		-84.1	45.3	deviation from long run trend	December 2001-present
	Growth in value of residential mortgage drawdowns	+	Mar-23	33.0%	5.61 pps	Red		-65.0%	57.0%	y-o-y growth rate (4-quarter rolling sum)	March 2005-present
Real estate	Residential property price growth (m)	+	Mar-23	3.9%	-11.10 pps	Light Green		-21.7%	20.4%	y-o-y growth	January 2006-present
	Commercial real estate price growth	+	Mar-23	-9.3%	-9.19 pps	Light Green		-43.0%	32.7%	y-o-y growth	March 1996-present
Macroeconomy	Unemployment rate	+	Dec-22	4.5%	-0.70 pps	Light Green		3.9%	15.9%	percentage	March 1998-present
	Modified Domestic Demand Growth	+	Dec-22	8.5%	2.90 pps	Light Green		-10.3%	10.6%	y-o-y growth rate (4-quarter rolling sum)	March 2002-present
	Domestic Inflation	+	Apr-23	7.2%	0.11 pps	Light Green		-6.6%	9.2%	annual increase of CPI	November 1997-present
	National credit-to-GNI* ratio	+	Dec-22	59.0%	-8.73 pps	Light Green		41.9%	257.6%	ratio	June 1971-present
Banking sector conditions	CET1 Ratio- domestic banks	-	Mar-23	14.6%	-1.48 pps	Light Green		6.6%	16.2%	percentage	March 2014-present
	Leverage ratio - domestic banks	-	Mar-23	7.0%	-0.16 pps	Light Green		6.7%	9.3%	percentage	September 2016-present
	Return on equity- domestic banks	-	Mar-23	10.8%	5.96 pps	Light Green		-12.6%	11.3%	percentage	March 2015-present
Market and global conditions	Growth in global indebtedness	+	Dec-21	-4.2%	-13.09 pps	Light Green		-4.2%	9%	y-o-y growth	December 1981-present
	Irish composite stress index	+	May-23	12%	-15.29 pps	Light Green		0.6%	83.6%	composite indicator	January 1999-present



Note: As in the Central Bank of Ireland’s [Systemic Risk Pack](#), the risk level column is categorised as follows: Orange, red and dark red colours highlight indicators moving in a direction associated with a build-up of systemic risk. Darker green colours will generally be associated with subdued financial system activity or the materialisation of systemic risk. As a result, light green and light yellow shades should be more indicative of benign conditions. Where appropriate the colour spectrum is inverted - for example for the CET1 ratio, leverage ratio and return on equity. Where a build-up of risks are associated with an indicator being below its threshold the heatmap is orange, red and dark red. A grey fill is used where colour coding cannot be constructed or data are not available. The list of indicators can vary over time depending on the suitability and availability of data. Care should be taken when interpreting some indicators as a short time series or limited number of observations may produce spurious results.

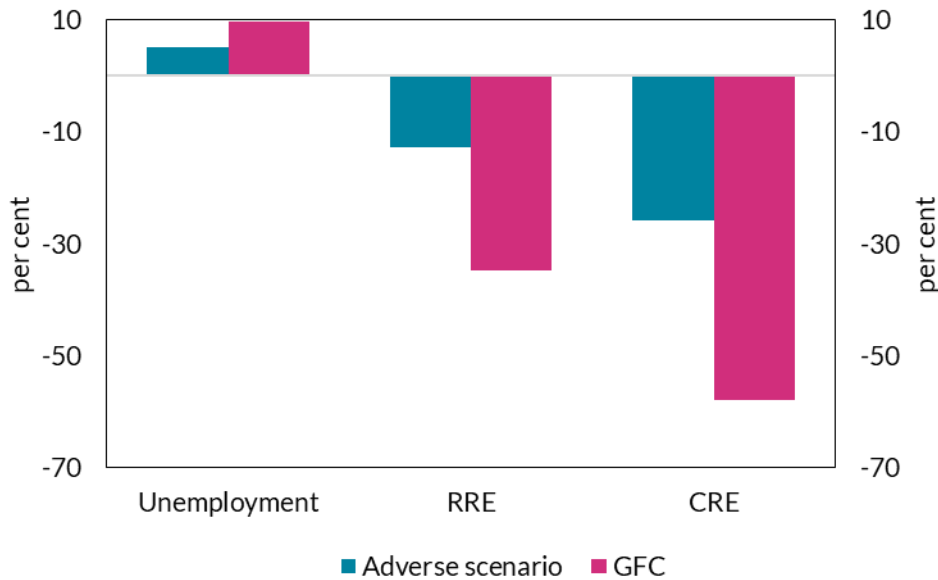
Use of stress testing to inform the CCyB

Macroprudential stress testing provides a tool which can be used to inform judgements on the setting of the CCyB rate. A key principle behind the Central Bank’s CCyB strategy is to seek to match the level of capital in the banking system to the magnitude of the risks that it faces. Stress testing is an analytical tool that can map potential future adverse scenarios to their impact on bank balance sheets, providing a valuable quantitative tool to assess the resilience required by banks to absorb potential adverse shocks. Box 2 in [the framework](#) outlines the Central Bank’s macroprudential stress testing approach in more detail.

The macroprudential stress testing framework was used to inform the Central Bank’s judgement regarding the 1.5 per cent CCyB rate deemed appropriate when risks are neither elevated nor subdued. The scenario employed (Chart 1), represented a significant adverse shock, but was, for instance, much less severe than what was observed during the global financial crisis (GFC). This reflects the fact that the intention was to provide resilience in a macro-financial environment when risks were neither elevated nor subdued. As set out in the framework, the level of capital depletion in this

adverse scenario, coupled with an acknowledgement of other elements of the prudential and regulatory architecture contributed to the judgement that a 1.5 per cent CCyB rate was appropriate for when risks are neither elevated nor subdued.

Chart 1: Macroprudential stress test adverse scenario used to inform the CCyB for a moderate risk environment relative to the global financial crisis



Source: Central Bank of Ireland

Notes: The chart shows the impact on unemployment, residential real estate prices (RRE) and commercial real estate prices (CRE) under an adverse scenario. For the unemployment series, the difference between the 2021 value and the maximum value over the scenario is reported, while the cumulative 3 year growth rate is reported for the real estate price series. The chart also presents comparable metrics over the first three years of the GFC (2009-2011).

Macroprudential stress tests will also serve to inform the Central Bank’s CCyB policy stance on an ongoing basis. It is expected that the Central Bank will run a CCyB related stress test on an annual basis. The intention is that this would serve to inform the Central Bank’s policy stance in general, rather than for a specific quarterly CCyB rate decision. The precise implementation of the CCyB stress test will be influenced by the prevailing environment. In general, it would be expected that:

- Within the [recovery phase](#) or the [build-up to 1.5 per cent in a standard risk environment phase](#), the key role of the stress test would be to inform the outlook for the banking sector under the [baseline scenario](#). This would inform the timing and pace of the build-up of the CCyB to the 1.5 per cent rate.
- Outside of these phases, [including in a standard risk environment](#) or where cyclical dynamics indicate [elevated \(or potential for an elevated\) risk environment](#), the [adverse scenario](#) would be a key focus of the stress test. The

stress test output would then inform the view as to whether a change in the CCyB rate would be warranted to match the level of resilience with the risk environment. In such circumstances, it is not intended that the CCyB rate would be mechanically linked to the stress test output, rather that the output would inform the Bank’s outlook for the policy stance over the coming quarters.

- In a [risk materialisation](#) phase, the focus of the stress test would switch to understanding the resilience of the system to the [materialising shock](#). Given that the buffer may need to be released quickly, the stress test may not always directly feed into release decisions. However, where feasible and appropriate it could be used to understand whether a partial or full release may be warranted.

[Input scenarios to the stress test will reflect plausible scenarios for the macroeconomic outlook based on prevailing cyclical conditions](#). It is envisaged that baseline scenarios would be informed by the Central Bank’s central outlook for the economy as communicated in its [Quarterly Bulletins](#). Adverse scenarios would be informed by the Central Bank’s assessment of the financial stability risks facing the Irish economy and financial system as outlined in its [Financial Stability Review](#) and drawing on the Central Bank’s macro-modelling capabilities and the broader analytical toolkit. The scenario used to inform the 1.5 per cent rate as part of the Central Bank’s strategy would also act as a benchmark in terms of severity.

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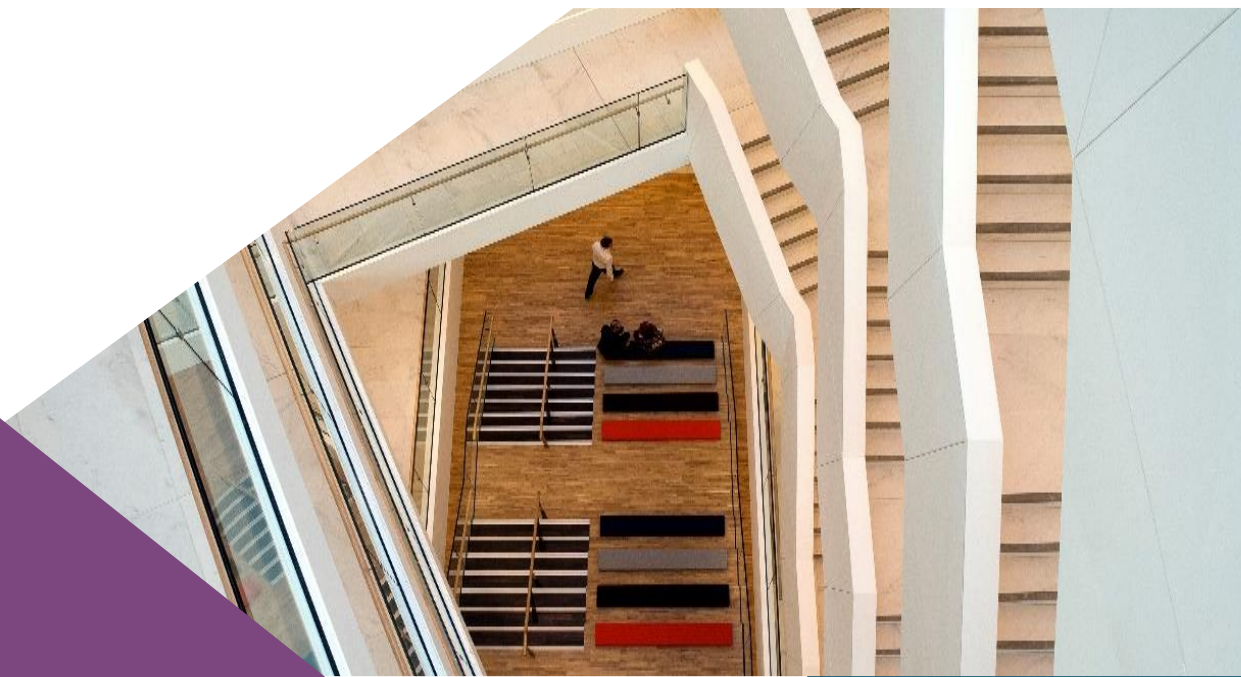
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