

Analytical framework for setting the Countercyclical Capital Buffer in the Netherlands

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This is a translation of the original Dutch-language version of the analytical framework for setting the Countercyclical Capital Buffer, which is the sole authoritative version.

The Countercyclical Capital Buffer in The Netherlands

This document describes the framework that DNB uses to determine the level of the Countercyclical Capital Buffer (CCyB). By being transparent about the way we will set the CCyB, and by describing the factors that are taken into account, we aim to provide insight into the policy principles underpinning the use of the CCyB. This document is structured as follows: Section 1 describes the purpose and applicable framework of the CCyB, section 2 focuses on the revised CCyB framework and section 3 sets out the academic and empirical basis for the list of indicators used.

Section 1: Introduction

The CCyB was introduced as part of the Basel III agreement in 2010 as a tool to address cyclical systemic risks. The primary goal of this buffer is to increase banks' resilience when cyclical risks are building-up, and to release these additional resources when systemic risks materialise. This gives banks additional headroom to absorb losses and support lending in times of crisis. The continuity of lending can then cushion the impact of a shock or shorten the duration of a crisis. The CCyB is the only buffer explicitly intended to vary over time with the degree of cyclical risk.

The credit-to-GDP gap is a key indicator in the determination of the CCyB, but there is also discretion to take other variables into account in order to address cyclical systemic risk. The emphasis in the Basel framework was on protecting the banking sector against periods of excessive credit growth associated with the build-up of system-wide risks. The Basel agreement included a proposal to measure the build-up of such risks by using the credit-to-GDP gap as a common benchmark.¹ This indicator was an integral part of a buffer guide that linked values of the credit-to-GDP gap to a CCyB rate.² Although the credit-to-GDP gap provides a good basis, it was already evident that it would be insufficient to map all the dimensions of cyclical risk equally well. The designated authorities therefore have discretion to take account of other variables they deem relevant to the management of cyclical systemic risk when determining the CCyB.

¹ The credit-to-GDP gap is the difference between long-term trend credit growth and observed credit growth, in both cases as a percentage of GDP.

² A buffer guide is a benchmark buffer rate as described in the CRD.

Despite this discretion, there was only a limited build-up of capital in the euro area that could be released immediately in times of acute stress. Although the applicable framework provides scope for a proactive CCyB policy, the overall size of the CCyB in the euro area before the coronavirus crisis (end of 2019) amounted to just 0.2% of total risk-weighted assets.³ A possible explanation is that the CCyB mechanism was strongly focused on the lessons learned from the 2007 credit crisis, i.e. on the risks of excessive credit growth, and to a lesser extent on other cyclical systemic risks. The limited build-up of releasable capital also applied to the Netherlands, which had a CCyB of 0%.

The coronavirus crisis, however, has highlighted the added value of more releasable buffers and we intend to take this into account by setting a positive CCyB in a standard risk environment. When the coronavirus outbreak occurred, it was essential that banks remained able to perform their intermediary role. In the absence of a CCyB, we therefore decided in March 2020 to temporarily provide additional headroom for the largest three banks by lowering the systemic risk buffer. Over time we would compensate for this reduction in the capital requirement by gradually building up a 2% CCyB for the exposures in the Netherlands.⁴ Against this background, we intend to make greater use of our discretionary power with regard to the CCyB. This results in the 2% CCyB in a standard risk environment included in the framework. We define a standard risk environment as a situation in which cyclical systemic risks are neither particularly high nor particularly low.

We believe our existing CCyB framework needs to be modified in the light of the intended use of the CCyB. As we wish to maintain a positive CCyB in a standard risk environment, it is important that the framework allows for a more precise determination of the phase of cyclical systemic risk in which the Netherlands finds itself at any given time. To this end we will monitor a broad range of indicators providing an overview of the macroeconomic environment, the state of financial and non-financial sectors, and the financial markets. Interactions between indicators and

³ See [Macroprudential policy after the COVID-19 pandemic \(europa.eu\)](#)

⁴ See the announcement of 17 March 2020 on our website: [DNB lowers bank buffer requirements to support lending](#). DNB lowered the SRB from 3% to 2.5% (ING), 2% (Rabobank) and 1.5% (ABN). In the case of ABN, the O-SII buffer was also lowered from 2% to 1.5%.

deviations from structural trends will also be examined. An overall risk profile will be drawn up on the basis of these indicators and expert judgement. On the basis of this overall risk profile, we will set the buffer rate each quarter and communicate any change externally.

We anticipate an increase of 1% per year towards the 2% CCyB in a standard risk environment. In principle, the buffer will be built up at a rate of 1% per year in order to reach the neutral level of 2% after two years. We may decide to adjust the accumulation rate if the situation so requires or if the economic and financial conditions permit. We may also opt for a faster accumulation rate when the CCyB is activated for the first time. The framework allows the buffer to be raised above 2% in the event of higher-than-normal cyclical systemic risk. An announced increase in the CCyB will only become binding after exactly 12 months, so banks will have sufficient time to comply with the buffer requirement.⁵

With our intended use of the CCyB, we aim to take fuller account of the inherent uncertainty in measuring cyclical systemic risks. Given the complexity of the financial system and the speed and unpredictability of adverse developments within it, the measurement of cyclical and other systemic risks is subject to inherent uncertainty. An ostensibly standard risk environment may consequently harbour growing cyclical vulnerabilities that could significantly impact the risk profile of institutions. Due to this inherent uncertainty and the systemic risks that may result, we believe a positive CCyB is appropriate when the cyclical systemic risk is deemed to be neither particularly high nor particularly low. This has the additional advantage that banks can gradually build up a buffer (in line with the purpose of the CCyB) and thus build-up capital in a timely manner that we can release if risks materialise. In addition, it may be easier for institutions to generate capital in this stage of the cycle, thereby reducing the risk of banks holding insufficient releasable capital when risks materialise.

We also believe that a neutral level of 2% strikes the right balance between providing sufficient headroom after a shock and the associated cost. When

⁵ By law we are permitted to vary this period in exceptional circumstances.

setting an appropriate level for this buffer, we should bear in mind that on the one hand that an inadequate buffer may not properly reflect the accumulated risks and could thus prove ineffective when released. On the other hand an excessive buffer may disproportionately increase the burdens on banks. A 2% buffer translates into roughly EUR 6 billion of releasable core capital. That is proportional to the peak accumulated losses of Dutch banks in previous crises, which amounted to EUR 12 billion between 2007 and 2016.⁶ Releasing such a buffer would create additional lending headroom of up to EUR 150 billion. We believe that this is appropriate, also taking into account the impact of the buffer reduction in March 2020. Sweden and the United Kingdom, countries with a similar CCyB policy, are also aiming for 2% in the neutral phase of the cycle.

Finally, we believe the applicable framework provides sufficient scope for the intended use of the CCyB, and some other European macroprudential authorities have already implemented such approaches. The applicable CCyB framework consists of European laws and regulations (the Capital Requirements Directive (CRD)) as implemented in Dutch legislation (the Decree on Prudential Rules for Financial Undertakings)⁷, plus the Recommendation of the European Systemic Risk Board (ESRB) on the use of the CCyB (ESRB 2014/1). The relevant CRD provisions require the designated authority to calculate a buffer guide that *“should reflect, in a meaningful way, the credit cycle and the risks due to excess credit growth in the Member State [...]”* and *“should duly take into account specificities of the national economy”*.⁸ The authority, at its own discretion, should thus consider various qualitative and quantitative factors, which are not listed exhaustively. The authority will then determine the CCyB each quarter on the basis of: a) the aforementioned buffer guide, b) ESRB guidance and c) *“other variables that the designated authority*

⁶ The peak accumulated losses of an individual Dutch bank are the maximum accumulated losses over a given interval in a predetermined time period. This interval varies from bank to bank. As banks make a profit in some years during such an interval, peak accumulated losses are lower than the total losses for the period 2007-2016. This figure is therefore not negative in the case of banks that only make profit during this period. See De Haan and Kakes (2020) for more information on European banks' peak accumulated losses after the credit crisis.

⁷ More specifically in Article 136 of the CRD and Section 105b of the Decree on Prudential Rules for Financial Undertakings. The implementation in Dutch law is dynamically aligned with EU law, so the latter prevails.

⁸ Article 136(2) of the CRD.

considers relevant for addressing cyclical systemic risk".⁹ We will use the buffer guide prescribed by the Basel Committee on Banking Supervision (BCBS) as a starting point and then supplement it, on the basis of the neutral level of 2%, with a broad set of indicators identifying the phase of cyclical systemic risk and comparing it to a structural trend.¹⁰ The aforementioned ESRB Recommendation also makes clear that the CCyB should not be set solely on the basis of credit growth indicators. It recommends that authorities also monitor the build-up of cyclical systemic risks using indicators designed to measure, for example, real estate overvaluation, mispricing of risk or the sustainability of private debt. We believe that given the discretionary nature of the applicable framework, combined with the inherent uncertainty in measuring cyclical systemic risks, the envisaged build-up of the CCyB to a level of 2% is appropriate when the cyclical risk moves towards the neutral level of the cycle (or has been there for some time). A similar rationale is also given for the similar CCyB policies in the United Kingdom, Lithuania and Sweden.

⁹ Article 136(3) of the CRD.

¹⁰ BCBS (2010).

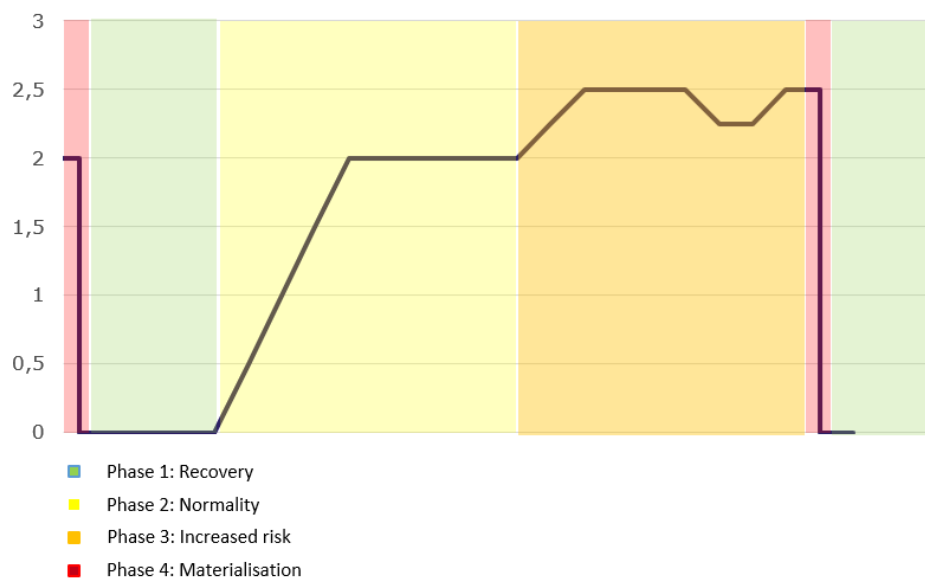
Section 2. DNB's revised CCyB framework

We will use the CCyB to ensure that the banking sector is sufficiently resilient to (cyclical) shocks. In the event of an economic or financial shock, the banking sector must be able to absorb the losses without cutting off the supply of credit. Banks' ability to continue to meet the credit needs of households and businesses after an economic or financial shock has beneficial macroeconomic effects. It allows the continuation and start-up of activities that add value to the economy, thereby helping to improve the macroeconomic situation. This may limit the negative impact of a shock on bank balance sheets. When the risk of a downside cyclical shock increases, the target level of the buffers is also increased. We will allow the CCyB to fluctuate in line with the exposure of the Dutch financial sector and economy to cyclical systemic risks, so that releasing the buffer also gives banks sufficient headroom in the event of a more severe shock.

When setting the CCyB, we will distinguish four different phases associated with the degree of systemic risk. Although the phases will usually be chronological, it is also possible to regress from Phase 3 to Phase 2, for example.

- **Phase 1 – recovery:** This phase follows a crisis and is characterised by a period of taking losses and subsequent recovery of balance sheets, both in the financial sector and among households and businesses. The CCyB has been (fully or partly) released in this phase.
- **Phase 2 – normality:** The balance sheet recovery is well under way in this phase, with the economic and financial cycle showing moderate growth. In this phase, the CCyB is built up to or has already reached the neutral level. In principle, we apply a neutral level of 2%.
- **Phase 3 – increased risk:** In this phase, excessive developments in lending or asset prices lead to an increased level of systemic risk, to which we can respond by raising the CCyB above the neutral level.
- **Phase 4 – materialisation:** In this phase, a risk materialises, causing a substantial downside shock. The CCyB is fully or partly released.

Figure 1: Illustrative use of the revised CCyB framework



Source: DNB

To determine the CCyB, we will monitor and assess the development of the cyclical systemic risk over time. The degree of systemic risk may vary over time, depending on the build-up of imbalances in (i) the macroeconomic environment, and the build-up of vulnerabilities in (ii) non-financial sectors, (iii) the financial sector and (iv) financial markets. We will look at the economic cycle and the external position to assess the build-up of imbalances in the macroeconomic environment. Any increase in these imbalances also raises the likelihood of a substantial downside shock. In order to assess the threat posed by such a shock to the stability of the financial system, we will examine the extent to which vulnerabilities are building up among households, businesses and in the financial sector itself. The greater the vulnerabilities in non-financial sectors, for example due to a sharp increase in debt, the more likely a shock is to threaten the stability of the system. Moreover, vulnerabilities may have accumulated in the financial sector itself, for example as a result of underestimating risks and vulnerabilities in financing. Finally, developments in the financial markets also play a role. The primary focus is on whether there are grounds to release the buffer on the basis of stress indicators, but we will also consider developments in cyclical risks, for example due to overvaluation of equity markets.

We will make an overall risk assessment based on a number of key indicators and a corresponding heat map. The key indicators (Table 1) are based on prescribed Directives, ESRB Recommendations, empirical and other literature, specificities of the Dutch economy and financial sector and experiences of other macroprudential authorities. The credit-to-GDP gap thus remains an important part of the framework (in line with the Basel requirements). A heat map will then be used to highlight the level of cyclical systemic risk and associated developments and to compare them to a structural trend.

We will set the CCyB on the basis of the prevailing phase of the economy and the financial sector at the time – and the associated cyclical systemic risk. In practice, expert judgement will also be used when assessing the systemic risk phase or associated developments, for instance if the picture presented by the heat map of indicators is not clear-cut. The first half of 2021, for example, saw moderate economic growth and rising bank losses (Phase 1), while asset prices remained very high (Phase 3). One way to address this is to focus on the indicators that are most relevant in the phase in question. Inevitably, however, the phase will be determined by weighing up the information from the various indicators and the expert judgement.

Phase 1 – recovery – the CCyB is at 0%

This phase follows a negative shock. The uncertainty surrounding the effects of the shock diminishes and the damage to the economy and financial balance sheets becomes increasingly evident. The economic recovery is under way and balance sheets begin to recover. The macroeconomic picture remains subdued in this phase. The economy is operating far below potential, spending is inhibited by the balance sheet recovery, asset prices are moderate and risk appetite is low. Lending is also subdued. This is due partly to low investment demand, but also to the fact that banks have limited capacity and willingness to increase their lending due to ongoing uncertainty about the impact of the shock.

We monitor in this phase in particular whether the impact of the shock is really behind us, whether the recovery of the economy and the financial sector is sufficiently under way and whether the prospects for further recovery are robust. The monitoring and assessment are focused particularly on indicators of the economic cycle, banks' profitability and banks' resilience to any further risks that may arise (e.g. CET1 ratio, net outflow of Stage 1 loans).

The CCyB is released in this phase in order to create more headroom for banks to maintain lending to the real economy. The CCyB remains at 0% for as long as necessary to not impede the recovery, and as long as appropriate having regard to developments in the risk profile. The guiding principle is that we will initiate the CCyB build-up to the neutral 2% level as soon as it is responsible to do so.

In Phase 2 – normality – the CCyB is in principle built up to 2% in annual steps of 1%

This phase starts as soon as the economic and financial conditions have sufficiently normalised. The outlook for economic growth is positive and not more uncertain than usual. Balance sheet recovery is under way in both the non-financial and financial sectors. Asset prices show moderate growth with no clear signs of over- or undervaluation. Credit growth shows a normal picture. The willingness to invest is moderate and lending is not (or no longer) impeded by weakened bank balance sheets. Cyclical systemic risk is neither particularly low nor particularly high in this phase.

We monitor in this phase a wide range of indicators related to the macroeconomic environment, financial markets and the position of the financial and non-financial sectors. We assess whether these indicators are deviating from what may be considered a 'normal' development (e.g. from a historical perspective or in relation to fundamental values). On the one hand, this broad view is necessary because systemic risks can manifest themselves in various ways. On the other hand, a broad set of indicators can make it difficult to draw an unambiguous conclusion. Developments in the macroeconomic environment, for example, will not always run in parallel with developments in financial markets. The emphasis is on identifying

developments that point to higher-than-normal systemic risk or increased vulnerability. When these signals are observed, we assess whether, against the wider backdrop, the systemic risk level is still neither particularly low nor particularly high.

A neutral CCyB level of 2% is associated with neither a particularly low nor a particularly high level of risk. When the transition from Phase 1 (recovery) to Phase 2 (normality) occurs, the CCyB is built up to 2%. In principle, this takes place at a rate of 1.0% per year. Such an accumulation rate ensures that banks restore the buffer fully and in a timely manner. It will then take two years for the 2% CCyB on Dutch exposures to be fully binding, whereas a financial cycle may last for 15 to 20 years.¹¹ This accumulation rate is also consistent with the phase-in paths of other buffers: the *capital conservation buffer* and the *systemic risk buffer* had gradual entry paths of 0.625% and 0.75% per year respectively over the total risk exposure. This accumulation rate can be slowed or accelerated if the risk profile so requires. Once the CCyB has been built up to 2%, the buffer remains at that level as long as the risk profile remains normal.

Phase 3 – increased risk – the CCyB is increased further

In this phase, the cyclical systemic risk is higher than in normal times. There are signs of overheating in the macroeconomic environment, such as high economic growth and the build-up of external imbalances. Asset prices are high relative to fundamental values, while developments in financial markets and lending point to increased vulnerabilities and underestimation of risks.

Against this background, our focus in this phase is mainly on developments in lending, real estate and risk appetite and the relationships between them.¹² We assess whether developments in bank and non-bank lending to businesses and households are excessive. Besides credit growth, we also assess indicators of debt sustainability in the sectors concerned. Strong price rises and high price levels in (residential and commercial) real estate markets may indicate heightened risk. Risk appetite in financial markets is also an important factor. Among financial institutions

¹¹ See Borio et al. (2018).

¹² See also the ESRB recommendation on monitoring cyclical risks – ESRB/2014/1

and non-financial sectors this is reflected among other things in stretched financial balance sheets (high leverage, vulnerable financing). Risks may be underpriced or underestimated particularly at times of high risk appetite, potentially leading to a further build-up of vulnerabilities.

In this phase we raise the CCyB above 2%. We will seriously consider a CCyB above 2% (but no higher than 2.5%) if at least one dimension poses high cyclical risk. A CCyB above 2.5% will be considered if multiple dimensions pose high or very high cyclical risk. Although the CCyB has no statutory maximum limit, reciprocity is only mandatory up to 2.5%.¹³ The CCyB is reduced to 2% when the cyclical risk falls back to a normal level (Phase 2) or the CCyB is partly or fully released if risks materialise (Phase 4).

Phase 4 – materialisation – the CCyB is fully or partly released

In this phase, a substantial downside shock occurs in the real economy or the financial sector. This shock may be due to the materialisation of risks that have built up in the macroeconomic environment or in financial balance sheets, but it may also have an external cause. In any case there is a real likelihood of substantial losses in the financial sector. Such a shock will be evident when it reveals itself.¹⁴

In this phase, we decide to release the CCyB immediately to enable banks to absorb losses without any attendant need for deleveraging (or excessive deleveraging).¹⁵ A decision must be taken on whether to release all or part of the CCyB. There is a trade-off between on the one hand the additional room for manoeuvre that banks have to continue lending and on the other hand the possibility of a further release of the CCyB in the event of unexpected further (or other) adverse developments. The results of stress tests, historical losses and calculations using DNB's DELFI model can serve as

¹³ As a rule the CCyB will also be reciprocated above that level. Reciprocity in this context means that designated authorities in other countries impose the same CCyB requirement on credit institutions under their supervision in respect of their financial exposures on Dutch territory.

¹⁴ By way of illustration, the CCyB has hitherto been released on only three occasions: In the UK following the unexpected result of the Brexit referendum (2016), in Hong Kong during the persistent protests (2019) and during the coronavirus crisis, when every country with a positive CCyB (apart from Luxembourg) released its CCyB (2020).

¹⁵ In such cases we will emphasise – as in March 2020 – that the released buffer is intended to support lending, not for extra dividend payments or share buy-backs.

input and will also be used where possible as part of the communication strategy. We will communicate the expected period for which we will not reactive the buffer alongside with a justification for this period.

Table 1: Key indicators of the revised CCyB framework

Dimension	Category	Indicators
Macroeconomic environment	Economic cycle	<ul style="list-style-type: none"> • Real GDP growth NL (annualised) • GDP growth estimate NL • Purchasing managers' index NL • Consumer confidence NL
	External position	<ul style="list-style-type: none"> • Current account NL (% of GDP)
Financial sector	Profitability	<ul style="list-style-type: none"> • Return on assets (annualised) • Net outflow of Stage 1 loans (% of total loans)
	Resilience	<ul style="list-style-type: none"> • CET1 ratio • Leverage ratio • Liquidity coverage ratio
	Risk appetite	<ul style="list-style-type: none"> • Euro Stoxx 50 VIX Index • Percentage (relative to total assets) in sub-investment grade: pension funds and insurers • Bloomberg Barclays high-yield euro spread on BB corporate bonds
Non-financial sectors	Lending to private sector	<ul style="list-style-type: none"> • Basel credit-to-GDP gap • Total credit to HHs as % of GDP (two-year change) • Total credit to NFCs as % of GDP (two-year change) • Real credit growth – HHs (two-year change) • Real credit growth – NFCs (two-year change)
	Debt sustainability	<ul style="list-style-type: none"> • Debt service ratio – HHs • Debt service ratio – NFCs
	Real estate	<ul style="list-style-type: none"> • House price index • Share of LTV above 90% (first-time buyers) • CRE price index • Price-to-income gap (vs average)
Financial markets	Valuations	<ul style="list-style-type: none"> • AEX index (real 3-year growth)
	Stress	<ul style="list-style-type: none"> • DNB Financial Stress Indicator • EURIBOR-OIS spread (3-month term)

Section 3. Rationale for list of indicators

This section provides a more detailed explanation of the revised framework we plan to use to determine the CCyB. It specifically considers the list of indicators used to measure cyclical systemic risk or its materialisation.

Risk monitoring and selection criteria for indicators

This framework identifies four dimensions relevant to the measurement of cyclical systemic risks and risk materialisation:

- *The macroeconomic environment:* on the one hand this a basis for mapping the development of system-wide risks at the macro level. On the other hand, standard economic indicators are examined to gauge the likelihood and impact of an economic shock.
- *The financial sector:* this dimension maps banks' sensitivity to shocks and the sector's ability to cope with the activation of the CCyB. It also measures banks' risk appetite and the build-up of cyclical risks.
- *The non-financial sector:* this dimension is mainly focused on the resilience of - and lending to - households and businesses. This shows how a shock in the economy or the financial sector can manifest itself in bankruptcies in the non-financial private sector. It also reveals any excessive credit growth.
- *The financial markets:* in this dimension the focus is on growing cyclical risk due to sharply rising asset prices, and on the degree of stress or risk materialisation in the markets.

This conceptual framework forms the basis of our CCyB policy. The conceptual framework is designed to map the formation of cyclical systemic risk as identified in the ESRB recommendation on guidance for setting CCyB rates (ESRB, 2014). The four dimensions are further elaborated and subdivided into ten different categories.

Finally, a list of indicators has been selected for each category on the basis of various selection criteria. First, the indicators should adequately reflect the requirements of the Capital Requirements Directive (CRD) and ESRB

recommendation 2014/1.¹⁶ Secondly, we have considered the findings of the academic literature on the early warning properties of an indicator (for both the Netherlands and Europe). Thirdly, data of the indicators should be timely available. Finally, indicators are added to ensure that specificities of the Dutch economy (e.g. being a small, open economy with a large banking sector) are taken into account. This also provides scope to take account of expert judgement.

Although the indicators provide input for decision-making, there is no mechanical link between the indicator values and the level of the CCyB. DNB will take decisions on the basis of guided discretion. We will look holistically at the development of the indicators and use expert judgement to determine the value of the CCyB. This means we can also add or remove indicators over time. We will clearly communicate any changes to the framework.

¹⁶ The European directives also draw on research conducted by the BCBS (e.g. Basel 2010). The BCBS concluded that the credit-to-GDP gap was best suited to identifying cyclical risks in the accumulation phase. The CRD therefore states that authorities must observe the credit-to-GDP gap and a buffer guide when taking decisions on the CCyB. In addition, the ESRB recommends (in ESRB 2014) that Member States consider not only the credit-to-GDP gap but also other quantitative and qualitative information when determining the level of the CCyB (e.g. overvaluation in real estate markets, credit developments, external imbalances, bank balance sheet quality, private debt levels and inadequate risk assessment). Finally, the ESRB recommends looking at stress indicators if a sudden release of the CCyB is required.

I. Macroeconomic environment

For this dimension we focus particularly on whether economic conditions have sufficiently normalised and whether any economic imbalances remain. We do this by looking specifically at indicators that can identify the economic cycle and our external position.

Economic cycle

The economic cycle is important in determining the CCyB, since raising capital requirements during an economic crisis may trigger procyclical effects. In such cases a rise in the CCyB may even disrupt lending and the economy. In order to determine the current cyclical state of the economy, we look mainly at the development of (annualised) gross domestic product and growth projections, including those of DNB.¹⁷ We also look at the purchasing managers' index (PMI). The PMI can be a useful predictor of economic activity in the euro area.¹⁸ The PMI reflects purchasing managers' confidence in the economy and can thus give an indication of developments on the supply side of the economy. A value above (below) 50 indicates a growing (contracting) economy and increasing (decreasing) confidence. The demand side of the economy is measured by means of consumer confidence. This indicator is often seen as an important predictor of economic growth and can serve as a good predictor of future consumption.¹⁹ Consumer confidence is measured in a consumer survey and published by Statistics Netherlands. It is expressed in values between -100 (very pessimistic) and 100 (very optimistic). As well as providing insight into economic conditions, some indicators also contain information on possible future crises. For example, low GDP growth (with high inflation) correlates with the risk of a banking crisis.²⁰

External position

The position of the Dutch economy in the global financial system is also relevant for determining the CCyB. International capital flows to and from the Netherlands can

¹⁷ Such as the projections in the Economic Developments and Outlook and the DFROG nowcast.

¹⁸ Lombardi and Maier (2011).

¹⁹ Déés, et al. (2011) and, specifically for the United States, Ludvigson (2004).

²⁰ Demirgüç-Kunt and Detragiache (2005).

give rise to vulnerabilities. We therefore also look at the current account (as a percentage of GDP), because a protracted current account deficit will be accompanied by net international capital inflows. Foreign capital flows tend to be more volatile and can therefore give rise to risks.²¹ Various studies have found that a current account deficit (including in developed countries) can be a signal of financial crises.^{22 23} A current account deficit also has implications for the extent to which loans become non-performing during a crisis.²⁴ Although the Netherlands usually has a current account surplus, we consider changes in this indicator to be informative in measuring the country's resilience to exogenous shocks.

II. Financial sector

In this dimension the financial sector is examined from various perspectives, primarily to determine whether financial conditions have normalised sufficiently (e.g. whether values are returning to pre-crisis levels or to their fundamentals). The resilience of the sector is also examined to assess whether an external shock could lead to a financial crisis, and whether any build-up of risks in the financial sector could also affect other sectors.

Profitability

Capital requirements should not be raised directly after an economic shock. We therefore identify the economic cycle when determining the CCyB. The economic cycle is also correlated with bank profitability, however.²⁵ We therefore also look primarily at the profitability of Dutch banks in order to prevent a rise in the CCyB leading to procyclical effects. We use the return on assets as a measure of profitability. We can thus determine on the one hand whether conditions have sufficiently normalised and on the other hand whether banks can cope with a higher

²¹ ECB (2016). At the same time, countries with strong (macroeconomic or institutional) foundations are more likely to attract less volatile capital, making them less sensitive to wide fluctuations in capital flows during a crisis.

²² Detken et al. (2014), Kalatie et al. (2018), Lang et al. (2019).

²³ Barrell et al. (2010a) show that one particular crisis in the Netherlands was not reflected in the current account between 1996 and 2008, but this was due to a one-off, idiosyncratic event.

²⁴ Kauko (2012).

²⁵ Korytowski (2018).

requirement. A high return on assets also includes early warning properties.²⁶ During periods of high profitability, banks tend to increase their intermediary activities (by increasing lending) and take more risks.²⁷ We also look at shifts in loans between Stage 1 (performing), Stage 2 (underperforming) and Stage 3 (non-performing). Specifically, this indicator measures the nominal size of loans moving from Stage 1 to Stages 2 and 3, minus the nominal amount of loans moving from Stages 2 and 3 to Stage 1. A higher net outflow of Stage 1 loans not only has implications for profitability (e.g. through increasing provisions), but may also presage an increase in non-performing loans.

Resilience

The resilience of the banking sector is relevant for determining the CCyB. The primary necessity is to monitor whether the banking sector has sufficient capital to cope with the higher CCyB requirement. In a weakly capitalised sector an increase in the demands placed on banks may bring them closer to their buffer requirements, potentially making them less inclined to lend (and thus impacting economic growth).²⁸ The amount of capital and liquidity in the banking sector can also provide an important early warning of a crisis. The likelihood of a banking crisis is reduced if the banking sector is better capitalised and has sufficient liquidity.²⁹ The framework takes both the unweighted capital ratio (leverage ratio) and the weighted capital ratio (CET1 ratio) into account. The liquidity coverage ratio is used as the liquidity benchmark. This ratio reflects the availability of liquid assets relative to the total net outflow of funds over the next 30 calendar days.

²⁶ Borio et al. (2010) conclude that the RoA is a better indicator of the build-up of risks than the RoE. This may be because the RoA is more stationary than the RoE, which implicitly also includes leverage. Finally, it should be borne in mind that monetary operations may inflate bank balance sheets and thus affect this benchmark.

²⁷ Borio et al. (2010). Behn et al. (2013) also come to this conclusion, although they look specifically at net income before tax as a percentage of total assets.

²⁸ Behn et al. (2020), for example, explain the reasons why banks may be wary of drawing on buffers. It may of course also be a reason to increase buffers in a weakly capitalised sector. The basic requirement is a sector that is robust, solid and able to perform its core function.

²⁹ Barrell et al. (2010b), Behn et al. (2013).

Risk appetite

It is important to monitor the pricing of risk and risk appetite in the financial sector. A high risk appetite may lead to underpricing or underestimation of risks, allowing a build-up of vulnerabilities. The CCyB can increase banks' resilience to such a build-up of vulnerabilities. We look at the Euro Stoxx 50 VIX Index to monitor risk pricing. The Euro Stoxx 50 VIX Index measures the expected volatility on the Euro Stoxx 50.³⁰ A prolonged period of low forecast volatility may point to an underestimation of risk. According to the literature, a prolonged low VIX indicator can be an early predictor of a crisis.³¹ We also monitor the risk appetite of institutional investors and investment funds by examining their readiness to invest in a lower rating grade such as sub-investment grade. When risks materialise, a higher risk appetite may lead to larger losses, which can also impact other parts of the financial sector. This indicator is also an expression of the overall risk appetite in the financial sector. Finally, we look at the spread between high-yield corporate bonds (BB rating) and safer reference assets. A narrow spread may indicate an underestimation or mispricing of risks by investors and can therefore have a predictive value for crises.³²

III. Non-financial sectors

This dimension shows the extent to which risks are building up in the non-financial private sector, for example due to excessive credit growth. We also assess whether this sector is sufficiently resilient to avoid exacerbating an economic or financial shock through an increase in business failures or defaults.

Lending to the private sector

Previous crises, and in particular the credit crisis, have shown that excessive credit growth is accompanied by a build-up of systemic risks and vulnerabilities.³³ The CCyB is an ideal means of building resilience to excessive credit growth and the associated systemic risk.³⁴ We use the credit gap as a basis for identifying the presence of (excessive) credit growth. The credit gap is the deviation of credit

³⁰ The Euro Stoxx 50 is an equity index comprising the 50 most important stocks in euro area countries.

³¹ Kalatie et al. (2018).

³² Babecký et al. (2014) and Kalatie et al. (2018).

³³ Alessi and Detken (2018).

³⁴ BCBS (2010).

(relative to GDP) from its long-term trend. The ESRB and the BIS have previously stated that the credit gap is the preferred indicator for determining the buffer.³⁵ When assessed against comparable indicators, the credit gap has been found to be the best predictor of banking crises in the European financial system. The predictive value of this indicator for forthcoming crises (related to the financial cycle) is also widely attested in the literature.³⁶ This is one of the reasons why the credit gap was given formal legal status. The designated authorities are required to publish their credit gap when taking decisions on the CCyB. The credit gap also has deficiencies, however, and does not function equally well for every Member State – including the Netherlands – in every time period.³⁷ That is why the ESRB (2014/1) recommended looking at more indicators than just the credit gap to detect excessive credit growth and related imbalances.

We therefore also look at specific developments in credit, on the basis that a financial crisis occurs when a credit/leverage boom bursts.³⁸ From a credit growth and debt perspective, the following indicators in particular appear to be easy to explain and to have relatively high predictive value (compared to other definitions). In the case of households they are total credit as a percentage of GDP (two-year change) and real growth of total credit to households (increase over two years). In the case of non-financial corporations they are consolidated credit as a percentage of GDP (two-year change) and real growth of consolidated credit to corporations (increase over two years).^{39 40}

³⁵ Detken et al. (2014) and Borio et al. (2010).

³⁶ See, for example, Borio and Lowe (2002), Borio and Drehmann (2009), Detken et al. (2014), and ESRB (2018).

³⁷ De Winter et al., (2021) show, for example, that the credit gap also has relatively wide confidence intervals, so it may be substantially larger or smaller than estimated. Furthermore, it is determined on the basis of an estimate of a long-term credit trend. The trend changes, however, as new data become available.

³⁸ Credit growth has also been found to be a good predictor of financial crises (see e.g. Schularick and Taylor (2012)).

³⁹ See Lang et al. 2019).

⁴⁰ A distinction between growth in credit to non-financial corporations and households is also important because credit growth among non-financial corporations leads to an almost commensurate increase in GDP. Credit to households is often spent on the purchase of a home. This generates little additional GDP. Rapid growth in loans to households, particularly mortgages, is associated with fragility and subsequent crises (Bezemer and Zhang, 2017).

Finally, we also take household debt levels into account, since high debt levels create vulnerabilities and can fuel volatility. In a time of economic shock, higher household debt can lead to a larger adjustment in consumption.⁴¹ This is particularly true of Dutch households, which have relatively low levels of accessible savings to draw on in times of difficulty. Partly for this reason, the Dutch economy tends to have higher peaks and deeper troughs than the economies of similar countries.⁴²

Debt sustainability

The increase in debt and the amount of debt can indicate a build-up of vulnerabilities. It is also important to monitor debt repayment capacity, however. When incomes are relatively low and repayment obligations are high, debts are more likely to lead to vulnerabilities, and hence to a sector that is less resilient to external shocks. Although ‘income relative to repayment obligations indicators’ also have a predictive value for financial crises, we look at these indicators mainly to identify the possible effects of a crisis.⁴³ Empirical research shows a link between repayment capacity before a recession and subsequent economic losses.⁴⁴ The debt service ratio (DSR) is used for both households and NFCs. This indicator expresses the ratio of the flow of loan instalments to the gross income flows of households or NFCs. The higher these ratios, the lower is the percentage of private sector income available for consumption and investment and for absorbing shocks.⁴⁵

Real estate

Substantial upward and subsequent sharp downward price movements in real estate markets are often accompanied by systemic financial crises.⁴⁶ It has been found that more than two-thirds of systemic banking crises were preceded by a boom-bust pattern in real estate markets.⁴⁷ We therefore analyse price levels of both commercial and residential real estate. A strong increase in price levels may indicate

⁴¹ OECD (2012).

⁴² DNB (2020).

⁴³ Lang et al. (2019).

⁴⁴ Drehmann and Juselius (2012).

⁴⁵ Drehmann and Juselius (2014), Detken et al. (2014) and Lang et al. (2019) find evidence that various specifications of the DSR indicator can provide added value.

⁴⁶ Hartmann (2015) and Reinhart et al. (2009).

⁴⁷ Crowe et al. (2013).

a growing risk of vulnerabilities materialising.⁴⁸ Developments in price-to-income gaps may also point to a build-up of vulnerabilities or an imminent real estate-related banking crisis.⁴⁹ Dutch banks have relatively large exposures particularly to residential real estate. The Netherlands has the highest rate of mortgage-financed home ownership in Europe.⁵⁰ The mortgages are usually provided by banks. It is therefore important to analyse not only the probability but also the impact of a shock on the materialisation of vulnerabilities in real estate markets. The potential impact is assessed mainly by looking at the percentage of households purchasing with a loan-to-value (LTV) above 90%. A high LTV indicates a higher risk appetite, because properties will go into negative equity more quickly in the event of a price correction. The LTV is also positively correlated with the probability of a non-performing mortgage.⁵¹

IV. Financial markets

In this dimension we look for any build-up of vulnerabilities in the financial markets. The indicators also provide information on stress in financial markets.

Valuations

We also look at developments in stock markets – mainly the AEX, but also foreign markets – to map any growing vulnerabilities in financial markets. A prolonged rise in stock markets, for example, may point to a mispricing of risks and incorrect valuations. Bubbles can even form in extreme situations, as in the case of the internet bubble at the start of the millennium. Share price growth can have a predictive value for a forthcoming crisis.⁵² Three-year share price growth appears to have the best predictive value for crises.⁵³ In order to gain a clearer picture of the long-term build-up of vulnerabilities in financial markets, we therefore also use a three-year growth rate adjusted for inflation.

Stress

⁴⁸ Van Dijk et al. (2021) find that the marketability of properties (market liquidity) tends to respond more quickly to shocks and is therefore an indicator of price developments.

⁴⁹ Cornacchia et al. (2015) and Detken et al. (2014).

⁵⁰ CBS (2019).

⁵¹ De Haan and Mastrogiacomo (2019).

⁵² Drehmann and Juselius (2014), Detken et al. (2014), Borio et al. (2011).

⁵³ Kalatie et al. (2018), Lang et al. (2019).

The above indicators contain primary information on the build-up of cyclical systemic risks and are generally intended to observe riskier developments gradually over time. Moreover, the data are often lagging and not available on a day-on-day basis. These indicators are therefore less suitable for identifying a sudden build-up or materialisation of risks. Market indicators are more suitable for this purpose (partly due to their high frequency and availability). Market indicators also have a predictive value for a banking crisis in the short term.⁵⁴ Policymakers must nevertheless be alert to the fact that with this kind of indicator the signal may contain more noise, so it may be incorrect.⁵⁵

The literature shows that Overnight Index Swap (OIS) spreads and a composite systemic stress indicator have a relatively high predictive value for a forthcoming banking crisis.⁵⁶ We use the three-month EURIBOR-OIS spread as a benchmark. EURIBOR is the benchmark rate for euro area interbank loans, often with short maturities. The OIS involves a swap of a floating rate (often based on an overnight rate) for a fixed rate. The difference between EURIBOR and OIS rates – the spread – represents an interbank default and liquidity risk. A rapid widening of the EURIBOR-OIS spread signifies an increase in risks in the financial sector. We also monitor the Financial Stress Index (FSI). The FSI is a Netherlands-specific application of the ECB systemic stress indicator. An advantage of the FSI over the EURIBOR-OIS spread is that it also looks at market stress in the Dutch equity, bond and foreign exchange markets. In addition, the indicator seems to be able to rapidly identify previous periods of stress (e.g. the GFC or the coronavirus outbreak).

⁵⁴ ESRB (2018) and Detken et al. (2014).

⁵⁵ Borio et al. (2011).

⁵⁶ Detken et al. (2014), for example, look at the composite ECB systemic stress indicator and the LIBOR-OIS. Borio et al.(2011) explore among other things the effectiveness of the LIBOR-OIS. For this framework we use the euro area equivalent of LIBOR, EURIBOR.

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