

# A Building Block Approach for Introducing a Positive Neutral Countercyclical Capital Buffer in Albania

Maximilian Fandl, Giorgia De Nora and Eugena Topi

SIP/2025/154

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**ABSTRACT:** The paper discusses the introduction of a positive neutral countercyclical capital buffer (CCyB) for Albania. The building blocks present a step-by-step guide to assess preconditions to be in place. Applied to the case of Albania, authors employ a set of methods for the calibration of a positive neutral rate, including a quantile local projection and stress-test based approach. The paper (i) finds a positive neutral CCyB regime is feasible and net beneficial for Albania, (ii) identifies the adequate range of the positive neutral rate between 100-200bps, and (iii) provides a template for emerging markets to explore positive neutral CCyB regimes.

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## SELECTED ISSUES PAPERS

# **A Building Block Approach for Introducing a Positive Neutral Countercyclical Capital Buffer in Albania**

Prepared by Maximilian Fandl, Giorgia De Nora and Eugena Topi<sup>1</sup>

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# A BUILDING BLOCK APPROACH FOR INTRODUCING A POSITIVE NEUTRAL COUNTERCYCLICAL CAPITAL BUFFER IN ALBANIA

## A. Introduction

1. **Positive neutral Countercyclical Capital Buffers (CCyB) have seen growing adoption in recent years.** The Bank of England pioneered a CCyB framework with a positive neutral rate in 2016, and a total of 23 countries have introduced CCyB regimes with explicit cycle-neutral rates by December 2025. Most adopters are in Central, Eastern and Southeastern Europe (CESEE, see Table 1) and other European countries.<sup>2</sup>
2. **Positive neutral CCyBs boost resilience through higher releasable buffer requirements over the financial cycle.** In the event of macro-financial shocks, more capital is available to be released by the macroprudential authority, compared to the conventional “zero neutral” CCyB approach (Adrian, 2024). International evidence, including from the COVID-19 pandemic, shows that countries with active releasable buffers maintained stronger bank lending and stability during periods of financial stress (BCBS, 2022b; Couaillier et al., 2022a, 2022b).
3. **There are two key differences between a positive neutral and zero-neutral CCyB.**
  - **First, the ex-ante announced positive neutral rate provides a ‘default setting’ that serves as an anchor for bank expectations.** Banks can expect the CCyB requirement to be set at the positive neutral rate for most of the time, or above the neutral rate in case of heightened cyclical systemic risks. The exceptions are periods of financial stress, when the CCyB is released, and brief recovery periods after severe stress episodes, when the rate remains below the neutral rate. Unlike in a zero-neutral regime, banks can expect the CCyB requirement to be re-raised to the positive neutral level soon after a stress episode, irrespective of the re-emergence of cyclical systemic risks.
  - **Second, a higher average CCyB rate through the cycle implies more room for bold releases should this be warranted.** Since the positive neutral rate does not constitute a higher *minimum* capital requirement but a higher *buffer* requirement, banks can expect that the buffer will be released if cyclical systemic risk actually occur.

<sup>2</sup> Cyprus, Greece, Iceland, Ireland, Netherlands, Portugal, Spain, Sweden and United Kingdom. Two additional countries, Denmark and Norway, have CCyB frameworks with positive neutral elements (‘early and gradual approach’, ECB and ESRB 2025), but without an explicit minimum or target positive neutral CCyB rate. A few cases extend to other parts of the world, such as Australia, Hong Kong, New Zealand or South Africa.

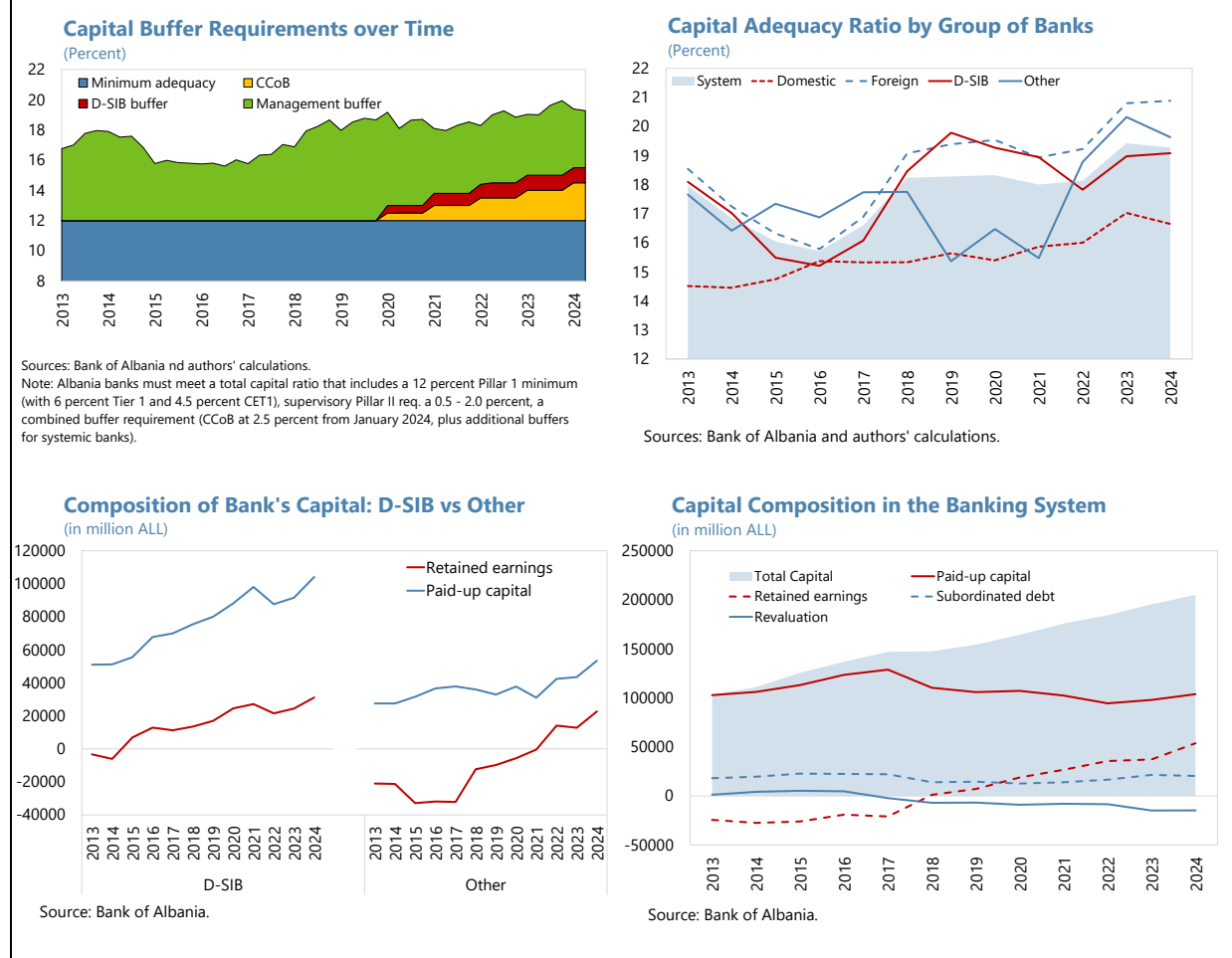
**Table 1. CCyB Rates in the CESEE and Caucasus Region**

CESEE and Caucasus Countries	CCyB		Positive neutral CCyB		
	Latest announced rate	Effective from	Regime	Announced	Cycle-neutral rate
Albania	0.50%	Dec-25	-		
Armenia	1.75%	May-25	Yes	2022	1.00%
Azerbaijan	0.50%	Mar-25	-		
Bosnia and Herzegovina	0.00%	Apr-22	-		
Bulgaria	2.00%	Oct-23	-		
Croatia	2.00%	Jan-27	-		
Czech Republic	1.25%	Jun-24	Yes	2019	1.00%
Estonia	1.50%	Dec-23	Yes	Dec-21	1.00%
Georgia	1.00%	Mar-27	Yes	Mar-23	1.00%
Hungary	1.00%	Jul-25	Yes	Jun-24	1.00%
Kosovo	0.00%	Jan-21	Yes	Sep-24	2.00%
Latvia	1.00%	Jun-25	Yes	Dec-23	1.00%
Lithuania	1.00%	Oct-23	Yes	Dec-17	1.00%
Montenegro	1.00%	Jan-26	-		
North Macedonia	2.00%	Oct-26	-		
Poland	2.00%	Sep-26	Yes	Jun-24	2.00%
Romania	1.00%	Oct-23	-		
Serbia	0.00%	Jun-17	-		
Slovakia	1.50%	Aug-23	-		
Slovenia	1.00%	Jan-25	Yes	Dec-23	1.00%

Note: Status as of December 2025.  
Source: ESRB, national authorities' websites, authors' calculation.

**4. The literature does not yet provide a hands-on approach for policymakers to explore a positive neutral CCyB across all relevant dimensions.** Some papers discuss the case for an explicit cycle-neutral rate (Herrera-Bravo et al, 2024, Leitner et al, 2023), without elaborating on operational design considerations at the country level. The BCBS (2024) report and a joint ECB-ESRB report (2025) reflect on initial experiences of EU member states with the positive neutral CCyB, while Miettinen and Nier (2025) provide guidance on operating a positive neutral CCyB regime through the cycle.

**5. While Albania has advanced its macroprudential policies, the current regulatory framework includes limited releasable buffers.** Albania has phased in the Capital Conservation Buffer and buffers for domestic systemically important banks (D-SIB) and recently raised the CCyB to a positive (yet not cycle-neutral) rate for the first time, at 0.25 percent effective from June 2025, and 0.5 percent effective from December 2025. The Combined Buffer Requirement (CBR) applies on top of a Pillar 1 requirement of 12 percent, which is higher than the 8 percent under the EU Single Rulebook. Albanian banks also need to maintain a 5.75 percent leverage ratio, higher than what is required under Basel III. This helps promote stability, but can restrict banks' ability to use excess capital, even in cases when banks have sizable low risk assets. Systemic banks also face MREL requirements. To comply with MREL requirements some banks that lack eligible liabilities are using CET1 capital that would otherwise support CBR compliance.

**Figure 1. Bank Capital Composition and Distribution Within the Albanian Banking System**

**6. To explore the feasibility and calibration of a positive neutral CCyB for Albania, this paper employs a modular framework with six building blocks.** These include legal feasibility, macro-financial conditions, cost benefit analysis, design considerations, integration into the macroprudential framework, and communication strategy. The paper finds that Albania's robust banking sector, favorable macroeconomic conditions, and flexible regulatory basis make it well positioned to adopt a positive neutral CCyB. The paper recommends calibrating the buffer using a combination of backward and forward-looking methods, supported by expert judgment. The analysis indicates a target range of around 100-200 basis points for the neutral rate.

## B. Building Blocks for a Positive Neutral CCyB

**7. The starting point for exploring the possible introduction of a positive neutral CCyB is an assessment of whether three *preconditions* are met.**

- **Legal feasibility:** Is the country's legal basis for the CCyB sufficiently flexible to accommodate a positive neutral CCyB? (Building block 1)

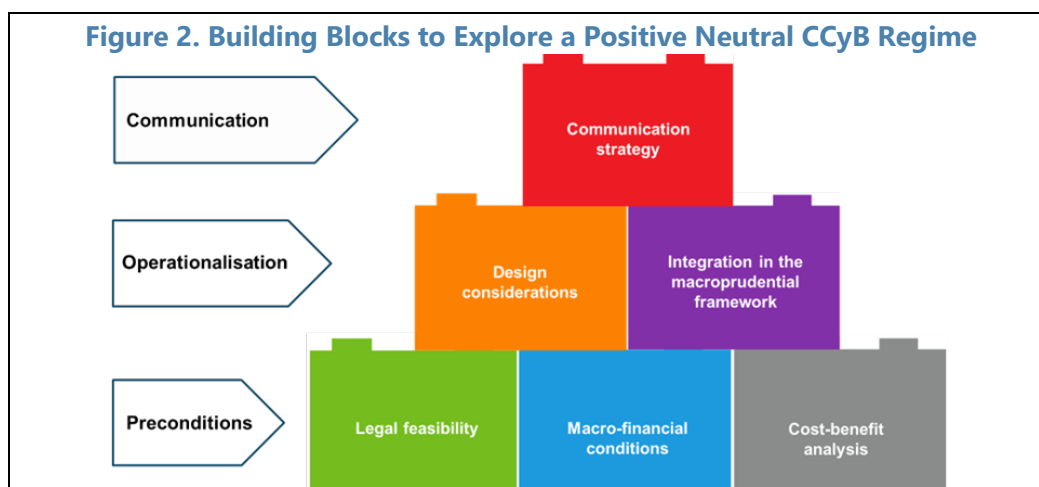
- **Macro-financial conditions:** As a profitable, well-capitalized and liquid banking system is less likely to engage in harmful deleveraging to meet capital buffer requirements, does the banking sector show appropriate system-wide solvency, stability and profitability? In addition, are macroeconomic conditions broadly stable, i.e. showing no signs of current economic or financial stress, to contain risks of procyclical effects on the economy? (Building block 2)
- **Costs and benefits:** Given the macro-financial conditions, are the benefits likely to exceed the costs of a positive neutral CCyB regime? (Building block 3).
  - **Benefits of the positive neutral CCyB:** A positive neutral CCyB reduces both the potential under-calibration of the CCyB from mismeasurement of cyclical risks and potential concerns regarding buffer usability by increasing the distance to the CBR. Furthermore, it strengthens resilience against shocks which might not necessarily stem from cyclical domestic imbalances. It also provides a buffer against possible shocks from real-estate risks or sovereign risks.
  - **Costs of a positive neutral CCyB:** An increase in overall capital requirements can in principle lead to a reduction in bank lending activity and impact on bank funding costs and profitability. Costs of activation can be non-linear: The more profitable banks are, the easier it is for them to satisfy the additional requirements with retained earnings, reducing their need for deleveraging (Lang and Menno (2023), Herrera et al (2024), ECB (2020), Boyarchenko et al. (2024) and Behn et al (2025)). Moreover, an earlier and more gradual activation of the CCyB, which characterizes the build-up of a positive neutral CCyB compared to zero neutral regimes, is found to lower the overall costs of activation.

**8. The operationalization and communication of a suitable positive neutral CCyB regime can be separated into three additional building blocks:**

- **Design considerations** with a focus on four issues: (i) setting the country-specific positive neutral target rate that ensures sufficient loss absorption capacity; (ii) deciding on the build-up speed, which should be gradual enough to minimize risks of negative effects on overall lending; (iii) revisiting the release methodology to ensure that capital is freed up in a timely manner to prevent deleveraging; and (iv) designing the analytical framework to determine under which conditions the rate would be increased beyond the neutral rate. (Building block 4)
- **Integration in the macroprudential framework** to (i) ensure no overlap in risk coverage with other micro- and macroprudential capital (buffer) requirements; and (ii) assess the implications of a capital-accretive introduction of the positive neutral CCyB (resulting in higher capital requirements at the time of adoption) vs. potential capital neutrality (adopting a positive neutral rate while reducing another capital requirement, such as the Pillar 1 requirement, at the same time). (Building block 5)
- **Communication strategy** to (i) foster understanding and acceptance of the positive neutral CCyB regime by the banking sector and the broader public; and (ii) provide the main principles for CCyB increases, releases and replenishment. The principles are meant to support



transparency and bank capital planning, while preserving flexibility and guided discretion for the macroprudential authority. (Building block 6).



### Building Block 1: Legal Feasibility

**9. In the case of Albania, the regulation underpinning the CCyB is drafted in a flexible way regarding relevant indicators to use and the timing of the buffer build-up.** Regulation No. 41/2019 on macroprudential capital buffers outlines three main inputs for setting Albania's countercyclical capital buffer (CCyB): (i) reference indicators of the credit cycle, such as the credit-to-GDP gap; (ii) ESRB recommendations for the CCyB rate; and (iii) other relevant factors identified by the Bank of Albania. The Bank of Albania published the CCyB methodology in June 2018,<sup>3</sup> giving the complementary early warning indicator (composite indicator) a dominant role for setting the CCyB in times when the credit-to-GDP gap as the official primary indicator is in negative territory. The composite indicator takes additional sub-indicators regarding credit and asset price developments<sup>4</sup> into account in line with ESRB recommendation 2014/1. The composite indicator, scaled between 0 and 1, is mapped into "CCyB benchmark rates" following a bucketing approach.<sup>5</sup>

**10. Introducing a positive neutral CCyB regime in Albania would only require minor regulatory changes.** These would give the Bank of Albania the mandate to set the positive neutral CCyB target rate, with or without indicating a pre-defined range, while the CCyB methodology would need to set out how the Bank of Albania would set the neutral rate and how it would operationalize the CCyB build-up, release, and replenishment (see building block 4).

### Building Block 2: Macro-Financial Conditions

**11. Albania's macro-financial stability, robust banking sector, and favourable growth outlook make a compelling case for implementing a positive neutral CCyB.**

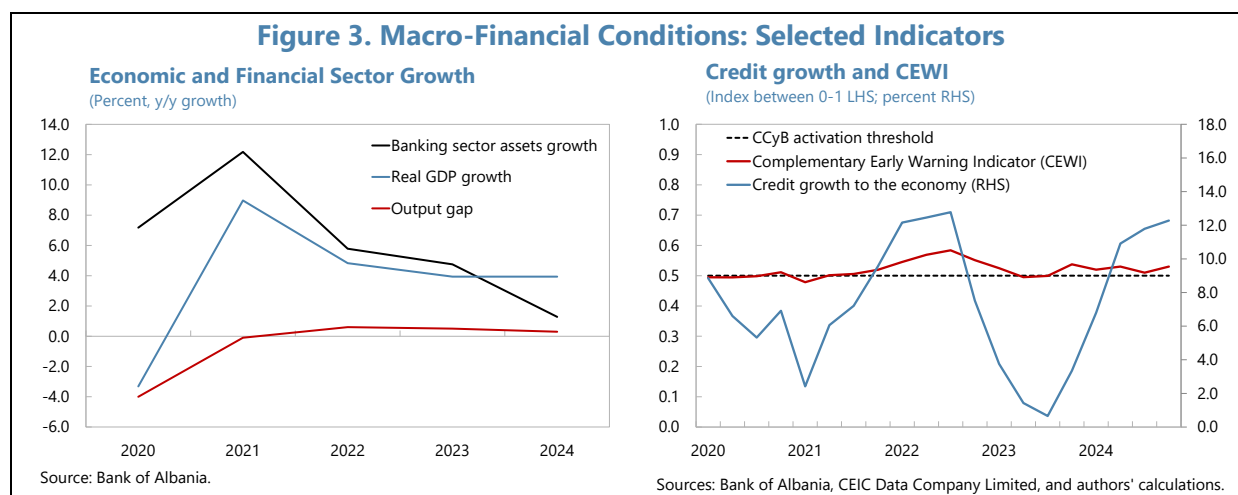
<sup>3</sup> Bank of Albania, 2018, "Applying the CCyB in Albania—Informative Note."

<sup>4</sup> Total credit intensity, housing loan growth, house price to rent growth, real house price index growth and real credit growth.

<sup>5</sup> The Bank of Albania uses a similar methodology to what is applied in the Czech Republic and Slovakia.



- **The Albanian banking sector has demonstrated strong system-wide profitability and solvency in recent years.** The return on assets (RoA) and return on equity (RoE) of Albanian banks stood above their historical averages in 2023 and 2024. System-wide capital adequacy remains strong, with the total capital ratio exceeding 19 percent, well above the average overall capital requirement. Strong profitability and capital generation capacity indicate a banking sector capable of absorbing a modest increase of the CBR, without incurring excessive deleveraging and increases in lending costs. In addition, cost of risk is low by historical comparison, with the non-performing loan (NPL) ratio at a historical low of 4.1 percent as of 2024.
- **Accelerated credit growth of Albanian banks signals a phase of financial cycle expansion that warrants vigilance.** Credit growth rates were in the double digits in 2023 and 2024, with particularly rapid increases in real estate lending. While these trends support short-term economic activity, they also raise concerns about cyclical systemic risk and overheating in the real estate market.
- **Current macroeconomic conditions in Albania are benign for the introduction of a positive neutral CCyB.** Albania has achieved robust real GDP growth, driven by construction and tourism services in recent years. The output gap is estimated to be positive, while economic sentiment and consumer confidence indicators at or above historic averages.



### Building Block 3: Cost-Benefit Analysis

**12. The benefits of introducing a positive neutral CCyB regime most likely outweigh the costs in Albania, assuming reasonable design and calibration as discussed in building block 4.** ECB and ESRB (2025) point to the common practice among EU member states that have introduced a positive neutral CCyB regime to conduct cost-benefit analyses with varying degrees of model reliance. While it was not possible to perform a model-based cost-benefit analysis based on data available in the context of this paper, a qualitative assessment supports the case for net benefits of a positive-neutral CCyB for Albania. On the one hand, there are long-term benefits from the higher resilience of Albanian banks to shocks, including stemming from potential risks emerging in the real

estate sector and rapid exchange rate appreciation. On the other hand, the short-term costs appear limited given the capital headroom and strong profitability of Albanian banks under current macro-financial conditions.

## Building Block 4: Design Considerations

**13. This section discusses four key questions that guide the design of the positive neutral CCyB regime in Albania, in line with the approach set out by Miettinen and Nier (2025):**

- (i) What should be the positive neutral rate?
- (ii) How quickly should it be built up?
- (iii) Under which conditions should the CCyB be released?
- (iv) Under which conditions could the CCyB be set at a higher rate than the neutral level?

### *I. Setting the Positive Neutral CCyB*

**14. To serve as a useful anchor, the positive neutral rate should be made explicit and remain stable over time.** International experience indicates a broad range between 0.5 percent (Greece) to 2 percent (e.g. Netherlands, Poland, Sweden, United Kingdom). Most countries with positive neutral CCyB regimes set the target rate at 1 percent (e.g., Australia, Czech Republic, Estonia, Georgia, Hungary, Latvia, Lithuania, Slovenia, Spain), close to the mid-point of the standard CCyB range (0-2.5 percent).<sup>6</sup>

**15. The methods used to set the positive neutral CCyB rate are heterogeneous and no ‘best practice’ has evolved yet.** Table 2 provides an overview of the main methods used, which include backward-looking approaches (e.g., historical losses), forward-looking approaches (stress test models) or other methods (e.g., expert judgement).<sup>7</sup> Most European countries have used a combination of the mentioned approaches to calibrate the target rate (ECB and ESRB 2025).<sup>8</sup>

Table 2. Overview of Positive Neutral CCyB Calibration Methods		
Backward-Looking Methods	Forward-Looking Methods	Other Methods
Historical losses	Stress tests	Expert judgement
Structural models	Risk indicators	
Risk indicators		
Sources: Basel Committee for Banking Supervision 2024, ECB/ESRB 2025, and authors' work.		

<sup>6</sup> The international practice is to set the positive neutral CCyB at 50 bps increments (e.g. 100 bps, 150 bps). The actual CCyB setting is done at 25 bps increments. No country has a positive neutral rate of 125 bps corresponding to the mid-point of the standard CCyB range.

<sup>7</sup> BCBS (2024) distinguishes between direct and indirect approaches for calibrating the positive neutral CCyB. The indirect method sets the maximum CCyB for high risk, then derives the neutral CCyB for standard risk from this value.

<sup>8</sup> Even in the case of countries that rely on model outputs in the calibration, the resulting positive neutral CCyB rate is set at 50 bps increments which suggests that either multiple inputs and/or discretion are universally applied in the respective decisions.

**16. Calibrating the CCyB based on backward and forward-looking methods combined with expert judgement appears appropriate for Albania.** Emerging markets such as Albania are characterized by rapid economic change, which makes historical events less relevant as a forward-looking guide compared to advanced economies. Moreover, because of their characteristics as recipients of capital inflows and their exposure to major foreign currencies, emerging markets may be susceptible to external shocks. It is therefore prudent to supplement backward-looking analysis with forward-looking assessments considering (i) banks' current risk exposures; (ii) available buffers; and (iii) projected changes in risks and buffers under various scenarios, including capital flow reversals and adverse FX outcomes.

*(a) Backward-Looking Analysis*

**17. Backward-looking analysis assesses which CCyB size would have been useful in past stress episodes** (e.g. De Nederlandsche Bank 2022).<sup>9</sup> In the case of Albania, the 'historical losses' method is of limited usefulness. Despite three episodes of system-wide financial stress in Albania (2002, 2008–10, 2013–14) the banking sector did not observe an overall loss-making year,<sup>10</sup> and the system-wide total capital ratio remained in the 15–18 percent range during 2008–14 (BoA 2014).

**18. A more promising backward-looking method for countries such as Albania is the 'losses-to-buffer' approach (De Nora et al. 2024).** This approach calibrates the target CCyB rate based on a panel quantile model that identifies which portion of banks losses could be covered by the positive neutral rate.<sup>11</sup> The methodology aims to distinguish the share of historical bank losses associated with cyclical systemic risk<sup>12</sup> from those linked to unobserved risk factors not necessarily related to the financial cycle, while controlling for bank-specific characteristics and macroeconomic developments. This makes the calibration method less likely to overlap with risks covered by existing prudential tools and more suitable for informing additional capital buffer needs.

**19. Applying the losses-to-buffer approach to quarterly data for Albanian banks supports a positive neutral CCyB broadly between 100 and 200 basis points.**

- The estimation uses data on 11 Albanian banks over the period from 2006Q1 to 2019Q4. The specification includes pre-tax RoA, net interest margin, cost to income ratio, impairment over total assets, net loans over total assets, risk weighted assets over total assets, tangible equity over tangible assets, Tier 1 capital ratio, log of total assets, GDP growth, credit growth as a proxy for domestic cyclical systemic risk and the BoA's policy rate. It includes bank specific and time fixed effects. To account for potential seasonality in the quarterly time fixed effects, the positive

<sup>9</sup> The 2 percent CCyB target rate (roughly EUR 6 billion of releasable core capital), which was calibrated based on multiple inputs, corresponds to the peak accumulated losses of Dutch banks in previous crises, which amounted to EUR 12 billion in 2007–16.

<sup>10</sup> Lowest recorded system-wide RoA of 0.1 percent in 2011.

<sup>11</sup> See De Nora, G. et al. (forthcoming).

<sup>12</sup> Domestic cyclical systemic risk is quantified with the domestic systemic risk indicator by Lang et al. (2019)

neutral CCyB is calibrated based on the sum of the quarterly estimated coefficients over each year (see Box 1).<sup>13</sup>

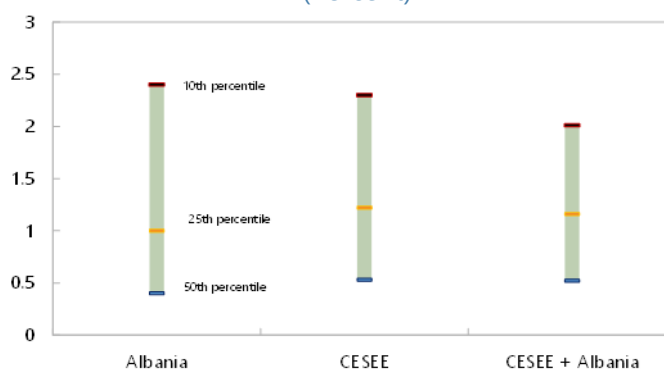
- The model is estimated on the 10th, 25th and 50th percentiles of the conditional return on asset distribution. For each percentile, the model is estimated one year ahead (see Box 1 for more details on the methodology) to account for the implementation lag of the CCyB. The choice of the percentiles is to calibrate the target rate for the positive neutral CCyB by targeting quantiles that, on the one hand, lie below or at the median of the conditional distribution and, on the other hand, avoid extreme tails. The resulting calibration for the positive neutral buffer rates based on Albanian data span between 0.4 percent (for the 50<sup>th</sup> percentile), 1 percent (for the 25<sup>th</sup> percentile) and 2.4 (for the 10<sup>th</sup> percentile).

**20. As a robustness check, a similar analysis is performed for a broader panel of CESEE countries, with and without Albania.** Specifically, the model is estimated on a sample of CESEE countries<sup>14</sup> over the period 2006 to 2019 at annual frequency. The data are sourced from S&P Capital IQ Pro platform and the BoA for Albania. Overall, the sample includes 75 banks. In this case, since the country dimension (N) is larger than the time dimension (T), a Jackknife correction is applied to reduce estimation biases (see Box 1). The model is estimated first with the full sample of CESEE countries, including Albania, and then excluding Albania .

**21. The application of the losses-to-buffer approach to CESEE countries delivers buffer rates between 0.5 and 2 percent.**

As shown in Figure 4, the resulting positive neutral rates for the full CESEE sample including Albania are 0.53 percent (50<sup>th</sup> percentile), 1.22 percent (25<sup>th</sup> percentile) and 2.3 percent (10<sup>th</sup> percentile). The equivalent rates for the CESEE countries excluding Albania are: 0.52 percent (50<sup>th</sup> percentile), 1.16 percent (25<sup>th</sup> percentile) and 2.01 percent (10<sup>th</sup> percentile). The results of the positive neutral rate calibration thus appear to be stable across the two estimation samples.

**Figure 4. Losses-to-Buffer Approach Applied to Albania**  
(Percent)



Source: Authors calculations

Note: PN buffer rates for i) Albania, ii) CESEE countries and iii) CESEE countries + Albania, considered at the 50<sup>th</sup>, 25<sup>th</sup> and 10<sup>th</sup> percentiles of the conditional distribution of ROA.

<sup>13</sup> Unlike the CESEE panel with annual data, this estimation does not use Jackknife coefficient correction.

<sup>14</sup> Albania, Austria, Cyprus, Estonia, Greece, Latvia, Lithuania, Slovenia and Slovak Republic.

### Box 1. The Losses-to-Buffer Method for Positive Neutral CCyB Calibration

**The method relies on a location-scale quantile model developed by Machado and Santos Silva (2019), integrated into a local projection framework (Jordà 2005).** This approach estimates the conditional distribution of bank profitability at different horizons, distinguishing between average (location) and quantile-specific (scale) effects of covariates. Unlike simpler quantile estimators, it accommodates bank- and time-fixed effects, thus controlling for unobserved heterogeneity across banks and common shocks over time, while preventing quantile crossing.

The conditional quantile of bank profitability at horizon  $h$  is specified as:

$$Q_{\pi_{i,t+h}}(\tau | X_{i,t}, Y_t) = X_{i,t}'(\beta_h^{(l)} + \beta_h^{(s)}q(\tau, h)) + Y_t'(\delta_h^{(l)} + \delta_h^{(s)}q(\tau, h)) + \alpha_{i,h}^{(l)} + \alpha_{i,h}^{(s)}q(\tau, h) + \lambda_{t,h}^{(l)} + \lambda_{t,h}^{(s)}q(\tau, h) + \varepsilon_{i,t+h}$$

where  $i$  indexes banks,  $t$  time,  $X_{i,t}$  are bank-specific controls,  $Y_t$  macro-financial variables,  $\alpha_{i,h}^{(l)}$  bank fixed effects, and  $\lambda_{t,h}^{(s)}$  time fixed effects. The location parameters ( $\cdot^{(l)}$ ) capture average effects across quantiles, while the scale parameters ( $\cdot^{(s)}$ ) capture deviations specific to quantile  $\tau$ . Finally, to address small-sample bias in the time dimension, the estimates are corrected using a split-sample jackknife procedure (Dhaene and Jochmans, 2015), where needed.

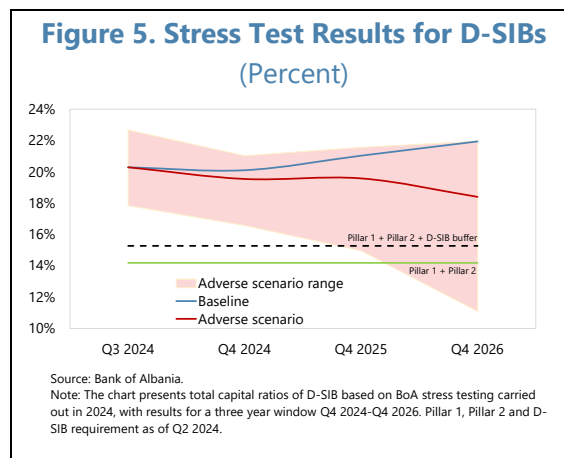
**The estimated coefficients are then mapped into capital requirements via a tractable linear calibration rule.** The unexplained negative time-fixed effects represent system-wide shocks not captured by observed bank- or macro-factors and by unobserved idiosyncratic bank specific factors. The calibration of the target PN CCyB rate relies on the average of statistically significant, non-positive time-fixed effects at selected quantiles of bank profitability and at one year horizon, rescaled by banks' average risk weights. This rule translates unexplained, system-wide losses into capital requirements, with the chosen quantile (e.g., 10th, 25th, or 50th percentile) reflecting the policymaker's tolerance for covering losses.

**The losses-to-buffer approach is particularly effective for calibrating the positive neutral rate given its flexibility and targeted design.** First, the ability to focus on different quantiles allows policymakers to address varying degrees of severity in the losses that the positive neutral rate is intended to cover. Second, the method seeks to minimize overlap with other prudential instruments by controlling for the main bank-specific and macro-financial characteristics that are likely to influence the calibration of other micro- and macro-prudential capital buffers. Furthermore, the time-fixed effects coefficients capture unobserved factors that affect all banks simultaneously as opposed to individual banks. As such, the information contained in these coefficients is useful to calibrate a buffer that is macroprudential in nature and targeting systemic rather than idiosyncratic risks. At the same, it aims to increase banking sector resilience by covering losses stemming from adverse shocks that may occur even during the early phases of the financial cycle.

#### (b) Forward-Looking Analysis

**22. Forward-looking analysis assesses the effects of stress scenarios on the banking sector to inform the setting of the appropriate CCyB rate.** Ideally, this analysis is done for multiple severe yet plausible scenarios (Gross and Millischer 2025). The resulting bank capital shortfalls can then be used to calibrate the positive neutral CCyB. In the absence of a multi-scenario approach, the outcome of recent system-wide bank solvency stress tests could be used as an alternative starting point for the CCyB calibration.

**23. In the case of Albania, we apply the ‘stress test modeling approach’ to recent solvency stress test results by Bank of Albania (2024).** The Bank of Albania stress test 2024 resulted in the system-wide total capital ratio of the banking system projected to fall from 20.2 percent (Q3 2024) to 18.4 percent (Q4 2026) under the adverse scenario. While the result highlights strong resilience at the aggregate level, some individual banks are experiencing shortfalls, partly leading to projected breaches of Pillar 2 and Pillar 1 requirements. Figure 5 illustrates the respective results for systemically important Albanian banks.



**24. An additional capital buffer requirement of 310 basis points would ensure that all systemic banks remain compliant with the combined Pillar 1 and 2 requirements.<sup>15, 16</sup>** While results do not have to be mechanically translated into positive neutral target rates of corresponding size, they provide another reference point that suggests that the lower end of the previously mentioned estimates (i.e. estimates on the 50<sup>th</sup> percentile in the losses-to-buffer approach) may be too low for the system to absorb large unexpected losses and remain above minimum capital requirements in case of a severe shock.

**25. Overall, the application of the above backward- and forward-looking methods to available data point to a range of the positive neutral rate broadly between 100bps and 200 bps.** Following the losses-to-buffer approach, policymakers can select percentiles to set the positive neutral CCyB rate depending on their risk tolerance. Based on the 25<sup>th</sup> or 10<sup>th</sup> percentiles, the target rate would be in the dimension of 100bps to 200bps, similar to the corresponding range for banks in the CESEE region. Under the stress testing approach, the indication would be somewhat higher (around 300bps), yet still closer to the 10<sup>th</sup> and 25<sup>th</sup> percentiles compared to the 50<sup>th</sup> percentile in the losses-to-buffer approach. The historical loss method is on first sight of limited usefulness in the case of Albania, yet could be refined by considering the length of Albanian NPL cycles that lead to accumulation of losses over several years.

## II. Build-Up Speed

**26. The timeline towards full build-up of the positive neutral CCyB should consider banks’ capital generation capacity to avoid a strong impact on bank lending.** Should the transition involve a sizable increase in the overall capital requirement, the target rate could be reached incrementally based on a timeline with defined phases or ‘forward guidance’. Recent research indicates that optimal cyclical capital requirements yield greater welfare gains when adjustments are

<sup>15</sup> In case of a partially capital-neutral CCyB build-up, such as the simultaneous reduction of the 12 percent Pillar 1 requirement, the additional capital buffer requirement would be lower by the same amount.

<sup>16</sup> As similar approach was followed in the 2023 Iceland FSAP (IMF 2023b).

made gradually over time (Munoz and Smets, 2024). According to BCBS (2024), most countries that have moved towards a positive neutral CCyB have adopted a stepwise approach or introduction timeline of more than 12 months to reach the target level. This was particularly common in countries with the highest positive neutral CCyB rates of 2 percent in international comparison (e.g. Netherlands, Poland, Sweden and United Kingdom).<sup>17</sup> Moreover, CCyB increases should primarily be fulfilled by organic capital generation. Hence, the appropriate build-up speed depends on a forward-looking estimate of bank profitability. This estimate could be based on banks' business and capital plans, or on the baseline scenario of a solvency stress test.

**27. In the case of Albania, the banking sector is estimated to have an annual capital generation capacity of approx. 80-90 basis points in 2025 and 2026.** Albanian banks have recorded a return on assets of 1.9 percent in 2024, more than 50 percent above the previous 10-year average. Even if returns on assets are projected to decrease in the coming 12–24 months, as under the baseline scenario of the BoA stress test 2024<sup>18</sup>, the organic capital generation capacity would remain at a healthy level that supports a swift build-up of the positive neutral CCyB rate, even more so in the case of a partially capital-neutral build-up (see building block 5).

### **III. Release Methodology**

**28. The higher buffer rate through the cycle implies that full or partial releases play a more relevant role under a positive neutral CCyB than under a zero neutral framework.** Against this background, CCyB release methodologies need to be revisited to fit the new regime and provide indications on the envisaged approach to the market, while maintaining a high degree of flexibility to react to unexpected events. In addition, the CCyB methodology should be adjusted by adding an explicit reference to the authorities' commitment to swiftly replenish the positive neutral buffer after a release during the recovery phase. Indicating the envisaged duration of the release and implicitly the timeline for replenishing the CCyB is also recommended by the BCBS (2010) guidance note and legally required for EU member states under the Single Rulebook.<sup>19</sup>

**29. The current CCyB release methodology in Albania is drafted with a focus on evidence of loss materialization rather than emerging financial stress and should be amended.** The current CCyB methodology (Bank of Albania 2018) sets out that in the release decision "the BoA would take into account the evidence of general systemic stress resulting in erosion of capital levels of banks, level of non-performing loans, losses suffered by banks, existing capital levels of banks, the degree to which the credit growth is seen to be constrained by the capital levels, housing and commercial real estate prices, and any other factors that are considered relevant for the decision". While the reference to NPL increases, capital erosion and capital constraints on bank lending points to a rather late release of the CCyB in a stress event, likely only after several months of the start of a

<sup>17</sup> For instance, Netherlands and Sweden gave banks two years to reach the 2 percent positive neutral CCyB.

<sup>18</sup> Under the baseline scenario, the total capital ratio of the Albanian banking system is projected to increase by 89 bps. in 2025 and by 87 bps. in 2026, assuming full profit retention.

<sup>19</sup> See Article 136(7)(g) of the Capital Requirements Directive.



financial stress episode, the Bank of Albania should make the release methodology more flexible with the possible introduction of a positive neutral CCyB. Specifically, more flexibility would allow the central bank to respond early to system-wide financial stress and support banking sector resilience with partial or full CCyB releases from a higher CCyB level than in place today.

#### IV. *Going Beyond the Neutral Rate*

**30. The methodology needs to differentiate between standard risk environments, in which the positive neutral CCyB is set, and elevated cyclical systemic risk that warrants a higher rate.**

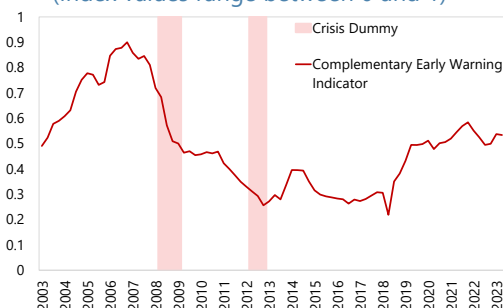
While maintaining a guided discretion approach, some clarification and communication in this respect would support the transparency of the positive neutral CCyB regime and its predictability for bank capital planning.

**31. In the case of Albania, this differentiation could be done based on the existing complementary early warning indicator with a recalibration of its threshold.**

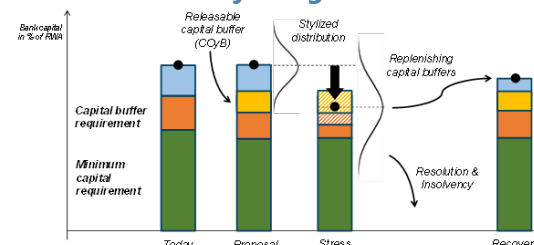
Should the Complementary Early Warning Indicator remain as the main indicator guiding the need for CCyB changes, rather than the still negative credit-to-GDP gap, the threshold for going beyond the neutral rate would need to be shifted from 0.5 to a higher threshold, subject to further analysis. As with the current CCyB methodology, it would be reasonable to define an explicit quantitative threshold to guide the decision-making in the spirit of a guided discretion approach. Based on the ex-post-performance of the Complementary Early Warning Indicator, as shown in Figure 6, indicator values around 0.7 provided useful early warnings in the pre-GFC period.

**Figure 6. Complementary Early Warning Indicator**

(Index values range between 0 and 1)



**Figure 7. Operating a Positive Neutral CCyB Regime**



Note: The chart illustrates a partially capital-accretive introduction of a positive neutral CCyB, and adjustments in buffer levels in stress and recovery scenarios. Relative sizes in the capital stack are only illustrative. Green: Minimum capital requirement. Orange: Non-releasable part of the capital buffer requirement. Yellow: Releasable part of the capital buffer requirement. Blue: Management buffer above the overall capital requirement.

#### Building Block 5: Integration in the Macroprudential Framework

**32. The positive neutral CCyB could either be introduced in a capital-accretive way, or in a partially or fully capital-neutral way.** International experience suggests that in most countries that have activated the positive neutral CCyB in the EU, its implementation followed the capital-accretive 'default setting', with capital neutrality not seen as a necessary precondition for activation in the respective countries. Some countries considered capital neutrality relevant under specific

circumstances, such as strong overlaps with other requirements or double counting of risks given the prevailing policy mix.<sup>20</sup>

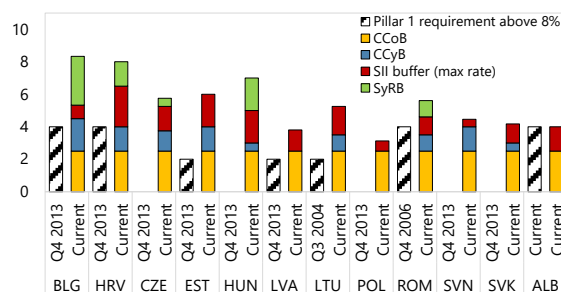
**33. There are no overlaps in the risk coverage with other micro- or macroprudential requirements,** which include:

- (i) the D-SIB buffer requirements, which address specific *structural* systemic risks;
- (ii) the CCoB, which is set at 2.5 percent under the Basel III framework irrespective of the systemic risk assessment yet supports resilience in major crises once other buffers have been used/released; and
- (iii) the minimum capital requirements. There is neither an overlap with the Pillar 1 requirement, which covers idiosyncratic credit, market and operational risks in a standardized way and without taking cyclical systemic risk into account, nor with the Pillar 2 requirements, which are set based on Bank of Albania's Supervisory Review and Evaluation Process (SREP) without explicitly linking them to stress test results.

**34. However, the high Pillar 1 requirement in Albania raises questions about the medium-term integration of the positive neutral CCyB in the revised capital stack.**

- A capital-neutral introduction would imply a *de facto* partial 'swapping' of part of the Pillar 1 requirement into a positive neutral CCyB. A similar approach was followed by Armenia in 2023 (see Central Bank of Armenia 2024). One drawback of this approach is that it would not use the current favorable profitability of Albanian banks to build capital buffers through earnings retention in response to CBR changes.
- An alternative option would be a partially capital-accretive build-up, for instance by a build-up of a positive neutral CCyB in excess of 100 bps combined with a 100-bps reduction in the Pillar 1 requirement (to 11 percent).

**Figure 8. Combined Buffer Requirements in Selected Countries**  
(Percent)



Sources: ESRB and Bank of Albania.

Note: Pillar 1 requirement above 8% indicates higher national capital requirements prior to the adoption of the EU Single Rulebook that sets out a uniform 8% total capital requirement in all EU member states. The chart does not include sectoral SyRBs (HUN, LTU, SVK). The current CBR refers to September 2024. SII buffers refer to the average rate applied in the country.

**35. The integration of a positive neutral CCyB may benefit from the experience of regional peer countries.** Several CESEE countries had historically higher Pillar 1 requirements than 8 percent before joining the EU and introducing the EU Single Rulebook. While Albania and several other EU

<sup>20</sup> Among the EU member states that opted for a capital-neutral build-up, Estonia offset the introduction of a positive neutral CCyB by discontinuing a previously applicable SyRB and the Netherlands partially offset it by not reintroducing a previously lowered SyRB for three systemic banks during the COVID-19 pandemic.

accession countries still have a higher Pillar 1 requirement than set out in the Single Rulebook, most CESEE peers in the EU have higher combined buffer requirements than Albania at this point. In some cases, such as Bulgaria, the SyRB was introduced simultaneously with the reduction of the Pillar 1 requirement in compliance with the EU Single Rulebook, i.e. in a capital-neutral way. These transitions happened in 2014 for most EU CESEE countries<sup>21</sup>—before the “invention” of a positive neutral CCyB regime.

**36. There are merits to either a partially capital-accretive or a fully capital-neutral introduction in the Albanian context.** Considering the significant gap that Albania still has vis-à-vis the EU average in terms of economic development and financial deepening, there appear to be some merits in avoiding the considerable short-term spike in overall capital requirements that would follow a fully capital-accretive positive neutral CCyB introduction. Moreover, significantly higher requirements for Albanian banks, compared to EU peers, might also create issues of competitiveness over time.

## Building Block 6: Communication Strategy

**37. Albania has a well-established macroprudential communication framework, with active communication of its CCyB decisions.** Quarterly CCyB decisions are published on the BoA website, supported by a decision rationale that includes information on the credit-to-GDP gap and complementary early warning indicators. Furthermore, cyclical systemic risks and the CCyB rate are discussed in other BoA reports. While the communication setup appears well suited for transitioning to a positive neutral CCyB, special attention should be paid to explaining the functioning of the positive neutral CCyB framework to the general public, also taking into account the level of financial education and trust in financial institutions.

## C. Conclusion

**38. Introducing a positive neutral CCyB regime would be an important milestone in the development of Albania’s macroprudential toolkit.** It would strengthen the BoA’s ability to react to stress episodes and improve the usability of capital buffers without unduly restricting bank credit provision, while maintaining a higher CCyB through the cycle compared to the existing buffer regime. While high bank profitability could support a fully capital-accretive transition to a positive neutral rate, there are some merits to a partially capital-accretive or a capital-neutral introduction in the Albanian context.

**39. The calibration of the positive neutral rate could be based on a suite of backward- and forward-looking methods, combined with expert judgement.** The above analysis points to a suitable range of around 100–200 bps for the positive neutral rate in Albania as a starting point for more refined analysis. Timely consultation of key stakeholders will be essential to facilitate the process and to build awareness in advance.

<sup>21</sup> Higher Pillar 1 requirements of Lithuania (10 percent) and Romania (12 percent) were already reduced to 8 percent in 2004 and 2006, respectively.

## Annex I. Losses-to-Buffer Approach: Horizon 1 Statistics

Annex I. Table 1. Location-Scale Quantile Panel (h=1, q=50th)		
	(Sample 1 (ALB only)	(Sample 2: CESEE + ALB)
Return on Assets	0.426*** (0.051)	.155*** (0.002)
Net interest margin	0.181*** (0.064)	.156* (0.011)
Cost-to-income	-0.000 (0.000)	-0.000 (0.991)
Impairments / assets	-0.053 (0.070)	-.0264 (0.788)
Net loans / assets	0.000 (0.010)	-.026* (0.012)
RWA / assets	-0.019* (0.011)	.009 (0.321)
Total equity / assets	0.006 (0.034)	-.099*** (0.004)
Tier 1 ratio	-0.019 (0.033)	.004 (0.837)
Log assets	-0.000 (0.003)	-.728*** (0.005)
Yield slope	-0.021** (0.009)	-.069 (0.206)
Real GDP growth	0.002** (0.001)	.1155** (0.001)
Domestic Systemic Risk Indicator (d-SRI)	0.202** (0.087)	-.324 (0.441)
Tier 1 × d-SRI	-0.001 (0.040)	.000 (0.739)
Observations	616	1,050
Bootstrap s.e., clustered by bank; bank and time fixed effects included in both models.		

## References

- Adrian, Tobias (2024), Reducing Amplification Through Releasable Capital Buffers, Presentation at 8th Annual Macroprudential Conference of Deutsche Bundesbank, Conference Centre Eltville am Rhein, 26–27 June, 2024,  
<https://www.bundesbank.de/resource/blob/829296/bbf00faf763a3324425e3e0a2c8d2417/mL/2024-06-26-adrian-data.pdf>.
- Arbatli-Saxegaard, E. C., & Muneer, M. A. (2020), The countercyclical capital buffer: A cross-country overview of policy frameworks (No. 6/2020). Staff Memo,  
<https://www.econstor.eu/bitstream/10419/246147/1/1735445630.pdf>.
- Babić, Domagoj and Stephan Fahr (2019), Shelter from the storm: recent countercyclical capital buffer (CCyB) decisions, ECB Macroprudential Bulletin vol. 7, European Central Bank,  
[https://www.ecb.europa.eu/press/financial-stability-publications/macroprudential-bulletin/html/ecb.mpbu201903\\_04~b8ad0c67e9.en.html](https://www.ecb.europa.eu/press/financial-stability-publications/macroprudential-bulletin/html/ecb.mpbu201903_04~b8ad0c67e9.en.html).
- Basel Committee on Banking Supervision (2010), “Guidance for national authorities operating the countercyclical capital buffer,” <https://www.bis.org/publ/bcbs187.htm>.
- Basel Committee on Banking Supervision (2022a), “Newsletter on positive cycle-neutral countercyclical capital buffer rates”, 5 October 2022,  
[https://www.bis.org/publ/bcbs\\_nl30.htm](https://www.bis.org/publ/bcbs_nl30.htm).
- Basel Committee on Banking Supervision (2022b), Buffer usability and cyclicity in the Basel framework, October 2022, <https://www.bis.org/bcbs/publ/d542.pdf>.
- Basel Committee on Banking Supervision (2024), Range of practices in implementing a positive neutral countercyclical capital buffer, Report. Bank for International Settlements,  
<https://www.bis.org/bcbs/publ/d585.pdf>.
- Behn, Markus and Claessens, Stijn and Gambacorta, Leonardo and Reghezza, Alessio, Macroprudential and Monetary Policy Tightening: More than a Double Whammy? No. 2025/3043, ECB Working Paper, 2025.
- Boyarchenko, Nina, and Leonardo Elias. Financing private credit. No. 1111. Staff Reports, 2024.
- Cappelletti, Giuseppe, Aurea Ponte Marques, Paolo Varraso, Žymantas Budrys, and Jonas Peeters. Impact of higher capital buffers on banks' lending and risk-taking: Evidence from the Euro Area experiments. No. 2292. ECB working paper, 2019,  
<https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2292~77deb8b18f.en.pdf>.
- Central Bank of Armenia 2023, Financial Stability Report,  
[https://www.cba.am/EN/ppperiodicals/Stability\\_Report\\_2023.pdf](https://www.cba.am/EN/ppperiodicals/Stability_Report_2023.pdf).

- Chen, Ruo, Vincenzo Guzzo, Fazurin Jamaludin, Adil Mohommad, Ritong Qu, and Yueshu Zhao. (2024) Bank Profitability in Europe: Not Here to Stay. No. 2024/142, International Monetary Fund. <http://dx.doi.org/10.5089/9798400282577.001>.
- Couaillier, Cyril, Alessio Reghezza, Costanza Rodriguez d’Acri, and Alessandro Scopelliti. (2022b), How to release capital requirements during a pandemic? Evidence from euro area banks, ECB WP No. 2720, September 2022, <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2720~e6f3686548.en.pdf>.
- Couaillier, Cyril, Marco Lo Duca, Alessio Reghezza, and Costanza Rodriguez d’Acri. (2022a) Caution: Do not cross! Distance to regulatory capital buffers and lending in Covid-19 times. Working Paper, <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2644~7d82c23abf.en.pdf>.
- De Nora, Giorgia, Ana Pereira, Mara Pirovano, and Florian Stammwitz. (2025), “From losses to buffer—Calibrating the positive neutral CCyB rate in the euro area”, ECB Working Paper 3061, [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=5290102](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5290102).
- Dhaene, Geert, and Koen Jochmans. (2015), Split-panel Jackknife Estimation of Fixed-effect Models, *The Review of Economic Studies*, vol. 82, issue 3, July 2015, 991–1030, <https://doi.org/10.1093/restud/rdv007>
- European Central Bank (2020), Financial Stability Review, November 2020, <https://www.ecb.europa.eu/pub/pdf/fsr/ecb.fsr202011~b7be9ae1f1.en.pdf>.
- (2024), Financial Stability Review May 2024, <https://www.ecb.europa.eu/press/financial-stability-publications/fsr/html/ecb.fsr202405~7f212449c8.en.html>.
- European Central Bank and European Systemic Risk Board (2025), 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, <https://www.ecb.europa.eu/pub/pdf/other/ecb.jointreportecbesrb202501~f5cf374d79.en.pdf>
- Gross, Marco and Laurent Millischer (2025), “Credit Loss in Translation: Informing Bank Provisions and Capital Buffer Requirements with Forward-Looking Credit Loss Distributions”, IMF Working Paper No. 2025/228, International Monetary Fund <https://www.imf.org/en/publications/wp/issues/2025/11/06/credit-loss-in-translation-informing-bank-provisions-and-capital-buffer-requirements-with-571625>.
- Herrera-Bravo, Luis, Mara Pirovano, and Valerio Scalone (2024), “The importance of being positive: costs and benefits of a positive neutral rate for the countercyclical capital buffer,” Macroprudential Bulletin Issue No. 4, June 2024, [https://www.ecb.europa.eu/press/financial-stability-publications/macroprudential-bulletin/html/ecb.mpbu202406\\_01~0ed53a85fa.en.html](https://www.ecb.europa.eu/press/financial-stability-publications/macroprudential-bulletin/html/ecb.mpbu202406_01~0ed53a85fa.en.html).

- International Monetary Fund (2023a), “Finland: Financial System Stability Assessment,” <https://www.imf.org/en/Publications/CR/Issues/2023/01/20/Finland-Financial-System-Stability-Assessment-528426>.
- (2023b), “Iceland: Financial Sector Assessment Program-Technical Note on Stress Testing and Systemic Risk Analysis,” <https://www.imf.org/en/Publications/CR/Issues/2023/07/26/Iceland-Financial-Sector-Assessment-Program-Technical-Note-on-Stress-Testing-and-Systemic-537013>.
- (2023c), “Integrated Policy Framework—Principles for the Use of Foreign Exchange Intervention”, Policy Paper No. 2023/061, <https://www.imf.org/en/Publications/Policy-Papers/Issues/2023/12/20/Integrated-Policy-Framework-Principles-for-the-Use-of-Foreign-Exchange-Intervention-542881>.
- (2024a), “Spain: Financial System Stability Assessment,” <https://www.imf.org/en/Publications/CR/Issues/2024/06/06/Spain-Financial-System-Stability-Assessment-549927>.
- (2024b), “Albania: 2023 Article IV Consultation-Press Release and Staff Report,” <https://www.imf.org/en/Publications/CR/Issues/2024/01/12/Albania-2023-Article-IV-Consultation-Press-Release-and-Staff-Report-543731>.
- (2024c), “Iceland: Staff Concluding Statement of the 2024 Article IV Mission,” <https://www.imf.org/en/News/Articles/2024/05/21/mcs-iceland-staff-concluding-statement-of-the-2024-article-iv-mission>.
- (2025a), International Monetary Fund (2025a), “Stress Testing the Albanian Banking Sector: A decade post-FSAP,” Selected Issues Paper, forthcoming.
- Jordà, Òscar (2005), Estimation and Inference of Impulse Responses by Local Projections, *American Economic Review* vol. 95, no. 1, March 2005, 161–182, <https://www.aeaweb.org/articles?id=10.1257/0002828053828518>.
- Lang, Jan Hannes and Menno, Dominik (2023), “The state-dependent impact of changes in bank capital requirements”, ECB Working Paper No. 2828, <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2828~9c4e7428de.en.pdf>.
- Leitner, Georg and Dvořák, Michal and Giammaria, Alessandro and Zsámboki, Balázs, How Usable are Capital Buffers? (September 2023). ECB Occasional Paper No. 2023/329, <https://www.ecb.europa.eu/pub/pdf/scpops/ecb.op329~60b6f9aa26.en.pdf>.
- Machado, José and João Santos Silva (2019), Quantiles via moments, *Journal of Econometrics*, 2019, vol. 213, issue 1, 145–173, <https://www.sciencedirect.com/science/article/abs/pii/S0304407619300648>.



Miettinen, Paavo and Erlend Nier (2025), Rethinking Macroprudential Capital Buffers, IMF Departmental Paper No. 2025/008, International Monetary Fund,  
<https://www.imf.org/en/publications/departmental-papers/issues/2025/11/20/rethinking-macroprudential-capital-buffers-557086>