

# Usability of Bank Capital Buffers: The Role of Market Expectations

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## **Abstract**

Following the COVID shock, supervisors encouraged banks to use capital buffers to support the recovery. However, banks have been reluctant to do so. Provided the market expects a bank to rebuild its buffers, any draw-down will open up a capital shortfall that will weigh on its share price. Therefore, a bank will only decide to use its buffers if the value creation from a larger loan book offsets the costs associated with a capital shortfall. Using market expectations, we calibrate a framework for assessing the usability of buffers. Our results suggest that the cases in which the use of buffers make economic sense are rare in practice.

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## I. INTRODUCTION

In the aftermath of the global financial crisis, bank regulators agreed on an upgraded set of banking regulations (Basel III) aimed at improving the resilience of the global financial system. A key aspect of these regulations were the new capital requirements, which essentially have two components: a minimum threshold and several buffers above this minimum.<sup>2</sup> The buffers have two objectives (BCBS, 2020b): first, to ensure that banks absorb losses in times of stress without breaching their minimum requirements; and second, to help maintain the flow of credit to the real economy in a downturn by lending to creditworthy businesses and households.

Following the COVID shock, however, a consensus seems to be emerging among policymakers (Campa, 2020; ECB, 2020f; Merlin, 2020; Quarles, 2021; Rohde, 2020), bankers (Botin, 2021; Gual, 2021), specialized financial press (Financial Times, 2020; Global Capital, 2020), analysts (Douglas, 2020; Emerson and Schuermann, 2021) and researchers (Abboud et al, 2021) that capital buffers may have not worked during the COVID crisis as originally intended.

In March 2020, several bank supervisors around the world alongside the Basel Committee on Banking Supervision (BCBS) released the countercyclical capital buffer (CCyB), reduced some specific buffer requirements (the non-binding Pillar 2 requirement and, in some countries, the systemic risk buffer as well), while encouraging banks to voluntarily use other remaining buffers, effectively allowing banks to operate temporarily below their CET1 capital requirements<sup>3</sup>. These actions were intended to stimulate lending, supporting economic growth and (indirectly) credit quality (BCBS, 2020a).

Instead, banks signaled no intention of drawing down their buffers. Banks have maintained capital ratios well above their minimum regulatory requirements, likely influenced by the extensive policy support measures. Also, by also reiterating their pre-COVID medium-run CET1 targets, bank actions have revealed plans to maintain even wider management buffers during the post COVID recovery. Furthermore, recent empirical studies by Berrospide et al (2021) and ECB (2021d), making use of credit register data during the COVID pandemic, find preliminary evidence of banks' reluctance to use their buffers to support lending in the US and the Eurozone, respectively.

A number of potential reasons have been put forward for banks' reluctance to use their buffers. In a keynote speech, the chairman of the BCBS cited three: market stigma, uncertainty around potential future credit losses, and uncertainty around supervisory expectations regarding the restoration of any buffer draw-down (Hernandez de Cos, 2021b).

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<sup>2</sup> See the Annex for a primer on banks' capital structure and buffer framework under Basel III.

<sup>3</sup> In this paper, we will equate CET1 capital requirements to the threshold defined by the Minimum Distributable Amount (MDA), that is, including the CET1 portions of Pillars 1 and 2 requirements, as well as the "regulatory capital buffers" (the so-called "combined buffer requirement", CBR), unless otherwise stated.

In this paper, we present a conceptual framework with which to assess the usability of capital buffers: the conditions under which we should expect banks to use their capital buffers. Our framework—which has some similarities to the one outlined by Drehmann et al (2020) and Borio et al (2020)—aims at mimicking the way a bank CEO would address the decision to voluntarily use its bank’s capital buffers.

Importantly, our focus is on *voluntary* buffer drawdowns, as these are the only cases where the discussion around *usability* is actually relevant. The alternative (*forced* buffer drawdowns) would shift the focus to the issue of loss-recognition, which is (or, rather, should generally be) non-discretionary in nature, as it is determined by the combination of accounting rules in place and both auditing and supervisory practices. Therefore, if banks fail to recognize loan losses (forbearance), this is likely to say little about Basel’s buffer framework itself, but mostly about both the implementation and enforcement of the existing rulebook around loss-recognition by both supervisors and auditors.

In addition – and equally important, this paper does not try to explain whether banks were (or not) in a position to even consider using the buffers during the COVID crisis. Instead, what this paper attempts to do is to provide a framework explaining whether (and if so, why) banks may use the buffers, were they put in position to make that choice. In other words, we present a framework for assessing a bank’s willingness to draw down its buffers provided this was deemed necessary in the first place.

Conceptually, for a bank to use its buffers, it must clear the following three hurdles at a time. First of all, the bank must have a sufficiently large “management buffer” (defined as CET1 above MDA) so any potential reduction in the bank’s CET1 ratio from either loss absorption or boosting loan growth may not trigger the distribution restrictions associated with breaching the MDA threshold. This is what we’ll call the capacity hurdle.

Second, there should also be a reasonable expectation that the supervisor would sign-off on the usability of buffers. For this, not only the bank should have a manageable pre-shock legacy of non-performing exposures (NPEs), but they should also be able to rebuild their buffers over a reasonable timeframe: not too short to be dilutive but not too long to not to be credible for the market. This is what we’ll call the supervisory hurdle.

And last but not least, the bank’s management team should also expect a reasonable return for the bank’s shareholders, and over a reasonable timeframe, on the investment made by using the buffers. This is what we’ll call the management hurdle. The introduction of this idea—that a bank CEO will only decide to use its buffers if the associated value creation offsets the costs associated with the capital shortfall—is also a novelty in the capital buffers literature.

To evaluate the second and third hurdles, we build a standard organic CET1 capital generation model and an equity valuation model. This allows us to estimate a bank’s forward-looking path for both CET1 and equity fair value under the assumption of buffer usability and then compare it to the counterfactual scenario of no buffer usage. We calibrate the models with FY3 consensus expectations and banks’ publicly-announced medium-run

targets for a suite of key bank-level metrics, for a sample of 71 banks in 23 countries and 5 continents, as of January 2021. Our sample represents around 60 percent of the banking sector's global market capitalization.

In our baseline scenario, we assume a buffer draw-down equal to 2.5 percent of RWAs across the sample.<sup>4</sup> We find that less than 5 percent of banks (weighted by market capitalization) clear all three hurdles. That is, only a handful of banks in the sample would be in a position to use their buffers. Importantly, we find that hurdle #3 (the management hurdle) is the most binding one, with most banks (79 percent) still showing a fair equity *value shortfall* by the end of Year 3 after the initial buffer draw-down date (Year 0). In other words, 4/5 of the banks in our sample fail to even reach the level of fair value that would make bank shareholders indifferent between using and not using the buffers.

Our main finding is, therefore, that a buffer draw-down makes no economic sense for a majority of banks in our sample. Based on this, we argue that a reduction in capital requirements, if temporary, is no such reduction. Provided the market expects a bank will have to rebuild its buffers, any buffer draw-down will open up a capital shortfall that will weigh on the bank's share price. Therefore, even if a bank meets the first two hurdles of our framework (both the capacity hurdle and the ability to rebuild buffers organically over a reasonable timeframe), a bank CEO will only decide to use its buffers in the case that the associated value creation offsets both the capital shortfall and the risks which the bank and its shareholders would incur.

Finally, we make a specific set of proposals aiming at enhancing the usability of capital buffers. We note that, even though the changes we propose are unlikely to guarantee the usability of buffers (no proposal will, given the role market expectations pay), these proposals will at least increase the likelihood that this happens by making usability less costly (i.e. less dilutive) for banks as compared to the current framework. On a fully loaded basis, our set of proposals would increase the likelihood of usability from less than 5 percent (in our baseline specification) to over 70 percent.

## Literature Review

The empirical literature on the economic effects of the release of capital buffers is not abundant. Partly, because events involving reductions in capital requirements are rare in practice. Most of the empirical evidence is related to the impact of the Basel II transition (Arbatli-Saxegaard and Juelsrud, 2020; Imbierowicz et al, 2018; and Brun et al, 2013). Partly, also, because of the relatively short period over which the CCyB and the broader capital buffers, a key component of Basel III, have been in place.

For these reasons, most of the research focuses on how an increase in the CCyB: (1) reduces excessive lending (Drehmann and Gambacorta, 2012; Aikman et al., 2015; Rubio and

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<sup>4</sup> The higher (lower) the initial buffer usage is, the lower (higher) the number of banks clearing the hurdles will be. We discuss in section IV why we have assumed 2.5 percent of RWAs as our baseline. We also conduct the entire analysis assuming a lower initial usage (of 1 percent of RWAs).

Carrasco-Gallego, 2016); (2) mitigates credit imbalances (Brzoza-Brzezina et al., 2015); (3) curbs credit cycles (Tayler and Zilberman, 2016; Gersbach and Rochet, 2017; Kanngiesser et al., 2019); and (4) limits system-wide losses (Bui et al., 2017).

A strand of the literature has also focused on past episodes of released capital. Jiménez et al. (2017) study the effects of dynamic provisioning in Spain on the supply of credit to firms in good and bad times. Sivec et al. (2019) provide empirical evidence on the effectiveness of capital buffer release based on a policy experiment in Slovenia where the central bank unexpectedly released capital buffers at the start of the financial crisis. Using detailed credit register data in a difference-in-differences setup, they find a positive effect of released capital on loan supply. Furthermore, while Jiménez et al. (2017) show that dynamic provisioning smooths credit supply cycles and, in bad times, supports firm performance, Sivec et al. (2019) show that by releasing capital buffers, increased lending to the economy was mainly directed towards healthy firms.

Another strand of the literature on capital releases has used simulations. In this group, ECB (2020a and 2020b), using its macro-micro model BEAST, shows that buffer usability leads to better economic outcomes (higher lending, with positive effects on GDP and lower credit losses) without a negative impact on banks' solvency.

Our framework falls squarely into this last strand of the literature. Conceptually, it is close in nature to the approach a market practitioner (bank management, a buy-side investor or a sell-side analyst) would follow when facing the task of modelling the decision to use the buffers. Critically, our work relies on market expectations and banks' own-declared targets for model calibration. To the best of our knowledge, our market-based approach is the first one of its nature being applied to formalizing the usability of bank capital buffers.

The rest of the paper is structured as follows. In the second section, we look into the behaviour of capital buffers through 2020 for a sample of listed banks accounting for around 60 percent of the banking sector's overall market capitalization. In this part, we also sum up the main explanations that have been put forward by policymakers and practitioners for such behavior. In the third section, we present our framework in detail, as well as the results of our baseline specification. In the fourth section, we make two main policy proposals for increasing the usability of capital buffers, and quantify their impact also in the context of our framework. In the sixth section, we present our key conclusions. Finally, in the Annex, we provide a primer on banks' capital structure, the Basel III capital buffer framework, and the implications of capital breaches.

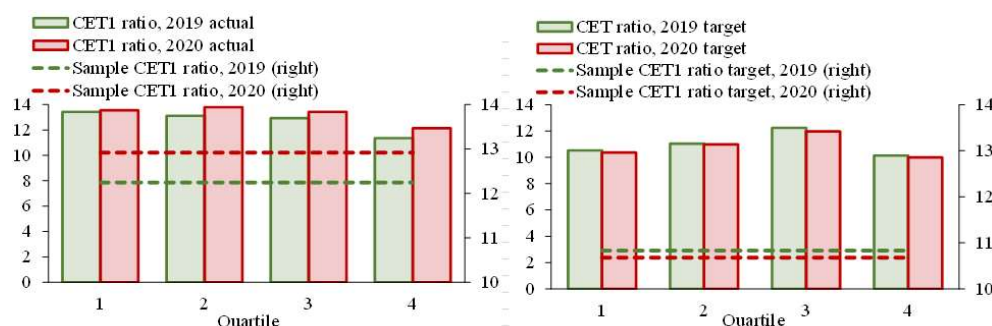
## **II. CAPITAL BUFFERS DURING THE COVID CRISIS**

Since policymakers announced both the deactivation of the CCyB and encouraged the use of all other buffers in March 2020 (BCBS, 2020b), there is no clear evidence that banks have actively dipped into them for either loss-absorption or to boost loan growth (Abboud et al, 2021).

First, banks reported higher end-2020 CET1 ratios (on a Basel III fully-loaded basis<sup>5</sup>) than prior to the COVID shock (Figure 1, left-hand-side exhibit), despite optically large COVID-related impairments booked over the course of 2020. This surprising increase of capital ratios likely reflected two main factors. On the one hand, the combined impact from a number of prudential measures, including a cash dividend and share buyback ban, in parallel to more flexibility in loan loss recognition as a way to avoid excessive procyclicality (see, e.g., ECB, 2020c).<sup>6</sup> On the other, the impact from Government guarantee schemes, retail loan moratoria schemes, and other fiscal support measures on an unprecedented scale.<sup>7</sup>

Second, banks' medium-run CET1 targets announced post-COVID were largely unchanged relative to their pre-COVID levels (Figure 1, right-hand-side exhibit).<sup>8</sup> Only a minority of banks (less than 20 percent) reported lower targets. This behavior holds across geographies and across banks with different return profiles. Importantly, as CET1 requirements have fallen over the last year, including through the deactivation of the CCyB, banks are now de facto targeting wider “management buffers” (defined as the distance from the CET1 target to the CBR’s upper bound) than before the COVID shock.

**Figure 1. CET1 Ratios, Market-Capitalization Weighted Averages  
(Percent of RWAs)**



Sources: Bloomberg Financial L.P.; and authors' calculations.

Note: Quartiles are calculated based on P/CET1 ratios, from low (first quartile) to high (fourth quartile).

Third, after the initial COVID shock, bank subordinated (bail-in-able) debt instruments (notably preferred shares and AT1s, but also LT2) started to recover fairly quickly, around mid-March already, outperforming bank equities, which remained depressed until the first

<sup>5</sup> Fully-loaded metrics include the impact from the full implementation of any pending regulations. Generally, albeit with a few notable exceptions, this does not include the impact from the portion of Basel III known as “Basel IV.” Investors focus on fully-loaded metrics as these are eventually the levels to which current ratios (on a phased-in basis) will naturally converge over time.

<sup>6</sup> For a summary of capital relief measures adopted in the Eurozone and their aggregate impact on CET1, see ECB (2021b).

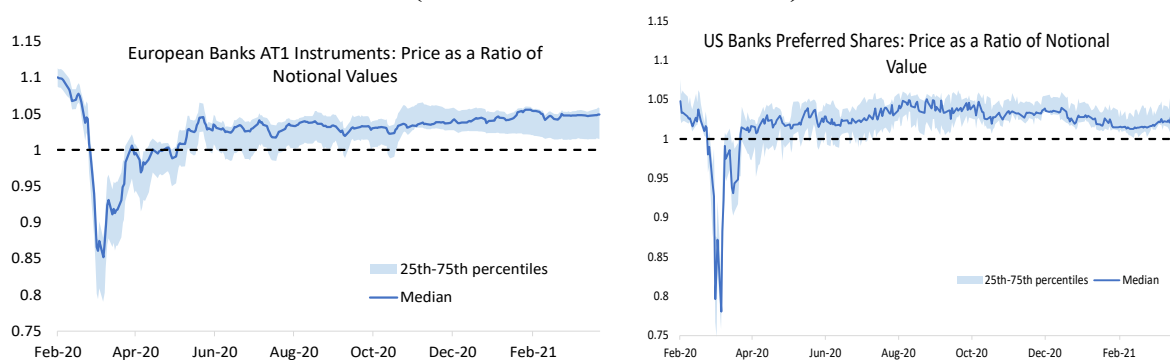
<sup>7</sup> For a global account (and assessment) of the measures adopted, see IMF (2020, 2021).

<sup>8</sup> Our sample (for further details, see section III.B.) only includes publicly listed institutions, which generally provide guidance to the market about their short-to-medium term targets for their CET1 ratios.



COVID vaccine announcement in early November 2020. The early recovery of this asset class (relative to traded equity) reflected investors' perception of lower risk for these instruments thanks to the capital relief, prudential and other fiscal measures adopted at the time. Figure 2 shows how the value of AT1 debt for European banks (see the left-hand-side exhibit) and preferred shares for US banks (see the right-hand-side exhibit) relative to the pre-COVID levels had fully recovered for most banks by 2020:Q2, implying negligible risks of skipped coupons and certainly no equity conversion risk, which are the type of risks these instruments should be pricing if the market was expecting banks to use their buffers and potentially bring their CET1 ratios below their respective MDA thresholds. Furthermore, the vast majority of credit rating actions for AT1s during the first half of 2020 were upgrades, generally from high yield into investment grade status.

**Figure 2. Subordinated Debt Prices  
(As a ratio of notional value)**

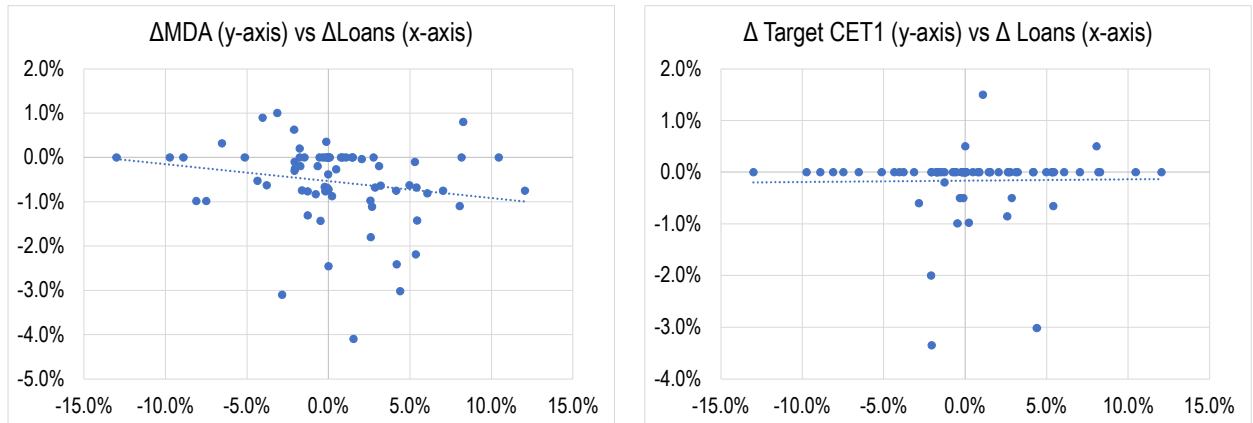


Source: Bloomberg Finance L.P.; and authors' calculations.

Fourth, available empirical evidence suggests that banks were reluctant to use their capital buffers, that is, to voluntarily bring their CET1 ratio below the threshold defined by the MDA during the COVID shock (Berrospide et al, 2021; ECB, 2021d). At the same time, however, empirical evidence also suggests that the reduction in CET1 requirements<sup>9</sup> that was engineered during the same period translated into both higher loan growth and lower interest rates (BCBS, 2021; ECB, 2021e). This can also be observed by simply plotting changes in MDA's vs changes in expected loan growth, both post- vs pre-COVID (Figure 3, left-hand-side exhibit). Last but not least, empirical evidence from Eurozone banks also suggests that the expansionary effect from lower CET1 requirements was larger when such reduction was perceived as permanent (via a lower P2R) rather than when it was perceived as temporary (via a lower CCyB/SyRB) (ECB, 2021e).

**Figure 3. Changes in CET1 capital requirements and loan growth**

<sup>9</sup> This included (1) a reduction of the binding portion of P2 requirements for banks in select regions, most notably the Eurozone and Nordics; (2) a reduction in the CBR due to both the release of the CCyB and the reduction/release of the SyRB in select countries; and (3) a reduction in the non-binding portion of P2 requirements.



Source: Bloomberg Finance L.P.; Company filings; and authors' calculations.

All of this preliminary evidence has triggered what seems to be an emerging consensus among policymakers, bankers, specialized financial press, analysts and researchers around the failure of capital buffers, narrowly defined as the CBR, to achieve some of the objectives they were originally designed for, notably that of supporting the recovery through bank lending, during the COVID crisis. As a result of this, policymakers have looked into the *potential causes* for the lack of buffer usability during the current crisis (Hernandez de Cos, 2021b; and ECB, 2020f). At least five plausible explanations have been put forward.

First, potential (automatic) distribution constraints may have undermined banks' willingness to operate below the MDA threshold. In fact, there is evidence of tighter lending conditions from banks operating with CET1 ratios in the proximity of this threshold (Berrospide et al, 2021; ECB, 2020g, 2021c and 2021d). To mitigate this problem, bank supervisors reduced capital requirements<sup>10</sup> and/or relaxed their MDA definitions to make distribution restrictions more gradual.<sup>11</sup> It has also been argued that by restricting dividend payments, the opportunity cost of drawing down the buffers was reduced. We note, however, that AT1 coupons can still be an important binding constraint.<sup>12</sup>

<sup>10</sup> The CCyB was deactivated in a number of jurisdictions, aimed at reducing overall CET1 requirements (as well as the MDA) for banks operating in countries that had it activated in the first place. Furthermore, in the Eurozone, authorities also announced the frontloading of Art. 104A of the CRD-V by which local banks were able to meet part of their P2R with non-CET1 (AT1 and T2) instruments, hence reducing their effective CET1 requirements (as well as their MDA). However, we note that this piece of regulation was going to be implemented anyway and its potential impact had already been widely discussed by the market since at least early December 2019 (Goldman Sachs, 2019a). Also, this had already been implemented in other European jurisdictions (e.g., UK). In sum, SSM's decision may have been partially/fully priced in by the market by the time it was formally announced. In any case, in Figures 1 and 3 we have treated this event as an unexpected cut in requirements.

<sup>11</sup> In the US, the Fed did revise (on 17 March 2020) the definition of eligible retained income through an interim final rule to ensure the automatic restrictions apply gradually; see Federal Reserve (2020c). The UK's PRA has also made a proposal along these lines; for details, see Fitch Ratings (2020).

<sup>12</sup> Schmitz et al (2021) disagree with this point. By looking empirically at the impact of recent AT1 coupon cancellations and non-call events on both AT1 yields and banks' weighted average cost of capital (WACC), the authors argue the size of any potentially negative stigma effects are small. As the authors themselves note,

(continued...)

Second, lack of buffer use may also reflect uncertainty on at least two levels. Firstly, the idea behind releasing regulatory capital buffers accumulated during good times is that of supporting both loss-absorption and bank lending during the subsequent downturn (BCBS, 2020b); however, it is unlikely that banks would pursue the latter objective on lending unless there is certainty on the impact and fulfillment of the former loss-absorption objective first.<sup>13</sup> This is particularly the case when banks have no policy incentives for adequate loss recognition but rather to delay it over time (provision smoothing). Secondly, there was also uncertainty about the (timing of the) reversal of some key capital relief and other prudential measures adopted early on in the crisis,<sup>14</sup> as well as about the potentially large impact of select regulatory changes which are still expected to crystallize post-COVID, notably the full implementation of Basel III (Botin, 2021).<sup>15</sup>

Third, the existence of other binding requirements —such the leverage ratio and/or MREL requirements— could have also weighed against the use of buffers (Rohde, 2020). Supervisors tried to address these concerns by relaxing T1 leverage requirements, albeit just temporarily.<sup>16</sup> In Europe, other meaningful policy actions included a temporary waiver on the application of the bank resolution directive (BRRD) by not deeming failing or likely-to-fail banks in need of direct support, to the extent that such measures were to address problems linked to the COVID pandemic (European Commission, 2020).

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however, their sample is small and AT1s are a fairly new asset class. In our view, the authors did not fully assess the broader market implications of Banco Popular's AT1 and T2 bail-in in early June 2017. This is an important event that deserves attention as it remains to this date the only bank resolution that has taken place under Europe's BRRD. While no broad-based contagion happened, selective but meaningful contagion was visible across the capital structure of some of Popular's weakest local peers (Financial Times, 2017; Goldman Sachs, 2017a), and, for the broader European banking space, Popular's bail-in did translate into a further deterioration of funding costs for smaller relative to larger players (Goldman Sachs, 2017b). Last but not least, the sample used also fails to account for the timing implications of a CBR breach associated with the usability of buffers in the spirit of the Basel-3 framework, as this -- contrary with the select coupon cancellations and noncalls observed to date -- has the potential to lead to a (post-usability) capital-rebuilding process and associated distribution restrictions of a multi-year nature.

<sup>13</sup> See Enria (2021) and Hernandez de Cos (2021b).

<sup>14</sup> For SSM banks, these included (1) IFRS9 transitional arrangements—which did not apply to provisions on Stage 3 loans so could be (partly) unwound once loans move from Stage 2 to Stage 3 as support schemes expire; (2) the recommendation to “avoid excessive procyclical effects when applying the IFRS 9”; and (3) the sovereign filter on EUR exposures; among others.

<sup>15</sup> Using bank-level data as of December 2019, EBA (2020) estimates an average impact for European banks of 170-230bp of CET1 from a full implementation of Basel III. For a sample of 173 banks globally, BCBS (2020d) estimates a T1 shortfall of around 2 percent of RWAs for larger (“Group 1”) banks, including G-SIBs, and >8 percent for the smaller (“Group 2”) banks. Full implementation of Basel III is expected for January 1, 2023 after the BCBS (2020c) decided to delay by one year in March 2020.

<sup>16</sup> For example, the US Federal Reserve on April 1, 2020; Japan's FSA on April 17, 2020; and Europe's SSM on September 17, 2020.

Fourth, stigma associated with a weaker capital position relative to peers was potentially another cause for the lack of buffer usage. The empirical literature suggests (1) a negative relationship between capital levels and funding costs and (2) a positive relationship between management buffers and credit ratings as the latter may signal a potential partial/full loss of access to select funding markets (ECB, 2020f). Obviously, it could be argued that there would be no stigma if all banks used their buffers at the same time. However, while perfect coordination among all players could make capital buffers effective in theory (if the positive macroeconomic spillovers from such behaviour helped offset the aggregate value shortfall that opened up from the buffer draw-down), nothing prevents investors from reallocating capital away from financials into other sectors, depressing valuations across the financials space as a whole. There may also be a collective action problem, as individual banks may have incentives to deviate from the common rule, which in itself acts as a disincentive from using buffers in the first place.

Fifth, it could also be argued that buffers may have not been used because – simply – there was no need to use them in the first place, as there was no risk of a credit crunch and/or banks entered into the COVID crisis with ample CET1 ratios and wide management buffers, particularly when compared to the global financial crisis (BCBS, 2021). In this regard, evidence seems to be mixed. On the one hand, loan officer surveys suggest that, as of 2020:Q4, many countries exhibited both weak demand for credit by SMEs but also tight “supply” conditions, as proxied by bank lending standards (IMF, 2021). On the other, however, there is evidence of tighter lending conditions for corporates reliant on banks operating with thin management buffers above their CBR during the COVID shock, both in the US (Berrospide et al, 2021) and in the Eurozone (ECB, 2021d). Relatedly, ECB (2020f) argues that the encouragement to use capital buffers was effective despite not being actually observable. The authors argue that banks’ capital targets should have been pushed higher by banks’ expectation for large credit losses, creating pressure to deleverage; however, their argument goes, the fact that we have not observed a meaningful increase in capital targets consistent with the magnitude of the COVID shock implies that banks have de facto used their buffers.<sup>17</sup>

In addition, we also see another two relevant factors which have not been discussed before but could have further limited buffer usability.

One is the uncertainty around the time available to organically rebuild the buffers. To mitigate this concern, supervisors have committed to provide banks with as much time as possible to rebuild their buffers in case they used them.<sup>18</sup> However, the market generally looks through “phase-in” variables and tends to focus on “fully-loaded” ones; in other words, what generally matters for the market is just the fact that buffers will have to be replenished

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<sup>17</sup> However, we note that while this could explain why banks’ medium-run CET1 targets have remained almost unchanged relative to their pre-COVID levels, this view probably underestimates the impact that the combination of prudential, fiscal and monetary actions—on an unprecedented scale—may have had in making COVID-related expected losses manageable for the banking system.

<sup>18</sup> In the Eurozone, the ECB has announced that it did not expect banks to operate above the level defined by their CBR/P2G earlier than end 2022 (ECB, 2021c).

in the not so distant future and their quantum, not so much the timeline for buffer replenishment. And even if the capital buffer rebuilding period was long enough, it is unclear whether the market would find it credible.<sup>19</sup> But even if it did, a potential stigma would likely be generated given the likely long duration of distribution restrictions which, according to the Basel framework, should remain in place for as long the bank operated with a CET1 ratio below the threshold defined by the CBR's upper bound.

Importantly, there could also be significant operational constraints. A structurally low return profile (which would normally be associated with a P/CET1 multiple well below unity for publicly-listed banks) would make the rebuilding timeline too long and/or any attempt to rebuild buffers inorganically too dilutive for shareholders. In addition, if rebuilding capital buffers becomes a multi-year event, the impact from any distribution restrictions—for shareholders, preferred shareholders and AT1 bondholders—may end up being a multiple of the cost associated with just a temporary ban on such restrictions.

### **III. CAPITAL BUFFERS: A FRAMEWORK TO ASSESS USABILITY**

#### **A. Rebuilding a Bank's Capital Position: The Role of Expectations**

A crucial feature that has not been properly incorporated in the buffer usability literature is that of market expectations around capital requirements, and whether the expectation of any supervisory decisions to be temporary or permanent matter. In the context of buffer usability, we argue that temporary reductions in capital requirements may not be considered as such reductions, as investors will expect the bank to rebuild any capital buffers they use. More formally, a bank's management may only decide to temporarily use their capital buffers if they see this decision as eventually being value-accretive for its shareholders.

At the core of a buffer usability decision is a bank's capital planning strategy. A bank's CET1 target is a function of its expectations for CET1 requirements. That is, if a bank expects its CET1 requirements to increase (fall), its CET1 target will generally increase (fall) as well, all else equal. As we show in Figure 1's right-hand-side exhibit, CET1 targets post-COVID have barely changed. This suggests that, in general, banks do not expect the reduction in CET1 requirements adopted in early 2020 to be permanent, despite continued calls by national and international supervisors for banks to use their capital buffers.

We also note supervisory communication and strategies have been diverse – both across and within buffer categories – ranging from a commitment to not to request banks to start rebuilding their CBR before the end of 2022 (Eurozone) to banks being allowed to operate with a lower CCoB just until mid-2021 before being expected to be fully rebuilt before mid-2022 (Brazil) or to banks facing lower CCyB but a higher SyRB (Norway, Canada), driving

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<sup>19</sup> Bank supervisors face a potential time-inconsistency problem. They have the incentive to accelerate the replenishment of buffers, eventually, either if the macroeconomic outlook improves or as the end-cycle approaches and the economy turns.

the overall CBR higher and potentially even offsetting the release of the CCyB.<sup>20</sup> All these different approaches may help explain expectations for broadly flat CET1 requirements by local banks, but may also induce others (some of which have operations in some/all these countries) to cast doubts over supervisory plans more generally.

We argue that, first, medium-term expectations about CET1 requirements are as important as (if not more important than) actual requirements, so a temporarily lower CCyB may prove ineffective if the market expects it to be fully rebuilt over a relative short period of time. Second, bans on dividend payments and share buybacks are likely to be not as long-lasting as any distribution restrictions resulting from a potential buffer draw-down to below the CBR's upper bound, which will last for as long it takes the bank to fully rebuild it; as a result, the ability of distribution bans to reduce the opportunity cost of using the buffers is limited. Furthermore, the issue of a potentially negative impact from distribution restrictions on sub-debt instruments (AT1s in particular) remains unresolved and may represent a high enough deterrent for buffer usability.<sup>21</sup> Even in the case of banks with no AT1s outstanding, drawing down buffers may also prevent these banks from issuing them for as long the CET1 remains below their MDA threshold, and hence reducing their capital optionality (and returns, as the cost of sub-debt instruments is lower than that of equity, by construction) over what is likely to be a multi-year period<sup>22</sup>. And third, even if the market did not price for the need to fully rebuild capital buffers over the short-to-medium run (in the absence of a formal supervisory announcement, uncertainty about the strength of the business cycle should translate into market expectations for a CCyB <100 percent of its maximum level), there is a potential time-inconsistency problem with policymakers' commitment to allow for a long-enough period for rebuilding buffers, as dilution risk increases over time for both bank shareholders and sub-debt bondholders.

## **B. Bank-Level Data: Market Expectations and Bank-Own Targets**

We are interested in running our analysis for banks operating not just on a post-COVID trend but, ideally, on paths which are the closest possible to their respective expected steady states (or “normalized” levels, in the bank analyst jargon) as otherwise the data would be distorted by cyclical effects. This is usual practice in bank valuation, with its rationale being that valuing a bank using net income in the aftermath of a crisis (e.g., FY1<sup>23</sup>) may lead to a distorted fundamental value. First, the crisis is likely to be short-lived. Second, a crisis tends

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<sup>20</sup> The same reasoning applies to other layers of CET1 requirements below the CBR. As an example, the Spanish press has recently reported that the SSM is considering to hike both P2R and P2G requirements for some Spanish banks (El Confidencial, 2021).

<sup>21</sup> The key difference between dividend and AT1 coupon restrictions lies on the fact that, in the former, higher retained earnings translate into an equally higher CET1 level (which could theoretically be distributed later on and serves as a partial offset for bank equity values), while in the latter, AT1 coupons are non-cumulative in nature, so failure to meet one payment cannot be offset with a higher coupon later on.

<sup>22</sup> The inability to issue AT1 instruments translates into a lower return profile, as banks have to fill their respective AT1 buckets with additional CET1 capital.

<sup>23</sup> *1-year forward* (or *FY1*) refers to market expectations for the full year which is currently ongoing.

to reduce the usefulness of any peer comparison: a lower net income (relative to peers) on the back of higher provisions could imply a comparatively worse credit quality profile, but it could also reflect a more prudent (or risk-averse) approach to loss recognition. Depending on which of the two alternatives the analyst chooses, a bank's post-crisis outlook may be diametrically different. For this reason, it is only by looking at the bank's "normalized" trends once the crisis is over, that an analyst would be able to properly assess a bank's fundamental value. For our analysis, we then calibrate our analysis with the longest-dated expectations data available (*3-year forward* or *FY3*)<sup>24</sup> across all relevant variables, which we collect from Bloomberg as of January 2021.

One important exception is CET1 capital. We do not use Bloomberg consensus expectations because it mixes "phase-in" with "fully loaded" CET1 ratios (we are interested in the latter). For this variable, we use instead banks' own-declared targets for their medium-term CET1 ratios, which we have collected directly from each bank's quarterly / half-year results presentations and/or relevant transcripts from bank management presentations, both post- and pre-COVID (end-2020 and end-2019, respectively).<sup>25</sup> In the few cases in which no targets were available as of late January 2021, we used their latest reported fully-loaded CET1 ratios. Figures 1 (right-hand-side exhibit) and 4 show banks' own medium-term targets and market consensus, ranked by their P/CET1 multiple and grouped per quartile.

Furthermore, we have also collected bank-level CET1 requirements (for which we focus on the level defined by the MDA), including the detail of any potential changes across the different layers of a bank's capital structure (Pillars 1 and 2, as well as at or within the CBR), at two different points in time: end-2019 (as a proxy for pre-COVID requirements) and end-2020 (as a proxy for post-COVID requirements). Mixing CET1 targets and requirements, both pre- and post-COVID, allows us to estimate the evolution of discretionary management buffers (defined as the gap between a bank's medium-run CET1 target and its MDA) per bank throughout the COVID crisis, as well as to capture any cross-country heterogeneity in the way national/regional authorities reacted to the COVID shock.

Our analysis is based on data from 71 listed banks across 23 countries and 5 continents, with an overall market capitalization of \$2.8 trn, which corresponds to around 60 percent of the global banking system. The rationale for the size and composition of our sample is as follows. We started with the sample of banks that were used to run IMF's Global Stress Test round in 2020 (IMF, 2020). We then identified those banks with FY3 market expectations

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<sup>24</sup> At the time of our cut-off date, most banks had yet to report their 2020:Q4 results (i.e., FY1 = 2020). The only exception were US banks that had just finishing reporting.

<sup>25</sup> There are other important reasons for compiling CET1 targets this way instead of using Bloomberg's. Given there is the expectation for large regulatory impacts beyond 2022 (the full implementation of Basel III, a.k.a "Basel IV," is expected for early January 2023), and that bank disclosures about these and other (operational, regulatory or legal) expected impacts are not done in a homogeneous way across the sector (often not even within the same jurisdiction), it's unclear whether Bloomberg-compiled targets fully capture all available information in a comparable way. Instead, a bank management's guidance/target on their CET1 fully-loaded ratios is likely to be a better measure of the bank's steady-state CET1 ratio given it should incorporate all the available information to the bank's management team and to the market.

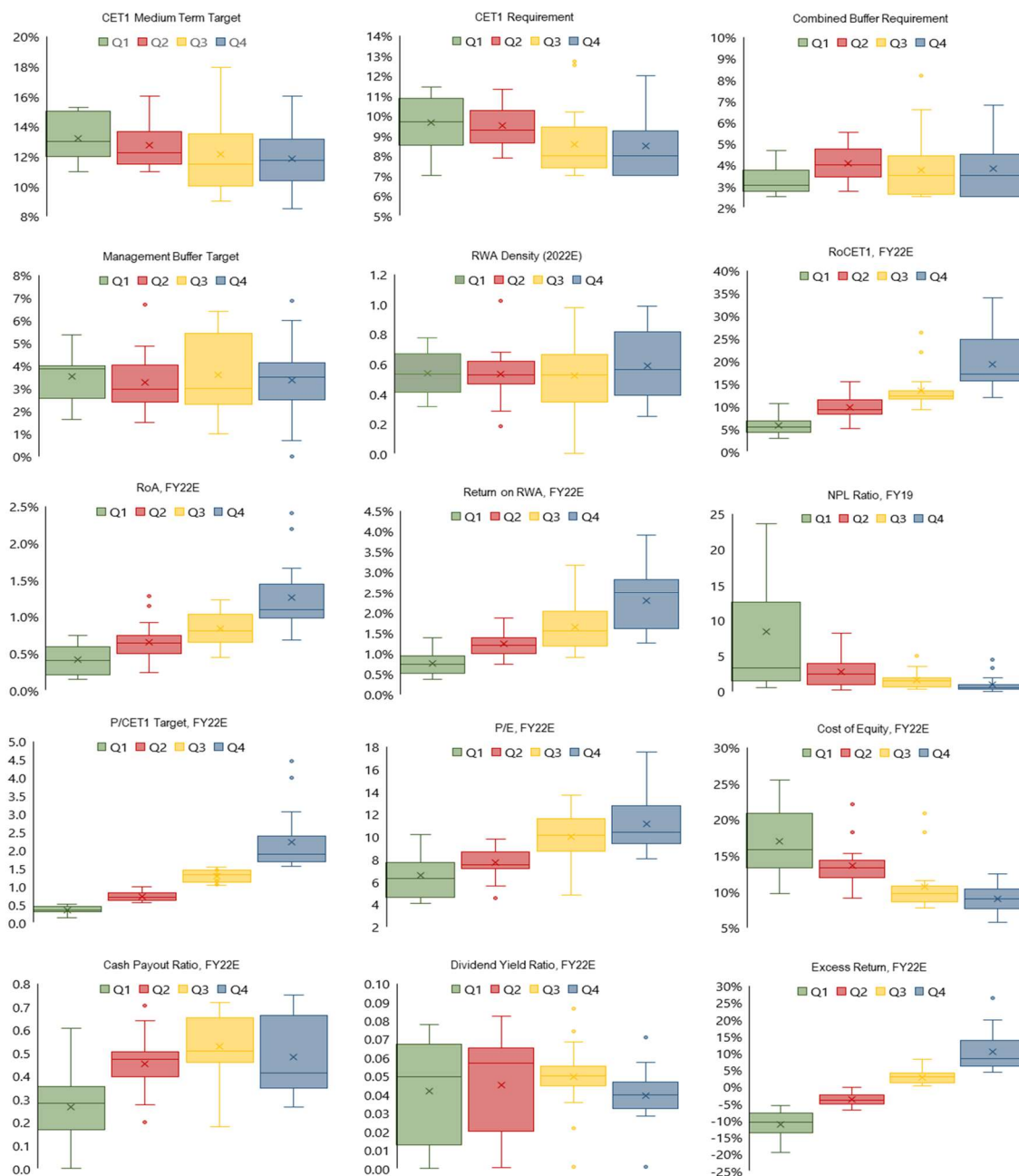
available for each one of the variables required to run our analytical framework (discussed next). Although the final sample is relatively large on a market capitalization basis, it is also skewed towards Advanced Economies (AE) banks as long-dated expectations for Emerging Market (EM) banks were more limited, with the notable exceptions of Brazil and South Africa.

### **C. Analytical Framework**

Regardless of the potential causes for the lack of buffer usability in the current crisis (see Section II), or even in the case, as some have argued, that there had been no need for the use of buffers in the first place, our paper aims at providing a conceptual framework to assess the usability of buffers (and of CET1 capital, more generally) in a forward-looking way. All in, our framework aims at mimicking the way a bank CEO would address the decision to voluntarily use (or not) a bank's capital buffers.

#### **Figure 4. Key Financial Indicators**





Sources: Bloomberg Financial L.P.; and IMF staff calculations.

Note: The quartiles are based on market capitalization of the banks in the sample. In these box-whisker charts, the boxes represent the inter-quartile range (*75th percentile – 25th percentile*), the whiskers represent the upper and lower bounds, the lines represent the median, and the “x” represents the mean. The dots outside the upper/lower bounds are the outliers which are defined as any value larger than [*75th percentile – (1.5 × interquartile range)*] or any value smaller than [*25th percentile – (1.5 × interquartile range)*].

Conceptually, for a bank to use its buffers, it must clear the following three hurdles at a time. First of all, the bank must have a sufficiently large “management buffer” (defined as CET1 above MDA) so any potential reduction in the bank’s CET1 ratio from either loss absorption or boosting loan growth may not trigger the distribution restrictions associated with breaching the MDA threshold. This is what we’ll call the *capacity hurdle*.

Second, there should also be a reasonable expectation that the supervisor would sign-off on the usability of buffers. For this, not only the bank should have a manageable pre-shock legacy of non-performing exposures (NPEs), but they should also be able to rebuild their buffers over a reasonable timeframe: not too short to be dilutive but not too long to not to be credible for the market. This is what we’ll call the *supervisory hurdle*.

And last but not least, the bank’s management team should also expect a reasonable return for the bank’s shareholders, and over a reasonable timeframe, on the investment made by using the buffers. This is what we’ll call the *management hurdle*. The introduction of this idea—that a bank CEO will only decide to use its buffers if the associated value creation offsets the costs associated with the capital shortfall—is also a novelty in the capital buffers literature.

### ***The Capacity hurdle***

As we have discussed earlier, the trigger of regulatory sanctions create disincentives for a bank’s CET1 ratio to drop below certain thresholds (Berrospide et al, 2021; ECB, 2021d), mostly due to potential distribution restrictions (in case of breaching the MDA threshold) and/or the potential shareholder dilution associated with the conversion of outstanding CoCo’s into equity (in case of the CET1 ratio breaching AT1 triggers whenever existing and binding).

Therefore, we equate a bank's capacity to use their buffers to the size of the bank's CET1 buffer above its MDA, which is in turn equal to the management buffer.<sup>26</sup> In other words, a bank's capacity to use its buffers ( $BU^{potential}$ ) is determined by the distance of its CET1 ratio ( $CET1^{initial}$ )<sup>27</sup> to its MDA (the so-called distance-to-MDA,  $DMDA$ ). The rationale for this is straightforward: the larger (smaller) the management buffer is, the lower (higher) the risk of hitting the MDA threshold, and the wider (thinner) the space available to voluntarily decide to boost (or not) loan growth once expected loan losses associated to a specific shock have been absorbed.

$$MDA = CET1^{req}$$

$$BU^{potential} = CET1^{initial} - MDA = DMDA$$

In our analysis, we assume the same level of buffer usability across banks so we can compare them against each other. In our baseline specification, we assume this level ( $BU^{effective}$ ) to be equal to 2.5 percent of RWAs. From this follows that in order to use their buffers, banks must have a management buffer equal to (or higher than) 2.5 percent of RWAs. This does not mean banks with lower management buffers cannot use them. They obviously can. In that case, however, we would be subjecting the banks to different initial shocks, and hence making the result not comparable across banks.

This amount (2.5 percent of RWAs) is roughly half of the average CBR globally, an amount which we judge as meaningful. Buffer usability needs to be meaningful in order to have visible economic effects, which is the idea behind buffer usability in the first place. On the one hand, we could assume buffer usability of a larger scale (i.e. >2.5 percent of RWAs) but it's unclear this would be consistent with the BCBS's request for "a measured drawdown" of bank buffers (BCBS, 2020b). On the other, we could alternatively assume a lower usability, but then two issues may potentially come up. First, the economic impact would be lower (and potentially negligible) as well. Second, banks will generally want to hold some management buffers—albeit small—if only to hedge themselves against any short-term and likely short-lived shocks (e.g., potential losses from the mark-to-market of their sovereign bond portfolios). So even if a bank has a small management buffer on paper, it may not be really usable for all practical purposes.

All that said, we will relax this assumption and also analyze the case of a lower level for  $BU^{effective}$  equal to 1 percent of RWAs. Even though this could be viewed as small – in line with our previous comments, we note this would be consistent with bank analysts' expectations at the time of the release of buffers in March 2020 (Goldman Sachs, 2020a).

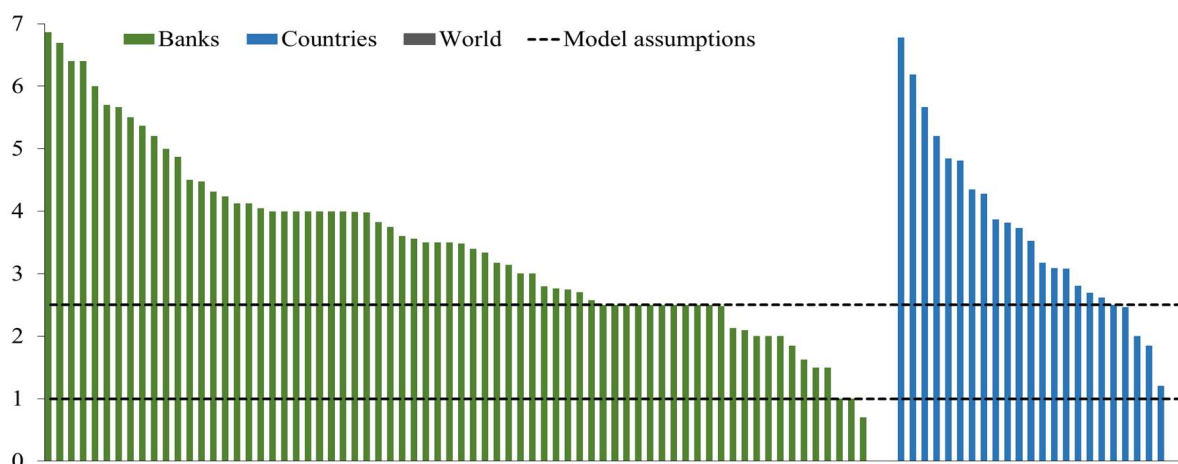
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<sup>26</sup> Our definition of "management buffer" also includes any non-binding Pillar 2 requirements (NBP2) in these jurisdictions where this exists, such as the P2G in the Eurozone. These non-binding buffers, however, are generally not disclosed to the market and, in any case, the implications of their breach are relatively limited compared to other layers of the capital structure, as discussed in the Annex.

<sup>27</sup> We use bank's medium-run CET1 targets (rather than actual CET1 ratios) as of January 2021, which are the relevant metric for bank valuation.

Furthermore, this would also be in line with the (only) two banks (out of our 71-bank sample) that have provided explicit guidance to the market on the portion of their CET1 ratio that they view as potentially usable or releasable.<sup>28</sup>

**Figure 5. Management Buffers  
(Percent of RWAs)**



Sources: Bloomberg Finance L.P.; and authors' calculations.

Note: Management buffer estimated as bank-level medium-run CET1 targets (announced post-COVID) minus CET1 capital requirements (as of end-2020); For countries and world, numbers are market-capitalization weighted averages. "Model assumptions" refers to an initial buffer use of 2.5 percent of RWAs or, alternatively, 1 percent of RWAs.

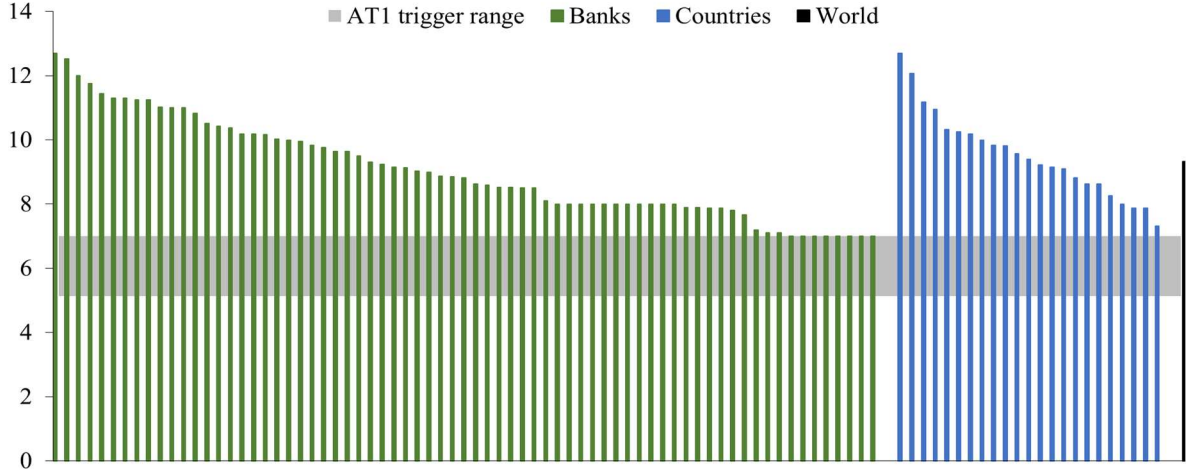
An immediate consequence emerges from our first hurdle. Banks operating with thinner management buffers—whatever the reason for this—are constrained in their capacity to use their CBR to expand credit. That is, their capacity for buffer usability is lower, regardless of their (risk-adjusted) return profile. Importantly, however, once a bank has already breached its MDA threshold, we find a second threshold before hitting the bank's absolute minimum (Pillar 1) requirements: the AT1 trigger ( $AT1^{trigger}$ ), which normally sits at either 5.125 percent or 7 percent of RWAs. Implications from hitting this second trigger are harsher than breaching bank's MDA, as they imply the automatic conversion into equity of all outstanding AT1 bonds with a particular trigger point, imposing losses on AT1 bondholders while also diluting existing shareholders. For comparability reasons, we assume the trigger to be at 7 percent of RWAs for all banks, regardless of their applicable level. Importantly, we make this assumption for all banks globally, regardless of whether they have any AT1 bonds outstanding or even plan to issue any AT1s at all. This, therefore, includes US banks, which hold preferred shares (instead of AT1s) that do not have such explicit trigger thresholds.

$$AT1^{trigger} = 7\% \text{ of } RWA$$

<sup>28</sup> One in the Netherlands and another one in the UK.

Interestingly, Figure 6 shows how the upper bound of the AT1 trigger range already sits within the CBR of most banks, implying that, for some banks in our sample, buffers could not be fully exhausted without triggering any outstanding AT1s. In addition, any decisions to reduce CET1 requirements (and therefore the MDA threshold), such as deactivating the CCyB<sup>29</sup>, reduces the CET1 distance to the AT1 trigger as the latter remains static, raising the probability of sub-debt conversion into equity, all else equal.

**Figure 6. Maximum Distributable Amount (MDA) Threshold  
(Percent of RWAs)**



Sources: Bloomberg Finance L.P.; and authors' calculations.

Note: MDA thresholds derived from CET1 capital requirements as of end-2020, and defined as the (CET1 portion of the) sum of Pillar 1 and 2 requirements, as well as the CBR. We assume all banks are both able and willing to fill their respective T2 buckets with T2 instruments. For the AT1 buckets, however, we make the assumption that they can fill their AT1 buckets with AT1 instruments, except for banks that are either too small (<1bn market cap) or have no publicly-announced plans to issue AT1 instruments in the near future; for these, we assume they fill their AT1 buckets with CET1, lifting their respective MDA thresholds beyond what their CET1 requirements would imply. For countries and world, numbers are market-capitalization weighted averages.

Based on this, a second implication emerges from our first hurdle. Even if buffer usability took place in a literal sense (i.e., the bank decided to breach its MDA and operate with the CET1 ratio within its CBR), such usability would also be constrained by the AT1 trigger. Furthermore, a reduction of CET1 requirements (and the MDA) reduces the bank's capacity to use its buffers, as it narrows the MDA distance to such trigger, therefore:

$$BU^{effective} \leq \min(MDA, CET1^{initial} - AT1^{trigger})$$

### ***The Supervisory hurdle***

<sup>29</sup> Or, in Europe, via regulatory permission to meet part of P2R with non-CET1 (AT1/T2) instruments by the frontloading of Art. 104A of the CRD-V since March 2020.

After using the buffers<sup>30</sup>, banks are expected to rebuild them<sup>31</sup>. For this, supervisors may give banks ample rebuild time as well as to potentially commit to not to require them to begin such rebuilding before a certain date. In any case, for both the bank and the supervisor a key question is whether the bank is going to be able to rebuild its buffers organically within a reasonable timeframe. Obviously, we do not know what “reasonable” is *ex ante*. We assume that it means a period that is neither too short to be perceived as potentially dilutive by bank managers and shareholders (e.g., 1 or 2 years) nor too long to run the risk of the bank not meeting its CBR by the end of the next cycle (e.g., more than 5 years). Hence, for the purpose of our analysis, we impose a threshold of 3 years, with the starting point (Year 0) being the moment in which buffers are used. In short, for a bank to clear this hurdle, it has to be able to rebuild its buffers (all the way up to the CET1 level defined by its target), organically, in 3 years or less.

In order to estimate a bank’s ability to rebuild its buffers, we build a bank’s standard organic CET1 capital generation model where incremental CET1 capital every year ( $\delta CET$ ) is equal to annual net earnings ( $NE^{PF}$ ), including the positive earnings impact from the incremental loan book ( $\delta LB$ ) originated as a result of the use of buffers, net of cash dividends ( $Div$ ) and AT1 coupon payments ( $C^{AT1}$ ). Importantly, following the initial use of buffers and the corresponding increase in assets and RWA, there is no further RWA growth to finance as we assume a static balance sheet thereafter, which is a standard assumption in stress testing as well as in the related buffers literature. We also assume no non-organic impacts on CET1 capital, such as mark-to-market, regulatory, etc.<sup>32</sup>

$$\delta CET = NE^{PF} = NE + \delta LB - Div - C^{AT1}$$

where,  $NE$  is the net earnings without using the buffer.

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<sup>30</sup> For this hurdle, we define “buffers” in a broad sense, as the portion of a bank’s CET1 used, regardless of whether this effectively leads to a breach of the CBR’s upper bound or not. For a formal MDA/CBR breach to take place, usage should be higher than the distance from the bank’s CET1 ratio to the MDA. However, one could also argue that the relevant metric would actually be smaller as a breach of the threshold defined by the non-binding P2 requirement (e.g., P2G in the Eurozone) may already suffice to trigger some supervisory actions.

<sup>31</sup> Despite we have labelled this as the “supervisory hurdle”, we note that no supervisory involvement should actually be expected provided a bank’s CET1 ratio remains above the level defined by the CBR (or maybe the non-binding P2 requirement). However, even in this case, if the bank’s CET1 ratio remained above the previous threshold but still fell below its medium-run target, it would also be expected to rebuild it after the draw-down takes place. The economic rationale for assessing the bank’s capacity to rebuild its buffers would exactly be the same in both scenarios. In our framework, we focus on deviations from a bank’s CET1 target so this hurdle is always – and by construction – binding for the banks in our sample.

<sup>32</sup> Generally, these impacts could take place through the bank’s Asset-liability Committee (ALCO) portfolio, which includes the bank’s sovereign holdings but also other potential credit and even equity exposures, as well as through the bank’s potential equity stakes in select financial and/or non-financial corporates.

In a first step, we calibrate the model with current stock prices as well as with FY3 market expectations data (as of January 2021).<sup>33</sup> For simplicity, we assume assets are equal to loans. On capital requirements, we have compiled data on the composition of each bank's CET1 capital requirements (as of January 2021). For completeness, we also impose a CET1 leverage ratio requirement of 3 percent of assets for all banks.

We also assume all banks have an amount of AT1, or AT1-like instrument, equal to 1.5 percent of their RWAs in line with Pillar 1 requirements. In the case of jurisdictions where a binding Pillar 2 requirement also exists, we also assume additional AT1s are required to fill the respective portion of that part of the capital stack.<sup>34</sup> We assume the average AT1 coupon, which would equate to the weighted average coupon  $r^{AT1}$  of all its outstanding AT1 bonds, equals half of its cost of equity ( $r^{equity}$ ).<sup>35</sup> Finally, we assume all banks are both willing and able to issue Tier 2 bonds to fill their respective buckets.

In a second step, we use our previous inputs and assumptions to compute the complete set of pre-buffer-usability variables per bank that we'll need for our capital generation model (and, later on, for our bank equity valuation model as well): the bank's capital structure (RWA density, initial level of CET1, management buffer, MDA threshold, level of AT1s, and CET1 leverage ratio); the return profile (return on equity or  $RoCET1$ , return on assets or  $RoA$ , and cost of equity or  $CoE$ )<sup>36</sup>; and valuation (cash dividend level and yield, P/CET1 and P/E multiples).

In a third step, we introduce the decision to use the buffers ( $BU$ ) which, in our analysis, we assume to be worth 2.5 percent of RWAs for all banks and to take place instantaneously. We make two further working assumptions: the RWA density ( $RWA^{density}$ ) and the  $RoA$  ( $r^{asset}$ ) associated to the incremental loan book will be equal to the back-book's. Therefore, the reduction in the CET1 ratio translates mechanically (and instantaneously) into an increase in the bank's loan book and, by construction, into the levels of both RWAs ( $RWA^{BU}$ ) and AT1s<sup>37</sup> ( $AT1^{BU}$ ). The bank's CET1 leverage falls but its net earnings (and hence its return profile) improves compared to the bank's pre-usability numbers from the second step.

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<sup>33</sup> We assume all distributions are made through cash dividends and that these are well captured by available consensus expectations; in other words, we assume no distributions take place through share buybacks.

<sup>34</sup> In cases where banks have announced they have no plans to issue AT1s or where we think they may not be able to so (due to either their small size or their large legacy of NPEs), we assume these banks will have to fill these requirements with additional CET1.

<sup>35</sup> There is an ongoing debate about the tax treatment of AT1 coupon payments (whether AT1s should be treated as debt instruments and their coupons being tax deductible, or rather as capital and their coupons not being tax deductible). For our purposes, we assume the tax treatment to be already captured by consensus net earnings for each bank. In a way, we are assuming each bank's AT1 cost to be broadly equal to that used by consensus.

<sup>36</sup> We define  $RoCET1$  as the return on Core Equity Tier 1 capital and  $CoE$  as the earnings yield, calculated as FY3 EPS over the bank's current stock price (P).

<sup>37</sup> We assume that banks have an unlimited capacity to (quasi-instantaneously) tap the AT1 market at the same rate that we originally assumed, equating to half of the bank's cost of equity. Otherwise, the amount of CET1

(continued...)

$$CET1^{BU} = CET1^{initial} - BU$$

$$RWA^{BU} = \frac{CET1^{initial}}{CET1^{BU}}$$

$$Assets^{BU} = \frac{(RWA^{BU} - RWA)}{RWA^{density}} + Asset$$

$$AT1^{BU} = \frac{(RWA^{BU} - RWA)}{RWA^{density}} \times 1.5\%$$

$$NE^{BU} = Assets^{BU} \times r^{assets}$$

Finally, in a fourth step, we calculate how long it will take the bank to rebuild its buffers. For this, we set the bank's pre-usability CET1 ratio at its medium-run CET1 target ( $CET1^{target} = CET1^{initial}$ ). This allows us to calculate the increase in the CET1 level required to fully rebuild the bank's capital buffers.<sup>38</sup> We note that this is actually higher than the amount that was effectively drawn-down in the previous step, as the RWAs are now higher than they were before. Assuming a static balance sheet, we calculate the bank's organic capital generation capacity as equal to its pro-forma (post buffer usability) net earnings ( $NE^{PF}$ ), net of both cash dividends ( $Div^{PF}$ ) and AT1 coupon payments ( $C_{AT1}^{PF}$ ).

The ratio of the bank's annual organic capital generation capacity ( $CG^{annual}$ ) over the level of CET1 to be raised delivers the number of years ( $BRY^{actual}$ ) that, under the conditions and assumptions described above, could take the bank to fully rebuild its CET1 ratio. If this was viewed as too long and the bank explored the possibility of raising their required CET1 in the capital markets, then comparing the level of CET1 to be raised over the bank's market capitalization would give us a sense of the dilution potential that such a deal would carry (Figure 7).

$$RWA^{PF} = RWA^{BU} + \delta RWA$$

$$Div^{PF} = NE^{BU} \times Payout\ Ratio$$

$$C_{AT}^{PF} = AT1^{BU} \times \frac{r^{equity}}{2}$$

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that the bank should rebuild would be even higher than what we estimate in our fourth step, by an amount equal to the incremental AT1 requirements.

<sup>38</sup> This assumes the bank meets its CET1 leverage ratio requirements (which we have set at 3 percent of assets). If this was not the case, we would focus on the bank's overall capital shortfall, which would equal to the highest of the CET1 and the CET1 leverage ratio shortfalls, in CET1 terms. We find the 3 percent CET1 leverage ratio to be binding for just 3 banks in case of 2.5 percent of RWAs draw-down (and just 1 bank in case of a 1 percent draw-down), out of a sample of 71.



$$CG^{annual} = NE^{BU} - Div^{PF} - C_{AT1}^{PF}$$

$$BRYears^{actual} = \frac{(CET1^{target} - CET1^{BU}) \times RWA^{PF}}{CG^{annual}}$$

$$EquityDilution = \frac{(CET1^{target} - CET1^{BU}) \times RWA^{PF}}{Market\ Capitalization}$$

**Table 1. Bank Capital Generation & Valuation Models: Median First-Quartile Bank****Step 1: Assumptions**

<b>Capital Structure</b>	
Assets	200.0
RWA density	53.3%
CET1 ratio	13.0%
Minimum CET1 Requirements, MR	9.7%
Combined Buffer Requirement, CBR	3.0%
Non-binding prudential buffers (e.g. P2G)	0.0%
Other (Pillar 1 + P2R/P2A or local equivalent)	6.7%
AT1 bucket (% RWAs)	1.5%
T1 leverage ratio target (% assets)	3.5%
<b>Profitability</b>	
RoCET1	5.4%
<b>Valuation</b>	
CoE (market-implied)	15.8%
Cash payout	28.3%
AT1 yield (assumed @ 50% of CoE)	7.9%

**Step 2: Implied Initial Conditions**

<b>Capital</b>	
RWA (Assets * RWA Density)	107
CET1 (CET1 ratio * RWA)	13.9
Management buffer (CET1 ratio - MR)	3.3%
Maximum Distributable Amount threshold, MDA (MR - OPB)	9.7%
Distance to MDA threshold (CET1 ratio - MDA)	3.3%
AT1, level (AT1 * RWA)	1.60
CET1 Leverage ratio ((AT1 level + CET1) / Assets)	7.7%
<b>Profitability</b>	
Net earnings (RoCET1 * CET1)	0.76
ROA (Net earnings / Assets)	0.4%
Market cap. (Net earnings / CoE)	4.8
P/CET1 (Market cap / CET1)	0.3x
P/E (Market cap / Net Earnings)	6.3x
<b>Valuation</b>	
Cash dividend (Net earnings * Cash payout)	0.2
Cash dividend yield (Cash dividend / Market cap.)	4.5%

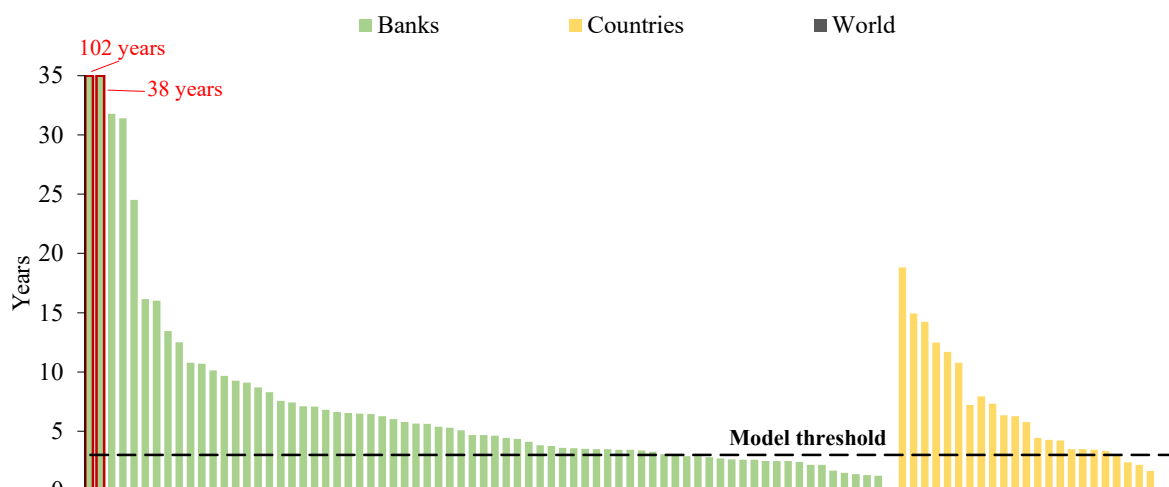
**Step 3: Release & Use of Buffers in Time t = 0**

<b>Buffer release (policy announcement)</b>	
MR PF, theoretical (MR - CBR)	6.4%
Distance to MR PF, theoretical (CET1 ratio - MR PF, theoretical)	6.6%
MR PF, effective (higher of theoretical MR PF and AT1 trigger @ 7%, higher bound of the 7%-5.125% range)	7.0%
Distance to MR PF, effective	6.0%
Change in Distance to MR PF from initial condition (pp.)	2.6%
<b>Buffer draw-down (bank decision)</b>	
Buffer draw-down assumption (% RWAs)	2.5%
CET1 ratio, PF (CET1 ratio - Buffer usage)	10.5%
RWA, PF (CET1 / CET1 ratio PF)	138.9
Change in RWA from initial conditions (RWA PF - RWA)	26.7
RWA density of incremental book, assumed = to backbook	56.1%
Change in assets (Change in RWA from initial conditions / RWA density of incremental book)	47.6
Assets PF (Assets + Change in assets)	247.6
AT1 shortfall <sup>1</sup> , level (AT1 % * Change in RWA from initial conditions)	0.40
AT1, level PF (initial + shortfall)	2.1
CET1 Leverage ratio PF ((CET1 + AT1 level PF) / Assets PF)	6.7%
ROA of incremental book, assumed = to backbook	0.43%
Change in Earnings (Change in assets * ROA of incremental book)	0.20
Earnings PF (Net earnings + Change in earnings)	1.07
ROA PF (Earnings PF / Assets PF)	0.43%

**Step 4a: Rebuild of Buffers (RB) [Static Approach]**

Target CET1 ratio, assumed = initial	13.0%
RWA growth (no growth assumed = static balance sheet)	0.0%
Change in RWA since release of buffer (RWA growth * RWA PF)	0.00
Target CET1 increase ((RWA PF + Change in RWA since buffer release) * Buffer drawn-down)	3.5
Target CET1 (CET1 + Target CET1 increase)	18.1
Implied Target CET1 leverage ratio, ((AT1 level PF + Target CET1) / Assets PF)	8.1%
<b>Option A - Organic rebuild</b>	
Cash dividend PF (Earnings PF * Cash payout)	0.30
Cash dividend yield PF (Cash dividend PF / Market cap.)	5.5%
RWA density during rebuild (RWA PF / Assets PF)	56%
Asset growth since buffer release (Change in RWA / RWA density during rebuild)	0.00
Change in CET1 required to keep the ratio stable	0.00
AT1 coupon payment (AT1, level PF * AT1 yield)	0.16
Organic capital build-up (Earnings PF - Cash dividends - Additional CET1 required to keep the ratio stable - AT1 coupons)	0.60
Years to rebuild buffers organically (Target CET1 level increase / Organic capital build-up)	5.8
<b>Option B - Inorganic rebuild (capital increase)</b>	
Capital increase, as a % of market cap (Target CET1 level increase / Market cap)	63.6%

Sources: Bloomberg Financial L.P. and authors' calculations.

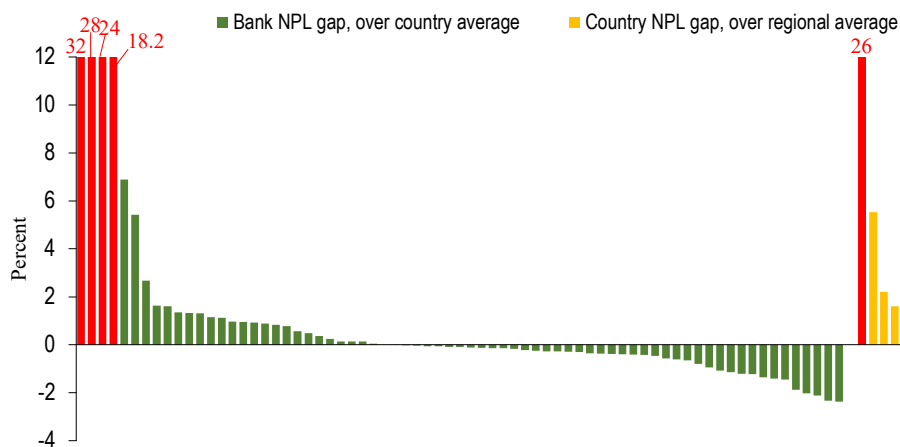
**Figure 7. Estimated Years to Rebuild 2.5 Percent Buffer Draw-Down**

Sources: Bloomberg Financial L.P.; and authors' calculations.

Some could argue that banks also have the option to rebuild their buffers inorganically (by raising equity in the capital markets). This is indeed an option but, in our view, not one that any management team would plan to (rationally and) voluntarily make in this particular context. On the one hand, high-return banks will be able to rebuild their buffers relatively quickly so they'll have no incentives to tap the market and bother their shareholders for this. On the other, however, low-return banks could have an incentive to accelerate the rebuild of buffers but this would be overly dilutive for their shareholders as, with a RoCET1 profile below their CoE, they will generally trade on a P/CET1 multiple below unity (importantly, hurdle #3 will capture the impact of buffer usability on bank valuation and what this means for shareholders and, as a result, for the management's incentives around usability).

Finally, we also have to control for banks that may have entered into the current crisis with extraordinarily large NPL legacies from the previous crisis. The rationale behind this is that these banks may also have to allocate part of future earnings to clean-up existing legacies, hence our previous calculations may be subject to a much higher risk relative to other banks with no such legacy issues.<sup>39</sup> Most notably, this is likely to be the case of Greek banks, with an average NPL ratio of >25 percent by the end of 2019, but it may also be the case of some banks in other jurisdictions. For this, a second condition that we impose for banks to clear the supervisory hurdle is that its pre-COVID (2019) NPL ratio is less than 3x higher the average of the region (i.e., continent) in which the bank operates, in order to account for regional differences in regulatory and/or supervisory practices. Our threshold is admittedly high, but we prefer it that way to avoid excluding banks that may just have structurally high NPL ratio due to their business model (e.g., consumer lending) rather than due to legacy issues (Figure 8).

<sup>39</sup> This may be most likely visible in the (relatively higher) market-implied cost of equity (CoE) of these banks, both relative to the sector as well as to its own return profile (RoCET1).

**Figure 8. NPL Ratios, pre-COVID-19**

Sources: Bloomberg Financial L.P.; and authors' calculations.

### *The Management hurdle*

After making sure a bank has enough capital to use and capacity to rebuild it within a reasonable timeframe, the last question a bank's management team needs to answer is whether there is any financial upside for the bank's shareholders from using its buffers. In other words, whether the bank is likely to make a "reasonable" return on investment from the capital buffer drawdown. As discussed earlier, we don't think any bank will decide to use its buffers if this decision doesn't make economic sense for its shareholders. We incorporate this idea into our framework by requiring each bank's expected fair value to be higher than the counterfactual scenario (of no use of buffers) by an amount equal to twice that bank's CoE over the amount of buffers "invested".<sup>40</sup>

We build a bank valuation model (which we link to the organic capital generation model just described) and estimate the path each bank's fair value would follow under the two alternative scenarios of buffer usability and its counterfactual. We use a capital-adjusted residual income model (also known as excess returns model), in the spirit of both Damodaran (2013) and Massari et al (2014), and in line with best practices from the financial industry.<sup>41</sup> We run the analysis over a period of twenty years, but our framework would allow us to either shorten or lengthen the timeframe under consideration.

In a nutshell, a residual income model values a bank's equity as the sum of the existing equity capital and the present value (discounted at the cost of equity) of the future excess returns. The excess return at a given time  $t$  is the difference between a bank's return and cost of equity at  $t$ , times the bank equity capital at time  $t-1$ .

<sup>40</sup> The 2x threshold is arbitrary but consistent with usual M&A practices of requiring the deal a return of investment (RoI) which is above the acquirer's CoE.

<sup>41</sup> See, e.g., Goldman Sachs (2019b) and Morgan Stanley (2020).

There are some important advantages to this approach over other alternatives for fundamental bank valuation, notably the dividend discount model “DDM” or the cash flow to equity model “CFTEM.” First, the residual income approach provides a common and homogeneous valuation approach in a context where uncertainty over cash dividend payments was significant (particularly for banks that were not expected to pay cash dividends even before the COVID shock, such as Greek banks<sup>42</sup>), which calls into question the use of the DDM approach. Second, it avoids the large contribution the terminal value has for a bank valuation under both the DDM and the CFTEM, which we view as an additional layer of uncertainty, particularly in the macroeconomic and financial context of our analysis. Third, unlike these two alternative models, the residual income approach allows us to focus on the key drivers of a bank’s (capital-adjusted) risk-adjusted return profile, and to better identify the channels through which the usability of buffers may impact bank value creation. And fourth, it is particularly well suited to value banks when they face balance sheet (credit quality) uncertainties as it was the case in the immediate post-COVID context.

In order to calculate the bank’s fair value, we proceed as follows. First, we calculate each bank’s adjusted CET1 level ( $CET_i^{adjusted}$ ), consistent with the bank’s medium-run CET1 target ( $CET_i^{target}$ ).<sup>43</sup> Second, we use the bank’s pro-forma (i.e., post usability) net earnings<sup>44</sup> ( $NE_{it}^{PF}$ ) in order to calculate its adjusted return profile (RoCET1,  $r_{adjusted,it}^{CET}$ ). Third, we calculate the fair value P/CET1 multiple ( $PCET_{it}^{multiple}$ ) at which we value the bank’s unadjusted CET1 ( $CET_{it}^{PF}$ ), by discounting the adjusted RoCET1 at the bank’s CoE ( $COE_{it}$ ).<sup>45</sup> Fourth, we multiply our fair value multiple by the bank’s unadjusted CET1 in order to get an unadjusted valuation ( $val_{it}$ ) of each bank, which we then discount at the bank’s CoE.

Finally, we make two final adjustments (on a NPV basis) to the unadjusted valuation obtained in the previous step. We add the NPV of expected cash dividends ( $Div_t$ ) but deduct

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<sup>42</sup> For an analysis of the Greek banking sector, including a practical application of the capital-adjusted residual income valuation model, see Goldman Sachs (2020c).

<sup>43</sup> The rationale behind this is not to overstate the bank’s return (RoCET1) profile by using an artificially low CET1 level. If the bank has a shortfall ( $CET1 < \text{its target}$ ), we add it back to its unadjusted CET1 level; however, if the bank had some excess capital ( $CET1 > \text{its target}$ ), we would rather deduct it from its unadjusted CET1 level.

<sup>44</sup> Technically, we could have also adjusted higher (lower) the bank’s net earnings by accounting for the impact of a capital shortfall (excess capital) by assuming the associated returns are consistent with the Government bond yield of the country(s) in which each bank operates. For simplicity, we have decided not to make such adjustment(s).

<sup>45</sup> We assume no explicit growth rate ( $g = 0$ ) in this exercise. The rationale for this assumption is that our CoE is a market-implied metric that could also be defined as the “earnings yield.” This is the implied discount rate that equates a bank’s FY3 EPS to its stock price. As such, our CoE measure already includes the growth rate implicitly assumed by consensus expectations.

the NPV of the combined capital shortfall<sup>46</sup> ( $C_{it}^{shortfall}$ , the larger of shortfalls in CET1,  $CET_t^{shortfall}$ , or CET1 leverage,  $CET1L_t^{shortfall}$ ):

$$CET_{it}^{shortfall} = CET_i^{target} - CET_{it}^{PF}$$

$$CET_i^{adjusted} = CET_{it}^{PF} \mp CET_{it}^{shortfall}$$

$$CET1L_{it}^{shortfall} = 3\% - CET1L_{it}^{PF}$$

where  $CET1L_{it}^{PF}$  is the proforma CET1 leverage ratio post buffer usage in time t for a bank i.

$$C_{it}^{shortfall} = \max(CET_{it}^{shortfall}, CET1L_{it}^{shortfall})$$

$$PCET_{it}^{multiple} = \frac{r_{adjusted,it}^{CET}}{CoE_{it}}$$

$$val_{it} = CET_{it}^{PF} \times PCET_{it}^{multiple}$$

$$val_{it}^{adjusted} = val_{it} - C_{it}^{shortfall}.$$

This framework allows us to measure the number of years it would take the bank to compensate the shareholder value destruction that buffer usability brings about. Similarly, it also allows us to estimate the bank's path for value creation under the scenario of no buffer usability (for which we just assume buffer usability equals 0 percent of RWAs in the model), so we are able to compare in which scenario shareholders are better off, not just at the time of using the buffers but also over time.

A bank will use its buffers only if the bank's expected fair value ( $val_{i3}^{expected}$ ) is higher than the required fair value ( $val_{i3}^{required}$ ) by Year 3: the former is simply the bank's expected fair value by Year 3 in the case buffers are used or "invested" (i.e.,  $NPV_{i3}^{BU}$ ); the later is defined as the expected fair value ( $NPV_{i3}$ ) in case of no buffer usability plus an additional fair value equal to the NPV of the return made on the buffers invested ( $NPV^{buffer}$ ), which we impose equal to twice of each bank's CoE and would serve to compensate shareholders for the risks incurred. We will refer to the gap between these two metrics ('expected' minus 'required' fair value) as the bank's "value shortfall" ( $val_i^{shortfall}$ ).

$$BU_i > 0 \quad \text{if} \quad val_{i3}^{expected} > val_{i3}^{required}$$

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<sup>46</sup> The impact would be positive (negative) in case the bank under consideration had excess capital (a capital shortfall).

$$val_{i3}^{expected} = NPV_{i3}^{BU}$$

$$val_{i3}^{required} = NPV_{i3} + NPV^{buffer}$$

$$val_i^{shortfall} = val_{i3}^{expected} - val_{i3}^{required}$$

*Management hurdle cleared if  $val_i^{shortfall} > 0$*

Arguably the value shortfall can be a very useful summary statistic for financial stability authorities and in the design of capital buffers (more on this in the policy section).

Finally, for a bank to clear this last hurdle, its value shortfall should fully close in 3 years or less following the use of buffers. As the reader may have realised by now, this way of thinking about the economics of buffer usability is conceptually similar to an M&A deal or to the acquisition of a loan portfolio in the secondary market. Ultimately, this is what voluntary buffer usability is aimed at: to generate a new loan book, relative to the counterfactual (of no buffer usage) and under particular macroeconomic and financial stress conditions.

For illustrative purposes, Table 2 shows the result of every step in the bank valuation model calibrated to the median bank in the first quartile of our sample. We also show a waterfall chart depicting the fair value transition across all the stages based on the median bank for the entire sample (Figure 9). Our starting point is the bank's expected fair value under the no buffer usability (NBU) path in Y3; the gap between this and the bank's current market cap is explained by the discount rate applied to Y3 earnings, given we are assuming a static balance sheet (and net earnings). Second, using the buffer (BU) has two opposing effects. On the one hand, it increases assets and—under the set of plausible assumptions described earlier—earnings and cash dividends as well. On the other, however, a CET1 shortfall opens up, more than offsetting the positive impact on fair value from the higher earnings and cash dividends. Finally, the fair value required by shareholders would equal the fair value under the no buffer usability (NBU) path plus an “extra” value that compensates them for the risks incurred with the usage of buffers, which we have set at twice the bank's CoE over the amount of buffers “invested”. The gap between the shareholders' required fair value and the fair value under the buffer usability (BU) path is what we have defined as the “value shortfall” and measures shareholders' opportunity cost when facing the decision of whether to use the buffers (or not) in terms of shareholder value creation.

## D. Discussion of Our Results

The upshot of the baseline specification is that very few banks in very few countries clear the three hurdles we impose for a bank to voluntarily use its capital buffers. Globally, for an assumed buffer usage of 2.5 percent of RWAs, only 3.3 percent of the banks analyzed (weighted by market capitalization) manage to clear all three hurdles currently (Table 3). While a majority of banks (roughly 65 percent) meet the supervisory criteria (ability to organically rebuild buffers in 3 years or less), just over half meet the capacity hurdle and

only 21 percent meet the management hurdle. In fact, there is only one country (out of 23), where we find a majority of its banks meeting all three hurdles, and just three countries where at least one bank manages to meet all criteria at a time.

**Table 2. Step 4b – Valuation (Multi-Year)**

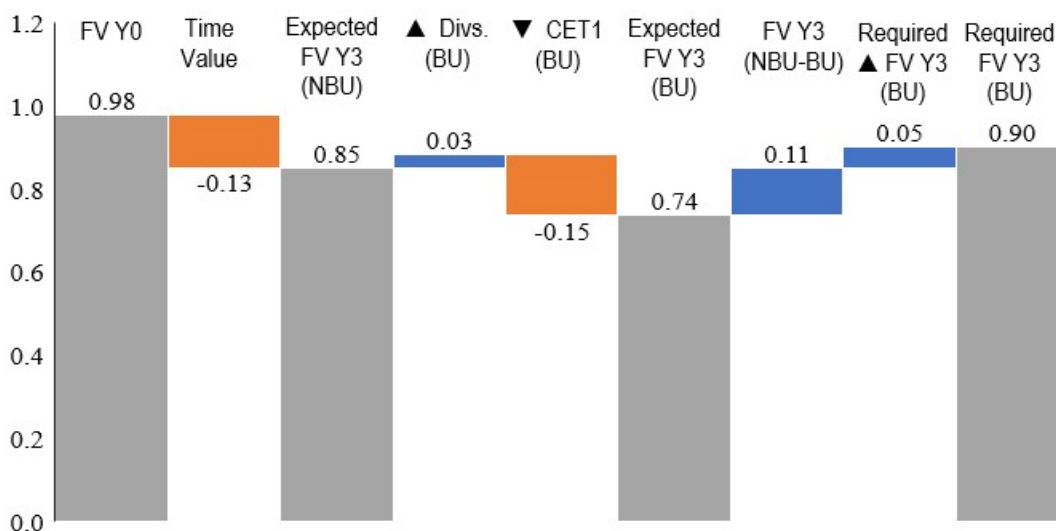
Organic capital generation model	t pre-BU	t post-BU	t+1	t+2	t+3	t+4	t+5	t+6	t+7	t+10	t+15
i CET1 level PF (CET1 level + organic cumulative capital build-up of 0.6 per annum)	13.9	13.9	14.4	14.9	15.4	15.9	16.4	17.0	17.5	19.0	21.6
ii CET1 ratio PF (percent of RWA PF)	13.0%	10.5%	10.9%	11.3%	11.7%	12.1%	12.4%	12.8%	13.2%	14.4%	16.3%
iii CET1 shortfall (13% target - PF) (percent of RWAs)	0.0%	2.5%	2.1%	1.7%	1.3%	0.9%	0.6%	0.2%	-0.2%	-1.4%	-3.3%
iv CET1 shortfall, level	0.0	3.3	2.8	2.3	1.8	1.2	0.7	0.2	-0.3	-1.8	-4.4
v Total AT1s (assumed full*) (at 1.5% of RWA)	1.6	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
vi CET1 leverage PF, percent of assets	6.9%	5.6%	5.8%	6.0%	6.2%	6.4%	6.6%	6.8%	7.1%	7.7%	8.7%
vii CET1 leverage shortfall, level (actual - target of 3% of assets)	-7.9	-6.4	-7.0	-7.5	-8.0	-8.5	-9.0	-9.5	-10.0	-11.6	-14.1
viii Combined shortfall, level (higher of CET1 and T1 leverage)	0.0	3.3	2.8	2.3	1.8	1.2	0.7	0.2	-0.3	-1.8	-4.4
<b>Valuation framework</b>											
ix CET1, level adjusted (i + iv)	13.9	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2
x RoCET1, adjusted (Earnings PF of 1.02/ ix )	5.4%	5.4%	5.4%	5.4%	5.4%	5.4%	5.4%	5.4%	5.4%	5.4%	5.4%
xi Fair P/CET1 multiple (RoCET1 adjusted / CoE of 15.8%)	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x	0.3x
xii Total fair value (sub-total, i * xi)	4.8	4.8	5.0	5.2	5.3	5.5	5.7	5.9	6.0	6.6	7.5
xiii Discount factor	1.0	1.0	1.2	1.3	1.6	1.8	2.1	2.4	2.8	4.3	9.0
xiv NPV of total fair value (sub-total, xii / xiii)	4.8	4.8	4.3	3.8	3.4	3.1	2.7	2.4	2.2	1.5	0.8
xv Cumulative incremental cash dividends	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.6	0.8
xvi NPV of Cumulative incremental cash dividends (xv / xiii)	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
xvii NPV of combined shortfall (viii / xiii)	0.0	3.3	2.4	1.7	1.1	0.7	0.4	0.1	-0.1	-0.4	-0.5
xviii Total adjustments, NPV (xvi + xvi )	0.0	-3.3	-2.3	-1.6	-1.0	-0.6	-0.2	0.1	0.3	0.6	0.6
xix Equity Value (total)	4.8	1.5	2.0	2.3	2.4	2.5	2.5	2.5	2.4	2.1	1.4
xx Equity value as a percentage of initial market implied value { xix ÷ ( xix for t pre-BU ) }	0%	-68%	-59%	-53%	-49%	-48%	-47%	-48%	-49%	-57%	-71%
<b>Counterfactual analysis</b>											
xxii Value under counter-factual (no buffer usability)	5.5	5.5	5.3	5.1	4.8	4.5	4.2	3.9	3.6	2.8	1.7
xxiii Return on excess capital {Excess capital * (CoE * 2)}		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
xvi Incremental required value, NPV (xxiii / xiii)		1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.4	0.2	0.1
xv Total required value, NPV		6.5	6.2	5.8	5.5	5.1	4.7	4.4	4.0	3.0	1.8
xvi Value (% vs fair value under buffer usability)	-12%	-76%	-68%	-61%	-56%	-51%	-46%	-43%	-40%	-32%	-23%

Sources: Bloomberg Financial L.P.; and authors' calculations.

Note: PF stands for pro forma. The release of buffers has no impact on the MDA per se, but it does reduce MR by making the CBR usable for either lending or loss-absorption. AT1 shortfall is assumed to be made up by additional issuance.

<sup>1</sup> AT1 shortfall is assumed to be made up by additional issuance.



**Figure 9. Evolution of a Bank's Fair Value Post Buffer Usage<sup>1</sup>**

Sources: Bloomberg Financial L.P.; and authors' calculations.

<sup>1</sup> Data of the bank with median P/CET1 ratio is used, for illustrative purposes.

Note: Y0 is the 0 year or the year in which buffers are used and Y3 is year 3 from the the 0 year. NBU stands for no buffer used, BU is buffer used, and FV is future value. All values are expressed as a ratio of the bank's CET1 target.

Relaxing our buffer usability assumption (down to 1 percent of RWAs, see Table 4) roughly doubles the success rate of banks in our sample (to about 6 percent) which still comes across as a (very) limited macroeconomic impact.

**Table 3. Analysis Results Where Buffer Usage is 2.5 Percent of RWA (Market Capitalization Weighted Averages)**

Banks Ranked by Price-to-Book Ratio	Capacity Hurdle	Supervisory Hurdle		Management Hurdle	Capital Buffer Usability	Pro-forma Impacts in t = 0			
	Capital Buffer Availability <sup>1</sup>	Years to Rebuild Buffers <sup>2</sup>	Asset Quality <sup>3</sup>	Bank's Expected Equity FV <sup>4</sup>	Success Rate <sup>5</sup>	Δ Loans (%)	Δ RoCET1 (pp.)	Δ CET1 Leverage Ratio (pp.)	Δ CET1 Ratio (pp.)
1st Quartile [Bottom]	1.5x	16.2	✗	✗	0.0	0.0%	0.0%	0.0%	0.0%
2nd Quartile	1.2x	7.5	✓	✗	0.0	0.0%	0.0%	0.0%	0.0%
3rd Quartile	1.3x	5.1	✓	✗	0.0	0.0%	0.0%	0.0%	0.0%
4th Quartile [Top]	0.7x	2.9	✓	✓	6.8	1.3%	0.4%	-0.1%	-0.2%
World	1.0x	5.2		✗	3.3	0.6%	0.2%	0.0%	-0.1%
Success rate <sup>5</sup>	53.6	64.6	99.6	20.7	3.3				

Sources: Bloomberg Financial L.P.; and authors' calculations.

<sup>1</sup> Hurdle cleared at 1 times of buffer drawn

<sup>2</sup> Hurdle cleared at less than or equal to 5 years

<sup>3</sup> Hurdle cleared at 3 times the regions pre-COVID 19 NPL ratio

<sup>4</sup> Hurdle cleared if expected equity FV is greater than required equity value in year 3

<sup>5</sup> Percent of banks, by market capitalization, clearing the hurdle

**Table 4. Analysis Results Where Buffer Usage Is 1.0 Percent Of RWA  
(Market Capitalization Weighted Averages)**

Banks Ranked by Price-to-Book Ratio	Capacity Hurdle	Supervisory Hurdle		Management Hurdle	Capital Buffer Usability	Pro-forma Impacts in t = 0			
	Capital Buffer Availability <sup>1</sup>	Years to Rebuild Buffers <sup>2</sup>	Asset Quality <sup>3</sup>	Bank's Expected Equity FV <sup>4</sup>	Success Rate <sup>5</sup>	Δ Loans (%)	Δ RoCET1 (pp.)	Δ CET1 Leverage Ratio (pp.)	Δ CET1 Ratio (pp.)
1st Quartile [Bottom]	3.7x	6.4	✗	✗	0.0	0.0%	0.0%	0.0%	0.0%
2nd Quartile	3.0x	3.4	✓	✗	4.4	0.4%	0.1%	0.0%	0.0%
3rd Quartile	3.3x	2.0	✓	✗	0.0	0.0%	0.0%	0.0%	0.0%
4th Quartile [Top]	1.9x	1.2	✓	✓	9.7	0.8%	0.2%	-0.1%	-0.1%
World	2.5x	2.2		✗	5.9	0.5%	0.1%	0.0%	-0.1%
Success rate <sup>5</sup>	70.0	95.4	99.6	20.7	5.9				

Sources: Bloomberg Financial L.P.; and authors' calculations.

<sup>1</sup> Hurdle cleared at 1 times of buffer drawn

<sup>2</sup> Hurdle cleared at less than or equal to 5 years

<sup>3</sup> Hurdle cleared at 3 times the regions pre-COVID 19 NPL ratio

<sup>4</sup> Hurdle cleared if expected equity FV is greater than required equity value in year 3

<sup>5</sup> Percent of banks, by market capitalization, clearing the hurdle

These results suggest that, under a set of plausible conditions which we infer from a combination of both market and bank managements' medium-term expectations, there are practically no incentives for a majority of bank management teams to voluntarily draw down their buffers. Importantly, we find that hurdle #3 is the most binding one, with most banks still showing a fair equity *value shortfall* by the end of Year 3 after the buffer draw-down date, implying that a majority of banks fail to reach the bank shareholders' required fair value within a reasonable timeframe. Or to put it differently, what we find is that a buffer draw-down (the magnitude of which we have assumed) makes no economic sense for a majority of banks in our sample. Provided the market expects that a bank will have to rebuild its buffers, any buffer draw-down will open up a capital shortfall that will weigh on the bank's share price. Therefore, even if a bank meets the first two hurdles in our framework (capacity and ability to rebuild buffers organically over a reasonable timeframe), a bank CEO will only decide to use its buffers in the case that the associated value creation offsets both the capital shortfall and the risks in which the bank and its shareholders incur. What our results tell us is that this case is rare in practice.

Interestingly, banks in the top quartile of our sample (as per their respective P/CET1 ratios) include most of banks clearing hurdle #3 (management hurdle) but it also includes most of the banks failing to clear hurdle #1 (capacity). This means that a number of banks in the top quartile do not have capacity to use their buffers despite having the potential to generate a high enough RoI so as to make the economics of buffer usability work. This is essentially due to a number of (mostly US) banks in the top quartile operating with very thin management buffers. This, in turn, is closely related to a key feature of the US bank

regulation discussed earlier: US bank capital requirements are well calibrated through the use of the SCB, reducing or even eliminating the need to hold any excess CET1 capital.<sup>47</sup>

Finally, for rebuilding bank capital organically (hurdle #2), a bank's return profile is the single most important factor. The more (less) profitable a bank is, the shorter (longer) it takes to rebuild its capital buffers. Consistent with this, on average, only banks in the top quartile of the profitability distribution clear this hurdle.

## **E. Robustness checks and discussion**

### **Sensitivity Analysis**

There are a number of important assumptions which require further discussion and analysis. First of all, we have assumed that the market's long-dated expectations (alongside banks' stated medium-run CET1 targets) equal to each bank's steady-state parameters post-COVID. This assumes that available long-dated expectations reflect the best information available in the market currently. Any forecasts beyond 2022 may be subject to a significant amount of uncertainty, particularly in the banking sector, which is subject to significantly higher earnings volatility (as well as both regulatory and macro risks) compared to others. Furthermore, the use of market's long-dated expectations is in our view the best way to effectively replicate a bank CEO's decision-making process, which is what we are ultimately pursuing.

Second, we also assume some of these expectations—in particular, assumptions about the RWA density and the RoA for both front- and back-books—to remain static even post buffer usability. This may not be necessarily the case, but we are unsure about the direction in which each of these variables may move as a result of the usability of buffers: will the return on RWA of the incremental book be higher or lower than that of the bank's back-book?<sup>48</sup> Our sensitivity analysis should help shedding some light on this issue.

We take the following two steps for the sensitivity analysis. First, we calibrate the organic capital generation and bank valuation models with the median values, per quartile, of the six variables that ultimately drive their respective dynamics and outputs: RWA density, CET1 ratio (medium-run target), minimum CET1 requirements (MDA), RoE (RoCET1), CoE and

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<sup>47</sup> Two recent cases help to illustrate this point. At the time of compiling the data required to run our analysis, one large US investment announced a medium-run CET1 target which was below its actual CET1 requirements, in the expectation (according to that bank's management team) that requirements would eventually fall. Another large US player launched earlier this year its intention to distribute to its shareholders all its CET1 in excess of its requirements through a share buyback program.

<sup>48</sup> There are good arguments in both directions. On the one hand, the front-book RoA may be higher if the bank "invests" its usable buffers in the most profitable segments (e.g., consumer) in a context of strong solvent demand for credit as well as of relatively stable lending standards and credit quality dynamics. On the other, if (solvent) credit demand is not strong enough, looser lending standards (required for loan growth to be similar to the previous scenario) may lead to relatively worse credit quality dynamics and a lower (even negative) front-book RoA.

cash pay-out. This allows us to calculate the evolution of both the capital shortfall (expected CET1 ratio – target CET1 ratio) and value shortfall paths (expected fair value – counterfactual fair value<sup>49</sup>) for each quartile’s median bank over time. For this, in our baseline specification, we assume buffers draw-down to be at 2.5 percent of RWAs. Second, we look at how these two paths change for different values of the following eight parameters, *ceteris paribus*. Specifically, buffer usability (from 0 percent to 100 percent of the bank’s CBR), RoA of the new assets (from 2x to 0x vs back-book), RWA density of the new assets (+/- 40 pp. vs back-book), cash pay-out (from 2x to 0x vs pre-usability level), RWA growth (+/- 4 percent vs our baseline static balance sheet assumption), CET1 ratio (+/- 2 pp. vs medium-run target), RoCET1 (+/- 4 pp. vs pre-usability level) and CoE (+/- 4 pp. vs pre-usability level).

Looking at the results of our sensitivity analysis (Table 5, and Figures 10 and 11), we find that a bank’s ability to rebuild fair value (hurdle #3) in the case of buffer usability seems to be more elastic (than its ability to rebuild its capital buffers, hurdle #2) to changes across the eight key parameters outlined above. In other words, the speed at which a bank rebuilds value is faster than that at which it rebuilds capital. At the same time, however, the value shortfall opened up when buffers are used is such that—in spite of the previous point—it tends to take much longer for the bank to rebuild value than to rebuild capital.

All in, a bank’s value-rebuilding strategy seems to be most effective when it builds upon one of the following three factors: a lower buffer usability; a higher RoA from the new assets (for example, through a larger portion of loans to higher-yielding segments); and/or a lower RWA density associated with the new/incremental asset base, which could be as a result of government guarantees.

Another avenue for buffer rebuilding is deleveraging, that is, materially reducing loan growth. We note that the ECB (2021f) finds a negative impact on lending in the adverse scenario of its latest Macroprudential Stress Test, once banks are required to rebuild their buffers; the impact is even larger when the finalisation of Basel-3 is accounted for in the analysis.

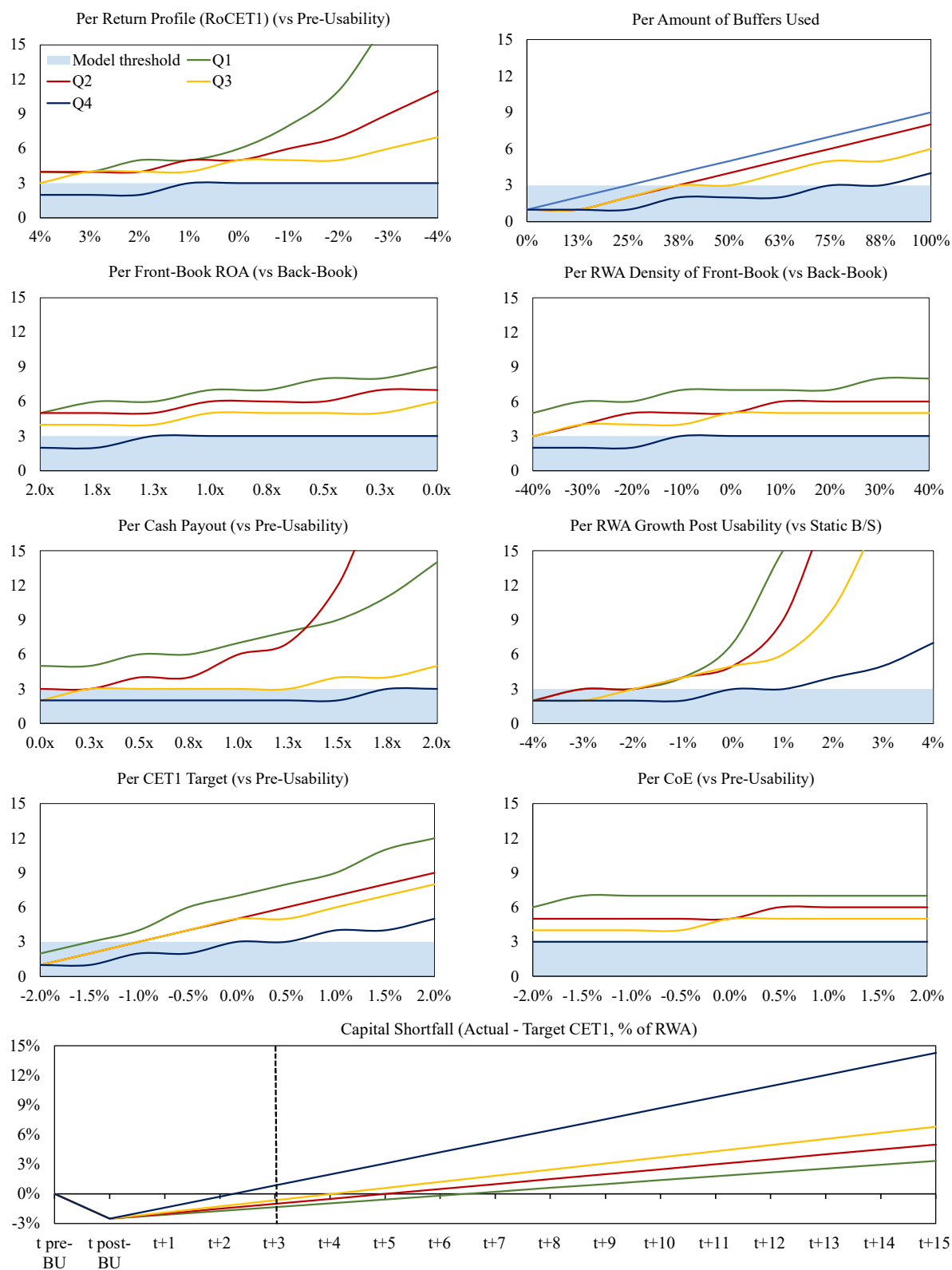
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<sup>49</sup> The bank’s fair value path under the counterfactual scenario of no buffer usability is estimated by assuming in our model buffers draw-down at 0 percent of RWAs, *ceteris paribus*.

Table 5. Sensitivity Analysis

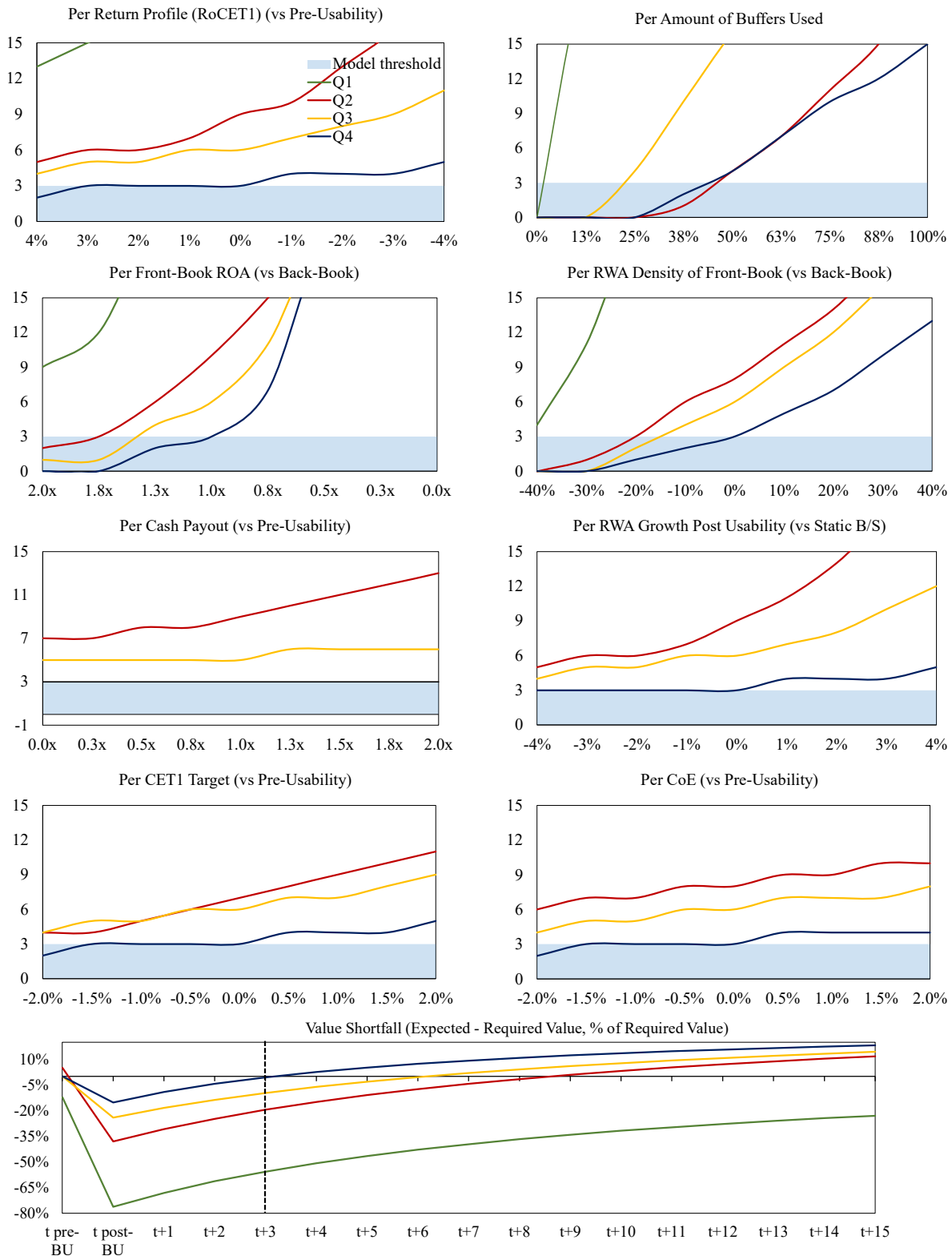
Key Metrics	Quartile	Supervisory Hurdle										Management Hurdle									
		Number of Years to Rebuild Buffers (hurdle at ≤ 3 years)										Number of Years to Meet Required Fair Value (hurdle at ≤ 3 years)									
		4%	3%	2%	1%	0%	-1%	-2%	-3%	-4%	4%	3%	2%	1%	0%	-1%	-2%	-3%	-4%		
Change in RoCET1 (pp. vs pre-usability)		4	4	5	5	6	8	11	17	>20	13	15	17	>20	>20	>20	>20	>20	>20		
	Q1	4	4	4	5	5	6	7	9	11	5	6	6	7	9	10	13	16	20		
	Q2	3	4	4	4	5	5	5	6	7	4	5	5	6	6	7	8	9	11		
	Q3	2	2	2	3	3	3	3	3	3	2	3	3	3	3	4	4	4	5		
	Q4																				
Buffer usability (% of Combined Buffer Requirement)		0%	13%	25%	38%	50%	63%	75%	88%	100%	0%	13%	25%	38%	50%	63%	75%	88%	100%		
	Q1	1	2	3	4	5	6	7	8	9	0	>20	>20	>20	>20	>20	>20	>20	>20		
	Q2	1	1	2	3	4	5	6	7	8	0	0	0	1	4	7	11	15	>20		
	Q3	1	1	2	3	3	4	5	5	6	0	0	4	10	16	>20	>20	>20	>20		
	Q4	1	1	1	2	2	2	3	3	4	0	0	0	2	4	7	10	12	15		
Change in ROA of new assets (multiple vs back-book)		2.0x	1.8x	1.5x	1.3x	1.0x	0.8x	0.5x	0.3x	0.0x	2.0x	1.8x	1.5x	1.3x	1.0x	0.8x	0.5x	0.3x	0.0x		
	Q1	5	6	6	6	7	7	8	8	9	9	12	16	>20	>20	>20	>20	>20	>20		
	Q2	5	5	5	5	6	6	6	7	7	2	3	5	6	10	15	>20	>20	>20		
	Q3	4	4	4	4	5	5	5	5	6	1	1	2	4	6	11	>20	>20	>20		
	Q4	2	2	3	3	3	3	3	3	3	0	0	1	2	3	7	20	>20	>20		
Change in RWA density of new assets (pp. vs back-book)		-40%	-30%	-20%	-10%	0%	10%	20%	30%	40%	-40%	-30%	-20%	-10%	0%	10%	20%	30%	40%		
	Q1	5	6	6	7	7	7	7	8	8	4	11	>20	>20	>20	>20	>20	>20	>20		
	Q2	3	4	5	5	5	6	6	6	6	0	1	3	6	8	11	14	18	>20		
	Q3	3	4	4	4	5	5	5	5	5	0	0	2	4	6	9	12	16	20		
	Q4	2	2	2	3	3	3	3	3	3	0	0	1	2	3	5	7	10	13		
Change in cash pay-out (multiple vs pre-usability)		0.0x	0.3x	0.5x	0.8x	1.0x	1.3x	1.5x	1.8x	2.0x	0.0x	0.3x	0.5x	0.8x	1.0x	1.3x	1.5x	1.8x	2.0x		
	Q1	5	5	6	6	7	8	9	11	14	>20	>20	>20	>20	>20	>20	>20	>20	>20		
	Q2	3	3	4	4	6	7	12	>20	>20	7	7	8	8	9	10	11	12	13		
	Q3	2	3	3	3	3	3	4	4	5	5	5	5	5	5	6	6	6	6		
	Q4	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3		
RWA growth (%) after using the buffers		-4%	-3%	-2%	-1%	0%	1%	2%	3%	4%	-4%	-3%	-2%	-1%	0%	1%	2%	3%	4%		
	Q1	2	3	3	4	7	15	>20	>20	>20	>20	>20	>20	>20	>20	>20	>20	>20	>20		
	Q2	2	3	3	4	5	9	19	>20	>20	5	6	6	7	9	11	14	18	>20		
	Q3	2	2	3	4	5	6	10	18	>20	4	5	5	6	6	7	8	10	12		
	Q4	2	2	2	2	3	3	4	5	7	3	3	3	3	3	4	4	4	5		
Change in medium-run CET1 ratio target (pp. vs pre-usability)		-2.0%	-1.5%	-1.0%	-0.5%	0.0%	0.5%	1.0%	1.5%	2.0%	-2.0%	-1.5%	-1.0%	-0.5%	0.0%	0.5%	1.0%	1.5%	2.0%		
	Q1	2	3	4	6	7	8	9	11	12	>20	>20	>20	>20	>20	>20	>20	>20	>20		
	Q2	1	2	3	4	5	6	7	8	9	4	4	5	6	7	8	9	10	11		
	Q3	1	2	3	4	5	5	6	7	8	4	5	5	6	6	7	7	8	9		
	Q4	1	1	2	2	3	3	4	4	5	2	3	3	3	3	4	4	4	5		
Change in CET1 leverage ratio requirements (pp. vs pre-usability)		-2.0%	-1.5%	-1.0%	-0.5%	0.0%	0.5%	1.0%	1.5%	2.0%	-2.0%	-1.5%	-1.0%	-0.5%	0.0%	0.5%	1.0%	1.5%	2.0%		
	Q1	7	7	7	7	7	7	7	7	7	>20	>20	>20	>20	>20	>20	>20	>20	>20		
	Q2	5	5	5	5	5	5	5	5	5	9	9	9	9	9	9	9	9	9		
	Q3	5	5	5	5	5	5	5	5	5	7	7	7	7	7	7	7	7	7		
	Q4	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4		
Change in CoE (pp. vs pre-usability)		-2.0%	-1.5%	-1.0%	-0.5%	0.0%	0.5%	1.0%	1.5%	2.0%	-2.0%	-1.5%	-1.0%	-0.5%	0.0%	0.5%	1.0%	1.5%	2.0%		
	Q1	6	7	7	7	7	7	7	7	7	>20	>20	>20	>20	>20	>20	>20	>20	>20		
	Q2	5	5	5	5	5	6	6	6	6	6	7	7	8	8	9	9	10	10		
	Q3	4	4	4	4	5	5	5	5	5	4	5	5	6	6	7	7	7	8		
	Q4	3	3	3	3	3	3	3	3	3	2	3	3	3	3	4	4	4	4		

Source: Authors' calculations.

**Figure 10. Number of Years to Rebuild Buffer—Sensitivity to Key Variables**

Sources: Bloomberg Financial L.P.; and authors' calculations.

**Figure 11. Number of Years to Reach Required Fair Value—Sensitivity to Key Variables**



Sources: Bloomberg Financial L.P.; and authors' calculations.

## Leverage ratio

The leverage ratio has also been cited as a potential constraint for buffer usability (Rohde, 2020). The leverage ratio may indeed be a constraint when usability is high. In our baseline specification (with usability at 2.5 percent of RWAs), doubling the CET1 leverage ratio requirement assumed across the sample (from 3 percent to 6 percent) would halve the success rate of the sample from 3.3 percent to 1.8 percent.<sup>50</sup> That said, given the overall success rate was already very low, the economic impact of a higher leverage ratio seems to be negligible in the context of an assessment of the capital buffers framework. Interestingly, when we reduce usability (to 1 percent of RWAs), an increase in the leverage ratio requirement of the same magnitude would just reduce the overall success ratio of the sample by roughly 50bps, from 5.9 percent to 5.4 percent, with no material impacts on lending compared to its counterfactual.

For all practical purposes, the impact of higher CET1 leverage ratio requirements are economically similar to these of higher CET1 requirements. In our sensitivity analysis, we do see that higher (lower) CET1 requirements translate, all else equal, into larger (smaller) capital and value shortfalls.

## Coordination

Another key topic is that of potential welfare-reducing actions from coordination failures among banks when using the buffers. While most banks may individually view the option of not using the buffers as economically superior to that of using them, some regulators have argued that a broad-based use of capital buffers could push the economy (and the banking system, as a result) into a better equilibrium associated with higher aggregate bank lending and GDP growth, and, as a result, with lower credit losses, at the cost of just a marginal impact on the banking system's average CET1 ratio (ECB, 2020a and 2020b).

In particular, ECB (2020b) estimates that the full usability of buffers by Eurozone banks (i.e., bringing their CET1 ratio down to the P2R's upper bound, post implementation of Art. 104A of CRD-V) would increase the overall bank lending up by 3 percent, real GDP up by 0.3–0.5 percent, and the overall crisis-related expected loss lower (both NPLs and their loss-given-default, LGD), with the CET1 ratio closing “just” 0.7 percent of RWAs lower; all of them by the end of the third year following the decision to drawdown the buffers, relative to the counterfactual scenario of no buffer usability.

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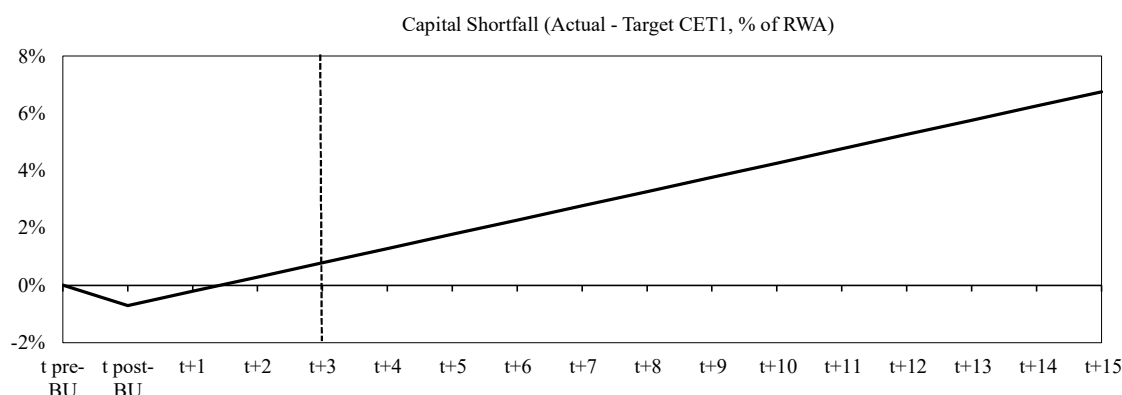
<sup>50</sup> In our framework, we focus on the CET1 leverage ratio, for which we assume a requirement of 3 percent. The reason we focus on the CET1 rather than on the T1 leverage ratio is that we have assumed those banks that are both able and willing to tap the AT1 market (a majority of them) are able to do it quasi-instantaneously and in potentially unlimited amounts. Hence, our framework does only yield constraints in the CET1 portion of a bank's T1 capital position. Even though a 3 percent CET1 leverage ratio may be seen as low for some, it is high for most banks given Basel III requires a 3 percent for the overall T1 (i.e., CET1 and AT1) leverage ratio. We therefore view our assumption as conservative, on average.



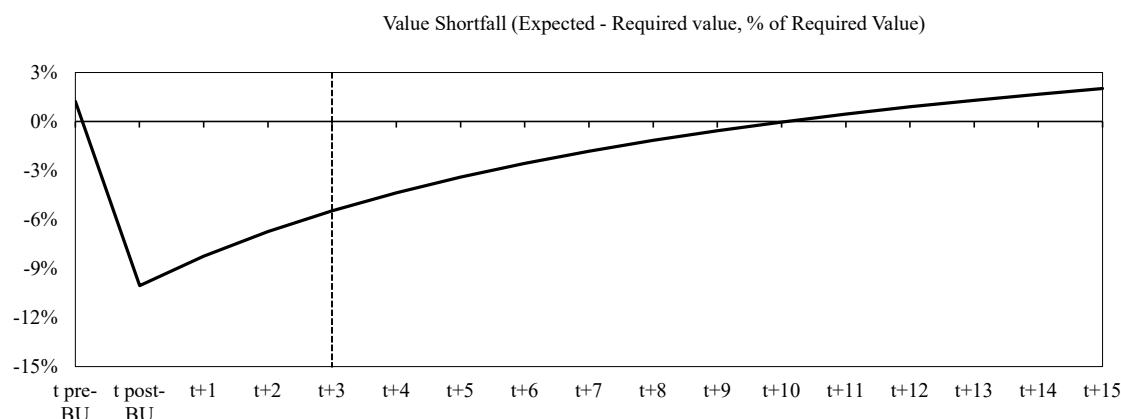
Even if we take these results at face value, it is still unclear to us why an Eurozone bank CEO would find using the buffers a financially superior option for its shareholders to that of not using them. The positive effects seem to be of a small magnitude given the risks the decision entails (for both the CEO and the bank's shareholders). Under the set of plausible conditions (implied from current market expectations) used in the calibration of our previous analysis, the buffer usability scenario would be associated with the banks involved (and, as a result, the sector as a whole) trading on a lower P/CET1 multiple compared to the counterfactual scenario of not using the buffers. From a bank valuation perspective, the lower (below-target) CET1 ratio would likely offset the positive impact from higher earnings (even when assuming the new loan book being as profitable as the bank's back-book).

Following the same methodology used for running our sensitivity analysis, we calibrate our model to European bank data and assume a buffer draw-down of 0.7 percent of RWAs, which is the difference the ECB estimates between buffer usability and its counterfactual by the end of Year 3. We find that a higher impact on lending that the ECB's (>5% percent and 3 percent, respectively) with European banks being able to fully rebuild its capital buffers in 1–2 years, clearing our hurdle #2 ( $\leq 3$  years) on aggregate (Figure 12). However, our analysis also suggests it would take them 11–12 years for their fair value path under the case of buffer usability to converge to that of the counterfactual, on aggregate, failing to clear our hurdle #3 ( $\leq 3$  years). Therefore, while 0.7 percent of RWAs may come across as an optically small impact to a bank's CET1 position, it is actually not.<sup>51</sup> All in, under the (currently expected) conditions for European banks, it's unclear why and how using the buffers could make bank shareholders better off compared to the counterfactual of not using them, even assuming perfect coordination among all players.

**Figure 12. Projected Capital and Value Shortfall for Euro Area Banks**



<sup>51</sup> A simple example should suffice to illustrate our point. For a bank with €10 billion of CET1 and €100 billion of RWAs (implying a CET1 ratio of 10 percent) and trading on a P/CET1 multiple of 0.5x (implying a market capitalization of €5 billion), a reduction of its CET1 level equivalent to 0.7 percent of its RWAs would equate to 14 percent of its market cap. This is certainly no small amount.



Sources: Bloomberg Financial L.P.; and authors' estimates.

## Incorporating our Global Stress Test

It could be argued that our counterfactual (no-buffer usability) scenario is too benign compared to how that expected scenario should be for bank authorities to deactivate the CCyB (and D-SIB buffers, wherever this is possible) and to encourage banks to using the remainder of their CBR in order to boost lending.

However, we note that – as we discuss in more detail in Section III.B – we run our analysis for banks operating not just on (what banks expected to be) a post-COVID trend but, ideally, on paths which are the closest as possible to their expected respective steady states (or “normalized” levels, in the bank analyst jargon) as otherwise the data would be distorted by cyclical effects. This is usual practice in bank valuation, with its rationale being that valuing a bank using net income in the aftermath of a crisis (e.g., FY1) may lead to a distorted fundamental value. It is for this reason that we calibrate our analysis with the longest-dated expectations data available (3-year forward, FY3) across all relevant variables.

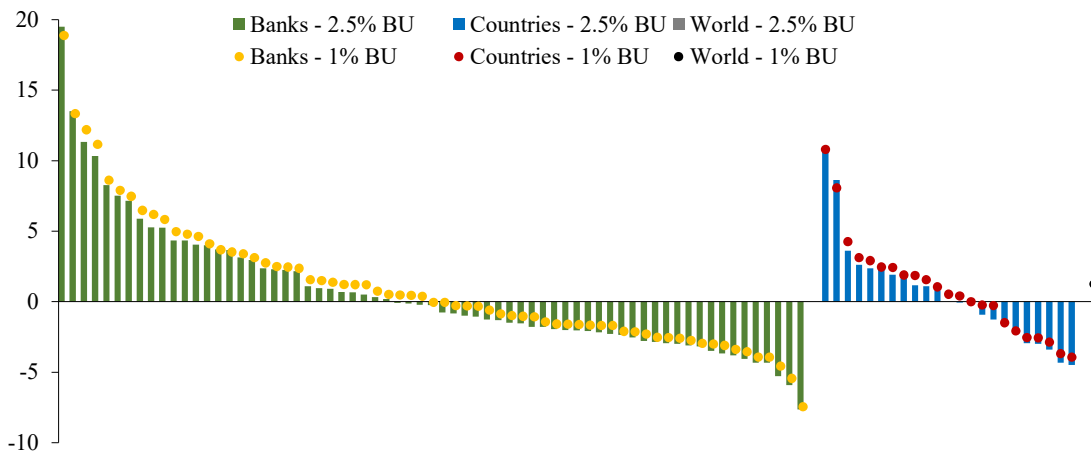
Another key implication of our approach is that by using post-COVID, FY3 market expectations (alongside bank’s own-stated, post-COVID, medium-run CET1 targets), we already incorporate any expected long-lasting effects from the COVID shock. Furthermore, we run a sensitivity analysis around the key variables that drive our framework (see Table 5 as well as Figures 10 and 11).

For completeness, we test our results from a scenario in which market expectations underestimate the impact from the crisis, medium-run CET1 ratios end up being materially lower (in Year 3) than expectations (as of Year 0). For this, we compare our bank-specific “value shortfall” metric (defined as the difference between a bank’s fair value post buffer usability in Year 3 and the bank’s market cap pre buffer usability, that is, in Y0) against the cumulative CET1 draw-down (CET1 ratio as of the end of Year 3 minus starting CET1 ratio as of end Y0) in the adverse scenario of the IMF’s Global Stress Test (GST). We normalize both variables as a percent of the bank’s RWAs in Year 3, which are obviously different in the two scenarios. Importantly, we’ll use the results of the GST that we published in October

2020 (see IMF, 2020), as this iteration took place in the context of the COVID crisis and is probably a good reflection of the set of policy expectations that justified the request by global and national/regional authorities for banks to use their buffers since early 2020. That said, why could banks decide to calibrate their own reaction functions with policymakers' rather than with market-implied (and their own-declared) expectations, it's unclear to us.

By running this analysis, we are effectively comparing a bank's expected upside risk from potentially avoiding a macro scenario similar to the one depicted by the GST against the downside risk associated with drawing down its capital buffers and temporarily operating below its median-run CET1 target (or even below its MDA). For a majority (60-50%) of banks in our sample, the (positive) value of the risk avoided is still lower than the (negative) value of the risk incurred, depending on whether we assume buffer usability at, respectively, 2.5% or 1% of RWAs. Importantly, for the net difference between these two values (Figure 13) to truly measure the value of the trade-off between or not using the buffers, we would need to assume, crucially, that the quantum of buffers used (1%, 2.5% or any other amount) suffices to fully offset the macro implications of the GST's adverse scenario. Whether this implicit assumption holds or not exceeds the scope of this paper.

**Figure 13. Value Shortfall vs. Adverse Scenario of Global Stress Test (GST)  
(as a percentage of RWAs)**



Sources: Bloomberg Financial L.P.; and authors' calculations.

### Bank incentives across the buffer structure

Incentives are the same but buffer design does differ across the CBR. In particular, a key difference lies on the fact that while some buffers that can be (de)activated (e.g., CCyB), others cannot (e.g., CCoB) (see the Annex for details).

Crucially, what ultimately really matters for investors is the portion of the buffers drawn down that will have to be eventually rebuilt, over which time period, and with what probability. On the one hand, the probability of a bank rebuilding its CCoB in full, and quickly, is 100%. This is by construction, as distribution restrictions (alongside some additional supervisory actions) will be in place for as long as the bank's CET1 ratio remains

below the threshold defined by the CCoB's upper bound. On the other, the quantum (and timing) of the CCyB expected to be rebuilt ex ante is uncertain and in any case state-contingent, with its probability being <100% on average, but increasing (decreasing) as we move down (up) within its potential range, which is currently set at 0-2.5% of RWAs<sup>52</sup>. As a result, for the same amount of CET1 being drawn-down, the (probability-weighted) capital shortfall expected to open up in the bank's valuation should be smaller (larger) if this results from using its CCyB (CCoB). What this also means is that, all else equal and under their current design, using the CCyB (CCoB) is less (more) punitive and therefore more (less) likely if a bank finds itself in a position to decide whether using or not its buffers.

The same rationale can be applied to other layers of a bank's CET1 structure, as changes in P2 requirements should not have the same implications – in the investors' minds – as changes in the CCyB following its (de)activation. While changes in P2 requirements are likely to be perceived as permanent (unless there is a new regulatory change), changes in the CCyB are state-contingent and therefore likely to be perceived as temporary in nature.

All in, the expansionary effect from lower P2 requirements should be larger than a cut to the CCyB; and, in turn, the expansionary effect from a lower CCyB should be larger than that from a lower CCoB.

Our framework provides the general case for capital (not just buffer) usability, of which these are three special cases, with each of them required to be calibrated for a different probability of capital rebuild post-usage. In our analysis<sup>53</sup>, we assume banks have to fully rebuild the buffers they draw down with a 100% probability. Hence, we implicitly assume all of a bank's buffers are made of CCoB or CCoB-like buffers. However, as discussed above, while the probability of rebuilding its CCoB will always be certain (100% probability), that of rebuilding its CCyB will generally be uncertain (<100% probability). Taking some of the jargon we have used in our analysis, using the CCyB (CCoB) opens up a lower (larger) expected "value shortfall", when even for the same level of CET1 drawdown.

Interestingly, this is consistent with preliminary evidence from the COVID crisis suggesting a mild expansionary effect from lower CET1 requirements announced early on (see Figure 3; see also BCBS, 2021, and ECB, 2021e). Importantly, the expansionary impact was found to be larger when the reduction in CET1 requirements was perceived as permanent (via a lower P2R) rather than when perceived as being temporary (via a lower CCyB/SyRB) (ECB, 2021e). Along these lines and in the context of the COVID crisis, Douglas (2020) also argues that while the CCyB has worked, the CCoB has not.

Therefore, enhancing the overall usability of capital buffers will require at least two changes that we'll elaborate further in the following section: (1) A larger weight of the CCyB within the CBR, and (2) introducing "forward guidance" in macroprudential policy announcements,

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<sup>52</sup> That is, if our starting point is a CCyB = 0%, the probability of building it back all the way up to 2.5% of RWAs will be lower, all else equal, than the probability to building it back up to just 0.5% of RWAs.

<sup>53</sup> Which focuses on bank buffers but that, as just discussed, can be applied to all layers of a bank's CET1 stack.

so macroprudential authorities can engineer market expectations around the expected buffer rebuild quantum and timing, ensuring the “value shortfall” generated by the buffer drawn-down is small enough to make buffer usability economical for the bank and its shareholders.

#### IV. POLICY PROPOSALS

A first conclusion from our analysis is that there is no single silver bullet that can guarantee banks’ voluntary use of their capital buffers. This is because buffer usability mechanically opens up a capital shortfall (from a valuation standpoint) at the bank—with its size being equal to the bank’s CET1 target minus its actual ratio post usability—which negatively impacts its share price. This is due to the expectation that the bank will have to rebuild the buffers after their usage.<sup>54</sup> And, unless the bank has a significantly above par risk-adjusted return, we have showed that the value associated with the earnings made from the incremental loan book will fail to fully offset such negative impact for most banks, generating a “value shortfall.”

Based on this insight and our buffer usability framework, we propose two policies that would optimize banks’ potential for buffer usability, if this was an objective policymakers considered worth considering: an enhanced CCyB framework and a public guarantee scheme. Their combined implementation has the potential, all else equal, to increase overall usability to >70 percent in our baseline specification (draw-down of 2.5 percent of RWAs) and >98 percent under a more modest draw-down of 1 percent of RWAs (Table 6). Also, while the resulting macroeconomic impact would be lower with a more modest draw-down (loan growth of c.8 percent vs c.16 percent in each scenario, respectively), a more broad-based usability across the sector would also minimize potential stigma effects that may not be fully captured by our framework.

##### **Enhanced Countercyclical Capital Buffer, ECCyB**

Buffer usability would make (no) economic sense whenever a bank’s expected fair value, after buffer usage, is above (below) the fair value that will plausibly be required by the bank’s shareholders. For banks that fail to clear this hurdle, the “value shortfall” opened up by the use of buffers would also be equal to the effective reduction in CET1 requirements that would make shareholders indifferent between using and not using the buffers from a shareholder value creation standpoint.

##### *(1) Incorporating expectations into the calibration of buffers*

First of all, we propose a modification to the CCyB, the *Enhanced CCyB* (ECCyB) *framework*, which would be calibrated with two key inputs: the value shortfall and the proportion of the buffer reconstruction that will be anticipated (and hence priced in) by the

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<sup>54</sup> Absent this expectation, which originates of the bank’s obligation to eventually meet either its capital requirements or self-imposed medium-run capital targets, there would be no capital shortfall. In the case banks were not expected to rebuild their buffers, this would imply a permanent reduction in capital requirements or targets.

market. Keeping the value shortfall constant, the ECCyB will be exclusively determined by market expectations around the proportion of the capital buffer to be rebuilt over a given period. Our proposal intends to guide market expectations on the proportion of capital to be rebuilt, with a view to having a positive impact on a bank fair value similar to that of a permanent relaxation of capital requirements.

**Table 6. Capital Buffer Usability: Success Rates, Overall and Per Hurdle, Across Different Scenarios and Policy Options**

Capital Buffer Usability Rate(s) and Select Policy Impacts, Overall and Per Hurdle	Capacity Hurdle	Supervisory Hurdle	Management Hurdle	Capital Buffer Usability	Pro-forma Impacts (System-wide) in t = 0			
	Capital Buffer Availability <sup>1</sup>	Years to Rebuild Buffers <sup>2</sup>	Bank's Expected Equity FV <sup>4</sup>	Success Rate <sup>5</sup>	Δ Loans (%)	Δ RoCET1 (pp.)	Δ CET1 Leverage Ratio (pp.)	Δ CET1 Ratio (pp.)
Baseline under medium buffer use (2.5% RWAs) <sup>6</sup>	53.6	64.6	20.7	3.3	0.6%	0.2%	0.0%	-0.1%
With a higher (2x) CET1 leverage ratio requirement	53.6	61.5	4.4	1.8	0.3%	0.1%	0.0%	0.0%
Baseline @ CCyB = buffer use <sup>7</sup>	100.0	64.6	20.7	19.3	4.0%	1.2%	-0.2%	-0.5%
With policy (ECCyB) <sup>8</sup>	100.0	64.6	46.0	36.8	8.3%	2.2%	-0.5%	-0.9%
With policy (Govt. Guarantees) <sup>9</sup>	71.2	98.7	68.8	58.6	12.1%	1.8%	-0.2%	-0.4%
With policy (ECCyB + Govt. Guarantees)	100.0	98.7	79.3	73.3	16.0%	2.7%	-0.4%	-0.7%
Baseline under low buffer use (1% RWAs) <sup>6</sup>	70.0	95.4	20.7	5.9	0.5%	0.1%	0.0%	-0.1%
With a higher (2x) CET1 leverage ratio requirement	70.0	80.2	20.1	5.4	0.4%	0.1%	0.0%	-0.1%
Baseline @ CCyB = buffer use <sup>7</sup>	100.0	95.4	20.7	20.7	1.7%	0.5%	-0.1%	-0.2%
With policy (ECCyB) <sup>8</sup>	100.0	95.4	46.0	46.0	4.2%	0.9%	-0.3%	-0.5%
With policy (Govt. Guarantees) <sup>9</sup>	75.3	98.7	100.0	73.6	6.2%	0.9%	-0.2%	-0.3%
With policy (ECCyB + Govt. Guarantees)	100.0	98.7	100.0	98.3	8.5%	1.4%	-0.5%	-1.0%

Sources: Bloomberg Financial L.P.; and authors' estimates.

<sup>1</sup> Hurdle cleared if the management buffer (i.e., any CET1 in excess of the bank's MDA) is at or above 1 times the amount of buffers drawn-down.

<sup>2</sup> Hurdle cleared at less than or equal to 3 years.

<sup>3</sup> Hurdle cleared at less than or equal to 3 times the regional (i.e., continent-wide) pre-COVID 19 NPL ratio.

<sup>4</sup> Hurdle cleared if expected bank equity fair value is greater than or equal to the shareholders' required equity fair value in Year 3.

<sup>5</sup> Percentage of banks (weighted by their market capitalization) clearing our three hurdles at a time.

<sup>6</sup> Baseline scenario assumes CCyB cannot (and is not expected to) be deactivated (e.g., because it was not activated in the first place).

<sup>7</sup> Baseline scenario, assuming the amount of buffers used equal a bank's CCyB which can (and is expected to) be deactivated.

<sup>8</sup> Our ECCyB assumes market anticipates 50 percent of the capital buffer rebuild.

<sup>9</sup> For the impact of the guarantee scheme, we have calculated the optimal RWA relief required to offset the value shortfall generated by the buffer draw-down in Year 3, with a limit at 100 percent of incremental RWAs.

Note: Conditional formatting is homogeneous across the three hurdles, then for each of the four impact variables separately.

In other words, the positive impact of lower expected capital requirements would offset the value shortfall (generated by the buffer use) and therefore would help the bank clear hurdle #3. Ideally, the regulatory guidance on the proportion of the buffer to be rebuilt (say 50 percent) would credibly determine the market expectations so that the supervisory guidance and markets expectations coincide.

It is important to emphasize that this policy proposal incorporates market expectations in two ways. First, by guiding markets on the proportion of the capital buffer to be rebuilt, and second, by using the *value shortfall* as a key input in the ECCyB framework (recall that the value shortfall is itself a function of the consensus expectations on a bank's key financial ratios, as described earlier). This new framework would entail two further changes to the current regulatory framework.

### (2) A change in the composition of the CBR

According to our framework, the optimal size of a bank's CCyB (i.e., our ECCyB) changes across banks and countries, as well as over time. Therefore, in order to ensure we maximize its usability, we propose to increase the size of the CCyB, beyond the current 0-2.5 percent to potentially account for the full CBR. The CBR's specific calibration, however, would require a separate analysis, exceeding the scope of this paper<sup>55</sup>. This measure would have to potential to effectively reduce the MDA threshold (in a meaningful way), reducing usability constraints (associated with hurdle #1) as a result. Importantly, changes in the CCyB due to its frequent, market-driven (re)calibration should not lead to an increase in the overall CBR. In other words, changes in the ECCyB would not translate into changes in the CBR itself but just to its composition.

### (3) Introducing “forward guidance” into macroprudential policy announcements

Another implication from our analysis is that it is key to ensure that the communication strategy around the “release of buffers” does not make the announcement self-defeating. For this, the appropriate regulation should be amended<sup>56</sup> to make sure buffers are rebuilt at 50 percent of the initial use over a period that is long enough for the market not to be concerned; we suggest to set it at 3 years.<sup>57</sup>

The choice of three years is based on the period over which market expectations are generally available in consensus-data platforms (such as Bloomberg) for bank capital and other relevant financial variables. The choice of 50 percent determines the number of banks that will clear hurdle 3: banks with a value shortfall below 50 percent of the buffer initially

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<sup>55</sup> It is however clear to us that the calibration of the CBR and the ECCyB are fundamentally different and should be performed independently from each other.

<sup>56</sup> The credibility of the supervisor's commitment is essential. Earlier in the paper, we have outlined recent cases in which domestic supervisors adopted decisions that could be perceived as contradictory by the market, whereby they cut the CCyB in March 2020 but then increased the SyRB in December 2020—as a result, local banks expected the full 2.5 percent CCyB to be rebuilt by 2021. In other cases, supervisory authorities set relatively close deadlines for the reconstruction of the buffers, making buffer usability impossible in practice.

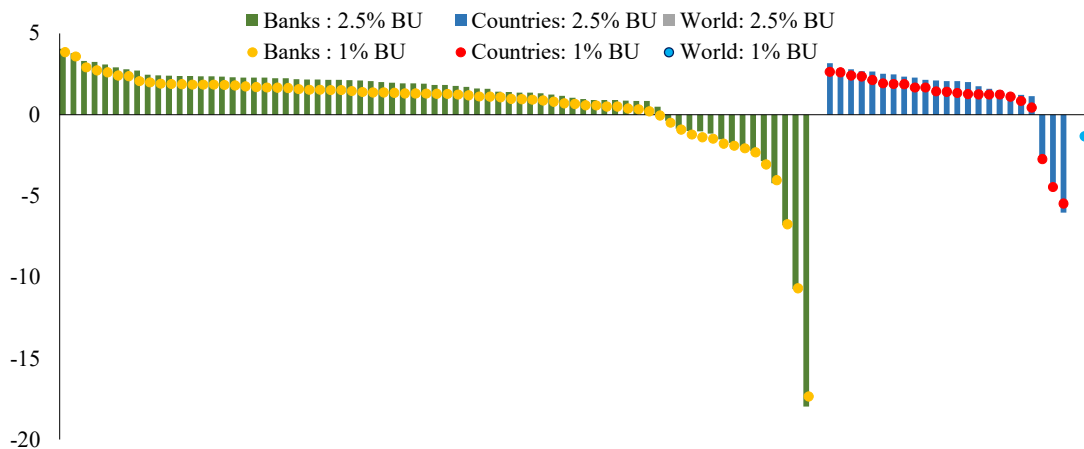
<sup>57</sup> The required communication strategy would be similar to the ECB (2020e)'s, according to which Eurozone banks will be allowed “to operate below the P2G and the combined buffer requirement until at least end-2022 [...] without automatically triggering supervisory actions.” And in any case, “[i]t will not require banks to start replenishing their capital buffers before the peak in capital depletion is reached. The exact timeline will be decided following the 2021 EU-wide stress test, and, as in every supervisory cycle, on a case-by-case basis according to the individual situation of each bank.”

used would clear it. Evidently, the regulator could choose a different value for this parameter depending on the degree of buffer usability the supervisor may want to achieve.

Conceptually, the authorities could even choose this parameter to be bank-specific, by calibrating it to each bank's value shortfall with a view to maximise the number of institutions that would clear hurdle #3 (e.g., a bank with a value shortfall of 40 percent of the buffer used would be asked to rebuild 60 percent of the buffer used). In Figure 13, we show the value shortfall for each of the 71 banks in our sample, as well as for the country averages (market-capitalization-weighted).

We note other proposals also aimed at increasing buffer usability have been made recently. Most notably, Campa (2020) has proposed a recalibration of the buffer structure, with a larger weight of the CCyB (*"buffers that can be switched off by the authorities"*) alongside a *"faster and larger"* rebuilding process during good times. While our analysis would agree with a larger weight of the CCyB in the CBR, a *"faster and larger"* rebuilding process would certainly be self-defeating, as per our analysis. It is precisely the expectation *that banks will have to fully rebuild* their buffers what drives a (potentially large) capital

**Figure 14. Value Shortfall  
(As Percent of RWA)**



Sources: Bloomberg Financial L.P.; and authors' estimates.

Note: The value shortfall in both cases (2.5 percent and 1.0 percent) is shown as percent of RWAs, therefore in the case of less buffer usage (i.e., 1 percent), the RWAs are also lower.

shortfall in their valuation which we find to be, in itself, the biggest deterrence for voluntary buffer usability by banks. Ultimately, even if we assumed prudential authorities were able to properly calibrate the CCyB based on the systemic risk (expected to be) generated over the cycle (see e.g., Adrian et al, 2020), its usability would be impaired if the market discounted the buffer rebuild, and expected this to happen over a relatively close timeframe.



Douglas (2020) has also proposed to reduce the CCoB by 1pp. to 1.5%, while increasing the CCyB by the same amount (1pp.) to 3.5% of RWAs, therefore leaving the overall CBR (assuming this is just made up of these two buffers) unchanged. Importantly, the author argues in favor of targeting a positive CCyB of 1% in normal times, “rather than having a base of zero”, as it happened to a number of countries going into the COVID pandemic. This would presumably allow bank authorities to always be in a position to cut the CCyB down to zero at times of stress, and to keep it there “for a considerable time before being raised to this new base”. In our view and in the context of our framework, Douglas’s (2020) proposal is superior to Campa’s (2020) as it drops the need for a “faster” buffer rebuilding process which, as we have argued, would be self-defeating by preventing banks from using their buffers in the first place. However, our proposal still differs from Douglas’s (2020) on two key levels: First, the author’s proposal entails a one-fits-all strategy, which may work for some banks, but will not work many others – as we have discussed in the context of our “value shortfall” concept; and second, the author ultimately proposes to fully rebuild the buffer used – as with Campa’s (2020) proposal, this also runs the risk to mechanically disincentive the use of buffers (as investors will assign a 100% probability to the CCyB being rebuilt back to at least the 1% level, which it is supposed to be its starting point in “normal times”) in the absence of a credible ex ante commitment by prudential authorities to not to request its full rebuild over a reasonable timeframe.

### A Public Guarantee Scheme

The “value shortfall” could also be used to calculate the optimal size of RWAs relief required by each bank for the economics of buffer usability to work. This could be implemented through a *public guarantee scheme*<sup>58</sup> on the incremental loan book. The key difference with the public guarantee schemes launched after March 2020 is that these were in many cases unlimited, while our proposal would be both limited and targeted, as they can be (re)calibrated according to each bank’s specific (and evolving) needs.

Implications of the associated RWA relief would be threefold. First, the magnitude of the CET1 draw-down required to reach the same economic impact (in terms of incremental lending) would be reduced, improving a bank’s capacity to use its buffers (hurdle #1); second, by reducing the required capital draw-down, the time for a bank to organically rebuild its buffers would also be shortened, increasing the odds to clear our hurdle #2 as well; and third, given the RWA relief would be calibrated to fully offset the “value shortfall” opened up in the case of buffer usability, a bank’s likelihood to clear our hurdle #3 would also be significantly improved.

Figure 14 shows the required size of public guarantees per bank, as well as (market cap-weighted) averages per country and globally. On average, a guarantee of over 40 percent of the incremental RWAs would be required for the economics of buffer usability to work. Individual banks with a larger “value shortfall” would require a higher proportion of

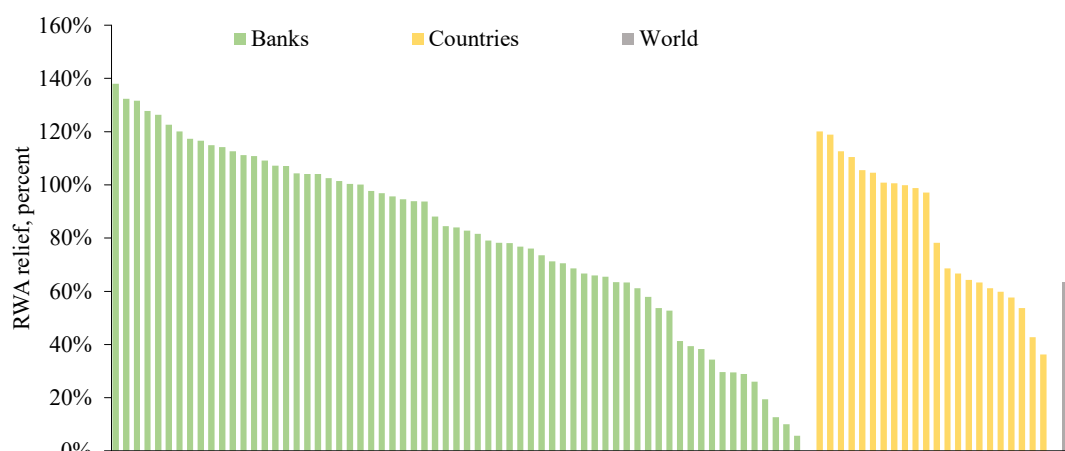
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<sup>58</sup> The guarantee scheme could be backed by national Governments, State-owned or State-backed national development banks, or a regional risk-pooling mechanism under the umbrella of supranational entity, such as the ESM or the EIB Group in Europe.

guarantees relative to their incremental RWAs. Prudential authorities could set the guarantee at a level between 0 and 100 percent with the objective of achieving a certain loan growth target. Evidently the guarantee scheme would only be needed for those banks for which the economics of buffer usability did not work either on their own or with the implementation of our ECCyB on a stand-alone basis. In this sense, we view the use of government guarantees as residual in nature.

A word of caution is in order, however. We have shown how the use of limited and targeted public-guarantees would enhance buffer usability. That said, a guarantee scheme may be generally justifiable only in extreme circumstances, such as a pandemic; otherwise, if banks were to expect public guarantees following every cyclical downturn, they could generate excessive bank risk taking and possibly lead to misallocation of credit. Therefore, the design of any public guarantee scheme should be mindful of the trade-off between enhancing buffer usability and introducing additional moral hazard into the system.

**Figure 15. RWA Relief**  
(As a percentage of incremental RWA)



Sources: Bloomberg Financial L.P.; and authors' calculations.

### Combining the ECCyB and Public Guarantees

These two proposals, combined, would go a long way to increase the likelihood of buffer usability, from >22 percent to almost 70 percent. This is mostly driven by a significant

increase in the success rate at hurdle #3, which it would now reach 100 percent,<sup>59</sup> but also due to some improvement in the success rate of hurdle #1, from 70 percent to 75 percent. By increasing the pool of banks that could potentially use their buffers, the expansionary impact of buffer usability would also increase, with expected loan growth at almost 6 percent and bank profitability up by almost 100 bp, on average across our sample.

### **When Less Is More**

Our analysis also yields an important insight on the relationship between usability and the optimal buffer size. In particular, our results suggest that a lower degree of buffer usability per bank may actually increase buffer usability at the aggregate system level (as a large number of institutions manage to clear all 3 hurdles at smaller CET1 draw-downs), provided the appropriate measures are adopted (along the lines of our previous two proposals).

In our view, there are two factors that make using a large portion of a bank's CBR problematic under the current regulatory framework. On the one hand, the higher the buffer draw-down, the higher the ECCyB with market pricing 50 percent of buffer rebuild; in this context, small changes in market expectations could make calibration unmanageable (with the ECCyB > CBR). On the other, leverage ratio requirements, while not a constraint at low usability levels per bank, they may become a constrain at higher levels of buffer usability. Overall, our analysis and results support the case for a moderate degree of buffer usability relative to a bank's CBR and overall CET1 position.

### **Other Complementary Policies to Be Considered**

We also propose two additional policies that would improve banks' capacity to clear hurdle #1, the capacity hurdle. As we have discussed earlier in the note, banks' capacity to use their existing buffers seems to be constrained by select thresholds that may trigger losses on (and dilute) bank investors. Firstly, the MDA threshold may limit a bank's willingness to reduce its CET1 ratio; in fact, capital-efficient banks that operate with CET1 ratios very close or at their own requirements may have no capacity to use buffers, regardless of their return profile. Secondly, an additional threshold would be the AT1 trigger point, which is generally set at either 5.125 percent or 7 percent of RWAs (depending on the jurisdiction).

Prudential decisions aimed at temporary relaxing capital requirements, such as the CCyB's deactivation, may also carry the unintended consequence of reducing a bank's capacity to voluntarily use its buffers by narrowing the portion of the CBR that is actually usable, given the AT1 trigger stays unchanged. This situation is further aggravated when the AT1 trigger already sits within the CBR itself, which is quite common given the 5.125–7 percent trigger range is already well above banks' absolute minimum (Pillar 1) requirements (see Figure 6 as well as Annex Figure 1).

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<sup>59</sup> The interpretation is that with these two proposals in place, all banks would have the economic incentive to use the buffers, assuming they had capacity (hurdle #1) as well as ability to rebuild them organically in a relative short timeframe (hurdle #2).

Second, complementing our previous proposals, we also suggest setting all AT1 triggers at 5.125 percent globally, in line with the Basel-3 minimum. This would help further address capacity constraints by widening the portion of the CBR could be potentially used. As discussed earlier, this proposal would not only affect the non-negligible portion of AT1s with triggers at 7 percent (mostly GBP denominated) but it would also improve the stability of the broader asset class by mechanically reducing the likelihood of equity conversions anywhere.

## V. CONCLUSIONS

There is a broad consensus on the merits of the large capital buffers built over the past decade to help banks absorb losses at times of stress, such as the COVID-19 pandemic. There is however far less consensus regarding the ability and willingness of banks to use their capital buffers to lend to firms and households for the recovery.

This paper proposes a market-based, forward-looking framework to analyze the usability of bank capital buffers. An important contribution of our framework is the key role that market expectations play in a bank's decision on whether to use its capital buffers. Bank management may only decide to temporarily reduce their capital buffers if they see this decision as eventually being value-accretive for the bank and its shareholders. At the core of a buffer usability decision is a bank's capital planning strategy. A bank's CET1 target is a function of its expectation around CET1 requirements. Hence, if a bank expects its requirements to increase (fall), its CET1 target will generally increase (fall) as well.

When we calibrate this framework to 71 banks across 23 countries, representing around 60 percent of the banking sector's global market capitalization, we find that the cases in which banks would be willing to use their buffers are indeed rare: less than 5 percent of our sample. Among the main factors driving (voluntary) buffer usability, bank profitability emerges, not surprisingly, as the single most important one. A bank's return profile not only determines a bank's potential to build buffers organically in a timely manner (our second hurdle), but it also determines a bank's potential to generate a sufficiently high return-on-investment from the buffers used within a reasonable timeframe (our third hurdle). While there is no silver bullet which guarantees that banks will use their available buffers, we propose some specific policies that would tend to make usability less punitive and therefore more likely.

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## ANNEX. BANK CAPITAL STRUCTURE AND IMPLICATIONS FOR BUFFER USABILITY: A PRIMER

### A. The Structure of Bank Capital under Basel III

In the aftermath of the global financial crisis, bank regulators agreed on an upgraded set of banking regulations (Basel III) to improve the resilience of the global financial system. A key aspect of these new regulations are the new capital requirements, which have two key components: a minimum threshold and several buffers above this minimum. Under Basel III, banks are subject to a minimum capital requirement of 8 percent of risk-weighted assets (RWA), which is the so-called Pillar 1. Out of this, the minimum Common Equity Tier 1 (CET1) ratio must represent at least 4.5 percent of RWA, while the remainder can be met with instruments that have a lower loss-absorption capacity: Additional Tier 1 Capital (AT1) and Tier 2 capital (T2) bonds accounting for (at least) 1.5 percent and (up to) 2 percent of RWA, respectively.<sup>60</sup>

Supervisors can also set additional capital requirements under the supervisory review process (Pillar 2) reflecting other risks that were not captured by Pillar 1 and/or risks that are firm-specific, including those related to the bank's business model, interest rate risk in the banking book and concentration risk, among others (BCBS, 2019). Pillar 2 requirements generally need to be met with capital of the same quality as Pillar 1.

On top of Pillars 1 and 2, banks are also required to hold *capital buffers* with the primary objective of keeping banks functioning in spite of shocks, thus strengthening the resilience of the banking system. Capital buffers are of three types. First, the capital conservation buffer (CCoB) applies to all banks, represents 2.5 percent of RWA, and cannot be deactivated by the prudential authority. Importantly, the CCoB can also satisfy Pillar 2 capital expectations. Second, the Systemic Risk Buffer (SyRB) applies to those banks that are designated by the Basel Committee on Banking Supervision (BCBS) as global systemically important banks (G-SIB) or by national authorities as domestic systemically important banks (D-SIBs). While the former cannot be deactivated, domestic regulation may allow the deactivation of the latter by national authorities. Third, the countercyclical capital buffer (CCyB) generates loss-absorbing resources worth 0–2.5 percent of RWA in response to the accumulation of systemic risk during credit booms, it is determined by national authorities and can be deactivated. Further, these three buffers could be complemented by any other jurisdiction-specific extensions and/or even additional supervisory buffers. In light of these features, capital buffers are usually split into those that are cyclical (essentially the CCyB) and those that are more structural in nature (CCoB and SRB).

The aggregation of all required capital buffers is generally known as the Combined Buffer Requirement (CBR), with its upper bound defining the threshold for the so-called Maximum

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<sup>60</sup> CET1 capital could be used to meet the AT1 and T2 buckets, and AT1s could also be used to fill the T2 bucket.

Distributable Amount (MDA). The MDA is of utmost importance for both bank equity and sub-debt investors and is also relevant for buffer usability, as it defines a capital threshold which, if breached, can trigger distribution restrictions (next section discusses this in greater detail).<sup>61</sup>

While capital buffers have not been designed for a proactive macroeconomic management, they ultimately aim at fulfilling a dual role (BCBS, 2020a). First and foremost, it allows banks to absorb credit losses at times of stress. Secondary to the previous goal, banks can also use these buffers to support lending and the economic recovery.<sup>62</sup> Unlike Pillars 1 and 2, prudential authorities can reduce the CBR in two ways. First, by either partly or fully deactivating the CCyB. And second, by allowing banks to (temporarily) operate with a CET1 ratio (below their MDA) within the CBR against a temporary supervisory commitment to not force banks to rebuild their buffers too quickly. In addition, supervisors can announce blanket distribution restrictions for cash dividends and share buybacks (as it happened in March 2020 across many jurisdictions as a response to the COVID-19 shock), which reduces the opportunity cost of breaching a bank's MDA.

Importantly, a bank may voluntarily decide to hold a capital ratio above its regulatory requirement. The gap between the two is known as the *management buffer*. Assuming a bank's capital ratio is at its medium-run target, such a voluntary buffer should reflect the bank's risk profile as perceived by the bank's management team, capturing all expected operational, regulatory, legal and other impacts over the short-to-medium run. Management buffers also serve to protect the bank from breaching its regulatory requirements in the case of a temporary shock. Any capital accumulated in excess of its own target should be interpreted as being available for its distribution to shareholders in the form of either higher (or extraordinary) cash dividends or share buybacks. A bank's CET1 position relative to its own target (or whatever its target the market thinks it should be) has important implications for the bank's valuation, as we discuss in Sections III and IV of the paper.

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<sup>61</sup> In the US, however, capital requirements for large banks (>\$100 billion in total assets) have a simpler structure: They are split into minimum CET1 requirements of 4.5 percent (equal to Basel III's Pillar 1); a Stress Capital Buffer (SCB) which is determined by the stress test results and is at least 2.5 percent; and, if applicable, a G-SIB buffer of at least 1 percent. See Federal Reserve (2020c) for the 2020 list of large individual bank capital requirements in the US.

<sup>62</sup> The literature on the impact from capital requirement reductions is limited, likely due to this being a rarer case in practice. For example, Arbatli-Saxegaard and Juelsrud (2020) use Norwegian bank data in the context of a capital requirement reduction that took place during the transition to Basel II and find that capital requirement reductions increase lending, and that the increased lending to firms translates into higher capital investment at the firm-level. Similar evidence is found by Imbierowicz et al (2018) and Brun et al (2013).

**Annex Table 1. Regulations on Prudential Buffers**

Type of Buffer	Applied	Governed	Distribution Restrictions Trigger:	Scope for Deactivation:
CCoB	Globally	Globally	Automatically	None
SIB	Globally for SIB; Country level for Domestic SIB	Globally for SIB; At country level for Domestic SIB	Automatically	None for global SIB; Per domestic regulation for Domestic SIB
CCyB	Globally	At country level	Automatically	Yes
Supervisory	Country level	At country level	Per domestic regulations	Per domestic regulations

Sources: Drehmann et al. (2020).

However, the fact that there is a gap between capital requirements and a bank's own capital target (management buffer) may also suggest that either the supervisor has not properly calibrated a bank's requirements according to its effective risk profile, or that any potential distribution restrictions—if the MDA threshold is breached—are so punitive that the bank feels safer by operating at a distance from it; this is the so-called *distance-to-MDA*.<sup>63</sup>

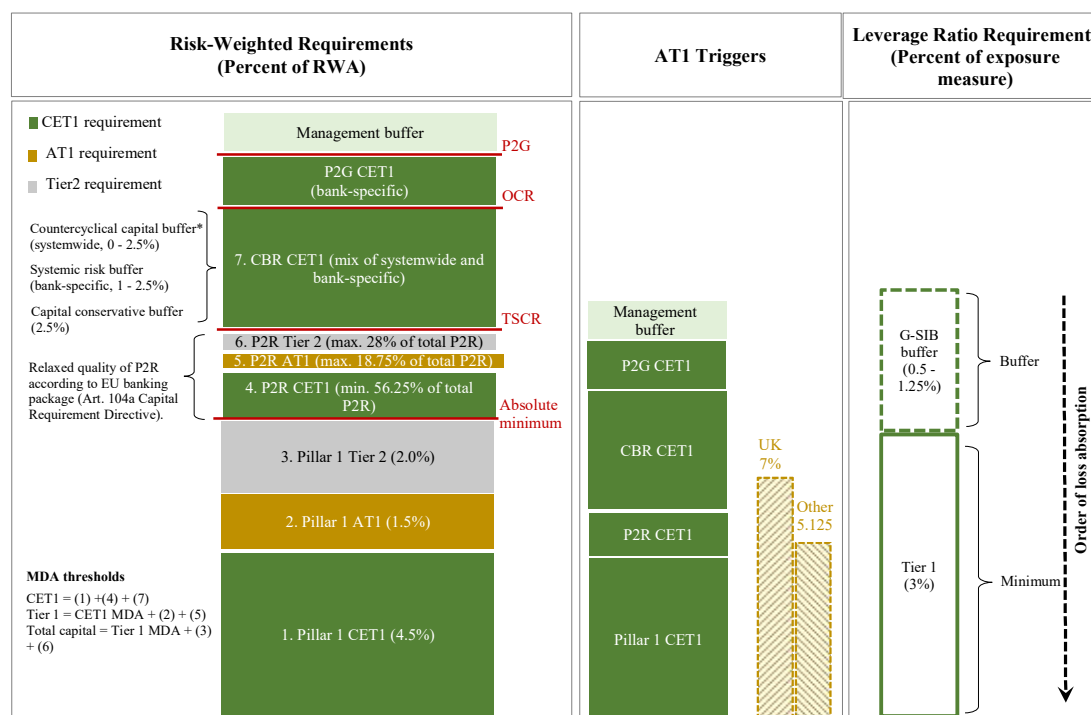
Importantly, banks are also required to meet a minimum Tier 1 (T1) leverage ratio of at least 3 percent of assets.<sup>64</sup> While the numerator includes the bank's CET1 and AT1 capital, the denominator may exceed a bank's overall asset exposures as it generally includes derivatives and certain off-balance sheet exposures as well.

Finally, banks are also expected to meet additional requirements with bail-in-able instruments, notably Total Loss-absorbing Capacity (TLAC) requirements for G-SIBs and the Minimum Requirements for Own Funds and Eligible Liabilities (MREL) for European banks under the Single Resolution Board (SRB) that are subject to Europe's Bank Recovery and Resolution Directive (BRRD).

<sup>63</sup> In the US, however, authorities have dealt with this issue by linking the calibration of capital requirements to the stress test results. The consequence is that US banks tend to be more capital-efficient and operate with thinner management buffers, relative to banks operating in other jurisdictions.

<sup>64</sup> Basel III's leverage ratio is defined as the "capital measure" (the numerator) divided by the "exposure measure" (the denominator) and is expressed as a percentage. For details, see BCBS (2014).

**Annex Figure 1. Basel III Regulations on Bank Capital Requirements, Triggers and Leverage Ratios**



Sources: Bank for International Settlements; European Central Bank; S&P Global Ratings; and authors' calculations.

Note: Banks may need lower quality capital requirements with eligible higher quality capital components (i.e., Tier 2 with CET1 or AT1, AT1 with CET1). TSCR is total SREP capital requirement (P1R + P2R). OCR is overall capital requirement (TSCR + CBR). MDA is maximum distributable amount, ADI is available distributable items, RWA is risk-weighted assets, AT1 is additional tier 1, P2R is pillar 2 requirement, CET1 is common equity tier 1, CBR is combined buffer requirement, and P2G is pillar 2 guidance. \*CCyB includes sector-specific add-ons imposed under macroprudential interventions.

## B. Breaching Capital Requirements: Implications for Banks and Investors

An important disincentive to the use of capital buffers are the sanctions a bank may be exposed to if capital buffers fall below certain thresholds. In the extreme, if a bank's CET1 capital ratio falls below its regulatory minimum, a bank could be subject to resolution.

The total minimum capital (Pillar 1) requirement is considered to roughly coincide with the bank's point of non-viability (PONV), or the trigger of its resolution process. The Basel framework refers to the PONV as the point at which a bank may no longer be considered viable as a going concern and non-CET1 capital instruments can be converted into equity or directly written down. The consequences of breaching a Pillar 2 requirement are—intentionally—not detailed in the Basel framework, and they vary across jurisdictions. In general, if the supervisor is not satisfied with the outcome of the supervisory review, it can take certain actions, including but not limited to requiring the bank to improve its risk

management processes, lower the risks which it assumes, maintain additional capital or even restrict the payment of dividends.<sup>65</sup>

Banks in breach of the CBR are allowed to continue operating as a going concern. In return, however, banks are expected to both rebuild buffers over an appropriate time frame and limit capital distributions until those buffers are replenished. Restrictions on capital distributions differ across jurisdictions but generally involve cuts to (1) dividend payments and share buybacks, (2) management remuneration, and (3) AT1 coupons. The Basel framework does not provide guidance on how such potential cuts would be allocated across these three components. However, our understanding is that it is not symmetrical: the AT1 coupons being cut only after both cash dividends and share buybacks were at zero and management variable remuneration was meaningfully reduced as a result (given the relative seniority of AT1 bonds over equity within the bank's capital structure).<sup>66</sup>

Importantly, under Basel III, distribution constraints do not require any supervisory action when a bank dips into its buffers. These constraints automatically cap what is available for distribution to a maximum amount, which Basel III has termed as “minimum capital conservation standards” but that it is generally known as the MDA. The MDA rate is 100 percent when a bank meets its total capital requirements, whereas a bank that has fully used its buffers is subject to an MDA rate of 0 percent (i.e., no distributions are allowed). In between these two extremes, the MDA rate has three categories (see Annex Table 2). The largest impact takes place in the very first moment MDA is breached, as the MDA rate mechanically falls from 100 percent to 60 percent, implying an automatic reduction of 40 percent in day one.

At the end of the day, the Basel framework only provides a set of minimum standards, meaning that national authorities have a significant amount of leeway in the way they implement them locally. This has led to the emergence of significant cross-country differences in both the definition and the implementation of distribution constraints (see Svoronos and Vrbaski, 2020). This also explains why, following the COVID-19 shock, some jurisdictions have made further changes to their MDA definitions as a way to reduce the impact of any potential distribution restrictions, therefore aiming at making buffer usability more attractive going forward.<sup>67</sup>

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<sup>65</sup> If a bank breaches the non-binding part of Pillar 2 requirements, there should be no automatic restrictions imposed on distributions. Responses to breaches of non-binding capital expectations are more case-specific and less likely to be disclosed. Generally, supervisors would require capital restoration timelines and supervision activities would become more intensive.

<sup>66</sup> This may not be necessarily the case in practice, however. While AT1s from issuers in certain jurisdictions (e.g., Switzerland) generally carry dividend stoppers (i.e., banks cannot skip AT1 coupons for as long as they are paying dividends), EU bank-issued AT1s just carry the management's “intention” – but not the obligation – to respect AT1s' relative seniority over equity. As an example of the latter, Bankia's 6 percent AT1 prospectus (July 11, 2017) mentions that while “it is the bank's current intention that [...] it will take into account the relative ranking of these instruments in its capital structure. [...] the bank may depart from this policy at its sole discretion.”

<sup>67</sup> For details of the US and UK cases, see Federal Reserve (2020c) and Fitch Ratings (2020), respectively.



**Annex Table 2. Capital Buffer Requirements (CBR) Related  
Distribution Restrictions under Basel III**

<b>Proportion of CBR Met</b>	<b>MDA Rate</b>
More than 100%	100%
75% - 100%	60%
50% - 75%	40%
25% - 50%	20%
0% - 25%	0%

Source: Fitch Ratings.