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Abstract

This paper analyses the ability of banks to use voluntary and regulatory capital buffers, taking advantage of the experience of the COVID-19 pandemic. In the first place, we find that the usability of macroprudential buffers is not hampered in Spain by other parallel banks' requirements. Additionally, we find that the existing voluntary buffers over capital requirements at the beginning of the pandemic have had significant effects on the financial markets, affecting the evolution of European bank stock prices, as well as the holdings of bank shares by investment funds. Lastly, we find no significant aggregate effect of voluntary capital buffers on the provision of financing to non-financial companies in Spain. However, we do identify negative effects in the supply of credit from banks with lower voluntary buffers to companies with which they had more recent relationships. Likewise, if the analysis is carried out exclusively on credit operations without public guarantees, we observe that those banks with lower voluntary capital buffers reduced credit more.

Keywords: capital usability, voluntary capital buffers, bank stock prices, provision of credit.

JEL classification: G20, G21, G28.

Resumen

Este trabajo analiza la capacidad de uso de los colchones de capital voluntarios y regulatorios por parte de las entidades bancarias, aprovechando la experiencia de la pandemia de COVID-19. En primer lugar, se encuentra que la usabilidad de los colchones macroprudenciales está muy poco limitada en España por otros requerimientos sobre las entidades. Adicionalmente, se encuentra que los colchones existentes sobre los requerimientos de capital al comienzo de la pandemia han tenido efectos significativos en los mercados financieros, lo que ha afectado a la evolución de las cotizaciones bancarias europeas, así como a las tenencias de acciones bancarias por parte de los fondos de inversión. Por último, no se observa un efecto agregado significativo del nivel disponible de colchones de capital sobre los requerimientos de capital en la provisión de financiación a las empresas no financieras en España. Sin embargo, sí se identifican efectos negativos en la oferta de crédito de los bancos con menores colchones voluntarios a las empresas con las que tenían relaciones más recientes. Asimismo, cuando el análisis se realiza exclusivamente sobre las operaciones crediticias sin garantía pública, sí se observa que las entidades con menor margen de capital por encima de los requerimientos redujeron más el crédito.

Palabras clave: usabilidad del capital, margen de capital voluntario, cotizaciones bancarias, provisión de crédito.

Códigos JEL: G20, G21, G28.

Contents

1 Introduction

In the wake of the last global financial crisis, the Basel Committee on Banking Supervision undertook an ambitious overhaul of the prudential regulatory framework for banks, known as Basel III. A significant aspect of this reform was the introduction of capital buffer requirements, which are set in addition to Pillar 1 and Pillar 2 microprudential requirements. There are multiple buffers that have different objectives (European Systemic Risk Board, 2018), but one thing that they all have in common is that non-compliance entails neither administrative sanctions nor supervisory intervention. Instead, restrictions are placed on profit distribution via dividend and bonus payouts and share buybacks.

Capital buffer requirements were, therefore, designed as a loss-absorbing component in addition to the voluntary capital buffers that institutions have always held to reduce the risk of non-compliance with strict capital requirements. From a macroprudential point of view, the availability of these regulatory buffers should help to stabilise the provision of credit to the real economy over financial cycles. Thus, Basel III introduced the counter-cyclical capital buffer (CCyB), designed to be accumulated during economic upswings. It generates an increase in capital requirements that can incentivise institutions to curb situations of systemic vulnerability as a result of excess credit growth. At the same time, during economic downswings, banks' use of existing capital buffers to absorb losses could help to avoid any excessive drops in the provision of credit to the real economy and, in particular, to the most viable projects. Even clearer are the incentives to use the CCyB during downturns, when the authorities would formally authorise its release, meaning that banks would be able to freely use the capital without being placed under any restrictions on profit distributions.

However, the macroprudential effectiveness of capital buffers in situations in which losses materialise requires that two conditions first be met. First, banks will only be able to use capital buffers if doing so does not interfere with other parallel requirements, such as those relating to leverage ratios or resolution requirements. The leverage ratio is a capital requirement unaffected by the loan portfolio's risk, while capital buffers are set in terms of risk-weighted assets (RWAs). The leverage ratio is intended as a non-risk-based backstop, meaning that this requirement should only be relevant in the event of a bank becoming highly leveraged without any uplift in RWAs. It is in this type of situation that capital buffer usability could be limited, although this limitation would be clearly justified by the high insolvency risk posed by the uncontrolled use of capital when over-leveraged.

The resolution requirements are intended to ensure sufficient loss-absorbing and recapitalisation capacity in the event that a bank's viability is threatened. Their scale depends on if, in the event that such problems arise, the bank is expected to be wound up under normal insolvency proceedings or resolved owing to concerns that its insolvency could severely affect financial stability. Resolution requirements depend on both RWAs and the total exposure used for calculating the leverage ratio. They can be met with own funds or other eligible liabilities. Since resolution requirements are numerically higher than requirements for the leverage ratio and minimum requirements in terms of RWAs, they will

constrain capital buffer usability if a bank does not have sufficient eligible liabilities of another kind. Resolution requirements were introduced relatively recently. Institutions have intermediate targets that must have been met in 2022 and the final requirements will come into force in 2024.[1]

Moreover, even when capital buffers do not interfere with any other requirement, they can only be deployed if banks are willing to use them – and assume the reputational damage that failing to make dividend payouts would entail. Again, this situation would be different in the case of the CCyB, since it is a capital buffer that can be released or formally reduced in moments of crisis. This means that, in practice, using it (once released) would not entail limitations on dividend payouts. However, it is essential that institutions do not operate under the impression that the release of the CCyB is temporary and could potentially be reverted at short notice. If this were the case, banks would not treat the CCyB any differently than other unreleased capital buffers. In any case, the CCyB must first be built up if it is to be usable. It is worth noting that CCyB rates in the year prior to the COVID-19 crisis were either very low or zero in most countries because there had been no imbalances in their credit cycles that would have justified activation.

This paper analyses the ability of banks to use voluntary and regulatory capital buffers, drawing on the experience of the COVID-19 pandemic. The pandemic represented the first systemic crisis event since the introduction of regulatory capital buffers, albeit one whose origin lay outside the financial system. Against this background, it is useful to study the extent to which capital levels, and in particular the regulatory and voluntary capital buffers available at the onset of the pandemic, helped banks to better absorb the impact of the crisis.

The authorities acted decisively from the very beginning of the pandemic, taking steps to allow more flexible use of the capital buffers available to credit institutions and thereby ensure the provision of credit to the economy. For example, on 12 March 2020 the European Banking Authority (EBA) released a statement encouraging supervisors and regulators to make use of the flexibility of the European regulatory framework to free up capital and thus mitigate the impact of COVID-19 on the banking sector.[2] Likewise, on the same day the European Central Bank (ECB) announced measures to ensure that credit institutions under its direct supervision would be able to continue providing financing to the real economy.[3] First, they were temporarily allowed to operate with levels below certain capital requirements[4] – a measure that was later buttressed by the relaxation of the CCyB as deemed appropriate by the national macroprudential authorities. Second, the latest revision of the Capital Requirements Directive (CRD V) was brought forward – it had initially been scheduled to come into effect in January 2021 – allowing banks to partially use capital instruments that do not qualify as common equity tier 1 (CET1) capital to meet the Pillar 2 requirement

1 Intermediate targets have applied for global systemically important banks since 2019.

2 See the press release "EBA statement on actions to mitigate the impact of COVID-19 on the EU banking sector".

3 See the press release "ECB announces easing of conditions for targeted longer-term refinancing operations (TLTRO III)".

4 The combined capital buffer, liquidity coverage ratio and Pillar 2 guidance (P2G).

(P2R) (Anguren, Gutiérrez de Rozas, Palomeque and Rodríguez García, 2020).[5] In parallel, the economic authorities launched an ambitious programme of fiscal measures to support the economy.

It is, therefore, extremely difficult to analyse the specific impact of the presence of capital buffers given that they overlap with the support measures that were implemented. However, it is possible to exploit differential effects between banks with larger capital buffers available and those with less capital, as well as between banks that benefited from the CCyB being freed up in some jurisdictions and banks that did not. The next section reviews studies that looked into capital buffer usability and effectiveness using this approach based on the differences between banks. Section 3 delves into the obstacles to the use of capital buffers in the Spanish banking system, as using such buffers may lead to a breach of other prudential or resolution requirements. Sections 4 and 5 then zoom out to look at the banking system in the wider euro area in order to indirectly assess the effectiveness of capital buffers using financial market data. More specifically, Section 4 investigates whether the levels of capital buffers immediately prior to the outbreak of the pandemic affected bank stock prices. A similar analysis is conducted in Section 5, although the focus is on amounts rather than prices, looking at the link between investment funds' trading flows in bank shares. Section 6 examines the impact of capital levels on the provision of credit by the Spanish banking system to the real economy, using data from the Banco de España's Central Credit Register (CCR). Lastly, Section 7 brings together the most useful conclusions from the review.

5 See the press release "ECB Banking Supervision provides temporary capital and operational relief in reaction to coronavirus".

2 Relevant bibliography

Owing to the relatively recent development of macroprudential policy in many countries, the literature has often focused on theoretical models to study its impact and effectiveness. For example, Clerc et al. (2015) created a theoretical model that included the default risk for households, firms and families. This framework allowed them to analyse the CCyB and show that its countercyclical nature helped to smooth the provision of credit to the economy over financial cycles. However, reducing capital requirements during downswings in the cycle is only positive for financial stability as long as capital requirements are sufficiently high – if not, lowering them could increase the risk of bank failures. From an empirical perspective, there is a body of work that uses structural vector autoregressive models to assess the impact of tightening capital requirements on the provision of credit to the economy and economic growth via sign restrictions (Noss and Toffano, 2016).

One of the limitations of these (empirical and theoretical) studies is that they assume ex ante that banks will be willing to make full use of the capital freed up in the event of a downturn. However, there are several obstacles in place that make this assumption problematic in practice: market pressure, uncertainty surrounding the way in which buffers will be accumulated again after their release, and their interaction with other parallel requirements. This is why, alongside the aforementioned literature on ex ante analyses of the impact of macroprudential policy, it is useful to consider studies of the effective ex post impact of the steps that were taken in any given jurisdiction. Of note in this regard is the pioneering work on the effectiveness of dynamic provisions in Spain. In particular, Jiménez, Ongena, Peydró and Saurina (2017) found that dynamic provisions smoothed cyclical variation in credit supply, supporting the provision of credit to the real economy during bad times. However, accumulating these provisions during upswings also led banks to take on more risks to make up for the lost profits caused by higher provisioning.

In addition, some authors have drawn on trailblazing experiences in the development of macroprudential policy in the Asia-Pacific region and have analysed the impact of macroprudential policy on credit to households in an empirical assessment drawing on coordinated supervision data from several jurisdictions (Cantú, Gambacorta and Shim, 2020). They reveal an asymmetry in the impacts of the tightening and easing of macroprudential policy on loans to households (with a greater effect in the case of tightening), although both impacts are significant. Lastly, Galán (2020) drew on the experience acquired over three decades of applying macroprudential tools in various jurisdictions (especially that of the last decade when use of these tools spread around the world) to analyse its impact on economic growth in both normal times and times of crisis using the growth-at-risk approach (Adrian, Boyarchenko and Giannone, 2019).

More recently, in 2020 and 2021, research began to be carried out into the impact of macroprudential decisions taken to address the impact of COVID-19 on financial stability. Casanova, Hardy and Onen (2021) used international panel data to study the impact on the provision of financing of the support measures put in place during the pandemic. They

separated support measures into two types: those intended to maintain a sufficient level of solvency to allow banks to provide credit and those intended to curb loan delinquency and cut their cost. The first type encompasses a wide range of measures intended to bolster banks' capital: restrictions on dividend payouts, reductions in RWA calculations and the easing and release of capital requirements. The second covers guarantees and moratoria introduced by many countries during the pandemic. Although the authors did find evidence that measures in the first group correlate with a significant increase in credit, they were not able to identify how much of the effect was the result of releasing capital buffers or the result of measures that increased the distance between banks' levels of capital and regulatory requirements. In the same vein, a study carried out by the Banco de España found non-causal evidence that countries that were able to totally or partially release their macroprudential buffers in the spring of 2020 appear to have contained the deterioration in growth-at-risk[6] better than countries that did not have the macroprudential headroom to take such steps (Banco de España, 2020). Lastly, Avezum, Oliveira and Serra (2021) analyse the effects of releasing macroprudential buffers during the COVID-19 pandemic using a sample of European countries. Their results suggest that the release policy played an important role in mitigating the procyclicality of credit to households. This study was based on an econometric methodology known as the synthetic control method, developed by Abadie and Gardeazábal (2003), which compares "treated" countries (i.e. those that released macroprudential buffers) with a control group (countries that did not), generating synthetic combinations of countries with properties similar to each treated country.

Lastly, regardless of the effects of releasing macroprudential buffers during a crisis such as that caused by COVID-19, there is mounting evidence attesting to the importance of voluntary capital buffers in the provision of credit to the economy in downturns. Specifically, Berrospide, Gupta and Seay (2021) found that in the United States, banks with lower voluntary buffers tended to restrict their credit supply more during the pandemic. This reduction was more marked for small and medium-sized enterprises (SMEs) that depended on banks for their financing, especially those whose banking relationships with the institutions were more recent. Couaillier, Lo Duca, Reghezza and Rodríguez d'Acri (2022) saw similar results for the euro area as a whole.

6 In this case, growth-at-risk is defined as the 5th percentile of GDP growth over a one-year horizon.

3 Overlap between capital buffers and other requirements

Capital buffers are set on top of the minimum prudential requirements in terms of RWAs. However, as noted previously, there are parallel leverage ratio and resolution requirements. If using capital from buffers means falling out of compliance with a parallel minimum requirement, the buffers will be unusable. This section describes the various parallel requirements that banks must meet and empirically analyses whether parallel requirements limited the usability of Spanish banks' buffers at the time of the crisis precipitated by COVID-19.

3.1 Minimum requirements

The minimum requirements for own funds in terms of RWAs are made up of two parts – one that is the same for all banks (Pillar 1) and another that is bank-specific (Pillar 2). The common component consists of 4.5% of RWAs in CET1, 6% in tier 1 capital, and 8% in total capital (tier 1 + tier 2). To this must be added an additional requirement, which can be set by the regulator (P2R), at least 75% of which must be covered with tier 1 capital. At least 75% of this capital must be CET1.[7] Banks must meet these requirements at all times. The regulator can give guidance for additional own funds (Pillar 2 guidance) on top of this that is specific to each bank, although failing to comply with this guidance does not automatically trigger measures.

The minimum requirements for the leverage ratio consist of 3% of total exposure (which includes total assets and off-balance-sheet exposures)[8] that must be covered with tier 1 capital, plus an additional requirement that can be set by the regulator (P2R), at least 75% of which must be covered with tier 1 capital. At least 75% of this capital must be CET1.[9] The minimum requirements for the leverage ratio have been in force since 28 June 2021. In addition, a leverage ratio buffer for global systemically important banks (G-SIBs) that must be met with tier 1 capital is planned for January 2023.

Resolution requirements (minimum requirement for own funds and eligible liabilities (MREL)) depend on the type of institution. There are three groups: (i) G-SIBs; (ii) resolution entities that are part of a resolution group whose total assets are greater than €100 billion (or less than €100 billion if the resolution authority considers it reasonably likely that its failure would pose a systemic risk); and (iii) other entities (including non-resolution entities, subject to normal insolvency proceedings in case of failure). For the first group, the minimum Pillar 1 requirements consist of 18% of RWAs and, in parallel, 6.75% of total exposure (as used for calculating the leverage ratio). To this must be added a possible additional requirement

7 See Article 92 of Regulation (EU) No 575/2013 of the European Parliament and of the Council, known as the Capital Requirements Regulation (CRR), and Article 104a of Directive (EU) 2019/878 of the European Parliament and of the Council, known as CRD V.

8 With the application of Article 429a(7) of Regulation (EU) 2019/876 of the European Parliament and of the Council, known as the Capital Requirements Regulation II (CRR II) (see also the "Capital Requirements Regulation Quick Fix" package in Regulation (EU) 2020/873 of the European Parliament and of the Council), on temporary derogations for certain central bank exposures, the Pillar 1 requirement was modified and may be higher than 3%.

9 See Articles 92 and 429 of the CRR, and Article 104a of CRD V.

of 8% of total liability and own funds. Minimum Pillar 1 requirements for the second group are 13.5% of RWAs and 5% of total exposure, as well as a possible additional requirement of 8% of total liability and own funds. There are no minimum Pillar 1 requirements for the third group.[10] These minimum requirements must be met with own funds and subordinated eligible liabilities. Conversely, there are requirements whose scale varies across banks – the P2R. They are set using standard formulae based on the bank's RWAs and total assets and are applied if higher than Pillar 1 minimum requirements (although there is no subordination requirement for eligible liabilities).[11] Resolution requirements will apply in full in 2024, with intermediate targets from 2022 onwards (in the case of G-SIBs, intermediate targets have applied since 2019).

3.2 Overlaps

Capital buffers are defined on top of minimum requirements for own funds in terms of RWAs and must be met with CET1. They are comprised of a capital conservation buffer (CCB) of 2.5% of RWAs, applicable to all banks,[12] plus a CCyB, a buffer for G-SIBs and for other systemically important banks (O-SIBs), and the systemic risk buffer (SyRB), the values of which fluctuate over time and depending on the institution.[13] The separate buffers are together referred to as the combined buffer requirement (CBR).[14] If an institution fails to comply with the capital buffers, as well as with the risk-based minimum requirements for own funds, limits are placed on how much it can pay out in distributions and it must draft a capital conservation plan (if the competent authority does not ratify the plan, the authority can put stricter measures in place).[15]

The capital used to cover the capital buffers can also be used to meet the parallel leverage ratio and resolution requirements.[16] Therefore, if the leverage ratio or resolution requirements are greater than the minimum risk-based requirements for own funds, partial or total use of the capital buffers would entail a breach of parallel minimum requirements, rendering the buffers unusable. Similarly, if the authorities should release a portion of the buffers (the CCyB, especially), the freed-up capital may not be usable, undercutting its effectiveness. We describe this as there being an overlap of buffers with parallel minimum requirements. This situation is illustrated in Figure 1.

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10 See Article 45 of Directive (EU) 2019/879 of the European Parliament and of the Council, known as the Bank Recovery and Resolution Directive II (BRRD II), and Article 92a of the CRR.

11 The standard formula to calculate the requirements in terms of RWAs is: Loss absorption amount (LAA) + recapitalisation amount (RCA) + market confidence charge (MCC), where LAA = 8% RWA + P2R, RCA = 8% post-resolution RWA + post-resolution P2R, MCC = combined buffer requirement (CBR) – CCyB. For requirements in terms of total exposure: LAA + RCA, where LAA = 3% of total exposure, RCA = 3% of total post-resolution exposure. In the case of non-resolution entities, only the LAA is applied in these formulae.

12 The authorities may exempt small and medium-sized investment firms from compliance with the CCB if such a derogation does not pose any threat to the stability of the relevant country's financial system.

13 See Articles 129 to 133 of Directive (EU) 2019/878 of the European Parliament and of the Council, 20 June 2019, known as CRD V.

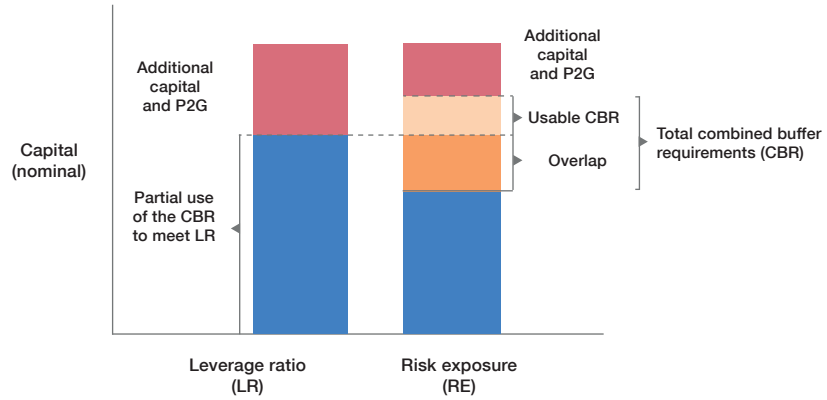
14 As previously noted, there is another buffer for G-SIBs that is defined as a percentage of total exposure and which must be met with tier 1 capital in addition to the leverage ratio requirement, the application of which is envisaged in January 2023.

15 See Articles 141 and 142 of CRD V.

16 The capital used for the CBR cannot be used to meet the MREL requirements in terms of risk-weighted assets (MREL-RWA). However, if the CBR is met in addition to minimum risk-based requirements, but not in addition to the MREL-RWA, restrictions on distribution payouts are not automatic. See Article 16a of BRRD II.

Figure 1

OVERLAPS BETWEEN THE COMBINED BUFFER REQUIREMENTS AND THE LEVERAGE RATIO



SOURCE: Own calculations drawing on ESRB (2021).

In order to calculate overlaps, the type of capital needed to meet each of the requirements must be considered. The formula for this, which is the same used in European Systemic Risk Board (ESRB) (2021), is given in Annex 1.

The following is an empirical analysis of the extent to which the capital buffers of Spanish banks may not be usable owing to parallel minimum requirements in the quarters of 2020 around the onset of the COVID-19 crisis. During the period under consideration, the leverage ratio requirements and MREL were not yet binding, so formally there were no overlaps. However, institutions were obliged to submit information on their leverage ratio. By contrast, leverage ratio requirements have been binding since June 2021. This date is close enough to the period under consideration that it can be used to analyse any overlaps that would exist if a 3% leverage ratio requirement had been in place. Given that the final MREL requirements will come into force in 2024 and that their influence on capital buffers will largely depend on eligible liabilities issued by institutions in coming years, these requirements have not been taken into account for this analysis. The data on requirements and capital are drawn from the supervisory financial information reported to the Banco de España and corresponds to consolidated values at banking group level.

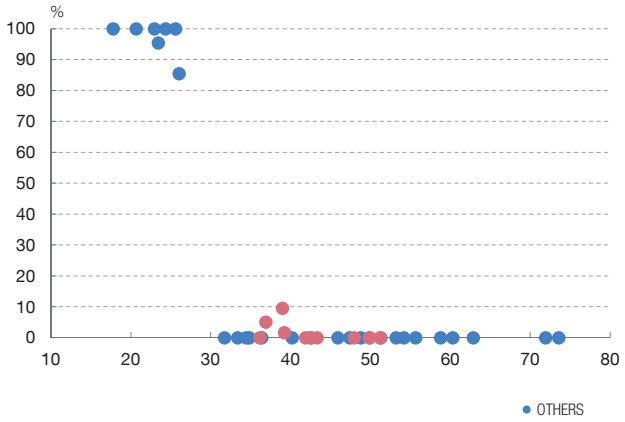
Chart 1 shows the percentage of the CBR that is unusable owing to overlapping with the leverage ratio (assumed to be 3%) for Spanish banks. It can be seen that most banks, particularly the biggest ones, have relatively small overlaps, although a handful of small banks have overlaps of around 100%. The overlaps are greater for banks with low risk densities (calculated as the ratio between RWAs and the total exposure used for the leverage ratio), since their minimum requirements in terms of RWAs are lower (in absolute terms) than those for the leverage ratio. Most significant institutions have little overlap but their average risk densities are such that even a small reduction could lead to significantly more overlap. An uptick in the overlaps of significant institutions can be observed between December 2019 and June 2020.

Chart 1

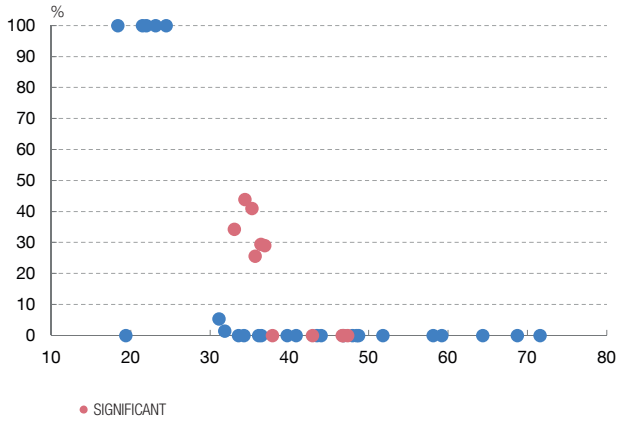
OVERLAP OF THE COMBINED BUFFER REQUIREMENTS AND THE LEVERAGE RATIO, IN DECEMBER 2019 AND JUNE 2020

Most Spanish institutions, particularly significant ones, have little overlap. In 2020, overlap increased, especially among significant institutions. The overlap is greater for institutions with low average risk densities.

1 % OF CRB UNUSABLE OWING TO OVERLAP WITH LEVERAGE RATIO. DECEMBER 2019 (a)



2 % OF CRB UNUSABLE OWING TO OVERLAP WITH LEVERAGE RATIO. JUNE 2020 (a)



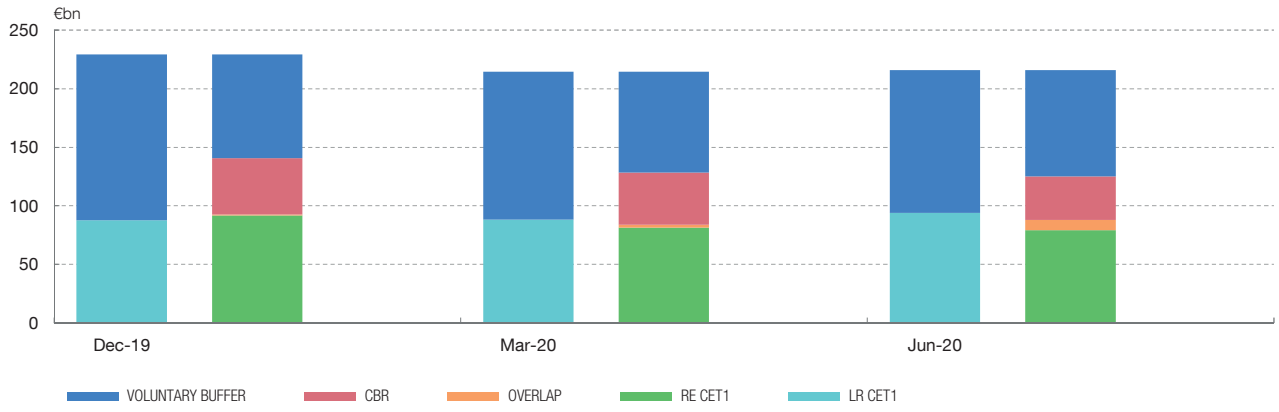
SOURCE: Banco de España.

a The red dots represent institutions under the direct supervision of the Single Supervisory Mechanism. The risk density is calculated as the ratio of RWAs to the total exposure used in the leverage ratio.

Chart 2

AGGREGATE OVERLAP BETWEEN THE COMBINED BUFFER REQUIREMENTS AND THE LEVERAGE RATIO

The aggregate overlap between the CBR and leverage ratio is moderate, although it increased in 2020.



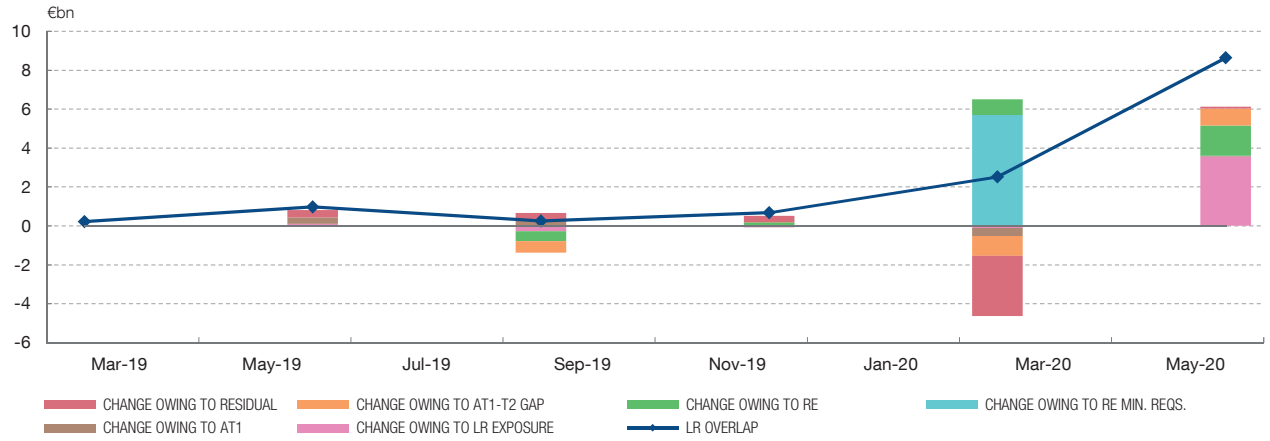
SOURCE: Banco de España.
NOTE: The light-blue sections represent the aggregate leverage ratio requirements (LR), the green sections represent the aggregate risk-weighted requirements (RE), the red sections represent the CBRs, the dark blue sections represent excess capital (including P2G), and the orange sections represent the proportion of the CBRs that is unusable owing to overlap with the LR requirements. The sum of the green (RE) and orange (overlap) sections is not equal to the light blue (LR) sections owing to aggregation effects.

Chart 2 shows aggregate overlaps. It can be seen that overlaps are low, although they increased somewhat in June 2020. In any case, the overlaps are very limited in comparison with total usable capital (CBR plus excess capital).

Chart 3

CHANGE IN THE OVERLAP BETWEEN THE AGGREGATE COMBINED BUFFER REQUIREMENTS AND THE LEVERAGE RATIO, AND THEIR COMPONENTS

The increase in the overlaps in March 2020 was mainly a result of the decrease in risk-based minimum requirements (P2R). The increase in June 2020 was mainly the result of the rise in the leverage ratio exposure.

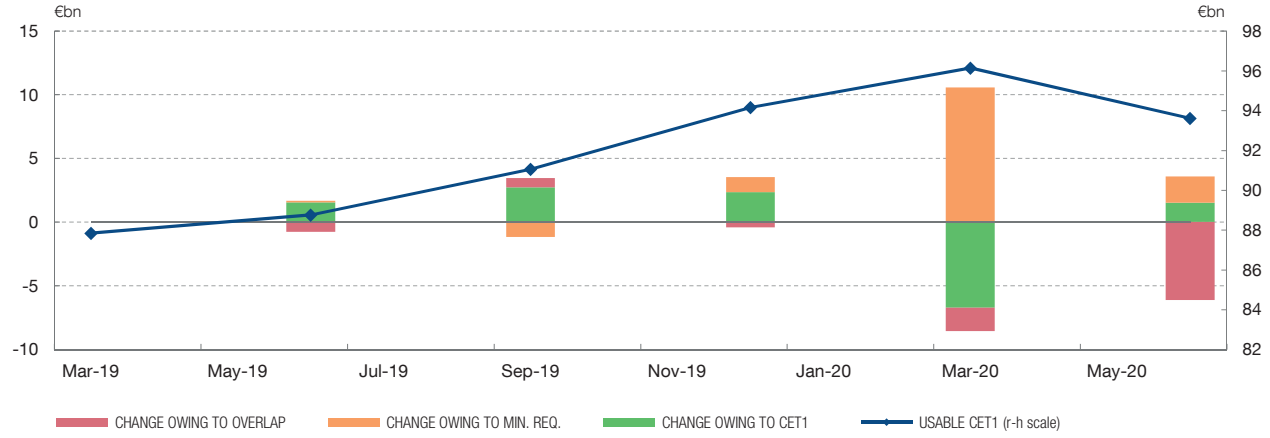


SOURCE: Banco de España.
NOTE: LR: leverage ratio; min. RE reqs.: minimum requirements set in terms of RWAs; AT1: additional Tier 1 capital; T2: Tier 2 capital. The residual is the result of aggregation effects. For comparison, the total usable capital during the period is never lower than €87 billion.

Chart 4

CHANGE IN AGGREGATE USABLE CET1 AND ITS COMPONENTS

The usable CET1 rose steadily until March 2020. In June 2020 it decreased somewhat (2.6%), owing mainly to the increase in overlaps.



SOURCE: Banco de España.
NOTE: Usable CET1 = CET1 – Risk-based min. req. – overlap with other requirements.

Chart 3 illustrates the change in the overlaps over time, as well as the drivers of that change. It shows that the increase in overlaps in March 2020 was mainly the result of a reduction in some banks' minimum risk-based requirements (P2R), while the increase in June 2020 was mainly caused by the increase in the exposure of the leverage ratio.[17] In any

17 In September 2020, the ECB approved the temporary exclusion of certain exposures to central banks in the Eurosystem from banks' total exposure measure.

case, the variations are small in comparison with the total usable capital, which remained above €88 billion at all times during the period under consideration.

Chart 4 depicts aggregate changes in usable CET1 (including CBR but excluding overlaps with the leverage ratio). It can be seen that usable capital rose steadily until March 2020. In June 2020 it decreased – albeit only slightly (by 2.6%) – owing mainly to the increase in overlaps.

In essence, this analysis shows that overlaps between Spanish banks' capital buffers and leverage ratio requirements were very low around the beginning of the COVID-19 crisis. They grew somewhat in 2020 mainly owing to the decrease in minimum risk-based requirements for some banks and the growth of the total exposure, but continued to represent a very small amount relative to the total usable capital. However, it seems appropriate to continue monitoring the scale of the overlaps, particularly when new resolution requirements are applied in 2022 and 2024.

4 Impact of capital buffers on bank stock prices during the pandemic

The aim of this analysis is to study whether the stock prices of banks with larger voluntary capital buffers were less affected by the shock triggered by COVID-19. Share prices are indicative of the present discounted value of banks' future profitability. Thus, during the pandemic, these prices were indicative of market expectations of banks' ability to weather the COVID-19 crisis. As a result, studying the market performance according to capital buffers allows analysis of whether investors perceived these loss-absorbing elements as a factor that contributed to shoring up banks' economic value and their ability to generate profits and withstand shocks.

In this study, given the limited number of listed Spanish banks and the greater availability of market data and buffers at European level, the scope of the analysis was broadened to include a sample of euro area significant institutions. Bank stock prices are sourced from Datastream, while data on banks' CET1 ratios are drawn from SNL Financial. Information on capital requirements was obtained from public databases and reports published by the ESRB and the ECB.[18] The following table shows the number of banks included in the analysis, as well as the banks' average capital buffers and CET1 ratios by country and for the sample as a whole.

Table 1
BANK SAMPLE AND AVERAGE CAPITAL BUFFER AND CET1 RATIO, BY COUNTRY

Country	Number of banks	Voluntary capital buffer (average % at end-2019)	CET1 capital ratio (average % at end-2019)
Austria	3	4.7	13.7
Belgium	1	8.4	17.2
Cyprus	2	7.3	17.4
Finland	1	7.5	16.3
France	4	5.6	14.4
Germany	4	6.3	15.6
Greece	4	6.3	16.3
Italy	9	5.0	14.0
Netherlands	2	7.4	16.4
Portugal	1	3.0	12.2
Slovakia	3	4.4	14.5
Spain	8	4.2	13.0
Total sample	42	5.4	14.6

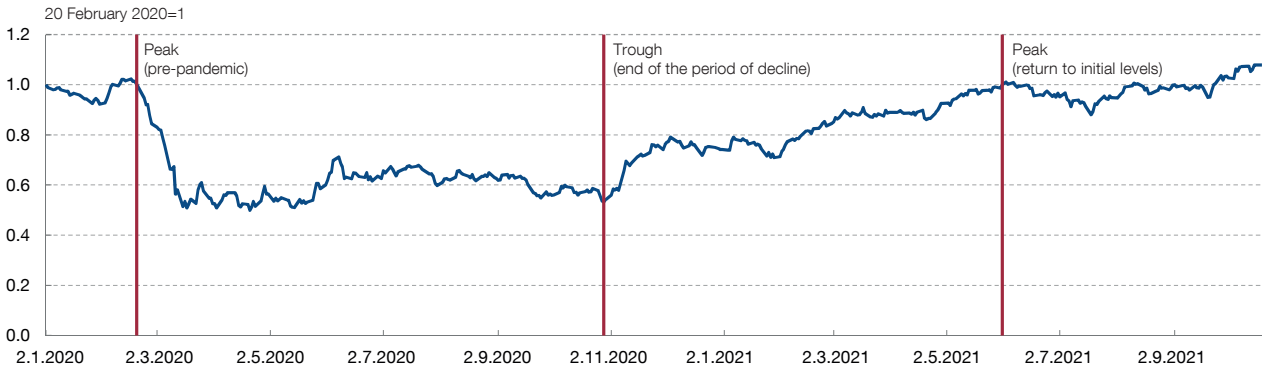
SOURCE: Own calculations based on SNL Financial data and public information on capital requirements from the ESRB and ECB.
NOTE: The voluntary buffer is obtained by deducing the mandatory minimum and buffer requirements from the capital ratio. CET1: CET1 ratio – P1 CET1– P2R CET1 – CBR; CBR: combined buffer requirements (CCB, CCyB, SyRB and the G-SIB and O-SIB buffers).

18 See the CBR as compiled and published by the ESRB. See the specific P2R for each bank determined during the supervisory review and evaluation process and published by the ECB for significant institutions.

Chart 5

SAMPLE BANK SHARE PRICES AND SELECTED STUDY PERIODS

Bank share prices were strongly affected by the course of the COVID-19 pandemic.



SOURCE: Own calculations based on Datastream.
NOTE: Average weighted by market capitalisation (as at 31 December 2019) of the sample banks, normalising the value on 20 February 2020 (prepandemic stock price peak) to one. The vertical lines indicate the start of the first period considered (20 February 2020), the end of the first period considered (29 October 2020) and the start of the second period considered (1 June 2021).

The voluntary buffer figure used in the analysis was calculated by deducing the publicly disclosed mandatory minimum and buffer requirements from the total CET1 capital of each institution as follows:

$$\text{Voluntary buffer} = \text{CET1 ratio} - \text{P1 CET1} - \text{P2R CET1} - \text{CBR}, \qquad [1]$$

where CET1 refers to common equity tier 1, P1 is the minimum Pillar 1 requirement (4.5%), P2R is the Pillar 2 requirement,[19] and CBR is the combined buffer requirement.

The date selected as the start of the period affected by the COVID-19 crisis is 20 February 2020, which corresponds to the highest bank stock prices prior to the outbreak of the pandemic, following which a decline was seen. After this, prices remained generally stable until 29 October 2020, when a persistent upward trend was seen in the average stock price of banks in the sample. Around 1 June 2021, the average stock price had recovered to its initial value. These developments are shown in Chart 5, along with the two periods considered in this study (the period of decline following the outbreak of COVID-19 until the announcement of the first vaccines, spanning from 20 February to 29 October and the period from 1 June to 19 October 2021, when stock prices had returned to their pre-pandemic levels but a high degree of economic uncertainty still remained).

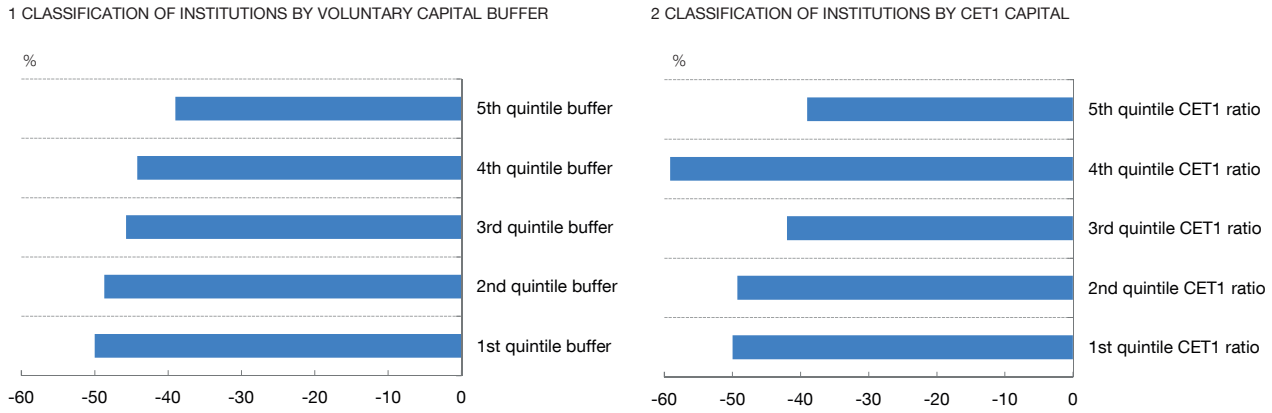
This study divides the sample of banks into quintiles based on their voluntary capital buffer or CET1 ratio prior to the pandemic and analyses the share price performance in each

19 P2G is not subtracted since it is not mandatory and is therefore considered voluntary capital.

Chart 6

WEIGHTED AVERAGE CHANGE IN STOCK PRICES IN 2020. 29 OCTOBER COMPARED WITH 20 FEBRUARY

The average share price of banks with smaller voluntary capital buffers fell more than the average for banks with larger buffers. The relationship is less clear when classifying banks by their level of CET1.



SOURCE: Own calculations based on Datastream, SNL Financial and public information on capital requirements from the ESRB and ECB.
NOTE: Average weighted by stock price of banks in the sample.

quintile. Thus, Chart 6 shows that the average stock price[20] of banks with a voluntary capital buffer (see Chart 6.1) or a CET1 ratio (see Chart 6.2) in the upper quintile of the distribution at the onset of the pandemic fell less than that of the banks in lower quintiles during the period studied.[21] The difference in decline is clearer when banks are classified according to their level of voluntary buffer than when they are classified according to their CET1 ratio.

The more recent period, from 1 June to 19 October 2021, when average bank stock prices had returned to their pre-pandemic levels, was one of economic recovery, although a high degree of uncertainty remained surrounding the appearance of new, more contagious, variants of COVID-19. This recovery is linked to several factors, including most notably the headway made in global vaccination, which allowed restrictions on activity to be scaled back and reduced uncertainty as to the evolution and impact of the pandemic. A positive correlation of both the CET1 ratio and the voluntary capital buffer with stock prices can also be seen during this time (see Chart 7). Again, the relationship is clearer when banks are classified according to their voluntary buffer.

This descriptive analysis shows that the share prices of banks with larger voluntary buffers or CET1 ratios performed better following the onset of the pandemic. The study described in this section shows that in the initial months of the pandemic, markets penalised banks according to the difference between their level of capital and their requirements, and

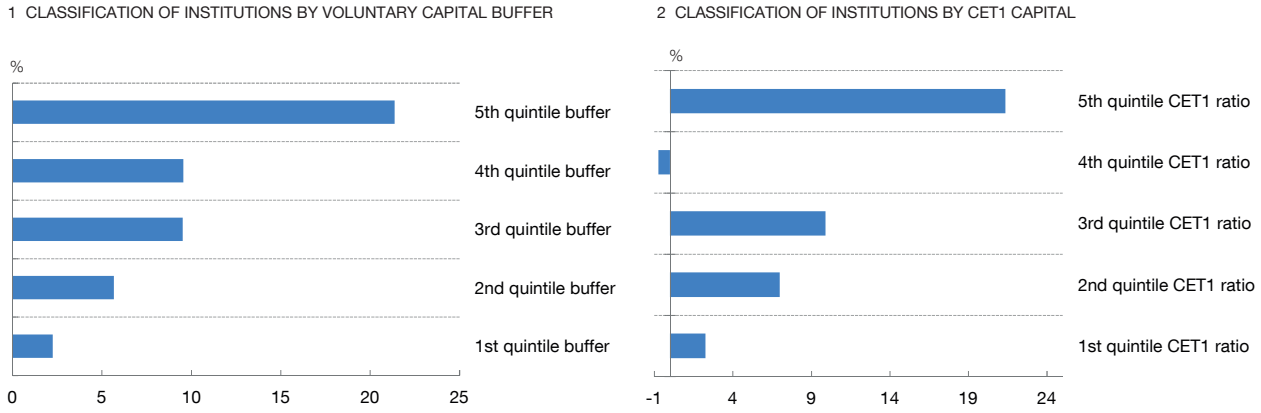
20 Weighted average by bank stock price with the price for each bank normalised to 1 on 20 February 2020.

21 This correlation can also be seen in other quantiles. Furthermore, regression analyses have been performed but robust findings were not possible owing to the small sample size.

Chart 7

WEIGHTED AVERAGE CHANGE IN STOCK PRICES IN 2021. 19 OCTOBER COMPARED WITH 1 JUNE

During the recovery phase, the average share price of banks with smaller voluntary capital buffers fell less than the average for banks with larger buffers. The relationship is less clear when classifying banks by their level of CET1.



SOURCE: Own calculations based on Datastream, SNL Financial and public information on capital requirements from the ESRB and ECB.
NOTE: Average weighted by stock price of banks in the sample.

to their CET1 ratio. The share prices of the institutions most affected later recovered in the comparatively stable period between the end of 2020 and mid-2021 in the wake of health authorities' approval of the first vaccines against COVID-19. However, increasing uncertainty from mid-2021 onwards after the emergence of new variants of the virus once again led to differences in the stock prices depending on the sizes of the capital buffers held.

5 Impact of capital buffers on bank stock purchases by investment funds

This section complements the previous price sensitivity analysis by studying the impact of capital buffers on bank shares held by other financial intermediaries. Specifically, it looks at changes in the holdings of bank shares by investment funds.[22] The initial hypothesis is that if a smaller capital buffer increases banking risk perception, then investors will sell the shares of small-buffer banks to a greater extent when a financial shock occurs. This can be used to assess market sensitivity to the level of bank buffers in times of stress, which is crucial to anticipate whether institutions may be reluctant to use them in such situations.

The data source for this exercise is Lipper for Investment Management (hereafter, Lipper), a database owned by Refinitiv that includes granular information on the securities holdings of investment funds located in different jurisdictions. It provides monthly holdings data, together with certain characteristics of these vehicles, such as the volume of assets under management or their investment policy. This exercise is confined to funds domiciled in the euro area to ensure that it covers relatively similar vehicles (e.g. funds subject to similar regulation). A representative sample of this sector can be found in Lipper.[23] The analysis focuses on euro area bank equity holdings, also with the aim of ensuring homogeneity. Data on buffers and other characteristics of institutions are obtained from the same sources used in previous sections.

Descriptive evidence

Chart 8 summarises the changes in the exposures of Lipper funds to euro area banks before (September 2019-February 2020) and after the COVID-19 shock (March-September 2020). The monthly percentage change in the number of shares of each bank is calculated individually for each fund in the sample. For example, if one month a fund has 1,000 shares of a bank, and in the following month the number of shares held by the fund rises to 1,500, the change in its holding will be 50%. This calculation is done for all pairs of fund-bank exposures in each month.[24] The chart shows the average of these changes over the two periods considered. In addition, a distinction is drawn as to whether institutions have a capital buffer above or below the median, to see whether there are any differences in funds' behaviour towards the two types of banks. The exercise uses the voluntary buffer defined in Section 4.[25]

22 Cohen and Schmidt (2009) also use changes in funds' equity holdings to assess some of these vehicles' preferences for certain types of stocks.

23 This analysis considers funds investing in equities, funds investing in fixed income and mixed funds, since the exposure to bank securities of other types of vehicles (e.g. real estate market funds) can be expected to be limited. According to the ECB's investment fund statistics, the assets of Lipper funds reporting their holdings represent just over one-third of the euro area fund industry's total assets. The performance of Lipper fund assets and that reported by the ECB have been found to be very similar over time. Therefore, no significant biases are expected in the results of this section (see Annex 2 for more details).

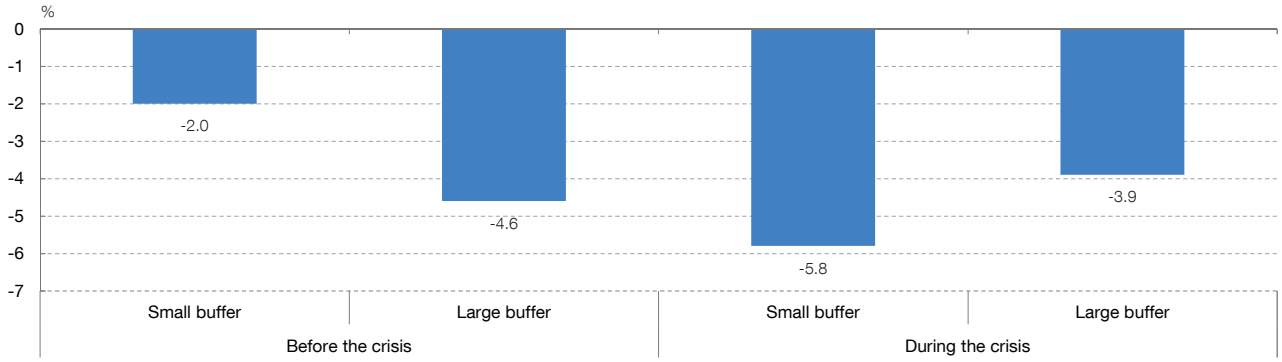
24 There were no stock splits in the bank sample in the period analysed, meaning that this measure is appropriate to capture decisions to buy or sell these shares. To ensure that the analysis is not distorted by outliers, changes in holdings below the 1st percentile and above the 99th percentile are removed from the sample.

25 As mentioned before, not all institutions report the P2R. However, those with P2R information represent the bulk of euro area banks' stock market capitalisation (85% of the total in December 2019). The funds' exposures are concentrated on these types of institutions, which means that the sample used is representative.

Chart 8

CHANGE IN BANK EQUITY HOLDINGS ACCORDING TO THEIR CAPITAL BUFFER LEVEL

Before the crisis bank equity holdings fell more for banks with large voluntary buffers. This situation reversed during the pandemic.



SOURCE: Own calculations based on Lipper.
NOTE: The vertical axis variable (netbuy) is the monthly change in bank equity holdings; the chart depicts the averages of the variable calculated for each type of bank and period. "Small buffer" refers to banks with a capital buffer below the median, while "large buffer" refers to those with a buffer above the median. "Before the crisis" includes holdings data from September 2019 to February 2020, while the "During the crisis" period begins in May 2020 and ends in September 2020.

The chart shows that before the pandemic, on average, the funds reduced their exposure to banks, with a more marked reduction in the case of those with a larger buffer. This situation reversed during the crisis, when sales of shares in institutions with a smaller buffer increased on average.[26] This suggests that investors may take this feature (banks' capital buffer) into account when making investment decisions, particularly in crises or situations with an increased risk perception.

Empirical analysis and results

Although the descriptive evidence is useful, it should be taken with caution, as the funds exposed to each type of institution (either with large or with small buffers) may be subject to different shocks. Thus, Lipper funds with a higher exposure to smaller-buffer institutions faced slightly higher capital outflows during the pandemic. This may at least partly explain the higher sales of shares in this type of institutions over that period (given that when there are significant capital outflows, funds must liquidate part of their assets to make payments to clients). However, there are important differences between institutions that are not addressed in the previous descriptive exercise. For example, variables such as a bank's credit quality may influence funds' investment decisions, particularly in periods of stress. As smaller-buffer institutions in the sample have higher credit ratings on average, it is important to separate the impact of the institution's credit quality on share sales and purchases from the effect associated solely with the capital buffer level, which is the focus of this study.

26 The result presented holds when shorter periods are considered, and even when comparing the changes in holdings between February 2020 (the last month before the start of the crisis) and March 2020 (the start of the pandemic).

A more formal analysis is proposed below that avoids some of the drawbacks mentioned above. Specifically, to analyse whether the capital buffer level influenced funds' investment decisions, regressions are estimated in which the dependent variable is the monthly change in each fund's equity exposure, defined as explained above. The main explanatory variable is a dummy variable that differentiates between institutions with a buffer above and below the median. This dummy interacts with a time dummy, allowing a distinction to be drawn between the effect of having a larger buffer before and during the first months of the health crisis. The specification includes some additional bank-level variables, some of which have already been used in the previous section. The model is completed with a set of fixed effects to take into account the heterogeneity between investment funds and the shocks experienced by these vehicles, as well as characteristics of the countries in which each bank operates. These aspects may influence funds' buying and selling decisions and are not directly related with institutions' capital buffer.

Table 2 shows the result of this regression exercise and confirms the above descriptive results. There were fewer purchases or more sales of larger-buffer bank shares before the pandemic, as indicated by the negative "large buffer" coefficient estimate. The opposite is true during the pandemic as the coefficient estimate for the interaction "large buffer*crisis" is positive and greater than the previous coefficient. The results are fairly consistent across all specifications.[27] Specifically, having a large buffer during the pandemic is associated with higher monthly net purchases (+11 percentage points (pp) compared with banks with a smaller buffer). Before the pandemic, this characteristic is associated with higher net sales (-4 pp on average). Moreover, a preference can be seen for buying (or for selling less) shares in large, more profitable banks with a better rating and a lower exposure to vulnerable sectors.[28]

Lastly, Chart 9 shows the sensitivity of funds' purchases and sales to banks' buffer level month by month, which makes it possible to see more granular effects over time. Specifically, it depicts the "large buffer" coefficient for monthly regressions using the same dependent variable (the monthly change in funds' holdings of bank shares). The 95% confidence intervals associated with the estimate are shown along with this coefficient.

Although the coefficient is slightly volatile in these regressions, the change after the onset of the pandemic in funds' behaviour towards banks with a larger buffer is evident. In particular, the "large buffer" coefficient estimate is negative (on average) before the crisis and positive (on average) after the crisis. This positive effect is smaller in the first stages of the health crisis. This could owe to the fact that the scale of the crisis was unknown at the start of pandemic, as was the specific shock experienced by each bank, which made it difficult to separate institutions according to their characteristics, such as capital buffers. The shock experienced at that time by the funds themselves must also be taken into account, as it may

27 All the results presented in this section are robust to different specifications (e.g. analysing the change in holdings relative to the funds' total asset volume; considering more categories of banks according to their buffer level, instead of two as in the main exercises; or using different control variables).

28 These latter effects are similar when the analysis is restricted to the period of the pandemic.

Table 2

ANALYSIS OF INVESTMENT FUNDS' NET PURCHASES ACCORDING TO BANKS' VOLUNTARY CAPITAL BUFFER

During the crisis triggered by COVID-19 investment funds were more likely to purchase shares of banks with larger voluntary buffers.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Solvency							
Large buffer	-3.523***	0.285	-0.767	-1.098*	-2.086**	-2.209**	-4.146***
	(0.475)	(0.558)	(0.588)	(0.592)	(0.957)	(1.011)	(1.120)
Large buffer*crisis	7.699***	7.496***	7.467***	7.510***	7.411***	8.128***	11.32***
	(0.797)	(0.789)	(0.787)	(0.787)	(0.762)	(0.779)	(1.146)
Other variables							
ln(assets)		0.929***	0.982***	0.717***	0.931***	1.041***	1.091***
		(0.136)	(0.138)	(0.149)	(0.299)	(0.320)	(0.321)
CET1 (capital)		-1.255***	-1.055***	-0.993***	-0.462*	-0.292	0.491
		(0.177)	(0.178)	(0.178)	(0.256)	(0.271)	(0.328)
CET1 (capital)*crisis							-1.464***
							(0.370)
ROA			1.549***	0.958***	1.619***	1.507***	1.529***
			(0.296)	(0.268)	(0.544)	(0.546)	(0.544)
Rating				-0.802***	-0.406*	-0.583**	-0.503**
				(0.166)	(0.240)	(0.254)	(0.254)
G-SIB					-0.152	0.149	0.0852
					(0.410)	(0.423)	(0.425)
Vulnerable					-0.223*	-0.274**	-0.255**
					(0.122)	(0.129)	(0.130)
NPL					-0.203	-0.257	-0.279
					(0.179)	(0.191)	(0.192)
Price change (%)						0.180***	0.164***
						(0.0344)	(0.0341)
P/E						0.0298	0.0355*
						(0.0207)	(0.0207)
DY						-0.0553	-0.00118
						(0.0591)	(0.0593)
R^2	0.465	0.466	0.467	0.472	0.483	0.486	0.486
No of observations	84,740	84,740	84,740	83,514	70,688	65,605	65,605
Fund-time FE	Y	Y	Y	Y	Y	Y	Y
Country-time FE	Y	Y	Y	Y	Y	Y	Y

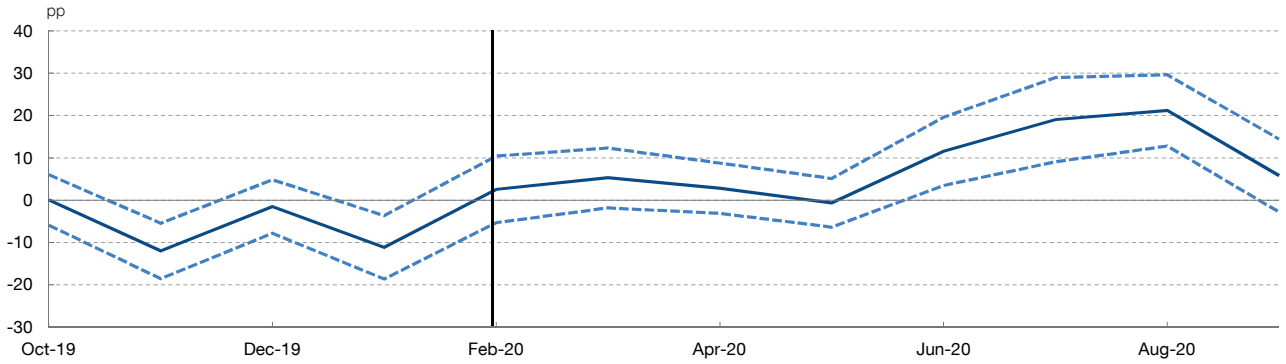
SOURCE: Banco de España.

NOTE: The table shows investment funds' investment decisions according to the institution's capital buffer. The dependent variable is the monthly percentage change in the number of shares in each bank held by each fund: "large buffer" is a dummy that equals one for banks whose capital buffer in December 2019 was above the median and zero otherwise; "crisis" is a dummy equal to one from March 2020 to September 2020 and zero from October 2019 to February 2020; ln(assets) is the natural logarithm of the institution's total assets; CET1 (capital) is the institution's CET1 capital ratio; ROA is the institution's return on total assets; rating is a categorical variable ranging from 1-20, where higher values indicate a worse rating (according to agencies S&P, Moody's and Fitch); G-SIB equals one for global systemically important significant institutions and zero otherwise; "vulnerable" captures the institution's exposure to the NACE I sector (Accommodation and food service activities), based on EBA data; NPL is each banks' non-performing loan ratio; "price change (%)" is the monthly change in the bank's share price; P/E is the share price-to-earnings ratio; and DY is the dividend yield or ratio of the previous year's dividend to the share price. The banks' variables refer to December 2019. All the specifications include fund-month and bank head office country-month fixed effects. The models are estimated using the ordinary least squares method and yield robust errors clustered at fund level.

Chart 9

IMPACT OF VOLUNTARY BUFFERS ON INVESTMENT FUNDS' NET PURCHASES OF BANK SHARES

After the outbreak of the COVID-19 pandemic, net purchases of shares of banks with voluntary capital buffers above the median increased.



SOURCE: Own calculations based on Lipper.
NOTE: The chart replicates the regression in column (6) of Table 2, but using monthly estimation periods, and depicts the coefficient and 95% confidence intervals associated with "large buffer", i.e. the effect of an institution having a large capital buffer (above the median) on purchases and sales of bank stocks held by funds. For example, for August 2020 the coefficient estimate is approximately +20. This indicates that the monthly change in equity holdings of this type of banks rose by 20 pp compared to the shares of banks with a smaller buffer, all else being equal. The vertical line marks February 2020, the last month before the pandemic.

have triggered “forced sales” and initially limited these vehicles’ capacity to differentiate banks on the basis of their higher or lower solvency. Lastly, in the latter part of the period analysed, the effect of increased purchases of bank shares with a larger buffer dissipates shortly before the announcements on the effectiveness of the vaccines mentioned in the previous section.

6 Impact of capital buffers on lending to the real economy

This section analyses the lending decisions of Spanish credit institutions in the more flexible regulatory setting in terms of capital requirements resulting from the measures adopted over the first months of the pandemic. Specifically, it studies the extent to which voluntary capital buffers at end-2019, defined as banks' capital headroom above their regulatory requirements, could have been a relevant factor in the new financing they granted during the pandemic. This is similar to the exercise conducted by Berrospide, Gupta and Seay (2021) for the United States. However, it is interesting to analyse whether the evidence found by these authors may be extrapolated to Spain.

This exercise draws on information on new lending from the CCR. This database includes very granular (transaction-level) information on the credit exposures of the reporting financial institutions (mainly credit institutions and specialised lending institutions)[29] to their borrowers, whether natural or legal persons. This information is reported monthly and makes it possible to discern changes in credit risk and observe some of the characteristics of the borrowers, which are complemented by additional information on firms' financial structure. Furthermore, data on capital buffers and other characteristics of the institutions are obtained from supervisory financial reporting, also used in Section 3.[30] In addition, the information on non-financial corporations (NFCs) is completed in greater detail with the information available for some of them in the Banco de España's Central Balance Sheet Data Office.[31]

The analysis is conducted at bank-firm level using quarterly data. The granularity of the information provided by the CCR is fully harnessed to analyse the extent to which institutions with less capital headroom in excess of their requirements increased their lending after the introduction of the regulatory flexibility measures prompted by the outbreak of the pandemic. Institutions are classified as buffer-constrained (BC), following the methodology in Berrospide, Gupta and Seay (2021), when the distance between their capital position and their overall capital requirements (the voluntary buffer) is equal to or less than the median for credit institutions reporting to the CCR in 2019 Q4.

The information used for the analysis has been restricted from the standpoint of both the credit institutions and the borrowers considered. In particular, only new loans

29 In 2020 194 credit institutions and branches in Spain of foreign credit institutions, 33 specialised lending institutions, 19 mutual guarantee and reguarantee companies and 38 real estate lenders reported to the CCR, along with Sareb, the Deposit Guarantee Scheme for Credit Institutions, the State-owned agricultural indemnity company (SAECA) and the Banco de España.

30 Specifically, the following financial statements have been consulted: F_01.01 - Balance sheet [statement of financial position]: assets; F_01.02 - Balance sheet [statement of financial position]: liabilities; C_03.00 - Capital adequacy – Ratios; C_04.00 - Capital adequacy; C_02.00 - Capital adequacy - Risk exposure amounts; C_01.00 - Capital adequacy - Own funds definition; C_47.00 - Leverage ratio calculation; F_02.00 - Statement of profit or loss.

31 The Banco de España Central Balance Sheet Data Office creates databases with the economic and financial information voluntarily submitted by the reporting non-financial corporations, together with that filed by law with the Mercantile Registries. The statistics and products disseminated on this page on NFC statistics are developed on the basis of these databases.

granted by Spanish credit institutions classified as significant institutions[32] to NFCs are taken into account. Further, the analysis considers not only drawn credit, but also increases in the amount drawable against lines of credit. That is why this document refers to loan commitments, in line with Berrospide, Gupta and Seay (2021), as this is a more appropriate measure to analyse banks' credit supply decisions than outstanding loan amounts, which may be affected by demand-driven swings in drawdowns and repayments. It is also important to highlight that only credit transactions originating at the institution have been considered, and that subrogated, segregated and purchased loans (both those still managed by a non-reporting institution and outright purchases) have been excluded.

Specifically, this study analyses the quarter-on-quarter growth rate of credit supply.[33] To this end, credit supply is measured based on new loan commitments with borrowers that already existed at the onset of the pandemic. The growth rate would therefore include both increases in drawn and/or undrawn credit due to new loan origination and increases in drawn and/or undrawn credit in previously arranged lines of credit that were increased in the period considered. Institutions are classified as buffer-constrained (BC) using a dummy variable that takes the value one for institutions where the distance to their combined capital requirements is equal to or lower than the median of all systemic Spanish institutions at end-2019 (4.15%), and zero otherwise.

The dependent variable $\frac{\Delta \text{ new lending}_{bft}}{\text{New lending}_{bft-1}}$ is the quarter-on-quarter growth rate for new loan commitments from bank b to firm f in period t.

$$\frac{\Delta \text{ new lending}_{bft}}{\text{New lending}_{bft-1}} = \beta_0 \text{POST}_t + \beta_1 \text{BC}_{b,2019Q4} + \beta_2 \theta + \ldots + \beta_3 \text{POST}_t \times \text{BC}_{b,2019Q4} \times \theta + \text{Bank characteristics}_{t-1} + \text{Firm characteristics}_{t-1} + \varepsilon_{bft} \quad [2]$$

The variable Post identifies the pandemic period, and takes the value one from 2020 Q2 onwards, and zero in the preceding quarters of 2019 and 2020. Additionally, information has been included as a control variable relating to the situation of each bank *(Ln of total assets,* the *liquidity ratio* (%), the *deposit-to-asset ratio* (%), *return on assets (ROA)* (%), the *common equity tier 1 (CET1) ratio* (%) and the *ratio of provisions to assets* (%)), of each NFC *(whether or not it is an SME, ROA* (%), *cost of borrowing* (%), the *solvency ratio* (%) and the *working capital ratio* (%)[34]) and of each NFC in the previous quarter.[35]

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32 The 12 Spanish significant credit institutions existing at the onset of the pandemic are considered: Abanca, Banco Sabadell, Banco Santander, Bankia, Bankinter, BBVA, CaixaBank, Grupo Cajamar, Ibercaja, Kutxabank, Liberbank and Unicaja. Bankia and Liberbank were subsequently absorbed by CaixaBank and Unicaja, respectively.

33 Credit supply has traditionally been analysed considering both decisions on the volume of committed loans (intensive margin) and decisions on the granting of new loans (extensive margin). This document analyses overall changes in credit supply considering decisions relating to both the volume of financing and the granting of credit. Therefore, the analysis is not confined solely to an increase in lending to existing customers at the onset of the pandemic (intensive margin) but also considers loans to new customers (extensive margin).

34 Defined as the ratio of the difference between current assets and current liabilities to total assets.

35 Due to the presence of outliers in the ratios of some control variables relating to firms, those with ROA below the 0.5 percentile or above the 99.5 percentile have been excluded from the analysis.

Table 3

IMPACT ON GROWTH IN NEW CREDIT COMMITMENTS TO FIRMS WITH A YOUNG BANKING RELATIONSHIP

Institutions with less capital buffer in excess of their requirements reduced lending to firms with which they had more recent banking relationships to a greater extent.

	(1)	(2)	(3)	(4)	(5)	(6)
*Post*BC*	1.249	1.518*	1.084	1.077	1.327	0.932
	(0.918)	(0.923)	(0.938)	(0.896)	(0.900)	(0.917)
*Post*Young_F*	4.232***	4.549***	3.992***	3.558***	3.886***	3.405***
	(1.293)	(1.295)	(1.327)	(1.246)	(1.248)	(1.280)
*Post*BC*Young_F*	-3.313**	-3.660***	-3.151**	-2.575**	-2.934 *	-2.526*
	(1.308)	(1.310)	(1.343)	(1.260)	(1.263)	(1.296)
Bank: CET1 ratio (%)		0.251	0.180		0.260	0.213
		(0.166)	(0.171)		(0.161)	(0.165)
Controls for bank charateristics$_{t-1}$	N	Y	Y	N	Y	Y
Controls for firm charateristics$_{t-1}$	N	N	Y	N	N	Y
Bank fixed-effects	Y	Y	Y	Y	Y	Y
Time period fixed effects	Y	Y	Y	Y	Y	Y
Sector-time period fixed effects	Y	Y	Y	Y	Y	Y
Province-time period fixed effects	Y	Y	Y	N	N	N
Size-time period fixed effects	Y	Y	Y	Y	Y	Y
Postcode-time period fixed effects	N	N	N	Y	Y	Y
No of observations	813,315	813,315	772,824	813,315	813,315	772,824
R^2	0.390	0.390	0.390	0.353	0.353	0.351

SOURCE: Banco de España.
NOTE: This table shows the results for the specification in equation [2], considering heterogeneous effects in lending by institutions with small voluntary buffers after the pandemic to firms that have a relatively recent banking relationship with the institution *(Young_F).* The dependent variable is the quarterly growth rate of new credit commitments from bank b to firm f in period t, with the quarter as the time unit. The variable *BC* is a dummy that takes the value one if institutions' distance to their combined capital requirements is equal to or less than the median distance of all systemic Spanish institutions at end-2019, and zero otherwise. The variable *Young_F* takes the value one if the NFC has a relatively recent relationship with the lender (with an age of less than 6.5 years). The initial specification (columns (1) and (4)) includes bank, time (quarter), industry-time (quarter) and location-time (quarter) fixed effects. Columns (1) to (3) take the province as the location level in the definition of the fixed effects, columns (4) to (6) consider the postcode instead. The initial specification is gradually saturated to include in columns (2) and (4), in addition to the CET1 ratio (%) (which is reported separately from the other control variables given its importance), other controls for banks: the liquidity ratio, the deposit-to-asset ratio (%), ROA (%), ln(assets) and the ratio of provisions to assets (%). Additionally, columns (3) and (6) include other controls for firms: ROA (%), the liquidity ratio (%), cost of borrowing (%), the permanent employee ratio (%), the solvency ratio (%) and the working capital ratio (%). Standard errors in brackets are robust clustered at bank level. Asterisks *, **, *** indicate that the coefficient estimate is significant at 10%, 5% and 1%, respectively.

To identify credit supply and demand in a sample of NFCs that borrow from a single institution,[36] borrowers have been grouped by *size*time, location*time and activity*time,*[37] thus extending the approach taken by Khwaja and Mian (2008), as proposed by other authors, such as Degryse et al. (2019), and used in similar analyses for the United States by Berrospide, Gupta and Seay (2021).

36 Among other issues, this could give rise to sample selection problems that could affect the outcome.

37 Four size categories are established, based on CCR information for firms: large, medium, small and micro enterprises. Location both at province and postcode level. Activity as defined by the three-digit NACE Rev 2 classification.

Table 4

IMPACT ON NEW CREDIT COMMITMENT GROWTH, EXCLUDING LOANS WITH COVID-19 STATE GUARANTEES

Excluding State-backed loans, institutions with less capital headroom in excess of their requirements significantly reduced lending to non-financial corporations.

	(1)	(2)	(3)	(4)	(5)	(6)
*Post*BC*	-1.652***	-1.667***	-1.775***	-1.593***	-1.623***	-1.745***
	(0.528)	(0.531)	(0.541)	(0.512)	(0.515)	(0.525)
Bank: CET1 ratio (%)		-0.250**	-0.280**		-0.255**	-0.279**
		(0.117)	(0.120)		(0.113)	(0.116)
Other controls: bank characteristics	N	Y	Y	N	Y	Y
Other controls: firm characteristics	N	N	Y	N	N	Y
Bank fixed effects	Y	Y	Y	Y	Y	Y
Sector-time period fixed effects	Y	Y	Y	Y	Y	Y
Postcode-time period fixed effects	Y	Y	Y	N	N	N
Size-time period fixed effects	Y	Y	Y	Y	Y	Y
Province-time period fixed effects	N	N	N	Y	Y	Y
No of observations	767,746	767,746	729,225	767,746	767,746	729,225
R^2	0.386	0.386	0.386	0.348	0.348	0.346

SOURCE: Banco de España.
NOTE: This table shows the results for the specification in equation [2], not considering heterogeneous effects in lending by institutions with small voluntary buffers (i.e. not including the triple interactions *Post*BC*θ).* State-backed loans are excluded from the analysis. The dependent variable is the quarterly growth rate of new credit commitments from bank b to firm f in period t, with the quarter as the time unit. The variable *BC* is a dummy that takes the value one if institutions' distance to their combined capital requirements is equal to or less than the median distance of all systemic Spanish institutions at end-2019, and zero otherwise. The initial specification (columns (1) and (4)) includes bank, time (quarter), industry-time (quarter) and location-time (quarter) fixed effects. Columns (1) to (3) take the province as the location level in the definition of the fixed effects, columns (4) to (6) consider the postcode instead. The initial specification is gradually saturated to include in columns (2) and (4), in addition to the CET1 ratio (%) (which is reported separately from the other control variables given its importance), other controls for banks: the liquidity ratio, the deposit-to-asset ratio (%), ROA (%), ln(assets) and the ratio of provisions to assets (%). Additionally, columns (3) and (6) include other controls for firms: ROA (%), the liquidity ratio (%), cost of borrowing (%), the permanent employee ratio (%), the solvency ratio (%) and the working capital ratio (%). Standard errors in brackets are robust clustered at bank level. Asterisks *, **, *** indicate that the coefficient estimate is significant at 10%, 5% and 1%, respectively.

In addition to analysing differences in the lending decisions of institutions with more and less capital headroom in excess of their requirements after the pandemic, the heterogeneity of their decisions is also analysed in terms of the characteristics of the NFCs.

Specifically, the heterogeneity in lending[38] is analysed considering NFCs with specific characteristics that could affect the decisions of institutions differently depending on the size of their voluntary buffers: SMEs, firms that did business with only one lender in 2019 Q4 *(SingleBank_F)* and firms that met both characteristics *(SME*SingleBank_F)*. Other NFCs considered are those whose relationship with the credit institution is young[39]

38 In the estimate in equation [2], this is a vector that alternatively includes the dummy variables SME, single bank *(SME*SingleBank_F)*, young relationship *(Young_F)*, NFCs with transactions maturing in 2020 Q2 *(Maturing)* and NFCs that benefited from a guaranteed loan during 2020 *(COVID_State_guarantee)*.

39 A banking relationship is considered young if it has lasted for less than the median age of the existing bank-firm relationships in 2019 Q4 (6.5 years).

(Young_F), those with transactions maturing in 2020 Q2 *(Maturing)* and those that benefited from a guaranteed loan during 2020 *(COVID_State_guarantee)*.

Analysing possible heterogeneous behaviours in the institutions' supply of credit to firms with these characteristics allows us to quantify the extent to which the firms whose financing was reduced or whose lending relationship was ended were selected by the bank, depending on its capacity to adjust its credit supply by using its voluntary buffers.

Overall, no significant differential effects were seen in institutions with less capital headroom in excess of their requirements (with the threshold defined as the median excess capital, as indicated above) (see Table A3.1 in Annex 3). However, in some cases statistically significant effects are seen in the post-pandemic rate of growth of new lending at institutions with smaller buffers when new lending is analysed considering heterogeneous firm-specific characteristics. Specifically, institutions whose capital headroom in excess of their requirements was lower than the median reduced lending to NFCs with recent banking relationships with the institution (≤6 years)[40] to a greater extent than to other firms (see the coefficient for the triple interaction *Post*BC*Young_F* in Table 3). The capital ratio coefficient is not statistically significant (columns (2), (3), (5) and (6)). This could be due to the low dispersion of this ratio across the different institutions.

Moreover, a series of additional regressions show no statistically significant differences in lending during the pandemic to firms with transactions maturing in the first quarter of the pandemic by institutions with smaller voluntary buffers and other institutions.[41] Additionally, lending during the pandemic by institutions with less capital headroom to NFCs banking with a single institution before the pandemic (2019 Q4) increased compared with lending to those with more than one banking relationship, although in this case the coefficients have a low significance, and only when province-level fixed effects are considered.[42]

Lastly, given that State-backed loans accounted for a very large share of the credit granted during the first months of the pandemic and could have different determinants, the analysis was repeated excluding new lending with COVID-19 State guarantees. This second analysis shows significant differential effects for institutions with less capital headroom in excess of their requirements (see Table 4). In particular, institutions with less capital headroom granted significantly less credit to NFCs after the outbreak of the pandemic. Comparison of this result with that obtained when considering all credit transactions (without excluding loans with COVID-19 State guarantees) shows the importance of State guarantees in bolstering the provision of credit to the economy and mitigating the economic effects of the pandemic, particularly by institutions with less room to do so (i.e. with lower voluntary buffers).

40 The age of 57.8% of all bank-firm relationships considered in the analysis was lower than or equal to the median relationship age in 2019 Q4 (6.79 years).

41 See Table A3.2 in Annex 3.

42 See Table A3.3 in Annex 3.

When the heterogeneity of the effects is analysed by firm characteristic, excluding State-backed loan transactions, the previous results hold true in qualitative terms[43] for NFCs with young banking relationships. Thus, a statistically significant reduction can be seen in the credit supplied by institutions with less capital headroom in excess of their requirements to NFCs with which they had a more recent banking relationship, compared with other institutions. The same is true for firms with loan transactions maturing in the first quarter of the pandemic.[44]

43 See Table A3.4 in Annex 3.

44 In this case, the statistical significance of the coefficient is lower (10%).

7 Conclusions

This document analyses the usability of both regulatory and voluntary capital buffers in the context of the crisis generated by the outbreak of the COVID-19 pandemic. This is a very relevant issue, as the rationale behind the implementation of the regulatory capital buffer framework was to generate additional capital headroom that banks can use to absorb losses in crisis situations, without being penalised for using Pillar 1 capital and without the cost that a drastic reduction in lending to hold their capital ratios stable would entail for society.

First, an analysis was conducted for Spanish banks of the extent to which the usability of macroprudential buffers is limited by parallel leverage ratio requirements. The overlap between both requirements was found to be very limited, although it increased slightly during 2020. Moreover, it does not affect all institutions evenly. In the future, this analysis will need to be extended to study the interaction between these requirements and the final MREL, which has not yet entered into force.

The impact of the existing voluntary capital buffers and overall solvency level on bank stock prices and investment funds' holdings of these shares was subsequently analysed. Panel data on euro area banks and investment funds were used in this case. The results show that share prices of banks with lower voluntary capital buffers tended to fare worse. Investment funds were also more inclined to sell shares of banks with smaller voluntary capital buffers than shares of banks with more capital headroom in excess of requirements.

Lastly, the impact of capital buffers on the provision of financing to non-financial corporations in Spain was analysed. In general, when overall lending is considered the effects don't vary depending on the voluntary capital buffers. However, significant negative effects were identified on the supply of loans from banks with smaller voluntary buffers to companies with which they had a more recent banking relationship. Moreover, when loans with COVID-19 public guarantees are excluded from the analysis, institutions with lower voluntary buffers are found to have granted significantly less credit to NFCs since the start of the pandemic. This result, compared with that obtained when all credit transactions are considered, seems to highlight the importance of State guarantees as an instrument to meet firms' financing needs and to bolster the provision of credit to the economy during the worst of the COVID-19 crisis.

In sum, the analyses conducted in this document show how important it is for institutions to have sufficient voluntary capital buffers in excess of capital requirements. In this regard, looking ahead, it would be interesting to study the extent to which building up regulatory buffers such as the CCyB during economic upswings could help increase voluntary capital buffers in crisis periods by releasing these previously built-up buffers.

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Annex 1 Calculation of the overlap between the combined buffer requirements and the leverage ratio

In calculating the overlaps the following should be borne in mind: (i) capital buffers must be met with CET1 capital; (ii) minimum risk-based requirements include CET1 components but also tier 1 (common equity tier 1 and additional tier 1 capital, T1 = CET1 + AT1) and total capital components (tier 1 and tier 2, TC = CET1 + AT1 + T2); (iii) leverage ratio requirements are in terms of tier 1 capital; and (iv) MREL can be met with total capital and eligible liabilities. Thus, for example, for there to be an overlap between the buffers and the leverage ratio (LR), the LR requirement that must be met with CET1 capital (because the institution does not have enough AT1 capital) must be bigger than the risk-based CET1 requirement (plus any part of the risk-based requirements in terms of T1 or TC that must be met with CET1 capital). The formula to calculate the overlaps with the leverage ratio, also used in ESRB (2021), is:

$$O_i = \min.(CBR_i, \max.(\underbrace{0, LR_i - AT1_i}_{\text{LR requirement to be met with CET1}} - \underbrace{(RR_{CET1,i} + CS_{AT1,i} + CS_{T2,i})}_{\text{Risk-based requirement to be met with CET1}}), \quad [1]$$

In this equation, O_i is the overlap of institution i; CBRi is the combined buffer requirement; LR_i is the leverage ratio requirement, $AT1_i$ is the additional tier 1 capital, $RR_{CET1,i}$ is the risk-based requirement in terms of CET1 capital, and $CS_{AT1,i}$ and $CS_{T2,i}$ are the additional tier 1 and tier 2 capital shortfalls (the part of these requirements that needs to be met with CET1), defined as:

$$CS_{AT1,i} = \max.(0, RR_{T1,i} - RR_{CET1,i} - AT1_i), \; CS_{T2,i} = \max.(0, RR_{TC,i} - RR_{T1,i} - T2_i - EAT1_i), \quad [2]$$

In this equation, $EAT1_i$ is the excess additional tier 1 capital that remains after meeting the T1 risk-based requirements, defined as:

$$EAT1_i = \max.(0, AT1_i - (RR_{T1,i} - RR_{CET1,i})) \quad [3]$$

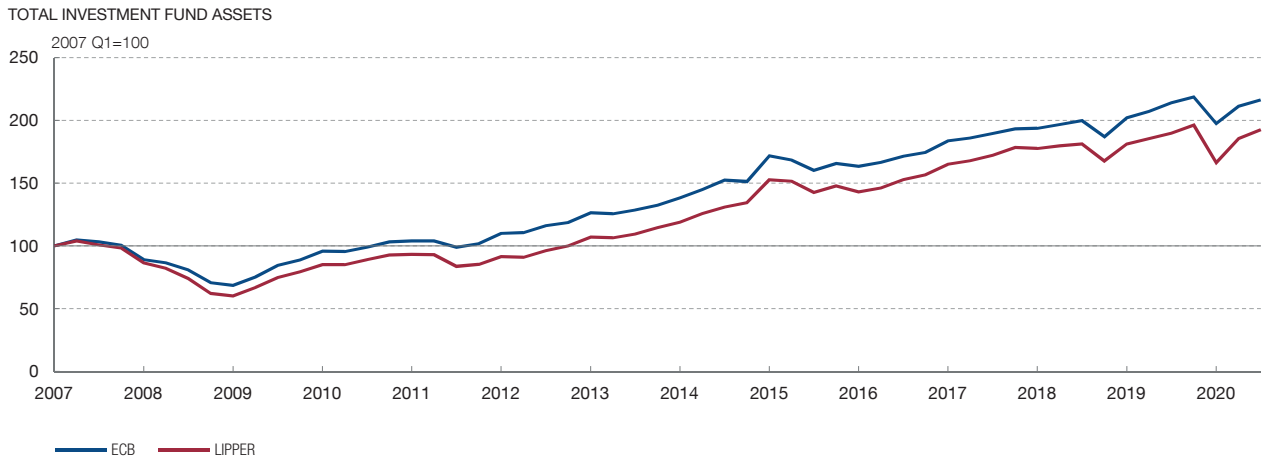
Annex 2 Representativeness of the Lipper fund sample

The chart below compares the performance of the assets of Lipper investment funds with those of the euro area fund industry, based on European Central Bank (ECB) statistics. The analysis focuses on equity, fixed-income and mixed funds, which together make up the bulk of the sector. Broadly, the performance of Lipper fund assets is quite similar to that of the ECB aggregate. They could therefore be a representative sample of this type of vehicle in the euro area.

Chart A2.1

COMPARISON OF TOTAL ASSETS IN TWO DATABASES

The data provided by Lipper follow a similar patern to the ECB statistics.



SOURCE: Banco de España.

Annex 3 Additional results

Table A3.1

IMPACT ON NEW CREDIT COMMITMENT GROWTH

When all lending is considered, without excluding State-backed loans, no statistically significant differences are seen in lending by institutions with less capital headroom in excess of their minimum requirements compared with other institutions.

	(1)	(2)	(3)	(4)	(5)	(6)
*Post*BC*	-0.089	0.043	-0.172	0.045	0.152	-0.067
	(0.691)	(0.696)	(0.711)	(0.665)	(0.670)	(0.685)
Bank: CET1 ratio (%)		0.295*	0,224		0.306*	0.258
		(0.166)	(0.171)		(0.161)	(0.165)
Controls for bank characteristics	N	Y	Y	N	Y	Y
Controls for firm characteristics	N	N	Y	N	N	Y
Bank fixed effects	Y	Y	Y	Y	Y	Y
Time period fixed effects	Y	Y	Y	Y	Y	Y
Sector-time period fixed effects	Y	Y	Y	Y	Y	Y
Postcode-time period fixed effects	Y	Y	Y	N	N	N
Size-time period fixed effects	Y	Y	Y	Y	Y	Y
Province-time period fixed effects	N	N	N	Y	Y	Y
No of observations	813,315	813,315	772,824	813,315	813,315	772,824
R^2	0.390	0.390	0.390	0.353	0.353	0.351

SOURCE: Banco de España.
NOTE: This table shows the results for the specification in equation [2] of the general text, not considering heterogeneous effects in lending by credit institutions with smaller voluntary buffers (i.e. not including the triple interactions *Post*BC*θ).* State-backed loans are excluded from the analysis. The dependent variable is the quarterly growth rate of new credit commitments from bank b to firm f in period t, with the quarter as the time unit. The variable *BC* is a dummy that takes the value one if institutions' distance to their combined capital requirements is equal to or less than the median distance of all systemic Spanish institutions at end-2019, and zero otherwise. The initial specification (columns (1) and (4)) includes bank, time (quarter), industry-time (quarter) and location-time (quarter) fixed effects. Columns (1) to (3) take the province as the location level in the definition of the fixed effects, columns (4) to (6) consider the postcode instead. The initial specification is gradually saturated to include in columns (2) and (4), in addition to the CET1 ratio (%) (which is reported separately from the other control variables given its importance), other controls for banks: the liquidity ratio, the deposit-to-asset ratio (%), ROA (%), ln(assets) and the ratio of provisions to assets (%). Additionally, columns (3) and (6) include other controls for firms: ROA (%), the liquidity ratio (%), cost of borrowing (%), the permanent employee ratio (%), the solvency ratio (%) and the working capital ratio (%). Standard errors in brackets are robust clustered at bank level. Asterisks *, **, *** indicate that the coefficient estimate is significant at 10%, 5% and 1%, respectively.

Table A3.2

IMPACT ON NEW CREDIT COMMITMENT GROWTH. HETEROGENEOUS EFFECTS: NON-FINANCIAL CORPORATIONS WITH A BANK RELATIONSHIP ENDING IN 2020 Q2

Institutions with less capital headroom in excess of their requirements did not reduce lending to a greater extent to firms whose banking relationship with them ended in 2020 Q2.

	(1)	(2)	(3)	(4)	(5)	(6)
*Post*BC*	1.013	1.248	1.021	0.861	1.064	0.833
	(0.999)	(1.004)	(1.024)	(0.948)	(0.952)	(0.972)
Maturing	-1.849	-1.853	-1.186	-1.556	-1.556	-0.814
	(5.533)	(5.527)	(5.642)	(5.209)	(5.206)	(5.286)
*Post*Maturing*	1.961	2.100	1.812	1.495	1.634	1.371
	(1.299)	(1.300)	(1.327)	(1.241)	(1.242)	(1.269)
*Post*BC*Maturing*	-1.978	-2.154	-2.075	-1.474	-1.642	-1.572
Bank: CET1 ratio (%)		0.293*	0.218		0.306*	0.249
		(0.166)	(0.171)		(0.161)	(0.165)
Controls for bank characteristics	N	Y	Y	N	Y	Y
Controls for firm characteristics	N	N	Y	N	N	Y
Bank fixed effects	Y	Y	Y	Y	Y	Y
Time period fixed effects	Y	Y	Y	Y	Y	Y
Sector-time period fixed effects	Y	Y	Y	Y	Y	Y
Province-time period fixed effects	Y	Y	Y	N	N	N
Size-time period fixed effects	Y	Y	Y	Y	Y	Y
Postcode-time period fixed effects	N	N	N	Y	Y	Y
No of observations	813,315	813,315	772,824	813,315	813,315	773,287
R^2	0.390	0.390	0.390	0.353	0.353	0.351

SOURCE: Banco de España.
NOTE: This table shows the results for the specification in equation [2] of the general text, considering heterogeneous effects in lending to firms with a banking relationship ending in 2020 Q2, the first whole quarter under the pandemic. The dependent variable is the quarterly growth rate of new credit commitments from bank b to firm f in period t, with the quarter as the time unit. The variable *BC* is a dummy that takes the value one if institutions' distance to their combined capital requirements is equal to or less than the median distance of all systemic Spanish institutions at end-2019, and zero otherwise. The initial specification (columns (1) and (4)) includes bank, time (quarter), industry-time (quarter) and location-time (quarter) fixed effects. Columns (1) to (3) take the province as the location level in the definition of the fixed effects, columns (4) to (6) consider the postcode instead. The initial specification is gradually saturated to include in columns (2) and (4), in addition to the CET1 ratio (%) (which is reported separately from the other control variables given its importance), other controls for banks: the liquidity ratio, the deposit-to-asset ratio (%), ROA (%), Ln(assets) and the ratio of provisions to assets (%). Additionally, columns (3) and (6) include other controls for firms: ROA (%), the liquidity ratio (%), cost of borrowing (%), the permanent employee ratio (%), the solvency ratio (%) and the working capital ratio (%). Standard errors in brackets are robust clustered at bank level. Asterisks *, **, *** indicate that the coefficient estimate is significant at 10%, 5% and 1%, respectively.

Table A3.3

IMPACT ON NEW CREDIT COMMITMENT GROWTH. HETEROGENEOUS EFFECTS: NON-FINANCIAL CORPORATIONS THAT DO BUSINESS WITH ONLY ONE BANK

Since the onset of the pandemic, new lending to firms that did business with only one bank decreased. However, institutions with less capital headroom in excess of their requirements appear to have increased lending to NFCs that did business with only one bank to a greater extent. This result should be taken with caution, as the coefficient for the triple interaction *Post*BC*SingleBank_F* is statistically significant at 1%.

	(1)	(2)	(3)	(4)	(5)	(6)
*Post*BC*	-0.560	-0.432	-0.645	-0.376	-0.275	-0.461
	(0.735)	(0.740)	(0.752)	(0.709)	(0.714)	(0.727)
*Post*SingleBank_F*	-3.588**	-3.638**	-3.878**	-3.034*	-3.085*	-3.055*
	(1.826)	(1.830)	(1.936)	(1.741)	(1.745)	(1.820)
*Post*BC*SingleBank_F*	3.295*	3.325*	3.568*	2.908*	2.941*	2.917
	(1.847)	(1.850)	(1.960)	(1.760)	(1.764)	(1.843)
Bank: CET1 ratio (%)		0.290*	0.219		0.304*	0.256
		(0.166)	(0.171)		(0.161)	(0.165)
Controls for bank characteristics	N	Y	Y	N	Y	Y
Controls for firm characteristics	N	N	Y	N	N	Y
Bank fixed effects	Y	Y	Y	Y	Y	Y
Sector-time period fixed effects	Y	Y	Y	Y	Y	Y
Province-time period fixed effects	Y	Y	Y	N	N	N
Size-time period fixed effects	Y	Y	Y	Y	Y	Y
Postcode-time period fixed effects	N	N	N	Y	Y	Y
No of observations	813,315	813,315	772,824	813,315	813,315	772,824
R^2	0.390	0.390	0.390	0.353	0.353	0.351

SOURCE: Banco de España.
NOTE: This table shows the results for the specification in equation [2] of the general text, considering heterogeneous effects for firms that did business with only one bank in 2019 Q4. The dependent variable is the quarterly growth rate of new credit commitments from bank b to firm f in period t, with the quarter as the time unit. The variable *BC* is a dummy that takes the value one if institutions' distance to their combined capital requirements is equal to or less than the median distance of all systemic Spanish institutions at end-2019, and zero otherwise. The variable *SingleBank_F* takes the value one if the NFC did business with only one bank in 2019 Q4 and zero otherwise. The initial specification (columns (1) and (4)) includes bank, time (quarter), industry-time (quarter) and location-time (quarter) fixed effects. Columns (1) to (3) take the province as the location level in the definition of the fixed effects, columns (4) to (6) consider the postcode instead. The initial specification is gradually saturated to include in columns (2) and (4), in addition to the CET1 ratio (%) (which is reported separately from the other control variables given its importance), other controls for banks: the liquidity ratio, the deposit-to-asset ratio (%), ROA (%), ln(assets) and the ratio of provisions to assets (%). Columns (3) and (6) include other controls for firms: ROA (%), the liquidity ratio (%), cost of borrowing (%), the permanent employee ratio (%), the solvency ratio (%) and the working capital ratio (%). Standard errors in brackets are robust clustered at bank level. Asterisks *, **, *** indicate that the coefficient estimate is significant at 10%, 5% and 1%, respectively.

Table A3.4

IMPACT ON NEW CREDIT COMMITMENT GROWTH, EXCLUDING LOANS WITH COVID-19 STATE GUARANTEES. HETEROGENEOUS EFFECTS: NON-FINANCIAL CORPORATIONS WITH A RECENT BANKING RELATIONSHIP

When State-backed loans are excluded, institutions with less capital headroom in excess of their requirements reduced lending to firms with more recent banking relationships to a greater extent.

	(1)	(2)	(3)	(4)	(5)	(6)
*Post*BC*	0.319	0.277	-0.030	0.114	0.055	-0.235
	(0.664)	(0.666)	(0.678)	(0.654)	(0.656)	(0.668)
*Post*1.Young_F*	5.105 ***	5.202 ***	4.746 ***	4.424 ***	4.518 ***	4.139 ***
	(1.005)	(1.006)	(1.029)	(0.975)	(0.976)	(1.000)
*Post*BC*Young_F*	-5.042 ***	-4.992 ***	-4.515 ***	-4.348 ***	-4.292 ***	-3.896 ***
	(1.014)	(1.016)	(1.039)	(0.984)	(0.986)	(1.010)
Bank: CET1 ratio (%)		-0.261 **	-0.292 **		-0.267 **	-0.292 **
		(0.117)	(0.120)		(0.113)	(0.116)
Controls for bank characteristic	N	y	Y	N	Y	Y
Controls for firm characteristics	N	N	Y	N	N	Y
Bank fixed effects	Y	Y	Y	Y	Y	Y
Time period fixed effects	Y	Y	Y	Y	Y	Y
Sector-time period fixed effects	Y	Y	Y	Y	Y	Y
Province-time period fixed effect	Y	Y	Y	N	N	N
Size-time period fixed effects	Y	Y	Y	Y	Y	Y
Postcode-time period fixed effect	N	N	N	Y	Y	Y
No of observations	767,746	767,746	729,225	767,746	767,746	729,225
R^2	0.386	0.386	0.386	0.348	0.348	0.346

SOURCE: Banco de España.
NOTE: This table shows the results for the specification in equation [2] of the general text, considering heterogeneous effects for firms that have a relatively recent banking relationship with the institution *(Young_F).* State-backed loans are excluded from the analysis. The dependent variable is the quarterly growth rate of new credit commitments from bank b to firm f in period t, with the quarter as the time unit. The variable *BC* is a dummy that takes the value one if institutions' distance to their combined capital requirements is equal to or less than the median distance of all systemic Spanish institutions at end-2019, and zero otherwise. The variable *Young_F* takes the value one if the NFC has a relatively recent relationship with the lender (of less than the median relationship age in 2019 Q4) and zero otherwise. The initial specification (columns (1) and (4)) includes bank, time (quarter), industry-time (quarter) and location-time (quarter) fixed effects. Columns (1) to (3) take the province as the location level in the definition of the fixed effects, columns (4) to (6) consider the postcode instead. The initial specification is gradually saturated to include in columns (2) and (4), in addition to the CET1 ratio (%) (which is reported separately from the other control variables given its importance), other controls for banks: the liquidity ratio, the deposit-to-asset ratio (%), ROA (%), Ln(assets) and the ratio of provisions to assets (%). Additionally, columns (3) and (6) include other controls for firms: ROA (%), the liquidity ratio (%), cost of borrowing (%), the permanent employee ratio (%), the solvency ratio (%) and the working capital ratio (%). Standard errors in brackets are robust clustered at bank level. Asterisks *, **, *** indicate that the coefficient estimate is significant at 10%, 5% and 1%, respectively.

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