How to release capital requirements during a pandemic? Evidence from euro area banks

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Abstract

This paper investigates the impact of the capital relief package adopted to support euro area banks at the outbreak of the COVID-19 pandemic. By leveraging confidential supervisory and credit register data, we uncover two main findings. First, capital relief measures support banks' capacity to supply credit to firms. Second, not all measures are equally successful. Banks adjust their credit supply only if the capital relief is *permanent* or implemented through established processes that foresee long release periods and affect their ability to distribute dividends. By contrast, discretionary relief measures are met with limited success, possibly owing to the uncertainty surrounding their capital replenishment path or because they did not affect dividend policy. Moreover, requirement releases were more effective for banks with a low capital headroom over requirements and did not trigger additional risk-taking. These findings provide key insights on how to design effective bank capital requirement releases in crisis time.

JEL classification: E61; G01; G18; G21

Keywords: Bank capital requirements; Countercyclical policy; Macroprudential policy; Credit register; Coronavirus

Non-technical summary

A key lesson of the Great Financial Crisis pointed to the benefits of using bank capital countercyclically, with banks accumulating capital in good times and using it to absorb losses and provide credit to the real economy during crisis times. As the COVID-19 pandemic broke out, European authorities put this lesson to the test by relaxing several capital constraints to help banks sustain the shock and meet the surge in credit demand.

This paper analyses the effects of two types of capital relief measures: capital requirement reductions and the flexibility granted in meeting supervisory capital expectations. First, authorities *reduced capital requirements* for Common Equity Tier 1 (CET1) capital, either on a permanent basis, or on a temporary basis within the macroprudential framework. These measures were: 1) the frontloading of new rules in the composition of the Pillar 2 requirement, allowing banks to partly use Additional Tier 1 and Tier 2 capital instruments; and 2) the reduction of the Combined Buffer Requirement, on which bank can draw in case of need, but triggering dividend restrictions. Second, prudential authorities adopted out-of-the framework supervisory recommendations allowing banks to *operate below* the Pillar 2 Guidance (P2G) during the pandemic. The P2G is a capital *demand* from the authority, but it is not legally binding: while its breach might lead to supervisory actions, it does not imply automatic sanctions.

Using credit register and supervisory data, and controlling for a vast range of other support measures (monetary, fiscal and prudential) adopted at the outbreak of the COVID-19, we investigate the impact of both types of capital relief measures on corporate credit supply at the bank-firm level.

We uncover two main results. First, capital relief measures were successful in supporting credit supply and did not result in unwarranted risk-taking - overall vindicating the expansionary merits of releasing capital measures in crisis time. Second, we show that actions trump words, as the type of relief matters: while capital requirement releases supported lending, allowing banks to operate below the P2G had no significant impact on banks' lending behaviour during the pandemic. As such, for relief measures to successfully convince banks to use the freed capital, clarity and predictability with regards to future replenishment paths are key. In addition, the requirement releases were more effective for banks with less capital headroom above the P2G, suggesting that the policies were also successful in mitigating their buffer usability constraints.

These findings have important implications for banking regulation. First, the countercyclical relaxation of capital requirements is effective in mitigating the risk of credit rationing in crisis times, and does not promote risk-taking in the form of lending towards insolvent firms. Second, results suggest that the design of the relief measure is key for its success: quantitative reductions in requirements with clear restrictions attached seem to be more effective than temporary changes in the capital that banks are asked to put aside, but without automatic sanction in case of breach. Third, banks appear reluctant to draw on their *in place* capital buffers, implying that the positive effect of capital relief on lending is stronger for those banks with an ex-ante smaller capital space. This suggests a case for having more *releasable* buffers.

1 Introduction

What is the impact of releasing bank capital requirements on credit supply during economic downturns? Does the nature of the release matter for its effectiveness? These questions have been at the forefront of the academic and policy debate on the design of prudential policies, and have been discussed with renewed intensity since the Great Financial Crisis (thereafter GFC) that led to the Basel III reform. The COVID-19 pandemic provides an ideal setting to test the functioning of the post-GFC prudential frameworks. The exogenous nature of the pandemic shock and the different types of capital requirement relief measures allow us to investigate the effectiveness of the prudential frameworks in place and to draw important lessons for their future design.

In this context, the capital requirement relief measures adopted in the euro area during the COVID-19 pandemic offer an attractive empirical setting to investigate these questions. The institutional setting in place ensures a level-playing field with common rules and, for significant institutions, a centralised supervision by the Single Supervisory Mechanism (SSM). At the same time, the determination of macroprudential capital buffers at the country level allows for an interesting source of policy heterogeneity in the empirical analysis. Moreover, the availability – for all countries in the euro area – of corporate loan-level credit register data and of supervisory data gives the opportunity to explore these developments at the most granular level.

EU banks face three types of capital requirements (see Figure 1). First, *minimum requirements*, that are composed of a constant Pillar 1 element (8% of Risk Weighted Assets, with at least 4.5% of CET1 ratio) and the bank-specific Pillar 2 Requirement (P2R), which before the Covid-19 crisis was supposed to be fully met with CET1 capital. Second, the *Combined Buffer Requirements* (CBR) sit on top of the minimum requirements, the sum of the two forming the Overall Capital Requirements (OCR). Dipping into the CBR triggers restrictions on dividend distributions, bonuses and coupon payments according to the Maximum Distributable Amount (MDA) mechanism (Svoronos and Vrbaski, 2020), and forces banks to communicate a recovery plan to the supervisor. Finally, on top of the CBR sits the *Pillar 2 Guidance* (P2G). This is not strictly speaking a requirement as it is not legally binding and corresponds to "a bank-specific recommendation that indicates the level of capital that the ECB expects banks to maintain in addition to their binding capital requirements."[1] Breaching the P2G does not trigger immediate

[1]For more information: https://www.bankingsupervision.europa.eu/banking/srep/html/p2g.en.html

restrictions but the supervisor may decide to take tailored measures.[2]

In March 2020, banks were faced with the COVID-19 pandemic and the prospect of a simultaneous surge in credit losses and in corporate credit demand, on the back of unprecedented liquidity needs by firms. Among a package of support measures, euro area and national authorities relaxed capital requirements to allow banks to absorb expected losses and meet the surge in credit demand. This effort took two forms. First, a *reduction in the level* of some requirements. Second, supervisors offered banks the *possibility to operate below the P2G* during the COVID period.

The reduction in the level of requirements came about through two channels. First, on March 12, 2020, the ECB announced the frontloading of a change in the composition of the P2R, initially planned for January 1st, 2021: with this change, banks were no longer forced to meet 100% of their P2R with CET1 capital, but only 56.25%, the rest being met with a mixture of Additional Tier 1 and Tier 2 capital.[3] As such, banks with excess AT1 and T2 immediately benefited from a reduction in their CET1 requirements. Second, several national authorities reduced the CBR by releasing partially or fully the counter-cyclical buffer (CCyB) and the systemic risk buffers (SyRB), two of the three components of the CBR. Both actions resulted in a reduction of the OCR. On the contrary, the possibility for banks to operate below the P2G left this capital expectation in place, while temporarily waiving the consequences of a breach.

This paper investigates whether policy measures introduced through regulatory actions or supervisory recommendations were equally effective in delivering a countercyclical policy impulse. To the extent that capital requirements, and by extension their releases, impact banks' capital planning and the adjustments in their balance sheets towards targets (Berger et al. 2008; Couaillier 2021), it is plausible to expect that changes in capital requirements need to be credible and non-discretionary to achieve their intended effects (Martynova et al. 2020, Walther and White 2020). For example, buffer relief measures included permanent releases or releases governed by macroprudential frameworks, and were clear on the process that would be followed to rebuild the buffers.[4] By contrast, recommendations to use the available P2G buffer were

[2] https://www.bankingsupervision.europa.eu/press/publications/newsletter/2016/html/nl161116.en.html

[3] In details, the same composition rule now applies for the Pillar 1 (8%) and the P2R: at least 56.25% of CET1 and at most 25% of Tier 2. Shortfalls in T2 (AT1) must be compensated by additional AT1 or CET1 (CET1).

[4] For example, the Irish authority referred explicitly to its CCyB Framework when notifying banks that the CCyB would be released to zero in April 2020, see: https://www.centralbank.ie/news/article/press-release

largely conveyed through press releases and speeches, leaving banks with public communication as the main input to inform their capital planning decisions.

We rely on granular loan-level data, using confidential bank supervisory data and the credit register of the European System of Central Banks (AnaCredit) to overcome identification challenges (as in Altavilla et al. 2021; Couaillier et al. 2022). We employ loan-level data to control for credit demand effects using firms with multiple bank relationships and introducing firm-time fixed effects (Khwaja and Mian, 2008). Second, we control for several pandemic-related measures that affected bank credit supply: most notably, at the loan-level, government guarantee and moratoria schemes. Prompt and forceful policy actions assuaged the worst economic effects of the pandemic. Government guarantees on new loans helped firms obtain bank loans to roll over liquidity and to satisfy working capital needs, while reducing the credit risk borne by banks for the provision of these loans; moreover, debt service moratoria have been widely introduced to mitigate firm liquidity concerns. To control for the confounding effect of these measures on bank lending, we match *AnaCredit* with bank-firm level information on payment moratoria and government guarantees. Third, we account for monetary and prudential measures by including bank-level exceptional liquidity measures, the Targeted Long Term Refinancing Operations III (TLTRO III). Altavilla et al. (2020) show that in the absence of TLTRO III lending to firms would have been 3 percentage points lower. Barbiero et al. (2022) find that the increase in lending supported by the recalibration of the TLTRO III at the onset of the pandemic was not accompanied by excessive risk-taking, especially for banks with low intermediation margin. Fourth, we control for the ECB recommendation to suspend dividend distribution during the COVID pandemic. Martinez-Miera and Vegas (2021) find that banks extended significantly more credit to non-financial corporations after the entry into force of the recommendation. At the same time, Matyunina and Ongena (2022) argue that dividend restrictions, by increasing uncertainty about future supervisory actions and undermining banks' market valuation, may have somehow affected banks' willingness to make use of the capital buffers. Finally, to strengthen the robustness of our findings, we also use instrumental variable techniques to control for bank-specific risks which could be endogenously driving our results on permission to operate below the P2G. To do so, we instrument P2G levels for 2020 with expected capital depletion data from the 2017 EBA stress test that served as the basis to set those P2G levels.

-statement-central-bank-of-ireland-18-march-2020

To preview our main findings, we uncover two key results. First, capital relief measures were successful in supporting credit supply, vindicating the expansionary merits of counteryclical capital requirement release in crisis times (Jimenez et al. 2017; Sivec et al. 2022). Second, *actions trump words* as the type of relief matters: while capital requirement releases supported lending, allowing banks to operate below the P2G had no significant impact on banks' lending behaviour during the pandemic. As such, for relief measures to successfully convince banks to use the freed capital, clarity and predictability with regards to their future replenishment paths is key. While the change in P2R composition rule was permanent, and the release of the CBR took the form of an official rate adjustment, with well established frameworks regarding potential future replenishment and release periods, banks may have been concerned by the uncertainty surrounding the permission to operate below the P2G going forward.[5] In addition, contrary to other capital requirements, the level of the P2G is not centrally disclosed by the SSM although some banks inform the market through their annual reports: this additional uncertainty may have made the use of the measure more difficult, as from the outside it was not always possible to know the exact size of the corresponding capital relief. Finally, while breaching the MDA trigger point results in immediate constraints, breaching the P2G does not, so banks may react less to communication on the usability of the P2G.

We also conduct additional analyses to investigate further the impact of capital requirement releases. We find that they were more effective for banks with a smaller capital headroom over buffers, suggesting that the policies mitigated in some way the buffer usability constraints they faced. Additionally, the expansionary effect of requirement releases did not translate into excessive risk-taking. Credit growth did not increase for firms with impaired credit, assuaging concerns regarding unwarranted support to zombie firms.

Our paper contributes to a growing literature which studies the effect of changing capital requirements on bank lending. The impact of the level of bank-specific capital surcharges (Berrospide and Edge, 2010; Berrospide and Edge, 2019; Gropp et al. 2019; De Jonghe et al. 2020) or structural buffers (Behn and Schramm, 2020; Degryse et al. 2020; Cappelletti et al. 2022) on bank lending has been extensively reviewed. Some authors have studied the effect of

[5]While the recommendation on the usability of the P2G was adopted in March 2020, the timeline of the P2G usability was clarified only at the end of July 2020, when the ECB publicly communicated that the P2G release would extend at least until end-2022. But in fact, also in response to the liquidity shock to firms at the time of the Covid-19 outbreak, the surge in credit occurred to a large extent in 2020 Q2. For further details on the timeline, see: https://www.bankingsupervision.europa.eu/press/pr/date/2020/html/ssm.pr200728_1~42a74a0b86.en.html

dynamic capital requirements (Aiyar et al. 2014; Auer, Matyunina and Ongena, 2022; Imbierowicz et al. 2018; Basten, 2019; De Jonghe et al. 2020). However, most of those studies investigate *increases* in capital requirements in *quiet times*. The literature on capital requirement *releases* in *crisis times* is instead very scarce. Among them, Jimenez et al. (2017) speak to this issue by investigating the impact of dynamic provisioning in Spain during its tightening period before the GFC and its relaxation thereafter, while Sivec et al. (2022) investigate the release of the Slovenian prudential filter during the GFC. Our paper contributes to this literature by being the first study to assess the effectiveness of capital requirement relief measures in the Basel III framework.

As such, our paper provides a contribution to the extant literature on rules vs. discretion in the design and the implementation of prudential policy (Walther and White, 2020; Maddaloni and Scopelliti, 2019; Agur and Sharma, 2013). While in the 1990s supervisory guidance was actively used in the US (Elliot et al. 2013), in Europe discussions on the balance between rules and discretion in the macroprudential realm advocated early on for a greater emphasis on rules. The latter, which eventually morphed into frameworks, would be used to determine clear policy reactions to unfolding economic developments, both when building and depleting capital buffers (Quagliarello and Libertucci, 2010). We show that in a situation of large uncertainty, as that created by the pandemic, only prudential measures which are released within known frameworks were effective in changing the lending behaviour of banks. We think this is related to issues of *permanency*, or at least *"predictability"*, which allow banks to adapt their expectations and, in turn, adjust their balance sheets and capital targets. This result echoes those documented for the 2013 US Supervisory Guidance on Leveraged Lending which had an impact on speculative-grade loan origination only after the related FAQs were published in the subsequent year (Calem et al. 2020). To the best of our knowledge, we are the first to investigate how the design of the capital requirement relief affects its effectiveness and to inform the discussion on "rules versus discretion" in the context of capital requirement releases.

Finally, we also differ from the previous literature in terms of data granularity and coverage. Earlier studies apply aggregate (Hancock et al. 1995; Lown and Morgan, 2006) or bank-level data (Peek and Rosengren, 2000) to the study of capital requirements and bank lending. However, bank-level data may be prone to endogeneity issues due to the omission of firm-level variables. Addressing this problem requires *perforce* bank lending and firm borrowing to be considered jointly to control for firm credit demand. Similarly to more recent studies

(Puri et al. 2011; Behn et al. 2016; Fraisse et al. 2020) we use loan-level analyses. However, while papers using loan-level analysis are mostly based on single country setting, we add to the relevant literature by resorting to *AnaCredit*, the credit register of the European System of Central Banks which allows us to exploit millions of loans in a multi-country setting.

The rest of the paper is organised as follow. Section 2 describes the econometric identification and introduces our data with useful descriptive statistics. Section 3 presents the results and Section 4 discusses additional analyses and robustness checks, while Section 5 concludes.

2 Econometric setting and data

2.1 Specification

We investigate the impact of regulatory capital relief measures by looking at bank lending quantities in the quarters around the outbreak of the Covid-19 crisis. Within the capital relief measures, we distinguish between those which resulted in an actual reduction of requirements for the CET 1 Ratio (both of a *permanent* or *transitory* nature) and the supervisory permission provided to banks to operate below certain capital demand. On the one hand, we investigate two distinct measures of capital requirement reduction (labelled as CAP REL): the front-loaded change in the composition of the P2R (the *permanent* reduction), and the reduction of the CBR (the *temporary* reduction). On the other hand, we also analyse whether allowing banks to operate below their assigned level of P2G supported lending. Our econometric strategy relies on the following identification:

$$\begin{aligned}\Delta Y_{f,b,c,t} =& \alpha CAP\,REL_{b,t} * PostCOVID_t + \gamma P2G_{b,t} * PostCOVID_t + \\ & \Phi\Sigma X_{b,t-1} + \Psi\Sigma Z_{f,b,t-1} + \eta_{f,t} + \mu_{c,t} + \rho_b + \epsilon_{f,b,t},\end{aligned} \tag{1}$$

with $\Delta Y_{f,b,c,t}$ being $\Delta credit_{f,b,c,t}$, i.e. the difference in the logarithm of the credit stock granted by bank b to firm f in quarter t. We progressively saturate the model with several combination of fixed effects. First, the firm-time fixed-effect $\eta_{f,t}$ is introduced to capture credit demand. Then, we add bank country-time fixed effects and bank fixed effects to capture all constant bank characteristics. Finally, we replace bank fixed effects with bank-firm fixed effects to capture not only constant bank-characteristics but also pre-existing long-term credit relations

between a bank and a firm.

We employ a large set of lagged bank-level variables ($X_{b,t}$) to control for bank-specific characteristics that can affect lending behaviour. Specifically, we use the CET1 ratio to control for bank solvency. The logarithm of total assets (TA.log) captures bank size, while the non-performing loans ratio (NPL) and the provisions to total assets ratio (PROVISION/TA) measure the credit quality of the loan portfolio. The risk weight density (RWA/TA), defined as the ratio between risk weighted assets and total original exposures, proxies for the riskiness of the banks' asset portfolio.[6] The net interest margin (NIM) measures the profitability of the credit portfolio while the cost-to-income ratio (CIR) captures business efficiency. The ratio of liquid assets over total assets (LIQUID/TA) is introduced to measure the liquidity of a banks' asset side while the ratio of deposits over total assets (DEP/TA) to account for a core element of its liabilities, and hence its funding structure. To account for a measure of *shadow* banking business model, the ratio of off-balance sheet exposures over total assets (OFF BS) is used. All the bank-specific control variables are lagged by one quarter and winsorised at the 2.5% level to limit the influence of outliers.

We control for the wide range of policy interventions introduced in the course of 2020: at the bank-firm level, we measure the share of loans under moratoria and guarantees to capture the impact that both policies had on firms' creditworthiness and on banks' lending incentives. At the bank level, we include the ratio of TLTRO III uptake over total assets to control for the effect of the monetary policy actions. We also control for the impact that recommendations on bank's dividend payments had on lending by including the ratio of dividends announced in early 2020 but not paid, divided by banks' risk weighted assets.

2.2 Data

2.2.1 Statistical sources

Our analysis relies on datasets collected from multiple confidential sources. First, bank-level data are based on several supervisory sources. Bank-level balance sheet as well as capital stack (Pillar 1 and 2), buffer requirements and capital guidance data are gathered from ECB Supervisory Statistics, while TLTRO take-up information is drawn from the ECB market operations

[6]The risk weights applied to banks' exposures depend also on the approach used by banks to compute risk-weighted assets: the Standardised Approach or the Internal-Rating Based (IRB) Approach. The choice of this approach may have some implications for bank lending, as in crisis times model-based regulation may foster a relative reduction in credit supply (Fiordelisi et al., 2021)

database. Information on the dividends that banks did not pay in 2020 following the supervisory recommendations is based on a confidential survey conducted by the SSM.

Bank-level data is matched with loan-level information from *AnaCredit*, the credit register of the European System of Central Banks which contains information on all individual bank loans to firms above €25,000 in the euro area.[7] *AnaCredit* encompasses information on key bank and borrower characteristics such as credit volumes, loan rates, firm location, firm size and firm sector. Importantly, *AnaCredit* collects unique data on the collateral received for each loan contract which allows us to identify whether the loan is subject to a public guarantee.[8] Furthermore, by using information on loan maturity dates at origination and checking whether these are extended following the pandemic outbreak, we are also able to identify which loan is benefiting from a payment moratoria. The data are collected by the European Central Bank from the national central banks of the Eurosystem in a harmonised manner to ensure consistency across countries. At the same time, we winsorise our data at the 2.5% level to ensure that reporting errors do not affect our results. Errors are clustered at the Firm-Quarter, Bank-Quarter, Firm-Bank levels.

2.2.2 Descriptive statistics

Our sample covers quarterly data from 2019 Q3 to 2020 Q4 and all *AnaCredit* exposures of Significant Institutions, i.e. large European banks directly supervised by the SSM.

Table A1 reports the descriptive statistics of the bank level variables employed. Panel A reports information on the capital relief measures. As P2G data is only available for the sample of banks under the direct supervision of the SSM, this restriction delimits our investigation perimeter to the Significant Institutions. The P2G relief is equal to the level of P2G existing at the beginning of 2020, as set in 2019 Q4. The P2R release is equal to the immediate relief from which banks benefited in Q2 2020 due to the frontloading in the change in composition rules. As such, a bank with ample excess AT1 and T2 benefited from a cut in the CET1 part of its P2R from 100% to 56.25%, while a bank with no excess AT1 nor T2 did not benefit from this measure at all. Finally, the CBR release corresponds to the reduction in CCyB and SyRB

[7] *AnaCredit* is the analytical credit register of the Eurosystem and additional documentation can be found here: https://www.ecb.europa.eu/stats/money_credit_banking/anacredit/html/index.en.html

[8] COVID guaranteed loans have been identified by using registry information (e.g. LEIs and RIAD codes) of the promotional lenders charged with this task in each country (for example, ICO in Spain, KFW in Germany, BPI in France and SACE/Fondo di Garanzia in Italy). In addition to the registry information of the guarantor, the starting date of the public guarantee scheme has also been used as an identifying device.

between Q4 2019 and Q2 2020. A striking feature of this data is how different the *quantum* of the combined requirement release is, with a mean of 0.7%, when compared to that of the potential relief due to the permission to operate below the P2G (activated via the discretionary channels described earlier) - which is nearly twice its size with a mean of 1.4%. The distribution of the overall requirement release is also presented graphically in Figure 2[9] which shows that some banks benefited from releases as large as 2% of their Risk Weighted Assets (RWA), while the bulk of the distribution benefited from releases as large as 1% of RWA.

In Panel B we complement the summary statistics with further details on the bank level data used in our analyses. For example, it shows that even the lower quartile of banks entered the pandemic with resilient balance sheets and capital ratios above 13%. NPL ratios had also decreased materially since the peaks observed in the aftermath of the GFC as the average NPL ratio in our sample stands at around 4%. The table further includes descriptive information on the amount of dividends which were not distributed over the course of 2020. The correlation matrix for the variables is presented in Table A3.

Turning to the matched bank-loan dataset, Panel C, shows that, on average, lending increased by 1.2% on a quarter-on-quarter basis during the overall sample, including the quarters before and after the pandemic outbreak. The summary statistics also show that the impact of fiscal policies on lending was material, albeit heterogeneously distributed across the cross section. We measure the two fiscal policies of interest as the share of a bank-firm loan relationship covered by a moratoria or by a government guarantee. With regards to the latter, the average share of bank-firm credit relationships benefiting from a government guarantee amounted to 8%. Furthermore, the standard deviation is high, suggesting that the cross-sectional heterogeneity in this regards is large. This is confirmed in the maximum figures which show that for some bank-firm pairs, the whole loan exchange was fully guaranteed. Finally, the table shows that our dataset contains more than six million observations, i.e. bank-firm quarterly observations on bank credit for firms having multiple lending relationships. In terms of country, most of our bank-firm pairs are located in Italy, France and Spain (Table A2).

[9]The levels of P2G could not be represented graphically owing to confidentiality reasons.

3 Results

Table A4 presents the results of the estimation for the baseline specification in equation (1). The table is divided in 4 columns where we progressively saturate the specification with fixed effects: the baseline specification in col. 1 includes firm-quarter fixed effects; the specifications in col. 2 and 3 include country-time and bank fixed effects, where the country refers to the nationality of the lender bank; finally, the specification in col. 4 presents firm-bank fixed effects at the level of lending relationship between borrower and lender. While the introduction of firm-quarter fixed effects is strictly required to control for credit demand, we believe that a robust analysis should also account for time-variant credit developments in national banking sectors and for bank-specific factors, in addition to the bank balance sheet controls. This is our benchmark specification. The inclusion of firm-bank fixed effects adds further robustness by controlling for characteristics of the lending relationships at the firm-bank level.

The results show that the reduction of capital requirements supported the expansion of credit volumes by significant euro area banks to non-financial corporations. Specifically, a 1% release of the P2R and the CBR (CAP REL) increases lending by about 1.2%-2.7% - depending on the econometric specification, while the permission to operate below the P2G does not show any effect on bank lending supply as the coefficients are always negative and statistically insignificant (columns 1-4). This suggests that the design of the relief measure is key for its effectiveness. First, P2R and CBR measures consisted in a reduction of official rates of requirements, in particular reducing the MDA trigger whose breach activates automatic restrictions. On the contrary, the possibility to operate below the P2G changes the consequence of a breach, which were already at the discretion of the supervisor, without eliminating the supervisory expectation. As such, the benefit of the change was less clear for banks. Second, and in line with the difference in the nature of the two reliefs, P2R/CBR and P2G measures also differed regarding the clarity of the replenishment rules. The change in P2R composition rules was permanent, while the reduction in CBR rates was transitory but set on an established basis, with rules regarding future rate increase decisions and notifications. As such, on the one hand, for the change in the P2R composition, banks knew that they would have not been asked to replenish it in the future, thereby making the released CET1 fully usable. On the other hand, the release of the CBR was made through well-defined regulatory frameworks improving the credibility of the release and, consequently, the time given for its replenishment. Indeed, banks knew that the build-up

of the CCyB would take at least 12 months and that it can be decided only after a turn in the credit cycle. On the contrary, the possibility to temporarily use the P2G freely was outside the scope of the framework, potentially feeding banks' concerns regarding future replenishment paths. In addition, also the different nature of these capital buffers could have contributed to raise different expectations about the different timing for their replenishment.[10]

Regarding the control variables, our results are in line with expectations. Government guarantee schemes and monetary policy measures - implemented to counter off the negative effect of the pandemic - explain most of the growth in bank lending supply. A 1 p.p. increase in the share of loans under government guarantees increase lending by about 0.22% (0.53% in column 4), while a 1 p.p. increase in the uptake of TLTRO III (relative to total assets) raise lending by 0.12%-0.14%. In addition, we document a negative and statistically significant relationship between the deposits-to-total assets ratio and bank lending during the pandemic. Banks relying on non-deposit sources of funds may have an increased sensitivity to the exceptional monetary policy tools implemented against the pandemic, thus being able to exploit favourable financing conditions and extend more credit than banks relying more on deposits as a source of funding (Disyatat, 2011).

4 Additional Empirical Analyses

In this section, we investigate whether capital requirement relief supported credit to banks with a limited capital management buffer on top of the P2G more than other banks. In addition, we also look at whether banks benefiting from capital relief measures extended more credit to riskier firms, suggesting an increase in their risk-taking behaviour which could harm financial stability.

4.1 Interaction with distance to P2G

As explained in Section 1, banks with limited excess capital may struggle to increase their lending supply during periods of financial distress as a breach of the CBR may trigger a series of restrictions in terms of dividend distributions, bonuses and coupon payments as well as negative

[10] In principle, markets could have expected a replenishment first of the P2G and only after of the CBR. In fact, given that different authorities are in charge of setting these buffers, no sequence on their replenishment was established or communicated at this regard, as the P2G is set by the ECB as Competent Authority for Significant Institutions, while the structural and cyclical buffers of the CBR are determined by national macroprudential authorities.

repercussions like market stigma effects - which may lead to higher funding costs - and heightened supervisory scrutiny (Couaillier et al. 2022), while in normal times breaching the P2G can trigger discretionary actions from the supervisor. Consequently, we hypothesize that, *ceteris paribus*, the benefits from capital requirement relief should be higher for those banks which entered the crisis with limited management buffers. To dig into this hypothesis, we augment the econometric identification strategy employed in equation 1 and interact our capital relief measures with the *ex-ante* shock distance to the P2G. Specifically, our econometric equation takes the following form:

$$\begin{aligned}\Delta Y_{f,b,c,t} = \alpha CAP\,REL_{b,t} * PostCOVID_t * Dist.P2GPreCOVID_b \\ + \gamma P2G_{b,t} * PostCOVID_t * Dist.P2GPreCOVID_b + \\ \Phi\Sigma X_{b,t-1} + \Psi\Sigma Z_{f,b,t-1} + \eta_{f,t} + \mu_{c,t} + \rho_b + \epsilon_{f,b,t}\end{aligned} \tag{2}$$

where the *Dist. P2G PreCOVID* variable is the difference between the CET1 ratio and the P2G level as of 2019 Q4. For consistency, we employ the same set of bank- and policy-specific control variables as in equation 1 and we saturate the model with the same combination of fixed effects. Our coefficient of interest here is α which indicates whether banks closer to the P2G, i.e. banks with smaller management buffer, benefit relatively more from the frontloading of the changes in the composition of the P2R and the release of the CCyB and SyRB.

The results reported in Table A5 are important for two reasons. First, the magnitude of the single coefficient (*CAP REL*PostCOVID*) is larger and the statistical significance improved (at the 1% level across all econometric specifications) in comparison to the baseline. This suggests that the effect of capital releases is stronger for banks with smaller capital headroom on top of the P2G. Second, the triple interaction term (CAP REL*PostCOVID*P2G PreCOVID) is negative and, in most of the specifications, statistically significant suggesting that the higher the pre-COVID distance to P2G the lower the effect of capital requirement releases on bank lending supply. Specifically, a 1 p.p. increase in the distance to the P2G prior to the pandemic leads to a 0.62%-0.72% decrease in the positive effect of capital requirement releases on credit provision. This result is in line with the analysis of Couaillier et al. (2022) which finds that, although

prudential authorities made clear at the beginning of the pandemic that banks were expected to use regulatory capital buffers to absorb losses and meet credit demand, banks did not show any intention to use such buffers. Nonetheless, the releases - by lowering regulatory capital requirements - enhanced the amount of capital available which is relatively more important for banks with limited management buffer, thus mitigating possible credit contractions coming from banks with little excess capital on top of the P2G.

4.2 Interaction with firm riskiness

The notion that more equity capital is indispensable to stifle risk-taking is at the heart of the Basel Capital Accords (Thakor, 2014; Dautović, 2020). A large literature also supports the view that higher capital requirements may curtail risk-taking behaviour since both managers and shareholders have more '*skin in the game*' and incentives to act prudently (Funlong and Keeley, 1989; Acharya et al., 2016). This opens up the question on whether lowering regulatory capital requirements either permanently - as in the case of the frontloading of the changes in the composition of the P2R - or temporarily to counter off economic downturns - as for the release of the CBR and the permission to operate below the P2G - poses concerns to financial stability because of stronger incentives for bank risk-taking. To investigates this issue, we follow the econometric identification strategy employed in equation 2 and use triple interaction terms between our capital relief measures and firms' riskiness. For this exercise, our econometric specification takes the following form:

$$\begin{aligned}\Delta Y_{f,b,c,t} = \alpha CAP\,REL_{b,t} * PostCOVID_t * L.IMPAIRMENT_b \\ + \gamma P2G_{b,t} * PostCOVID_t * L.IMPAIRMENT_b + \\ \Phi \Sigma X_{b,t-1} + \Psi \Sigma Z_{f,b,t-1} + \eta_{f,t} + \mu_{c,t} + \rho_b + \epsilon_{f,b,t}\end{aligned} \tag{3}$$

where L.IMPAIRMENT is a dummy taking the value 1 if bank$_b$ has identified and recognized loan impairments in existing credit relationships with firm$_f$.[11] This dummy is lagged by one

[11] Arguably, this dummy does not capture new loans granted to riskier firms without pre-pandemic bank relationships; however, they represent a tiny fraction of the sample. Importantly, for the firms having existing lending relationships with the bank, this variable captures the most accurate assessment of firm riskiness from the viewpoint of the bank, as based on the private information collected by the lender in the credit relationship.

quarter and computed at the bank-firm level. Again, we employ the same set of bank- and policy-specific control variables as in equation 1 and we saturate the model with the same combination of fixed effects. Our interest lies on the two triple interaction terms which may point to heighten bank risk-taking behaviour during the pandemic coming from banks benefiting the most from the capital requirement relief measures.

The results are reported in table A6 and are important for several reasons. First, the results are mostly in line with the baseline specification of Table A4 with respect to the effectiveness of the type of relief. Indeed, the coefficient for *CAP REL * PostCOVID* is statistically significant across specifications and with magnitude in line with the baseline regressions whilst the coefficient of *P2G*PostCOVID* is negative and statistically insignificant. This, once again, confirms that the requirement releases introduced within well-established frameworks, on a permanent or transitory basis, are more effective than relief measures based on supervisory communications. Second, the triple interaction (*CAP REL*PostCOVID*L.IMPAIRMENT*) is negative and statistically significant, indicating that the release of the P2R and the CBR did not increase bank risk-taking behaviour to more fragile firms.[12] On the contrary, the higher the size of capital requirement releases, the lower is the lending growth to firms for which banks recognized loan impairments. Therefore, banks benefiting from capital requirement releases during the pandemic increased lending relatively more to sounder firms, i.e firms able to constantly repay their debt without creating past due obligations. We do not find any particular effect from the triple interaction *P2G*PostCOVID*L.IMPAIRMENT*, which is never statistically significant in our specification.

4.3 Robustness

Tables A7 to A9 present some robustness analyses respectively for the effects of the permission to operate below the P2G and of the capital requirement releases (CBR and P2R).

The increase in credit volumes after the capital relief measures may come either from existing lending relationships between firms and banks or from new credit relationships. In Table A7 we explore whether, in the existing lending relationships, banks increased the credit volumes granted to firms. For this purpose, we replace the dependent variable: instead of the continuous quarterly change in log credit volume, we use a dummy taking the value 1 when the credit

[12] The coefficient for the triple interaction is not significant only in the specification reported in Column 4, using firm-bank fixed effects. As the impairment dummy is also defined at the level of individual firm-bank lending relationships, its effect is already captured by the firm-bank fixed effects

volume in lending relationships increased between $t-1$ and t and run a logit regression. It confirms the expansionary impact of the requirement releases and the absence of support from the permission to operate below the P2G.

One potential concern could be the potential endogeneity of the P2G, as this is set by banking supervisors based on the risk of banks. In fact, the P2G is a bank-specific recommendation that indicates the level of capital that the ECB expects banks to maintain in addition to their binding capital requirements and it serves as a buffer for banks to withstand stress. It is determined on the basis of the results of the regular EU-wide stress tests, which examine the impact an economic shock would have on banks' capital ratios. In particular, banks are assigned to different buckets based on the amount of capital depletion observed in the adverse scenarios of the stress test. These risk characteristics may be potentially relevant also to explain the lending behaviour of these banks. Therefore, it may be useful to address this potential endogeneity concern by capturing the exogenous components of the P2G level below which banks were allowed to operate during the pandemic. For this purpose, we develop a two-stage approach. First, we regress the P2G at the bank-level on the capital depletion observed in the results of the stress tests.[13] Afterwards, we compute the predicted values of the P2G based on the coefficient of this estimation and we use the residuals from the first stage estimation. Then we use these residuals, instead of the the pre-existing P2G levels, in the estimation of equation (1). The results of this estimation are presented in Table A8 and confirm the conclusions from the previous analysis. The permission to operate below the P2G is not related to any expansionary effect on lending volumes. On the other hand, the releases of the P2R and of the CBR display stronger positive and significant effects.

Finally, Table A9 re-runs equation (1) splitting the $CAPREL$ variable between $P2RREL$ and $CBRREL$. It confirms that both types of releases had expansionary effect. The effect appears more stable for the P2R release, potentially owing to the permanent nature of this release.

5 Conclusion

The multi-pronged policy package implemented by euro area prudential authorities to avert a procyclical reaction by banks in the face of the COVID-19 pandemic included two sets of

[13] The results of this exercise are illustrated in Table A10.

policies. On the one hand, authorities reduced capital requirements for CET1 capital, either on a permanent basis, or a temporary basis within the processes established by the macroprudential framework. On the other hand, prudential authorities adopted out-of-the framework supervisory recommendations allowing banks to operate below the level of the P2G during the COVID pandemic. In this paper, we study which of these capital relief measures was most effective.

We uncover two key results. First, capital relief measures were successful in supporting credit supply, vindicating the expansionary merits of counteryclical capital requirement releases in crisis times (Jimenez et al. 2017; Sivec et al. 2022). Second, *actions trump words* as the type of relief matters: while capital requirement releases supported lending, allowing banks to operate below the P2G had no significant impact on banks' lending behaviour during the pandemic. We also find that the releases were more effective for banks with a smaller capital headroom over buffers and that they did not translate into excessive risk-taking.

We put forward an explanation for these results which, building on the dichotomy between *discretion* and *rules* (Kydland and Prescott 1977), suggests that the modalities of the release and the associated mechanisms governing future buffer replenishment paths contributed to the policy's effectiveness amid the uncertain pandemic times. As capital changes impact banks' capital planning and the adjustments in their balance sheets towards targets (Berger et al. 2008; Couaillier 2021), only capital releases that provided banks sufficient clarity with regard to the *permanency* or *predictability* of the measure were effective in supporting lending during the pandemic. These results confirm that to increase the effectiveness of countercyclical policies during crisis times, e.g. when uncertainty is high and there is pressing need to smooth the cycle, a greater emphasis on rules that determine clear policy reactions is helpful. Tilting the current balance of buffers from those that can be used (so-called *usable* buffers) towards those that can be released through macroprudential frameworks (so-called *releasable* buffers), for example, would strengthen policymakers' capacity to respond to future systemic events.

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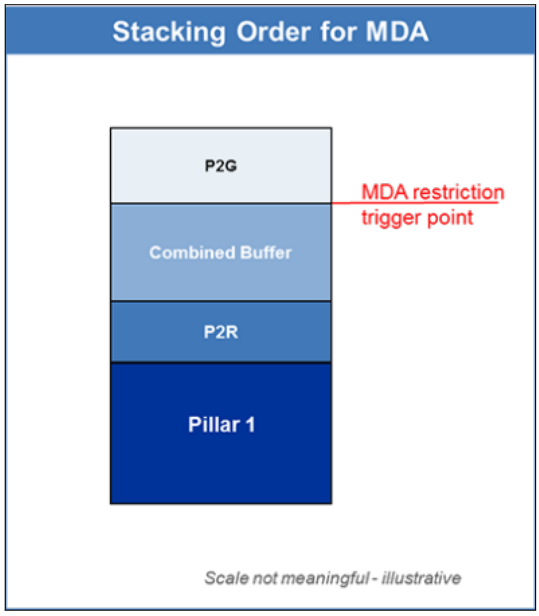
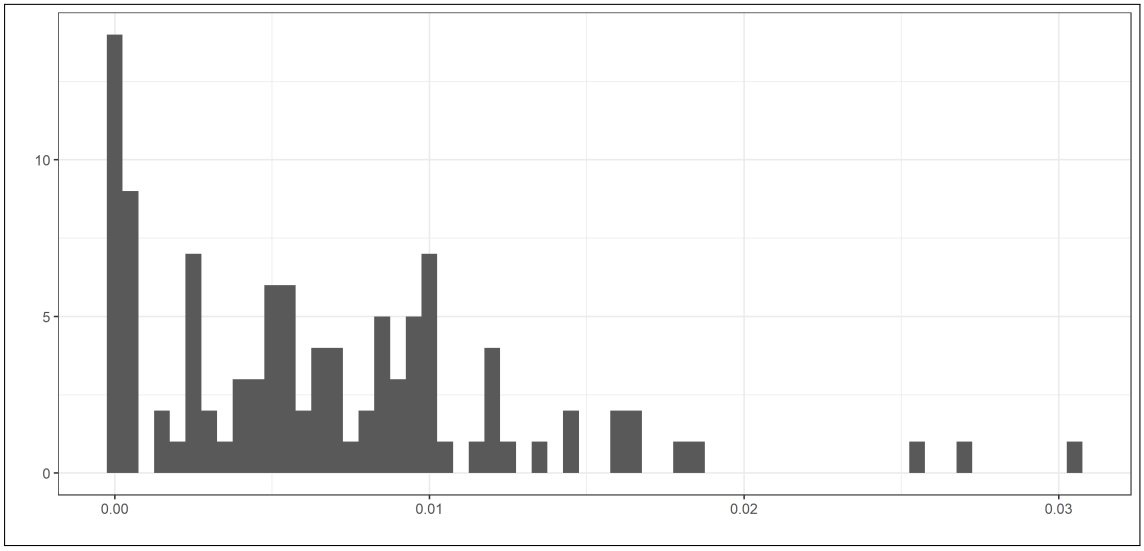
Figure 1: Stacking Order of Capital Requirements



Source: Single Supervisory Mechanism

Figure 2: Distribution of Capital Requirement Releases



Source: ECB, authors' calculation
Note: Magnitude of the capital requirement release measures, in percentage point of Risk Weighted Assets. The P2R release corresponds to the share of the P2R that banks could immediately meet with their excess Additional Tier 1 and Tier 2 Capital. The CBR release corresponds to the reduction in Countercyclical Capital Buffer and Systemic Risk Buffers. The requirement release is defined as the sum of the P2R and the CBR releases.

A Appendix

Table A1: Summary Statistics

Panel A: Bank level releases

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
CAP REL	106	0.007	0.006	0.000	0.002	0.010	0.030
CBR REL	106	0.004	0.004	0.000	0.0003	0.005	0.023
P2R REL	106	0.003	0.003	0.000	0.000	0.006	0.013
P2G 2020	106	0.014	0.007	0.010	0.010	0.018	0.060

Panel B: Bank level

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
L.TA.log	925	25.071	1.504	21.550	24.440	26.076	27.925
L.CET1	925	0.178	0.074	0.110	0.136	0.195	0.578
L.DEP/TA	923	0.704	0.188	0.133	0.641	0.829	0.920
L.RWA/TA	925	0.403	0.153	0.086	0.302	0.489	0.828
L.NIM	921	0.014	0.007	0.002	0.010	0.018	0.031
L.NPL	925	0.042	0.053	0.00003	0.013	0.044	0.251
L.LIQUID/TA	925	0.175	0.113	0.008	0.093	0.227	0.499
L.CIR	918	0.606	0.279	−1.732	0.496	0.733	2.457
TLTRO.III	925	0.048	0.104	0.000	0.000	0.014	0.440
L.LOAN/TA	925	0.783	0.096	0.477	0.735	0.849	0.961
L.OFF BS	925	0.191	0.116	0.011	0.121	0.239	0.628
DIVIDEND.REST	930	0.001	0.003	−0.001	0.000	0.000	0.023

Panel C: Bank-firm level

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Δ credit	6,293,711	0.012	0.227	−0.470	−0.053	0.000	0.780
S.GUAR	6,293,711	0.081	0.232	0.000	0.000	0.000	1.000
S.MORA	6,293,711	0.002	0.043	0.000	0.000	0.000	1.000

Table A2: Number of observations per country

Country	N
AT	24967
BE	103509
CY	24896
DE	280390
EE	4990
ES	1255936
FI	84893
FR	1566489
GR	122712
IE	7681
IT	2402727
LT	8995
LU	6018
LV	1489
MT	1180
NL	28625
PT	336543
SI	17778
SK	13893

Table A3: Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
CAP REL x PostCOVID	1															
CBR REL x PostCOVID	0.873	1														
P2R REL x PostCOVID	0.804	0.412	1													
P2G x PostCOVID	0.539	0.387	0.535	1												
L.TA.log	0.158	0.052	0.232	-0.055	1											
L.CET1	0.191	0.226	0.082	0.283	-0.325	1										
L.DEP/TA	-0.211	-0.156	-0.205	-0.135	-0.356	-0.309	1									
L.RWA/TA	-0.216	-0.156	-0.213	-0.227	-0.315	-0.300	0.444	1								
L.NIM	-0.145	-0.107	-0.139	-0.142	-0.226	-0.166	0.478	0.605	1							
L.NPL	-0.172	-0.169	-0.115	0.002	-0.091	-0.198	0.292	0.432	0.481	1						
L.LIQUID/TA	0.231	0.216	0.169	0.076	0.138	-0.028	-0.080	-0.134	-0.224	-0.170	1					
L.CIR	-0.014	-0.024	0.004	-0.106	0.059	-0.254	0.204	0.020	-0.033	0.002	0.136	1				
TLTRO.III	0.158	0.046	0.239	0.309	0.101	-0.009	0.031	-0.108	-0.097	0.004	0.001	-0.030	1			
L.LOAN/TA	-0.164	-0.137	-0.140	-0.128	-0.064	0.008	0.044	-0.003	0.133	-0.082	-0.881	-0.077	-0.029	1		
L.OFF BS	0.008	-0.037	0.059	-0.184	0.355	-0.345	0.031	0.190	-0.118	-0.070	0.281	0.191	0.033	-0.216	1	
DIVIDEND.REST	0.307	0.241	0.281	0.267	0.191	0.049	-0.158	-0.060	-0.126	-0.123	0.135	-0.114	0.072	-0.120	0.179	1

Table A4: Impact of Capital Requirement Release and P2G Flexibility on Bank Lending Volume

Dependent Variable:	Δ credit			
Model:	(1)	(2)	(3)	(4)
Variables				
CAP REL x PostCOVID	1.247*	1.744**	2.723**	2.773**
	(0.6658)	(0.7343)	(1.197)	(1.169)
P2G x PostCOVID	-1.046	-0.9751	-1.240	-0.3585
	(0.9633)	(0.9927)	(1.081)	(0.9604)
L.TA.log	-0.0006	0.0024	-0.0665	-0.0603
	(0.0020)	(0.0023)	(0.0722)	(0.0783)
S.MORA	0.0057	4.58×10^{-5}	-0.0008	0.0133
	(0.0075)	(0.0082)	(0.0067)	(0.0107)
S.GUAR	0.2267***	0.2251***	0.2284***	0.5305***
	(0.0317)	(0.0316)	(0.0317)	(0.0469)
L.CET1	-0.0695	0.0074	0.4014	0.3189
	(0.0642)	(0.0663)	(0.2914)	(0.2797)
L.DEP/TA	-0.0853***	-0.0820***	-0.5190*	-0.5814**
	(0.0280)	(0.0266)	(0.2711)	(0.2573)
L.RWA/TA	0.0162	0.0033	-0.3982*	-0.4534*
	(0.0300)	(0.0346)	(0.2300)	(0.2523)
L.NIM	0.0489	-0.1761	-1.018	-0.3897
	(0.4693)	(0.5661)	(2.783)	(2.486)
L.NPL	0.1499***	0.0767	0.2407	0.1988
	(0.0452)	(0.0512)	(0.1648)	(0.1529)
L.LIQUID/TA	-0.0502	-0.0022	-0.6203***	-0.7751***
	(0.0421)	(0.0476)	(0.2071)	(0.2081)
L.CIR	-0.0044	-0.0089***	-0.0120***	-0.0137***
	(0.0027)	(0.0028)	(0.0038)	(0.0035)
TLTRO.III	0.1328***	0.1210***	0.1275***	0.1437***
	(0.0278)	(0.0333)	(0.0371)	(0.0423)
L.LOAN/TA	-0.0069	0.0199	-0.6288***	-0.7925***
	(0.0669)	(0.0717)	(0.2093)	(0.1988)
L.OFF BS	-0.0264	-0.0332	0.0854	0.0860
	(0.0198)	(0.0224)	(0.0822)	(0.0761)
DIVIDEND.REST	1.576*	0.7729	0.9081	-0.4170
	(0.8260)	(0.8418)	(1.527)	(1.549)
L.PROVISION/TA	-0.4098	-1.527**	2.404	-0.6980
	(0.5526)	(0.6192)	(1.857)	(1.805)
Fixed-effects				
Firm-Quarter	Yes	Yes	Yes	Yes
Bank country-Quarter		Yes	Yes	Yes
Bank			Yes	
Firm-Bank				Yes
Fit statistics				
Observations	5,480,013	5,480,013	5,480,013	5,480,013
R^2	0.47950	0.48100	0.48325	0.62353
Within R^2	0.03878	0.03816	0.03772	0.06252
Banks	102	102	102	102
Firms	572,484	572,484	572,484	572,484

Clustered (Firm-Quarter & Bank-Quarter & Firm-Bank) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: The endogenous variable is the log-difference in the stock of debt ($\Delta credit$). The exogenous variables include the decrease in CET1 requirements due to change in P2R composition rules and Combined Buffer Requirement release ($CAP\,REL\,x\,PostCOVID$), the usable P2G ($P2G\,x\,PostCOVID$), the restricted dividends announced in 2020 but not issued, as a share of RWA ($DIVIDEND.REST$), the share of loans under guarantee or moratoria ($S.GUAR$ and $S.MORA$ respectively) the lagged CET1 ratio ($L.CET1$), total assets in log ($L.TA.log$), Non-Performing Loan ratio ($L.NPL$), Risk Weight density ($L.RWA/TA$), liquid assets over total asset ratio ($L.CASH/TA$), deposits over total assets ($L.LIQUID/TA$), loans over total assets ($L.LOAN/TA$), Net Interest Margin ($L.NIM$), Cost to Income ratio ($L.CIR$), Provision over Total asset ratio ($L.PROVISION/TA$) and off-balance-sheet exposure over total asset ratio ($L.OFF\,BS$).

Table A5: Impact of Capital Requirement Release and P2G Flexibility on Bank Lending Volume - Interaction with the Distance to the P2G

Dependent Variable:	Δ credit			
Model:	(1)	(2)	(3)	(4)
Variables				
CAP REL x PostCOVID	3.330***	3.361***	4.186***	4.321***
	(1.051)	(1.111)	(1.606)	(1.519)
Dist. P2G PreCOVID	0.0863	0.1436		-14.09
	(0.2029)	(0.2061)		(39.38)
P2G x PostCOVID	-1.518	-0.5237	-1.898	-0.5144
	(1.436)	(1.502)	(1.756)	(1.633)
L.TA.log	0.0004	0.0028	-0.0121	-0.0024
	(0.0019)	(0.0022)	(0.0715)	(0.0798)
S.MORA	0.0084	0.0019	0.0006	0.0167
	(0.0088)	(0.0094)	(0.0072)	(0.0112)
S.GUAR	0.2271***	0.2255***	0.2277***	0.5306***
	(0.0325)	(0.0323)	(0.0325)	(0.0474)
L.CET1	-0.0968	-0.0158	0.5408**	0.4959*
	(0.1011)	(0.0926)	(0.2713)	(0.2579)
L.DEP/TA	-0.0769***	-0.0874***	-0.5966**	-0.6581***
	(0.0281)	(0.0272)	(0.2650)	(0.2457)
L.RWA/TA	0.0070	-0.0114	-0.2936	-0.3362
	(0.0313)	(0.0331)	(0.2289)	(0.2527)
L.NIM	0.1434	-0.0213	-2.404	-1.817
	(0.4875)	(0.5680)	(2.850)	(2.549)
L.NPL	0.1449***	0.0843	0.1681	0.1271
	(0.0483)	(0.0555)	(0.1565)	(0.1484)
L.LIQUID/TA	-0.0344	0.0208	-0.5350***	-0.6909***
	(0.0415)	(0.0485)	(0.1976)	(0.1975)
L.CIR	0.0082	0.0091	0.0076	0.0060
	(0.0065)	(0.0069)	(0.0052)	(0.0046)
TLTRO.III	0.1399***	0.1308***	0.1349***	0.1515***
	(0.0297)	(0.0352)	(0.0374)	(0.0426)
L.LOAN/TA	0.0457	0.0943	-0.5192**	-0.6785***
	(0.0665)	(0.0704)	(0.2060)	(0.1959)
L.OFF BS	-0.0219	-0.0240	0.1058	0.0985
	(0.0204)	(0.0223)	(0.0836)	(0.0767)
DIVIDEND.REST	2.126**	1.537*	0.8323	-0.4494
	(0.8729)	(0.8873)	(1.464)	(1.469)
L.PROVISION/TA	-0.6129	-1.690***	2.447	-0.5194
	(0.5456)	(0.6184)	(1.903)	(1.833)
CAP REL x PostCOVID × Dist. P2G PreCOVID	-0.6240**	-0.4162	-0.7079*	-0.7259**
	(0.2754)	(0.2832)	(0.3930)	(0.3448)
Dist. P2G PreCOVID × P2G x PostCOVID	0.2291**	0.0765	0.2489*	0.2160*
	(0.0996)	(0.1009)	(0.1302)	(0.1152)
Fixed-effects				
Firm-Quarter	Yes	Yes	Yes	Yes
Bank country-Quarter		Yes	Yes	Yes
Bank			Yes	
Firm-Bank				Yes
Fit statistics				
Observations	5,308,638	5,308,638	5,308,638	5,308,638
R^2	0.48135	0.48300	0.48507	0.62289
Within R^2	0.03917	0.03838	0.03753	0.06301
Banks	98	98	98	98
Firms	548,003	548,003	548,003	548,003

Clustered (Firm-Quarter & Bank-Quarter & Firm-Bank) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: The endogenous variable is the log-difference in the stock of debt ($\Delta credit$). The exogenous variables include the decrease in CET1 requirements due to change in P2R composition rules and Combined Buffer Requirement release ($CAP\,REL\,x\,PostCOVID$), the usable P2G ($P2G\,x\,PostCOVID$), the pre-COVID difference between the CET1 ratio and the sum of the P2G and the Overall Capital Requirements ($distP2GPreCOVID$), the restricted dividends announced in 2020 but not issued, as a share of RWA ($DIVIDEND.REST$), the share of loans under guarantee or moratoria ($S.GUAR$ and $S.MORA$ respectively) the lagged CET1 ratio ($L.CET1$), total assets in log ($L.TA.log$), Non-Performing Loan ratio ($L.NPL$), Risk Weight density ($L.RWA/TA$), liquid assets over total asset ratio ($L.CASH/TA$), deposits over total assets ($L.LIQUID/TA$), loans over total assets ($L.LOAN/TA$), Net Interest Margin ($L.NIM$), Cost to Income ratio ($L.CIR$), Provision over Total asset ratio ($L.PROVISION/TA$) and off-balance-sheet exposure over total asset ratio ($L.OFF\,BS$).

Table A6: Impact of Capital Requirement Release and P2G Flexibility on Bank Lending Volume - Interaction with Firm Riskiness

Dependent Variable:	Δ credit			
Model:	(1)	(2)	(3)	(4)
Variables				
CAP REL x PostCOVID	1.291*	1.842**	3.169***	3.073***
	(0.6841)	(0.7610)	(1.220)	(1.188)
L.IMPAIRMENT	0.0257***	0.0247***	0.0259***	0.1005***
	(0.0050)	(0.0051)	(0.0052)	(0.0077)
P2G x PostCOVID	-1.063	-1.005	-1.620	-0.5618
	(0.9981)	(1.031)	(1.143)	(1.014)
L.TA.log	-0.0002	0.0028	-0.0691	-0.0631
	(0.0020)	(0.0024)	(0.0716)	(0.0782)
S.MORA	0.0054	-0.0002	-0.0016	0.0146
	(0.0077)	(0.0084)	(0.0068)	(0.0111)
S.GUAR	0.2283***	0.2265***	0.2302***	0.5309***
	(0.0321)	(0.0320)	(0.0321)	(0.0472)
L.CET1	-0.0637	0.0116	0.3702	0.2252
	(0.0656)	(0.0683)	(0.2989)	(0.2837)
L.DEP/TA	-0.0843***	-0.0813***	-0.5612**	-0.6426**
	(0.0282)	(0.0269)	(0.2714)	(0.2583)
L.RWA/TA	0.0205	0.0069	-0.4330*	-0.4642*
	(0.0308)	(0.0353)	(0.2305)	(0.2509)
L.NIM	0.0986	-0.1268	-0.7447	0.3567
	(0.4764)	(0.5700)	(2.693)	(2.392)
L.NPL	0.1499***	0.0805	0.2604	0.2300
	(0.0459)	(0.0519)	(0.1633)	(0.1498)
L.LIQUID/TA	-0.0525	-0.0070	-0.6626***	-0.8054***
	(0.0425)	(0.0478)	(0.2093)	(0.2091)
L.CIR	-0.0044	-0.0090***	-0.0123***	-0.0139***
	(0.0027)	(0.0028)	(0.0038)	(0.0035)
TLTRO.III	0.1377***	0.1263***	0.1343***	0.1527***
	(0.0282)	(0.0337)	(0.0375)	(0.0426)
L.LOAN/TA	-0.0143	0.0102	-0.6657***	-0.8323***
	(0.0683)	(0.0730)	(0.2096)	(0.1979)
L.OFF BS	-0.0316	-0.0386*	0.0804	0.0708
	(0.0194)	(0.0220)	(0.0818)	(0.0750)
DIVIDEND.REST	1.543*	0.7133	0.6030	-0.5938
	(0.8415)	(0.8574)	(1.534)	(1.526)
L.PROVISION/TA	-0.5339	-1.650***	2.305	-0.6162
	(0.5705)	(0.6348)	(1.866)	(1.818)
CAP REL x PostCOVID × L.IMPAIRMENT	-1.773*	-2.098**	-2.747***	0.6275
	(0.9172)	(0.9395)	(0.9075)	(0.8477)
L.IMPAIRMENT × P2G x PostCOVID	-0.1743	-0.0761	0.1813	-0.2169
	(0.4629)	(0.4708)	(0.4855)	(0.4191)
Fixed-effects				
Firm-Quarter	Yes	Yes	Yes	Yes
Bank country-Quarter		Yes	Yes	Yes
Bank			Yes	
Firm-Bank				Yes
Fit statistics				
Observations	5,180,712	5,180,712	5,180,712	5,180,712
R^2	0.48201	0.48356	0.48599	0.62868
Within R^2	0.04048	0.03985	0.03947	0.06602
Banks	102	102	102	102
Firms	551,819	551,819	551,819	551,819

Clustered (Firm-Quarter & Bank-Quarter & Firm-Bank) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: The endogenous variable is the log-difference in the stock of debt ($\Delta credit$). The exogenous variables include the decrease in CET1 requirements due to change in P2R composition rules and Combined Buffer Requirement release ($CAP\,REL\,x\,PostCOVID$), the usable P2G ($P2G\,x\,PostCOVID$), a dummy taking the value 1 if bank i had booked impairment on loans to firm j ($L.IMPAIRMENT$), the restricted dividends announced in 2020 but not issued, as a share of RWA ($DIVIDEND.REST$), the share of loans under guarantee or moratoria ($S.GUAR$ and $S.MORA$ respectively) the lagged CET1 ratio ($L.CET1$), total assets in log ($L.TA.log$), Non-Performing Loan ratio ($L.NPL$), Risk Weight density ($L.RWA/TA$), liquid assets over total asset ratio ($L.CASH/TA$), deposits over total assets ($L.LIQUID/TA$), loans over total assets ($L.LOAN/TA$), Net Interest Margin ($L.NIM$), Cost to Income ratio ($L.CIR$), Provision over Total asset ratio ($L.PROVISION/TA$) and off-balance-sheet exposure over total asset ratio ($L.OFF\,BS$).

Table A7: Impact of Capital Requirement Release and P2G Flexibility on the Probability of Higher Loan Volume

Dependent Variable:	I(Δ credit >0)
Model:	(1)
Variables	
CAP REL x PostCOVID	32.69***
	(9.927)
P2G x PostCOVID	-42.34**
	(17.11)
L.TA.log	0.1677***
	(0.0447)
S.MORA	-0.3320*
	(0.2007)
S.GUAR	1.851***
	(0.3676)
L.CET1	-3.159
	(2.090)
L.DEP/TA	-1.908***
	(0.5765)
L.RWA/TA	4.743***
	(0.5880)
L.NIM	-28.62***
	(9.547)
L.NPL	1.826**
	(0.8055)
L.LIQUID/TA	-0.6721
	(0.7423)
L.CIR	-0.0269
	(0.0430)
TLTRO.III	2.839***
	(0.4956)
L.LOAN/TA	-0.0928
	(1.303)
L.OFF BS	-1.499***
	(0.4743)
DIVIDEND.REST	12.15
	(13.93)
L.PROVISION/TA	-4.929
	(8.331)
Fixed-effects	
Firm-Quarter	Yes
Fit statistics	
Observations	2,216,490
Squared Correlation	0.10455
Pseudo R^2	0.07927
BIC	15,086,699.9

Clustered (Firm-Quarter & Bank-Quarter & Firm-Bank) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: The endogenous variable is a dummy taking the value 1 if the credit volume between bank i and firm j has increased over the quarter. The exogenous variables include the decrease in CET1 requirements due to change in P2R composition rules and Combined Buffer Requirement release ($CAP\,REL\,x\,PostCOVID$), the usable P2G ($P2G\,x\,PostCOVID$), the restricted dividends announced in 2020 but not issued, as a share of RWA ($DIVIDEND.REST$), the share of loans under guarantee or moratoria ($S.GUAR$ and $S.MORA$ respectively) the lagged CET1 ratio ($L.CET1$), total assets in log ($L.TA.log$), Non-Performing Loan ratio ($L.NPL$), Risk Weight density ($L.RWA/TA$), liquid assets over total asset ratio ($L.CASH/TA$), deposits over total assets ($L.LIQUID/TA$), loans over total assets ($L.LOAN/TA$), Net Interest Margin ($L.NIM$), Cost to Income ratio ($L.CIR$), Provision over Total asset ratio ($L.PROVISION/TA$) and off-balance-sheet exposure over total asset ratio ($L.OFF\,BS$).

Table A8: Impact of Capital Requirement Release and P2G Flexibility on Bank Lending Volume - Robustness with P2G Residuals from Stress Tests

Dependent Variable:			Δ credit	
Model:	(1)	(2)	(3)	(4)
Variables				
CAP REL x PostCOVID	1.933**	2.564***	3.093***	2.542**
	(0.8074)	(0.9718)	(1.181)	(1.132)
P2G.res	-0.3245	0.0730	-0.4038	-0.4323
	(1.043)	(1.211)	(1.404)	(1.383)
L.TA.log	-0.0008	0.0017	-0.0131	-0.0254
	(0.0021)	(0.0025)	(0.0790)	(0.0872)
S.MORA	0.0094	0.0059	0.0020	0.0146
	(0.0134)	(0.0139)	(0.0103)	(0.0166)
S.GUAR	0.2624***	0.2604***	0.2607***	0.5881***
	(0.0384)	(0.0379)	(0.0382)	(0.0538)
L.CET1	0.0995	0.1083	0.3737	0.3203
	(0.0612)	(0.0698)	(0.2590)	(0.2528)
L.DEP/TA	0.0021	-0.0143	-0.5011*	-0.5696**
	(0.0224)	(0.0239)	(0.2716)	(0.2602)
L.RWA/TA	0.0272	-0.0031	-0.2240	-0.4338
	(0.0324)	(0.0356)	(0.2769)	(0.3250)
L.NIM	0.9338*	0.8070	3.030	4.902
	(0.5104)	(0.6982)	(5.955)	(6.113)
L.NPL	0.0756*	0.0660	0.3575	0.3190
	(0.0435)	(0.0489)	(0.2260)	(0.2254)
L.LIQUID/TA	-0.1401***	-0.0933*	-0.3304	-0.5610**
	(0.0451)	(0.0556)	(0.2709)	(0.2801)
L.CIR	0.0035	0.0024	0.0040	0.0022
	(0.0044)	(0.0042)	(0.0037)	(0.0037)
TLTRO.III	0.1690***	0.1708***	0.1797***	0.2123***
	(0.0389)	(0.0463)	(0.0466)	(0.0503)
L.LOAN/TA	-0.2069***	-0.1192	-0.3291	-0.5921**
	(0.0752)	(0.0836)	(0.2524)	(0.2386)
L.OFF BS	0.0543**	0.0451	0.1174	0.1307
	(0.0253)	(0.0302)	(0.0939)	(0.0889)
DIVIDEND.REST	1.995**	1.488	0.6383	-0.8978
	(0.8523)	(0.9448)	(1.445)	(1.462)
L.PROVISION/TA	-0.2723	-1.304**	-7.892**	-8.319**
	(0.5662)	(0.6233)	(3.503)	(3.780)
Fixed-effects				
Firm-Quarter	Yes	Yes	Yes	Yes
Bank country-Quarter		Yes	Yes	Yes
Bank			Yes	
Firm-Bank				Yes
Fit statistics				
Observations	3,526,437	3,526,437	3,526,437	3,526,437
R^2	0.50247	0.50417	0.50545	0.63990
Within R^2	0.04895	0.04723	0.04440	0.07421
Banks	76	76	76	76
Firms	378,713	378,713	378,713	378,713

Clustered (Firm-Quarter & Bank-Quarter & Firm-Bank) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: The endogenous variable is the log-difference in the stock of debt ($\Delta credit$). The exogenous variables include the decrease in CET1 requirements due to change in P2R composition rules and Combined Buffer Requirement release ($CAP\,REL\,x\,PostCOVID$), the residual of the regression of the 2020 P2G over expected capital depletion in the 2018 stress tests ($P2G.res$), ($P2G\,x\,PostCOVID$), the restricted dividends announced in 2020 but not issued, as a share of RWA ($DIVIDEND.REST$), the share of loans under guarantee or moratoria ($S.GUAR$ and $S.MORA$ respectively) the lagged CET1 ratio ($L.CET1$), total assets in log ($L.TA.log$), Non-Performing Loan ratio ($L.NPL$), Risk Weight density ($L.RWA/TA$), liquid assets over total asset ratio ($L.CASH/TA$), deposits over total assets ($L.LIQUID/TA$), loans over total assets ($L.LOAN/TA$), Net Interest Margin ($L.NIM$), Cost to Income ratio ($L.CIR$), Provision over Total asset ratio ($L.PROVISION/TA$) and off-balance-sheet exposure over total asset ratio ($L.OFF\,BS$).

Table A9: Impact of Capital Requirement Release and P2G Flexibility on Bank Lending Volume - Separating the Impact of P2R and CBR

Dependent Variable:	var endo			
Model:	(1)	(2)	(3)	(4)
Variables				
P2R REL x PostCOVID	2.012**	1.725*	2.086*	2.455**
	(0.9094)	(0.9376)	(1.194)	(1.194)
CBR REL x PostCOVID	-0.5674	1.811	9.751***	5.966*
	(1.123)	(1.671)	(3.689)	(3.502)
P2G x PostCOVID	-1.208	-0.9702	-0.7386	-0.1425
	(0.9735)	(0.9988)	(1.036)	(0.9391)
L.TA.log	-0.0002	0.0024	-0.0370	-0.0487
	(0.0019)	(0.0023)	(0.0745)	(0.0789)
S.MORA	0.0055	5.08×10^{-5}	-0.0013	0.0128
	(0.0075)	(0.0082)	(0.0067)	(0.0108)
S.GUAR	0.2262***	0.2251***	0.2284***	0.5300***
	(0.0318)	(0.0316)	(0.0317)	(0.0468)
L.CET1	-0.0685	0.0077	0.2395	0.2518
	(0.0641)	(0.0666)	(0.2941)	(0.2862)
L.DEP/TA	-0.0837***	-0.0819***	-0.5627**	-0.5946**
	(0.0278)	(0.0266)	(0.2776)	(0.2599)
L.RWA/TA	-0.0027	0.0040	-0.4324*	-0.4658*
	(0.0313)	(0.0354)	(0.2359)	(0.2556)
L.NIM	0.1372	-0.1800	-1.251	-0.5006
	(0.4603)	(0.5480)	(2.781)	(2.489)
L.NPL	0.1516***	0.0764	0.2569	0.2046
	(0.0451)	(0.0520)	(0.1636)	(0.1525)
L.LIQUID/TA	-0.0468	-0.0021	-0.6648***	-0.7876***
	(0.0417)	(0.0472)	(0.2131)	(0.2101)
L.CIR	-0.0049*	-0.0089***	-0.0123***	-0.0138***
	(0.0027)	(0.0028)	(0.0038)	(0.0036)
TLTRO.III	0.1275***	0.1210***	0.1370***	0.1478***
	(0.0278)	(0.0333)	(0.0380)	(0.0423)
L.LOAN/TA	0.0044	0.0195	-0.6362***	-0.7888***
	(0.0685)	(0.0755)	(0.2059)	(0.1961)
L.OFF BS	-0.0322*	-0.0331	0.1190	0.0997
	(0.0196)	(0.0219)	(0.0826)	(0.0769)
DIVIDEND.REST	1.612**	0.7683	0.6727	-0.4937
	(0.8163)	(0.8445)	(1.537)	(1.559)
L.PROVISION/TA	-0.5531	-1.526**	1.816	-0.8886
	(0.5693)	(0.6200)	(1.822)	(1.831)
Fixed-effects				
Firm-Quarter	Yes	Yes	Yes	Yes
Bank country-Quarter		Yes	Yes	Yes
Bank			Yes	
Firm-Bank				Yes
Fit statistics				
Observations	5,480,013	5,480,013	5,480,013	5,480,013
R^2	0.47956	0.48100	0.48334	0.62354
Within R^2	0.03889	0.03816	0.03789	0.06256
Banks	102	102	102	102
Firms	572,484	572,484	572,484	572,484

Clustered (Firm-Quarter & Bank-Quarter & Firm-Bank) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Note: The endogenous variable is the log-difference in the stock of debt ($\Delta credit$). The exogenous variables include the decrease in CET1 requirements due to change in P2R composition rules ($P2R\,REL$) and Combined Buffer Requirement release ($CBR\,REL$), the usable P2G ($P2G\,x\,PostCOVID$), the restricted dividends announced in 2020 but not issued, as a share of RWA ($DIVIDEND.REST$), the share of loans under guarantee or moratoria ($S.GUAR$ and $S.MORA$ respectively) the lagged CET1 ratio ($L.CET1$), total assets in log ($L.TA.log$), Non-Performing Loan ratio ($L.NPL$),, Risk Weight density ($L.RWA/TA$), cash over total asset ratio ($L.CASH/TA$), deposits over total assets ($L.DEP/TA$) market funding over total asset ($L.MKTFUNDING/TA$), loans over total assets ($L.LOAN/TA$), Net Interest Margin ($L.NIM$), Cost to Income ratio ($L.CIR$), Provision over Total asset ratio ($L.PROVISION/TA$) and off-balance-sheet exposure over total asset ratio ($L.OFF\,BS$).

Table A10: Impact of Capital Depletion from Stress Tests on P2G Level

	Dependent variable:
	P2G 2020
Capital Depletion	18.196***
	(1.771)
Constant	0.004***
	(0.001)
Observations	78
R^2	0.581
Adjusted R^2	0.576
Residual Std. Error	0.005 (df = 76)
F Statistic	105.544*** (df = 1; 76)
Note:	*p<0.1; **p<0.05; ***p<0.01

Note: The endogenous variable is the P2G level in 2020 of bank i. The exogenous variable is the expected capital depletion as estimated in the 2017 Stress Test exercise of the SSM. *p<0.1; **p<0.05; ***p<0.01