What are banks' actual capital targets?

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Abstract

How do banks set their target capital ratios? How do they reach them? This paper investigates these questions using capital ratio targets banks announce to their investors, instead of estimating implicitly targets. It provides several key lessons. First, targets increase with capital requirements but banks react similarly to *strict* and *usable* requirements, contrary to the objective of the Basel III framework. Targets are also procyclical, suggesting banks want to showcase solvency in crisis times. Second, the gap between actual and target capital predicts balance-sheet adjustment. Banks bridge two-thirds of the gap with outstanding capital and the rest by adjusting assets. Third, this adjustment is stronger for banks initially below their target, suggesting stronger pressure to build solvency than to distribute capital to investors. As such, using the European corporate credit register, I show that this gap was an important determinant of banks credit supply during the COVID-19 pandemic. These results shed light on banks' capital management and provide important lessons for policymakers regarding the design of the prudential framework.

Keywords: Bank regulation, target capital structure, Bank credit.

JEL Codes: E51, E58, G21, G28.

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1 Introduction

How firms choose their target capital structure and how they reach it are key questions in financial economics. Two reasons make those issues particularly relevant for banks. First, banks' choice of capital targets and their means of adjustment have considerable consequences over their ability to provide credit, with large and direct impact on the rest of the economy. Second, given this critical role, regulators impose capital requirements to avoid the social cost of bank failure and limit the moral hazard implied by deposit guarantee schemes. Critically, regulators have the double objective of improving banks' solvency without unduly constraining credit supply. Understanding how banks react to such requirements is thus key for policymakers. A large literature in corporate finance deals with firms' and banks' capital structure. However, managers typically do not announce their choice, so one has to estimate their implicit target based on the evolution of actual capital ratios.

This paper contributes to the literature by presenting and investigating an original dataset of *explicit* target capital ratios that European banks publicly announce to investors. In doing so, it revisits key issues in bank capital management: the impact of capital requirements, banks' procyclical behaviour, the speed and channels of adjustment and its impact on banks' credit supply. Using *announced* targets results in several critical improvements over *estimated* targets. First, when investigating the determinants of targets, one can directly regress them on explanatory variables, yielding much more accurate estimates than partial adjustment models used for implicit targets. Second, one can estimate the adjustment channels toward observed targets rather than estimated ones. As such, estimation errors are not compounded. To the best of my knowledge, this is the first paper to investigate capital structure by exploiting a dataset of *observed* capital targets.

European banks increasingly communicate publicly on target CET1 ratio, i.e. the ratio of Common Equity Tier 1, the purest form of capital consisting mostly of issued equity and retained earnings, over Risk Weighted Assets (RWA). This is the central capital ratio on which capital regulation is based and as such the main capital ratio policymakers and banks managers communicate about. As such, the distance between a bank's actual CET1 ratio and its target can be an important predictor of its future balance-sheet adjustments. Indeed, a bank that is below (above) its target should act to increase (reduce) its CET1 ratio, by increasing its stock of CET1, by reducing the size of its total exposures or by rebalancing its portfolio toward safer assets to reduce risk weight density and thus its RWA. Investigating the determinants of those targets and the speed and means of adjustment provides several key lessons.

I first investigate how banks set their targetes. Using partial adjustment models, Berger,

DeYoung, Flannery, Lee, and Öztekin (2008) show that American banks hold excess capital on top of regulatory requirements and adjust quickly when undercapitalised. Gropp and Heider (2010) find that deposit insurance and capital requirements played a secondary role in explaining capital ratios from 1991 to 2004, which rather converged toward bank-specific, time invariant levels. De Jonghe and Öztekin (2015) and Bakkar, De Jonghe, and Tarazi (2019) find similar results, based on an international sample of banks. I eliminate the need for partial adjustment model, using instead observed targets. I identify two key drivers. First, capital requirement have a material but lower than unity impact on target: banks do not adjust one for one to change in capital requirements, suggesting that they balance the risk of breaching requirements with their perceived costs of having a high capital ratio, in line with the trade-off theory of capital. Importantly, this paper also investigates whether the different types of capital requirements introduced with Basel III have different impacts. To the best of my knowledge, this is the first paper to look into this topic. This informs in particular on the actual usability of the so-called regulatory buffers that banks are expected to meet in good time but to consume during crisis rather than constraining credit. A lower coefficient for those buffers than for strict minimum requirements would imply that banks see lower cost in breaching buffers, suggesting willingness to dip into them in case of need. In practice, this impact is not significantly different from for minimum requirements, suggesting that banks do not distinguish between *strict* requirement and *usable* buffers, impeding the countercyclical objective of the regulatory framework. Second, targets are procyclical, as a fall in expected GDP growth tends to raise targets. This is consistent with banks being under pressure and attempting to reassure investors about their solvency during adverse time.

Those results contribute to the larger literature on corporate capital structure. The literature has developed several theories of firms' capital structure. The *pecking order* theory (Donaldson (1961); Myers (1984)) postulates that information asymmetries make external capital more expensive for a firm, so that managers prioritize funding sources with lower information asymmetry: first internal capital, then debt and finally external capital. As such, firms do not have a preferred capital structure and their leverage ratio rather reflects their past profitability (i.e. capacity to generate internal capital) and investment opportunities (which increase the need for external finance). In the *market timing* theory (Baker and Wurgler (2002)), managers issue equity when they consider equity to be overvalued, in the best interest of existing shareholders. In this theory again, a firm's leverage reflects the history of its share prices, rather than any target capital ratio. On the contrary, the *tradeoff* theory (Graham and Harvey (2001)) suggests that firms optimise their liability structure by balancing the cost and benefits of capital and debt. The mere existence of banks' capital targets reported in this paper supports this tradeoff theory. Moreover, results indicate that these targets depend on several banks' and economic variables, in line with the tradeoff theory. The positive impact of profitability and the Price Earning Ratio on targets provide some support to the pecking order and market timing theories respectively, but they merely belong to a larger set of contributors defining the target capital ratio. Overall, those results are in line with the finding of Flannery and Rangan (2006) for non-financial corporations.

Second, I assess the speed of adjustment toward target. Banks are serious about the targets they announce. The adjustment occurs whatever the initial sign of the distance to target. However, it is substantially faster for banks below their targets, suggesting that the pressure to build sufficient capital to protect the franchise value and avoid costly regulatory breach is greater than the pressure to reallocate or return excess capital. To the best of my knowledge, this is the first paper to explore the asymmetric speed of the convergence to target.

Then, I investigate how banks converge toward their target. De Jonghe and Oztekin (2015) find that banks increase their capital ratios toward target through equity growth rather than balance-sheet reduction. Using monthly German data, Memmel and Raupach (2010) confirm that the liability side contributes the most to adjustment, despite faster adjustment on the asset side. Bakkar et al. (2019) find that Systemically Important Financial Institutions (SIFI) adjust faster to their capital ratio targets than other banks and Maurin and Toivanen (2012) that banks adjust proportionally more their security holdings than their loans to meet their targets. Revisiting those issues with announced target, I confirm that most of the adjustment occurs through banks' stock of capital. Nonetheless, asset side management via RWA reduction accounts for roughly one-third of the adjustment. In particular, banks adjust their corporate credit exposures, which typically carry high risk weights. These findings raise concerns about procyclical behavior during crises, when banks suffer losses and tend to announce higher targets, as this suggests that they procyclically cut on corporate credit supply to fill the gap when firms need credit the most.

Finally, I show that the distance between actual and target capital ratios was a critical determinant of banks' corporate credit supply during the COVID crisis. Containment measures considerably reduced firms' revenues, causing a surge in their liquidity needs while deteriorating their credit quality. As a result, banks faced both a surge in credit demand and the prospect of major credit losses. This major exogenous shock challenged their ability to meet their capital targets. Using confidential granular bank-firm level credit data from the European credit register, I investigate banks' credit supply at firm level, in particular controlling for firm-specific credit demand. I show that banks entering the pandemic with a capital ratio lower than their targets lent significantly less than others. The effect was economically substantial and confirms the previous bank-level results, signalling the critical impact of capital management on credit supply during crisis.

The findings of this paper provide key lessons for policymakers. They confirm that capital management has a substantial impact on banks' credit policy. They also inform on the impact of capital requirements on targets, and, in turn, the effectiveness of the regulatory framework. This paper suggests that banks do not consider regulatory buffers to be *usable*, contrary to the intention of the regulator, as the framework was designed for banks to draw on buffers during a crisis in order to absorb losses rather than cutting credit supply. However, *releasable* buffers could mitigate banks' procyclical behaviour, as a countercyclical reduction in requirements can lower CET1 ratio targets, offsetting banks' tendency to increase targets in crisis time. By reducing targets, this would encourage banks to increase credit supply, in particular corporate credit. Finally, monitoring banks' announced targets and the distance between their targets and their actual capital ratios would inform on banks' future behaviour, thus informing policymakers when setting monetary or prudential policies.

The rest of the article is organised as follows. Section 2 discusses the transition from implicit to explicit targets and presents the dataset of announced target. Section 3 introduces the econometric specifications. Section 4 houses the results and Section 5 concludes.

2 Announced banks target CET1 ratios

2.1 The use of announced targets

In the absence of data on observed banks' target capital ratios, the literature has so far relied on estimated implicit targets, pinned down through partial adjustment models introduced for bank capital by Flannery and Rangan (2008). Two key assumptions underpin such an approach. First, the target is unobserved but relies on a set of observed variables X, and can thus be defined as:

$$CET1_{i,t+1}^* = \theta X_{i,t} \tag{1}$$

Second, banks move sluggishly toward those targets at an unobserved speed λ :

$$CET1_{i,t+1} = \lambda CET1_{i,t+1}^* + (1-\lambda)CET1_{i,t}$$

$$\tag{2}$$

Such behaviour can be rationalised with convex adjustment costs, so that banks are better

off with slow adjustment rather than with a single large jump.¹ Then, injecting (1) into (2) and rearranging to get rid of the unobserved components provides:

$$CET1_{i,t+1} = \alpha CET1_{i,t} + \beta X_t + u_{i,t},$$

$$\lambda = 1 - \alpha, \ \theta = \beta/(1 - \alpha)$$
(3)

with $\alpha = 1 - \lambda$ and $\beta = \theta(1 - \alpha)$. Equation 3 can be estimated econometrically and, using $\lambda = 1 - \alpha$ and $\theta = \beta/(1 - \alpha)$, one can thus recover the unobserved target with: $\widehat{CET1}_{i,t+1}^* = \widehat{\beta}(1 - \widehat{\alpha})X_{i,t}$

In a second step, the distance between the actual CET1 ratio and estimated target is injected in a regression model to assess the elasticity of a set of banking variable to this distance:

$$\Delta Y_{i,t} = \gamma (CET1_{i,t-1} - \widehat{CET1}_{i,t-1}) + \delta Z_{i,t-1} + \epsilon_{i,t}, \tag{4}$$

with γ being the coefficient of interest. This partial adjustment approach is intellectually clear and convenient, but also suffers from important drawbacks. First, the reliance on a model of the unobserved target mechanically implies the presence of noise in the estimation of the first step. This is especially true since the CET1 ratio is a rather sluggish variable, meaning that $\hat{\alpha}$ could be close to 1, making $\hat{\theta}$ unstable. Second, this approach relies on the assumption of a constant adjustment speed λ .². Third, Equation 3 implicitly assumes that all the impact of X_{t-1} on $CET1_t$ is mediated by $CET1_t^*$, ruling out the possibility of a direct impact on $CET1_t$ alone. This assumption has no clear justification. For instance, a bank suffering a one-off loss may be unable to immediately issue equity or liquidate assets, and would thus experience a fall in $CET1_t$ while $CET1_t^*$ is unchanged. Alternatively, this fall in profitability could both affect $CET1_t$ directly and make the bank readjust its target $CET1_t^*$. Those two possibilities make necessary to disentangle both impacts. Fourth, the output of the first step (Equation 3) is transmitted as an input in the second one (Equation 4), where the literature often treats the estimated distance to target as observed and not as the result of a noisy estimate.³

Using explicit, observed targets improves both steps significantly. In the first one, using

¹Fast deleveraging would entail high liquidation costs, while rapid balance-sheet expansion would imply low screening and/or low prices.

²Berger et al. (2008) proposes a three-step method to estimate time-variant λ , also used in Bakkar et al. (2019); De Jonghe and Öztekin (2015); Öztekin and Flannery (2012). The first step consists in estimating Equation 3, to recover the estimated $\widehat{k^*}_{i,t}$ target capital ratio and thus the distance to target $\widehat{DEV^*}_{i,t}$. In a second step, they estimate $k_{i,t} - DNK_{i,t} = (\Lambda Z_{i,t})\widehat{DEV^*}_{i,t} + \epsilon_{i,t}$ with $DNK_{i,t}$ the capital ratio that the bank would have reached by keeping its dividend policy constant from the last quarter and issuing no share, and $Z_{i,t}$ a set of variables expected to affect adjustment speed, allowing to get $\lambda_{i,t} = \Lambda Z_{i,t}$. Finally, the first step is re-estimated using this time-varying bank specific speed. This method however crucially depends on a fixed speed adjustment for initialisation that feeds into the estimation of $\lambda_{i,t}$

³In this regard, Bakkar et al. (2019) use the bootstrap procedure from Pagan (1984) to tackle this issue.

observed targets enables direct regressions, reducing uncertainty around estimated elasticity and in particular eliminating the need for a dynamic panel. Second, it also allows for direct estimation of the speed of adjustment, rather than dealing with an indirect evaluation of the unobserved λ . Additionally, this allows for sign-dependent speed of adjustment. Third, the use of announced targets explicitly disentangles the impact of variables X_{t-1} on $CET1_t^*$ and on $CET1_t$, so that an impact on the latter is not mistaken for an impact on the former. In the second step, the use of an observed variable eliminated the need to account for the estimation noise around target determinants, enhancing the estimation.

2.2 A new dataset of announced targets

This paper uses a unique data set on announced bank CET1 ratio targets. Observations were manually collected from banks' websites and financial communication documentation. Figure 1 presents examples of what banks' announcements of CET1 targets look like. Banks typically announce those targets in slide decks or financial documents as part of their investor communication. These documents are generally published quarterly, sometimes yearly, in particular for non-listed banks. I gathered four key elements while compiling those targets: (i) the value of the target; (ii) the nature of the target: level of CET1 ratio or distance to capital requirements; (iii) the definition of the CET1 ratio: Fully Loaded (FL) or Phased-In (PI); and (iv) the horizon of the target: some targets apply at all time, others are defined for a precise horizon (2022 for instance) and others are defined over a qualitative horizon ("medium term"). The majority of banks express their targets in absolute terms (e.g. 13%) but some express them as a distance to capital requirements (e.g. 200 basis points above requirements). Finally, due to financial reforms following the GFC, the definition of CET1 has been revised toward stricter definition of the eligibility criteria. As a result, a part of the existing outstanding CET1 is excluded from the Fully Loaded new definition of the CET1. To ensure smooth transition, such items are "grandfathered" and gradually phased-out of CET1. CET1 ratios using this temporary definition are deemed *Phased in*. Most banks announce CET1 targets in FL terms, as the definition is both more stable and set to become the norm. The collection exercise covered the 117 European banks deemed Significant Institutions (SI) due to their size and complexity and directly supervised by the Single Supervisory Mechanism (SSM), as well as listed European banks, excluding subsidiaries of non-euro area banks and state-owned banks. Both categories generally do not publish CET1 targets due to their reduced interactions with investors. Moreover, the support of their parent institution or of a government distorts their incentives and make them inherently different from standalone banks.



Figure 1: Examples of announced target CET1 ratios

Source: Banks websites

One could be concerned that managers may be tempted to announce unchallenging targets, to limit the risk of missing it. Indeed, missing business targets is detrimental for stock prices and for their career. Nevertheless, two factors mitigate this concern. First, announcing an excessively low target comes at a cost, as investors may interpret that as a negative signal on managers' private knowledge of the bank's outlook, specifically its internal capital generation capacity. Second, exceeding the target capital ratio is not necessarily beneficial for managers. Indeed, contrary to high profitability, high capitalisation is not always good news for investors. They may interpret that as a sign of suboptimal capital allocation and call for capital distribution or larger asset expansion. Mathematically speaking, the optimal CET1 ratio has an interior solution, at least in the eyes of investors. As such, exceeding a CET1 target is not necessarily desirable, as it may signal an inefficient capital structure. In practice, many banks announcing targets well below their actual CET1 ratio explicitly commit to returning capital to shareholders. Overall, bank managers have no interest in systematically announcing low targets. This is confirmed by the results of this paper, which show that banks tend to converge toward their targets, also in the case that when they are initially above them.

In total the collected dataset consists of an unbalanced panel of 1346 observations from 70 banks. It covers banks from all countries in the euro area except Lithuania, Latvia and Slovakia, for which I could not identify any bank announcing a target. The sample period spans from Q1 2014 to Q4 2021. The dataset covers a large share of the European banking system, increasing over time: the sample captures about 66% of total asset of euro area banks since 2018, compared to about 40% at the beginning of the sample period.

Figure 2 reports the distribution of announced CET1 targets over time. Banks have progressively increased their targets until mid-2017, as the new regulatory framework and its implementation process were clarified and the European economy gradually recovered from the European

Figure 2: Banks' target CET1 ratios - %



Source: Banks websites, ECB, author's calculations *Note:* The chart reports the evolution of banks' CET1 targets over time. The solid line reports the average and the boxplot the quartiles and the first and ninth deciles.

sovereign debt crisis. They have since then mostly evolved in a stable interval, with the interquartile range remaining in the 12.5%-16% interval. In response to the Covid-19 pandemic outbreak, European and national authorities implemented a series of capital relief measures in Q1 2020, resulting in a reduction in CET1 requirements.⁴ This has resulted in some downward adjustment in banks CET1 targets, but undershooting the fall in requirements. Nevertheless, the relative stability of the distribution masks bank-level variations: banks announcing targets in level have on average updated their targets every six quarters since Q2 2017.

Figure 3 presents the distribution over time of the distance between actual and target CET1 ratios. It can be split in three periods. First, between 2014 and 2016, banks were largely below their targets, trying to rebuild their balance-sheet after the GFC and the European debt crisis and to comply with new and larger capital requirements. As they increased their capital ratio, their gradually reduced the gap with their target. In the second phase, between 2017 and 2019, the distribution was relatively stable and centered around 0. Finally, since 2020 and the outbreak of the COVID-19 pandemic, banks are largely above their targets, owing largely to prudential policies that (i) reduced capital requirements that partially fed into lower targets, (ii) support measures that increased CET1 ratios⁵ and (iii) a suspension of dividend announced by the European supervisors that forced banks to retain earnings rather than distribute them. As such, banks emerged from the COVID-19 pandemic with ample excess capital, which is

⁴See in particular https://www.bankingsupervision.europa.eu/press/pr/date/2020/html/ssm .pr200312~43351ac3ac.en.html

⁵For instance, the so-called SME Supporting Factor that reduces the risk weights on credit to Small and Medium Enterprises was reinforced, thus reducing RWA and increasing the CET1 ratio. For more details on the so-called "Banking Package", see https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_757

Figure 3: Distance of banks CET1 ratios to targets



Source: Banks websites, ECB, author's calculations *Note:* The chart reports the evolution of the distance between target and actual CET1 ratio over time. A positive (negative) value implies that the actual ratio is larger (smaller) than the target one. The solid line reports the average and the boxplot the quartiles and the first and ninth deciles.

consistent with announcements of ambitious capital distribution plans.

Figure 4 plots capital requirements over CET1 ratio targets, providing two key lessons. First, targets appear strongly positively correlated with capital requirements, suggesting that those requirements have a material impact on banks' target. Second, the slope of this relation is less than one-for-one: banks seem not to fully adjust their targets after a change in requirements. This is consistent with the view, common among bankers, that capital is costly for banks, so that there is a trade-off between running a comfortable buffer above requirements to avoid unintended breaches and the cost of running high capital ratios.





Source: Banks websites, ECB, author's calculations Note: This chart showcases the Overall Capital Requirements (minimum requirements plus regulatory buffers) of European banks versus their announced targets, binned by buckets of 20 bps of overall capital requirements. It is possible for banks to announce targets below the reported OCR, as they may plan to issue AT1 and T2 that would reduce their corresponding shortfalls and thus the OCR.

3 Econometric settings and data

In a first step, I estimate the determinants of banks' CET1 ratio targets. The use of announced targets allows for a direct panel regression of the CET1 ratio targets on a set of banking characteristics and macrofinancial variables:

$$Target_{i,t+1} = \zeta X_{i,t} + \kappa_i + \eta_{i,t+1},\tag{5}$$

The first key expected driver of banks' CET1 ratio targets is the stack of regulatory own fund demand they must comply with. The European regulatory framework distinguishes between three main types of capital demand, as illustrated in Figure 5. First, the minimum requirements or *Total SREP Capital Requirement* (TSCR) that banks must meet at all time.⁶ Failure to meet the TSCR triggers material supervisory intervention, potentially costly to shareholders and managers, with measures ranging from forced asset disposal to the resolution of the bank. The TSCR is composed of the system-wide Pillar 1 (P1, 8% or RWA) and the bank-specific Pillar 2 Requirement (P2R), revised annually. The P1 and, since 2020 as part of the banking package adopted in reaction to the Covid-19 pandemic, the P2R can be met with a mix of CET1 and less pure forms of capital, the so-called Additional Tier 1 (AT1) and Tier 2 (T2).⁷ A failure

⁶SREP stands for *Supervisory Review and Evaluation Process*, the review of banks risk and core capital requirements conducted annually by European supervisors.

⁷Banks must fulfil both P1 and P2R with a minimum of 56.25% of CET1 and can meet the rest with AT1 and T2, with at most 25% of T2. As such, the 8% Pillar 1 can be met with 4.5% CET1, 1.5% AT1 and 2% T2.

to have enough AT1 or T2 creates a shortfall that banks must plug with additional CET1.

Second, on top of the TSCR lie the so-called *combined buffer requirements* (CBR),⁸ fully composed of CET1, that are meant to be *usable*, meaning that banks under stress can dip into the CBR. The bank is then restricted in capital distribution (dividend, share buyback, bonuses) by a Maximum Distributable Amount (MDA) ⁹ and must present a *Capital Conservation Plan*, including profit forecasts and intended measures to bridge the gap in capital. If the supervisor rejects the plan, it can require the institution to increase capital over a specified period and consequently lower the MDA¹⁰. However, drawing on the CBR does not constitute a regulatory breach *stricto sensus* and is expected to cushion credit supply in crisis time. The introduction of the CBR was one the the key post-GFC reforms adopted in Basel III with the objective of making bank capital less procyclical, so that they would accumulate capital in good times to meet the CBR and use it to absorb losses during crisis, rather than reducing credit to deleverage and thus procyclically worsen the crisis. The TSCR and the CBR together constitute the *Overall Capital Requirements* (OCR).

On top of the OCR, European supervisors also set a capital demand, the so-called *Pillar 2 Guidance*, "which indicates to banks the adequate level of capital to be maintained to provide a sufficient buffer to withstand stressed situations. Unlike the P2R, the P2G is not legally binding."¹¹ The P2G is also confidential, while other requirements are public.

The expected impact of capital requirements on targets is positive, but below one. Indeed, in a trade-off approach of the capital structure, banks may balance the cost of higher risk of breach due to low CET1 ratio with the cost of high CET1 ratio.¹² Consequently, banks are expected to operate with a management buffer above requirements, i.e. extra CET1, and to absorb part of hikes in requirement by reducing this buffer. As changes in the CBR are implemented with a phase-in period, meaning that future requirements are known well before their enter into place,¹³ I use *announced* capital requirements rather than the ones *in place*, in line with the forward-looking nature of targets in banks' strategic planning: for a target announced at time t for quarter t + h, I use the capital requirements that are expected at t for t + h. In an extension

⁸The CBR consist in (i) a Conservation Buffer (CCoB) of 2.5%, (ii) a Countercyclical Capital Buffer (CCyB) which bank-specific rate is an average of national rates weighted by banks' relevant credit exposures in each country, (iii) a Systemic Risk Buffer (SRB) imposed by the domestic authority to all or a subset of banks and (iv) the Global and Other Systemic Institution Buffers (G-SII and O-SII) that depend on the size and materiality of the bank for the financial system; for more details, see the Capital Requirements Directive V (CRD V) https://www.eba.europa.eu/regulation-and-policy/single-rulebook/interactive-single-rulebook/100832

⁹Article 141 of CRD IV

¹⁰Article 142 of CRD IV

¹¹See https://www.bankingsupervision.europa.eu/banking/srep/html/p2r.en.html

 $^{^{12}}$ Whether capital is actually costly has produced a vast literature and is beyond the scope of this paper. The simple fact that many investors and managers perceive capital to be costly rationalises this trade-off approach. 13 For instance, the O-SII and G-SII buffers announced in late 2015 and the CCoB were associated with a

phase-in period from 2016 to 2019. Increase in the CCyB are typically associated with a one-year delay.



Figure 5: Own funds demand in the European prudential framework

Source: Single Supervisory Mechanism

Note: the chart is illustrative and the scales not meaningful

of the baseline regression, I disentangle the impact of the minimum requirements, the buffers and the P2G. This informs on the perceived stringency of those different requirements: one could expect the coefficient to increase with the cost of breach. On the contrary, should all requirements have similar impact on the targets, this would suggest that managers treat them are similarly stringent. In particular, this would imply that they do not consider the CBR more usable than the TSCR, while this feature is a key component of the regulatory framework. As such, this approach tests banks' perception of the prudential framework and its ability to reach its objective of a countercyclical management of banks' capital.

The list of explanatory variables includes a vast range of potential determinants of targets identified in the corporate literature. The logarithm of Total Assets captures banks' size, as larger banks generally hold lower CET1 ratios. This can come from a better ability to optimise their capital structures and by the anticipation that large bank would benefit from a too-big-to-fail policy support. The Return on Asset (RoA) accounts for banks' profitability. The impact of profitability on targets is *a priori* unclear: more profitable banks and those with better assets have higher internal capital generation capacity and as such need less outstanding capital, but shareholders may want to protect their high franchise value with larger capital buffers (Marcus (1984)). Asset quality is captured through the provision ratio and the ratio of impaired assets to total assets. Banks' business models are captured with income diversification, defined as the share of non-interest income in total operational income (Kok and Schepens (2013), Bakkar et al. (2019)), the risk weight density (i.e. Risk Weighted Assets divided by Total Original Exposures) and the deposit ratio. The ratio of cash to total assets capture the liquidity position of the

bank. The 1-year ahead consensus forecast of domestic GDP growth rate and inflation from the Survey of Professional Forecasters accounts for expectations regarding future the macrofinancial environment and business opportunities. An adverse macrofinancial environment may increase investors' risk aversion; to avoid a detrimental flight-to-quality, banks may then announce larger CET1 ratio targets in adverse times to commit to high solvency and reassure investors. On the contrary, during good times, banks may underestimate risk (Fonseca and González (2010)). The impacts of conventional and unconventional monetary policy are captured respectively by the 3-month Euribor rate and the ratio of Targeted Long Term Refinancing Operations (TLTRO) uptake in total liabilities. The 10-year sovereign yield captures the sovereign risk and the effect of monetary policy on the back-end of the yield curve.

In a second step, I assess the speed of adjustment, i.e. the change in the distance to target:

$$Gap_{i,t} = \tau Gap_{i,t-1} + u_{i,t},\tag{6}$$

With $Gap_{i,t} = CET1_{i,t} - Target_{i,t}$ the deviation from target. In line with the literature relying on partial adjustment models, I conduct a pooled regression without intercept the bank fixedeffects ι_i .¹⁴.

In the third step, I investigate the informational content of targets on future banks' behaviour by regressing the change in a set of balance-sheet and financial account variables on the distance to target:

$$\Delta Y_{i,t} = \chi Gap_{i,t-1} + \psi Z_{i,t-1} + \iota_i + \epsilon_{i,t},\tag{7}$$

With $\Delta Y_{i,t}$ being the quarterly change in a vast range of bank-level variables: CET1 ratio, CET1 outstanding (in euro), Risk Weight density, total original exposures, loans to corporations and households and cash holding (in log-difference for volumes and difference for ratios). I use the same bank-level control variables than in the previous steps and control for macroeconomic conditions by saturating the model with quarter x country fixed effects. In those three steps, standard errors are clustered at the bank level to account for heterosketasticity and serial correlation.

In a final fourth step, I investigate the impact of the distance to CET1 ratio target on banks' corporate credit supply during the COVID-19 pandemic. I exploit credit register data at the bank-firm level to estimate the following equation:

$$\Delta y_{i,j} = \vartheta Gap_i + \varphi W_{i,j} + \nu_j + \nu_{i,j},\tag{8}$$

¹⁴An intercept (pooled or at bank-level) would imply a trend in distance to target and so ultimately a trend in CET1 ratio and/or target. For further details, see Berger et al. (2008)

With $\Delta y_{i,t}$ the log-difference in credit volume lent by bank *i* to firm *j* between before and after the outbreak of the COVID-19 pandemic. Following the approach by Khwaja and Mian (2008), I collapse the dataset in a single pre-COVID (2019 Q3-Q4) and a single post-COVID (2020 Q3-Q4) period to tackle autocorrelation in standard errors (see Bertrand, Duflo, and Mullainathan (2004)) and I introduce firm fixed effects v_j to control for firm credit demand. As such, I compare how much credit firm *j* received from multiple banks with different distance to their target. I control for the same set of bank-level variables than in the previous exercise, taking their value in 2019 Q4. I also control at bank-firm level for credit guarantee and moratoria, which played a major role during the pandemic, and at bank-level by the reduction in overall capital requirements in reaction to the COVID pandemic.¹⁵ All macroeconomic variables are implicitly captured in the fixed effects. Standard errors are clustered at the bank and borrower levels.

In the last three steps, I extend the baseline results by distinguishing between positive and negative distance to target, in order to investigate potential asymmetry, suggesting more intense pressure for adjustment on one side of the target or different channels of adjustment.

Bank data come from European banking supervision reports, namely the COREP and FIN-REP templates. The definitions of the indicators used in the regressions from those templates are produced by the European Banking Authority.¹⁶ Macroeconomic data come from the Statistical Data Warehouse of the ECB and the macroeconomic forecast from the Consensus Forecast from Consensus Economics. Bank-firm credit data come from AnaCredit, the credit register of the European System of Central Banks which contains information on all individual bank corporate loans to firms above $\in 25,000$ in the euro area.¹⁷ AnaCredit also allows identifying loans under moratoria or benefiting from public credit guarantee schemes during the COVID-19 pandemic. The dataset contains about one million single bank-firm credit growth pre/post COVID. Banks data are winsorised at the 0.5% and 99.5% level. Tables A1 and A3 in the Appendix present the summary statistics level and correlation matrix of the variables in the baseline model. Table A2 summarises the bank-firm level variables.

¹⁵In reaction to the outbreak of the COVID pandemic, and to free capital so that banks could absorb losses while providing credit to the real economy, the Single Supervisory Mechanism, the supervisory arm of the ECB, decided to front-load a change in the composition rule of the P2R, so that instead of being fully composed of CET1, banks could meet in with the same mix of capital than for the Pillar 1: at least 56.25% of CET1 and at least 75% of T1 (CET1 + AT1). Moreover, many national authorities reduced their CCyB, partially or completely, and some reduced their SyRB. For more details, see Couaillier, Lo Duca, Reghezza, and Rodriguez d'Acri (2022)

¹⁶https://eba.europa.eu/eba-updates-methodological-guidance-on-risk-indicators-and-analysis -tools

¹⁷AnaCredit stands for analytical credit datasets. Additional documentation can be found here: https:// www.ecb.europa.eu/stats/money_credit_banking/anacredit/html/index.en.html

4 Results

4.1 Determinants of CET1 targets

4.1.1 Announced targets

Table 1 presents the estimation of Equation 5. The main regression is presented in Column (1) in pooled regression. It provides two key lessons.

First, an increase in capital requirements has a statistically significant and economically material impact on targets: banks do react to capital requirements. Nevertheless, this impact is less than unity. This suggests that banks reduce their target excess capital when requirements increase. This is consistent with a trade-off theory of bank capital, in which managers balance the expected cost of regulatory breach due to thinner excess capital against the perceived cost of holding a large capital ratio. Consequently, they hold a management buffer over requirements that they progressively reduce to smooth the impact of requirement hikes: a 1pp increase in requirements drives the target up by ~ 0.6 pp, implying a reduction in management buffer by $\sim 0.4pp$.

Second, banks tend to adjust their capital targets procyclically, as captured by the negative impact of GDP growth forecast, in line with results from partial adjustment models in Fonseca and González (2010) and Francis and Osborne (2012). In adverse economic environment, investors tend to become more risk averse and fly to quality. Banks react by committing to higher CET1 targets, to reassure investors and show they can cover unexpected losses without breaching capital requirements. Such behaviour has strong economic implications: to reach those higher targets, banks can typically reduce their credit supply when it is the most necessary to help firms and households shoulder an economic crisis.

Together, those two results suggest that countercyclical capital requirements could be useful tools to mitigate financial crisis. By raising requirements in good times to push CET1 ratios higher, authorities can lower them when a crisis hits, mitigating banks' procyclical behaviour and thus alleviating its economic cost.

Table 1: Determinants of target CET1 ratio

D 1 (17 11)										
Model:	(1)	(2)	(3)	(4)	(5)	ann (6)	(7)	(8)	(9)	(10)
Variables										
Constant	30.30***		31.08^{***}		27.37**		28.78**		31.60***	
	(10.11)		(9.430)		(10.03)		(12.48)		(11.37)	
OCR w. P2G	0.6439^{***}	0.3174^{***}	0.5775^{***}	0.2205^{***}	0.3041**	0.3302^{***}	0.7323^{***}	0.2630^{***}		
	(0.1288)	(0.0889)	(0.1171)	(0.0513)	(0.1275)	(0.0933)	(0.1407)	(0.0796)		
Total Assets, log	-0.8208**	-1.938	-0.8005**	0.7280	-0.7512^{**}	3.092^{***}	-0.8973*	-0.9021	-0.9027**	-1.926
	(0.3703)	(1.824)	(0.3528)	(1.098)	(0.3024)	(0.8901)	(0.4797)	(1.280)	(0.4082)	(1.842)
Deposit ratio	-0.0123	-0.0360	-0.0014	-0.0062	(0.0312)	(0.0013)	(0.0027)	-0.0444	-0.0092	-0.0613
DW	(0.0284)	(0.0282)	(0.0290)	(0.0145)	(0.0387)	(0.0377)	(0.0303)	(0.0276)	(0.0272)	(0.0362)
R.W	-0.0707	-0.0440	-0.0333	-0.0110	-0.0074	-0.0180	-0.0377	(0.0230)	-0.0752	-0.0423
BoA	0.6977**	-0.0211)	0.6160*	-0.1784	0.5766	-0.5131*	0.8067	-0.2455	(0.0278) 0.6227^*	-0.0164
10011	(0.3382)	(0.2114)	(0.3201)	(0.1739)	(0.4678)	(0.2517)	(0.5713)	(0.1856)	(0.3173)	(0.2059)
Impairment ratio	-0.2843***	-0.1154*	-0.3346***	-0.0578	-0.3525***	-0.0487	-0.2373**	-0.0955*	-0.2848***	-0.1091*
1	(0.0964)	(0.0605)	(0.0950)	(0.0597)	(0.1135)	(0.1022)	(0.0968)	(0.0554)	(0.0906)	(0.0621)
Liquid assets	-0.0309	-0.0118	-0.0449	-0.0066	-0.0295	-0.0547^{*}	0.0168	-0.0048	-0.0193	-0.0118
	(0.0343)	(0.0205)	(0.0372)	(0.0233)	(0.0353)	(0.0283)	(0.0392)	(0.0194)	(0.0343)	(0.0204)
Diversification	0.0366^{*}	0.0149	0.0338^{*}	-0.0067	0.0838^{***}	-0.0118	0.0137	0.0098	0.0339^{*}	0.0140
	(0.0202)	(0.0101)	(0.0185)	(0.0066)	(0.0211)	(0.0159)	(0.0202)	(0.0099)	(0.0184)	(0.0088)
Provisions	-0.1162	0.3908	-0.6994	0.7947	-1.016	0.2293	0.4749	0.6252^{*}	-0.1153	0.4334
TT TD O	(0.6660)	(0.4195)	(0.5102)	(0.4950)	(0.6797)	(0.4745)	(0.7647)	(0.3734)	(0.6447)	(0.4068)
TLIRO	-0.2018**	-0.0041	-0.3301***	-0.1441***	-0.3687***	-0.1107	-0.1483	0.0080	-0.1995**	0.0280
FUDIDOD	(0.0812)	(0.0679)	(0.0898)	(0.0515)	(0.0867)	(0.0905)	(0.0921)	(0.0600)	(0.0757)	(0.0696)
LURIBOR	-3.908	-2.045	-4.707	-3.408	-5.709	-1.995	-1.798	-1.409	-4.905	-0.8955
10 year soy yield	(1.142) 0.8270**	0.2701	0.0413***	0.3083)	(1.427) 1 307***	0.4113*	0.8027**	(0.7937) 0.3171	0.0127**	0.4038
10-year sov. yield	(0.3870)	(0.3371)	(0.3197)	(0.2740)	(0.3857)	(0.2042)	(0.3757)	(0.2966)	(0.3784)	(0.3333)
GDP forecast 1v	-0.2019**	-0.1162**	-1.252***	-0.3847*	-0.0490	-0.0475	-0.2933	-0.0855*	-0.2252**	-0.0481
	(0.0794)	(0.0518)	(0.2920)	(0.2244)	(0.0989)	(0.0493)	(0.1961)	(0.0436)	(0.0892)	(0.0590)
CPI forecast 1y	-0.4475	0.1213	-0.4686	0.3310	-0.6750**	0.1634	-0.2265	0.1799	-0.2586	-0.1790
-	(0.3495)	(0.2797)	(0.4220)	(0.2047)	(0.3281)	(0.2116)	(0.5574)	(0.2263)	(0.3476)	(0.3012)
PER					0.0161**	0.0037				
					(0.0071)	(0.0050)				
CET1 ratio								0.2645^{***}		
								(0.0814)	ate ate ate	
TSCR									0.6745***	0.0631
CDD									(0.1421)	(0.1136)
CBR									0.8139	0.0500
Pac									0.0042	0.0843
120									(0.3053)	(0.1781)
									(0.000)	(0.0.00)
Fixed-effects		37		37		37		37		37
Bank		Yes		Yes		Yes		Yes		Yes
Fit statistics										
Observations	1,079	1,079	784	784	465	465	172	1,079	1,079	1,079
\mathbb{R}^2	0.49471	0.89174	0.59915	0.95291	0.76388	0.95767	0.40942	0.90157	0.51151	0.89794
Within \mathbb{R}^2		0.23711		0.39277		0.42424		0.30638		0.28080

Clustered (Bank) standard-errors in parentheses

Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Notes: Column (1) presents the results of the baseline pooled panel regression while column (2) reports the results with bank fixed effects. Columns (3) and (4) repeat the same regressions with the sample period ending in Q4 2019. Columns (5) and (6) repeat the same regressions than columns (1) and (2), adding the Price to Book Value (PTBV) as an additional control variable. Column (7) reports the regression on new targets only. Column (8) adds the lagged CET1 ratio as explanatory variable. Column (9) and (10) decomposes the own fund demand into the TSCR, the CBR and the P2G, with pooled regression and bank fixed effects respectively. Explanatory variables include announced the CET1 Overall Capital Requirement plus P2G, the log of Total asset, the ratio of deposits to total assets, the Risk Weight density, the Return on Asset, the impairment ratio, the ratio of cash to total assets, the diversification ratio (non-interest income over total operating income), the provision ratio of TLTRO over total assets, the annual domestic GDP growth and inflation, the 3-month EURIBOR rate and the 10-year sovereign yield. Balance-sheet and macroeconomic variables are lagged by one quarter. Errors are clustered at the bank level.

The regressions also provide some complementary lessons. A higher impairment ratio is associated with lower targets, suggesting that banks holding troubled assets acknowledge their difficulty in building up their capital ratio: a 1pp increase in impairment ratio translates into around a 0.3pp decrease in target CET1 ratio. A higher policy rate reduces the target CET1 ratio, in line with Marcus (1983) finding that an increase in interest rate is associated with lower capital ratios. Profitability is associated with some positive impact on targets, providing some support to the pecking order theory of capital: banks tend to target higher capital ratio when they can generate it internally. However, the coefficient does not prove stable across specification, and can also be explained in the tradeoff theory of capital by managers' willingness to protect the higher franchise value of the bank.

I run a series of robustness check. In column (2) I run the regression at the including bank fixed effects. Results are qualitatively unchanged, but coefficients are generally shrunk toward zero. De Jonghe and Öztekin (2015); Gropp and Heider (2010) and Bakkar et al. (2019) argue that time-invariant banks fixed effects are the primary determinants of their target CET1 ratios, implying that the inclusion of those fixed effects is key for unbiased target estimates. De Jonghe and Öztekin (2015) note that the fixed effect alone have a strong R^2 , suggesting their inclusion is necessary. Indeed, a regression on bank-fixed effects alone explains 78% of announced targets, close to the 85% found by De Jonghe and Oztekin (2015) with partial adjustment model on an international sample of banks. Adding the other explanatory variables only increases the R^2 to 89%, suggesting that they play only a marginal role in explaining banks' targets. Nevertheless, the opposite exercise of including all regressors but banks' fixed effects returns an R^2 of 49%, suggesting a substantial explanatory power. Several of the bank-level explanatory variables evolve sluggishly, meaning that most of their variance is cross-sectional and thus filtered out by banks' fixed effects. As such, the inclusion of bank-level fixed effect is necessary to appropriately fit banks' targets, but may lead to inaccurate elasticities for timevariant but sluggish explanatory variables. Moreover, those papers are based on pre-Basel III bank data, when capital requirements were materially lower and thus constrained much fewer banks' targets, which could revolve more easily toward bank specific time invariant targets. In Columns (3) and (4) I rerun the same regressions but ending the sample period in Q4 2019, thus removing the COVID-19 pandemic, characterised by a huge economic shock and uncertainty triggering important fiscal, monetary and prudential measures that may affect the regression results. In Column (7), I focus on new targets. Due to the small size of the sample, this regression is also run at the pooled level. In column (8) I add the lagged CET1 ratio as an additional explanatory variable.¹⁸ This creates an endogeneity issue, as targets move sluggishly

¹⁸The definition of the CET1 ratio used here, Phased-in or Fully-loaded is in line with the one used by the

and affect the actual CET1 ratio. Nevertheless, this provides a useful robustness check to determine if banks announce their targets taking into account their current CET1 ratio to limit the necessary adjustment. As expected, a higher ratio is associated with a higher target buffer. For all those regressions, the results are qualitatively unchanged.

I extend the baseline results with two extensions. First, to test the validity of the market timing theory of capital, I add banks' Price Earning Ratio as an additional explanatory variables in columns (5) and (6). According to this theory, banks' capital targets should increase with their PER. Indeed, a high PER indicates that stock prices are high and thus capital is a relatively cheap source of funding for the bank. Results provide some support for this theory: the impact of the PER on target is positive in both regressions and significant for the pooled one.

In columns (9) and (10) I disentangle the different components of CET1 demand, to assess their respective impact on bank's target. I decompose the total of own fund demand into the TSCR (minimum requirements), the CBR (usable buffers) and the P2G (capital demand), by decreasing order of regulatory stringency and thus expected impact. This expectation is not supported by the data. In the pooled regression, the TSCR and the CBR have similar coefficients, while only the CBR is significant once bank fixed effects are added. This implies that banks do not consider the CBR as less stringent than the minimum requirements, suggesting that they see a high cost in the restriction on capital distribution triggered by the breach of the CBR. This result has important positive and normative implications. On the positive side, it suggests that banks are committed to service regular dividend to their investors even in crisis time (when buffers are meant to be used). On the normative side, the usability of those buffers is mitigated by banks' unwillingness to draw on them, impeding their countercyclical purpose. Banks suffering losses would prefer to cut back on lending to reduce their RWA and increase their CET1 ratio rather than absorbing their losses by dipping into the CBR, which would activate dividend restrictions. This is consistent with banks' communication at the outbreak of the COVID-19 pandemic, when they largely communicated on their ability and willingness to navigate through the crisis with ample excess capital over the MDA trigger. In both regressions, the coefficient of the P2G is non-significant. This could suggest that banks treat the P2G as freely usable. Alternatively, as most banks have a P2G of 1%, it may be econometrically difficult to obtain a significant coefficient.

Overall, those results are consistent with the trade-off theory of capital, with banks balancing the cost of running high capital ratios with the risk of costly regulatory breach and trying to reassure investors in time of stress by promising not to deplete capital. Regulatory requirements

bank to define its target.

substantially affect banks' capital policy but results raise concern regarding the usability of the regulatory buffers introduced in Basel III, while countercylical release of requirements look more promising. Finally, those results also provide some support to the market-timing theory, as banks target higher capital ratio when their stock price is higher.

4.1.2 Comparison with partial adjustment models

One of the main contributions of this paper is the use of announced targets instead of estimated targets recovered from partial adjustment models. In order to assess the performance of partial adjustment models in estimating targets and elasticities, I run the partial adjustment model of Equation 3 using the same set of explanatory variables that for Table 1, with bank fixed effects as standard in the literature. As standard for dynamic panel data, and partial adjustment models in particular, I use a General Method of Moments (GMM) setting, relying on the standard system GMM proposed by Blundell and Bond (1998). I run the partial adjustment model on two datasets: first on the same set of banks present in the dataset of announced targets, for the sake of comparability; second on all banks consolidated in the euro area, to account for the fact that partial adjustment models do not require announced targets and can thus be applied on a larger set of banks.

Figure 6 compares the distance between actual announced targets and the fitted values of the three regressions. It appears that partial adjustment models produce distributions well centered around zero, meaning that their fitted values do not systematically deviate from announced targets. Nevertheless, their distribution of distance to announced target is quite large, with an interquartile range of more than 3pp, a material value for targets mostly ranging between 12.5 and 15%. In comparison, the regressions on announced target produces an interquartile range about three times smaller. This confirms that partial adjustment models produce noisy estimates of banks' targets and should be considered a second-best approach when announced targets are not available.

It would be interesting to compare the confidence intervals around the estimated coefficients in the two approaches. However, while the econometric structure used with announced targets allows for the use of all standard econometric approaches to build confidence intervals, the literature models does not provide a method to recover them when relying on partial adjustment models, reinforcing the case for the use of announced targets. Absent such confidence intervals, Figure 7 compares the estimated coefficients obtained with the partial adjustment regressions with the estimates and confidence intervals from the regression with announced targets. Coefficients from the two partial adjustment regressions often lie well outside the confidence interval of



Figure 6: Comparison of fit quality - announced targets and partial adjustment models

Note: Distance between fitted value and actual target from regression on announced targets (blue) and partial adjustment models on banks announcing targets (yellow) and ultimate parent banks in the euro area (orange). The partial adjustment models are estimated with difference GMM.

the regression with announced target, suggesting poor ability to recover the correct elasticities.¹⁹

Another issue should also be considered when comparing both models. It is well known that the GMM for short dynamic panel data should be used with caution, due to the risk of instrument proliferation and overidentification (see Roodman (2009b)), their complexity and the diversity of possible specifications, relying on different and easily breached assumptions (see Roodman (2009a)). The direct regression panel allowed by the use of announced target considerably reduces this model uncertainty.

4.2 Speed of adjustment

In a second step, I explore banks' speed of adjustment to their targets. Figure 8 represents the average distance between actual and target CET1 ratios in the eight quarters following the announcement of a new target. It separates banks initially above and below their targets. Two features emerge. First, banks do converge toward their targets, whatever their initial position. Second, the difference in the speed of convergence between the two groups of banks is striking. Banks initially above their targets converge only slowly toward it, with the distance falling by 0.5pp in two years. In contrast, those below their targets converge much more rapidly, reducing the distance by 1.5pp in two years, or 75% of the initial gap.

¹⁹The difference is possibly non statistically significant, but this would visibly require large confidence intervals around estimates with partial adjustment models, thus confirming that announced target allow for more precise estimates of the eslasticities.



Figure 7: Comparison of long term elasticities - announced targets and partial adjustment models

Note: Confidence intervals for panel regression on announced targets (blue) and partial adjustment models on banks announcing targets (yellow) and ultimate parent banks in the euro area (orange). The partial adjustment models are estimated with difference GMM.



Figure 8: Average convergence to new targets - percentage points

Note: The figure represents the distance between actual and target CET1 ratio when banks announce a new target and in the subsequent eight quarters. The sample consists of all announced targets that banks kept constant for at least 8 quarters. The sample is split between banks initially below (blue line) or above (yellow line) their targets when they announce it.

I estimate Equation 6 to recover the adjustment speed. In an extension, I split the $Gap_{i,t-1}$ variable into $Gap_{i,t-1}^+$ and $Gap_{i,t-1}^-$, to determine whether the adjustment speed depends on the sign of the deviation. In both cases, I exclude the observations corresponding to a change in target, in order to estimate the adjustment speed toward a constant target from one period to the other.

Table 2 presents the results. Banks take their targets seriously. Indeed, the coefficient on lagged target distance to target is significantly within the (0,1) interval, implying that banks do reduce their distance to target over time. The autocorrelation parameter at 92.5% implies a quarterly reduction in the gap by 7.5%. This lies at the lower end of the convergence rates in the existing literature, which typically finds adjustment speed between 8 and 20%.²⁰ Column (2) disentangles the cases of positive and negative distances to target. The result is twofold. First, banks adjust from both sides of the targets, with the autocorrelation coefficients again significantly in the (0,1) interval at the 1% level. This confirms that banks do not treat target announcement as a minimum threshold to set as low as possible to be sure to overpass it. On the contrary, when above target, they act to reduce their CET1 ratio. Second, banks below their targets adjust significantly faster than those above, with an adjustment speed of $\sim 18\%$ versus $\sim 5\%$. The difference between both speeds of adjustment is significant at the 1% level. Rolling over both coefficients, this means that after one year (two years) banks below their targets have closed more than 55% (80%) of the distance against 18% (33%) for banks above their targets. This suggests that the former banks are under greater pressure to adjust. This is consistent with investors being primarily concerned about the solvency of a bank and its ability to avoid costly regulatory breach, and less about high capitalisation suggesting a suboptimal use of funds. This also implies that many European banks have been able to retain large capital ratios despite commitment to return capital to shareholders in a context of low profitability. Columns (3) and (4) reproduce for robustness the regressions of Columns (1) and (2) but using the pre-Covid data only results are quantitatively unchanged and quantitatively very similar.

This result is consistent with the idea that banks above targets use this slack capital to accommodate shocks while those below their targets scramble to meet them. This asymmetry also provides support for the use of countercyclical in capital requirement over the financial cycle. Results from the previous section imply that a 1pp change in requirement translate in a 0.64pp change in target. For banks below their targets in crisis time (a likely case due to loss absorption on the one hand and procyclical target adjustment on the other) This would result in a 35bps $(0.64 \times (1 - 0.82^4))$ impact in CET1 ratio over one year for banks below their

²⁰This comparison converts into quarterly speed λ estimated on yearly data for a large part of the literature.

target, but only a muted 12bps for banks above target. As banks tend to be above their targets during the upward phase of the financial cycle and to fall below them during crisis, this suggests that raising requirements in good time and relaxing them in bad would provide substantial expansionary support during crisis, when banks react quickly, without choking economic growth in good times, when banks smooth their reaction over time.

Dependent Variable:		Targe	t dist.	
Model:	(1)	(2)	(3)	(4)
Variables				
Target dist.	0.9238^{***}		0.9109^{***}	
	(0.0299)		(0.0421)	
Target dist., pos.		0.9485^{***}		0.9391^{***}
		(0.0254)		(0.0398)
Target dist., neg.		0.8161^{***}		0.8149^{***}
		(0.0230)		(0.0270)
Wald test dist. target $= 1$	6.49^{**}		4.47^{**}	
Wald test pos. dist. $target = 1$		4.1^{**}		2.34
Wald test neg. dist. $target = 1$		64.14^{***}		46.97^{***}
Wald test pos. dist. $target = neg. dist. target$		13.84^{***}		5.84^{**}
Nb banks	74	74	74	74
Fit statistics				
Observations	$1,\!251$	$1,\!251$	903	903
\mathbb{R}^2	0.84841	0.85117	0.85266	0.85547
Adjusted \mathbb{R}^2	0.84841	0.85105	0.85266	0.85531

Table	2 :	Speed	of	adj	ustment
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Clustered (Bank) standard-errors in parentheses

Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Notes: p<0.1; *p<0.05; ***p<0.01. Column (1) presents the results of the pooled regression of the CET1 ratio distance to target on its lag while columns (2) distinguishes between positive and negative lagged distance to target. Columns (3) and (4) reproduce the same regressions with the sample period ending in Q4 2019. Explanatory variables are lagged by one quarter.

4.3 Impact on balance-sheet adjustment

While the previous section investigated the speed at which banks converge to their targets, the present section assess *how* they adjust. Banks can activate three broad channels to reach their targets. First, they can adjust their outstanding CET1 ratio, either through internal capital generation or external capital movements (distribution of capital or issuance of equity). Second, they can adjust the size of the balance-sheet. Third, they can alter the risk weight density, reallocating their portfolio toward safer or riskier assets. Their strategy of adjustment have strong implication for the real economy. In particular, the latter two affect banks' assets, and thus their ability and willingness to finance the real economy.

I first conduct a purely accounting exercise. For all new targets, I compute the initial distance

to target, its change over the next two years and the contribution of the change in total assets, risk weight density and outstanding CET1.²¹. Table 3 reports the average values, separating banks initially above or below their targets. It presents three key features. First, consistent with a faster speed of adjustment, the reduction of the distance occurs from both sides of the targets, but it is substantially larger for banks initially below them. Second, those banks reduce their distance to target primarily through their outstanding CET1 ratio. For a total reduction of the distance of 1.4 percentage points, 1 pp comes from outstanding CET1. Third, those banks also constrain their balance-sheet to reach their target capital ratio. First, they expand much less their total assets than banks above targets. Second, while the sample period was marked by a de-risking of banks portfolios across-the-board, the trend has been stronger for banks initially below their targets, more than offsetting the increase in total assets. As such, banks initially below their targets tend to reduce their RWA while those initially above expand it materially. This suggests that capital management has material consequences for banks' business decision and the financing of the economy.

 Table 3: Decomposition of the convergence to the target CET1 ratios

Inital sign	Initial distance	TA	Risk Weigt	RWA	CET1	Change
of the distance		contrib.	contrib.	contrib.	contrib.	in distance
		(1)	(2)	(1) + (2)	(3)	(1) + (2) + (3)
Negative	-1.71	-0.41	0.78	0.37	1.01	1.38
Positive	4.16	-1.50	0.37	-1.13	0.37	-0.65

Notes: This table presents the average convergence to the target CET1 ratio in the two years after a new target announcement, provided the target has remained unchanged during the two years. It separates banks that are initially above or below their target. The change in the distance to target is decomposed in contribution from changes in total assets, risk weight density (the two combined providing the contribution of the Risk Weighted Assets) and in outstanding CET1. All values are expressed in percentage points. Distance to target are winsorised at 0.5%.

Turning to econometrics, estimating Equation 7 assesses the predictive power of the gap between actual and target CET1 ratios provides on banks' future behaviour and the channels through which banks adjust toward their targets. Table 4 presents the results. Confirming previous results, the CET1 ratio adjusts upward (downward) when the distance to target is negative (positive). This adjustment of the ratio occurs through both a higher outstanding CET1 (the numerator) and a lower RWA (denominator). Rolling over the estimated coefficients to assess the evolution of outstanding CET1 and RWA until the distance to target congerges to zero, the increase in outstanding CET1 accounts for two thirds of the total adjustment while change in RWA accounts for the remaining third.²² This is consistent with De Jonghe and Öztekin (2015) and Memmel and Raupach (2010) who find that banks below their targets

²¹As the target is fixed over the period, the change in distance to target is equal to the change in CET1 ratio. With $CET1 ratio = \frac{CET1}{RWTA}$, one can decompose the change in CET1 ratio in $RW contribution = CET1 ratio_{t-1} * (RW_t - RW_{t-1}) * 0.5 * (TA_t + TA_{t-1})/RWA_t$, $TA contribution = CET1 ratio_{t-1} * (RW_t + RW_{t-1}) * 0.5 * (TA_t - TA_{t-1})/RWA_t$, $CET1 contribution = (CET1_t - CET1_{t-1})/RWA_t$

 $^{^{22}}$ Strictly speaking, the breakdown depends on the initial and target CET1 ratio. In practice, the 2/3 vs 1/3 breakdown is valid throughout the set of actual and target values observed in the sample.

adjust through equity growth rather than asset reduction.

The effect on RWA appears driven by portfolio rebalancing, as captured by the significant impact on risk weights. In particular, banks below their targets lend less to NFC which both reduces assets and risk weight density, as those exposures typically carry high risk weights, while they reduce their cash holding. Combining results of Tables 1 and 4, a back-of-the-envelope calculation implies that a 1pp hike in capital requirements increases the target, and consequently the distance to target, by 0.35 pp, triggering a quarterly 0.34 * 0.62 = 0.21pp negative shock on NFC loan quarterly growth, or 0.85pp on annual growth rate. Those results confirm banks' procyclical behaviour identified in the previous sections. When faced with an economic crisis, banks tend to increase their CET1 targets. Simultaneously, their retained earnings fall due to weaker economic activity and credit losses. Both effects have a negative impact on the distance to target. Banks react by reducing their corporate credit supply to reduce their risk weight density, increasing their CET1 ratio.

In an extension of the previous regression, and in line with the analysis of the speed of adjustment, I re-run the regressions separating positive and negative distances to target, to determine whether the choice and magnitude of adjustment channels depend on the sign of the distance. The results housed in Table 5 confirm that the adjustment occurs on both sides of the targets and that it is faster for banks under their targets, in particular through stronger adjustment of corporate credit. Moreover, banks below their targets also reduce their credit to households while they accumulate cash.

In a robustness exercise reported in tables A5 and A6 in Appendix for the sake of space, I end the sample period in Q4 2019 to exclude the COVID-19 pandemic period, market by largely distorted macroeconomic forecasts and strong fiscal, monetary and prudential support measures. Results remain qualitatively unchanged.

Overall, those results confirm that the distance to announced target informs on future balance-sheet evolution. Banks converge toward their targets by adjusting mostly their outstanding capital but also their asset side through portfolio reallocation, in particular corporate credit. The adjustment is larger for banks which are below their targets, which tend to accumulate more capital and to reduce credit supply to firms and households and to accumulate cash instead, reducing their risk weights and thus increasing their capital ratio.

4.4 Impact on credit supply during the COVID-19 pandemic

The previous results imply that the distance to the target capital ratio has a strong predictive power on banks' balance-sheet, and in particular on their corporate credit. To better identify

Dependent Variables:	CET1	CET1 €	RWA	RW	TOE	HH loans	NFC loans	Cash
COVID		(-)	(-)	Full sa	mple	(-)	(+)	(-)
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
Target dist.	-0.2069^{***}	-0.9884^{***}	0.6102^{***}	0.1966^{**}	0.1502	0.2830	0.7512^{**}	-2.982
	(0.0593)	(0.3641)	(0.2143)	(0.0829)	(0.2445)	(0.3033)	(0.3470)	(1.868)
Total Assets, log	-1.073	-5.383	-2.407	0.6728	-6.423	-10.89*	-2.356	-31.23
	(0.6915)	(5.167)	(3.404)	(1.174)	(5.538)	(6.008)	(4.097)	(27.87)
Deposit ratio	0.0107	0.1265	0.0365	0.0155	-0.0237	-0.4873^{**}	0.0125	-0.0786
-	(0.0132)	(0.0891)	(0.0466)	(0.0205)	(0.0713)	(0.2303)	(0.0594)	(0.6277)
RW	0.0061	-0.2208***	-0.2157^{***}	-0.2614^{***}	0.4115^{***}	0.1597	-0.0785	0.4652
	(0.0088)	(0.1015)	(0.0701)	(0.0369)	(0.1210)	(0.1975)	(0.0924)	(0.5573)
RoA	-0.0339	-0.3893	-0.1279	0.0739	-0.1122	0.0800	-0.1998	-4.181
	(0.1391)	(1.120)	(0.4628)	(0.2147)	(0.6681)	(0.4227)	(0.5363)	(7.576)
Impairment ratio	-0.0328	-0.2060	0.0395	0.0617	-0.1677	-0.3163	-0.2145	-0.1397
-	(0.0480)	(0.2982)	(0.2554)	(0.1081)	(0.1976)	(0.2775)	(0.2015)	(1.681)
Liquid assets	-0.0244**	-0.1320*	0.0066	0.0365	-0.0756	-0.1364	-0.0806	-4.399^{***}
-	(0.0112)	(0.0753)	(0.0598)	(0.0271)	(0.0699)	(0.0870)	(0.0804)	(1.345)
Diversification	-0.0034	-0.0166	0.0202	0.0055	0.0148	0.0347	0.0063	0.1345
	(0.0036)	(0.0235)	(0.0179)	(0.0072)	(0.0194)	(0.0298)	(0.0148)	(0.2453)
Provisions	0.1429	2.969	-0.0198	1.006*	-2.886	0.0660	0.5746	2.280
	(0.2859)	(2.800)	(0.9888)	(0.5644)	(1.797)	(2.288)	(1.444)	(13.35)
TLTRO	-0.0469	-0.2554	0.1486	0.1809^{**}	-0.2987	-0.0261	-0.2670	1.928
	(0.0371)	(0.3014)	(0.1344)	(0.0725)	(0.2078)	(0.2624)	(0.1915)	(1.497)
Excess capital	-0.0814**	-0.3944^{*}	0.0592	-0.1387^{**}	0.3376^{*}	-0.3274	-0.3878^{**}	-0.6682
-	(0.0377)	(0.2138)	(0.1668)	(0.0624)	(0.1697)	(0.3058)	(0.1845)	(1.972)
Fixed-effects								
Bank	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country x Quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Charmations	015	015	015	014	014	015	015	015
Diservations D ²	910	910	910	914	914	910	910	910
K^{-}	0.51364	0.57402	0.47778	0.49892	0.48305	0.59596	0.47971	0.33625
Within R ²	0.15444	0.09848	0.08046	0.17682	0.08695	0.06192	0.03163	0.09689

Clustered (Bank) standard-errors in parentheses

Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Notes: Explanatory variables include the distance between bank's actual CET1 ratio and its target, the log of Total asset, the ratio of deposits to total assets, the Risk Weight density, the Return on Asset, the impairment ratio, the ratio of cash to total assets, the diversification ratio (non-interest income over total operating income), the provision ratio, the ratio of TLTRO over total assets, the annual domestic GDP growth and inflation, the 3-month EURIBOR rate and the 10-year sovereign yield. Balance-sheet and macroeconomic variables are lagged by one quarter. Errors are clustered at the bank level. All explanatory variables are lagged by one quarter.

Table 5: Impact of distance to	o target - Sign-dependent effect
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Dependent Variables:	CET1	CET1 €	RWA	RW	TOE	HH loans	NFC loans	Cash
COVID	(1)			Full sa	mple			
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
Target dist., pos.	-0.1454^{*}	0.3789	0.7649^{***}	0.1881^{**}	0.1723	-0.4106	0.5386	-0.5548
	(0.0816)	(0.4362)	(0.2743)	(0.0938)	(0.2315)	(0.5082)	(0.3376)	(2.179)
Target dist., neg.	-0.2501^{***}	-1.947^{***}	0.5017^{**}	0.2026^{*}	0.1348	0.7694^{**}	0.9003**	-4.685^{**}
	(0.0521)	(0.4445)	(0.2028)	(0.1028)	(0.3214)	(0.2952)	(0.4227)	(2.006)
Total Assets, log	-1.019	-4.192	-2.272	0.6654	-6.403	-11.50*	-2.542	-29.11
	(0.7194)	(5.639)	(3.381)	(1.188)	(5.570)	(6.005)	(4.043)	(27.03)
Deposit ratio	0.0110	0.1335^{*}	0.0372	0.0155	-0.0236	-0.4908**	0.0114	-0.0662
	(0.0126)	(0.0784)	(0.0475)	(0.0204)	(0.0716)	(0.2248)	(0.0586)	(0.6171)
RW	0.0062	-0.2195^{**}	-0.2156^{***}	-0.2614^{***}	0.4115^{***}	0.1591	-0.0788	0.4675
	(0.0091)	(0.1029)	(0.0693)	(0.0370)	(0.1210)	(0.1964)	(0.0944)	(0.5599)
RoA	-0.0095	0.1528	-0.0665	0.0705	-0.1035	-0.1950	-0.2841	-3.219
	(0.1432)	(1.089)	(0.4549)	(0.2108)	(0.6490)	(0.4487)	(0.5199)	(7.695)
Impairment ratio	-0.0317	-0.1813	0.0423	0.0616	-0.1673	-0.3288	-0.2184	-0.0958
	(0.0478)	(0.3043)	(0.2555)	(0.1084)	(0.1986)	(0.2808)	(0.2018)	(1.692)
Liquid assets	-0.0254^{**}	-0.1538^{*}	0.0041	0.0366	-0.0760	-0.1253	-0.0772	-4.438^{***}
	(0.0109)	(0.0793)	(0.0613)	(0.0272)	(0.0708)	(0.0823)	(0.0800)	(1.340)
Diversification	-0.0023	0.0086	0.0230	0.0053	0.0152	0.0219	0.0024	0.1793
	(0.0041)	(0.0248)	(0.0175)	(0.0074)	(0.0193)	(0.0299)	(0.0155)	(0.2662)
Provisions	0.1601	3.352	0.0235	1.004^{*}	-2.880	-0.1281	0.5151	2.959
	(0.2811)	(2.634)	(1.000)	(0.5648)	(1.806)	(2.181)	(1.444)	(12.62)
TLTRO	-0.0418	-0.1418	0.1615	0.1802^{**}	-0.2969	-0.0837	-0.2847	2.130
	(0.0369)	(0.3337)	(0.1366)	(0.0724)	(0.2072)	(0.2516)	(0.1955)	(1.529)
Excess capital	-0.0968**	-0.7364^{***}	0.0204	-0.1365^{**}	0.3321^{*}	-0.1539	-0.3347^{*}	-1.275
	(0.0418)	(0.2096)	(0.1738)	(0.0634)	(0.1751)	(0.3272)	(0.1803)	(1.971)
Fixed-effects								
Bank	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country x Quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	100	100	2.00	100	2.00	1.00		100
$Fit\ statistics$								
Observations	915	915	915	914	914	915	915	915
\mathbb{R}^2	0.51596	0.59386	0.47857	0.49893	0.48306	0.59898	0.48059	0.33809
Within \mathbb{R}^2	0.15848	0.14046	0.08184	0.17684	0.08697	0.06894	0.03328	0.09939

Clustered (Bank) standard-errors in parentheses

Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Notes: Explanatory variables include the distance between bank's actual CET1 ratio and its target, the log of Total asset, the ratio of deposits to total assets, the Risk Weight density, the Return on Asset, the impairment ratio, the ratio of cash to total assets, the diversification ratio (non-interest income over total operating income), the provision ratio, the ratio of TLTRO over total assets, the annual domestic GDP growth and inflation, the 3-month EURIBOR rate and the 10-year sovereign yield. All explanatory variables are lagged by

and robustify this finding, I turn here to granular bank-firm level credit data in the context of the COVID pandemic.

In this final exercise, I investigate how banks' credit supply during the COVID-19 pandemic was affected by the distance to their CET1 ratio target. The pandemic constituted a major exogenous shock, provoking a surge in corporate credit demand, while banks anticipated massive credit losses. As such, banks below their targets could be tempted to restrict credit supply to preserve their capital ratio. On the contrary, banks above their targets could use their capital slack to increase business and reduce their distance to target.

Table 6 houses the estimation of Equation 8. Column (1) reports the results of the baseline linear regression. The distance to target CET1 ratio has a significant and economically material impact on credit supply: at 1pp negative distance to target is associated with a 2.3% fall in credit supply. This confirms that announced CET1 targets have a strong impact on banks' credit policy, as they adjust their credit supply in line with their capital slack. In Column (2), I separate positive and negative distances to target, to assess potential non-linearity to the elasticity of credit supply to the distance to target. The impact is concentrated in negative distances: a 1pp negative distance to target triggers a substantial reduction in credit supply by 7%. Those results confirm that banks under capital stress behave procyclically in crisis by reducing credit supply. On the contrary, those above target, and thus with capital slack, do not seem to symmetrically increase credit supply in proportion to their slack. This suggests that they do not plan to use this slack to increase business, rather planning to return it to shareholders in the form of dividend or share buybacks. Those behaviours are in line with those identified at the bank-level in the previous section. Importantly, those regressions control by the excess capital above requirements at the outbreak of the COVID crisis, meaning that the capital stress identified here does not come from low buffers above capital requirements, but from banks' willingness to stick to their announced targets, suggesting strong virtue signalling motives.

Those results confirm that banks procyclically adjust their credit supply to reach their capital target, with strong negative consequences on firms credit during crisis.

Dependent Variable:		$\Delta credit$
Model:	(1)	(2)
Variables		
Target dist.	2.399^{*}	
0.000	(1.316)	
Excess capital	0.6712	0.5446
The second se	(1.125)	(1.213)
COVID guarantees	0.8979^{***}	0.8992***
0	(0.1162)	(0.1157)
Moratoria	0.1946***	0.1887***
	(0.0229)	(0.0240)
Total Assets, log	-0.5070	-1.252
	(2.253)	(2.207)
Deposit ratio	-1.560^{***}	-1.520***
	(0.3343)	(0.3342)
RW	-0.3224	-0.4213
	(0.5946)	(0.5848)
RoA	7.634	5.729
	(7.627)	(7.865)
Impairment ratio	2.786	3.982
	(2.886)	(2.613)
Liquid assets	-0.8146^{***}	-0.8207^{***}
	(0.1482)	(0.1278)
Diversification	0.5501^{***}	0.5975^{***}
	(0.1591)	(0.1630)
Provisions	-11.24^{***}	-9.534**
	(4.006)	(4.001)
TLTRO	0.8727	0.6550
	(0.7574)	(0.7422)
OCR release	-9.310	-7.698
	(5.959)	(5.583)
Target dist., pos.		-2.894
		(3.642)
Target dist., neg.		6.971***
		(2.605)
Fixed-effects		
Firm	Yes	Yes
Fit statistics		
Observations	943,030	943,030
\mathbb{R}^2	0.44783	0.44819
Within \mathbb{R}^2	0.05646	0.05709

Table 6: Impact of the distance to target on credit

 supply during COVID

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

Notes: This Table presents the impact of a bank's distance to its CET1 ratio target on its corporate credit supply between pre- (2019 Q3 to Q4) and post-COVID (2020 COVID)Q3 to Q4) periods. Column (1) presents the results of the baseline regression while column (2) reports the results separates positive and negative distance to the target. Explanatory variables include announced the CET1 Overall Capital Requirement plus P2G, the log of Total asset, the ratio of deposits to total assets, the Risk Weight density, the Return on Asset, the impairment ratio, the ratio of cash to total assets, the diversification ratio (non-interest income over total operating income), the provision ratio, the ratio of TLTRO over total assets, the share of loans under moratoria and under guarantee in the post-COVID stock of loans and the release of the overall capital raquirements between $Q4\ 2019$ and $Q2\ 2020$.

5 Conclusion

This article investigates banks' capital ratio targets: how banks set them, how and how fast do they converge to them and what is the impact on banks' credit supply. It does so building on an original dataset of capital ratio targets European banks publicly announce to their investors. This materially contributes to the existing literature, which depends on estimates of unobserved targets. The analysis of observed targets provides several key lessons. First, announced targets increase with capital requirements, but not one for one. This is consistent with the trade-off theory according to which banks balance the expected cost of regulatory breach versus the cost of high capital ratios. Moreover, banks do not distinguish between strict and usable capital requirements, suggesting that the latter would not cushion a credit supply shock as intended. Banks also tend to increase their targets when faced with an adverse economic environment, suggesting they try to reassure investors regarding their solvency and capacity not to breach capital requirement. Overall, the way banks set their targets appears in line with the trade-off theory of capital. Second, banks are serious about their targets: they do converge toward them. Importantly, the adjustment is materially faster for banks initially below their targets, suggesting higher pressure to build up solvency than to return capital to investors. Third, the gap between target and actual capital ratio has important informational content on banks' future balancesheet adjustments. Banks bridge two-third of the gap by adjusting their volume of capital. They bridge the remaining third with their assets, with material impact on corporate credit supply. As such, the distance between actual and target capital ratio was a critical determinant of banks' credit supply during the COVID-19 pandemic: banks that entered the crisis with a CET1 ratio below their targets offered lower credit supply than other banks, reacting procyclically to the crisis.

Those results provide important lessons for policymakers. They confirm the material impact of banks' capital management on their credit supply. They call for the monitoring of banks' announced targets to anticipate credit development and to assess the effectiveness of prudential policies. They also indicate that banks are unwilling to reduce their capital ratios during adverse times and to draw on their regulatory buffers, raising concerns regarding buffers' usability. On the contrary, results point to strong procyclical credit restriction during crisis. Simultaneously, this calls for the build-up of appropriate countercyclical capital requirements that the regulator could release in crisis times, to mitigate banks' procyclical reaction. Appropriate communication and forward guidance could also influence banks' anticipations and, in turn, their CET1 targets and credit policy. Further ahead, this paper paves the way for further analysis of banks' strategic planning, in particular their targets for return on equity and payout ratio, their drivers and their consequences on banks' behaviour.

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A Appendix

	Ν	Mean	SD	Min	Q1	Median	Q3	Max
Target	1346	14.28	3.17	10.00	12.00	13.50	15.00	31.00
Total Assets, log	1295	25.53	1.72	20.98	24.54	25.55	26.92	28.53
Deposit ratio	1295	69.07	12.59	19.34	60.96	70.20	78.84	93.10
RW	1304	35.13	10.55	3.15	28.17	34.43	41.10	78.08
RoA	1293	0.37	0.61	-4.48	0.20	0.39	0.61	7.60
Impairment ratio	1239	2.03	2.85	0.01	0.40	0.92	2.24	16.01
Liquid assets	1248	16.27	12.36	0.67	7.31	13.52	21.82	62.11
Diversification	1289	38.51	35.67	-970.48	26.58	38.19	51.92	94.35
Provisions	1283	0.65	0.54	0.00	0.27	0.50	0.93	3.65
TLTRO	1295	2.62	3.80	0.00	0.00	0.79	3.76	18.89
PER_roll	552	14.33	21.95	-0.00	7.81	10.33	13.92	392.93
CET1 ratio	1343	14.82	4.67	-0.52	11.74	13.60	16.50	37.12
OCR w. P2G	1127	11.64	1.73	6.25	10.38	11.50	12.67	19.64
TSCR	1223	7.80	1.76	4.50	6.30	7.59	9.00	17.14
CBR	1241	2.92	1.21	0.00	2.50	2.75	3.54	7.05
P2G	1207	0.89	0.78	0.00	0.00	1.00	1.25	4.00

Table A1: Summary statistics for bank level data

Source: European Central Bank supervisory data

Notes: This table provides the summary statistics for all the regression variables used in the baseline regression.

	Ν	Mean	SD	Min	Q1	Median	Q3	Max
Guarantees	1219460	0.10	0.25	0.00	0.00	0.00	0.00	1.00
Moratoria	1219460	0.02	0.14	0.00	0.00	0.00	0.00	1.00
Credit (k ${\in})$	1219460	1328.41	18500.44	0.00	55.39	150.00	452.48	$9,\!292,\!986.70$

Table A2: Summary statistics for bank-firm level data

Source: AnaCredit

Notes: This table provides the summary statistics for all the regression variables used in the baseline regression.

 Table A3:
 Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Target	1																	
Total Assets, log	-0.4	1																
Deposit ratio	0.16	-0.44	1															
RW	-0.21	-0.1	0.03	1														
RoA	0.12	-0.12	0.06	0.03	1													
Impairment ratio	-0.15	-0.2	0.24	0.32	-0.17	1												
Liquid assets	-0.18	0.39	-0.43	-0.01	-0.02	-0.35	1											
Diversification	0.07	0.04	-0.09	-0.07	0	0	0.19	1										
Provisions	-0.23	0.13	0.03	0.1	-0.21	0.15	-0.13	-0.18	1									
TLTRO	-0.17	-0.06	0.14	0.06	-0.24	0.29	-0.25	0.12	0.12	1								
EURIBOR	-0.16	0.14	-0.22	0.09	0.09	0.25	-0.07	0.05	0.09	-0.23	1							
10-year sov. yield	0.02	-0.16	0.24	0.23	-0.07	0.59	-0.31	0.13	0.09	0.36	0.35	1						
PER	-0.01	0.05	-0.1	-0.02	-0.25	0.15	0.08	0.09	0.03	-0.02	0.11	-0.03	1					
CET1 ratio	0.74	-0.44	0.15	-0.39	0.2	-0.29	-0.18	-0.05	-0.3	-0.26	-0.23	-0.23	-0.03	1				
OCR w. P2G	0.36	-0.28	0.15	0.08	-0.03	0.02	-0.08	-0.12	-0.16	-0.23	-0.18	-0.12	0.05	0.35	1			
TSCR	0.24	-0.37	0.06	0.16	-0.04	0.36	-0.26	-0.03	0.03	-0.09	0.37	0.23	0.11	0.2	0.54	1		
CBR	0.15	0.2	0.02	-0.04	0.01	-0.3	0.16	-0.09	-0.21	-0.15	-0.49	-0.36	-0.04	0.09	0.46	-0.37	1	
P2G	0.11	-0.1	0.12	-0.11	-0.09	-0.2	0.08	-0.06	-0.11	-0.02	-0.53	-0.24	-0.07	0.25	0.36	-0.34	0.35	1

Notes: This table reports the correlation matrix of the main regression variables for the sample of banks in the main regression, containing 950 bank-quarter observations.

Table A4: Impact of distance to target	, robustness with distance to requ	uirements
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Dependent Variables: Model:	CET1 ratio (1)	$\begin{array}{c} \text{CET1} \in \\ (2) \end{array}$	Issued capital (3)	Retained earnings (4)	RWA (5)	RW (6)	TOE (7)	Exp. NFC (8)	HH loans (9)	$\begin{array}{c} \text{Cash} \\ (10) \end{array}$
Variables										
Target dist., pos.	-0.2858***	-1.018**	-0.2152	-1.048	0.7223^{***}	0.0930^{*}	0.2995^{**}	0.0053	0.0288	-0.3983
0 /1	(0.0680)	(0.3993)	(0.1866)	(2.779)	(0.1967)	(0.0534)	(0.1421)	(0.1984)	(0.2228)	(1.126)
Target dist., neg.	-0.2737***	-1.855***	-1.296**	-11.75***	0.5414***	0.1792^{**}	0.0900	0.4842	0.6063^{**}	-3.031***
6 , 6	(0.0723)	(0.5971)	(0.5891)	(5.061)	(0.1522)	(0.0894)	(0.2706)	(0.3101)	(0.2720)	(1.505)
Cap. req. dist.	36.46^{***}	160.5^{***}	42.87	584.0	-68.40^{***}	-16.34^{**}	-12.28	4.124	-7.095	27.09
1 1	(4.418)	(45.45)	(42.06)	(426.1)	(20.07)	(7.342)	(18.14)	(29.30)	(21.34)	(133.0)
Total Assets, log	1.316**	6.777	-0.3573	51.07	-4.011	-0.0309	-4.033	-0.9770	-1.541	11.10
	(0.6102)	(4.068)	(3.708)	(47.19)	(3.136)	(1.365)	(3.336)	(3.221)	(3.238)	(15.54)
Deposit ratio	0.0066	0.1702	0.0747	-0.3176	0.0937^{*}	0.0183	0.0185	-0.0389	-0.3831^{**}	0.8439^{*}
	(0.0283)	(0.1897)	(0.0704)	(0.9620)	(0.0505)	(0.0242)	(0.0699)	(0.0694)	(0.1791)	(0.4404)
RW	2.535^{**}	-10.74	-10.05	114.9	-24.65^{***}	-24.30^{***}	39.40^{***}	-12.43	16.44	55.92
	(1.157)	(7.759)	(8.567)	(102.4)	(7.849)	(3.820)	(10.75)	(8.126)	(16.60)	(35.68)
RoA	-0.9392^{***}	-0.4145	0.2503	30.50	0.4104	0.2926	-0.0018	0.3180	1.107	-11.43
	(0.3459)	(4.407)	(3.264)	(31.31)	(1.435)	(0.4724)	(1.524)	(1.343)	(1.803)	(18.49)
Impairment ratio	0.0044	0.0343	0.3267	3.082	-0.0519	0.0427	-0.1628	0.0021	-0.4879^{***}	-2.816
	(0.0403)	(0.3558)	(0.3269)	(3.655)	(0.1392)	(0.0825)	(0.1970)	(0.2041)	(0.1832)	(1.847)
Cash/TA	0.0062	-0.0582	-0.0018	3.874^{*}	-0.0868	-0.0146	-0.0139	0.0360	-0.0340	-5.737^{***}
	(0.0150)	(0.1187)	(0.0962)	(2.160)	(0.0619)	(0.0378)	(0.1051)	(0.0841)	(0.1218)	(0.7430)
Diversification	-0.0110^{***}	-0.0605**	-0.0002	0.5269	0.0241^{*}	0.0115	-0.0042	-0.0116	-0.0002	-0.1509
	(0.0032)	(0.0297)	(0.0327)	(0.3914)	(0.0142)	(0.0071)	(0.0147)	(0.0159)	(0.0263)	(0.1893)
Provisions	0.2544	1.813	0.8730	30.86	-0.6511	0.7563^{**}	-2.652^{**}	0.7411	-0.2806	-11.94
	(0.1987)	(1.144)	(1.234)	(19.01)	(0.9822)	(0.2997)	(1.168)	(1.145)	(1.516)	(11.27)
TLTRO	-0.0272	-0.1349	-0.0399	-1.135	0.0534	0.0590	-0.0822	0.2364	-0.0002	0.4425
	(0.0223)	(0.1738)	(0.1394)	(2.392)	(0.0874)	(0.0474)	(0.1278)	(0.2212)	(0.1372)	(1.051)
Fixed-effects										
Bank	Yes	Yes	Yes	Ves	Yes	Yes	Yes	Yes	Yes	Yes
Country x Quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics										
Pos - Neg	0.02	1.68	3.1*	3 8/1*	0.85	0.74	0.5	3.95*	27	1.86
Observations	1 186	1 185	1 186	1 13/	1 186	1 185	1 185	1 186	1 185	1 186
D^2	0 50647	1,100	1,100	0.91107	1,100	1,100	1,100	0.41449	1,100	1,100
n Will: D ²	0.39047	0.33334	0.32097	0.31107	0.48248	0.47430	0.43872	0.41448	0.04248	0.328/3
Within R ²	0.35326	0.18364	0.02754	0.00850	0.12064	0.16113	0.06759	0.01707	0.03356	0.11752

Notes: *p<0.1; **p<0.05; ***p<0.01. Explanatory variables include the distance between actual CET1 ratio and the target CET1 ratio (*Targetdist.*) and the MDA trigger (*Cap.req.dist*), the number of quarters before target must be reached (*Horizon*), the bank's Return on Asset, Impairment ratio, Loan to deposit ratio, Net Interest Margin and log of TA (demeaned at the quarterly level in the cross-section), quarterly growth in real GDP and HICP, unemployment rate, credit demand index of the Bank Lending Survey and the interest rate of the Main Refinancing Operations of the ECB. All explanatory variables are lagged by one quarter. Errors clustered at the bank level.

Dependent Variables:	CET1	CET1 €	RWA	RW	TOE	HH loans	NFC loans	Cash
COVID	(1)	(2)	(2)	(4) FALS	5E (5)	(6)	(7)	(8)
	(1)	(2)	(3)	(4)	(5)	(0)	(7)	(8)
Variables								
Target dist.	-0.2630***	-1.212^{***}	0.7277^{***}	0.1462^{*}	0.3187	0.3260	0.5301^{**}	-3.095^{*}
	(0.0386)	(0.3558)	(0.1349)	(0.0805)	(0.2205)	(0.2679)	(0.2207)	(1.834)
Total Assets, log	0.1400	-1.394	-4.357	1.677	-11.95^{**}	-10.03*	-1.924	-56.22**
	(0.7273)	(6.284)	(3.134)	(1.252)	(4.931)	(5.195)	(4.925)	(25.09)
Deposit ratio	0.0164	0.2090	0.0720^{*}	0.0294	-0.0350	-0.3304^{***}	-0.0027	0.0146
	(0.0184)	(0.1665)	(0.0426)	(0.0282)	(0.0780)	(0.0783)	(0.0490)	(0.4918)
RW	0.0061	-0.2087	-0.2383***	-0.2311***	0.3198^{**}	0.0381	-0.0685	0.4910
	(0.0137)	(0.1383)	(0.0643)	(0.0420)	(0.1213)	(0.0731)	(0.0770)	(0.6421)
RoA	-0.0205	0.8286	-0.4457	0.0494	-0.4076	0.1392	-0.2808	-3.755
	(0.1278)	(1.318)	(0.3123)	(0.1050)	(0.2741)	(0.2857)	(0.3107)	(4.510)
Impairment ratio	-0.1152	-0.2596	0.3072	0.0781	0.2378	-0.2851	-0.2334	0.8277
	(0.0692)	(0.4199)	(0.2632)	(0.1218)	(0.1894)	(0.2447)	(0.1745)	(1.640)
Liquid assets	-0.0301*	-0.2150^{*}	-0.0197	0.0180	-0.0600	-0.2231* ^{**}	-0.0708	-3.648^{**}
	(0.0157)	(0.1273)	(0.0578)	(0.0292)	(0.0695)	(0.0703)	(0.0850)	(1.600)
Diversification	-0.0114***	-0.0418*	0.0341^{*}	0.0100	0.0172	0.0471	-0.0022	0.1818
	(0.0041)	(0.0232)	(0.0195)	(0.0090)	(0.0144)	(0.0356)	(0.0125)	(0.2268)
Provisions	-0.2902	2.378	1.146	0.7743	-0.3763	1.700	0.9280	6.489
	(0.3483)	(3.097)	(1.043)	(0.8386)	(2.169)	(1.924)	(1.323)	(16.44)
TLTRO	-0.1072^{***}	-0.3691	0.2360	0.1206	0.0353	-0.1151	-0.3049^{*}	3.435^{**}
	(0.0393)	(0.3550)	(0.1781)	(0.1067)	(0.2253)	(0.2536)	(0.1663)	(1.576)
Fixed-effects								
Bank	Ves	Ves	Ves	Ves	Ves	Ves	Ves	Ves
Country x Quarter	Ves	Ves	Ves	Ves	Ves	Ves	Ves	Ves
	165	165	165	165	165	165	165	105
$Fit\ statistics$								
Observations	808	807	808	807	807	808	808	808
\mathbb{R}^2	0.48822	0.54550	0.47269	0.48424	0.47145	0.61845	0.47400	0.29297
Within \mathbb{R}^2	0.15128	0.08589	0.09799	0.15449	0.08143	0.06574	0.03378	0.07475
	0.20220	0.00000	0.00.00	0.20220	0.000000	0.000.4	0.000.0	

Clustered (Bank) standard-errors in parentheses

Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Notes: Explanatory variables include the distance between bank's actual CET1 ratio and its target, the log of Total asset, the ratio of deposits to total assets, the Risk Weight density, the Return on Asset, the impairment ratio, the ratio of cash to total assets, the diversification ratio (non-interest income over total operating income), the provision ratio, the ratio of TLTRO over total assets, the annual domestic GDP growth and inflation, the 3-month EURIBOR rate and the 10-year sovereign yield. All explanatory variables are lagged by one quarter.

Dependent Variables:	CET1	CET1 €	RWA	RW	TOE	HH loans	NFC loans	Cash
Model:	(1)	(2)	(3)	(4) FAL	(5)	(6)	(7)	(8)
Variables								
Target dist., pos.	-0.2395***	-0.1774	1.015^{***}	0.0986	0.5439^{**}	-0.2726	0.1380	-1.529
	(0.0724)	(0.4988)	(0.1850)	(0.0996)	(0.2510)	(0.3648)	(0.1936)	(2.496)
Target dist., neg.	-0.2793***	-1.930****	0.5294^{***}	0.1789^{*}	0.1642	0.7385^{***}	0.8004^{**}	-4.174^{*}
	(0.0491)	(0.4471)	(0.1526)	(0.1047)	(0.3458)	(0.2487)	(0.3501)	(2.252)
Total Assets, log	0.1748	0.1768	-3.932	1.605	-11.61**	-10.91**	-2.503	-53.90**
	(0.7068)	(6.118)	(3.178)	(1.277)	(5.067)	(5.070)	(4.816)	(24.72)
Deposit ratio	0.0161	0.1976	0.0687	0.0300	-0.0376	-0.3235^{***}	0.0018	-0.0035
	(0.0182)	(0.1654)	(0.0445)	(0.0276)	(0.0757)	(0.0717)	(0.0479)	(0.4854)
RW	0.0069	-0.1762	-0.2288***	-0.2327^{***}	0.3274^{***}	0.0184	-0.0814	0.5426
	(0.0140)	(0.1390)	(0.0624)	(0.0411)	(0.1181)	(0.0731)	(0.0799)	(0.6356)
RoA	-0.0164	0.9609	-0.3959	0.0413	-0.3692	0.0357	-0.3487	-3.484
	(0.1254)	(1.239)	(0.3153)	(0.1041)	(0.2667)	(0.2877)	(0.3426)	(4.603)
Impairment ratio	-0.1128	-0.1550	0.3366	0.0732	0.2608	-0.3463	-0.2735	0.9877
	(0.0690)	(0.4357)	(0.2662)	(0.1238)	(0.1883)	(0.2438)	(0.1665)	(1.666)
Liquid assets	-0.0303*	-0.2241^{*}	-0.0221	0.0184	-0.0619	-0.2179^{***}	-0.0674	-3.661^{**}
	(0.0157)	(0.1302)	(0.0588)	(0.0294)	(0.0711)	(0.0691)	(0.0850)	(1.607)
Diversification	-0.0110^{**}	-0.0234	0.0393^{**}	0.0091	0.0212	0.0363	-0.0093	0.2101
	(0.0044)	(0.0181)	(0.0188)	(0.0093)	(0.0140)	(0.0348)	(0.0136)	(0.2493)
Provisions	-0.2776	2.927	1.300	0.7486	-0.2548	1.380	0.7183	7.327
	(0.3439)	(2.871)	(1.102)	(0.8251)	(2.088)	(1.845)	(1.282)	(16.25)
TLTRO	-0.1042^{***}	-0.2403	0.2726	0.1144	0.0646	-0.1915	-0.3549^{**}	3.634^{**}
	(0.0384)	(0.3664)	(0.1847)	(0.1050)	(0.2267)	(0.2560)	(0.1724)	(1.648)
Fixed-effects								
Bank	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country x Quarter	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$Fit\ statistics$								
Observations	808	807	808	807	807	808	808	808
R^2	0.48856	0.55606	0.47554	0.48461	0.47255	0.62157	0.47748	0.29374
Within \mathbb{R}^2	0.15184	0.10712	0.10287	0.15510	0.08335	0.07338	0.04019	0.07575

Table A6: Impact of distance to target - preCovid - Sign-dependent effect

Clustered (Bank) standard-errors in parentheses

Signif. Codes: ***: 0.01, **: 0.05, *: 0.1

Notes: Explanatory variables include the distance between bank's actual CET1 ratio and its target, the log of Total asset, the ratio of deposits to total assets, the Risk Weight density, the Return on Asset, the impairment ratio, the ratio of cash to total assets, the diversification ratio (non-interest income over total operating income), the provision ratio and the ratio of TLTRO over total assets. All explanatory variables are lagged by one quarter.