



Supervisory forward guidance: the effectiveness of the 2020 euro area supervisory capital relief on the bank credit supply channel

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Abstract

We investigate the effectiveness of the euro area's single supervisory mechanism's capital relief measures in response to the outbreak of the coronavirus pandemic, in terms of large non-financial corporations' lending outcomes. Using a granular borrower level dataset and controlling for the policies of other euro area authorities, bank characteristics and demand effects, we find that the lifting of the pillar 2 guidance (P2G) capital recommendation had a considerable statistically significant impact in supporting bank credit supply. The results are attributed to both, the capital made available and announcement effects. The latter are generated by the communication of supervisory plans and the fact the P2G was not designed to be *ex ante* "releasable". The announcement of granted supervisory flexibility seems to have reduced uncertainty surrounding forthcoming regulatory responses in the beginning of the pandemic and acted as a *de facto* "supervisory forward guidance" in support of bank business decisions. Going forward we propose the creation of a formal supervisory forward guidance strategy, to complement the existing communication channels, to the benefit of banks' and market participants' decision making during both normal and crisis times. Our work therefore contributes to the literature threefold: (i) it introduces a novel granular supervisory dataset at the borrower level, (ii) it is one of the first papers to take a euro area supervisory perspective in analysing the effectiveness of capital relief measures at the onset of the Covid-19 pandemic, and (iii) it proposes a new supervisory policy instrument, the "supervisory forward guidance" with the goal of informing and steering banks' and market participants' expectations in order to prevent distress episodes.

Keywords Pandemic support measures · Microprudential measures effectiveness · Supervisory forward guidance · Bank credit supply · Large corporates · Lending

JEL Classification G21 · G28 · C23 · G01

Introduction

The Global Financial Crisis and the European Sovereign Debt Crisis have unambiguously left their mark on the EU economic landscape of the past decade. While the biggest challenges faced at their peak have been overcome, their memory will no doubt linger in the minds of policymakers as cautionary tales of the perils one could face in the event of insufficient or untimely action.

The vicious spiral of bank deleveraging during a downturn, leading to impaired access to funding and weak business prospects, later resulting in NPLs and further deleveraging, has inspired policy makers to develop innovative policies and regulatory initiatives. One of their aims has been to prevent future pro-cyclical behaviours that choke growth in a downturn, deepening and prolonging the economic fallout. From the creation of the banking union and the SSM, macroprudential policy and Basel 3, to unconventional monetary policy; a new playbook for containing and mitigating the effect of crises had been written.

Cue the Covid-19 global pandemic—an unprecedented health crisis with the potential to wreak havoc beyond previous distress events. While the exact date it started to produce effects in Europe can be debated, what is clear is that numerous policy authorities acknowledged in early 2020 the

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fast-moving nature of the risks and their damaging potential to the economy.

The ECB announced on the 2nd of March it was closely monitoring the situation and stood ready to take appropriate and targeted measures as necessary.¹ On the 12th of March a set of microprudential and monetary measures were announced, followed soon after by macroprudential measures intended to allow banks to fulfil their role in funding the real economy.² These actions acknowledged that this time around it was not the financial sector that triggered the problem, but it will be key to the solution by keeping households and corporates afloat. The measures were complemented by multiple national specific government support measures for private sector entities, and the European Commission's SURE Programme aimed at mitigating unemployment risks.³

Among the measures with direct impact for banks, the microprudential ones contained a communication element where European supervisors committed to take a flexible approach to supervisory tasks, in order to enable banks to continue funding the real economy. The supervisory authorities' statement was further backed by an unprecedented step, relaxing the bank-specific supervisory recommendation on the Pillar 2 Guidance (P2G), which was designed to provide a sufficient capital buffer for banks to withstand stressed situations, but not as an *ex ante* or pre-cautionary releasable countercyclical policy, as compared to its macroprudential counterparts. The ECB announced that no supervisory reaction to potential breaches of the P2G recommendation would be pursued, thus, from a practical perspective the P2G was *de facto* set to zero. The act amounted in a sense to a "*supervisory forward guidance*" clarifying regulatory expectations and next steps, and was meant to lend credibility to the commitment by providing an additional capital cushion on top of bank internal capital target levels. In turn this was expected to reduce uncertainty for bank's business decisions.⁴

¹ See <https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200302~f2f6113f52.en.html>.

² For microprudential relief measures see <https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200312~45417d8643.en.html>; for monetary policy measures see https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200312_1~39db50b717.en.html, for macroprudential and national measures see <https://www.esrb.europa.eu/home/search/coronavirus/countries/html/index.en.html>.

³ See https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/financial-assistance-eu/funding-mechanisms-and-facilities/sure_en.

⁴ The Bank Lending Survey 2020 Q4 edition provides further evidence in this direction. Section 3.2 on banks' adjustments to regulatory and supervisory actions documents that "*banks indicated that regulatory or supervisory relief measures implemented in the context of the coronavirus pandemic had led to a significant increase in banks' total assets (...)*" and that "*(...) banks indicated that regulatory or supervisory action had had a strong easing impact on their funding conditions*".

The P2G announcement was complemented by a decision to frontload the implementation of CRD V⁵ allowing the partial use of capital instruments that do not qualify as Common Equity Tier 1 (CET1) capital, to meet the Pillar 2 Requirements (P2R). The overall capital "relief"⁶ generated was estimated by the ECB to be in the range of €90bn for the P2G, and €30bn for the P2R frontloading, for a combined effect of about €120bn in terms of CET1 capital.⁷

Other measures on the supervisory side have aimed to provide operational relief such as adjusting regulatory submission timetables, postponing on-site inspections and performing a pragmatic SREP⁸ for 2020 in light of the large uncertainty surrounding business conditions. Finally, a recommendation to postpone dividend payments and share buybacks until at least October 2020 had been issued on 27th March 2020, which was followed by extensions until January 2021 and later September 2021, in July and December 2020, respectively.

On the macroprudential side, a number of national authorities have released their Countercyclical Capital Buffer (CCyB) or have forgone its implementation following increase decisions which have yet to become binding requirements prior to the pandemic. Structural capital buffers like the Global Systemically Important Institutions (GSII), Other Systemically Important Institutions (OSII) and the Systemic Risk Buffer (SyRB) have also been modified by various authorities in the sense of release or substitution. The relief of macroprudential measures was estimated to be in the range of €20bn in terms of CET1 capital.

On the monetary policy side, a decision to ease conditions for targeted long-term refinancing operations (TLTRO III)⁹ had been made, followed by US dollar liquidity enhancing operations, the Pandemic Emergency Purchase Programme (PEPP) and a series of other measures aimed at ensuring the

⁵ Capital Requirements Directive V was scheduled to enter in effect on 1st January 2021. For further details see *CRD V consolidated version 01/01/2022* <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013L0036> and *CRD V transposition status*.

https://ec.europa.eu/info/publications/capital-requirements-directive-crd-v-transposition-status_en.

⁶ Given the non-binding nature of the P2G capital recommendation, the act to relax it is not a release in the strict sense.

⁷ See https://www.bankingsupervision.europa.eu/press/publications/html/ssm.faq_ECB_supervisory_measures_in_reaction_to_the_coronavirus~8a631697a4.en.html.

⁸ Supervisory Review and Evaluation process performed annually to decide about necessary supervisory measures specific to each supervised bank, which is driven by the riskiness of each entity. For 2020 the 2019 figures were used as the basis of the pragmatic assessment, see https://www.bankingsupervision.europa.eu/press/publications/newsletter/2020/html/ssm.ni200513_2.en.html.

⁹ See the ECB Press release for further details. The measure entailed *inter alia* a reduction by 25 basis points of the interest rate, an increase in the borrowing allowance, and a removal of the bid limit.



liquidity and collateral eligibility of banking institutions. Finally, governments have provided various support schemes which can be classified as loan moratoria, government guarantees or forbearance measures in support of households and corporates.

While an exhaustive description of all measures undertaken by the multiple national and European authorities is beyond the scope of this work, it can be argued that the above likely reflects the most relevant support measures from the perspective of bank lending to non-financial corporates (NFCs).¹⁰ With the benefit of hindsight and a number of granular datasets, this work aims to assess the effectiveness of policy actions taken in the beginning of 2020 in support of an important segment of the real economy.

Estimating the effectiveness of policy measures during the Covid-19 pandemic is a very complex problem requiring multiple perspectives, data sets and methods. The complexity, *inter alia*, relates to disentangling the effects of multiple policy actions.¹¹ The present study analyses a specific slice only, while controlling for other policies. It takes a supervisory perspective, looking at the evidence relating to lending outcomes towards the largest non-financial corporates, and will try to answer three key questions:

- (1) Have the supervisory capital relief measures been effective in supporting the credit supply channel?
- (2) If so, what was their contribution among the myriad other policies implemented by authorities?
- (3) Are there any lessons supervisors could learn from this experience?

To answer these questions, it is important to distinguish between demand side and supply side effects on observable loan growth. Only looking at the reported loan growth figures cannot inform us whether SSM measures were indeed effective. While aggregate loan growth itself constitutes an observable outcome, whether the effect was driven by demand or supply side factors, however, is latent. This is because observable credit exposures represent an equilibrium level between bank credit supply and firm credit demand. Consequently, as the applied supervisory capital relief measures aim at fostering supply of credit by SSM banks, the analysis' outcome variable is unobservable.

From an observable perspective, it can be noted that past distress events have generally resulted in a contraction of

corporate loan origination. Between the September 2008—the Lehman Brothers bankruptcy filing, and November 2014—the beginning of the SSM Banking Supervision, Europe has been marred by the effects of the financial and sovereign debt crisis and as a consequence exhibited an average year-on-year loan growth rate towards non-financial corporates of around -0.5% .¹²

In comparison, the period spanning March 2020—the start of the pandemic relief measures, to December 2020 shows the annual loan growth rate hovering around 4.7% . No doubt the effect of the already existing accommodative monetary policy stance should play a role in the figure, however if comparing it to the pre-pandemic/pre-measures period of January 2019–February 2020, the NFC loans growth rate is around 2% . So, while a loan contraction could have reasonably been expected given past turmoil experience, in the 2020 period the opposite seems to have taken place.

Contrary to past distress events, the pandemic has seen the widespread use of lockdown measures. In contrast to a financial crisis, where the effects of constrained credit supply and fractured financial intermediation trickle down to non-financial corporates eventually subduing loan demand, lockdown measures have had an instantaneous effect on all sectors by disturbing normal business operations. The liquidity and cash flow of companies were therefore the first to be in jeopardy.

As a result, several motives could emerge which would endogenously impact loan demand: (i) precautionary liquidity reasons, weathering the shock to cash flows, (ii) in the case of strong firms, buying out assets or competitors at distressed prices in order to consolidate market share, or (iii) reduced medium and longer term investments due to heightened uncertainty. The ECB Bank Lending Survey¹³ (BLS) documents a net increase in the loan demand of firms throughout 2020 in all economic sectors apart from real estate, supporting the view that net impact of lockdown measures on loan demand was to expand funding needs.

With the above in mind, and considering only the net effect in loan demand as reported by banks in surveys, a simplified theoretical supply–demand representation can provide some nuance as to why a closer look at the data may be warranted. Under certain specific conditions, a positive loan growth rate could also emerge endogenously due to strong pickup in loan demand even if the SSM measures were ineffective. More precisely, if the increase in loan demand outpaced a hypothetical supply contraction. Figure 1 shows a stylised representation of such a scenario, where the loan quantity Q^{**} specific to a pandemic equilibrium

¹⁰ See for example Ayadi and Cucinelli [6] for a review on policy interventions in the EU, and Anderson, Papadia and Véron [5] for an overview of government guaranteed bank lending.

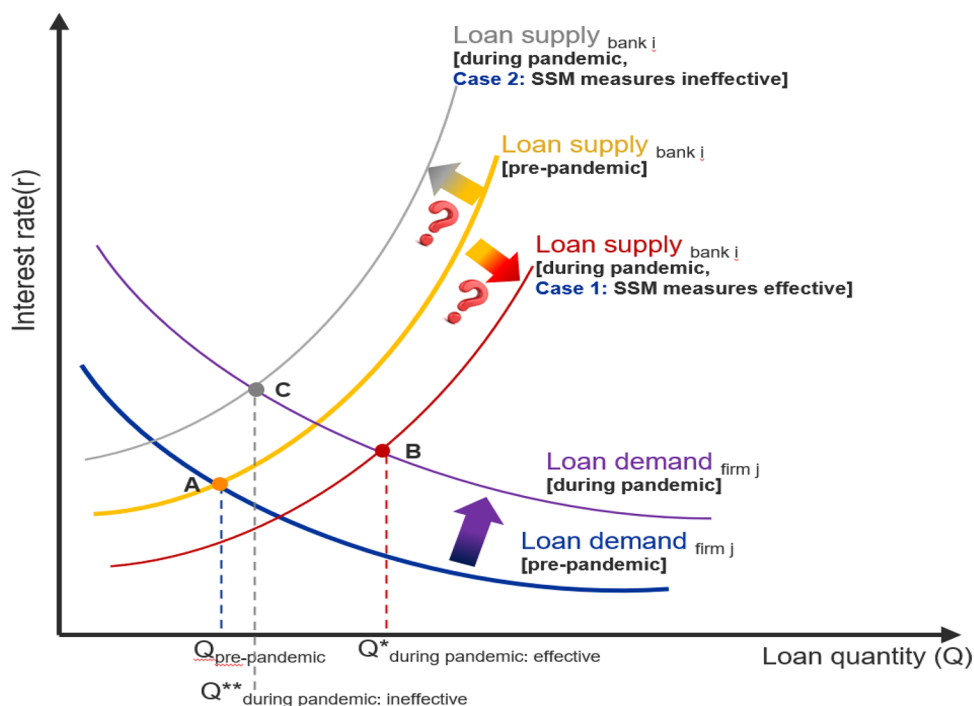
¹¹ For an extensive discussion on the effects of monetary, macro and microprudential policies and their interrelations, please see Beyer et al. [9].

¹² ECB Balance Sheet Items dataset. For further figures see appendix.

¹³ See ECB Bank Lending Survey Q4 2020 issue [15].



Fig. 1 Stylised representation of potential loan supply and demand evolution



where loan supply contracted (Point C) is actually greater than the pre-pandemic period loan level Q (Point A). This paper's implicit objective is thus to empirically determine whether during the analysed pandemic period the NFC loan market was in the equilibrium Point B, where credit supply expanded, or in Point C, where credit supply contracted, since both would observationally produce loan growth figures in the positive range for this stylized example.

To answer the research questions we will therefore need to strip away loan demand factors which may vary over time, in order to isolate the bank loan supply channel. We will then control for the effect of the multiple policies implemented, as well as bank specific factors that could play a role in lending decisions, in order to identify and conclude on the effectiveness of the SSM's capital relief measures. Since banks and borrowers may have different characteristics that can evolve over time, we will perform our analysis at the bank-firm relation level using a highly granular supervisory panel dataset.

Overview of Pillar 2 measures setup

Following the paradigm of risk-based supervision, the ECB conducts an annual Supervisory Evaluation and Review Process (SREP). One of the outcomes is the assessment of additional capital needs for supervised banks, which are specific to each institution's risk profile and are in addition to the universally applied Pillar 1 capital requirements of minimum

4.5% common equity tier 1 (CET1) capital relative to risk weighted assets.

These so-called Pillar 2 measures are split into Pillar 2 Requirements (P2R) and Pillar 2 Guidance (P2G) since the 2016 SREP. P2R are binding capital requirements which aim to capture risks underestimated or not covered by Pillar 1. Breaching them has direct legal consequences for banks such as potentially being declared *failing or likely to fail*, and eventually in the case of non-compliance having their banking license revoked.

P2G on the other hand reflects a bank's capacity to withstand stress scenarios and absorb losses before regulatory capital buffers are breached. It is primarily informed by supervisory stress tests and represents a guidance from supervisors. While it is not a legally binding capital buffer, it is expected that banks comply with this constraint. In cases of P2G breaches supervisors "will carefully consider the reasons and circumstances and may define fine-tuned supervisory measures".¹⁴

In practice, it is useful to consider the capital stacking for euro area banks, which determines the order in which capital buffers are depleted in case of losses. From this perspective, P2G is at the top of the capital stack, taking the first hit in the event of distress. It is followed by macroprudential buffers in the form of Combined Buffer Requirements (CBR), the P2R and finally the Pillar 1 requirements. Breaching the

¹⁴ See https://www.bankingsupervision.europa.eu/about/ssmexplained/html/stress_test_FAQ.en.html.



CBR entails automatic constraints on dividend and bonus distribution (MDA constraints) which may be followed by signalling and reputational consequences in the market. Therefore, maintaining the P2G as well as a management buffer on top of it, may be perceived by banks as a signalling strategy to market participants on the health of the institution and its ability to withstand significant shocks without risking any automatic consequences from supervisory authorities.

Through this lens it can be understood that the 12th March 2020 supervisory announcement rendered the P2G constraint slack. In effect this expanded banks' management buffer relative to the nearest regulatory buffer by at least 1 pp. depending on the institution, which in theory could have worked to offset bank risk aversion and could have supported the credit supply channel. The following chapters will investigate if this hypothesis seems to be confirmed by the data.

Related literature

This work fits into the vast literature on determinants of credit supply and contributes an empirical analysis to the emerging strand assessing the effects of the pandemic policy responses. While our approach is in the spirit of many published works, it is useful to highlight a few related findings in the literature in the context of this analysis.

Given its importance to monetary policy transmission, the bank lending channel has been extensively analysed by researchers around the globe. Acknowledging the importance of disentangling supply from demand for reliable policy insights, empirical work has focused on both time series and panel data methods.

Jiménez et al. [18, 19] use borrower level Spanish credit registry data and an identification strategy which controls for time-varying firm heterogeneity to assess the impact of monetary policy and business cycles in a panel data model. They find evidence of the importance of the supply channel in the transmission of tighter monetary policy. The work also shows empirically that less granular, bank-level, panel regressions are not well specified to identify such effects.

Ciccarelli et al. [11] analyse the effect of monetary policy shocks through the credit supply channel in a VAR framework. They use bank lending survey responses and changes in lending standards to isolate the credit demand and find evidence that monetary policy shocks are amplified by the credit supply channel.

Closer to a microprudential perspective, the impact of capital on bank lending has been a topic of importance both before and after the Great Financial Crisis. Cohen and Scatigna [12] show that banks which emerged from the crisis with higher capital ratios were able to expand lending more, Gambacorta and Mistrulli [17] show bank capital matters in

the propagation of different shocks to lending, while Berrospide and Edge [8] use similar insights to assess the effect of the US Troubled Asset Relief Program (TARP) on lending outcomes.

With the onset of the global financial and the sovereign debt crises, analyses of the credit supply channel and lending outcomes have become of vital importance for policymakers. The literature has therefore catered to this need, and financial stability considerations have played a more prominent role in recent investigations.

The causes of the observed severe credit contraction amid the sovereign debt crisis is assessed by Acharya et al. [2] The authors find that European firms that had a pre-crisis lending relationship with banks that suffered from the sovereign debt crisis became themselves financially constrained throughout it. This result is attributed to losses on sovereign debt holdings of GIIPS states as well as risk-shifting incentives of weakly capitalised banks to buy additional risky sovereign bonds, instead of engaging in corporate lending.

Acharya et al. [1] again investigate bank lending during the sovereign debt crisis, however, with the target to assess whether and how a policy measure, namely the OMT announcement, impacted the credit supply. Through an improved capitalisation of banks following the announcement and its related increase in prices of sovereign bonds, loan supply to the corporate sector increased according to the authors.

Pursuing the regulatory capital strand of the literature, several works have previously studied the link between bank capital requirements or supervisory intervention, and loan growth. Thakor [23], Aiyar et al. [3, 4], Bridges et al. [10], Behn et al. [7], De Jonghe et al. [13] and Fraise et al. [16] confirm empirically on various samples the inverse relation between higher capital requirements and bank issued loans. Peek and Rosengren [22] as well as Kupiec et al. [21] show that even regulatory enforcement actions other than capital requirements, as well as assigning poor supervisory risk ratings can lead to reductions in loans for affected banks.

This supports the view that changes in supervisory guidelines, in the sense of both increased capital requirements, or more intense scrutiny, can steer bank lending behaviour towards a more conservative approach. Nevertheless, we may still ask if during distress periods the reverse holds, and relaxed supervisory guidelines translate symmetrically to an increase in lending activity, thereby offsetting risk aversion likely experienced by lenders during times of turmoil.

The Covid-19 pandemic has amplified the need for deeper analysis of the bank lending channel and empirical-driven policy advice. The unprecedented policy response of multiple authorities adds to the complexity of the topic, requiring novel datasets and approaches to assess the effectiveness of individual measures to support lending, and inform whether there exists a need for further policy action.



Our work therefore aims to study the effectiveness of the relaxation in supervisory constraints in the euro area around the start of the Covid-19 pandemic, in terms of bank lending outcomes to large corporates. To our knowledge we are one of the first to take a comprehensive supervisory perspective in assessing the multitude of support policies implemented, and we do so using a novel and granular microprudential dataset.

Data

A preliminary inspection of the data reveals the aggregate growth figures hide some heterogeneity. Certain NFC sectors, such as accommodation and transportation, were expected to be universally hit by the lockdown measures. Due to the uncertainty surrounding their business prospects, banks could have cut exposures and avoided extending further loans to these sectors, which in turn would have exacerbated their troubles and fuelled a wave of insolvencies.

Conversely, other sectors such as information technology and communication were among the expected winners of the pandemic economics, with demand for IT related services increasing significantly due inter alia to the switch to remote working by a large proportion of companies. For these cases an alternative concern that a lending spree, essentially extending loans without scrutinising enough the viability of loan applications, could eventually lead to a 90 style Dot-com *loan bubble*.

Both hypothetical scenarios would have implications for the analysis, yet neither appears to be at play, at least on first sight, in the sample we observe. Figure 2 shows the distribution of annual growth rates of exposures by NFC NACE sectors just prior to the pandemic (Q1–Q4 2019), and after its onset (Q1–Q4 2020). The pandemic sectoral distributions, while exhibiting some changes,¹⁵ have probability mass in both the negative and positive domain as opposed to a significant location shift to e.g. either the negative or positive range for some specific sector. This suggests banks were still carrying out due diligence, and no particular NFC sector was shut out of the credit market or experiencing a lending spree, respectively.

Nevertheless, a more granular analysis is required in order to conclude on the observed patterns. To this end, several supervisory and market data sources are combined to create a novel dataset which captures the largest exposures of banks to individual firms, as reported to the SSM by significant institutions. Exposure relations can be tracked over

time between Q1 2019–Q4 2020, with the observation unit at the bank-firm-quarter level.

Granular lending information is sourced at firm level from the SSM's short term exercise (STE) concentration template. The data template is a supervisory quarterly reporting by significant institutions of their top 100 largest exposures towards consolidated level obligors, which could vary over time. The sample covered in this analysis is therefore capturing the largest and most liquid NFCs that have borrowing relations with SSM banks. While this caveat is important for interpreting the results of the analysis, we expect the findings to be representative of large corporates in general, beyond those reported by banks under the large exposure requirements and/or the top 100 limit. Owing to the dataset specificities, the analysis refers to existing borrowers only (intensive margin).

The dependent variable reflects the gross nominal exposure value of banking book positions,¹⁶ under a log transformation. It refers to direct and indirect positions, as well as additional exposures that may arise from underlying assets.¹⁷ The advantage of using exposure data, which contains also revolving credit lines and NFC debt security holdings, as opposed to having an analysis on loans and advances only, is that it allows to capture the liquidity providing function and support for credit substitution effects, as elaborated further.

Anecdotal evidence suggests that at the onset of the pandemic, NFCs have sought to secure liquidity for precautionary reasons, by expanding revolving credit lines. This liquidity provision channel, aimed at dispelling private sector funding uncertainty, would be part of the intended effects of the capital relief measures and is therefore deemed an important effect to measure in this analysis. Revolving credit lines are therefore captured by our dependent variable.

Furthermore, the banking system is an important holder of corporate debt securities in part due to ECB monetary policy collateral eligibility. Measures preventing a bond selloff, or rapid unwinding of derivatives positions would ensure a proper functioning of credit markets and a viable credit substitution effect for the large corporates studied in this analysis, which are able to tap financial markets. Ensuring exposures to corporates through these markets are not disorderly and massively reduced in a short period of time ensures fire sales and contagion effects can be avoided, and funding stability from a system perspective can be retained for all NFCs. Taking note of this channel, our dependent

¹⁵ While *Administration and support* exhibits a significant shift post-pandemic, it should be noted its distribution is based on comparatively fewer data points due to availability, and sectoral implications should be assessed with corresponding caveats.

¹⁶ Loans and advances, off-balance sheet items and derivatives items that are considered performing or partially performing. For non-performing exposures, the non-performing portion is excluded while the remaining exposure amount is reported.

¹⁷ Indirect positions and exposure from underlying assets refer to off-balance exposures or exposures through derivatives where the contract was not directly entered with the reported firm, nevertheless the underlying debt or equity instruments was issued by the firm.



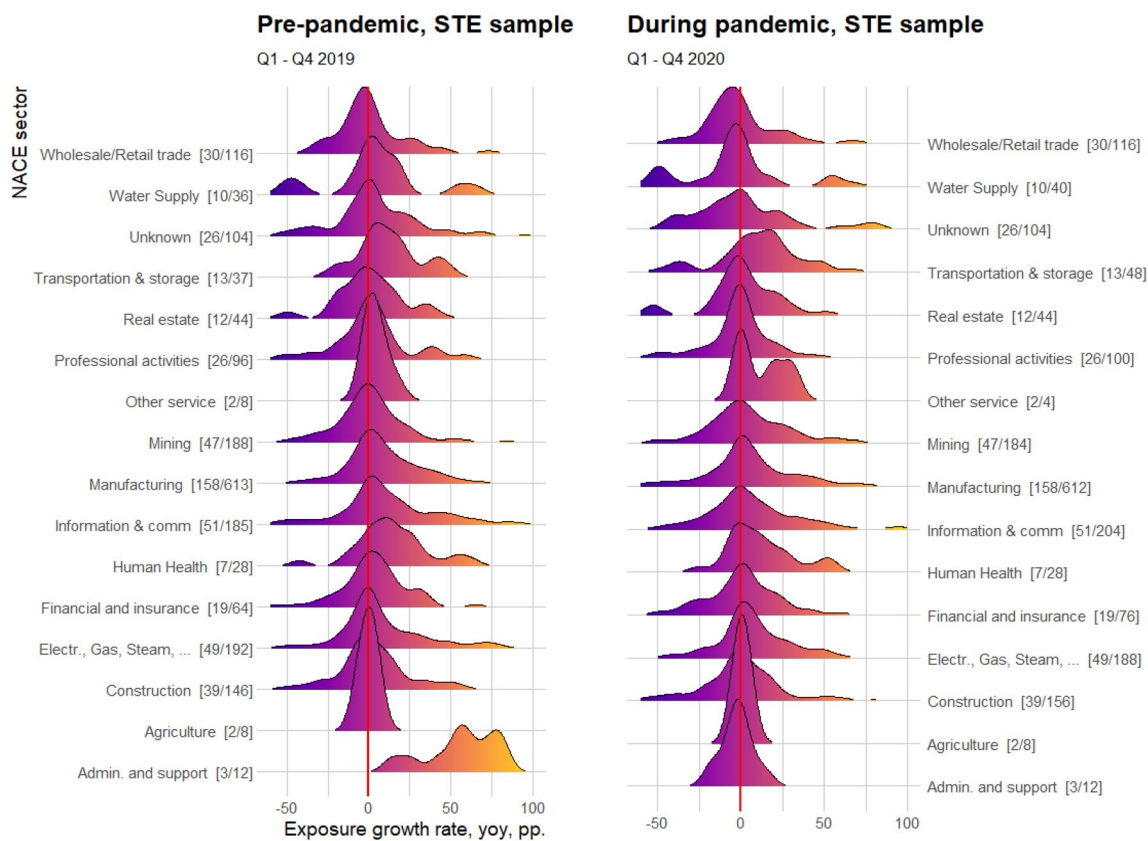


Fig. 2 Distributions of annual growth rate of exposures to NFC sectors, pp

variable would also capture the impact on exposures through debt securities holdings or derivatives positions.

In order to construct a panel dataset from the supervisory filings, and accurately assess the effects of the enacted policies over time, the STE sample is restricted only to exposures towards NFCs that can be tracked in consecutive quarters since 2019.

To allow the sampling of bank-firm relations where the exposure increases over time and makes it to the top 100 that then must be reported to the SSM, or conversely those that could have gradually decreased during the pandemic until dropping out of the granular reporting requirements, a selection strategy has been employed. The selection strategy allows additionally the inclusion of bank-firm relations missing at most two consecutive quarters of the tail ends of the reviewed period, i.e. Q1–Q2 2019 or Q3–Q4 2020. Overall, this procedure which leads to the creation of an unbalanced panel, expands the data availability relative to the balanced panel case (i.e. full 2019–2020 coverage) by about 13%. Further details are provided in Appendix 2.

Our analysis employs an identification strategy in the spirit of Khwaja and Mian [20], therefore the covered NFCs need to report borrowing relations with at least 2 consolidated level bank entities over the observed time horizon. This will allow the demand effects to be controlled for as

they evolve over time and be specific to each firm, as detailed in the next section on the modelling approach.

A robustness specification is also pursued, which follows Degryse et al. [14], and uses industry-location-time (ILT) dummies allowing firms with single bank relations to be analysed. Two caveats for this alternative identification strategy are present. First, the strategy would typically isolate demand effects at the industry-location-size-time level, allowing a further differentiation between small and medium enterprises and large corporates. For our sample however, the reported exposures in the STE dataset refer only to large corporates therefore size differences would not play a role. Second, while relaxing the two or more bank relations constraint of Khwaja and Mian [20] seemingly extends the sample, the STE dataset does not report industry or location of the borrowers. This alternative approach sample is therefore matched with Moody's CreditEdge and Bureau van Dijk Orbis via the borrower's reported LEI code, to retrieve country and sectoral information needed for the construction of the dummies. For some borrowers this procedure does not yield any information on their industry or location, and therefore due to data coverage limitations the resulting dataset is slightly smaller than the sample using the Khwaja and Mian procedure.

Next, COREP and FINREP data is merged to the STE sample to provide bank specific indicators, at consolidated level. A



Table 1 Variables description

Variable	Description
CCyB	Countercyclical Capital Buffer requirement for bank <i>b</i> in % of Risk Weighted Assets, pp
CET1 ratio	Common Equity Tier 1 ratio, pp
Cost to income	Overhead costs/Total Net Operating Income, pp
Coverage ratio	Accumulated impairment and negative charges in fair value due to credit risk and provisions/Loans and advances non-performing exposures, pp
Distributed dividends	Distributed dividends/Total equity, pp
Forbearance	Total NFC loans under forbearance/NFC loan portfolio, for each bank <i>b</i> and quarter <i>t</i> , pp
Guarantees	Total NFC loans under government guarantees/NFC loan portfolio, for each bank <i>b</i> and quarter <i>t</i> , pp
Headroom to MDA	CET 1 ratio—Pillar 1 requirement—P2R—CCoB—CCyB—OSII/GSII/SyRB, pp
HH deposits	Household deposits/Total liabilities, pp
Leverage ratio	Tier 1 capital/ Total exposure, pp
ln (Credit exposure)	Natural logarithm of credit exposure of bank <i>b</i> towards firm <i>f</i> at quarter <i>t</i>
Loans under moratoria	Total NFC loans under moratoria/NFC loan portfolio, for each bank <i>b</i> and quarter <i>t</i> , pp
NFC deposits	Non-Financial Corporation deposits/Total liabilities, pp
NPL ratio	Non-performing exposures/Gross carrying amount, pp
OSII/GSII/Systemic risk buffer (SyRB)	The structural capital required from bank <i>b</i> in % of Risk Weighted Assets, pp Depending on the existence of the OSII or GSII buffers for some institution, the maximum between the SyRB, OSII and GSII represents the prevailing structural buffer requirement. Estonia and Slovakia are exceptions where due to national policies the variable is computed as the sum of SyRB, OSII and GSII buffers
Pandemic	Dummy equal to 0 during Q1-Q4 2019, and 1 during Q1-Q4 2020
Pillar 2 Guidance	P2G supervisory capital constraint prevailing at the time of the ECB measures announcement (Q1 2020). Values specific for each bank <i>b</i> , in % of Risk Weighted Assets, pp
Pillar 2 requirements frontloading	Maximum Pillar 2 Requirement that can be covered using lower quality capital than CET 1, as of Q1 2020 following the ECB measures. In line with CRDV, amount is computed as 43.75% of prevailing Pillar 2 Requirement. Values specific for each bank <i>b</i> , in % of Risk Weighted Assets, pp
Retained dividends	Dividends planned for distribution by banks before the publication of the 27th March 2020 SSM recommendation to not pay dividends, less the amounts already paid before or after its publication. Bank specific and relative to bank equity capital, pp
ROE	Return on equity; Annual profit or loss/Total Equity, pp
RWA density	Risk Weighted Assets/Total Assets, pp
SREP score	Supervisory Risk and Evaluation Process score, reflecting ECB Banking Supervision's assessment of a bank's risk profile for a given year. Discrete variable between 1 (lower risk) and 4 (higher risk) specific for each bank <i>b</i> and time <i>t</i>
Share of CB funding	Central bank funding/Total liabilities for each bank <i>b</i> and quarter <i>t</i> ; pp

dedicated supervisory data collection during the pandemic, called Covid-19 reporting, is also used. It augments at the bank level the take-up and evolution of government support in the form of moratoria, forbearance and guarantees, and the figures are scaled relative to each significant institutions' NFC loan portfolio. Banks' dividend distribution plans ahead of the 27th March recommendation to refrain from distributing dividends are sourced from confidential surveys conducted by the SSM, and provide information on temporarily retained funds during the studied pandemic outbreak period. Figures referring to planned dividend distributions, and post-recommendation retained dividends are the most suitable data to assess the effects of the SSM dividend measure in a quantitative framework. This unique dataset provides in-depth insights only available to the supervisors and we are among the first to use this data in a research study. A detailed variable description is provided in Table 1.

The model and results

The following sections will proceed as follows: Sect. 5.1 will elaborate on the model specification, the identification strategy and the key variables used in the analysis; Sect. 5.2 will then present the main findings, while Sect. 5.3 will elaborate on the policy implications of the results in the context of potential future action.

Estimation strategy

This analysis aims to identify the impact of supervisory capital relief measures on the bank credit supply channel, controlling for the effect of other policies, bank characteristics and time-varying demand effects. The main specification estimated is depicted in the equation below. The dependent



variable is the natural logarithm of credit exposures of bank b towards firm f , at quarter t . A Khwaja–Mian identification strategy is used, hence each firm in the sample has at least two bank relations. The γ_{ft} term is a firm-time fixed effect used in the identification, and captures observed and unobserved firm heterogeneity, including time-varying firm demand. X_{bt} are bank characteristics and Z_{bt} are other policy measures used as control variables and explained further below.

$$\begin{aligned} \ln(\text{Credit exposure})_{bft} = & \beta_0 + \beta_1 * \text{Pandemic}_t * \text{Pillar 2 Guidance}_b \\ & + \beta_2 * \text{Pandemic}_t * \text{Pillar 2 Requirements frontloading}_b \\ & + \beta_3 * \text{Pandemic}_t * \text{Retained dividends}_b \\ & + \theta * X_{bt} + \delta * Z_{bt} + \gamma_{ft} + \mu_b + \varepsilon_{bft} \end{aligned}$$

The studied supervisory policies are the Pillar 2 Guidance supervisory capital constraint, the Pillar 2 Requirements frontloading, and the Retained dividends following the 27th March supervisory recommendation on dividends policy. They apply to all banks in the sample, but their magnitudes are bank-specific.

The *Pillar 2 Guidance* variable in the model refers to the level of capital banks were advised to hold just prior to the measures announcement in Q1 2020, or in other words, the capital constraint faced by each bank at the start of the pandemic due to prior assessment by supervisors.

Pillar 2 Requirements frontloading is modelled as the maximum amount of lower quality capital allowed by the SSM to cover the Pillar 2 Requirement (P2R) in advance of the CRDV timeline, for each bank. It is computed in line with the legal texts as 43.75% of the P2R to be covered by CET1 capital. Even though not all banks may have had the necessary Additional Tier 1 (AT1) and Tier 2 (T2) instruments readily issued to make full use of the allowed capital substitution, the objective of our approach is to quantify the effectiveness of the microprudential policy announcement itself and therefore we consider the maximum allowed amount to be the relevant variable to be investigated.

The *dividend recommendation* resulted in a temporary retention of earnings on the balance sheets of some banks, which would have otherwise been used, as planned, for dividend disbursements or share buybacks. In this sense the policy's desired outcome has been to precautionarily increase the resilience of bank institutions, in a time of great uncertainty. Its effect on NFC loans can therefore be twofold: either direct through additional capital available for lending, in case banks would forgo the disbursement of the retained capital after the recommendation's expiration, or indirect promoting lending from existing sources through its boost to the resilience of each institution. In the latter's case the idea is that the capital position of the bank—now above the internal target level thanks to the retention policy, would dampen pandemic-driven risk averseness and prevent a contraction of its now

presumably riskier loan book. Identifying econometrically the indirect effects of the dividend recommendation as a contribution through the resilience channel is a challenging endeavour, and beyond the scope of this analysis.

The dividend recommendation explores instead a direct lending dimension in our model, and together with the capital headroom covariate, detailed further on, acts also as a control which enables a cleaner identification of the other two supervisory policies. The three supervisory policy variables are each interacted with a *Pandemic* dummy that is meant to capture the regime shift to the pandemic period, and which takes value 0 between Q1–Q4 2019 and 1 between Q1–Q4 2020. The interaction term therefore serves to isolate the studied effect to the 2020 pandemic period, using the 2019 period as a baseline for comparison.

Other policy measures are controlled for through the vector Z_{bt} , which encompasses macroprudential buffer releases, monetary policy, and government support measures. For the case of macroprudential measures, the countercyclical capital buffer as well structural buffer requirements are captured through individual variables. Monetary policy is controlled through two main channels. First, yield curve and macro related factors are captured by the time fixed effects. This includes the effect of communication regarding a relaxation of TLTRO conditions, the increase in net asset purchases, interest rate changes and other related decisions which affect all banks simultaneously and to the same degree. Second, the take-up of TLTRO funding and other central bank funding obtained by each bank is captured by the *Share of Central Bank funding* variable, relative to total liabilities. While this design is deemed appropriate to ensure microprudential policy factors are disentangled from the monetary policy ones, the causal effect of monetary policy is likely not identified and beyond the scope of this work, and should consequently be interpreted with caution.

Similarly, government support policies during the pandemic are also controlled through two main channels. First, the impact of individual policies such as moratoria, forbearance and government guaranteed loans are included as controls at bank level and are relative to their NFC portfolios. The variables take value 0 prior to the pandemic and starting from Q1 2020, when they are implemented, they evolve each quarter until the end of the sample. Announcement effects relating to government support measures, as well as factors such as the magnitude of the support packages, and the fiscal space of the sovereign are additionally controlled for through a country-specific government support vector of dummies.

Bank characteristics which can impact the credit supply provision are controlled through a multitude of variables and are represented by the X_{bt} vector. The factors taken into consideration can be classified as *capital and risk*, *funding*, *asset quality* and *profitability*. Within the *capital and risk* we control for the *CET1 ratio*, the *leverage*



Table 2 Main regression results

	ln (Credit exposure)		
	(1)	(2)	(3)
Pandemic * Pillar 2 Guidance	−0.1061*** (0.0242)	−0.1056*** (0.0234)	−0.0884** (0.0371)
Pandemic * Pillar 2 Requirements frontloading	0.0351 (0.0500)	0.0466 (0.0576)	0.0020 (0.0968)
Pandemic * Retained dividends (dividend recommendation)	0.0049 (0.0033)	0.0046 (0.0033)	−0.0003 (0.0057)
Bank controls	Yes	Yes	Yes
Other policies controls	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes
Firm-time fixed effects	Yes	No	No
Firm fixed effects	No	Yes	No
Time fixed effects	No	Yes	No
Industry-location-time fixed effects	No	No	Yes
Government support fixed effects	Yes	Yes	Yes
Observations (bank-firm-quarter)	6812	6812	5963
Clustered standard errors	Bank level	Bank level	Bank level
Adj. R-squared	0.126	0.122	0.008

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

ratio, the risk weighted assets density, the bank's SREP score¹⁸ and the capital headroom available until hitting the MDA¹⁹ trigger. The risk weighted asset density and the SREP score control for the banks' riskiness. The latter variable represents an external perspective, reflected by the supervisor's internal assessment of the bank risk profile, which takes the form of a score between 1 (lower risk) to 4 (higher risk). The capital headroom refers to the capital available above the macroprudential buffers, which once breached leads to automatic restrictions on dividend distributions. On funding we look at the shares of household deposits, and at the share of NFC deposits to total liabilities. For asset quality we include the coverage ratio and the NPL ratio. Finally, for profitability we control for the return on equity, the cost to income and the historically distributed dividends as a share of equity. Additional unobservable bank characteristics are captured by the bank fixed effects μ_b .

¹⁸ The Supervisory Review and Evaluation Process (SREP) is an annual ECB internal exercise during which supervisors assess the risk profile of each bank. For further details please see: <https://www.bankingsupervision.europa.eu/about/ssmexplained/html/srep.en.html> and https://www.bankingsupervision.europa.eu/banking/srep/2019/html/aggregate_results_2019.en.html.

¹⁹ Maximum Distributable Amount restriction defined in Article 141 of Directive 2013/36 CRD IV. The trigger is hit once the available CET1 capital is below the Combined Buffer Requirement (CBR).

Results on the effectiveness of the supervisory capital relief measures

Controlling for the effect of other policies and the changes in firm demand, the model results show a strong statistical significance can be attributed to the Pillar 2 Guidance relief's impact on the bank credit supply (Table 2). The effect withstands the alternative specifications, as well as additional robustness checks and placebo tests elaborated on in the robustness section.

The estimates display a negative conditional correlation between the Pillar 2 Guidance interacted with the pandemic dummy, and the NFC loan growth during the pandemic. The ECB announcement released this capital constraint from supervisory consequences throughout the 2020 period, implying a reduction of the Pillar 2 Guidance level to 0 for all banks. In turn this supported an increase in supply conditions of around 10 pp. for every 1 pp. of Pillar 2 Guidance buffer made available for use.

The magnitude of the effect is attributed to both capital relief and announcement effects. Concerns regarding the uncertain business environment and a potential heavy-handed supervisory response, such as requesting more capital at an inopportune time, seem to have been alleviated by the constraint relaxation. Since Pillar 2 Guidance capital was not designed to be *ex ante* releasable, the policy benefited from a surprise component which enhanced its effects. The results therefore imply that in the policy's absence supply conditions could have experienced a sharp contraction, potentially leading to a credit crunch.



No significance is found for the effect of the Pillar 2 Requirements frontloading and the retained dividends on large corporates' lending outcomes, albeit some caveats should be noted. In particular, Pillar 2 Requirements frontloading may lack the same surprise effect boost the Pillar 2 Guidance relief benefitted from, on account of the fact the policy was previously known and was expected to come into effect as of January 2021.

Nevertheless, as availability of AT1 and T2 instruments would increase on bank balance sheets over time, the effect may become more prominent outside the studied sample range, taking note that 2020 may not have enjoyed the most optimal market conditions for capital instruments issuance on account of participants' risk averseness. Indeed, there were no AT1 or T2 issuances by significant institution during March and April 2020 as the market froze in the first stage of the pandemic, albeit it had begun a slow rebound as of May 2020.

Regarding the dividend recommendation, its effect should be considered also through the lens of its impact on the resilience of bank institutions. As mentioned in the previous section, lending outcomes owing directly to the retained capital would likely need to be connected with bank decisions to defer the 2020 planned disbursements for periods longer than the recommendation's horizon. For the recommendation's 2020 duration, a number of bank institutions had not made official decisions regarding the fate of the retained dividends after the September 2021 limit. From a resilience perspective however, the recommendation's impact could be more prominent as it would produce indirect effects by giving banks the confidence that any unforeseen deterioration in portfolios can be more than matched by loss bearing capacity, nevertheless this is not captured by our model.

We also find bank NPL ratios, as well as forbearance measures play a statistically significant role on the supply conditions towards large NFCs, in line with recent ad-hoc Bank Lending Survey qualitative question replies. Further details are provided in Appendix 3 containing the full estimation results.

Policy implications

In terms of policy implications, the effect of centralized communication to steer bank decisions and reassure market participants should not be ignored. We argue a formal "supervisory forward guidance" strategy could be created, to help shape supervised banks' expectations regarding measure extensions and risk areas they should focus to improve—which is empirically shown can translate to business decisions.

The strategy would complement the already existing interactions between euro area joint supervisory teams (JSTs) and supervised banks, as well as occasional public communications, but would add a layer of institutional level steering and commitment to statements. Market

participants could also benefit, as they would more accurately judge what are the supervisors' strategic steering directions, their expectations and risk areas of focus on European banks during normal times. During system-wide distress events, they would understand the extend and length of microprudential lifelines which would stabilize market funding conditions and bank valuations.

Finally, supervisory forward guidance could entail a positive interplay to Pillar 3 disclosures. Markets would be better able to gauge the risk level and strategic direction the supervisors aim for, and could compare the forward guidance to the information provided by banks under Pillar 3 disclosures to see which banks are aligned in this vision and which deviate to some degree. The disciplining market effect would do the rest, nudging banks in the right direction and providing supervisors with a proverbial *carrot*, to their capital requirements *stick*.

Conclusion

In this paper we analyse the effectiveness of pandemic policies in support of large NFC lending, with a focus on supervisory measures. We show that the Pillar 2 Guidance relief has been an important contributor to the bank credit supply channel conditions, suggesting that in the absence of the policy a credit crunch could have ensued. The impact on the supply channel offset other dampening factors such as risk aversion, and uncertainty regarding business decisions as side-effects to the lockdowns.

We attribute the large magnitude of the result to both the capital made available through the Pillar 2 release as well as to announcement effects. The SSM communication amounted to a de facto "*supervisory forward guidance*" clarifying authorities' plans, providing some operational flexibility and indicating no capital requirements increase was planned²⁰ in the 2020 period. Additionally, a surprise release of the existing P2G buffer was announced—which was not designed as an *ex ante* releasable policy. The action lent credibility to the commitment, and steered expectations.

The policy implication of our results is that supervisory announcement effects can play an important role in steering bank decisions along the prudential objectives of policy authorities. We propose that a formal *supervisory forward guidance strategy* could be created, which could be beneficial to banks and market participants in both normal and distress times.

²⁰ Directly implied by the announcement of a *pragmatic SREP* which meant P2R buffers would remain unchanged, and by the release of the P2G buffers.



The *supervisory forward guidance* concept could take a less restrictive form than its monetary policy counterpart. It would primarily focus on communicating medium and long term supervisory objectives, risk tolerance levels, and steer expectations of market participants and supervised institutions. There would be no need to commit to a certain target variable level, since the goal is not to steer a macro level variable as in the case of inflation, but instead the idea is to

facilitate desired bank outcomes in terms of risk levels or behaviours without the need to resort to capital requirements or other punitive supervisory measures.

Appendix 1. Aggregate level data

See Figs. 3, 4 and 5.

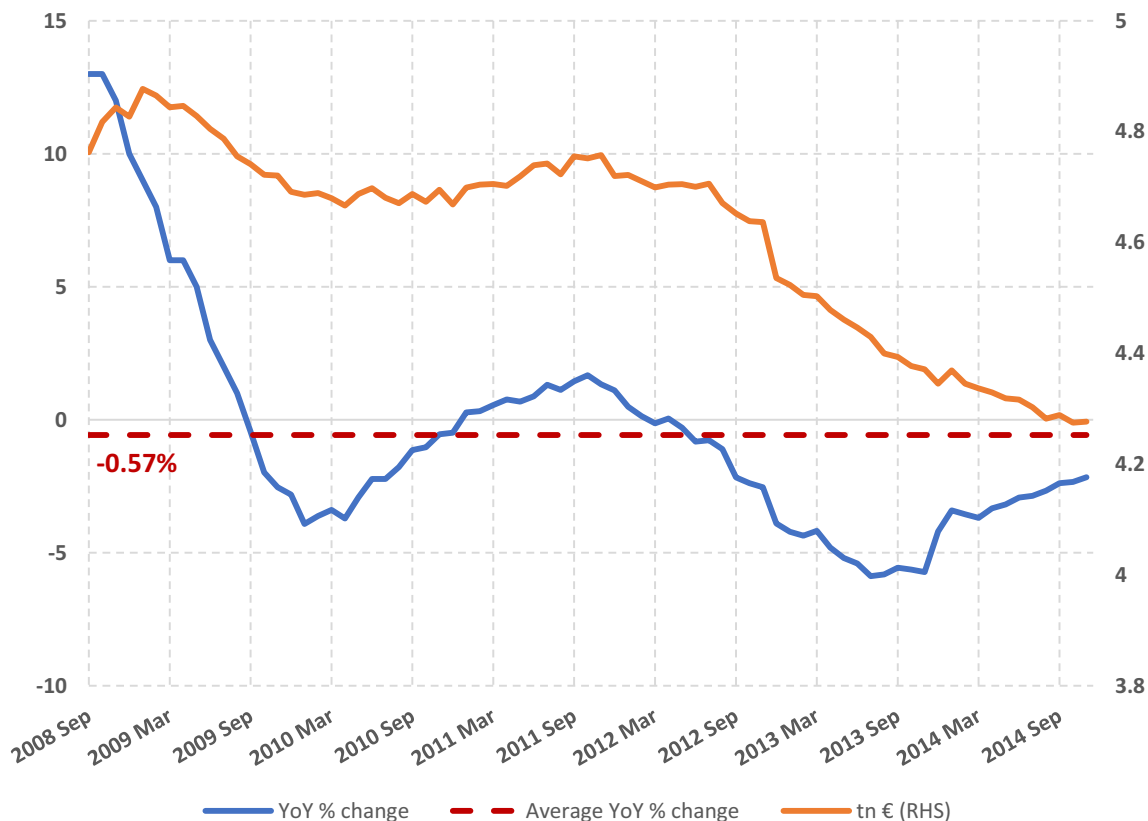


Fig. 3 Non-financial corporations loan growth during previous distress period September 2008–November 2014, pp (LHS) and € tn (RHS)



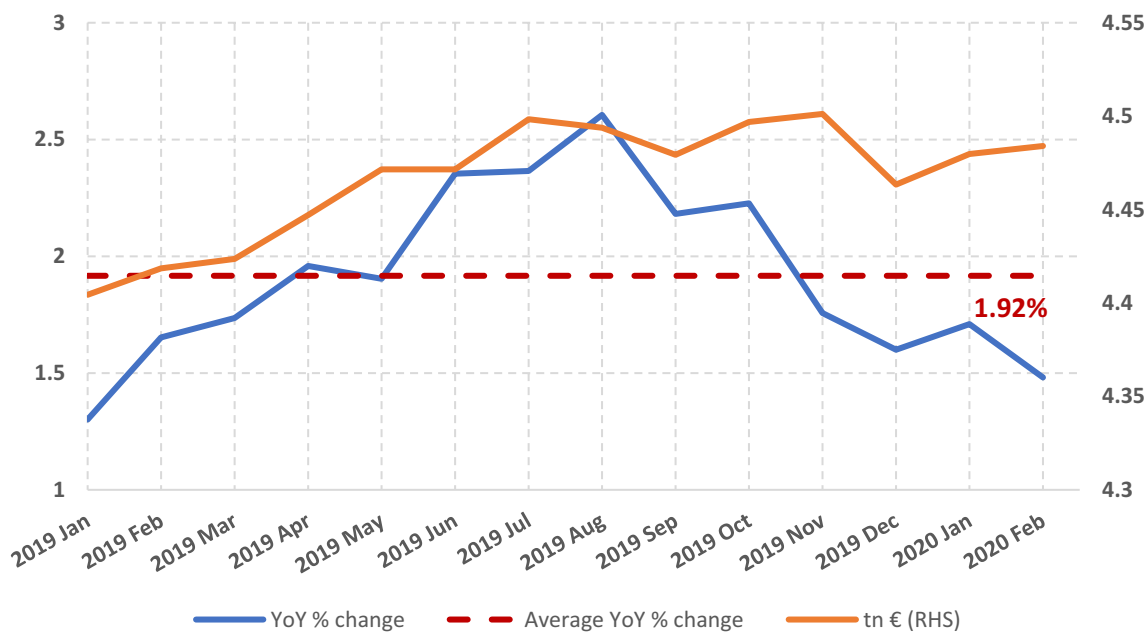


Fig. 4 Non-financial corporations loan growth pre-pandemic period January 2019–February 2020, pp (LHS) and € tn (RHS)

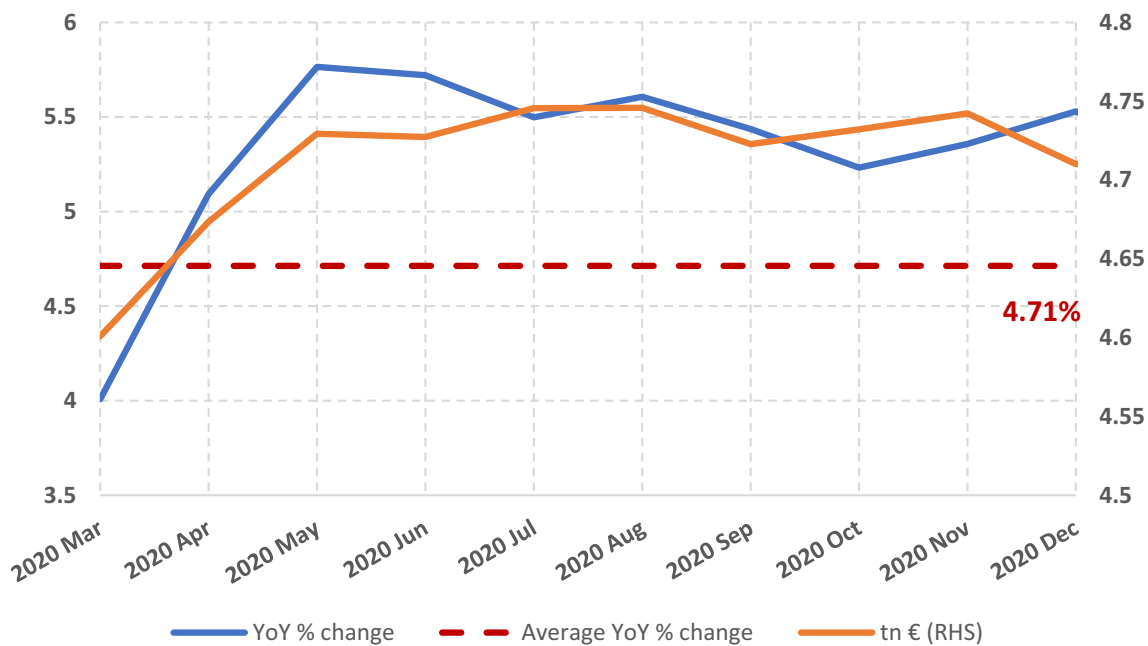


Fig. 5 Non-financial corporations loan growth during the pandemic period March 2020–December 2020, pp (LHS) and € tn (RHS)



Appendix 2. Summary statistics and sample coverage

See Tables 3, 4 and 5.

Table 3 Summary statistics, bank-firm-quarter level

Variables	Units	Khweja-Mian sample						Industry-location-time sample									
		Obs	Mean	Median	S.D	Min	Max	Obs	Mean	Median	S.D	Min	Max				
Central Bank funding	% of Total liabilities	6812	6.60	6.23	4.39	0.00	3.13	9.10	20.05	5967	5.73	5.08	3.93	0.00	2.69	8.13	20.05
CET1 capital ratio	pp	6812	14.94	14.43	3.48	11.05	12.81	15.85	41.75	5967	14.91	14.57	3.06	11.08	12.88	15.96	45.64
Cost to income ratio	pp	6812	64.86	65.48	13.93	23.60	54.74	73.25	127.30	5967	65.30	65.99	14.29	28.15	54.74	72.26	127.30
Countercyclical capital buffer	pp	6812	0.08	0.02	0.13	0.00	0.00	0.10	1.00	5967	0.10	0.04	0.14	0.00	0.01	0.15	0.90
Coverage ratio	pp	6812	43.55	43.91	12.10	5.09	39.21	52.49	67.35	5967	42.40	43.27	12.93	0.00	33.92	52.49	67.35
Covid 19 forbearance	% of NFC loans	3452	0.47	0.09	0.92	0.00	0.01	0.51	7.42	3014	0.60	0.14	1.09	0.00	0.01	0.60	10.93
Covid 19 guarantees	% of NFC loans	3452	3.02	0.65	4.07	0.00	0.00	5.73	20.62	3014	2.47	0.46	3.60	0.00	0.00	4.33	15.92
Covid 19 moratoria	% of NFC loans	3452	5.16	2.00	6.52	0.00	0.23	8.13	34.53	3014	4.79	2.00	6.11	0.00	0.19	7.75	34.53
Credit exposures	logarithm	6812	19.60	19.70	1.31	14.69	18.67	20.59	23.18	5967	19.72	19.82	1.19	15.06	18.89	20.58	23.18
Distributed dividends	% of Equity	6812	0.38	0.00	1.29	0.00	0.00	0.00	13.51	5967	0.37	0.00	1.24	0.00	0.00	0.00	12.14
Headroom to min. distributable amount trigger	pp	6812	5.58	5.12	3.43	1.49	3.29	6.47	31.63	5967	5.41	4.96	3.05	1.49	3.20	6.49	36.15
Household deposits	% of Total liabilities	6812	32.01	33.27	16.42	0.18	19.83	41.61	84.58	5967	29.60	32.16	16.11	0.00	16.23	37.22	74.30
Leverage ratio	pp	6812	6.00	5.48	1.85	3.15	4.79	6.50	14.39	5967	6.01	5.44	1.90	3.26	4.62	6.69	14.39
NFC deposits	% of Total liabilities	6812	15.48	14.76	8.20	0.98	12.34	17.98	42.84	5967	15.44	14.59	8.40	0.98	12.24	18.04	42.84
NPL ratio	pp	6812	3.99	2.90	4.11	0.25	1.76	4.24	34.44	5967	3.63	2.69	4.18	0.01	1.45	3.82	34.44
Pillar 2 Guidance	pp	6812	1.15	1.00	0.30	1.00	1.00	1.25	3.00	5967	1.14	1.00	0.30	1.00	1.00	1.15	2.10
Pillar 2 requirements frontloading	pp	3452	0.83	0.77	0.22	0.44	0.66	0.98	1.42	3014	0.84	0.77	0.22	0.44	0.66	0.98	1.42
Retained dividends	% Equity	3452	2.19	2.19	2.83	not reported due to confidentiality	2.83	not reported due to confidentiality	2.72	3014	2.19	2.19	2.72	not reported due to confidentiality	2.72	not reported due to confidentiality	2.72
Return on equity	pp	6812	4.27	5.20	6.20	-40.7	2.59	7.08	25.72	5967	4.20	5.21	5.75	-40.7	2.57	6.85	25.72
Risk weighted assets density	pp	6812	39.52	36.68	11.30	6.67	32.43	43.43	75.29	5967	39.36	36.43	12.00	19.99	31.05	43.77	75.29
Structural risk buffers	pp	6812	0.81	1.00	0.76	0.00	0.13	1.00	3.00	5963	0.91	1.00	0.76	0.00	0.25	1.00	3.00
SREP score		6812	2.45	2	0.54	2	2	3	4	5967	2.42	2	0.54	2	2	3	4



Table 4 Summary statistics, bank-quarter level

Variables	Units	Khwaja–Mian sample						Industry–location–time sample								
		Obs	Mean	Median	S.D	Min	Max	Obs	Mean	Median	S.D	Min	Max			
Central Bank funding		470	5.77	4.73	4.76	0.00	20.05	422	6.02	5.06	4.62	0.00	2.33	9.02	20.05	
CET1 capital ratio	pp	470	16.41	14.73	5.52	11.05	17.15	422	15.95	14.73	5.17	11.08	13.34	16.34	45.64	
Cost to income ratio	pp	470	62.51	63.17	16.42	23.60	72.44	422	64.99	66.01	16.28	28.15	54.51	73.81	127.30	
Countercyclical capital buffer	pp	470	0.10	0.01	0.20	0.00	0.10	422	0.09	0.02	0.16	0.00	0.00	0.10	0.90	
Coverage ratio	pp	470	42.13	42.62	12.96	5.09	33.58	422	42.56	43.02	13.14	0.00	32.62	52.44	67.35	
Covid 19 forbearance	% of NFC loans	236	0.51	0.09	1.08	0.00	0.50	7.42	212	0.67	0.13	1.47	0.00	0.00	0.57	10.93
Covid 19 guarantees	% of NFC loans	236	2.55	0.30	4.22	0.00	3.53	20.62	212	2.46	0.39	3.92	0.00	0.00	3.53	15.92
Covid 19 moratoria	% of NFC loans	236	5.29	1.65	7.37	0.00	8.14	34.53	212	5.56	1.74	7.52	0.00	0.10	9.13	34.53
Distributed dividends	% of Equity	470	0.48	0.00	1.76	0.00	0.00	13.51	422	0.43	0.00	1.56	0.00	0.00	12.14	
Headroom to min. distributable amount trigger	pp	470	6.89	5.39	5.24	1.49	4.01	31.63	422	6.55	5.39	4.97	1.49	4.05	36.15	
Household deposits	% of Total liabilities	470	37.52	36.52	18.89	0.18	28.22	84.58	422	34.65	35.18	18.37	0.00	20.00	46.09	74.30
Leverage ratio	pp	470	6.61	5.98	2.33	3.15	4.88	14.39	422	6.82	6.07	2.45	3.26	5.04	8.38	14.39
NFC deposits	% of Total liabilities	470	15.81	14.90	8.67	0.98	10.71	42.84	422	14.81	13.93	8.27	0.98	10.20	18.10	42.84
NPL ratio	pp	470	4.01	2.83	4.88	0.25	1.44	4.25	422	4.17	2.95	5.09	0.01	1.45	4.30	34.44
Pillar 2 Guidance	pp	470	1.18	1.00	0.37	1.00	1.00	3.00	422	1.20	1.00	0.34	1.00	1.00	1.25	2.10
Pillar 2 Requirements frontloading	pp	236	0.89	0.88	0.23	0.44	0.77	1.42	212	0.89	0.88	0.24	0.44	0.77	0.98	1.42
Retained dividends	% Equity	236	2.47		3.27	not reported due to confidentiality			212	1.98		2.62	not reported due to confidentiality			
Return on equity	pp	470	4.86	5.19	6.31	-40.8	2.48	25.72	422	4.31	4.91	6.19	-40.8	2.22	6.83	25.72
Risk weighted assets density	pp	470	40.52	38.50	12.06	6.67	32.55	75.29	422	42.00	39.39	12.44	19.99	32.64	49.18	75.29
Structural risk buffers	pp	470	0.84	0.75	0.80	0.00	0.00	3.00	418	0.73	0.50	0.78	0.00	0.00	1.00	3.00
SREP score		470	2.48	2	0.56	2	2	4	422	2.5	2	0.57	2	2	3	4



potential losses. The unfortunate context of the pandemic could therefore be one of the reasons, aside from magnitude of the package, which would explain the results.

On the monetary policy side it is important to note that we do not identify the effects of individual measures such as the TLTRO extensions. Rather we control for the overall policy's impact through our proxy, the share of central bank funding, and the time fixed effects. The TLTRO in particular is a policy where funding is tied to lending outcomes. Nevertheless, the lending outcomes don't have to be linked directly

to the largest corporates, such as those in our sample, even if for example their securities would be the ones pledged for collateral. In fact the lack of significance result might point to the fact that it is not large corporates who benefitted from these policies, which could be a reassuring sign from the perspective of equitable impact of monetary policy, provided the TLTRO funding has been directed towards SMEs.

See Table 6.

Table 6 Full Regression results

		ln (Exposures)		
		(1)	(2)	(3)
Supervisory policies	Pandemic * Pillar 2 Guidance	-0.1061*** (0.0242)	-0.1056*** (0.0234)	-0.0884** (0.0371)
	Pandemic * Pillar 2 Requirements frontloading	0.0351 (0.0500)	0.0466 (0.0576)	0.0020 (0.0968)
	Pandemic * Retained dividends (dividend recommendation)	0.0049 (0.0033)	0.0046 (0.0033)	-0.0003 (0.0057)
Other policy controls	CCyB	-0.1606* (0.0921)	-0.1725* (0.0976)	-0.1455* (0.0869)
	OSII/GSII/SRB requirement	-0.0467 (0.0449)	-0.0558 (0.0545)	-0.0333 (0.0774)
	CB funding (% of Total Liabilities)	-0.0027 (0.0036)	-0.0028 (0.0037)	0.0019 (0.0046)
	Loans under moratoria (% of NFC loans)	0.0012 (0.0012)	0.0012 (0.0013)	-0.0012 (0.0021)
	Guarantees (% of NFC loans)	0.0011 (0.0018)	0.0011 (0.0018)	-0.0018 (0.0050)
	Forbearance (% of NFC total loans)	-0.0231*** (0.0067)	-0.0238*** (0.0069)	-0.0243** (0.0096)
	Headroom to MDA	-0.0832** (0.0371)	-0.0956** (0.0432)	-0.0465 (0.0639)
Capital and risk	CET 1 ratio	0.1019** (0.0439)	0.1166** (0.0503)	0.0623 (0.0656)
	Leverage ratio	-0.0052 (0.0190)	-0.0107 (0.0191)	-0.0133 (0.0352)
	RWA density	0.0071 (0.0046)	0.0077 (0.0048)	-0.0001 (0.0045)
	SREP score	0.0520** (0.0251)	0.0503* (0.0279)	0.0539 (0.0327)
	Funding	NFC deposits (% of TL)	-0.0017 (0.0063)	-0.0026 (0.0066)
HH deposits (% of TL)		-0.0063 (0.0040)	-0.0056 (0.0042)	-0.0049 (0.0035)
Asset quality	Coverage ratio	0.0015 (0.0009)	0.0017* (0.0010)	0.0043*** (0.0014)
	NPL ratio	-0.0098** (0.0044)	-0.0109** (0.0047)	-0.0148** (0.0058)



Table 6 (continued)

		ln (Exposures)		
		(1)	(2)	(3)
Profitability	Distributed dividends (% Equity)	0.0025 (0.0022)	0.0021 (0.0023)	0.0041 (0.0037)
	ROE	0.0015 (0.0010)	0.0015 (0.0011)	0.0005 (0.0020)
	Cost to Income	0.0022** (0.0009)	0.0020** (0.0009)	-0.0005 (0.0009)
	Bank fixed effects	Yes	Yes	Yes
	Firm-time fixed effects	Yes	No	No
	Firm fixed effects	No	Yes	No
	Time fixed effects	No	Yes	No
	Industry-location-time fixed effects	No	No	Yes
	Government support fixed effects	Yes	Yes	Yes
	Observations (bank-firm-quarter)	6812	6812	5963
	Clustered standard errors	Bank level	Bank level	Bank level
	Adj. R-squared	0.126	0.122	0.008

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Robustness checks and placebo tests

Sequential inclusion of regressors

See Table 7.

Table 7 Sequential inclusion of regressors

		ln (Exposures)			
		(1)	(2)	(3)	(4)
Supervisory policies	Pandemic * Pillar 2 Guidance	-0.0917** (0.0386)	-0.1159*** (0.0239)	-0.1141*** (0.0238)	-0.1061*** (0.0242)
	Pandemic * Pillar 2 Requirements frontloading			0.0145 (0.0382)	0.0351 (0.0500)
	Pandemic * Retained dividends (dividend recommendation)			0.0045 (0.0034)	0.0049 (0.0033)
Other policy controls	CCyB				-0.1606* (0.0921)
	OSII/GSII/SRB requirement				-0.0467 (0.0449)
	CB funding (% of Total Liabilities)				-0.0027 (0.0036)
	Loans under moratoria (% of NFC loans)				0.0012 (0.0012)
	Guarantees (% of NFC loans)				0.0011 (0.0018)
	Forbearance (% of NFC total loans)				-0.0231*** (0.0067)



Table 7 (continued)

		ln (Exposures)			
		(1)	(2)	(3)	(4)
Capital and risk	Headroom to MDA		-0.0450** (0.0189)	-0.0442** (0.0174)	-0.0832** (0.0371)
	CET 1 ratio		0.0631*** (0.0195)	0.0626** (0.0250)	0.1019** (0.0439)
	Leverage ratio		-0.0058 (0.0200)	-0.0060 (0.0202)	-0.0052 (0.0190)
	RWA density		0.0057 (0.0052)	0.0057 (0.0053)	0.0071 (0.0046)
	SREP score		0.0250 (0.0252)	0.0309 (0.0240)	0.0520** (0.0251)
Funding	NFC deposits (% of TL)		0.0014 (0.0059)	0.0015 (0.0059)	-0.0017 (0.0063)
	HH deposits (% of TL)		-0.0046 (0.0034)	-0.0049 (0.0034)	-0.0063 (0.0040)
Asset quality	Coverage ratio		0.0019* (0.0011)	0.0020* (0.0011)	0.0015 (0.0009)
	NPL ratio		-0.0101** (0.0045)	-0.0100** (0.0043)	-0.0098** (0.0044)
Profitability	Distributed dividends (% Equity)		0.0018 (0.0021)	0.0023 (0.0023)	0.0025 (0.0022)
	ROE		0.0016 (0.0011)	0.0015 (0.0010)	0.0015 (0.0010)
	Cost to Income		0.0029** (0.0011)	0.0028*** (0.0010)	0.0022** (0.0009)
	Bank fixed effects	Yes	Yes	Yes	Yes
	Firm-time fixed effects	Yes	Yes	Yes	Yes
	Government support fixed effects	Yes	Yes	Yes	Yes
	Observations (bank-firm-quarter)	6812	6812	6812	6812
	Clustered standard errors	Bank level	Bank level	Bank level	Bank level
	Adj. R-squared	0.135	0.145	0.145	0.126

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Placebo tests

See Table 8.



Table 8 Placebo results using randomised Pillar 2 Guidance values

	ln (Credit exposure)		
	(1)	(2)	(3)
Pandemic * Placebo Pillar 2 Guidance	0.0007 (0.0014)	0.0007 (0.0014)	0.0007 (0.0027)
Pandemic * Pillar 2 Requirements frontloading	0.0119 (0.0403)	0.0224 (0.0457)	-0.0057 (0.1116)
Pandemic * Retained dividends (dividend recommendation)	0.0061 (0.0037)	0.0057 (0.0037)	0.0015 (0.0056)
Bank controls	Yes	Yes	Yes
Other policies controls	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes
Firm-time fixed effects	Yes	No	No
Firm fixed effects	No	Yes	No
Time fixed effects	No	Yes	No
Industry-location-time fixed effects	No	No	Yes
Government support fixed effects	Yes	Yes	Yes
Observations (bank-firm-quarter)	6812	6812	5963
Clustered standard errors	Bank level	Bank level	Bank level
Adj. R-squared	0.182	0.18	0.241

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Alternative pandemic date definition

Our main results encode the pandemic implementation of the relief measures as of Q1 2020. This is in line with the fact that a series of measures were announced in the first part of March 2020, which allows sufficient time for effects to be present on extensions of revolving credit facilities, and changes in exposures through purchases or sales of NFC debt securities.

Indeed, supervisory insights tell that in the beginning of the pandemic period, NFC requests for increase in the size of credit facilities has been observed across significant institutions, and these liquidity providing facilities have been drawn upon more than in pre-pandemic times. Considering the fact banks' corporate debt holdings could similarly begin adjustments on relatively shorter notice than changes to loans portfolios, this would support the decision to use Q1 2020 as the beginning of the pandemic period, where effectiveness should be measured.

Nevertheless, in order to cross check our findings, Table 9 runs the main estimation results under an alternative pandemic date definition, which starts in Q2 2020 instead of Q1. All policy interaction terms are revised under this robustness check, which uses the “*pandemic alt. date*” variable.

Bank risk profile checks

The main results control for a variety of bank characteristics relevant in determining the credit supply decisions,

aside from the relief measures of interest. Bank risk profiles in particular could be important drivers of such decisions during uncertain periods like the pandemic, and ensuring they are properly controlled for has been a priority for the analysis.

To this extent, the *risk weighted assets density* and the bank *SREP score* are part of the set of controls of the main results. The former is a proxy for the internal risk assessment of banks themselves, which through internal risk models and granular portfolio information determine to some degree the value of risk weights, and thereby in part the value of risk weighted assets. The SREP score reflects the external risk assessment of a bank's riskiness as performed by supervisors during the annual review process. Together with bank fixed effects both controls should strip out the risk appetite component from the variables of interest.

Nevertheless, bank risk profiles could be correlated with the amount of P2G capital they are recommended to hold by the supervisor. If this were to be the case, then we should observe riskier banks increase lending supply relative to their peers, if we were to split the bank sample benefitting from the P2G relief in two.

To test this hypothesis we construct a *higher bank risk* dummy and interact it with the P2G variable of interest to see if there is any statistical difference in the post relief period's lending behaviour, between riskier banks and the rest of the sample.

The *higher bank risk* dummy takes value 0 for banks that have SREP scores 1 and 2 (less risky) and value 1 for banks that have scores of 3 and 4 (more risky). The *SREP score*



Table 9 Alternative pandemic date definition

	ln (Credit exposure)		
	(1)	(2)	(3)
Pandemic alt. date * Pillar 2 Guidance	-0.0695** (0.0330)	-0.0709** (0.0328)	-0.0695** (0.0311)
Pandemic alt. date * Pillar 2 Requirements frontloading	0.0108 (0.0395)	0.0169 (0.0434)	-0.0498 (0.0848)
Pandemic alt. date * Retained dividends (dividend recommendation)	0.0010 (0.0021)	0.0005 (0.0021)	0.0014 (0.0037)
Bank controls	Yes	Yes	Yes
Other policies controls	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes
Firm-time fixed effects	Yes	No	No
Firm fixed effects	No	Yes	No
Time fixed effects	No	Yes	No
Industry-location-time fixed effects	No	No	Yes
Government support fixed effects	Yes	Yes	Yes
Observations (bank-firm-quarter)	6812	6812	5963
Clustered standard errors	Bank level	Bank level	Bank level
Adj. R-squared	0.128	0.124	0.008

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

variable is a natural candidate to construct this difference since P2G capital recommendations are determined on the basis of supervisory stress test outcomes, and the SREP score is not a determinant of these decisions. The dummy

should therefore add new informational content, to allow a split of the bank sample into higher and lower risk.

The results of Table 10 show that the main P2G relief result is retained, as the sign and significance remain unchanged, while a marginal increase in the magnitude is

Table 10 Higher bank risk interactions

	ln (Exposures)		
	(1)	(2)	(3)
Pandemic * Pillar 2 Guidance	-0.1307*** (0.0239)	-0.1312*** (0.0240)	-0.1077** (0.0443)
Pandemic * Pillar 2 Guidance * Higher bank risk	0.0310* (0.0163)	0.0327* (0.0174)	0.0416 (0.0274)
Pandemic * Pillar 2 Requirements frontloading	0.0080 (0.0517)	0.0162 (0.0571)	-0.0348 (0.0926)
Pandemic * Retained dividends (dividend recommendation)	0.0050* (0.0029)	0.0048 (0.0030)	0.0007 (0.0040)
Bank controls	Yes	Yes	Yes
Other policies controls	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes
Firm-time fixed effects	Yes	No	No
Firm fixed effects	No	Yes	No
Time fixed effects	No	Yes	No
Industry-location-time fixed effects	No	No	Yes
Government support fixed effects	Yes	Yes	Yes
Observations (bank-firm-quarter)	6812	6812	5963
Clustered standard errors	Bank level	Bank level	Bank level
Adj. R-squared	0.131	0.126	0.02

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$



observed. The additional effect exhibited by higher risk banks in the post relief period is captured by the *Pandemic * Pillar 2 Guidance * Higher bank risk* interaction term, yet this shows limited evidence of a statistical difference between the two bank groups' behaviour in terms of their lending to large NFCs.

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Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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