Lenders asymmetric reaction to the ECB non-standard policies in the syndicated loan market

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Abstract:

We investigate the effectiveness of the bank lending channel, i.e. whether and how the accommodative monetary policy of the European Central Bank (ECB) mitigated the disruption in syndicated bank lending from 2008 to 2014. We show that both standard and non-standard measures of the ECB's accommodating monetary policy alleviated banks' funding constraints to support their lending activities in the syndicated loan market. However, we highlight a cross-sectional asymmetry in banks' responses depending on the financial indicator chosen. The supply of loans by banks with a low Tier 1 ratio or by small banks is supported by non-standard policies while these policies are not significant for lowly capitalised financial institutions.

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'The recent credit crisis has reminded us of the crucial role performed by banks in supplying lending to the economy, especially in a situation of serious financial distress'.

L. Gambacorta and D. Marques-Ibanez[1]

In 2008, Lehman Brothers' bankruptcy filing triggered one of the most significant financial crises in banking history, deeply affecting the three major syndicated loan markets with a decrease by 60% of issuance volume between 2007 and 2009. The syndicated loan market is a major source of external finance for firms and represents more than one third of all international corporate financing, including money-market instruments, bonds, and equities (Gadanecz, 2004).[2] A large body of literature explores the impact of the financial crisis on the syndicated loan market.[3] Ivashina and Scharfstein (2010) focus on the U.S. banking sector and highlight how the banking panic set off a disruption in syndicated bank lending, combined with a run on lines of credit granted before the crisis, totaling dollar 26.8 billion. This run affected banks' balance sheets, damaging their liquidity position and reducing new-loan origination to large corporations. In a larger perspective, Cerutti et al. (2015) explore the evolution and drivers of cross-border bank-loan exposures from 1995 to 2012 for a panel of 26 lender countries and 76 borrower countries. The authors find that the 2008 financial crisis significantly impacted the syndicated loan market, with a reduction in cross-border exposures (see also De Haas and Van Horen, 2012). In line with Ivashina and Scharfstein (2010), they highlight a disruption in the issuance volume of new loans

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[1] Gambacorta and Marques-Ibanez (2011, p. 138).

[2] A syndicated loan is a hybrid of a bank loan and public debt, gathering together commercial banks and other financial institutions, and implying both monitoring and underwriting activities (Dennis and Mullineaux, 2000; Chaudhry and Kleimeier, 2015).

[3] In an extensive study, Kleimeier et al. (2013) analyse the impact of roughly 200 financial crises on the geographical repartition of cross-border loans from 1995 to 2008. By distinguishing between banking, currency, and twin crises, the authors highlight significant differences among the types of crises, with stronger effects from twin financial turmoil.

associated with higher stocks of syndicated loans on banks' balance sheets due to significant drawdowns on existing lines of credit. The confidence crisis, combined with an increase in uncertainty, makes banks reluctant to lend money. Acharya and Merrouche (2013) show that during the subprime crisis, large settlement banks in the U.K. started hoarding liquidity for precautionary purposes due to a rise in their funding risk.

Amid the magnitude of the financial shock and the increasing pressures on the banking industry, central banks intervened to reduce strains in financial markets and provide credit institutions with financial support.[4] However, shocks to financial and monetary conditions do not have the same impact on banks, depending on their level of capital and liquidity (Gambacorta and Marques-Ibanez (2011) and Jiménez et al. (2012, 2014) among others). Gambacorta and Marques-Ibanez (2011) show that weakly capitalised banks with a higher dependence on market funding reduced credit availability more significantly than other banks during the financial crisis that began in 2008. In addition, Jiménez et al. (2014) highlight greater vulnerability for banks with low capital or liquidity when monetary and macroeconomic conditions worsen. Facing an increase in short-term interest rates or a decrease in GDP, these weakly capitalised banks grant fewer loans than strongly capitalised banks, thereby worsening the credit crunch. Kishan and Opiela (2006) investigate the asymmetry of banks' reaction to both contractionary and expansionary monetary policies. They find that small low-capital banks compared to small high-capital banks decrease more total loans when facing a contractionary monetary policy while they are less able to increase total loans when an expansionary policy is implemented by the central bank. They argue that the transmission of expansionary monetary policy during economic recoveries can be supported by small banks when these banks are well-capitalised. Overall, these studies find that the composition and strength of

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[4] Fawley and Neely (2013) provide a precise description of the quantitative easing programmes implemented by the Federal Reserve (Fed), the Bank of England (BoE), the ECB, and the Bank of Japan (BoJ).

banks' balance sheets play a significant role in the transmission channel of monetary policy. As such, assessing the effectiveness of monetary-policy transmission through the bank lending channel requires a deeper analysis of these fluctuations across banks with different financial positions.

The goal of this paper is to assess the impact of the ECB accommodating monetary policy on the syndicated loan market. More precisely, we estimate the effects of standard and non-standard policies of the ECB on the issuance volume of syndicated loans (bank lending channel). We study banks asymmetric response to monetary policy shocks by differentiating banks according to three different financial indicators, i.e. capital level, Tier 1 ratio, and size.

We contribute to the debate on the effectiveness of the bank lending channel (Bernanke and Blinder, 1988; Bernanke and Gertler, 1995) by investigating whether the ECB's accommodating monetary policy contributed to mitigating the disruption in the issuance volume of syndicated loans.[5] Peek and Rosengren (2013) emphasise the importance of understanding the role of credit institutions in monetary policy transmission. The authors show that the development of new non-standard measures triggered a shift in the objective of monetary policy, requiring a re-assessment of its bank lending transmission channel. Adelino and Ferreira (2016) explain that the decrease in bank lending was due to reduced access to wholesale funding and to an increase in the cost of funding, reinforcing the importance of studying this channel.

In contrast to Gambacorta and Marques-Ibanez (2011) that investigate the transmission of both standard and non-standard monetary policies on aggregated nominal bank lending, we focus our analysis on the syndicated loan market. To the best of our knowledge, this is the first work that explores the impact of the overall ECB accomodative monetary policy on the syndicated loan

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[5] J.C. Trichet speech (11/23/2009): '*These 'non-standard' measures started in October 2008 and were designed to… enable banks to continue their lending to households and firms*'.

market, one of the major sources of international finance for corporations. We hypothesise that the measures implemented by the ECB supported syndicated bank lending, reducing the impact of the 2008 financial crisis with an asymmetric effect on financial institutions depending on their capitalization, the level of their Tier 1 ratio, and their size. By providing credit institutions with funds, the ECB alleviated the constraints on banks' balance sheets, providing them with more flexibility to allocate resources.

To test our hypothesis empirically, we estimate a cross-section regression for a sample of 15 European banking groups between 2008 and 2014. We analyse the potential effects of several monetary policy instruments (i.e. the interest rate and non-standard ECB policies) on syndicated bank lending. We pay particular attention to the microeconomic foundations of bank lending activities by using loan-specific data rather than overall lending aggregates (Popov and Van Horen, 2015).

Overall, we find that both standard and non-standard measures strengthened bank lending activities by increasing syndicated-loan volume. However, we show a cross-sectional asymmetry in banks' responses with the supply of loans by lowly capitalised banks increasing more thanks to standard measures than non-standard policies. Policies affecting the size of the ECB balance sheet were less effective than interest-rate instruments in providing lowly capitalised banks with funds to support their lending activities. On the contrary, non-standard measures are more efficient in supporting credit supply of banks with a low Tier 1 ratio and small banks than standard measures.

Our findings confirm the existence and the effectiveness of the bank lending channel over the recent period for the syndicated loan market. The innovation is the nature of the instruments that are found to be effective in the transmission of monetary policy. After the Lehman collapse, the ECB successfully alleviated the impact of the 2008 crisis, hence limiting the consequences for the

real economy, with the ultimate recipient being the borrowing companies. This result remains valid when we consider banks' specific loan-attribution process and resist several robustness checks.

The remainder of this paper is organised as follows. The first section describes the expansionary monetary policy implemented by the ECB and is followed by Section 2 which presents our methodology. Section 3 describes our data, while section 4 provides descriptive statistics. Section 5 investigates whether the measures of ECB's monetary policy contributed to supporting syndicated bank lending considering banks' capital level. Section 6 is dedicated to robustness checks. Section 7 concludes the paper.

1. **ECB Monetary Policy**

Typically, the ECB targets short-term interest rates to conduct monetary policy, i.e. buy or sell short-term debt securities using the Main Refinancing Operations (MROs)and the Longer-Term Refinancing Operations (LTROs).[6] One month after the collapse of Lehman Brothers, the ECB implemented the Fixed-Rate, Full Allotment tender procedures (FRFA) to address the deterioration of financial conditions and decreased its main interest rate by 325 basis points between October 2008 and May 2009 (Figure 2).

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[6] The maturity of the LTROs was extandedfrom three to six months for the first time on March 28, 2008.

Figure 2: ECB Monetary Policy: Standard Measures
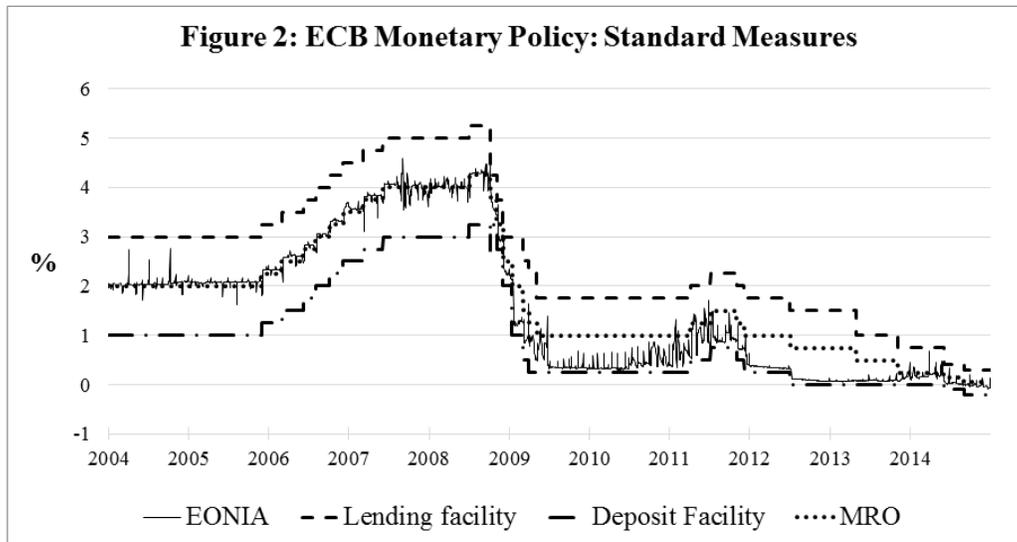
Source: ECB website. EONIA stands for Euro OverNight Index Average.

However, in 2009, concerns over counter-party risk remained significant, disturbing the operations of European interbank markets (Drudi et al., 2012). With short-term interest rates approaching the zero lower bound, the ECB adopted non-standard measures to reduce financial distress and stimulate the economy. The ECB extended the maturity of its LTROs to 12 months, satisfying credit institutions' demand for longer maturities. In addition, the ECB announced the Covered Bond Purchase Programme (CBPP), aiming at purchasing euro-denominated covered bonds for a predetermined amount equal to 60 billion euros over 14 months. This programme contributed to alleviating the maturity constraints that credit institutions faced when lending long and borrowing short, generally through on-demand deposits. These measures targeting the main players in the European economy, i.e. the banks contributed to increasing the monetary base.[7]

Nevertheless, during the financial crisis of 2008, tax revenues decreased and economic growth slowed down, exacerbating budget and debt problems. In 2010, European credit institutions

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[7] Fawley and Neely (2013) highlight a significant difference between the programmes implemented by the ECB and the BOJ, and those implemented by the Fed and the BoE. The difference lies in the reality that the economies of Europe and Japan are more bank-oriented, while those of the U.S. and U.K. are more bond-oriented.

holding substantial amounts of sovereign debt had to face new difficulties linked to the sovereign-debt crisis occurring in the monetary union. The ECB announced its Securities Market Programme (SMP)[8] with a two-fold objective: with the ability to purchase government debt on the secondary market, the ECB aimed to ensure liquidity and restore an appropriate transmission mechanism for monetary policy. Unfortunately, the European sovereign-debt crisis continued to plague European interbank markets, and the ECB had to intervene with additional measures in 2011[9] to restore confidence. As a result, the size of the ECB balance sheet significantly increased between 2008 and 2012, as shown in Figure 3.

Figure 3: ECB Balance Sheet: Relevant Assets
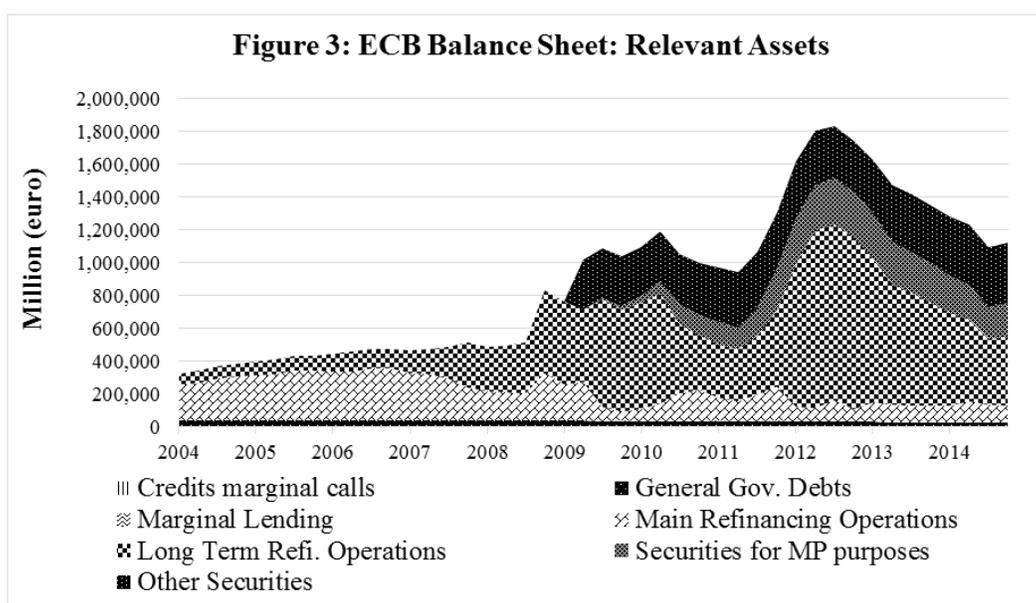
Source: ECB website.

All of these measures carried out by the ECB may have potentially affected the economy through several transmission channels (Mishkin, 1996). As banks are credit-constrained, the bank lending channel is effective when the monetary policy affects credit institutions' external finance premium,

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[8] On September 6, 2012, the ECB replaced the SMP with the Outright Monetary Transactions programme to address the lack of an enforcement mechanism to receive support.
9 In 2011, a second CBPP was set up for 40 billion euros. In addition, the ECB announced an extension of the LTROs' maturity, up to 36 months.

subsequently altering credit availability in the economy (Stein, 1998; Gan, 2007; Disyatat, 2011 among others).[10] Gambacorta and Marques-Ibanez (2011) provide evidence of a significant impact of monetary policies before and during the lending crisis. However, the authors argue that banks' reactions are not homogenous and depend on banks' capital levels, as well as their use of new and innovative tools, such as securitization. In line with this analysis, several papers (Angeloni et al., 2003; Gambacorta, 2005 among others) investigate how the relationship between monetary policy and the level of deposits can disturb bank lending activities. Gambacorta (2005) studies a sample of Italian banks and shows that a tightening monetary policy leads to a decrease in deposits and loans afterward, with the effect being more significant in smaller banks unable to raise uninsured funds. We contribute to the debate on the effectiveness of the bank lending channel (Bernanke and Blinder, 1988; Bernanke and Gertler, 1995) by investigating whether the ECB's accommodating monetary policy contributes to mitigating the disruption in the issuance volume of syndicated loans.

2. <u>The influence of monetary policy on banks' lending</u>

Following a financial shock, credit institutions may experience higher funding constraints, resulting in a contraction in syndicated bank lending. Our objective is to estimate to what extent ECB standard (proxied by the Euro OverNight Index Average - EONIA) and non-standard measures (proxied by the size of the balance sheet) mitigated the impact of the 2008 financial crisis by supporting lending in the syndicated loan market. We make the two-following hypothesis:

Hypothesis 1: the overall expansionary monetary policy implemented by the ECB through both standard and non-standard measures contributed to support bank lending activities.

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[10] Considering the credit channel in general, Kishan and Opiela (2000) highlight the importance of distinguishing between the bank lending channel and the borrower net-worth channel. They argue that the former depends on banks' asset volume and capital.

Hypothesis 2: Banks size, level of capital or financial strength affect the transmission of both standard and non-standard instruments to loans' emissions.

In the following model we analyze the bank lending channel and assess both the direct effect of ECB measures (Hypothesis 1) and whether these effects are different with respect to bank's size, capitalization level, or financial strength (Hypothesis 2). As such, we interact monetary policy variables with banks quarterly total assets, capital ratio or T1 ratio. As our model is specified at the tranche level of a syndicated loan, we also control for bank and year fixed effects.. We manually matched the loan amount granted by each bank (intensive margin) with the associated explanatory variables. This allows us to disentangle between credit supply and credit demand by introducing firm-level variables to control for credit demand and correctly identify credit supply effect (Jiménez et al., 2012).

In addition, we contribute to the literature on syndicated loans by considering all credit institutions that are part of the syndicate. In the syndicated loan market, a syndicate is divided into two distinct groups of lenders, depending on their roles. The lead arrangers are responsible for structuring, administering, and monitoring loans, while the participants behave as investors and provide funds. While the literature focuses on loans provided by lead arrangers, we consider each bank's individual decision to lend. Even if the bank is only a participant, it still has the choice to invest or not at the beginning of the syndication process, and this decision may also be influenced by the monetary conditions. However, as the lead lender might provide larger fundings, we control for lead arrangers in our model.

We model the amount of each syndicated loan i provided by lender l to borrower b at time t as follows:

(1)

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$$Amount_{iblt} = \alpha_1 + \alpha_2 * \Delta MP_t + \alpha_3 * \Delta MP_t * C_{lt} + \alpha_4 * \Delta GDP_{t-1} + \alpha_5 * \Delta BLS_{t-1} + \alpha_6$$

$$* \ Controls_{iblt} + \alpha_l + \alpha_t + \varepsilon_{iblt}$$

where ΔMP_t stands for a change in monetary policy proxied by either a change in the EONIA ($\Delta EONIA_t$) (Jiménez et al., 2014 among others) and a change in the size of the ECB balance sheet (ΔBS_t) (Gambacorta and Marques-Ibanez, 2011) accounting for standard and non-standard policies respectively and non-standard components of the balance sheet (ΔNS_t) . The variable representing the size of the ECB balance sheet contains the MROs, fulfilled at a fixed rate with full allotment after the Lehman collapse, the LTROs which benefited from an extension in their maturity, and the securities held for monetary purposes through the different programmes (e.g., CBPP, SMP, etc.). However, this variable may be biased by the presence of the MROs, considered as standard measures before the crisis and the FRFA implementation. Accordingly, we built a more restrictive variable, called non-standard (ΔNS_t), in which we remove these MROs, focusing exclusively on non-standard policies implemented by the ECB. The banks characteristics C_{lt} represents for each lender l at time t its size (proxied by the Total Assets), its capital level (proxied by the Common Equity to Total Assets ratio) or its financial strength (proxied by the T1 Capital Ratio). The interaction between ΔMP_t and C_{lt} assesses the relation between monetary policy decisions and banks' structure. In the following estimations, we test each monetary policy measure separately before analyzing their joint effect on loan amount. In line with the theory, an accommodating monetary policy either through a decrease in the EONIA or an expansion of the size of the ECB balance sheet should contribute to an increase in bank lending, i.e. α_2 negative for standard measures but positive for non-standard policies.

Jiménez et al. (2012) show that the economic conditions have a significant impact on bank loans. As such, we include the macroeconomic context in our model with the change in the eurozone's

gross domestic product[11] (ΔGDP_{t-1}), and the banks' anticipations of credit demand based on question 9 in the bank lending survey (ΔBLS_{t-1})[12] quarterly provided by the ECB (Del Giovane et al., 2011).

$Controls_{iblt}$ is a matrix of our control variables. It includes the characteristics of the loan, i.e. its maturity, whether the loan is secured, its type, and seasonal effects.[13] We also control for the characteristics of the borrower, i.e. its industry and the risks associated with this industry,[14] the borrower's credit rating when the loan is issued,[15] and whether the borrower is located in the same country as the lender to control for possible home-bias. Our model contains a dummy variable reflecting whether the lender is the lead arranger. We also consider the lender's strategy in terms of industry portfolio diversification. A bank may develop expertise in one specific industry from often lending to companies in this industry. As such, the bank can save on information-gathering and -monitoring costs. However, the risk of this 'focus' strategy (Acharya et al., 2006) is a lack of diversification, which may sometimes push banks to lend more to companies in other industries. Finally, we integrate in our analysis the relationship between the lender and the borrower as well

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[11] Using the specific lender's country GDP instead of the eurozone GDP provides comparable results.

[12] The main objective of the BLS is to provide the ECB's Governing Council with information regarding the financing conditions in the eurozone, using questionnaires sent out to banks and enterprises to gauge their opinions about the market appetite for loans. In our model, we use the information related to the answers to question 9 ("Please indicate how you expect demand for loans or credit lines to enterprises to change at your bank over the next three months [apart from normal seasonal fluctuations]"). We consider the quarterly variation of the overall category, i.e. all loans (short- and long-term) to all companies (small, medium, and large), and we include the balance of opinions in our model (between -100 and +100).

[13] In the loan contract, the different characteristics may be co-determined with the loan amount limiting the use of these variables as explanatory variables. As a robustness test, we also run our model without these loan characteristics and the results are highly similar.

[14] The industry risk may affect a bank's portfolio of loans, especially during a crisis, when investors become risk-averse. We compute a Value-at-Risk (VaR) per industry to control for this risk using industry indices produced by Datastream. Then we manually match the industry of the borrower with these indices to associate one VaR per loan.

[15] DealScan provides credit ratings produced by the three leading U.S. credit-rating agencies (CRAs), i.e. Standard & Poor's, Moody's and Fitch. These ratings are automatically reported in the database when they exist. In our sample, we consider for each loan the rating each time it is provided by one of the three CRAs. For rated loans with more than one rating, we apply the 'worst of 2 and median of 3 ratings' rule (Bongaerts et al., 2012). We then categorise borrowers as investment-grade, junk-grade, or unrated. In the regression, we use the group of unrated loans as the reference.

as bank fixed effects (α_b) to control for time-invariant bank heterogeneity and year dummy variables (α_t).[16]

To take into consideration the asymmetric transmission of monetary policy (Gambacorta, 2005), we run the model using a cross-section estimation method per loan (tranche level in a syndicated loan) and per credit institution, rather than per country. We perform our regressions with robust standard errors.

Data

Because our analysis focuses on the monetary policy implemented by the ECB., we consider all credit institutions that can benefit from its open market operations. According to European Directive 2000/12/EC (European Parliament – March 20, 2000), "a 'credit institution' shall mean an undertaking whose business is to receive deposits or other repayable funds from the public and to grant credits for its own account". The ECB establishes a list of Monetary Financial Institutions (MFIs) that fall within the scope of this definition.[18] From this list, we select only credit institutions that must satisfy the ECB reserve requirement, restricting our list to 5,294 MFIs. To run our analysis on a quarterly basis, we restrict our sample to MFIs for which we have access to quarterly financial information and which are active in the syndicated loan market. Our final sample contains 86 credit institutions located in 10 eurozone countries (Austria, Belgium, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, and Spain). We collect financial data from banks using Bloomberg, and we complete our series with information from banks' balance sheets. In our

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[16] In a robustness test, we run the same model using bank times year fixed effects to control for time-variant bank heterogeneity and the results remain similar.

[18] MFIs are defined by the ECB as 'central banks, resident credit institutions as defined in community law, and other resident financial institutions whose business is to receive deposits and/or close substitutes for deposits from entities other than MFIs and, for their own account (at least in economic terms), to grant credit and/or make investments in securities. Money market funds are also classified as MFIs' (Regulation (EC) No. 25/2009 – ECB/2008/32). On February 29, 2016, this list contained 7,959 MFIs. The list is updated on a monthly basis.

study, we consider the quarter when the loan is issued to determine the relevant bank's financials. The ECB provides data on monetary-policy instruments.

In addition, we use the LPC DealScan database to get data on syndicated loans, provided by each MFI. In LPC DealScan, we obtain all of the loans' characteristics and the industries involved, as well as the credit rating and nationality of the borrower. The industry risk is computed using data from Datastream. LPC DealScan also provides access to the MFI's role in the syndicate, its strategy in terms of industry specialization, its relationship with the borrower and the bank allocation, i.e. how much each MFI has invested per loan. Finally, the GDP and the results of the bank lending survey are extracted from Eurostat and the ECB website, respectively.

To investigate the effect of the ECB accommodative measures on syndicated bank lending, we run our baseline analysis from January 2008 to December 2014. For the sake of our study, we group the 86 MFIs under the names of their parents for which we have financial information on a quarterly basis. Our final sample contains 10,271 unique loans provided by 19 banking groups to 4,317 borrowing companies between 2008 and 2014. One specificity of the syndicated loan market is that several banks participate to one syndicated loan involving that one loan may appear several times in our database resulting in a total of 52,555 observations in our sample. Our dataset allows for good inferences on how accommodative monetary-policy instruments impact credit supply, depending on banks' capital, Tier 1 ratio and size.

Table I provides the definition and the descriptive statistics of each variable included in our analysis.

Insert Table I here.

Table II presents the 19 banking groups included in our sample ranked according to the total quantity of loans provided. In this table, we report the countries in which these banking groups

have MFIs involved in syndicated loans, as well as descriptive statistics of loans characteristics for each banking group over the time period.

Insert Table II here.

Table III displays the description of our sample in terms of geographical repartition of borrowers, types, objectives, and maturities of the loans. This table highlights that the 19 banking groups lend to companies that are mainly located either in Western Europe or North America, with the two regions representing more than 80% of our sample. Our objective is to study lending behaviour of banks active in the international syndicated loan market. As such, we do not limit our analysis to a sample of European borrowers. Instead, we control for the geographical location of borrowers in our estimates. Regarding the most common loan characteristics, term loans and lines of credit dominate the sample and are used mainly to finance general corporate functions, LBOs, project finance and takeovers, with more than 50% of the loans maturing in one to five years.

Insert Table III here.

Estimation Results

Table IV reports the main estimation results for several alternatives of our model based on three different indicators of banks' structure: total assets, capital ratio, Tier 1 ratio. For each measure, we estimate five different specifications. In Models (1), (2), and (3), we introduce separately each monetary policy instruments measures with their interaction term to assess the impact of the variation of the EONIA ($\Delta EONIA_t$), of the size of the ECB balance sheet (ΔBS_t), and of the non-standard ECB operations (ΔNS_t), respectively, on loan amounts. Then we focus on how the overall ECB monetary policies influence syndicated loan amounts by considering a simultaneous implementation of standard and non-standard policies: $\Delta EONIA_t$ and ΔBS_t in Model (4), $\Delta EONIA_t$ and ΔNS_t in Model (5). We include in all models control variables for the characteristics

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of the loan, borrower, lender, and lender-borrower relationship to better consider credit institutions' lending process.

Insert Table IV here.

Across models and specifications, we find a negative and significant coefficient for the change in the EONIA. A decrease in the benchmark rate significantly supports the supply of syndicated loans by all banks. Considering the non-standard policies, the coefficients of the size of the ECB balance sheet is positive and significant. These results confirm the hypothesis that ECB non-standard measures contribute to mitigating lender funding constraints and support lending activities. The model based on a more restrictive definition of non-standard measures (ΔNS_t) provides equivalent results.

Focusing on the interaction terms, the size of the financial institution tends to reduce the benefits of non-standard policies as larger lenders will benefit less from the additional liquidity provided by the central bank. At the opposite, banks with a higher capital ratio will benefit less from interest rate policies while their lending amounts will increase as the central bank balance sheet expands.

3. **The asymmetric effects of non-standard policies**

While our previous results emphasize the positive effects of accommodative monetary policies on banks' lending activities in the syndicated loan market, it does not consider the heterogeneous structures of banks in the Euro Area. With 8 financial institutions listed as "*global systemically important banks*" by the Financial Stability Board in 2014 (FSB, 2014),[21] the heterogeneity encompasses banks' structures, business models and nationality. To study the asymmetric transmission of accommodating monetary policies, we group our lenders depending on their

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[21] BNP Paribas, Deutsche Bank, BBVA, Credit Agricole, ING, Santander, Société Générale and Unicredit. List published on November 6, 2014.

financial structure. We expect small and financially weak lenders to benefit more from accommodative measures due to their limited access to alternate source of funding, Financial institutions with low level of capital should benefit less from expansionary monetary policies (Kishan and Opiela, 2006).

The 19 banking groups in our sample are sorted according to the three financial indicators previously used: (1) the size of the financial institution with its total assets, (2) the level of capital ratio, (3) the Tier 1 ratio. To rank these banking groups, we compute the average of each indicator between 2008 and 2014[22] for each financial institution. We run three distinct tests alternatively considering each indicator to assess how financial and monetary shocks affect the two subgroups of lenders. We focus the analysis on the top or bottom six banks (higher or lower tercile) versus the other banks.[23]

Building on Equation (1), we now estimate:

$$Amount_{iblt} = \alpha_1 + \alpha_2 * \Delta MP_t + \alpha_3 * \Delta MP_t * D_{l,h} + \alpha_4 * \Delta GDP_{t-1} + \alpha_5 * \Delta BLS_{t-1} + \alpha_6 \quad (2)$$
$$* Controls_{iblt} + \alpha_l + \alpha_t + \varepsilon_{iblt}$$

The dummy variable D_l (D_h) is equal to one for banks that belong to the bottom (top) tercile in terms of size, capital ratio, or Tier 1 ratio, the three specifications being estimated separately. As such, the interaction term assesses whether the effect of a change in monetary policy differs across financial institutions according to these three different financial indicators. Results are provided with *Lender* and *Year* fixed effects separately. As the lending strategy of a bank may evolve over time and to control for this time-variant bank heterogeneity, (*Lender*Year*) fixed effect are also implemented.

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[22] The results remain similar when we use the ranking of each indicator based on the average for the year 2008 only.
[23] To assess our results, we run three robustness tests. We start considering banks that are below the bottom quintile.

In line with the results obtained in the previous section, we find that both accommodating standard ($\Delta EONIA_t$) and non-standard policies (ΔBS_t, ΔNS_t) successfully stimulate banks' syndicated lendings (Model (1) to (3)) thereby confirming our Hypothesis 1. As the EONIA decreases, amounts tend to increase and an increase of the size of the ECB balance sheet generates larger lending in the syndicated loan market. However, in Models (4) and (5), interest rates reductions do not statistically increase loan amounts. The following section details, for each financial indicator, the marginal effects of the ECB accommodative policies.

Size

Table V provides the estimated coefficients of Equation (2) when banks are ranked according to their size (Total Assets).

Insert Table V here.

We focus on models (4) and (5) that jointly estimate the effects of standard and non-standard measures, When banks are ranked according to the level of total assets, we find that a decrease of the main interest rate negatively impact lending amounts provided by small banks while expansionary non-standard policies have a larger and positive effect on credit supply of these banks. Smaller banks tend to have a more limited access to alternative sources of funding either in terms of quantity or at a higher cost and accommodative policies successfully reduce this constraint. At the opposite, large banks' lending activities tend to benefit less from non-standard policies (Model (1), (2) and (3)). The marginal effects for large banks is not significant considering Models (4) and (5) suggesting that monetary stimulus does not channel to firms financing.

Capitalization

Table VI provides the estimated coefficients of Equation (2) when banks are ranked according to their capitalization (Capital Ratio).

Insert Table VI here.

We find that banks with a relatively low level of capital benefit more from interest rates decreases while the marginal effect of non-standard measures is close to zero (panel with Bank and Year FE) or not significant (panel with Bank*Year FE). When the ECB implements an expansionary monetary policy, the supply of loans by lowly capitalised banks is stimulated by standard measures but non-standard one appears ineffective. Our results depart from the previous findings on the bank lending channel (among others Kishan and Opiela (2006)). While the traditional bank lending channel supports lowly-capitalised banks inability to increase lending during expansionary policies, we find that interest rates policies tend to further support lendings. .

Financial Strength

Table VII provides the estimated coefficients of Equation (2) when banks are ranked according to their financial strength (Tier 1 Ratio).

Insert Table VII here.

When banks are ranked according to the level of their Tier 1 ratio, standard policies have either a negative effect when considering non-standard policies (left Panel) or no specific effect on banks with a low level of Tier 1 ratio (Right Panel) . Non-standard policies provide larger positive effects on lending amounts to banks belonging to the lowest Tier 1 ratio tercile. In line with the bank lending channel, financial institutions perceived by others as weaker or with a lower solvency might have a limited access to alternative sources of fund or with a higher premium, leading to a

reduction of their lending activities. For this specific group of banks, non-standard measures provide funding at a lower cost and then stimulate the amounts lent on the syndicated loan market.

Overall, these results confirm the existence and effectiveness of the bank lending channel over the recent period for the syndicated loan market and highlight the critical need for the ECB to develop non-standard measures to overcome the limits of standard measures during crises. The ECB had to intervene with additional major measures in 2008 to limit the spread of the crisis to the real economy enabling banks to maintain credit supplies with the ultimate recipient being the borrowing parties. However, our conclusions also highlight the importance of considering the nature of the monetary policy tool as they can have different impact on banks according to the strength of their balance sheet. The size of the financial institution appears to be the main source of asymmetry (Hypothesis 2) in the transmission of monetary policy. Small lenders reaction to accommodative non-standard policies is stronger while lenders with a low level of capital or a weak financial structure behave as any other lender.

4. **Robustness Checks**

4.1 Alternative banks' ranking

In the main estimation model, we consider a bank to be small (large), lowly (highly) capitalized or financially weak (strong) if it belongs to the sample of the bottom (top) six banks (tercile) with the the lowest (highest) total assets, capital ratio, or Tier 1 ratio respectively. As a robustness check, we use a more restrictive threshold by focusing on the banks' bottom and top quintile for each specification (i.e. the four banks with the lowest Total Assets, Capital Ratio, or Tier 1 ratio)The results are provided in Table VIII.

Insert Table VIII here.

Our conclusions remain in line with our previous with two noticeable differences. First, we find that banks with a larger level of total assets benefit less for non-standard policies. The interactions terms considering either the size of the ECB balance sheet or the non-standard measures are both significant and negative in Models (2) to (5). Compared to other financial institutions, large banks' lending activities are less positively impacted by the expansion of the ECB balance sheet in line with the findings of Gambacorta and Marques-Ibanez (2011). Second, lenders level of capital (Middle Panel) does not explain any asymmetric lending behavior. This result is coherent to the structure of the euro-area banking sector. Systematically important banks associated with a large size tend to have a lower capital ratio. There structure and importance in the euro-area liquidity market, making them less dependent on deposits, allows them to access funding easily. Banks with a high capital ratio tend to be smaller institutions but with low T1 ratio making them more sensitive to deposits and tension in the liquidity market (Right Panel) thus explaining the larger reaction to non-standard policies.

4.2 Aggregated measure for the ECB accommodative policy

In the period under consideration (2008-2014), the ECB simultaneously decreased its key interest rates and expanded its balance sheet through changes in its conventional instruments (Fixed rates Full allotment procedure for the MROs and LTROs, several increases in the LTROs maturity) and non-standard programs. These contemporary implementations might generate endogeneity issues between the different monetary instruments and bias their effects' assessment. As a robustness check, we replace our three monetary policy measures ($\Delta EONIA_t$, ΔBS_t and ΔNS_t) by an aggregated indicator, the ECB "shadow rate" estimated by Wu and Xia (2016, 2017). The authors use a multifactorial shadow rate term structure model to assess the effective monetary

policy rate, considering both standard and non-standard policies. We estimate Equation (2) using the change of the shadow rate ΔSR_t instead of ΔMP_t. Results are provided in table IX.

Insert Table IX here.

The results on the direct effects of monetary policy confirms our previous finding and our first Hypothesis as a decrease of the shadow rate (a more accommodative monetary policy) leads to larger lending amounts. However, focusing on the interaction terms, lenders level of capital ratio or T1 Capital Ratio does not appear to provide larger lending in the syndicated loan market. The positive effect of ECB accommodative policies seems to be reduced for small banks (Left Panel, Model (2)).

5. <u>Conclusion</u>

The objective of this paper is to assess the impact of the accommodative monetary policies implemented by the ECB on syndicated bank lending. Its innovation relies on our investigation of the role played by both standard and non-standard measures on banks' credit supply. The use of these measures at unprecedented levels requires a reassessment of the bank lending channel as a transmission mechanism for monetary policy.

We run an empirical analysis on syndicated loan amounts from a sample of 19 European banking groups between 2008 and 2014. The use of six different databases allows us to integrate the precise characteristics of all players involved with banking transactions into our data and conclusions. Through a cross-sectional regression of 52,555 loans, we study the influence of monetary policies on loans' amounts. We control for loan's, borrower's, and lender characteristics in addition to the

relationship between the lender and the borrower. Our analysis includes Lender, Year or (Lender*Year) fixed effects.

We show that accommodative standard and non-standard policies significantly increase lending amounts. Furthermore, a decrease of the central bank interest rate leads to a larger increase of loans' amounts supplied by lowly capitalized banks. However, we find that an increase of loans' supply by these banks is smaller when considering an expansion of the central bank balance sheet through non-standard policies. On the contrary, financially weaker and smaller banks tend to benefit more from non-standard monetary policies. Our results are robust to alternative rankings of banks. The main asymmetry in the Euro-Area bank lending channel comes from the size of the financial institution.

Considering the transmission of ECB monetary policy, our empirical analysis of the syndicated loan market provides evidence of the existence of the bank lending channel. Standard and non-standard ECB policies successfully stimulate lending on the syndicated loan market, but the size of this stimulus depends on bank characteristics. The innovative, accommodating ECB monetary policy facilitates banks' access to alternative sources of funds, reducing the constraints imposed to financial institutions with a low Tier 1 ratio or to relatively small banks. On average, the instruments used by the ECB seem to play a significant role in reducing the constraints on financial markets, supporting credit supply for syndicated loans.

These results contribute to the debate on the effectiveness of such unforeseen measures. We argue that these measures limited the spillover effects of the 2008 financial crisis into the real economy by supporting bank lending activities. A further extension of this paper would involve deepening the analysis using more detailed data on ECB open-market operations to better understand the mechanisms of each instrument in monetary policy. Another development of this paper could focus

on the marginal effect of non-standard policies on non-financial institutions' investment strategies

and its implications for the macroeconomic environment.

Appendices

Appendix A: Pearson Correlation Matrix

We compute the correlation matrix of all variables that are not dummies or interaction terms.

Insert Table A1 here.

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Table I. Variables definition

This table provides the definition for the variables included in the empirical analysis. The dependent variable, i.e. the amount of the loan, in addition to the characteristics of the loan, the characteristics of the borrower (except the Value-at-Risk for borrower's industry computed from Datastream), the characteristics of the lender, and their relationship are computed by the authors using data from the LPC DealScan database. The instruments of monetary policy and the results of the bank lending survey are provided by the ECB while the GDP is extracted from Eurostat. Our final sample contains ~~10,271 unique loans~~ provided by 15 banking groups to ~~4,317 borrowing companies~~ between 2008 and 2014. In Appendix A, we provide the Pearson correlation matrix between all variables that are not dummies.

Variable	Definition	Unit	Average	St. Dev.	Min.	Max.
	Dependent Variable					
$Amount_{iblt}$	Amount of loan i provided by credit institution l to borrower b at time t (taken as a logarithm)	Million euro	45,58	88,72	0,01	4200
	MP_t: Monetary policy instruments					
$\Delta EONIA_t$	The variation of the quarterly EONIA	Bps	-0,07	0,45	-1,82	0,81
ΔBS_t	The quarterly variation of the ECB quarterly balance sheet equal to total assets minus general government debt denominated in euro, marginal lending facility, credits related to marginal calls and other securities	%	0,03	0,20	-0,28	0,75
ΔNS_t	The quarterly variation of the value of ECB unconventional policies (i.e. the sum of LTROs and securities purchased for monetary policy purposes from the quarterly balance sheet assets)	%	0,05	0,27	-0,33	1,05
	Lender's financial indicators					
C_l	Credit institution i Capital Ratio (measured as Common Equity / Total Assets)	%	4,09	1,66	0	13,67
	Credit institution i Tier 1 ratio	%	11,21	2,28	0	17,30
	Credit institution i Total Assets	Million euro	1227305	606283	43544	2305337
D_l	Variable equal to one when the loan is provided by the five lowest capitalised lenders	Dummy	0,65	0,48	0	1
	Variable equal to one when the loan is provided by the five lenders with the lowest Tier 1 ratio	Dummy	0,11	0,31	0	1
	Variable equal to one when the loan is provided by the five lenders with the smallest total assets	Dummy	0,05	0,21	0	1
D_h	Variable equal to one when the loan is provided by the five most highly capitalised lenders	Dummy	0,17	0,38	0	1
	Variable equal to one when the loan is provided by the five lenders with the highest Tier 1 ratio	Dummy	0,50	0,50	0	1
	Variable equal to one when the loan is provided by the five lenders with the largest total assets	Dummy	0,63	0,48	0	1
	Macroeconomic environment					

ΔGDP_{t-1}	Quarterly change in the Eurozone GDP taken with one lag	Million euro	0,34	2,05	-5,50	2,80
ΔBLS_{t-1}	Quarterly change in banks' anticipations of credit demand based on question 9 of the bank lending survey	Numerical	0,49	11,83	-28,61	31,03
Loan characteristics						
$Maturity_i$	The loan's maturity (taken as a logarithm)	Month	58,66	43,27	1	432,00
$Secured_i$	Variable equal to one when the loan is secured	Dummy	0,40	0,49	0	1
Rev_i	Variable equal to one when the loan is a revolver loan (with a maturity lower than 1 year)	Dummy	0,01	0,08	0	1
	Variable equal to one when the loan is a revolver loan (with a maturity higher than 1 year)	Dummy	0,38	0,49	0	1
$Term_i$	Variable equal to one when the loan is a term loan	Dummy	0,33	0,47	0	1
Q_i	Variable equal to one when the loan is issued during the fourth quarter of the year (seasonal effect)	Dummy	0,26	0,44	0	1
Borrower characteristics						
$Industry_b$	Variable with a value of one when the borrower belongs to the manufacturing sector	Dummy	0,30	0,46	0	1
	Variable with a value of one when the borrower belongs to the financial sector	Dummy	0,11	0,32	0	1
	Variable with a value of one when the borrower belongs to the service sector	Dummy	0,12	0,32	0	1
	Variable with a value of one when the borrower belongs to the transportation sector	Dummy	0,10	0,30	0	1
	Variable with a value of one when the borrower belongs to the real estate sector	Dummy	0,02	0,15	0	1
	Variable with a value of one when the borrower belongs to the trade sector	Dummy	0,10	0,30	0	1
	Variable with a value of one when the borrower belongs to another sector	Dummy	0,30	0,46	0	1
Ind_risk_{ib}	Value-at-Risk of the industry	%	-0,02	0,01	0	-0,01
CR_{ib}	Variable equal to one if the borrower is investment grade	Dummy	0,17	0,37	0	1
	Variable equal to one if the borrower is junk grade	Dummy	0,07	0,25	0	1
$Domestic_{ib}$	Variable equal to one when the borrower has the same nationality as the lender	Dummy	0,24	0,43	0	1
Lender additional characteristics						
$Lead_{il}$	Variable equal to one when the lender is the lead arranger	Dummy	0,69	0,46	0	1
$Strategy_{il}$	The total amount lent by the credit institution to the industry of the borrower associated with the loan the year before (taken as a logarithm)	Million euro	1738	2232	0,06	13629
Lender-Borrower relationship						
$Relation_{iblt}$	Variable equal to one when the lender has already lent to the borrower during the previous year	Dummy	0,21	0,41	0	1

Table II. Sample of banking groups

This table provides descriptive statistics of the 15 banking groups included in our sample. BBVA stands for Banco Bilbao Vizcaya Argentaria. The countries are Austria (AU), Belgium (BE), France (FR), Germany (GE), Greece (GR), Ireland (IR), Italy (IT), Luxembourg (LU), Netherlands (NL), and Spain (SP). Number of loans represents the sum of all loans in which the banking group has participated. Average loan characteristics (i.e. amount expressed in millions of euro, maturity expressed in months) and the quarterly average of the capital ratio (i.e. common equity to total assets, expressed in millions of euros), Tier 1 Capital ratio and total assets (in millions of euros) of each banking group are computed for the 2008-2014 period.

Banking Group	Countries	Number of loans	Amount	Maturity	Total Asset	Capital ratio	Tier 1 ratio
BNP		8,442	53.19	55.41	1,979	3.47	11.10
Deutsche bank	GE/LU	7,166	66.39	53.87	1,896	2.81	14.05
ING	BE/FR/GE/IR/IT/LU/NL	5,678	39.27	58.37	1,189	3.85	11.29
Crédit Agricole		5,258	44.37	63.93	1,646	2.64	10.62
Commerzbank	GE/IT/SP	3,895	37.59	50.25	671	3.11	11.31
Société Générale		3,784	45.86	55.50	1,198	3.85	11.33
Natixis		3,644	36.99	58.92	521	3.47	10.91
Unicredit bank	IT/LU	3,374	39.87	61.77	923	6.22	9.94
BBVA	FR/IT/SP	2,907	41.37	73.6	577	6.27	10.01
Santander SA	BE/SP	2,551	51.81	68.17	1,191	5.95	10.65
Intesa Sanpaolo	IT	1,823	49.34	52.37	642	7.86	9.87
KBC bank NV	BE/IR	1,216	26.46	52.96	284	3.65	11.48
Sabadell SA	SP	653	17.68	74.27	106	5.97	9.30
Banco Populare Espanol	SP	587	17.82	66.8	143	6.69	9.73
Bankinter	SP	474	11.01	67.22	56	5.26	9.49
Erste bank	AU/LU	473	22.34	51.72	209	5.44	9.80
Banca Monte dei Paschi di Siena	IT	341	18.59	61.08	219	5.9	7.82
Banca Popolare di Milano	IT	219	19.38	63.05	49	8.79	8.65
Alpha Bank AE	GR	70	33.54	90.13	66	8.5	10.96

Table III. Sample of loans

This table provides descriptive statistics of the sample of loans. The amount is expressed in millions of euros. The first panel provides the split of borrowers according to their geographical region. The second, third, and fourth panels describe the sample of loans in terms of loan type, loan objective, and loan maturity respectively.

	Number		$Amount_{ij}$	
Borrowers' region				
Africa	522	1%	19,797.76	1%
Asia Pacific	3,925	7%	134,297.79	6%
Eastern Europe/Russia	3,866	7%	119,153.05	5%
Latin America/Caribbean	1,497	3%	63,940.25	3%
Middle East	777	1%	32,611.24	1%
USA/Canada	11,981	23%	713,026.71	30%
Western Europe	29,987	57%	1312,849.5	55%
Loan type				
Revolver (<1Y)	304	1%	25,786.44	1%
Revolver (>1Y)	20,203	38%	979,670.41	41%
Term loan	17,240	33%	642,939.24	27%
Others	14,808	28%	747,280.2	31%
Loan objective				
General purposes	28,902	55%	1453,556.5	61%
Leverage Buy-out (LBO)	2,955	6%	59,218.03	2%
Takeover	2,314	4%	238,894.56	10%
Project finance	4,469	9%	124,796.68	5%
Recapitalization	524	1%	19,271.61	1%
Working capital	1,742	3%	65,453.3	3%
Acquisition	1,932	4%	102,648	4%
Commercial Paper backup	214	0%	22,899.25	1%
Others	9,503	18%	308,938.37	13%
Loan maturity				
Short-Term (<1y)	1,200	2%	93,095.53	4%
Medium-Term (1y-5y)	22,930	44%	1093,505.7	46%
Long-Term (>5y)	28,425	54%	1209,075.1	50%

Table IV. Estimation results

We estimate the cross-section regression detailed in Equation (1) for 19 euro-area banking groups with robust standard errors. The dependent variable is the loan amount granted by each MFI included in the sample and taken as a logarithm. The table displays five different specifications. First, each monetary policy measure is implemented individually: standard measures with the change of the EONIA (1), non-standard measures with the change of the size of the ECB balance sheet (2) and a more restrictive proxy based on the balance sheet (3). Then standard and non-standard policies are implement simultaneously in models (4) and (5). The interaction terms between monetary policies and lenders size (Total Assets), capitalization (Capital Ratio) or financial strength (T1 Capital Ratio) are presented separately. All regressions are run with a constant term. Standard errors are clustered at a *Lender* level. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

Variables	$C = Total\ Assets$					$C = Capital\ Ratio$					$C = T1\ Capital\ Ratio$				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	EONIA	Balance sheet	Non-standard	(1)+(2)	(1)+(3)	EONIA	Balance sheet	Non-standard	(1)+(2)	(1)+(3)	EONIA	Balance sheet	Non-standard	(1)+(2)	(1)+(3)
Monetary policy instruments															
$\Delta EONIA_t$	-0.134***			-0.033	0.043	-0.163***			-0.202***	-0.251***	-0.165*			0.004	-0.004
ΔBS_t		0.429***		0.386***			0.185*		-0.125			0.619***		0.422**	
ΔNS_t			0.366***		0.415***			0.164**		-0.174*			0.455***		0.377***
Interaction Terms															
$\Delta EONIA_t * C_{lt}$	0.000			-0.000	-0.001*	0.013			0.030**	0.048***	0.005			-0.007	-0.005
$\Delta BS_t * C_{lt}$		-0.001**		-0.001**			0.022		0.072***			-0.036*		-0.024	
$\Delta NS_t * C_{lt}$			-0.001**		-0.001***			0.018		0.082***			-0.022		-0.021
Macroeconomic environment															
ΔGDP_{t-1}	0.021*	0.023**	0.031***	0.028***	0.031***	0.021*	0.023**	0.031***	0.027***	0.029***	0.021*	0.025**	0.031***	0.029***	0.031***
ΔBLS_{t-1}	0.001	-0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.000	-0.001	-0.000	0.000	0.000
Observations	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555
Loan charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relationship	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender*Year FE	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
R²	0.192	0.192	0.192	0.192	0.192	0.192	0.192	0.192	0.192	0.192	0.192	0.192	0.192	0.192	0.192

Table V. Results focusing on lenders' size

We estimate the cross-section regression detailed in Equation (2) for 19 euro-area banking groups focusing on lenders' size ($D_{l,h} = TA_{l,h}$). The dependent variable is the loan amount granted by each MFI in the sample and taken as a logarithm. The table displays five different specifications. Monetary policy measures are implemented individually: standard measures with the change of the EONIA (1), non-standard measures with the change of the size of the ECB balance sheet (2) and a more restrictive proxy based on the balance sheet (3). Standard and non-standard policies are implement simultaneously in models (4) and (5). The left panel presents results with Lender and Year fixed effects (FE) while the right panel presents results with (Lender*Year) fixed effects. Standard errors are clustered at a *Lender* level on the left panel and *Lender*Year* level on the right panel. All regressions are run with a constant term. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

Variables	Lender and Year FE					Lender * Year FE				
	(1) EONIA	(2) Balance sheet	(3) Non-standard	(4) (1)+(2)	(5) (1)+(3)	(1) EONIA	(2) Balance sheet	(3) Non-standard	(4) (1)+(2)	(5) (1)+(3)
Monetary policy instruments										
$\Delta EONIA_t$	-0.158***			-0.096***	-0.067*	-0.161***			-0.113***	-0.084**
ΔBS_t		0.378***		0.245***			0.352***		0.188**	
ΔNS_t			0.320***		0.225***			0.311***		0.189***
Interaction Terms										
$\Delta EONIA_t * TA_l$	0.151*			0.364***	0.502***	0.070			0.235**	0.343***
$\Delta EONIA_t * TA_h$	0.058**			0.011	-0.019	0.072**			0.047	0.021
$\Delta BS_t * TA_l$		0.190		0.731**			0.117		0.477*	
$\Delta BS_t * TA_h$		-0.197***		-0.170*			-0.162*		-0.079	
$\Delta NS_t * TA_l$			0.088		0.752**			0.086		0.560**
$\Delta NS_t * TA_h$			-0.155***		-0.173**			-0.147**		-0.111
Macroeconomic environment										
ΔGDP_{t-1}	0.021***	0.023***	0.030***	0.028***	0.030***	0.023***	0.024***	0.032***	0.029***	0.032***
ΔBLS_{t-1}	0.001	-0.000	0.000	0.000	0.000	0.000	-0.001	-0.000	-0.000	-0.000
Observations	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555
Loan charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relationship	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Lender FE	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Lender*Year FE	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
R²	0.241	0.241	0.241	0.241	0.242	0.247	0.247	0.247	0.247	0.247

Table VI. Results focusing on lenders' capital structure

We estimate the cross-section regression detailed in Equation (2) for 19 euro-area banking groups focusing on lenders' capitalisation ($D_{l,h} = CR_{l,h}$). The dependent variable is the loan amount granted by each MFI in the sample and taken as a logarithm. The table displays five different specifications. Monetary policy measures are implemented individually: standard measures with the change of the EONIA (1), non-standard measures with the change of the size of the ECB balance sheet (2) and a more restrictive proxy based on the balance sheet (3). Standard and non-standard policies are implement simultaneously in models (4) and (5). The left panel presents results with Lender and Year fixed effects (FE) while the right panel presents results with (Lender*Year) fixed effects. Standard errors are clustered at a *Lender* level on the left panel and *Lender*Year* level on the right panel. All regressions are run with a constant term. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

Variables	Lender and Year FE					Lender * Year FE				
	(1) EONIA	(2) Balance sheet	(3) Non-standard	(4) (1)+(2)	(5) (1)+(3)	(1) EONIA	(2) Balance sheet	(3) Non-standard	(4) (1)+(2)	(5) (1)+(3)
Monetary policy instruments										
$\Delta EONIA_t$	-0.067**			0.024	0.053	-0.055			0.015	0.015
ΔBS_t		0.308***		0.342**			0.223**		0.256*	
ΔNS_t			0.230***		0.286**			0.155*		0.174
Interaction Terms										
$\Delta EONIA_t * CR_l$	-0.060			-0.138*	-0.167*	-0.071			-0.117**	-0.100
$\Delta EONIA_t * CR_h$	-0.063			-0.042	-0.009	-0.083*			-0.083	-0.047
$\Delta BS_t * CR_l$		-0.100		-0.277*			0.025		-0.141	
$\Delta BS_t * CR_h$		0.133		0.074			0.127		-0.001	
$\Delta NS_t * CR_l$			-0.035		-0.238*			0.077		-0.060
$\Delta NS_t * CR_h$			0.123*		0.116			0.142		0.076
Macroeconomic environment										
ΔGDP_{t-1}	0.021***	0.023***	0.030***	0.028***	0.031***	0.023***	0.024***	0.032***	0.030***	0.032***
ΔBLS_{t-1}	0.001	-0.000	0.000	0.000	0.000	0.000	-0.001	-0.000	-0.000	0.000
Observations	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555
Loan charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relationship	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Lender FE	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Lender*Year FE	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
R²	0.241	0.241	0.241	0.241	0.241	0.247	0.247	0.247	0.247	0.247

Table VII. Results focusing on lenders' financial strength

We estimate the cross-section regression detailed in Equation (2) for 19 euro-area banking groups focusing on lenders' financial strength ($D_{l,h} = T1_{l,h}$). The dependent variable is the loan amount granted by each MFI in the sample and taken as a logarithm. The table displays five different specifications. Monetary policy measures are implemented individually: standard measures with the change of the EONIA (1), non-standard measures with the change of the size of the ECB balance sheet (2) and a more restrictive proxy based on the balance sheet (3). Standard and non-standard policies are implement simultaneously in models (4) and (5). The left panel presents results with Lender and Year fixed effects (FE) while the right panel presents results with (Lender*Year) fixed effects. Standard errors are clustered at a *Lender* level on the left panel and *Lender*Year* level on the right panel. All regressions are run with a constant term. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

Variables	*Lender and Year FE*					*Lender * Year FE*				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
	EONIA	Balance sheet	Non-standard	(1)+(2)	(1)+(3)	EONIA	Balance sheet	Non-standard	(1)+(2)	(1)+(3)
Monetary policy instruments										
$\Delta EONIA_t$	-0.101***			-0.054*	-0.049	-0.112***			-0.053	-0.041
ΔBS_t		0.260***		0.190***			0.254***		0.189**	
ΔNS_t			0.207***		0.138***			0.211***		0.155**
Interaction Terms										
$\Delta EONIA_t * T1_l$	0.001			0.118	0.236*	-0.015			0.033	0.110
$\Delta EONIA_t * T1_h$	-0.031			-0.065	-0.066	-0.019			-0.051	-0.058
$\Delta BS_t * T1_l$		0.258*		0.421*			0.132		0.175	
$\Delta BS_t * T1_h$		-0.037		-0.121			-0.014		-0.090	
$\Delta NS_t * T1_l$			0.212**		0.511**			0.129		0.280*
$\Delta NS_t * T1_h$			0.003		-0.079			0.007		-0.077
Macroeconomic environment										
ΔGDP_{t-1}	0.021***	0.023***	0.030***	0.028***	0.030***	0.021***	0.024***	0.032***	0.030***	0.032***
ΔBLS_{t-1}	0.001	-0.000	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	0.000
Observations	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555
Loan charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relationship	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Lender FE	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Lender*Year FE	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
R²	0.241	0.241	0.241	0.241	0.241	0.247	0.247	0.247	0.247	0.247

Table VIII. Bottom quintile

We estimate the cross-section regression detailed in Equation (2) for 19 euro-area banking groups. The dependent variable is the loan amount granted by each MFI in the sample and taken as a logarithm. The table displays five different specifications. Monetary policy measures are implemented individually: standard measures with the change of the EONIA (1), non-standard measures with the change of the size of the ECB balance sheet (2) and a more restrictive proxy based on the balance sheet (3). Standard and non-standard policies are implement simultaneously in models (4) and (5). Lender and Year fixed effects (FE) are included. Standard Errors are clustered at a *Lender* level. All regressions are run with a constant term. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

a	Total Assets					Capital Ratio					T1 Capital Ratio				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Variables	EONIA	Balance sheet	Non-standard	(1)+(2)	(1)+(3)	EONIA	Balance sheet	Non-standard	(1)+(2)	(1)+(3)	EONIA	Balance sheet	Non-standard	(1)+(2)	(1)+(3)
Monetary policy instruments															
$\Delta EONIA_t$	-0.143***			-0.074**	-0.044	-0.113***			-0.066	-0.046	-0.104***			-0.070**	-0.062*
ΔBS_t		0.369***		0.268***			0.280***		0.191*			0.235***		0.142**	
ΔNS_t			0.307***		0.243***			0.238***		0.171*			0.200***		0.114**
Interaction Terms															
$\Delta EONIA_t * D_l$	0.243***			0.433***	0.546***	-0.001			-0.023	-0.030	-0.011			0.070	0.161
$\Delta EONIA_t * D_h$	0.042			-0.021	-0.056	-0.038			0.062	0.080	-0.052			-0.044	-0.031
$\Delta BS_t * D_l$		0.078		0.706***			-0.051		-0.075			0.195*		0.287	
$\Delta BS_t * D_h$		-0.213***		-0.228**			0.231		0.317			0.095*		0.041	
$\Delta NS_t * D_l$			-0.023		0.682***			-0.029		-0.065			0.169**		0.372**
$\Delta NS_t * D_h$			-0.157***		-0.221**			0.140		0.247			0.087		0.050
Macroeconomic environment															
ΔGDP_{t-1}	0.021***	0.023***	0.030***	0.028***	0.031***	0.021***	0.023***	0.031***	0.028***	0.030***	0.021***	0.023***	0.030***	0.028***	0.030***
ΔBLS_{t-1}	0.001	-0.000	0.000	0.000	0.000	0.001	-0.000	0.000	0.000	0.000	0.001	-0.000	0.000	0.000	0.001
Observations	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555
Loan charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender charac.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relationship	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender*Year FE	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
R²	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241	0.241

Table IX. Aggregated measure for the ECB accommodative policy

We estimate the cross-section regression detailed in Equation (2) for 19 euro-area banking groups focusing on lenders' financial strength ($D_{l,h} = T1_{l,h}$). The dependent variable is the loan amount granted by each MFI in the sample and taken as a logarithm. The table displays five different specifications. Monetary policy is measured using the ECB shadow rate ΔSR_t from Wu and Xia (2016,2017). The regression (1) presents results with Lender and Year fixed effects (FE) while the regression (2) panel presents results with Lender*Year FE. All regressions are run with a constant term. Standard errors are clustered at a *Lender* level in (1) and *Lender*Year* level in (2). Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

Variables	$D = Total\ Assets$		$D = Capital\ Ratio$		$D = T1\ Capital\ Ratio$	
	(1) Lender, Year FE	(2) Lender*Year FE	(1) Lender, Year FE	(2) Lender*Year FE	(1) Lender, Year FE	(2) Lender*Year FE
Monetary Policy Instruments						
ΔSR_t	-0.060***	-0.062***	-0.018	-0.003	-0.053***	-0.047**
Interaction Terms						
$\Delta SR_t * D_l$	0.110	0.128**	-0.015	-0.037	0.025	0.029
$\Delta SR_t * D_h$	0.032*	0.036	-0.036	-0.045	0.021	0.008
Macroeconomic environment						
ΔGDP_{t-1}	0.006	0.006	0.003	0.008	0.008	0.006
ΔBLS_{t-1}	0.001	0.001	0.001	0.000	0.000	0.000
Observations	52,555	52,555	52,555	52,555	52,555	52,555
Loan charac.	Yes	Yes	Yes	Yes	Yes	Yes
Borrower charac.	Yes	Yes	Yes	Yes	Yes	Yes
Lender charac.	Yes	Yes	Yes	Yes	Yes	Yes
Relationship	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	No	Yes	No	Yes	No
Lender FE	Yes	No	Yes	No	Yes	No
Lender*Year FE	No	Yes	No	Yes	No	Yes
R²	0.191	0.191	0.186	0.183	0.183	0.178

Table A1. Pearson Correlation Matrix

	$\Delta EONIA_t$	ΔBS_t	ΔNS_t	ΔBLS_{t-1}	ΔGDP_{t-1}	Maturity	Industry risk	Strategy
$\Delta EONIA_t$	1							
ΔBS_t	-0.59	1						
ΔNS_t	-0.74	0.91	1.00					
ΔBLS_{t-1}	0.04	-0.14	-0.19	1.00				
ΔGDP_{t-1}	0.34	-0.05	-0.14	-0.33	1.00			
Maturity	0.00	0.01	0.02	-0.04	0.06	1.00		
Industry risk	0.16	-0.12	-0.15	-0.08	0.49	0.09	1.00	
Strategy	0.02	-0.03	-0.05	0.02	0.03	0.03	0.17	1.00