IÉSEG SCHOOL OF MANAGEMENT

May 2020

WORKING PAPER SERIES

2020-ACF-03

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

Aurore Burietz
IESEG School of Management & LEM-CNRS 9221, Lille, France

Matthieu Picault
IESEG School of Management, Lille, France

IÉSEG School of Management Lille Catholic University 3, rue de la Digue
F-59000 Lille
Tel: 33(0)3 20 54 58 92 www.ieseg.fr

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

Aurore Burietz[a]
IÉSEG School of Management

Matthieu Picault[*b]
IÉSEG School of Management

Abstract:

We investigate the effectiveness of the bank lending channel, that is, whether, and if so how, the accommodative monetary policy of the European Central Bank (ECB) mitigated the disruption in syndicated bank lending between 2008 and 2014. We show that both standard and non-standard measures of the ECB's accommodating monetary policy alleviated banks' funding constraints, helping support their lending activities in the syndicated loan market. We highlight a cross-sectional asymmetry in the banks' responses to non-standard measures, with small or highly capitalised banks providing loans with higher amounts. In the European region, bank size appears to be the most discriminating factor when it comes to distinguishing between banks.

Keywords: Syndicated loans, financial crisis, bank lending channel, European Central Bank, Non-standard monetary policies
JEL classification: E52, F34, G21

We want to thank Manuel Buchholz, Hicham Daher, Kenneth de Beckker, Hans Degryse, Alain Durré, Alexandre Girard, Christophe Godlewski, Pierre-Guillaume Méon, Suren Pakhchanyan, Mikael Petitjean, Michael Scharnagl and Daniel Thornton, as well as the participants at the IFABS Conference, FMA Annual Meeting, MFS Conference, EFMA Conference, AFFI Conference, ICMAIF Conference, GdRE Conference and 3L workshop, for their insightful comments and suggestions. We acknowledge funding from the People Programme (Marie Curie Actions) of the European Union's Seventh Framework Programme FP7/2007-2013/ under REA grant agreement n°608129. All remaining errors are ours.
[a]IÉSEG School of Management, 3 Rue de la Digue, 59000 Lille, France. Phone : +33 320 545 892. a.burietz@ieseg.fr.
[*]Corresponding author.
[b]IÉSEG School of Management, 1 Tunnel de Nanterre-La Défense, 92044 Paris, France. m.picault@ieseg.fr. Phone .: +33 155 911 010.

'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 filed for bankruptcy, triggering one of the most significant financial crises in banking history and deeply affecting the three major syndicated loan markets with a 60% drop in the issuance volume between 2007 and 2009. The syndicated loan market is a major source of external financing for firms, and it 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 that the financial crisis had 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, and when combined with a run on the lines of credit granted before the crisis, the total comes out to 26.8 billion dollars. This run affected banks' balance sheets, damaging their liquidity position and reducing new-loan origination given to large corporations. In line with Ivashina and Scharfstein (2010), Cerutti et al. (2015) highlight a disruption in the issuance volume of new loans that are associated with higher stocks of syndicated loans on banks' balance sheets because of significant drawdowns on existing lines of credit. In short, the confidence crisis, combined with an increase in uncertainty, made banks reluctant to lend money. Acharya and Merrouche (2013) show that during the subprime crisis, large settlement

[1] Gambacorta and Marques-Ibanez (2011, p. 138).
[2] A syndicated loan is a hybrid of a bank loan and public debt, and it gathers together commercial banks and other financial institutions, implying both are responsible for 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 emerging from twin financial turmoil.

banks in the UK started hoarding liquidity for precautionary purposes because of the 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 on the financial markets and provide credit institutions with financial support.[4] Typically, the ECB targets short-term interest rates to conduct monetary policy, that is, buying or selling short-term debt securities using the main refinancing operations (MROs) and the longer term refinancing operations (LTROs).[5] One month after the collapse of Lehman Brothers, the ECB implemented the fixed-rate, full allotment (FRFA) tender procedures to address the deterioration of financial conditions while decreasing its main interest rate by 325 basis points between October 2008 and May 2009. 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 twelve months, satisfying credit institutions' demand for longer maturities. In addition, the ECB announced the covered bond purchase programme (CBPP), which aimed 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 the credit institutions faced when lending long and borrowing short. These measures targeting banks helped increase the monetary base.[6]

[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).
[5] The maturity of the LTROs was extended from three to six months for the first time on March 28, 2008.
[6] 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 UK are more bond oriented.

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 holding substantial amounts of sovereign debt had to face new difficulties linked to the crisis in the monetary union. The ECB announced its securities market programme (SMP),[7] which had the following two objectives: 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[8] to restore confidence. As a result, the size of the ECB balance sheet significantly increased between 2008 and 2012.

In front of the magnitude of these unprecedented measures, the literature remains barely developed regarding the measures' effects on the syndicated loan market. The goal of the current paper is twofold. First, we assess the impact of the ECB's accommodating monetary policy on the syndicated loan market. More precisely, we estimate the effects of the ECB's standard and non-standard policies on the issuance volume of syndicated loans (bank lending channel). By providing credit institutions with funds, the ECB alleviated the constraints on banks' balance sheets, providing them with liquidity and more flexibility to allocate resources. Second, we study the banks' asymmetric response to monetary policy shocks by differentiating banks according to three different financial indicators: size, capital level and Tier 1 capital ratio. We hypothesise that the measures implemented by the ECB supported syndicated bank lending, reducing the impact of the 2008 financial crisis. We expect the effect to be asymmetric across financial institutions because they do not face the same costs to access alternate sources of funding.

[7] On September 6, 2012, the ECB replaced the SMP with the outright monetary transactions programme to address the lack of an enforcement mechanism for receiving support.
[8] In 2011, a second CBPP was set up for 40 billion euros. In addition, the ECB announced an extension of the LTROs' maturity of up to thirty-six months.

To empirically test our hypotheses, we estimate a cross-section regression for a sample of nineteen European banking groups between 2008 and 2014. We analyse the potential effects of two monetary policy instruments (i.e., the interest rate and non-standard ECB policies) on syndicated bank lending by using the LPC Dealscan database. In addition, we introduce interaction terms between monetary policy measures and three distinct banks' financial ratios to assess the effectiveness of the bank lending channel. The analysis is run at the bank level to investigate the asymmetric transmission of the monetary policy. 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). We also control for the banks' heterogeneity by using bank fixed effects.

The major identification challenge is to disentangle between credit supply and credit demand because both can be affected by a change in monetary and economic conditions. To address this identification challenge, we control for credit demand using macro- and microeconomic variables. First, we consider the change in the gross domestic product (GDP) of the Eurozone to account for variations in business cycle conditions (Jiménez et al., 2012). Second, we use the bank lending survey that is provided by the ECB every quarter to build a proxy for the banks' anticipation of credit demand (Del Giovane et al., 2011). Finally, we control for potential demand effects using microeconomic variables such as the industry of the borrower and its credit rating. The first measure integrates any productivity shock occurring in one specific sector while the second measure allows us to evaluate the financial position of the borrower. Both are key determinants for borrowers' demand for loans.

Overall, we find that both the standard and non-standard measures strengthened bank lending activities by increasing syndicated loan volume. The analysis shows that a decrease in the benchmark rate and an increase in the ECB balance sheet are associated with larger loan amounts.

However, we highlight a cross-sectional asymmetry in the banks' response. Non-standard measures are more efficient than standard measures in supporting the credit supply of small banks or banks with a high capital ratio. On the contrary, the loan amounts provided by lowly capitalised banks increase more when standard measures are implemented. The whole ECB monetary policy supports lending by the largest banks, but the magnitude is lower. We argue that bank size is more discriminant than capital ratio when studying the transmission of monetary policy. Finally, disentangling banks according to their Tier 1 capital ratio displays less conclusive results.

Our findings confirm the existence and effectiveness of the bank lending channel for the syndicated loan market within the studied period. 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 by expanding its balance sheet, hence limiting the consequences for the real economy, with the ultimate recipient being the borrowing companies. Providing several ample liquidity programmes and substituting the interbank market, the ECB participated in the reduction of funding the costs of banks that were not capital constrained. This result remains valid when we consider the banks' specific loan-attribution process and resist several robustness checks.

With the current paper, we add 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 that was implemented after the Lehman collapse contributed to mitigating the disruption in the issuance volume of syndicated loans.[9] All measures carried out by the ECB may have potentially affected the economy through several transmission channels (Mishkin, 1996). Because banks are credit constrained, the bank lending channel is effective when

[9] 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*'.

the monetary policy affects credit institutions' external finance premium, subsequently altering credit availability in the economy (Stein, 1998; Gan, 2007; Disyatat, 2011 among others).[10] 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 the monetary policy, requiring a re-assessment of the bank lending transmission channel. Adelino and Ferreira (2016) explain that the decrease in bank lending was because of reduced access to wholesale funding and to an increase in the cost of funding, reinforcing the importance of studying this channel.

We also contribute to the literature that seeks to identify the effects of non-standard measures on financial institutions. Chodorow-Reich (2014) runs high-frequency event studies to measure the impact of unconventional monetary policy announcements by the FOMC on the financial sector. Crosignani et al. (2017) focus on the three-year LTRO of the ECB and document a positive relationship between the implementation of this programme and Portuguese banks purchasing short-term domestic government bonds. Lenza et al. (2010) describe and compare the non-standard measures implemented by the ECB, the Federal Reserve and the Bank of England; they argue that these measures had a significant impact on the money market spreads and analyse the consequences for the real economy. Gambacorta and Marques-Ibanez (2011) use both standard and non-standard measures proxied by the change in the overnight rate and the level of total assets of central banks, respectively, to evaluate the impact of the monetary policy on bank lending. We complement this literature by studying the transmission mechanism of the whole ECB's accommodative monetary policy, that is, we consider both the decrease in the benchmark rate and the different programmes implemented to provide banks with liquidity. In contrast to Gambacorta and Marques-Ibanez

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

(2011), who investigate the transmission of both standard and non-standard monetary policies on aggregated nominal bank lending, we focus on the syndicated loan market. To the best of our knowledge, the current paper is the first work that explores the impact of the overall ECB accommodative monetary policy on the syndicated loan market, which is one of the major sources of international finance for corporations.

Finally, we add to the literature on cross-sectional asymmetry in banks' responses to monetary policy changes. Shocks to financial and monetary conditions do not have the same impact on all banks, especially when taking into account their size, level of capital and liquidity. Gambacorta and Marques-Ibanez (2011) argue that banks' reactions to monetary policy are not homogenous and depend on the banks' capital levels, as well as their use of new and innovative tools, such as securitisation; they show that weakly capitalised banks with a higher dependence on market funding reduced their credit availability more significantly than other banks during the financial crisis. In addition, Jiménez et al. (2014) highlight greater vulnerability for Spanish 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' reactions to both contractionary and expansionary monetary policies. They find that when compared with small high-capital banks, small low-capital banks decrease more total loans when facing a contractionary monetary policy and are less able to increase total loans when an expansionary policy is implemented by the central bank. The authors 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 banks' balance sheets play a significant role in the transmission channel of monetary policy. 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 banks' 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 that are unable to raise uninsured funds. As such, assessing the effectiveness of monetary policy transmission through the bank lending channel requires a deeper analysis of these fluctuations across banks that have different financial positions because the degree of informational asymmetry between banks and investors impacts the transmission of monetary policies (Kashyap and Stein, 1995, 2000; Stein, 1998 among others). Our findings confirm previous studies that highlight cross-sectional asymmetry in banks' responses to both standard and non-standard monetary policy measures. We contribute to this literature by enlarging the sample of banks and considering the whole ECB accommodating monetary policy.

The remainder of the present paper is organised as follows: Section 1 presents our methodology. Section 2 describes our data, and section 3 provides descriptive statistics. Section 4 investigates whether the measures of the ECB's monetary policy helped support syndicated bank lending. Section 5 deepens the analysis by considering banks' size, capital structure and financial strength separately. Section 6 is dedicated to robustness checks, and section 7 concludes the paper.

1. The influence of monetary policy on banks' lending

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 the ECB's 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 following hypotheses:

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

Hypothesis 2: The impact of monetary policy measures is stronger for smaller banks, for banks with a lower level of capital or for banks with a lower level of the Tier 1 capital ratio because of these banks' limited access to alternate sources of funding.

In our model, we analyse the bank lending channel and assess both the direct effect of the ECB's measures (Hypothesis 1) and whether this effect is different with respect to the specific bank's capitalisation level, financial strength and size (Hypothesis 2). As such, we interact monetary policy variables with banks' total assets, capital ratio and Tier 1 capital ratio. Our model is specified at the tranche level of a syndicated loan; 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 that control for credit demand and correctly identify credit supply effect (Jiménez et al., 2012). We also control for bank and year fixed effects.

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, which depends on their roles. The lead arrangers are responsible for structuring, administering and monitoring loans while the participants behave as investors and provide funds. Although 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 bank's monetary conditions. However, we control for lead arrangers' specific behaviour in our model.

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

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

where ΔMP_t is a change in the monetary policy proxied by 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), which accounts for standard and non-standard policies, respectively, and non-standard components of the balance sheet (ΔNS_t).[11] The variable representing the size of the ECB balance sheet contains the MROs that are fulfilled at a fixed rate with full allotment after the Lehman collapse, the LTROs that benefited from an extension in their maturity and the securities held for monetary purposes through the different programmes (e.g., CBPP, SMP, etc.). However, the variable ΔBS_t may be biased by the presence of the MROs, which are considered standard measures before the crisis and 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} represent the size (total assets), the capital level (common equity to total assets ratio) and the financial strength (Tier 1 capital ratio) of each lender l at time t. The interaction between ΔMP_t and C_{lt} assesses the relationship between monetary policy decisions and the banks' structure. In the following estimations, we test each monetary policy measure separately before analysing their joint effect on the loan amount. In line with the theory, an accommodating monetary policy, either

[11] As an alternative proxy for ECB monetary policies, we tested two aggregated indicators, namely two ECB 'shadow rates' that are estimated by Wu and Xia (2016, 2017) and Krippner (2013), respectively. However, our findings are less conclusive. The shadow rates provide a useful benchmark for a central bank monetary policy based on forward rates. Nevertheless, with the negative values during our sample period, they cannot properly explain the borrowing/lending decisions because they do not represent realistic borrowing costs in the international syndicated loan market.

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, that is, α_2 would be negative for standard measures but positive for non-standard policies. We expect this effect to be stronger for smaller banks, banks with lower levels of capital ratio or a lower Tier 1 capital ratio, that is, α_3 would be positive for standard measures but negative for non-standard policies.

Disentangling credit supply from credit demand is key in our analysis because both can be affected by a change in monetary and economic conditions. To address this identification challenge, our analysis contains macro- and microeconomic variables. 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 GDP[12] (ΔGDP_{t-1}) and the banks' anticipation of credit demand based on question 9 in the bank lending survey (ΔBLS_{t-1}),[13] which is provided quarterly by the ECB (Del Giovane et al., 2011). We also control for any productivity shock occurring in one specific sector by building variables to account for the industry of the borrower and the risks associated with this industry.[14] Finally, we add the borrower's credit rating when the loan is issued[15] and whether the borrower is located in the same country as the lender, hence controlling for possible home bias, as the key determinants of credit demand

[12] Using a lender's country GDP instead of the Eurozone GDP provides comparable results.

[13] The main objective of the BLS is to provide the ECB's Governing Council with information regarding the financing conditions in the Eurozone, and this is done using questionnaires sent out to banks and enterprises to gauge their opinions about the market's appetite for loans. In our model, we use the information from 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, that is, 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).

[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 by 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): Standard & Poor's, Moody's and Fitch. These ratings are automatically reported in the database when they appear. 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.

(Giannetti and Laeven, 2012 among others). These variables are included in the matrix $Controls_{iblt}$, which also considers the characteristics of the loan, that is, its maturity, whether the loan is secured, its type and seasonal effects.[16] 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 because of 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, in our analysis, we integrate the relationship between the lender and borrower, as well as bank fixed effects (α_l), to control for time-invariant bank heterogeneity and year dummy variables (α_t).[17]

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

2. Data

Focusing on the monetary policy implemented by the ECB, our analysis considers all credit institutions that can benefit from the ECB's open market operations and non-standard programmes. 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

[16] 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 fairly similar.

[17] 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.

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's 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 for which are active in the syndicated loan market. Our final sample contains 148 credit institutions located in eleven Eurozone countries (Austria, Belgium, Finland, 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 the banks' balance sheets. In the current study, we consider the quarter when the loan is issued to determine the relevant bank's financials. The ECB provides the data on monetary policy instruments.

In addition, we use the LPC DealScan database to collect data on syndicated loans provided by each MFI. In the 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 specialisation, 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's 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 148 MFIs under the names of their parents and collect information about the latter on a quarterly basis. Our final sample contains 21,947 unique loans provided by nineteen banking groups to 8,565

[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.

borrowing companies between 2008 and 2014. One specificity of the syndicated loan market is that several banks participate in one syndicated loan, so that one loan may appear several times in our database, resulting in a total of 52,555 observations in our sample. Our dataset allows us to make good inferences on how accommodative monetary policy instruments impact credit supply depending on the banks' size, capital and the Tier 1 capital ratio.

3. Descriptive statistics

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

Insert Table I here.

Ranked according to the total quantity of loans provided, Table II presents the nineteen banking groups included in our sample. In Table II, we report the countries in which these banking groups have MFIs involved in syndicated loans, as well as descriptive statistics of the loan characteristics for each banking group over the time period.

Insert Table II here.

Table III displays the description of our sample in terms of the geographical repartition of the borrowers, type, objective and maturity of the loans. This table highlights that the nineteen 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 the 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 the 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.

4. Estimation results

Table IV reports the main estimation results for several alternatives of our model based on the three different indicators of banks' structure: total assets, capital ratio and Tier 1 capital ratio. For each measure, we estimate five different specifications. In Models (1), (2) and (3), we introduce each monetary policy instrument measure separately with its interaction term to assess the impact of the variation of the EONIA ($\Delta EONIA_t$), the size of the ECB balance sheet (ΔBS_t) and the non-standard ECB operations (ΔNS_t), respectively, on the loan amounts. In Models (4) and (5), we assess how the overall ECB monetary policy influences syndicated loan amounts by considering standard and non-standard policies simultaneously, that is, $\Delta EONIA_t$ with ΔBS_t and $\Delta EONIA_t$ with ΔNS_t, respectively. We include the control variables for the characteristics of the loan, borrower, lender and lender–borrower relationship in all models to better consider the credit institutions' lending process.

Insert Table IV here.

We show that the ECB monetary policy through both standard and non-standard measures reduces constraints on banks' lending, increasing credit supply. More importantly, the effects are different across banks because all banks do not face the same restrictions. 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 and, more specifically, banks with a lower capital ratio. Considering non-standard policies, the coefficients of the size of the ECB balance sheet are positive and significant. These results confirm the

hypothesis that ECB non-standard measures contribute to mitigating lender funding constraints and support lending activities, especially for smaller banks or for banks with a higher capital ratio. The model that is based on a more restrictive definition of non-standard measures (ΔNS_t) provides equivalent results. In line with the literature, we show that these non-standard measures are more successful for banks with a high capital ratio because they do not face binding capital constraints, and hence, they are better able to expand their loan supply relative to constrained banks. We also confirm the significant role played by non-standard measures in supporting credit supply during the crisis period, highlighting the importance of adjusting monetary policy tools during exceptional times. With innovative programmes, the ECB managed to limit the impact of the financial crisis on the real economy.

5. The asymmetric effects of the ECB accommodative monetary policy

Our previous results emphasise the positive effects of the ECB's accommodative monetary policy on banks' lending activities in the syndicated loan market. With eight financial institutions in the Eurozone listed as '*global systemically important banks*' by the Financial Stability Board in 2014 (FSB, 2014),[19] the heterogeneity encompasses banks' structures, business models and nationality. To further investigate the asymmetric transmission of accommodating monetary policies, we group our lenders depending on their financial structure. We expect small and financially weak lenders to benefit more from accommodative measures because of their limited access to alternate sources of funding. Financial institutions with a low level of capital should benefit less from expansionary monetary policies (Kishan and Opiela, 2006).

[19] BNP, Deutsche Bank, BBVA, Crédit Agricole, ING, Santander SA, Société Générale and Unicredit Bank. The list was published on November 6, 2014.

The nineteen banking groups in our sample are sorted based on the three financial indicators previously used: (1) total assets, (2) capital ratio and (3) Tier 1 capital ratio. To rank these banking groups, we compute the average of each indicator between 2008 and 2014[20] for each financial institution. We focus the analysis on the bottom or top six banks (lower or higher tercile) versus the other banks.[21] We run three distinct tests that alternatively consider each indicator separately to assess how financial and monetary shocks affect the two subgroups of lenders.

Building on Equation (1), we now estimate the following:

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

The dummy variable $D_{lo,hi}$ is equal to one for banks that belong to the bottom or top tercile, respectively, in terms of size, capital ratio or Tier 1 capital 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. The results are first provided with lender and year fixed effects separately. Because the lending strategy of a bank may evolve over time and to control for this time-variant bank heterogeneity (Lender*Year), fixed effects are also implemented.

Our findings for monetary policy measures are in line with our previous results for the three models when considering each financial indicator separately. We find that both standard ($\Delta EONIA_t$) and non-standard accommodating policies (ΔBS_t, ΔNS_t) successfully stimulate banks' lending (Models (1) to (3)), thereby confirming Hypothesis 1. As the EONIA decreases, the amounts tend to increase while an expansion of the ECB's balance sheet generates larger lending in the syndicated loan

[20] The results remain similar when we use the ranking of each indicator based on the average for the year 2008 only.
[21] To assess our results, we run a robustness test that considers banks belonging to the bottom or top quintile.

market. However, in Models (4) and (5), only non-standard measures significantly support the banks' lending increasing loan amounts. The following section details the marginal effects of the ECB's accommodative policies for each financial indicator.

Size

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

Insert Table V here.

We find that a decrease of the main interest rate does not support the lending amounts provided by small banks while non-standard expansionary policies have a larger and positive effect on the credit supply of these banks when compared with the average banks. The stimulus effect of the accommodative monetary policy is also significant for larger banks but to a lower extent. Compared with other financial institutions of average size, large banks' lending is positively impacted by the expansion of the ECB balance sheet, but the magnitude is lower and in line with the findings of Gambacorta and Marques-Ibanez (2011). The implementation of unconventional measures by the ECB reduces this constraint by directly providing additional liquidity to smaller financial institutions. The results are less conclusive when considering Models (4) and (5) with both standard and non-standard measures.

Capitalisation

Table VI provides the estimated coefficients of Equation (2) when the banks are ranked according to their capitalisation (capital ratio).

Insert Table VI here.

From Table VI, we conclude that there is no significant asymmetry in the banks' responses to monetary policy shocks. The only exception is for weakly capitalised banks that capture the full effect of the standard measures that increase the loan amounts when the benchmark rate diminishes. Otherwise, we find that the marginal effect of non-standard measures is lower (significant at the 10% confidence level in the 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 from lowly capitalised banks is stimulated by standard measures while non-standard ones appear ineffective. Here, our results depart from previous findings on the bank lending channel (Kishan and Opiela, 2006). Although the traditional bank lending channel shows that lowly capitalised banks are less capable of increasing lending during expansionary policies, we find that interest rates policies are efficient in supporting lending of these banks.

Looking at the specificities of the Eurozone banking sector, small banks tend to have a higher capital ratio.[22] As such, we can infer that the transmission of an expansionary monetary policy is supported by small banks because these banks are also well capitalised. Hence, our results are in line with our conclusions when estimating Equation (1) based on the capital ratio as a standalone variable. We also confirm the conclusions of previous literature (Peek and Rosengreen, 1995a, 1995b; Bliss and Kaufman, 2003; Kopecky and VanHoose, 2004; Kishan and Opiela, 2006) when considering highly capitalised banks, highlighting important implications regarding the relationship between monetary policy and capital regulations. The bank lending channel is less effective when banks are capital constrained. However, the absence of statistically significant

[22] We can see in Table II that three of the six smallest banks (Banca Popolare di Milano, Alpha bank AE, Banco Populare Espanol) belong to the sample of banks with the highest capital ratio while the three other banks (Bankinter, Sabadell SA, Erste bank) have a capital ratio above the average, i.e. 5.24.

results from Equation (2) based on the banks' split regarding their capital ratio suggests that the latter is less discriminant than the level of banks' total assets.

Financial Strength

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

Insert Table VII here.

We show that the standard policies have either a negative effect or no specific effect, disregarding the level of a bank's Tier 1 capital ratio. Conversely, non-standard policies significantly support the lending amounts provided by banks belonging to the lowest Tier 1 capital ratio tercile. In line with the bank lending channel, financial institutions perceived by others as weaker or with a lower solvency might have limited access to alternative sources of funds 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 stimulate the amounts lent on the syndicated loan market.

Overall, these results confirm the existence and effectiveness of the bank lending channel in the studied period for the syndicated loan market, highlighting 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 crisis from spreading to the real economy, which enabled 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 because the tool can have different impacts on banks according to the strength of the bank's balance sheet. The size of the financial institution appears to be the

main source of asymmetry (Hypothesis 2) when it comes to the transmission of monetary policy. The reaction of small lenders to non-standard accommodative policies is stronger.

6. Robustness Checks

ECB and Federal Reserve Monetary Policies

Following the Lehman collapse, several major central banks implemented exceptional measures to limit the liquidity crisis in the financial industry. The Federal Reserve intervened massively with its quantitative easing programmes aimed at lowering interest rates. The ECB and the Fed acted simultaneously, complicating the task of disentangling between the effects of each monetary policy. Moreover, dealing with the syndicated loan market implies that international banking and the Fed's monetary policy may affect the credit supply given by international banks. Banks in our sample have subsidiaries located abroad, notably in the U.S. As such, these subsidiaries may have benefited from the programmes implemented by the Fed, changing their lending behaviour accordingly. To ensure that we correctly capture the effects of the ECB's actions, we horserace the ECB's and Fed's monetary policies in a model that focuses on Hypothesis 1. We test whether the overall expansionary monetary policy implemented by the ECB through both standard and non-standard measures contributed to support bank lending activities while taking into account the Fed's monetary policy with two proxies: the evolution of the Fed's funds rate and the size of the Fed's balance sheet. Table VIII presents the effects of both the ECB's and Fed's monetary policies, focusing on standard (interest rates) and non-standard (balance sheet) policies.

Insert Table VIII here.

In line with the theory, when both central banks decrease their target rates or increase the size of their balance sheets, loan amounts increase. However, we show that only the ECB's monetary

policy significantly supports the supply of syndicated loans when we estimate the model with both the standard and non-standard measures of the two central banks. Our findings confirm the robustness of our results with respect to Hypothesis 1 and show that our variables correctly capture the ECB's monetary policy in the main estimation.

Alternative banks' ranking

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

Insert Table IX here.

Our conclusions remain in line with our previous findings but with one noticeable difference. There is no asymmetry in lending behaviour based on the banks' capital ratio (middle panel). More specifically, banks with a lower capital ratio do not show a different lending behaviour because of the implementation of the ECB's accommodative monetary policy. This result is consistent with the structure of the Eurozone's banking sector, where banks with a low capital ratio are also systematically important. As such, these banks do not have to rely on monetary policy measures to obtain liquidity because of their role and importance in the Eurozone's liquidity market.

Controlling for demand effects

In previous estimations, we control for credit demand with macro- and microeconomic variables. To assess the robustness of our results, we estimate our model using an alternative control for credit

demand based on Degryse et al.'s (2017) approach. In line other studies' attempts to better distinguish between credit supply and credit demand (Khwaja and Mian, 2008 among others), we build fixed effects per group of borrowers located in the same country that belong to the same industry and multiply these fixed effects with a year dummy to account for the time-variant characteristics of these groups of borrowers. Table X presents the results.

Insert Table X here.

Here, the results remain highly similar. A decrease in the EONIA or an increase in the size of the ECB's balance sheet are positively associated with loan amounts. Disentangling between banks, we show that size is still the main determinant of the asymmetry in the banks' responses when it comes to having small banks capturing the full effects of non-standard measures. To a lower extent, banks with a low Tier 1 capital ratio provide loans with larger amounts when these non-standard measures are developed, which is in line with previous results.

Controlling for quarterly unobservable effects

In our main estimations, we control for changes in the macroeconomic environment using year fixed effects in addition to the variation of the GDP and the monetary policy of the ECB. However, bank lending behaviour can be impacted by a set of additional factors that are unobservable. In the following robustness test, we try to capture these unobservable factors using quarter fixed effects instead of year fixed effects. We focus on Hypothesis 2 and better integrate the time-variant characteristics of the banks.

Equation (2) is adjusted to exclude all time-dependent regressors, instead focusing on the interaction term between monetary policy measures and banks' characteristics. The model is described as follows:

$$Amount_{iblt} = \alpha_1 + \alpha_3 * \Delta MP_t * D_{lo,hi} + \alpha_6 * Controls_{iblt} + \alpha_l + \alpha_t + \varepsilon_{iblt} \quad (3)$$

The results are provided in Table XI.

Insert Table XI here.

Following previous findings, there is an asymmetry in the banks' responses to monetary policy measures based on their size and level of the Tier 1 capital ratio. Small banks or banks with a low Tier 1 capital ratio provide larger loans because of non-standard operations led by the ECB while large banks or banks with a high Tier 1 capital ratio benefit from standard measures for increasing loan amounts. On the contrary, small banks' lending is hampered by these standard measures. There is no significant asymmetry when disentangling between banks with low and high capital ratios.

7. Conclusion

The objective of the current paper is to assess the impact of the accommodative monetary policies implemented by the ECB on syndicated bank lending. The innovation here 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 nineteen European banking groups for the period between 2008 and 2014. The use of six different databases allows us to integrate the precise characteristics of all players involved with banking transactions. Through a cross-sectional regression of 52,555 loans, we study the influence of monetary policies on the amount of the loans. We control for loans, borrowers, and lenders characteristics in addition to the relationship between the lender and borrower. Our analysis includes lender, year or (Lender*Year) fixed effects.

We show that accommodative standard and non-standard policies significantly increase the lending amounts. Furthermore, a decrease of the central bank's interest rate leads to a relatively lower increase of the amount of loans supplied by highly capitalised banks. However, we find that an increase of the loans' supply by these banks is larger when considering an expansion of the central bank's balance sheet through non-standard policies. Smaller banks, and to some extent financially weaker banks, also tend to benefit more from non-standard monetary policies. Our results are robust to alternative rankings of these banks. The main asymmetry in the Eurozone bank lending channel comes from the size of the financial institution.

Considering the transmission of ECB's monetary policy, our empirical analysis of the syndicated loan market provides evidence of the existence of the bank lending channel. On average, the instruments used by the ECB seem to play a significant role in reducing the constraints on financial markets, supporting the supply of syndicated loans. 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, supporting the credit supply of small banks or banks that are not capital constrained.

These results contribute to the debate on the effectiveness of unforeseen measures. We argue that by supporting bank lending activities, the ECB's measures limited the spillover effects of the 2008 financial crisis into the real economy. A further extension of the current paper would involve deepening the analysis using more detailed data on the ECB's open-market operations to better understand the mechanisms of each instrument in the monetary policy. Another future research channel of the present paper could focus on the marginal effect of non-standard policies on non-financial institutions' investment strategies and the implications this would have on 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.

References

Acharya, V.V., Hasan, I. and Saunders, A. (2006) Should Banks be Diversified? Evidence from Individual Bank Loan Portfolios, *Journal of Business* **79**, 1355-1412.

Acharya, V.V. and Merrouche, O. (2013) Precautionary Hoarding of Liquidity and Interbank Markets: Evidence from the Subprime Crisis, *Review of Finance* **17**, 107-160.

Adelino, M. and Ferreira, M.A. (2016) Bank Ratings and Lending Supply: Evidence from Sovereign Downgrades, *Review of Financial Studies* **29**, 1709-1746.

Angeloni, I., Kashyap, A. K. and Mojon, B. (Eds.). (2003). Monetary Policy Transmission in the Euro Area: A Study by the Eurosystem Monetary Transmission Network. Cambridge University Press.

Bernanke, B.S. and Blinder, A.S. (1988) Credit, Money, and Aggregate Demand, *American Economic Review* **78**, 435-439.

Bernanke, B.S. and Gertler, M. (1995) Inside the Black Box: The Credit Channel of Monetary Policy, *Journal of Economic Perspectives* **9**, 27-48.

Bliss, R.R. and Kaufman, G. (2003) Bank Procyclicality, Credit Crunches, and Asymmetric Effects of Monetary Policy, *Journal of Applied Finance* **13**, 23-31.

Bongaerts, D., Cremers, M. and Goetzmann, W.N. (2012) Tiebreaker: Certification and multiple credit ratings, *Journal of Finance* **67**, 113-152.

Cerutti, E., Hale, G. and Minoiu, C. (2015) Financial Crises and the Composition of Cross-border Lending, *Journal of International Money and Finance* **52**, 60-81.

Chaudhry, S.M. and Kleimeier, S. (2015) Lead Arranger Reputation and the Structure of Loan Syndicates, *Journal of International Financial Markets, Institutions & Money* **38**, 116-126.

Chodorow-Reich, G. (2014) Effects of Unconventional Monetary Policy on Financial Institutions, *Brookings Papers on Economic Activity* **Spring**, 155–204.

Crosignani, M., Faria-e-Castro, M. and Fonseca, L. (2017) The (Unintended?) Consequences of the Largest Liquidity Injection Ever, *Federal Reserve Bank of St. Louis Working Paper* No. 2017-39.

Degryse, H., De Jonghe, O., Jakovljevic, S., Mulier, K., and Schepens, G. (2017) The Impact of Bank Shocks on Firm-level Outcomes and Bank Risk-Taking, *Working Paper*.

Del Giovane, P., Eramo, G. and Nobili, A. (2011) Disentangling Demand and Supply in Credit Developments: A Survey-based Analysis for Italy, *Journal of Banking & Finance* **35**, 2719-2732.

Dennis, S.A. and Mullineaux, D.J. (2000) Syndicated Loans, *Journal of Financial Intermediation* **9**, 404-426.

Disyatat, P. (2011) The Bank Lending Channel Revisited, *Journal of Money, Credit and Banking* **43**, 711-734.

Drudi, F., Durré, A. and Mongelli, F.P. (2012) The Interplay of Economic Reforms and Monetary Policy: The Case of the Eurozone, *Journal of Common Market Studies* **50**, 881-898.

Fawley, B.W. and Neely, C.J. (2013) Four Stories of Quantitative Easing, *Federal Reserve Bank of St. Louis Review* (Jan./Feb.), 51-88.

Financial Stability Board (2014) 2014 Update of List of Global Systemically Important Banks (G-SIBs), *Financial Stability Board*, November 2014.

Gadanecz, B. (2004) The Syndicated Loan Market: Structure, Development and Implications, *BIS Quarterly Review* (December), 75-89.

Gambacorta, L. (2005) Inside the Bank Lending Channel, *European Economic Review* **49**, 1737-1759.

Gambacorta, L. and Marques-Ibanez, D. (2011) The Bank Lending Channel: Lessons from the Crisis, *Economic Policy* **26**, 135-182.

Gan, J. (2007) The Real Effects of Asset Market Bubbles: Loan- and Firm-Level Evidence of a Lending Channel, *Review of Financial Studies* **20**, 1941-1973.

Giannetti, M. and Laeven, L. (2012) The Flight Home Effect: Evidence from the Syndicated Loan Market during Financial Crises, *Journal of Financial Economics* **104**, 23-43.

Ivashina, V. and Scharfstein, D. (2010) Bank Lending During the Financial Crisis of 2008, *Journal of Financial Economics* **97**, 319-338.

Jiménez, G., Ongena, S., Peydró, J.-L. and Saurina, J. (2012) Credit Supply and Monetary Policy: Identifying the Bank Balance-sheet Channel with Loan Applications, *American Economic Review* **102**, 2301-2326.

Jiménez, G., Ongena, S., Peydró, J.-L. and Saurina, J. (2014) Hazardous Times for Monetary Policy: What do Twenty-three Million Bank Loans say About the Effects of Monetary Policy on Credit Risk Taking? *Econometrica* **82**, 463-505.

Kashyap, A.K. and Stein, J.C. (1995) The Impact of Monetary Policy on Bank Balance Sheets, *Carnegie-Rochester Conference Series on Public Policy, Elsevier* **42**, 151-195.

Kashyap, A.K. and Stein, J.C. (2000) What do a Million Observations on Banks say About the Transmission of Monetary Policy? *American Economic Review* **90**, 407-428.

Khwaja, A. I. and Mian, A. (2008) Tracing the Impact of Bank Liquidity Shocks: Evidence from an Emerging Market, *American Economic Review* **98**, 1413-1442.

Kishan, R.P. and Opiela, T.P. (2000) Bank Size, Bank Capital, and the Bank Lending Channel, *Journal of Money, Credit and Banking* **32**, 121–141.

Kishan, R.P. and Opiela, T.P. (2006) Bank Capital and the Loan Asymmetry in the Transmission of Monetary Policy, *Journal of Banking & Finance* **30**, 259–285.

Kleimeier, S., Sander, H. and Heuchemer, S. (2013) Financial Crises and Cross-border Banking: New Evidence, *Journal of International Money and Finance* **32**, 884-915.

Kopecky, K. and VanHoose, D. (2004) A Model of the Monetary Sector with and without Binding Capital Requirements, *Journal of Banking & Finance* **28**, 633-646.

Krippner, L. (2013) Measuring the Stance of Monetary Policy in Zero Lower Bound Environments, *Economics Letters* **118**, 135-138.

Lenza, M., Pill, H. and Reichlin, L. (2010) Monetary Policy in Exceptional Times, *Economic Policy* **25**, 295-339.

Mishkin, F.S. (1996) The Channels of Monetary Transmission: Lessons for Monetary Policy, *NBER Working paper* No. 5464.

Peek, J. and Rosengren, E.S. (1995a) The Capital Crunch: Neither a Borrower nor Lender be, *Journal of Money, Credit, and Banking* **27**, 626-638.

Peek, J. and Rosengren, E.S. (1995b) Bank Lending and the Transmission of Monetary Policy, *Federal Reserve Bank of Boston Conference Series* No. 39.

Peek, J. and Rosengren, E.S. (2013) The Role of Banks in the Transmission of Monetary Policy, *Federal Reserve Bank of Boston Public Policy Discussion Working paper* No. 13-5.

Popov, A. and Van Horen, N. (2015) Exporting Sovereign Stress: Evidence from Syndicated Bank Lending during the Euro Area Sovereign Debt Crisis, *Review of Finance* **19**, 1825-1866.

Stein, J.C. (1998) An Adverse-Selection Model of Bank Asset and Liability Management with Implications for the Transmission of Monetary Policy, *The Rand Journal of Economics* **29**, 466-486.

Wu, J. C. and Xia, F. D. (2016) Measuring the Macroeconomic Impact of Monetary Policy at the Zero Lower Bound, *Journal of Money, Credit, and Banking* **48**, 253-291.

Wu, J. C. and Xia, F. D (2017) Time Varying Lower Bound of Interest Rates in Europe, *Chicago Booth Research Paper* No. 17-06.

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 21,947 unique loans provided by 19 banking groups to 8,565 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	4,200
	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 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 balance sheet assets)	%	0.05	0.27	-0.33	1.05
	Lender characteristics					
C_{lt}	Total Assets	Billion euro	1,227.31	606.28	43.54	2,305.34
	Capital Ratio (measured as Common Equity / Total Assets)	%	4.09	1.66	0	13.67
	Tier 1 capital ratio	%	11.21	2.28	0	17.30
D_s	Variable equal to one when loan i is provided by the five lenders with the smallest total assets	Dummy	0.05	0.21	0	1
	Variable equal to one when loan i is provided by the five lenders with the lowest level of capital	Dummy	0.65	0.48	0	1
	Variable equal to one when loan i is provided by the five lenders with the lowest Tier 1 capital ratio	Dummy	0.11	0.31	0	1
D_h	Variable equal to one when loan i is provided by the five lenders with the largest total assets	Dummy	0.63	0.48	0	1
	Variable equal to one when loan i is provided by the five lenders with the highest level of capital	Dummy	0.17	0.38	0	1
	Variable equal to one when loan i is provided by the five lenders with the highest Tier 1 ratio	Dummy	0.50	0.50	0	1
	Macroeconomic environment					
ΔGDP_{t-1}	Quarterly change in the Eurozone GDP taken with one lag	%	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 equal to one when the borrower belongs to the manufacturing sector	Dummy	0.30	0.46	0	1
	Variable equal to one when the borrower belongs to the financial sector	Dummy	0.11	0.32	0	1
	Variable equal to one when the borrower belongs to the service sector	Dummy	0.12	0.32	0	1
	Variable equal to one when the borrower belongs to the transportation sector	Dummy	0.10	0.30	0	1
	Variable equal to one when the borrower belongs to the real estate sector	Dummy	0.02	0.15	0	1
	Variable equal to one when the borrower belongs to the trade sector	Dummy	0.10	0.30	0	1
	Variable equal to 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 loan i the year before (taken as a logarithm)	Million euro	1,738	2,232	0.06	13,629
	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 19 banking groups included in our sample. BBVA stands for Banco Bilbao Vizcaya Argentaria. The second column contains the countries where the MFIs are located, i.e. Austria (AU), Belgium (BE), Finland (FI), 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 total assets (expressed in billions of euros), capital ratio (i.e. common equity to total assets), and Tier 1 capital ratio and 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	FR/IR	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	FI/FR/GE	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	FR/GE/LU	3,784	45.86	55.50	1,198	3.85	11.33
Natixis	FR/GE/LU	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	73.60	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	66.80	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	5.90	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	8.50	10.96

Table III. Sample of loans

This table provides descriptive statistics of the sample of loans. The first column discloses the number of loans while the second column contains the total amount 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 of loans		*Total loan amount*	
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 European banking groups. 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 tested separately: 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 assessed simultaneously in models (4) and (5). The interaction terms between monetary policies and lenders size (Total assets), capitalization (Capital ratio), and financial strength (Tier 1 capital ratio) are presented separately. All regressions are run with a constant term. Standard errors are clustered at the Lender level. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

	$C_{lt} = Total\ assets$					$C_{lt} = Capital\ ratio$					$C_{lt} = Tier\ 1\ capital\ ratio$				
	(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															
$\Delta EONIA_t$	-0.134***			-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
Controls															
Loan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender	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
Nbr. of Clusters	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
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
R^2	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 European banking groups focusing on lenders' size ($D_{lo,hi} = TA_{lo,hi}$). 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 tested separately: 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 assessed simultaneously in models (4) and (5). The interaction terms between monetary policies and lenders size are presented separately considering either the six lenders with the lowest or the highest level of total assets respectively. The left panel presents results with Lender and Year fixed effects (FE) while the right panel presents results with (Lender*Year) fixed effects. All regressions are run with a constant term. Standard errors are clustered at a Lender level on the left panel and Lender*Year level on the right panel. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

	Lender and Year FE					Lender * Year FE				
	(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)
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										
$\Delta EONIA_t * TA_{lo}$	0.151*			0.364***	0.502***	0.070			0.235**	0.343***
$\Delta EONIA_t * TA_{hi}$	0.058**			0.011	-0.019	0.072**			0.047	0.021
$\Delta BS_t * TA_{lo}$		0.190		0.731**			0.117		0.477*	
$\Delta BS_t * TA_{hi}$		-0.197***		-0.170*			-0.162*		-0.079	
$\Delta NS_t * TA_{lo}$			0.088		0.752**			0.086		0.560**
$\Delta NS_t * TA_{hi}$			-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
Controls										
Loan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender	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
Nbr. of Clusters	19	19	19	19	19	133	133	133	133	133
Observations	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555
R^2	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 European banking groups focusing on lenders' capital structure ($D_{lo,hi} = CR_{lo,hi}$). 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 tested separately: 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 assessed simultaneously in models (4) and (5). The interaction terms between monetary policies and lenders capital structure are presented separately considering either the six lenders with the lowest or the highest level of capital respectively. The left panel presents results with Lender and Year fixed effects (FE) while the right panel presents results with (Lender*Year) fixed effects. All regressions are run with a constant term. Standard errors are clustered at a Lender level on the left panel and Lender*Year level on the right panel. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

	Lender and Year FE					Lender * Year FE				
	(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)
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										
$\Delta EONIA_t * CR_{lo}$	-0.060			-0.138*	-0.167*	-0.071			-0.117**	-0.100
$\Delta EONIA_t * CR_{hi}$	-0.063			-0.042	-0.009	-0.083*			-0.083	-0.047
$\Delta BS_t * CR_{lo}$		-0.100		-0.277*			0.025		-0.141	
$\Delta BS_t * CR_{hi}$		0.133		0.074			0.127		-0.001	
$\Delta NS_t * CR_{lo}$			-0.035		-0.238*			0.077		-0.060
$\Delta NS_t * CR_{hi}$			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
Controls										
Loan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender	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
Nbr. of Clusters	19	19	19	19	19	133	133	133	133	133
Observations	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555
R^2	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 European banking groups focusing on lenders' financial strength ($D_{lo,hi} = T1_{lo,hi}$). 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 tested separately: 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 assessed simultaneously in models (4) and (5). The interaction terms between monetary policies and lenders financial strength are presented separately considering either the six lenders with the lowest or the highest Tier 1 capital ratio respectively. The left panel presents results with Lender and Year fixed effects (FE) while the right panel presents results with (Lender*Year) fixed effects. All regressions are run with a constant term. Standard errors are clustered at a Lender level on the left panel and Lender*Year level on the right panel. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

	Lender and Year FE					Lender * Year FE				
Variables	(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										
$\Delta EONIA_t$	-0.101***			-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										
$\Delta EONIA_t * T1_{lo}$	0.001			0.118	0.236*	-0.015			0.033	0.110
$\Delta EONIA_t * T1_{hi}$	-0.031			-0.065	-0.066	-0.019			-0.051	-0.058
$\Delta BS_t * T1_{lo}$		0.258*		0.421*			0.132		0.175	
$\Delta BS_t * T1_{hi}$		-0.037		-0.121			-0.014		-0.090	
$\Delta NS_t * T1_{lo}$			0.212**		0.511**			0.129		0.280*
$\Delta NS_t * T1_{hi}$			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
Controls										
Loan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender	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
Nbr. of Clusters	19	19	19	19	19	133	133	133	133	133
Observations	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555	52,555
R^2	0.241	0.241	0.241	0.241	0.241	0.247	0.247	0.247	0.247	0.247

Table VIII. ECB and Federal Reserve Monetary Policies

We estimate the cross-section regression detailed in Equation (2) for 19 European banking groups. The dependent variable is the loan amount granted by each MFI included in the sample and taken as a logarithm. The table displays three different specifications. First, each monetary policy measure is tested separately: standard measures with the change of the EONIA and the Fed Funds rate (1), and non-standard measures with the change of the size of the ECB and the Federal Reserve balance sheet (FBS) (2). Then standard and non-standard policies are assessed simultaneously in model (3). All regressions are run with a constant term. Standard errors are clustered at the Lender level. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

Variables	(1) Interest rates	(2) Balance sheet	(3) (1)+(2)
	Monetary policy instruments		
$\Delta EONIA_t$	-0.088***		-0.058**
$\Delta Fed\ Funds_t$	-0.099**		-0.035
ΔBS_t		0.213***	0.145***
ΔFBS_t		0.247***	0.128
	Macroeconomic environment		
ΔGDP_{t-1}	0.024**	0.029***	0.031***
ΔBLS_{t-1}	-0.000	-0.002**	-0.001
	Controls		
Loan	Yes	Yes	Yes
Borrower	Yes	Yes	Yes
Lender	Yes	Yes	Yes
Relationship	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Lender FE	Yes	Yes	Yes
Lender*Year FE	No	No	No
Nbr. of Cluster	19	19	19
Observations	52,555	52,555	52,555
R^2	0.184	0.184	0.184

Table IX. Alternative banks' ranking

We estimate the cross-section regression detailed in Equation (2) for 19 European banking groups. 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 tested separately: 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 assessed simultaneously in models (4) and (5). The interaction terms between monetary policies and lenders size ($D_{lo,hi} = TA_{lo,hi}$), capitalization ($D_{lo,hi} = CR_{lo,hi}$), and financial strength ($D_{lo,hi} = T1_{lo,hi}$) are presented separately considering either the bottom or top four lenders respectively. All regressions are run with a constant term. Standard errors are clustered at the Lender level. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

	$D_{lo,hi} = Total\ assets$					$D_{lo,hi} = Capital\ ratio$					$D_{lo,hi} = Tier\ 1\ capital\ ratio$				
	(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															
$\Delta EONIA_t * D_{lo}$	0.243***			0.433***	0.546***	-0.001			-0.023	-0.030	-0.011			0.070	0.161
$\Delta EONIA_t * D_{hi}$	0.042			-0.021	-0.056	-0.038			0.062	0.080	-0.052			-0.044	-0.031
$\Delta BS_t * D_{lo}$		0.078		0.706***			-0.051		-0.075			0.195*		0.287	
$\Delta BS_t * D_{hi}$		-0.213***		-0.228**			0.231		0.317			0.095*		0.041	
$\Delta NS_t * D_{lo}$			-0.023		0.682***			-0.029		-0.065			0.169**		0.372**
$\Delta NS_t * D_{hi}$			-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
Controls															
Loan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender	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
Nbr. of Clusters	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19
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
R^2	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 X. Estimation results with borrowers' group FE

We estimate the cross-section regression detailed in Equation (2) for 19 European banking groups. 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 tested separately: 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 assessed simultaneously in models (4) and (5). The interaction terms between monetary policies and lenders size ($D_{lo,hi} = TA_{lo,hi}$), capitalization ($D_{lo,hi} = CR_{lo,hi}$), and financial strength ($D_{lo,hi} = T1_{lo,hi}$) are presented separately considering either the bottom or top six lenders respectively. All regressions are run with a constant term and Borrower's country*sector*year FE. Standard errors are clustered at the Borrower's country*sector*year level. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

	$D_{lo,hi} = Total\ assets$					$D_{lo,hi} = Capital\ ratio$					$D_{lo,hi} = Tier\ 1\ capital\ ratio$				
	(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															
$\Delta EONIA_t$	-0.153***			-0.138***	-0.124**	-0.081*			-0.056	-0.059	-0.113***			-0.099*	-0.103*
ΔBS_t		0.236**		0.056			0.159		0.095			0.172*		0.053	
ΔNS_t			0.226***		0.068			0.125		0.052			0.148*		0.023
Interaction Terms															
$\Delta EONIA_t * D_{lo}$	0.015			0.159	0.239**	-0.028			-0.050	-0.049	-0.038			0.027	0.116
$\Delta EONIA_t * D_{hi}$	0.068***			0.055*	0.033	-0.066*			-0.056	-0.019	0.010			-0.005	-0.006
$\Delta BS_t * D_{lo}$		0.268*		0.499**			-0.018		-0.077			0.204*		0.236*	
$\Delta BS_t * D_{hi}$		-0.132**		-0.048			0.119		0.037			-0.049		-0.055	
$\Delta NS_t * D_{lo}$			0.167		0.484**			0.012		-0.047			0.196**		0.339***
$\Delta NS_t * D_{hi}$			-0.128***		-0.082			0.131**		0.105			-0.027		-0.036
Macroeconomic environment															
ΔGDP_{t-1}	0.021*	0.012	0.017	0.021*	0.021*	0.021*	0.012	0.017	0.021*	0.021*	0.021*	0.012	0.017	0.021*	0.021*
ΔBLS_{t-1}	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
Controls															
Loan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender	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	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lender FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sic*Geo*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nbr. of Clusters	3,195	3,195	3,195	3,195	3,195	3,195	3,195	3,195	3,195	3,195	3,195	3,195	3,195	3,195	3,195
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
R^2	0.148	0.147	0.148	0.148	0.148	0.147	0.147	0.147	0.148	0.148	0.147	0.147	0.147	0.148	0.148

Table XI. Estimation results with lender quarter FE

We estimate the cross-section regression detailed in Equation (2) for 19 European banking groups. 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 tested separately: 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 assessed simultaneously in models (4) and (5). The interaction terms between monetary policies and lenders size ($D_{lo,hi} = TA_{lo,hi}$), capitalization ($D_{lo,hi} = CR_{lo,hi}$), and financial strength ($D_{lo,hi} = T1_{lo,hi}$) are presented separately considering either the bottom or top six lenders respectively. All regressions are run with a constant term. Standard errors are clustered at the Lender*Quarter level. Table 1 provides the description of the variables. ***, **, * are significant at 1%, 5%, and 10%, respectively.

	$D_{lo,hi} = Total\ assets$					$D_{lo,hi} = Capital\ ratio$					$D_{lo,hi} = Tier\ 1\ capital\ ratio$				
	(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)
Interaction Terms															
$\Delta EONIA_t * D_{lo}$	0.012			0.382**	0.554***	-0.093			-0.113	-0.214*	-0.098			0.071	0.210
$\Delta EONIA_t * D_{hi}$	-0.110			-0.203*	-0.260**	-0.090			-0.019	0.063	-0.167*			-0.202*	-0.213**
$\Delta BS_t * D_{lo}$		0.608**		1.285***			0.134		-0.013			0.529**		0.642**	
$\Delta BS_t * D_{hi}$		-0.060		-0.307			0.305		0.276			0.124		-0.106	
$\Delta NS_t * D_{lo}$			0.463**		1.219***			-0.002		-0.227			0.395***		0.686***
$\Delta NS_t * D_{hi}$			-0.071		-0.351**			0.237		0.315			0.107		-0.116
Controls															
Loan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender	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
Lender FE	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Quarter FE	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lender*Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nbr. of Clusters	389	389	389	389	389	389	389	389	389	389	389	389	389	389	389
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
R^2	0.193	0.193	0.193	0.193	0.194	0.193	0.193	0.193	0.193	0.193	0.187	0.193	0.193	0.193	0.193

Table A1. Pearson Correlation Matrix

	$\Delta EONIA_t$	ΔBS_t	ΔNS_t	ΔBLS_{t-1}	ΔGDP_{t-1}	*Maturity*	*Industry risk*	*Strategy*	$\Delta Fed\ Funds_t$	ΔFBS_t
$\Delta EONIA_t$	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		
$\Delta Fed\ Funds_t$	0.49	-0.42	-0.52	0.00	-0.05	-0.06	-0.06	0.05	1	
ΔFBS_t	-0.41	0.41	0.44	0.12	0.03	0.04	0.13	-0.03	-0.89	1