ECONSTOR
Make Your Publications Visible.

A Service of
ZBW
Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Berg, Tobias; Haselmann, Rainer; Kick, Thomas; Schreiber, Sebastian

Working Paper

Unintended side effects of unconventional monetary policy

LawFin Working Paper, No. 27

Provided in Cooperation with:
Center for Advanced Studies on the Foundations of Law and Finance (LawFin), Goethe University

Suggested Citation: Berg, Tobias; Haselmann, Rainer; Kick, Thomas; Schreiber, Sebastian (2022) : Unintended side effects of unconventional monetary policy, LawFin Working Paper, No. 27, Goethe University, Center for Advanced Studies on the Foundations of Law and Finance (LawFin), Frankfurt a. M.,
https://doi.org/10.2139/ssrn.4006275

This Version is available at:
https://hdl.handle.net/10419/249308

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

GOETHE UNIVERSITÄT FRANKFURT AM MAIN

FOUNDATIONS OF LAW AND FINANCE

LawFin Working Paper No. 27

Unintended Side Effects of Unconventional Monetary Policy

Tobias Berg | Rainer Haselmann | Thomas Kick | Sebastian Schreiber

Electronic copy available at: https://ssrn.com/abstract=4006275

Unintended Side Effects of Unconventional Monetary Policy *

Tobias Berg[†] Rainer Haselmann[‡] Thomas Kick[§]

Sebastian Schreiber[¶]

December 2021

Abstract

Using granular supervisory data from Germany, we investigate the impact of unconventional monetary policies via central banks' purchase of corporate bonds. While this policy results in a loosening of credit market conditions as intended by policy makers, we document two unintended side effects. First, banks that are more exposed to borrowers benefiting from the bond purchases now lend more to high-risk firms with no access to bond markets. Since more loan write-offs arise from these firms and banks are not compensated for this risk by higher interest rates, we document a drop in bank profitability. Second, the policy impacts the allocation of loans among industries. Affected banks reallocate loans from investment grade firms active on bond markets to mainly real estate firms without investment grade rating. Overall, our findings suggest that central banks' quantitative easing via the corporate bond markets has the potential to contribute to both banking sector instability and real estate bubbles.

*The views expressed in this paper are those of the authors and do not necessarily reflect the views of Deutsche Bundesbank or its staff. This research was funded by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) – project FOR 2774.

[†]Frankfurt School of Finance & Management; t.berg@fs.de.

[‡]Goethe University, CAS LawFin, and CEPR; haselmann@econ.uni-frankfurt.de.

[§]Deutsche Bundesbank; thomas.kick@bundesbank.de

[¶]Goethe University and Deutsche Bundesbank; schreiber@econ.uni-frankfurt.de.

Electronic copy available at: https://ssrn.com/abstract=4006275

1 Introduction

With interest rates being at a lower bound since the last decade, central banks shifted their focus on new unconventional monetary policy tools. One prominent policy tool has been the purchase of corporate bonds.[1] The main rationale for a central bank to directly purchase corporate debt is that financial intermediaries might hoard liquidity during monetary expansions rather than lend it out to the real sector (Benmelech and Bergman, 2012).

There is now a substantial literature investigating the impact of this specific quantitative easing (QE) policy, in particular the ECB's Corporate Sector Purchase Programme (CSPP). The assessment of the program is quite bright. Large companies with direct access to the bond market benefit due to lower bond yields and tend to issue more bonds (see among others Todorov (2020), Abidi and Miquel-Flores (2018), or Zaghini (2019)). Smaller companies also seem to benefit from central banks' QE: since larger companies now rely more on bond markets instead of bank debt, intermediaries extend their lending activities to smaller companies with no direct access to bond markets (see Grosse-Rueschkamp et al. (2019), Ertan et al. (2020), or Arce et al. (2018)). In sum, credit market conditions in the corporate sector loosened with banks extending credit to previously rationed firms.[2]

While this empirical evidence convincingly documents that central banks' intervention in corporate bond markets was successful in reaching the intended goals regarding credit market conditions, potential unintended consequences regarding financial sector stability

[1]Examples of corporate bond purchases comprise the ECB's Corporate Sector Purchase Programme (CSPP) launched in 2016 and its Pandemic Emergency Purchase Programme (PEPP), the FED's Secondary Market Corporate Credit Facility (SMCCF) as well as comparable programs conducted by the Bank of England and the Bank of Japan.

[2]For a summary of this evidence see De Santis et al. (2018). Beyond looser credit market conditions, the same papers further highlights improved corporate bond market liquidity as another benefit of this QE measure.

Electronic copy available at: https://ssrn.com/abstract=4006275

have mostly been ignored.[3] Central banks' corporate bond purchases have at least two opposing effects on banks' net worth. First, due to the documented decrease in corporate bond yields, the prices of these bonds increase and banks holding long-term corporate bonds bonds experience capital gains. Second, firms with a direct access to bond markets demand fewer loans from banks since these firms substitute bonds with bank debt. This drop in demand should all else equal result in a drop in banks' net interest income when holding constant for credit risk. The second effect is further amplified by the fact that central banks only buy bonds from firms that issue investment grade rated debt. While central banks' practice to only accept high quality assets from commercial banks as collateral is important to prevent moral hazard (see e.g. Aghion and Bolton (1992)), this practice impacts the composition of borrowers that demand bank debt. Concretely, central banks selectively pick the safest customers and leave more risky borrowers for commercial banks.

Given that banks directly invest only a very small fraction of their assets in corporate bonds, the second effect described above is likely to have a considerable larger impact on banks' net worth and banks likely react to this new situation.[4] One reaction could be that banks aim to restore profitability and thus extend loans to more risky borrowers.[5] Given that previous papers document that commercial banks are willing to expand their lending

[3]One notable exception that indirectly focuses on this issue is Grosse-Rueschkamp et al. (2019). While their analysis does not focus on bank and/or financial stability, the authors argue that the QE program increased banks' risk taking in corporate credit. Other unintended consequences discussed in the existing literature is deterioration of market liquidity for those bonds targeted by central banks. Abidi and Miquel-Flores (2018) find that bid-ask spread of these bonds worsened in response to ECB's QE policy due to the change in bargaining power of sellers towards buyers. Another unintended consequence are rating upgrades for bonds which do not fulfill the eligibility criteria to be targeted by such an QE policy. Abidi et al. (2019) document an increase in rating activity precisely where incentives to game ratings are the highest for a bond to become eligible.

[4]CSPP-eligible bond holdings account for around 0.5% of total assets for the average bank in our sample.

[5]Draghi (2018) argues that decreased yields on the bond market also benefit banks that finance themselves there. The possibility to obtain financing via the bond market is however only possible for a very small number of banks in our sample.

Electronic copy available at: https://ssrn.com/abstract=4006275

activities to previously rationed firms as a response to the QE measure, banks should be willing to expand credit to firms to which they considered lending as not worthwhile before the intervention.

In this paper, we systematically investigate whether corporate bond purchases by central banks have a detrimental impact on financial intermediaries. We focus on the impact of the purchase of corporate bonds (Corporate Sector Purchase Programme; CSPP) announced in March 2016 by the ECB on the stability of the German banking sector. Combining several regulatory datasets of Deutsche Bundesbank, we obtain detailed information regarding banks' lending decisions (i.e. lending volumes, PDs, loan defaults, portfolio level interest rates, bank level balance sheet data) as well as detailed information on the profitability of these banks.

Our identification strategy is as follows. Banks differ in their lending exposure to CSPP eligible firms when the program was introduced. Importantly, the CSPP announcement was not anticipated by the market such that the event constitutes a plausible source of exogenous variation.[6] Our difference-in-differences estimation thus compares those banks that had a high exposure to CSPP eligible firms (measured across the two years before to the CSPP announcement) with banks that were less affected, before the CSPP announcement relative to after the CSPP announcement.[7] To account for potential differences between treated and untreated banks, we include bank fixed effects, time fixed effects and a set of controls in our bank-level specifications. Our identifying assumption thus is that at least after including these fixed effects and controls, bank CSPP affectedness is as good as randomly assigned.

[6]See e.g. https://www.bloomberg.com/news/articles/2016-08-02/now-we-have-two-answers-to-the-ecb-corporate-liquidity-question

[7]See Grosse-Rueschkamp et al. (2019) for a similar identification strategy.

Electronic copy available at: https://ssrn.com/abstract=4006275

In a first step, we confirm the findings of previous papers regarding the impact of the CSPP on banks' portfolio composition in our set-up. Treated banks substitute lending from eligible firms to ineligible firms. Overall, the fraction of lending to eligible firms over total lending decreases by 1.56-1.65 percentage points more for treated banks than for control group banks. This constitutes a sizeable effect. Since lending to eligible firms accounts for 12.98% of the portfolio of treated banks, the coefficient suggests a decline of 12-13% of the pre-event share of eligible lending at treated banks. Similar to previous papers, we also find no effect of the CSPP on overall lending amounts, i.e. confirm that a substitution from eligible to ineligible firms is taking place.

We further investigate whether the riskiness of treated bank lending is affected by the CSPP. As argued above, the ECB only bought bonds that carry an investment grade rating. Doing so could worsen the quality of the pool of bank borrowers. In line with this presumption, we find that treated banks substituted lending to eligible firms with lending to higher-risk ineligible firms as measured by the probability of default that banks report to the supervisor.

Given that treated banks respond to the drop in loan demand by shifting lending to more risky borrowers, the overall impact of the CSPP on banks' profitability is a priori not clear. We first discuss the components of banks' profitability, i.e. loan write-offs and the net interest margin, and next discuss bank profitability itself. Loan write-offs increase by 4.9-5.1bps of total assets for treated banks after the CSPP relative to control group banks which constitutes an 25 % increase of the pre-event value. Interestingly, we do not observe any effect on net interest income. Even though treated banks increase risk-taking, this is not compensated by higher net interest income. We also do not find that the CSPP

Electronic copy available at: https://ssrn.com/abstract=4006275

impacted other items of the profit and loss statement such as fee income, trading income, or operational costs. This is not surprising, given that banks' pre-event corporate bond holdings are rather negligible. Overall, we find that treated banks' return on assets (RoA) decreases by an amount approximately equal to the increase in loan write-offs. Consistent with a gradual process of substituting eligible firms with risky ineligible ones, effects increase over time after the CSPP announcement and therefore tend to be larger towards the end of our sample period compared to the mean treatment effects discussed. This is in line with the increase in the ECB's holding of CSPP securities during the treatment period. The finding that bank profitability decreases constitutes an important unintended consequence of the CSPP program. Treated banks lend more to high-risk ineligible firms, but are not compensated by higher interest rates. All else equal, the quantitative easing did decrease banks' net worth which could in aggregate be detrimental to financial stability.

Another open question we tackle is the impact of CSPP on capital allocation. Note that interest rates have already been low several years before the program was initiated by the ECB. Therefore, it is worth investigating *where* the additional lending to ineligible firms is going to. We find that the share of high-yield firms increases while the share of public firms decreases in treated banks' portfolios relative to control group banks after the CSPP. Interestingly, we observe that the share of SMEs remains unchanged relative to control group firms.

We further investigate changes in capital allocation across industries. Strikingly, CSPP causes a reallocation in treated banks' lending portfolios from the financial subsidiaries of industrial firms to the real estate sector. Since basically all CSPP-eligible firms have these subsidiaries, a decrease in lending to these firms after the CSPP is not surprising. Real

Electronic copy available at: https://ssrn.com/abstract=4006275

estate sector firms observe an increase of 1.78 percentage points in the portfolio share of treated as compared to control group banks. We further investigate the reallocation of funds by treated banks post-CSPP towards the real estate sector in more detail. Lending shares increase mainly for high yield and non-rated real estate firms. Public and private as well as SME and non-SME real estate firms benefit similarly. In sum, the increase in lending to ineligible firms concentrated in the real estate sector constitutes a second unintended side effect. While it is hard to evaluate the impact of this loan reallocation on real estate markets, Balloch (2018) argues that the increase in corporate bond funding in Japan did contribute to both the real estate bubble in the 1980s and bank problems in the 1990s.

Our paper contributes to the evaluation of zero interest rate policy and unconventional monetary policy measures on bank behavior. Heider et al. (2019) suggest that banks particularly affected by negative rates due to great reliance on deposits reduce their loan supply and engage in more risk taking. Borio et al. (2017) argue that a low interest rate environment erodes bank profits. Brunnermeier and Koby (2018) formalize this in a model in which policy rate cuts at some point contract bank lending rather than boosting it. Our findings complement the above ones by suggesting that central bank corporate bond programs further threaten bank profitability, which is under pressure anyway in times of historically low interest rates.

More specifically, existing studies on the central banks' corporate purchase programs largely find favorable effects: As CSPP eligible firms respond to the program by substituting bank financing with bond financing, banks that lent much to such firms can now lend to CSPP ineligible firms, which use the funds for valuable investments (Grosse-Rueschkamp et al., 2019). Previous studies on the CSPP did not tackle consequences regarding financial

Electronic copy available at: https://ssrn.com/abstract=4006275

stability, but rather focus on effects the program had on bond issuance and yields (Rischen and Theissen (2018), Zaghini (2019)), CSPP eligible firms (Grosse-Rueschkamp et al., 2019) and spillover firms. Grosse-Rueschkamp et al. (2019) and Ertan et al. (2020) further focus on real effects for spillover firms. Our study enriches the emerging CSPP literature by analyzing its unintended adverse consequences for the banking sector.

We further contribute to the literature on unconventional monetary policy's impact on financing stability and its potentially adverse side effects. Balloch (2018) provides empirical and theoretical evidence that as bond funding is facilitated for large firms, banks' corporate loan portfolios decrease in quality such that bank profitability is lowered. Arce et al. (2018) document similar spillovers, but conclude that the pool of bank borrowers does not become substantially worse, as spillover firms are rather large and not overly risky.

Finally our paper contributes to the literature on the transmission of monetary policy. Agarwal et al. (2018) illustrate a dilemma banks face once credit condition loosen: only high risk borrowers tend to demand more loans, while more profitable low risk borrowers do not. In a similar vein, our findings suggest that there is a bound to the effectiveness to credit expansion induced by monetary policy. Once central bank intervene in corporate bond markets, commercial banks shift their lending to high-yield real estate firms.

The rest of the paper is organized as follows. In Section 2 we describe the institutional details surrounding ECB's corporate bond purchase program. Section 3 presents our data set and descriptive statistics. Section 4 describes our empirical results and Section 5 concludes.

Electronic copy available at: https://ssrn.com/abstract=4006275

2 Institutional Details

As part of its unconventional monetary policy package to stimulate the Euro Area economy in response to low inflation rates, the ECB in 2016 started to purchase corporate bonds under the Corporate Sector Purchase Programme (CSPP). Concretely, the CSPP was announced on March 10th 2016 and began to operate from June 8th 2016 on. Since then, monthly net purchases amount to around €5.5bn on average (with the exception of January to October 2019, where no net purchases took place).[8] Since March 2020, the CSPP is complemented by the ECB's Pandemic Emergency Purchase Program (PEPP), under which further purchases of the same eligible universe were carried out.

The CSPP holdings are clearly sizable from an aggregate perspective. As of September 2021, CSPP holdings amount to around €300bn, which, together with around €35bn of corporate bond holdings under the PEPP amounts to €335bn. This represents about 27% of the eligible universe of corporate bonds (ICMA, 2021), and it is equal to 3% of outstanding bank lending in the Eurozone, and 7% of outstanding bank lending to non-financial corporations in the Eurozone.[9]

In order to qualify for the CSPP, a bond must be Euro-denominated and issued by a non-financial firm incorporated in the Euro Area. It further must have a remaining maturity of between 6 months and 30 years[10], a yield to maturity that exceeds the ECB's current deposit facility rate and an Investment Grade (IG) rating (BBB- or better on the S&P scale)

[8] In this period, there were only reinvestments of matured bonds' principal. The restart of the CSPP in November 2019 was due the weak economic outlook in the Euro Area.

[9] Loans to Euro Area Residents were €13.3trn as of September 2021, of which €4.8trn are loans to non-financial corporations. See https://sdw.ecb.europa.eu/reports.do?node=10000029 and http://sdw.ecb.europa.eu/reports.do?node=10000031 for details.

[10] Since the announcement of the PEPP in March 2020, commercial paper, i.e. bonds with remaining maturity below 6 months but at least 28 days, is also eligible for purchase.

Electronic copy available at: https://ssrn.com/abstract=4006275

by at least one external credit rating institution out of those four that the ECB accepts (S&P, Moody's, Fitch, DBRS). In contrast to the ECB's Public Sector Purchase Program, purchases not only take place in the secondary market but also in the primary market. Further, purchases are carried out not directly by the ECB, but by six national central banks under the coordination of the ECB. A purchase limit of 70% per ISIN applies, i.e. the ECB must not hold more than 70% of an individual bond. Importantly, the purchases are supposed to be market neutral in the sense that e.g. no country or industry shall be favored (Cœuré, 2015).

As shown in De Santis et al. (2018) and depicted in Figure 1.A, the unexpected announcement of the CSPP triggered eligible bonds' (and to some extent ineligible bonds') spreads to decline substantially even before the purchases began. This drastic decrease in funding cost translates into more bond issuances as can be seen in Figure 1.B.

3 Data and Descriptive Statistics

Our main data sources are proprietary supervisory datasets provided by Deutsche Bundesbank. The German Credit Register contains all loans granted by German banks on a quarterly basis as well as the borrower identity and supervisory information such as the assigned Probability of Default (PD). As there is a reporting threshold of €1m (before 2015: €1.5m), we exclude bank-firm relationships that never exceed €1.5m (Behn et al., 2021). We narrow down the Credit Register to banks' Eurozone non-financial corporate lending, as it comprises both CSPP eligible firms and potential spillover firms, by only keeping the relevant sector in the credit register. We manually flag those firms that are CSPP eligible,

Electronic copy available at: https://ssrn.com/abstract=4006275

namely those firms that have at least one bond outstanding that fulfills all CSPP criteria in the quarter prior to the CSPP, i.e. as of 2015q4. Our sample runs from 2012 to 2019.

We only include those banks that between 2012 and 2015 on average lend more than €250m to Eurozone non-financial corporations and thereof have at least one loan to a CSPP-eligible firm[11]. We further drop banks if their total corporate lending doubles or halves from some quarter to the next one, as this indicates fundamental reorganizations such as mergers.

We then enrich the credit register with bank balance sheet and P&L information and regulatory variables from the Bundesbank's BAKIS and SON datasets, respectively. We use yearly P&L data to examine sources of bank income and employ further yearly and quarterly variables as controls throughout our analysis.

We merge in firm level data from Bureau van Dijk's Amadeus database to flag those firms that are SMEs. As we use the mapping provided by Deutsche Bundesbank, only German firms can be mapped, i.e. detailed firm level data is only available for German firms.

In many tests, we assess firm riskiness using PDs reported in the Credit Register. We calculate each firm's time-invariant PD by taking the median PD across all banks for a given firm quarter.[12] We then consider the PD in the quarter prior to the CSPP announcement, i.e., 2015q4. If no PD for 2015q4 is available, we consider the one from 2015q3, then from 2015q2 and so on until 2012q1. If still no PD is available, which is in particular the case for firm that are born or retrieve bank credit for the first time after 2015, we consider the PD

[11]The €250m threshold ensures that banks have sizeable Eurozone NFC portfolios. As we below define bank affectedness according to the fraction of CSPP eligible borrowers in the Eurozone NFC portfolio, banks with very few of these borrowers would likely end up with very low or very high values. Requiring at least one CSPP eligible borrower in the portfolio ensures that we do not deal with very specialized banks.

[12]Defining the PD as time-invariant ignores potential dynamics in risk but ensures that firms that at some point have a rating always have a rating. We verify manually that the PD-implied rating we compute matches external ratings (if available) in most cases.

Electronic copy available at: https://ssrn.com/abstract=4006275

from 2016q1, then from 2016q2 and so on until 2019q4 . Finally, we transform the PDs into ratings according to historical default rates. We winsorize all variables that are not in logs and that are not shares bounded to [0;1] at the 1% and 99% level.

Table 1 provides descriptive statistics on the main variables used throughout our analysis, separately for treated banks and control banks. All variable definitions can be found in Appendix A1.

We consider a bank as treated if its share of CSPP eligible borrowers to total Eurozone corporate lending averaged between 2014q1 and 2015q4 (*Share Eligible (Static)*) is above-median. Treated banks on average have about 14% of their total corporate lending to CSPP-eligible firms, while the average for control banks is around 2%.

As they hold a larger fraction of CSPP eligible, and therefore IG-rated borrowers, treated banks have fewer High-Yield borrowers in their loan book (20.58% vs 25.82%) and the volume-weighted PD of their loan book is a good bit below that of control banks (2.21% vs 3.70%). As CSPP eligible firms must have bonds outstanding, they are mostly public, entailing that affected banks lend more to public firms (21.52% vs 9.73%), but less to SMEs (29.62% vs 41.00%) relatively to control banks.

These differences also translate to the P&L statement: while treated and control banks are equally profitable (with an average RoA of 0.79%), treated banks have a lower net interest income (1.82% vs. 1.91% of total assets) due to lending to on average safer borrowers, but for the same reason face fewer profit-impeding loan write-offs (0.19% vs. 0.28% of total assets). All other return components again are virtually equal for treated and control banks.

What is less clear a priori is that treated banks on average are larger (in terms of both total corporate lending and total assets). However, when rather considering the median, the

Electronic copy available at: https://ssrn.com/abstract=4006275

difference vanishes, suggesting that among the treated banks are some very large ones. The size difference might also account for the fact that treated banks have a higher off-balance-sheet ratio than control banks. While the deposit ratio and the share of fee income are roughly equal for treated and control banks, treated banks are slightly better capitalized, again possibly due to less risky borrowers and therefore lower Risk-Weighted Assets (RWA).

4 Empirical Analysis

4.1 Research Design

We estimate difference-in-differences regressions of the following type:

$$y_{bt} = \beta \times Treat_b \times After_t + Controls_{bt-1} + \gamma_b + \gamma_t + \varepsilon_{bt} \tag{1}$$

where b indicates bank and t period (i.e. quarter or year depending on the specification). y_{it} is a bank portfolio composition or profitability measure. $Treat_b$ is equal to one for banks whose share of lending to CSPP eligible firms (relative to total Eurozone corporate lending) in the two years before the CSPP is above the median. $After_t$ is equal to one for quarters after 2015q4 or years after 2015. γ_b and γ_t are bank and quarter/year fixed effects. We further include lagged control variables (Log Total Assets, Capital Ratio, Deposit Ratio, Off-Balance-Sheet Ratio and Share of Fee Income). We cluster standard errors on the bank level, i.e. the level of treatment (Bertrand et al., 2004). The coefficient of interest, β, measures whether highly CSPP-affected banks differ in terms of portfolio composition or profitability after the CSPP was announced, relative to less CSPP-affected banks. Our

Electronic copy available at: https://ssrn.com/abstract=4006275

identifying assumption therefore is that after including the above-mentioned controls and fixed effects, treatment (i.e. lending to a large fraction of CSPP eligible borrowers) is as good as randomly assigned, i.e. that treatment and control banks do not differ in their loan granting based on unobservables.

4.2 Results

4.2.1 Impact of the CSPP on banks' portfolio composition

The CSPP resulted in a substitution from eligible firms to ineligible firms. This substitution effect affects treated banks (mean share of eligible firms: 13.75%) more than control group banks (mean share of eligible firms: 1.69%). Therefore, the fraction of lending to eligible firms over total lending decreases by 1.56-1.65 percentage points more for treated banks than for control group banks (see Columns (1)-(3) of Table 2).

Two facts are worth highlighting: first, the effect is economically sizable. Lending to eligible firms accounts for 12.98% of the portfolio of treated banks. The decline by 1.56-1.65 percentage points thus represents 12-13% of the pre-event share of eligible lending at treated banks.

Second, the coefficient of interest is astonishingly stable across specifications with and without controls and with and without fixed effects. This suggests that the selection on observable variables is small: it moves the coefficient of interest by less than 0.1, or less than a tenth of the coefficient value. Using the arguments made by Altonji et al. (2005), the selection on unobservable variables would need to be at least a factor ten larger than the selection on observable variables to invalidate our results. Reassuringly, this coefficient

Electronic copy available at: https://ssrn.com/abstract=4006275

stability holds not only for our first regression, but throughout all specifications that we report in the following.

Column (4)-(6) of Table 2 suggest no effect of the CSPP on overall lending amounts. Thus, the drop in lending to eligible firms was fully substituted by an increase in lending to ineligible firms. Reassuringly, this finding is in line with prior findings (Grosse-Rueschkamp et al., 2019).

Eligible firms must have an investment grade rating, and are thus lower-risk. Columns (7)-(9) of Table 2 suggest that treated banks substituted lending to eligible firms with lending to higher-risk ineligible firms. This is qualitatively not surprising. However, the effects are quantitatively astonishingly large: control group banks have an average PD that is 67% higher than the average PD of treated banks (3.70% versus 2.21%). Columns (7)-(9) of Table 2 suggest that this gap narrows by roughly 1/3 due to the CSPP.

Lending to higher-risk ineligible firms can plausibly constitute an intended consequence of the CSPP. It increases funding for ineligible – and potentially constrained – firms and can therefore foster investment. In the following, we document two unintended side effects: bank profitability decreases, and the increase in lending to ineligible firms is concentrated in the real estate sector.

4.2.2 Impact of the CSPP on bank profitability

Table 3 depicts results for bank profitability. The dependent variable in Columns (1)/(2) is loan write-offs divided by total assets. Loan write-offs is a flow measure, measuring

Electronic copy available at: https://ssrn.com/abstract=4006275

the yearly addition to loan loss provisions. Loan write-offs increase by 4.9-5.1bps of total assets for treated banks after the CSPP relative to control group banks. This effect is economically large: loan write-offs pre-CSPP are equal to 19bps (treated banks) and 28bps (control banks), so the effect of 4.9-5.1bps constitutes approximately one-half of the difference between treatment and control group banks.

Interestingly, we do not observe any effect on net interest income, see Columns (3) and (4) of Table 3. Even though treated banks increase risk-taking, this is not compensated for by higher net interest income. Note that this no-result is not only due to statistical insignificance, but the coefficients in Column (3)/(4) are economically small, constituting only one-fourth of the effect documented on loan write-offs in Columns (1)/(2).

All other items of the profit and loss statement (such as fee income, trading income, or operational costs) are not affected (see Columns (5)/(6) of Table 3). Thus, the return on assets (RoA) decreases by an amount equal to the increase in loan write-offs. The mean pre-CSPP RoA in our sample is 0.79% (both for treated banks and control banks). Thus, a decrease by 0.05-0.06% constitutes a decrease in RoA by 6-7% of the sample mean.

Figures 2-7 document the dynamics of the treatment effects from 2016-2019. All effects increase over time, in line with the increase in the ECB's holding of CSPP securities, and effects therefore tend to be larger towards the end of our sample period compared to the mean treatment effects documented in the prior tables.

Electronic copy available at: https://ssrn.com/abstract=4006275

4.2.3 Impact of the CSPP on capital allocation across industries

We have so far documented that treated banks lend more to high-risk ineligible firms, but are not compensated by higher interest rates. We now open the black box and analyze in detail *where* the additional lending to ineligible firms is going to.

Table 4 provides the results. Panel A suggests that the share of high-yield firms increases (Columns (1)/(2)) increases and the share of public firms decreases (Columns (5)/(6)) in treated banks' portfolios increases relative to control group firms after the CSPP. The share of SMEs remains unchanged relative to control group firms (Columns (3)/(4)), suggesting that the additional lending to ineligible firms did not disproportionately flow to SMEs.

Panel B of Table 4 depicts changes in lending shares across industries. The dependent variable is the share of lending to industry X on the bank x quarter level, where the industry X is listed at the top of each column. Strikingly, CSPP causes a reallocation in treated banks' lending portfolios from the financial services sector to the real estates sector.

To understand these results, it is important to understand the definition of the industry "financial services". We have excluded pure financial firms (such as banks and insurance companies) from our sample. Firms in the financial service industry are financial subsidiaries of industrial firms that are typically set up by larger industrial firms to raise funds for the industrial firm. Almost all CSPP-eligible firms have these subsidiaries, so a decrease in lending to these firms after the CSPP is not surprising.

Strikingly, almost the entire decrease in lending to financial services firms (-1.93 percentage points, see column (5) of Table 4) is allocated to the real estate sector (+1.78 percentage points, see column (1) of Table 4. We do not observe any significant changes in the port-

Electronic copy available at: https://ssrn.com/abstract=4006275

folio share for any other industry (manufacturing, wholesale, energy, or other). Thus, the additional lending to ineligible firms is entirely allocated to firms in the real estate sector. Figure 8 maps out this effect over time.

Table 5 deconstructs further the reallocation of funds by treated banks post-CSPP towards the real estate sector. While there are almost no CSPP-eligible firms in this sector, lending shares increase mainly for high yield real estate (+0.58 PP) and non-rated real estate (+1.15PP). These changes represent approximately 7.67%-9.48% of the pre-CSPP portfolio share of high yield and non-rated real estate lending. Public and private as well as SME and non-SME real estate firms benefit similarly.

5 Conclusion

In this paper, we have explore the unintended side effects of the ECB's Corporate Sector Purchase Programme (CSPP). We document two unintended side effects: First, affected banks' profitability decreases significantly after the introduction of the CSPP. This profitability effect is driven by an increase in risk-taking that is not compensated for by higher net interest income. This finding is consistent with more competition among banks for borrowers that are not eligible for the ECB's purchase programme. As lower bank profitability has been associated with lower financial stability, these results suggest that the CSPP might have adversely impacted financial stability.

Second, the ECB's CSPP causes an increase in lending to ineligible firms, but this lending is concentrated in the real estate sector, in particular to High Yield or unrated real estate firms. In contrast, we do not find any effect of the ECB's CSPP in other industries apart

Electronic copy available at: https://ssrn.com/abstract=4006275

from real estate. These findings suggests that the ECB's CSPP did have a first-order effect on the German real estate market.

Overall, our finding suggests that unintended consequences of unconventional monetary policy exist. We document potential effects on financial stability as well as an increase in real estate lending. Any benefits of unconventional monetary policy – such as lower bond spreads and lending rates – need to be balanced against the unintended side effects in order to assess the overall effect of unconventional monetary policy on financial markets and the real economy.

Electronic copy available at: https://ssrn.com/abstract=4006275

References

Abidi, N., Falagiarda, M., and Miquel-Flores, I. (2019). Credit rating dynamics: evidence from a natural experiment. *ECB Working Paper No. 2274*.

Abidi, N. and Miquel-Flores, I. (2018). Who benefits from the corporate qe? a regression discontinuity design approach. *ECB Working Paper No. 2145*.

Agarwal, S., Chomsisengphet, S., Mahoney, N., and Stroebel, J. (2018). Do banks pass through credit expansions to consumers who want to borrow? *The Quarterly Journal of Economics*, 133(1):129–190.

Aghion, P. and Bolton, P. (1992). An incomplete contracts approach to financial contracting. *The Review of Economic Studies*, 59(3):473–494.

Altonji, J. G., Elder, T. E., and Taber, C. R. (2005). Selection on observed and unobserved variables: Assessing the effectiveness of catholic schools. *Journal of Political Economy*, 113(1):151–184.

Arce, Ó., Gimeno, R., and Mayordomo, S. (2018). The effects of the eurosystem's corporate sector purchase programme on spanish companies. *Banco de Espana Article*, 2:18.

Balloch, C. M. (2018). Inflows and spillovers: Tracing the impact of bond market liberalization. *Unpublished working paper. Columbia University.*

Behn, M., Haselmann, R. F., and Vig, V. (2021). The limits of model-based regulation. *Journal of Finance, Forthcoming, LawFin Working Paper*, (20).

Electronic copy available at: https://ssrn.com/abstract=4006275

Benmelech, E. and Bergman, N. K. (2012). Credit traps. *American Economic Review*, 102(6):3004–32.

Bertrand, M., Duflo, E., and Mullainathan, S. (2004). How much should we trust differences-in-differences estimates? *The Quarterly Journal of Economics*, 119(1):249–275.

Borio, C., Gambacorta, L., and Hofmann, B. (2017). The influence of monetary policy on bank profitability. *International Finance*, 20(1):48–63.

Brunnermeier, M. K. and Koby, Y. (2018). The reversal interest rate. Technical report, National Bureau of Economic Research.

Cœuré, B. (2015). Embarking on public sector asset purchases. speech at the second international conference on sovereign bond markets, frankfurt, 10 march 2015. *https://www.ecb.europa.eu/press/key/date/2015/html/sp150310˙1.en.html*.

De Santis, R. A., Geis, A., Juskaite, A., Cruz, L. V., et al. (2018). The impact of the corporate sector purchase programme on corporate bond markets and the financing of euro area non-financial corporations. *Economic Bulletin Articles*, 3.

Draghi, M. (2018). Letter from the ecb president to several members of the european parliament on the expanded asset purchase programme. *Press Release*.

Ertan, A., Kleymenova, A., and Tuijn, M. (2020). Financial intermediation through financial disintermediation: Evidence from the ecb corporate sector purchase programme. *Fama-Miller Working Paper*, pages 18–06.

Electronic copy available at: https://ssrn.com/abstract=4006275

Grosse-Rueschkamp, B., Steffen, S., and Streitz, D. (2019). A capital structure channel of monetary policy. *Journal of Financial Economics*, 133(2):357–378.

Heider, F., Saidi, F., and Schepens, G. (2019). Life below zero: bank lending under negative policy rates. *The Review of Financial Studies*, 32(10):3728–3761.

ICMA (2021). Central bank corporate bond purchase programmes. *https://www.icmagroup.org/Regulatory-Policy-and-Market-Practice/Secondary-Markets/central-bank-corporate-bond-purchase-programs/.*

Rischen, T. and Theissen, E. (2018). Underpricing in the eurozone corporate bond market. *University of Cologne, CFR Working Paper*, (18-03).

Todorov, K. (2020). Quantify the quantitative easing: impact on bonds and corporate debt issuance. *Journal of Financial Economics*, 135(2):340–358.

Zaghini, A. (2019). The cspp at work: yield heterogeneity and the portfolio rebalancing channel. *Journal of Corporate Finance*, 56:282–297.

Electronic copy available at: https://ssrn.com/abstract=4006275

Table 1: Descriptive Statistics

	Unit	Level	Treat				Control			
			n	Mean	SD	Median	n	Mean	SD	Median
Measure on bank affectedness										
Share Eligible (Static)	%	Bank	121	13.75	10.72	9.32	120	1.69	1.28	1.52
Quarterly measures on bank corporate loan portfolio composition										
Share Eligible	%	Bank x Quarter	3,559	12.98	10.00	9.71	3,551	2.22	2.22	1.79
Lending to Eligibles	€m	Bank x Quarter	3,559	372	1,460	74	3,551	35	98	13
Lending to Ineligibles	€m	Bank x Quarter	3,559	2,645	8,792	540	3,551	1,785	4,788	700
Total Corp Lending	€m	Bank x Quarter	3,559	3,018	10,004	625	3,551	1,819	4,862	718
PD	%	Bank x Quarter	3,559	2.21	2.12	1.62	3,551	3.70	5.16	2.39
Share HY	%	Bank x Quarter	3,559	20.58	9.63	18.87	3,551	25.82	15.50	21.70
Share SME	%	Bank x Quarter	3,555	29.62	15.01	28.53	3,551	41.00	14.59	39.02
Share Public	%	Bank x Quarter	3,559	21.52	11.79	18.36	3,551	9.73	7.34	7.97
Yearly measures on bank profitability										
NII / Toas	%	Bank x Year	908	1.82	0.43	1.90	913	1.91	0.45	1.91
Loan write-offs / Toas	%	Bank x Year	908	0.19	0.16	0.15	913	0.28	0.26	0.21
Rest / Toas	%	Bank x Year	908	-0.84	0.36	-0.89	913	-0.85	0.35	-0.86
RoA	%	Bank x Year	908	0.79	0.35	0.80	913	0.79	0.41	0.77
Yearly lagged control variables										
Capital Ratio	%	Bank x Year	908	17.03	3.38	16.65	913	16.14	3.57	15.53
Deposit Ratio	%	Bank x Year	908	49.10	12.07	48.77	913	49.80	12.21	48.67
Off-BS Ratio	%	Bank x Year	908	3.04	2.63	2.18	913	2.47	1.83	2.11
Share of Fee income	%	Bank x Year	908	18.32	8.26	17.32	913	18.28	8.00	17.58
Quarterly lagged control variables										
Total Assets	€bn	Bank x Quarter	3,559	13.38	39.60	3.35	3,551	7.41	13.14	3.68

This table presents descriptive statistics, separately for treated bank and for control banks. All variable definitions are in Appendix A1.

Electronic copy available at: https://ssrn.com/abstract=4006275

Table 2: Bank Portfolio Composition and Risk

Dependent variable:	Share Eligible			Ln(Total Corp Lending)			Ln(PD)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat x After	-1.5625***	-1.5600***	-1.6497***	0.0089	0.0089	0.0045	0.2225***	0.2228***	0.2239***
	(-3.00)	(-2.99)	(-3.25)	(0.32)	(0.32)	(0.21)	(3.49)	(3.49)	(3.53)
Controls	no	no	yes	no	no	yes	no	no	yes
Quarter FE	no	yes	yes	no	yes	yes	no	yes	yes
Bank FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110

This table examines how the corporate lending portfolio of highly CSPP-affected banks evolves in relation to that of less CSPP-affected banks and which impact this has on portfolio risk. In Columns (1), (4), and (7), we only include a bank fixed effect. In Columns (2), (5), and (8), we add a quarter fixed effect and in Columns (3), (6), and (9), we also include lagged control variables (Log Total Assets, Capital Ratio, Deposit Ratio, Off-Balance-Sheet Ratio and Share of Fee Income). T-statistics with standard errors adjusted for clustering at the bank level are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1%-level (two-tailed), respectively.

Electronic copy available at: https://ssrn.com/abstract=4006275

Table 3: Impact of the CSPP on Bank Profitability

Dependent variable:	Loan Write-offs / Toas		NII / Toas		Rest / Toas		RoA	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treat x After	0.0516***	0.0487***	0.0179	0.0129	-0.0183	-0.0209	-0.0521**	-0.0567**
	(2.97)	(2.88)	(0.72)	(0.57)	(-0.75)	(-0.93)	(-2.02)	(-2.25)
Controls	no	yes	no	yes	no	yes	no	yes
Bank FE	yes	yes	yes	yes	yes	yes	yes	yes
Quarter FE	yes	yes	yes	yes	yes	yes	yes	yes
Observations	1,821	1,821	1,821	1,821	1,821	1,821	1,821	1,821

This table examines how selected return components are affected by the CSPP. All variable definitions are in Appendix A1. We include one fixed effect for each bank and one fixed effect for each quarter. In Columns (2), (4), (6), and (8), we also include lagged control variables (Log Total Assets, Capital Ratio, Deposit Ratio, Off-Balance-Sheet Ratio and Share of Fee Income). T-statistics with standard errors adjusted for clustering at the bank level are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1%-level (two-tailed), respectively.

Electronic copy available at: https://ssrn.com/abstract=4006275

Table 4: Impact of the CSPP on Capital Allocation

Panel A: Firm Risk and Size

Dependent variable:	Share HY		Share SME		Share Public	
	(1)	(2)	(3)	(4)	(5)	(6)
Treat x After	1.4664***	1.4852***	0.0645	0.1136	-1.0750*	-1.1230*
	(2.74)	(2.81)	(0.09)	(0.17)	(-1.71)	(-1.84)
Controls	no	yes	no	yes	no	yes
Bank FE	yes	yes	yes	yes	yes	yes
Quarter FE	yes	yes	yes	yes	yes	yes
Observations	7,110	7,110	7,106	7,106	7,110	7,110

Panel B: Industries

Dependent variable:	Real Estate	Manuf.	Wholesale	Energy	Fin. Serv.	Other
	(1)	(2)	(3)	(4)	(5)	(6)
Treat x After	1.7801***	0.4922	0.2497	-0.5177	-1.9270***	-0.0773
	(2.67)	(1.11)	(0.63)	(-1.38)	(-4.18)	(-0.13)
Controls	yes	yes	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes	yes	yes
Quarter FE	yes	yes	yes	yes	yes	yes
Observations	7,110	7,110	7,110	7,110	7,110	7,110
Sample Mean in %	32.17	13.48	8.82	8.75	6.20	30.58

Panel A examines the impact the CSPP has on affected banks' portfolio composition in terms of High-Yield Borrowers, SME borrowers and public, i.e. listed, borrowers. Panel B examines changes in portfolio composition by industry. The last row indicates the pre-CSPP average industry share. All variable definitions are in Appendix A1. We include one fixed effect for each bank and one fixed effect for each quarter. In Columns (2), (4), and (6) of Panel A as well as in the entire Panel B, we also include lagged control variables (Log Total Assets, Capital Ratio, Deposit Ratio, Off-Balance-Sheet Ratio and Share of Fee Income). T-statistics with standard errors adjusted for clustering at the bank level are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1%-level (two-tailed), respectively.

Electronic copy available at: https://ssrn.com/abstract=4006275

Table 5: Capital Allocation in the Real Estate Sector

	CSPP Eligibility		Risk			Firm Size		Public/Private	
Dependent variable:	Eligible	Ineligible	IG	HY	Unrated	SME	Large	Public	Private
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat x After	0.0242	1.7558***	0.0463	0.5791*	1.1547**	0.3809*	1.3991**	0.0529	1.7271***
	(0.71)	(2.64)	(0.10)	(1.82)	(2.25)	(1.71)	(2.26)	(0.64)	(2.65)
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Quarter FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110
Sample Mean in %	0.06	32.11	11.06	6.12	14.99	6.88	25.28	1.10	31.07
% of sample mean	44.17%	5.47%	0.42%	9.48%	7.67%	5.52%	5.54%	4.81%	5.56%

This table examines the impact of the CSPP on banks' Corporate Real Estate Portfolio. The dependent variable in each column is the quarterly share of a bank's portfolio, e.g., the dependent variable in Column 1 is the total lending to IG-rated Real Estate firms divided by the overall corporate loan portfolio size. The sample mean prior to the CSPP as well as the magnitude of the coefficient (defined as the coefficient divided by the sample mean) are given in the two last rows. For instance, the average bank had 11.06% of its total loans granted to IG rated Real Estate firms prior to the CSPP. The coefficient found in (1) therefore amounts to 0.0463%/11.06%=0.42%. All variable definitions are in Appendix A1. We include one fixed effect for each bank and one fixed effect for each quarter as well as lagged control variables (Log Total Assets, Capital Ratio, Deposit Ratio, Off-Balance-Sheet Ratio and Share of Fee Income). T-statistics with standard errors adjusted for clustering at the bank level are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1%-level (two-tailed), respectively.

Electronic copy available at: https://ssrn.com/abstract=4006275

Figure 1: Effect of the CSPP on Bond Spreads and Issuance

Figure 1.A: Spreads

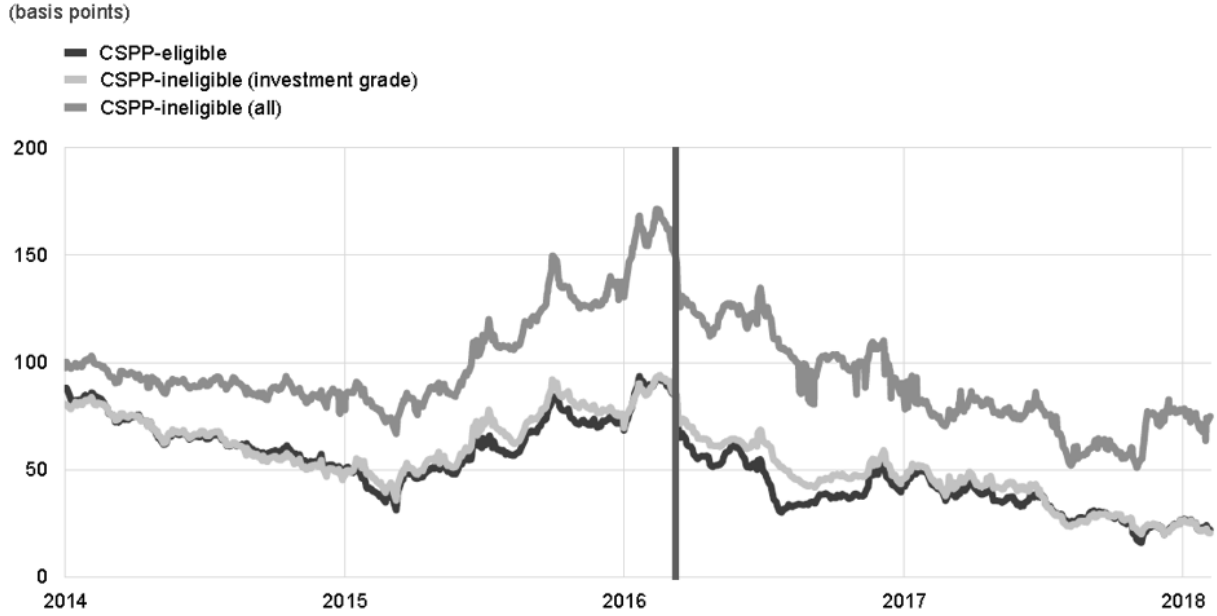
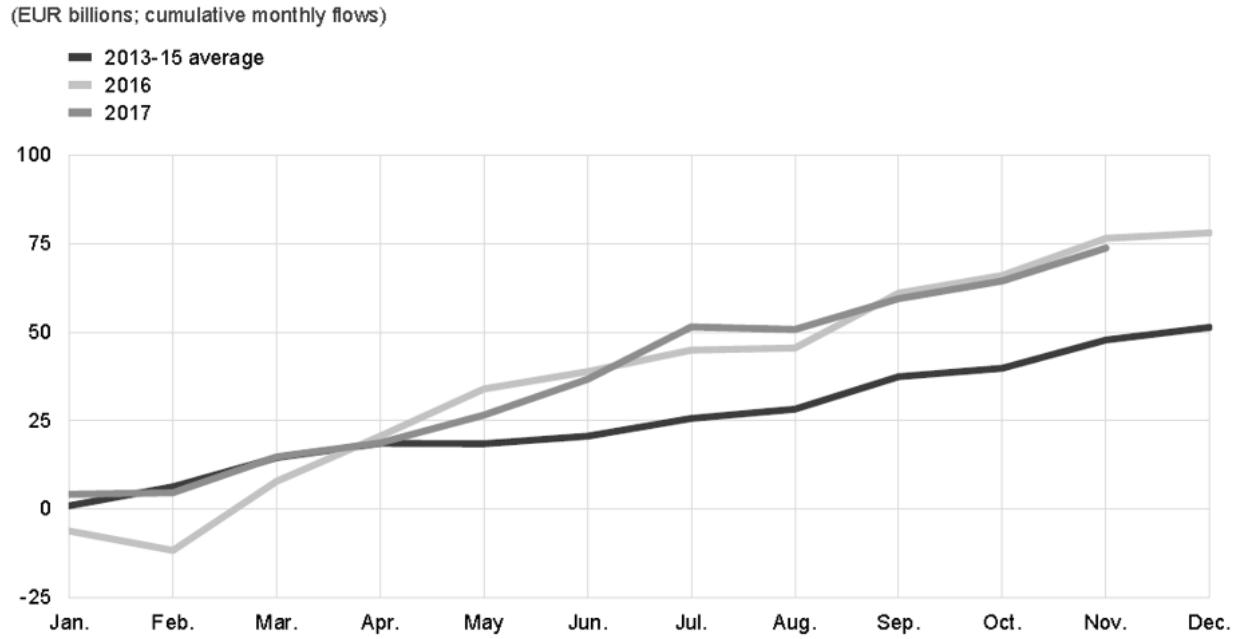


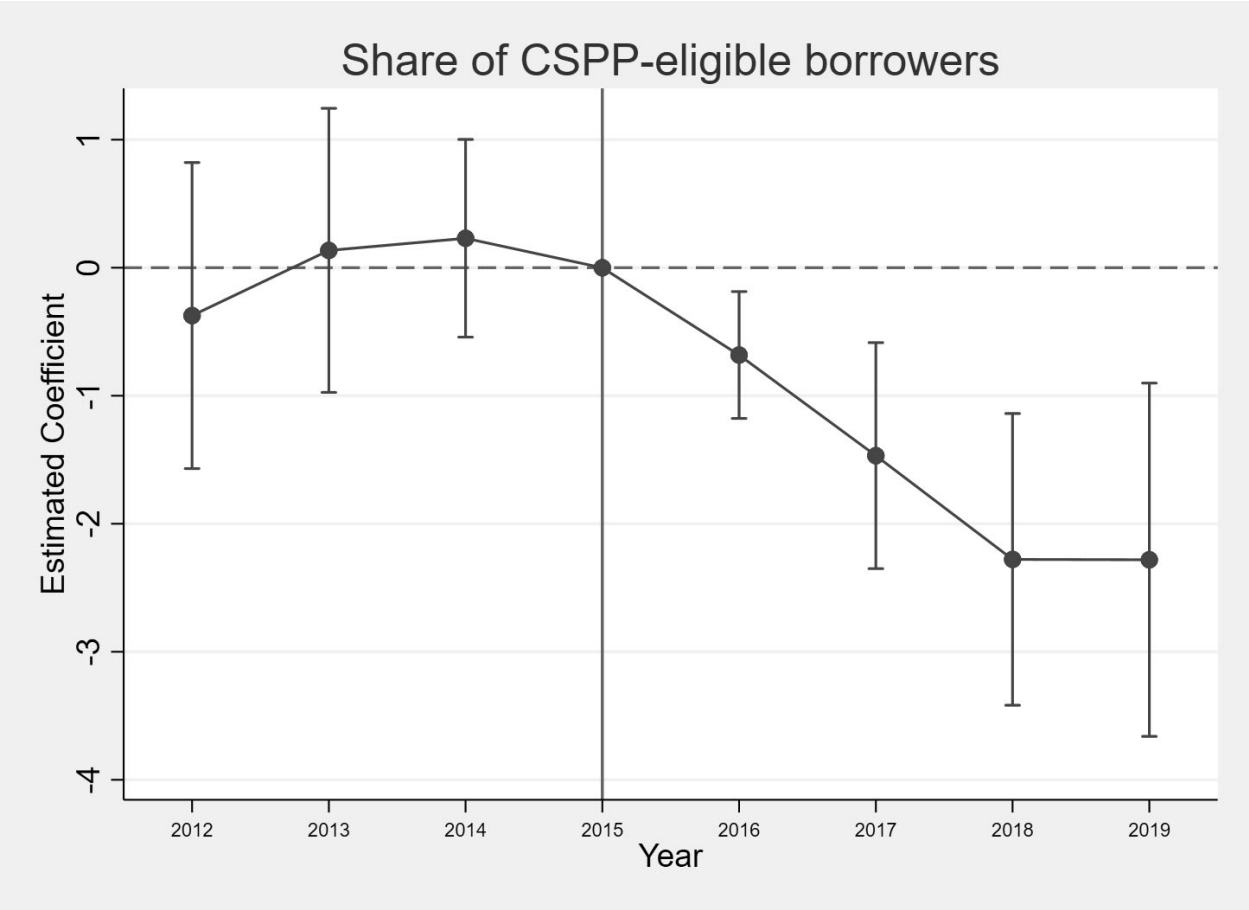
Figure 1.B: Issuances



Source: De Santis et al. (2018). Figure 1.A depicts the impact the CSPP announcement had on CSPP eligible/ineligible bonds' spreads. Figure 1.B indicates how the CSPP spurred issuance of euro-dominated NFC long term debt.

Electronic copy available at: https://ssrn.com/abstract=4006275

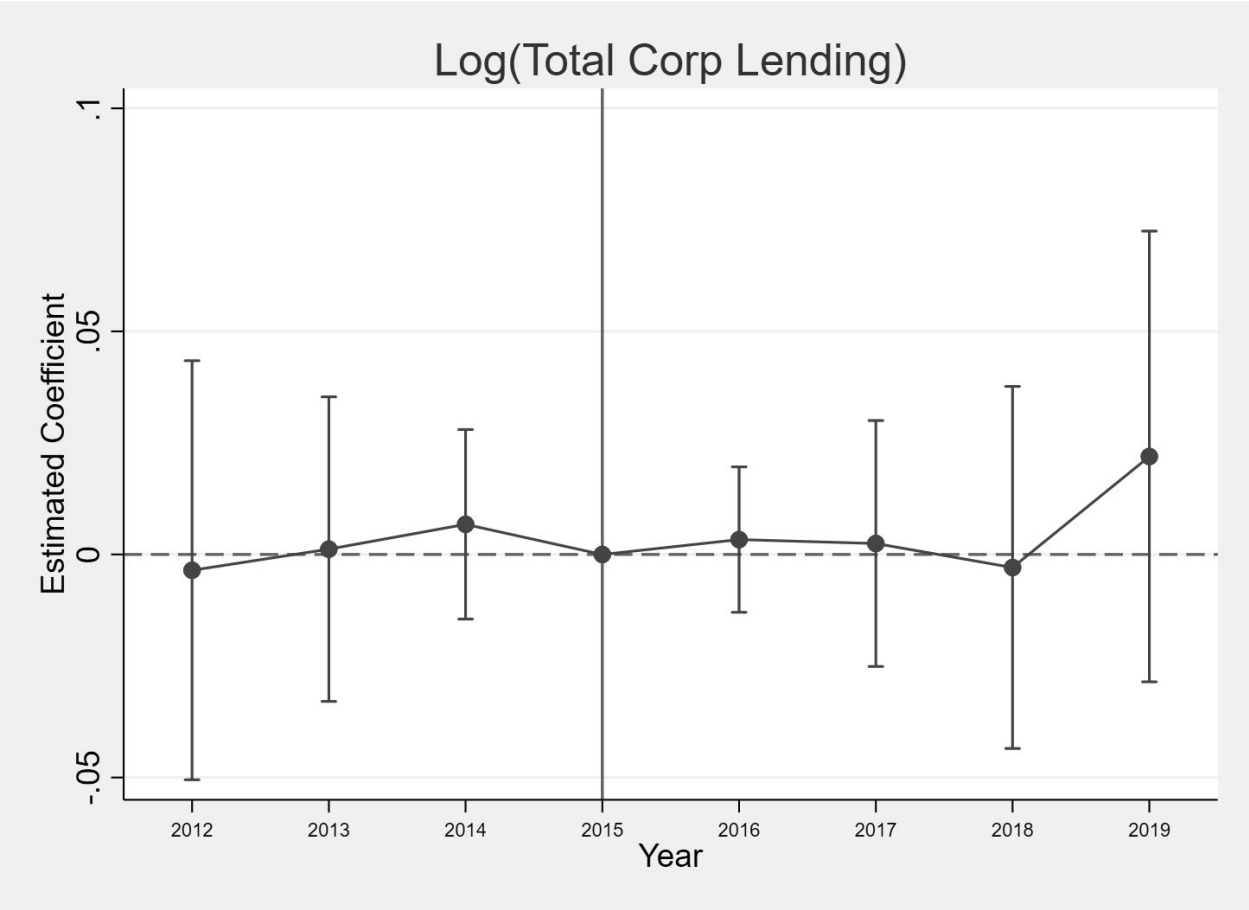
Figure 2: Evolution of Share Eligible



This figure depicts estimated coefficients from mapping out Column (3) in Table 2 over time with 2015 as base year. The solid lines around coefficients indicate 95% confidence intervals.

Electronic copy available at: https://ssrn.com/abstract=4006275

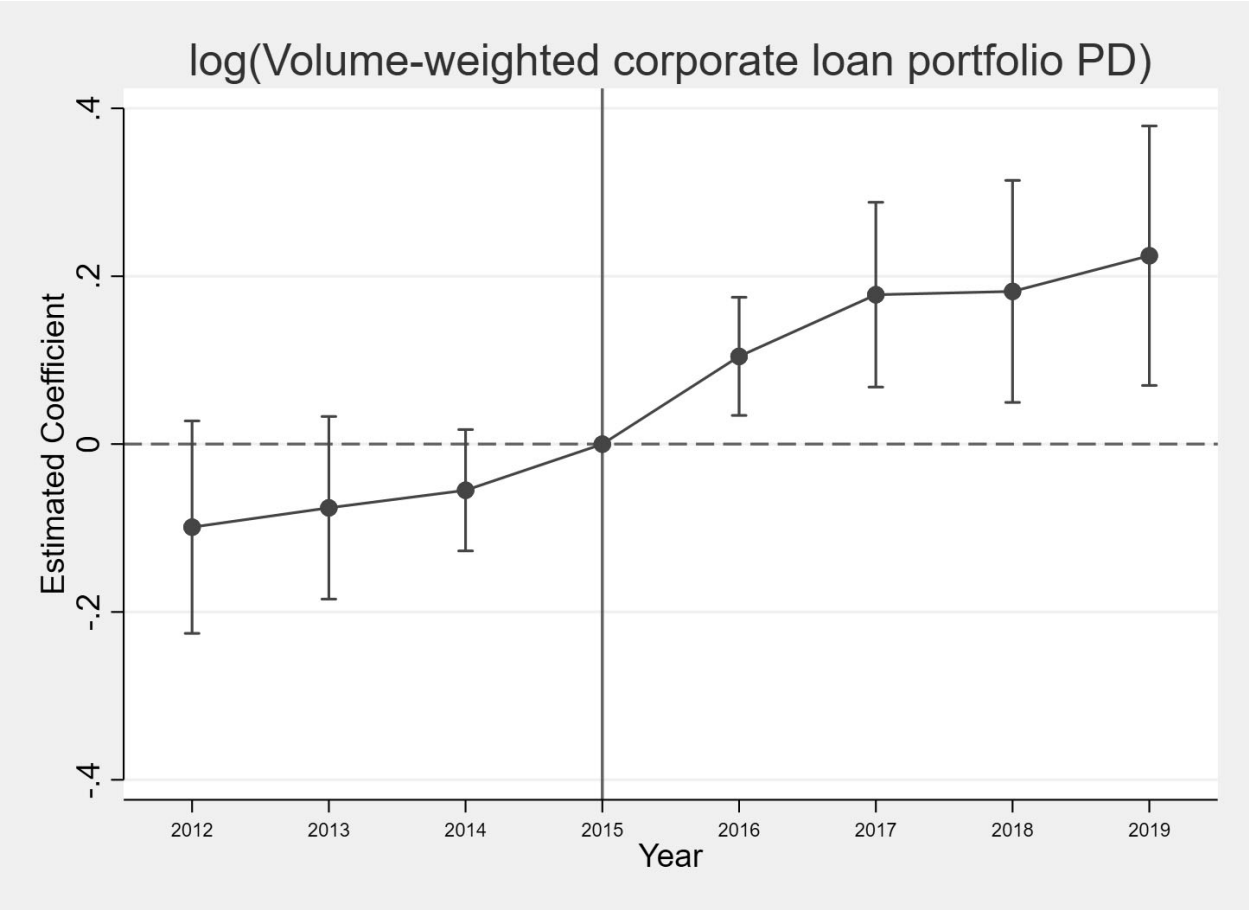
Figure 3: Evolution of Total Corporate Lending



This figure depicts estimated coefficients from mapping out Column (6) in Table 2 over time with 2015 as base year. The solid lines around coefficients indicate 95% confidence intervals.

Electronic copy available at: https://ssrn.com/abstract=4006275

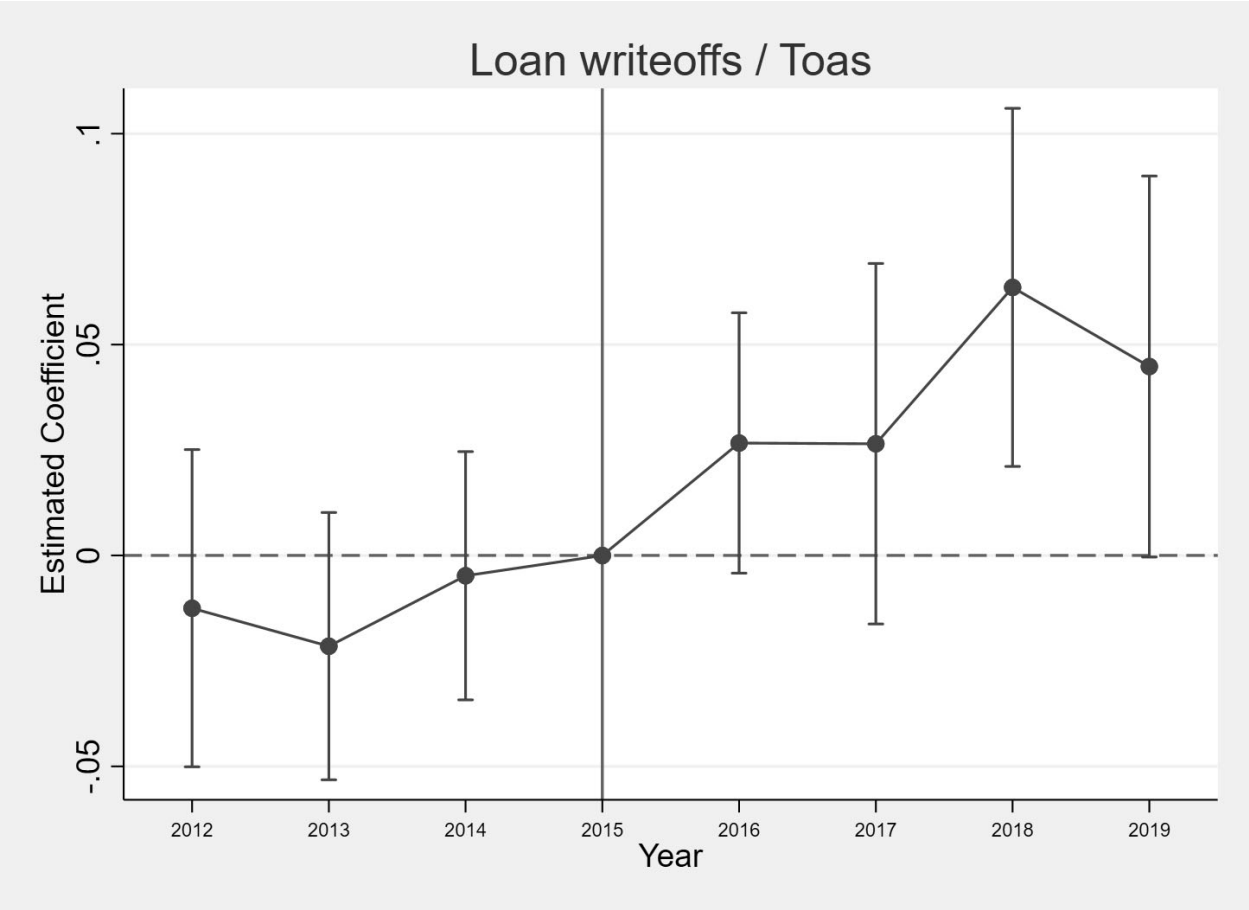
Figure 4: Evolution of the log PD



This figure depicts estimated coefficients from mapping out Column (9) in Table 2 over time with 2015 as base year. The solid lines around coefficients indicate 95% confidence intervals.

Electronic copy available at: https://ssrn.com/abstract=4006275

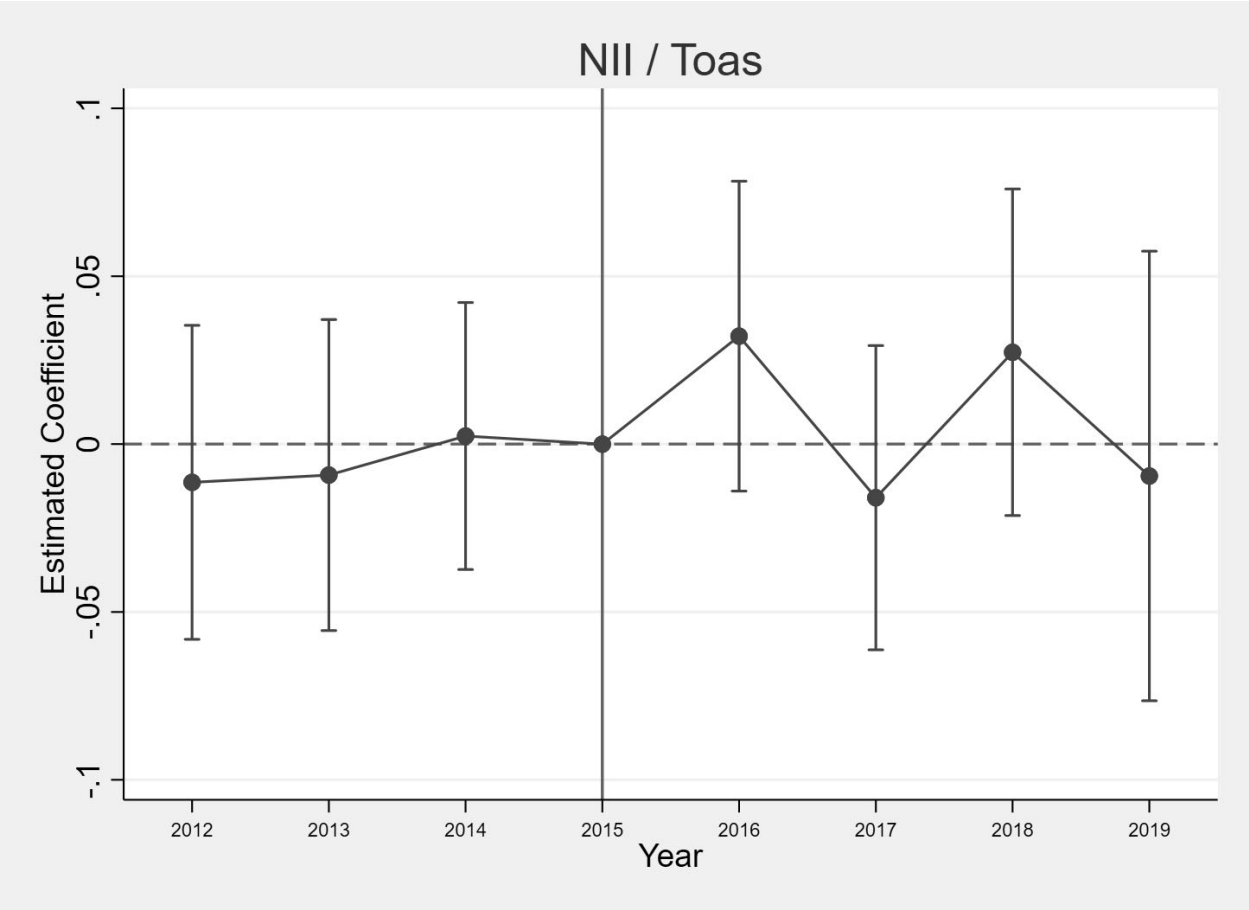
Figure 5: Evolution of the Loan Write-offs



This figure depicts estimated coefficients from mapping out Column (2) in Table 3 over time with 2015 as base year. The solid lines around coefficients indicate 95% confidence intervals.

Electronic copy available at: https://ssrn.com/abstract=4006275

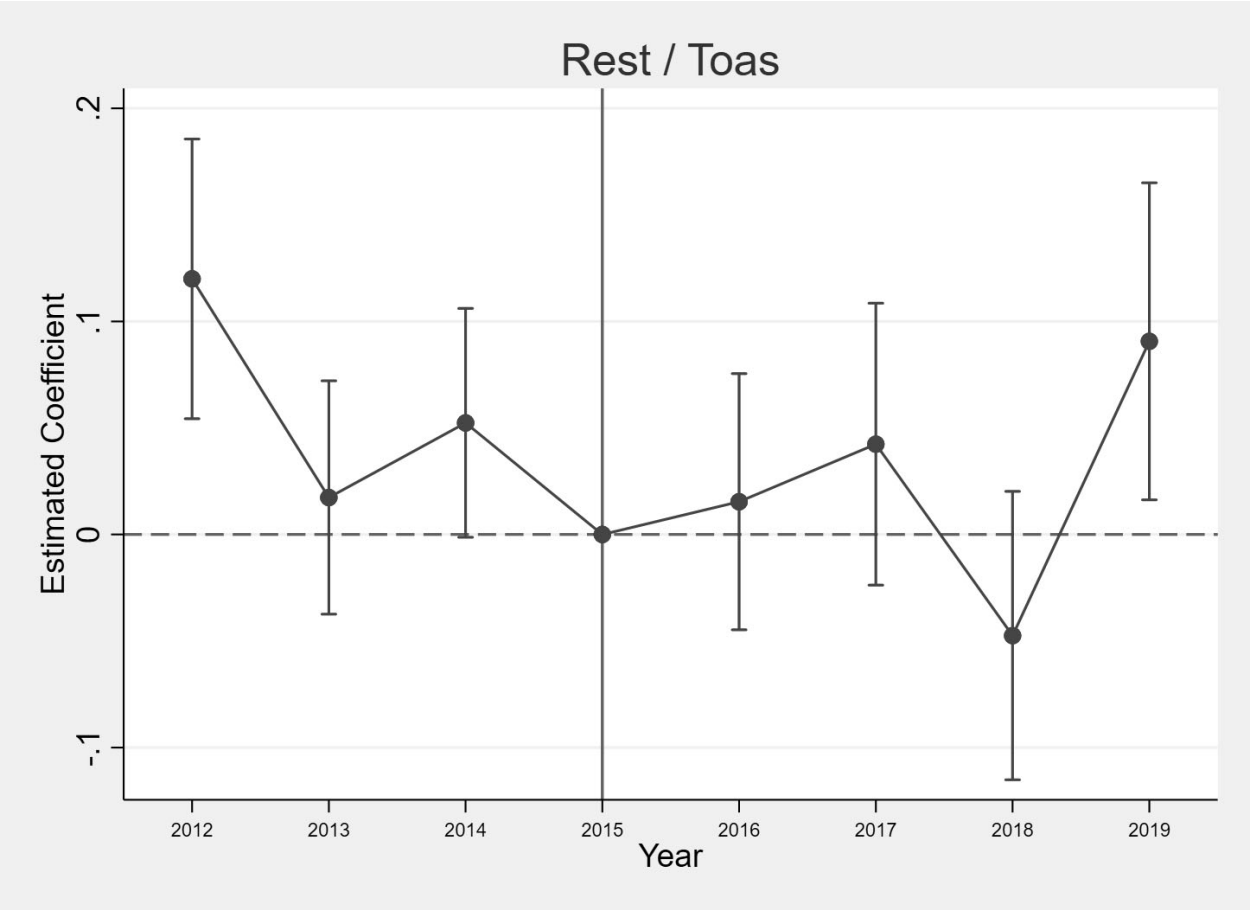
Figure 6: Evolution of the Net Interest Income



This figure depicts estimated coefficients from mapping out Column (4) in Table 3 over time with 2015 as base year. The solid lines around coefficients indicate 95% confidence intervals.

Electronic copy available at: https://ssrn.com/abstract=4006275

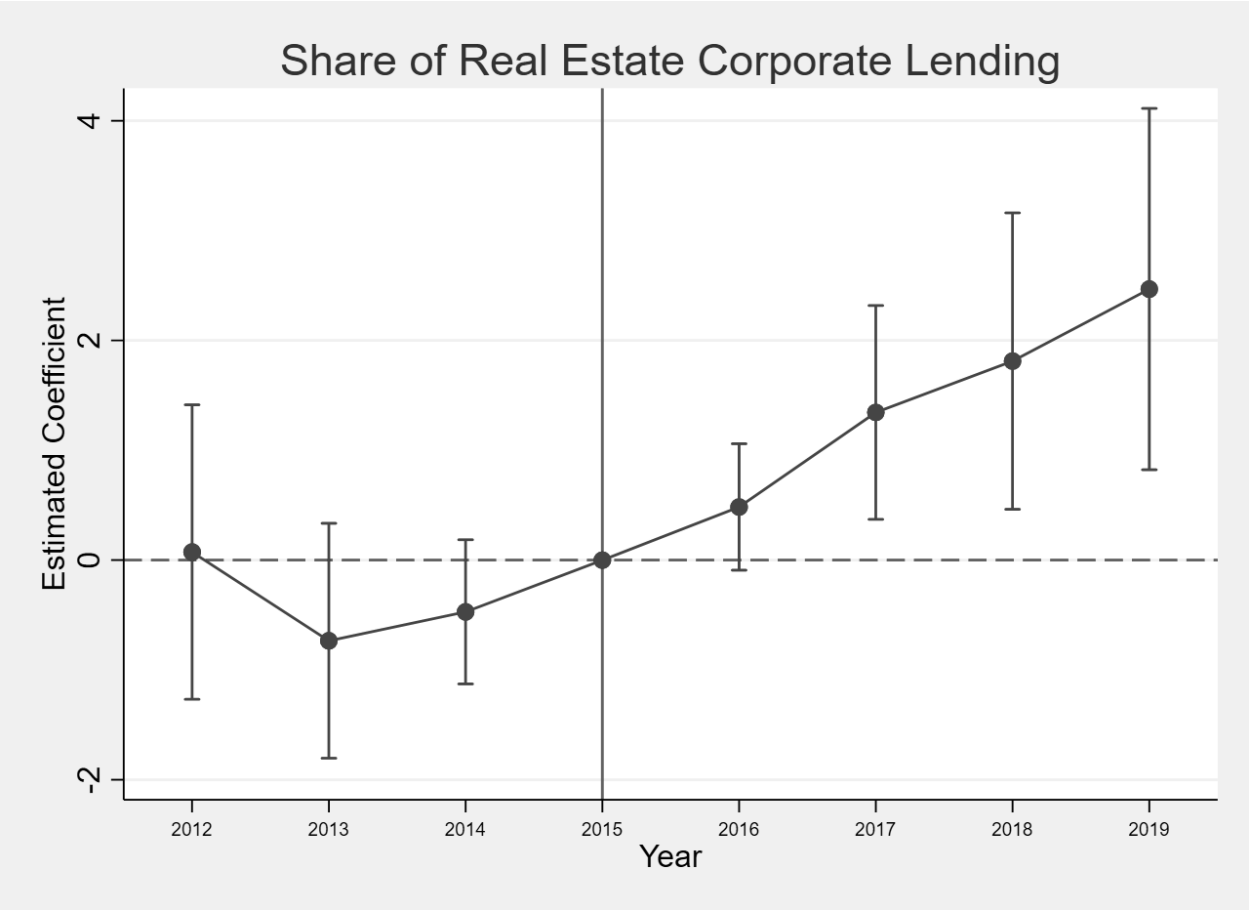
Figure 7: Evolution of the Other P&L Positions



This figure depicts estimated coefficients from mapping out Column (6) in Table 3 over time with 2015 as base year. The solid lines around coefficients indicate 95% confidence intervals.

Electronic copy available at: https://ssrn.com/abstract=4006275

Figure 8: Evolution of Capital Allocation to the Real Estate Sector



This figure depicts estimated coefficients from mapping out Column (1) in Table 4 over time with 2015 as base year. The solid lines around coefficients indicate 95% confidence intervals.

Electronic copy available at: https://ssrn.com/abstract=4006275

Table A1: Variable Appendix

Variable Name	Definition	Source
Share Eligible (Static) (%)	(Average lending to CSPP eligible firms between 2014q1 and 2015q4) / (Average lending to all firms between 2014q1 and 2015q4)	Credit Register
Share Eligible (%)	Fraction of a bank's Eurozone corporate portfolio that is to CSPP-eligible firms	Credit Register
Lending to Eligibles (€m.)	Lending to CSPP-eligible Eurozone non-financial corporations (NFCs)	Credit Register
Lending to Ineligibles (€m.)	Lending to CSPP-ineligible Eurozone non-financial corporations (NFCs)	Credit Register
Total Corp Lending (TCL) (€m.)	Lending to CSPP-eligible Eurozone NFCs + Lending to CSPP-ineligible Eurozone NFCs	Credit Register
PD (%)	Volume-weighted PD of a bank's Eurozone NFC portfolio. Constructed as follows: First, each firm is assigned a static PD as the median PD across all banks as of 2015q4 (if no 2015q4 PD is available, take the one from 2015q3,..,2012q1,2016q1,..2019q4). Do not consider firms with missing PD. Then, value-weight the firm PDs per bank-quarter	Credit Register
Share HY (%)	(Lending to firms with (PD-implied) High Yield Rating) / Total Corporate Lending	Credit Register
Share SME (%)	Lending to SMEs (According to definition in Amadeus) / Total Corporate Lending	Credit Register, BvD Amadeus
Share Public (%)	Lending to Public Firms / Total Corporate Lending	Credit Register
NII / Toas (%)	Net Interest Income / Total Assets	SON
Loan write-offs / Toas (%)	Write-offs on loans / Total Assets	SON
Rest / Toas (%)	(Fee Result + Trading Result + Other Noninterest Income – Administrative and Personnel Cost + Loan Write-ons + Revaluation Result + Extraordinary Result) / Total Assets	SON
RoA (%)	NII/Toas - Loan write-offs / Toas + Rest/Toas	SON

Electronic copy available at: https://ssrn.com/abstract=4006275

Variable Name	**Definition**	**Source**
Capital Ratio (%)	(T1 and T2 capital) / RWA	BAKIS
Deposit Ratio (%)	(Overnight deposits + term deposits) / Total Assets	BAKIS
Off-BS Ratio (%)	Off-BS-Activities / Total Assets	BAKIS
Share of Fee income (%)	Fee Income / Total Income	BAKIS
Total Assets (%)	GDP-Deflated Total Assets	BAKIS

Electronic copy available at: https://ssrn.com/abstract=4006275

Table A2: Capital Allocation in the Manufacturing Sector

	CSPP Eligibility		Risk			Firm Size		Public/Private	
Dependent variable:	Eligible	Ineligible	IG	HY	Unrated	SME	Large	Public	Private
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat x After	0.1842	0.3080	0.3718	0.2155	-0.0950	-0.0809	0.5731	0.2433	0.2490
	(1.03)	(0.71)	(1.39)	(1.19)	(-0.39)	(-0.68)	(1.45)	(1.11)	(0.60)
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Quarter FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110
Sample Mean in %	1.55	11.93	5.63	4.14	3.71	2.11	11.37	2.75	10.73
% of sample mean	11.89%	2.58%	6.60%	5.21%	-2.56%	-3.83%	5.04%	8.86%	2.32%

This table examines the impact of the CSPP on banks' Corporate Portfolio in the Manufacturing Sector. The dependent variable in each column is the quarterly share of a bank's portfolio, e.g., the dependent variable in Column 1 is the total lending to CSPP eligible manufacturing firms divided by the overall corporate loan portfolio size. The sample mean prior to the CSPP as well as the magnitude of the coefficient (defined as the coefficient divided by the sample mean) are given in the two last rows. All variable definitions are in Appendix A1. We include one fixed effect for each bank and one fixed effect for each quarter as well as lagged control variables (Log Total Assets, Capital Ratio, Deposit Ratio, Off-Balance-Sheet Ratio and Share of Fee Income). T-statistics with standard errors adjusted for clustering at the bank level are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1%-level (two-tailed), respectively.

Electronic copy available at: https://ssrn.com/abstract=4006275

Table A3: Capital Allocation in the Wholesale Sector

	CSPP Eligibility		Risk			Firm Size		Public/Private	
Dependent variable:	Eligible	Ineligible	IG	HY	Unrated	SME	Large	Public	Private
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat x After	0.0497	0.2000	0.0061	0.3876	-0.1440	-0.0162	0.2659	-0.1722	0.4219
	(1.22)	(0.50)	(0.03)	(1.22)	(-0.62)	(-0.13)	(0.76)	(-1.38)	(1.10)
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Quarter FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110
Sample Mean in %	0.18	8.64	2.90	3.55	2.38	1.63	7.19	1.00	7.82
% of sample mean	28.22%	2.31%	0.21%	10.94%	-6.06%	-0.99	3.70%	-17.20%	5.40%

This table examines the impact of the CSPP on banks' Corporate Portfolio in the Wholesale Sector. The dependent variable in each column is the quarterly share of a bank's portfolio, e.g., the dependent variable in Column 1 is the total lending to CSPP eligible wholesale firms divided by the overall corporate loan portfolio size. The sample mean prior to the CSPP as well as the magnitude of the coefficient (defined as the coefficient divided by the sample mean) are given in the two last rows. All variable definitions are in Appendix A1. We include one fixed effect for each bank and one fixed effect for each quarter as well as lagged control variables (Log Total Assets, Capital Ratio, Deposit Ratio, Off-Balance-Sheet Ratio and Share of Fee Income). T-statistics with standard errors adjusted for clustering at the bank level are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1%-level (two-tailed), respectively.

Electronic copy available at: https://ssrn.com/abstract=4006275

Table A4: Capital Allocation in the Electricity Sector

	CSPP Eligibility		Risk			Firm Size		Public/Private	
Dependent variable:	Eligible	Ineligible	IG	HY	Unrated	SME	Large	Public	Private
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat x After	-0.1537***	-0.3640	-0.4584*	0.1419	-0.2012	0.4649*	-0.9826**	-0.2469**	-0.2708
	(-2.66)	(-0.96)	(-1.74)	(0.84)	(-0.98)	(1.72)	(-2.56)	(-2.04)	(-0.78)
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Quarter FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110
Sample Mean in %	0.42	8.34	3.82	1.63	3.30	2.83	5.92	1.43	7.32
% of sample mean	-27.09%	-4.37%	-11.99%	8.69%	-6.10%	16.44%	-16.59%	-17.27%	-3.70%

This table examines the impact of the CSPP on banks' Corporate Portfolio in the Electricity Sector. The dependent variable in each column is the quarterly share of a bank's portfolio, e.g., the dependent variable in Column 1 is the total lending to CSPP eligible electricity firms divided by the overall corporate loan portfolio size. The sample mean prior to the CSPP as well as the magnitude of the coefficient (defined as the coefficient divided by the sample mean) are given in the two last rows. All variable definitions are in Appendix A1. We include one fixed effect for each bank and one fixed effect for each quarter as well as lagged control variables (Log Total Assets, Capital Ratio, Deposit Ratio, Off-Balance-Sheet Ratio and Share of Fee Income). T-statistics with standard errors adjusted for clustering at the bank level are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1%-level (two-tailed), respectively.

Electronic copy available at: https://ssrn.com/abstract=4006275

Table A5: Capital Allocation in the Financial Sector

	CSPP Eligibility		Risk			Firm Size		Public/Private	
Dependent variable:	Eligible	Ineligible	IG	HY	Unrated	SME	Large	Public	Private
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat x After	-1.2691***	-0.6579*	-1.7399***	-0.0693	-0.1178	0.0040	-1.9310***	-0.7556***	-1.1713***
	(-5.13)	(-1.72)	(-4.36)	(-0.70)	(-0.86)	(0.66)	(-4.19)	(-2.86)	(-3.63)
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Quarter FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110
Sample Mean in %	2.61	3.59	5.58	0.31	0.31	0.02	6.18	3.54	2.66
% of sample mean	-48.71%	-18.31%	-31.18%	-22.21%	-38.53%	27.25%	-31.23%	-21.36%	-44.04%

This table examines the impact of the CSPP on banks' Corporate Portfolio in the Financial Sector. The dependent variable in each column is the quarterly share of a bank's portfolio, e.g., the dependent variable in Column 1 is the total lending to CSPP eligible financial firms divided by the overall corporate loan portfolio size. The sample mean prior to the CSPP as well as the magnitude of the coefficient (defined as the coefficient divided by the sample mean) are given in the two last rows. All variable definitions are in Appendix A1. We include one fixed effect for each bank and one fixed effect for each quarter as well as lagged control variables (Log Total Assets, Capital Ratio, Deposit Ratio, Off-Balance-Sheet Ratio and Share of Fee Income). T-statistics with standard errors adjusted for clustering at the bank level are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1%-level (two-tailed), respectively.

Electronic copy available at: https://ssrn.com/abstract=4006275

Table A6: Capital Allocation in Other Sectors

	CSPP Eligibility		Risk			Firm Size		Public/Private	
Dependent variable:	Eligible	Ineligible	IG	HY	Unrated	SME	Large	Public	Private
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treat x After	-0.4849*	0.4076	-0.6838	0.2304	0.3761	0.2666	-0.3439	-0.2445	0.1672
	(-1.70)	(0.69)	(-1.39)	(0.69)	(1.04)	(1.43)	(-0.58)	(-0.61)	(0.29)
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bank FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Quarter FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110	7,110
Sample Mean in %	2.65	27.94	13.39	8.01	9.19	4.87	25.72	5.61	24.98
% of sample mean	-18.32%	1.46%	-5.11%	2.88%	4.09%	5.48%	-1.34%	-4.36%	0.67%

This table examines the impact of the CSPP on banks' Corporate Portfolio in other sectors than those depicted in the above tables. The dependent variable in each column is the quarterly share of a bank's portfolio, e.g., the dependent variable in Column 1 is the total lending to CSPP eligible other firms divided by the overall corporate loan portfolio size. The sample mean prior to the CSPP as well as the magnitude of the coefficient (defined as the coefficient divided by the sample mean) are given in the two last rows. All variable definitions are in Appendix A1. We include one fixed effect for each bank and one fixed effect for each quarter as well as lagged control variables (Log Total Assets, Capital Ratio, Deposit Ratio, Off-Balance-Sheet Ratio and Share of Fee Income). T-statistics with standard errors adjusted for clustering at the bank level are reported in parentheses. *, ** and *** indicate statistical significance at the 10%, 5% and 1%-level (two-tailed), respectively.

Electronic copy available at: https://ssrn.com/abstract=4006275