

Tracking the real effects of monetary policy: Evidence from European Central Bank's SMP purchases ^{*,**}

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Abstract

We test if unconventional monetary policy by the ECB had any real effects in terms of employment, investment, sales, and productivity. Specifically, we observe the security-by-security trades under the Security Markets Program (SMP) of the ECB, match these transactions to security holdings of all German banks, and assemble a large sample of around half a million German corporates that maintain relationships with these 1,700 banks. We test if those corporates tied to banks exposed to the positive liquidity shock represented by the SMP exhibit any economic stimulus. Our results indicate instead that firms connected to an SMP shocked bank experience lower growth in employment and sales than those companies which finance with unaffected banks. But we also find evidence that firms connected to stimulated banks show higher increases in their level of investment as well as productivity.

Keywords: Unconventional monetary policy, asset purchase programs, ECB

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1. Introduction

“[...] the ECB has taken a series of major monetary policy measures [...] because the use of these new instruments can have different consequences than conventional monetary policy, in particular with respect to the distribution of wealth and the allocation of resources, it has become more important that those consequences are identified, weighed and where necessary mitigated.”

Camdessus lecture by Mario Draghi, President of the

ECB, IMF, Washington, DC, 14 May 2015

We ask whether and how unconventional monetary policy in the form of asset purchase programs transmitted to the real economy. For a large European economy, Germany, we observe which financial institutions were affected by such an exogenous monetary policy shock. Specifically, we match security-by-security transactions of the Securities Market Program (SMP), under which the European Central Bank (ECB) purchased a notional value of sovereign bonds in secondary markets on the order of €218 billion from five countries (Italy, Ireland, Spain, Portugal, and Greece) between May 2010 and September 2012 (Manganelli, 2012; Eser and Schwaab, 2016) to the bank-by-bank security holdings of all German banks. To trace out any real effects, we identify then for approximately 500,000 German corporations their bank relationship. By comparing corporates’ employment, investment, sales, and productivity that were tied to banks with access to the SMP to those corporates that were banking with financial institutions that had no SMP access, we shed light on the real effects of unconventional monetary policy.

In contrast to most prior work that has to rely on the times series variation of aggregate asset purchase programs, detailed information on SMP transactions, security holdings by banks, and corporates’ relationships with banks allow us to take a granular micro-perspective that exploits the cross-sectional differences of corporates’ economic choices before and after the policy shock. Identifying the differences of economic choices by German corporates in response to the SMP shock transmitted through their relationships with German banks is particularly useful to avoid the econometric challenge that most policy impact evaluations suffer from endogenous relationships between the state of the economy and the decision by the central planner to activate a certain policy instrument (Ghysels et al., 2014). Arguably, the ECB launched the SMP¹ due to dramatically widening sovereign debt spreads during the European

¹As well as other, smaller scale asset purchase programs, such as the covered bond purchase programs.

sovereign debt crisis. By mitigating the resulting funding pressure for some Eurozone economies, the main objective was thus to restore the conventional transmission mechanism of monetary policy rather than spurring employment and investment by German small and medium sized enterprises (SME). Therefore, the SMP transactions represent an important exogenous policy shock to German banks and firms that is particularly well-suited as a quasi-natural experiment to test if unconventional monetary policy has consequences for the real economy.

The main contribution of this paper is therefore to provide direct evidence on the transmission of monetary policy through banks' security holdings to real economic activity of individual corporations that is based on observed differences in banks' exposure to an exogenous policy shock. By combining the unique and detailed data on both the executed trades under a large ECB asset purchase program with detailed holdings data of an entire banking system that was not targeted by the program as such, we bridge earlier micro and macro literature that investigated unorthodox monetary policy instruments.

From a macro perspective, various studies assess the effect of both US and, to a lesser extent, European asset purchases. This literature usually relies on Vector Autoregressive Regression (VAR) methods to econometrically identify the response of real variables to unconventional monetary policy. For example, [Gambacorta et al. \(2014\)](#) report that loose monetary policy sparked economic output and increased prices even at interest rates close to zero. Also [Boeckx et al. \(2017\)](#) find that lengthening the balance sheet of the ECB stimulates bank lending, stabilizes financial markets, and boosts economic activity and prices. But they also document significant differences in the transmission intensity and even the direction of policy shock responses conditional on differences in the capitalization and the riskiness of national banking systems. They note that a more granular perspective on monetary policy transmission that takes into account bank-level heterogeneity is warranted.

At the micro level, most studies that investigate the effects of conventional and unconventional monetary policy focus, in turn, on any observable changes in the behaviour of banks. One strand focuses on the effectiveness of emergency liquidity provision by the Federal Reserve in the US, such as [Wu \(2011\)](#) or [Duygan-Bump et al. \(2013\)](#). Another strand relates more directly to the implications of sovereign debt holdings by banks, which have been subject to preferential regulatory treatment in terms of capital requirements and subjects to outright purchases by central banks. [Acharya et al. \(2014\)](#) use bank-level data combined with syndicated loan market data to show that emergency bailouts resulted in higher loan pricing. [Jiménez et al. \(2014\)](#) show that excess liquidity due to loose monetary policy also induced the least well capitalized banks to lend at higher loan rates to the most risky borrowers, suggesting

that monetary policy is potentially hazardous to both financial and firm stability. Related, [Acharya and Steffen \(2015\)](#) show that the preferential treatment of sovereign debt induced banks to engage in carry-trades, thereby juxtaposing desired contributions to financial stability through monetary policy of central banks. With respect to non-bank financial intermediaries, however, [Chodorow-Reich \(2014a\)](#) uses high-frequency event studies to show that unconventional policy in the US between 2008-09 improved the financial stability especially of life insurances. He finds only limited evidence of additional risk taking as a consequence of a quest for yield among money market mutual funds, which contrasts with a number of studies attributing undesirable bank behaviour, such as liquidity hoarding ([Acharya and Merrouche, 2013](#)) or credit traps ([Benmelech and Bergman, 2012](#)), to excessively loose monetary policy. To the extent that already the effects of asset purchase programs within the financial system are mixed, the effects of unorthodox policies on the real sector are ex ante unclear and call for empirical evidence.

Such evidence is generally scarce. Recent literature on the real effects of bank funding shocks focuses on the transmission of negative liquidity shocks as they occurred throughout the financial crisis and sovereign debt crisis on firms, such as [Degryse et al. \(2016\)](#) for Belgian firms, [Amador and Nagengast \(2016\)](#) for Portuguese firms, [Bottero et al. \(2017\)](#) for Italian firms, and [De Marco \(2017\)](#) for a set of European firms. An important example are [Popov and Rocholl \(2015\)](#) who focus on German firms. They analyze a large sample of German firms and explain employment and wages conditional on each firms relationship with a bank that is affected by the financial crisis. Their identification scheme mimics the one suggested in [Puri et al. \(2011\)](#). Distressed regional banks are those that are part of a central savings banks funding network where the parent bank had an exposure to the subprime mortgage market in the US prior to the 2008 meltdown. This approach suffers from a number of important limitation. First, it only considered regional savings banks, which have a corporate loan market share on the order of 20%. It neglects therefore the largest part of Germany's banking sector other than government-owned savings banks that is of critical importance to fund investment and employment. Second, this approach only gauges (indirectly) exposure to the 2008 crisis, but remains mute as to the effects of policy steps taken by central banks to battle the more recent economic slump after 2010. Third, the transmission of shocks *and* policy remains rather indirect because it remains unobserved, which banks have been exposed to which policy to what extent. Tracking an asset purchase program in detail at the security-bank-firm level is what we do with our more granular view.

Similarly, [Chodorow-Reich \(2014b\)](#) pursues a more direct approach for U.S. firms. He identifies banks' exposure to the financial crisis by each bank's exposure to Lehman brothers through syndicated loan deals,

in holdings of asset backed securities, and by other balance sheet measures. Using syndicated loan data, he shows both a decline in credit supply for banks that are affected by the financial crisis as well as a negative effect on employment growth at firms those banks provide syndicated loans to. However, also this important paper remains mute as towards the real effects of unconventional monetary policy, which is the gap that we seek to fill with this paper.

To investigate the real effects of unconventional monetary policy measures in response to the European sovereign debt crisis on firms, we construct a large, novel dataset to exactly identify those firms that were affected through their banks' trading portfolio holdings of securities that were absorbed by the ECB under the SMP. We sample approximately half a million German firms and their bank relationship. Around 95% of sampled firms are SME that depend intensively on banks for external funding purposes.² We estimate the differential effect between SME that are connected with banks that hold SMP eligible assets in their portfolio relative to SME that have no such bank relationships. We compare firm-level employment, investment, sales, and labor productivity as measures of economic activity in the years before the EU sovereign debt crisis (2008–2009) to the time periods during (2010–2012) and after the asset purchase program was in place (2013–2014). Next to bank- and firm-specific control variables, we specify firm-fixed effects to account for unobservable firm characteristics and district-year-fixed effects to gauge local aggregate demand.

We find that SME with a business relationship to banks that are affected by the SMP shock exhibit between 3% to 5% lower employment compared to SME without relationships to SMP banks during the time period in which the ECB conducted the asset purchases. This employment differential in employment persists during the two years after the SMP stopped in 2012. With respect to turnover, we find a negative differential effect for affected firms on the order of 70 basis points during the SMP period and 4.2% after 2012. In contrast, SME that are exposed to the positive liquidity shock through their bank invest about 2% more into fixed assets compared to non-affected firms. This result is even larger in magnitude for the time after the SMP purchases stopped. Likewise, firms exposed to treated banks exhibit larger labor productivity of about 1.7% in crisis times and 2.3% in the aftermath of the SMP. Overall, these results provide evidence that unconventional monetary policy in the form of outright asset purchases had unintended consequences for the real economy besides the reduction of sovereign bond spreads of periphery countries in the Eurozone. The results suggest that loose monetary policy measures

²The European Commission defines SME as firms with less than 250 employees and less than €50 million turnover or less than €43 million balance sheet volume. In the EU, 90% of firms are classified as SMEs.

sparked capital expenditures, but also a relative contraction of the labor intensity of German SME. As such, gains in labor productivity accrue apparently more than proportionate to those firms that happened to maintain relationships with banks that benefited unintentionally from the asset purchase program of the ECB.

Section 2 outlines the identification strategy and the estimation method. Section 3 describes the firm and the bank sample. Section 4 discusses first the main results regarding real outcomes in terms employment, investment, sales, and productivity. In this section we also shed light on the intensive margin of treatment. Subsequently, we discuss robustness checks using a matched sampling of firms as well as further subsamples of firms and estimation techniques. Section 6 analyzes the role of different bank relationships before we conclude in Section 7.

2. Identification and specification

In Q2:2010, the ECB started to purchase sovereign bonds from selected European countries to combat soaring spreads and spreading concerns regarding the ability of these economies to roll-over debt and associated financial instability of banking systems that were heavily exposed to these assets ([Eser and Schwaab, 2016](#)). Until Q1:2012, the ECB purchased a notional volume of more than €200 billion in sovereign bonds from Greece, Italy, Ireland, Portugal, and Spain, roughly equal to 3% of Eurozone GDP at the time. The SMP thereby represented the largest asset purchase program until then with the explicit objective to "address the malfunctioning of securities markets and restore an appropriate monetary policy transmission mechanism" ([ECB, 2010](#)).

Our identification strategy of the real effects of unconventional monetary policy in the Eurozone exploits the fact that the SMP was therefore an exogenous monetary policy shock to *German* banks and firms. Rather than mitigating funding pressure of German banks or sparking output growth of German SME, the SMP was incepted in response to dramatically widening spreads for periphery bonds during the European sovereign debt crisis. Therefore, the policy is much less prone to reverse causality critique compared to, for example, empirical studies aiming to identify the effects of liquidity facilities on domestic banking systems, such as [Berger and Roman \(2015\)](#), because the policy was not introduced as a result of weak economic conditions that ignited unconventional loose monetary policy. In fact, German corporates grew above the Eurozone average by the time the ECB launched the SMP as opposed to macroeconomic and corporate sector conditions in the Eurozone periphery that continued to be bleak by 2010.

As such, the effect of the SMP on the German economy represents a quasi-natural experiment to

shed light on the real effects of unconventional monetary policy in general and asset purchase programs by central banks in particular. Despite its objective to ease funding conditions in the periphery of the Eurozone, we expect that the effects of the SMP can be economically meaningful. German banks held significant amounts of periphery sovereign debt prior to the sovereign debt crisis (see, for example, [Buch et al., 2011](#); [Kirschenmann et al., 2016](#); [Horváth et al., 2015](#)). Since a selective purchase of certain sovereign debt of the Eurozone by the ECB was unanticipated, we argue that self-selection of banks into holding these assets is likewise a subordinate concern in our set-up.

Specifically, our identification strategy hinges on the observed transactions conducted by the ECB on a security-by-security basis rather than aggregate volumes of various asset purchase programs. As in [Eser and Schwaab \(2016\)](#), we observe for each individual transaction the number and market value of the purchased asset that is identified by its individual ISIN number together with a time stamp of execution dates. To track the differential effect of these transactions on firms' choices via their bank-firm relationships, we pursue a two-stage matching. First, we identify which German banks held assets that were purchased by the ECB. Second, we identify for 1.5 million German firms the banks with whom they maintain a relationship so as to shed light which firms were affected by the SMP via their financial institution. Ultimately, we then compare the development of factor demand, output, and productivity of firms with and without such a treatment in the years prior to the SMP (2008-2009) with the development of these variables during (2010-2012) and after (2013-2014) the SMP was in place.

2.1. German banks and the Securities Markets Purchase program

To this end, we first combine SMP transactions data with the securities holding statistic of Deutsche Bundesbank. These data report all securities held in banks' trading and hold-to-maturity portfolios, quarter-by-quarter and security-by-security. Banks that held securities at the end of a quarter that were part of the SMP purchases during the quarter are affected by the expansionary monetary policy shock. Such banks possess a larger credit granting capacity through two channels. First, banks may directly sell these fixed income assets under the SMP to the ECB and convert the resulting excess reserves into credit to corporates and households. Second, even if banks did not actually sell the asset to the ECB, [Eser and Schwaab \(2016\)](#) document favorable asset price increases after the announcement of the program. Banks that benefited from positive valuation effects from increased market prices therefore should also possess a larger credit supply capacity compared to a bank that did not hold an SMP bond.

A possible concern regarding the external validity of our identification scheme is that the entire focus of the SMP, namely Eurozone periphery country debt, implies that only very few (very large) German

banks were affected by the policy. The combined SMP purchase and the security holdings statistic data clearly rebut such concerns. Around 400 of the more than 1,700 German banks held at least once a security in their portfolio, which was part of the SMP in the same quarter. Hence, the shock that we analyze has a pervasive effect on the German banking system rather than affecting only large and listed banking groups with active investment banking divisions. Likewise, figure 1 shows that in terms of the total assets, affected banks exhibited a market share of around 75% during the six quarters when the ECB purchased sovereign debt securities between Q2:2010 and Q1:2012.

– Figure 1 around here –

The SMP shock affects banks of all banking groups, which we show in Figure 2. Any change in banks' conduct regarding credit granting and pricing should be of particular importance to SMEs, which depend to a larger extent on bank finance compared to large corporations with direct access to financial markets. The data reveals that 23% of the regional private, savings, and cooperative banks are affected. These relatively small institutions are traditionally the prime bank relationship for SME and we have therefore reason to hypothesize that SMP effects existed in Germany as well. Regarding the importance of sovereign bonds purchased under the SMP in banks' portfolios, we find that these shares are overall small. While large and nationwide operating banks have on average between 0.26 and 0.91% of eligible assets in their portfolio, the bandwidth of portfolio share is more narrow for the group of small banks. They hold between 0.11% and 0.29% of assets in their portfolio potentially eligible to the SMP. Small shares are reasonable to expect, given a well documented home bias in holding sovereign debt (e.g. [Acharya et al., 2014](#); [Kirschenmann et al., 2016](#)). It remains an empirical question though, whether even such relatively small exposures yield any real effects, for example by altering banks' expectations of the ECB to stand ready as a lender of last resort by conducting asset purchase programs.

– Figure 2 around here –

A first important requirement for a valid identification is, however, that banks with SMP securities in their portfolios are not systematically different from another. Otherwise, one might be concerned that certain banks self-selected into riskier sovereign debt, for example in search for yields or with the intention to benefit from regulatory arbitrage ([Acharya and Steffen, 2015](#)). To this end, Table 1a shows a comparison of various bank traits between banks with and without SMP access for the period before and during the policy. Banks do not differ significantly with respect to capitalization, liquidity, cost-income-ratios, return on equity, customer loan growth, and total asset growth. However, affected banks

are larger in terms of balance sheet size, possess more hidden liabilities, and lower shares of customer loans and non performing loans. These differences persist for both time periods raising concerns about whether banks treated differently are indeed comparable and later whether firms matched to those banks are as well.

– Table 1a around here –

Therefore, we conduct a propensity score matching including only banks which belong to small, regional banks: small private banks, savings banks, and cooperative banks. Panel B of table 1a confirms that these matched samples of banks are identical regarding their characteristics both before SMP as well as thereafter³. For the banks in these matches samples, the share of relevant asset holdings is distributed statistically identical as well. For this sample of small, regional banks it is also plausible that their asset holding do neither cause ECB’s choices to purchase certain sovereign bonds, nor that they are subject to further unobserved effects which are systematically related to the bank’s holding of peripheral sovereign debt of up to 0.29% on average. Therefore, the policy shock in the form of the SMP and the treatment of banks is arguably random and exogenous. Testing the real effects on firms associated with these banks will be one of our most important robustness test to show that our findings for the whole universe of firms that we observe holds also for a matched sample of firms associated with a matched sample of banks.

– Table 1b around here –

Eliminating level differences in bank traits still does not exclude differences in the trends exhibited by these variables prior to the start of the SMP. This is a potential concern if, say, banks with exposures to relatively risky sovereign debt that was bought by the ECB already exhibited deteriorating financial profiles prior to the SMP. Table 1b shows therefore the growth rates of bank characteristics before SMP (from 2008 to 2009) and during SMP (from 2010 to 2012) for both treated and non treated banks. Only very few differences in trends exist between banks for the whole sample and only one with respect to hidden liabilities for the matched sample of banks, thereby validating the common trends assumption. Regarding the full sample of banks, panel A, we find that treated banks increase equity by 0.023% whereas non treated banks have on average a stable equity ratio. Both before and during SMP significantly fewer treated banks have hidden liabilities than not treated banks. During SMP not affected banks grow more

³We conduct a one-to-one propensity score matching procedure based on the listed bank characteristics. Having a larger set of not treated banks than treated banks arises from matching banks in each year, thereby allowing differences in the matched not treated banks between years.

regarding their balance sheet size than affected banks do. Only differences with respect to hidden liabilities are persistent to the matched sample. For all other characteristics, we find no differences in trend over time and for affected and not affected banks. In particular loan levels and liquidity, which are indicators for structural differences in liquidity providing behaviour towards the real economy, are not statistically different.

In sum, we expect that SMP affected banks possess additional credit bearing capacities, which may result in an increased supply of lending to SME due to unconventional monetary policy. Especially for opaque, bank-finance dependent SME these effects might therefore very well be highly relevant and should affect the financing conditions of German firms.

2.2. Firms and their relationship with treated and not treated banks

As a next step, we establish the connection between banks and firms. We do so for a large sample of German firms as in [Popov and Rocholl \(2015\)](#). For each firm we observe the name of the bank or banks with which the firm maintains a payment service relationship from the Dafne database provided by Bureau van Dijk.⁴ Accordingly, we know for each firm if it is connected to one or more banks that were exposed to the monetary policy shock. Based on these data, we divide our sample of firms into those with and without an exposure to the unconventional monetary policy shock represented by the SMP.

We consider a firm shocked if it reports at least once a relationship with a bank that is affected through its asset holdings during the time where the SMP was in place.⁵ Although the majority of firms has a relationship to only one bank, there are also firms with multiple bank relationships. About half of the sampled firms are considered treated by the SMP.

Due to the persistence of bank relationships and the exogeneity of unconventional monetary policy, we rule out that firms self-select into a bank-relationship based on the treatment of the bank by the SMP. However, firms might be systematically different based on whether they are with a treated or not treated bank. [Table 2](#) shows that this is the case. Treated firms differ from those not treated with respect to both the variables we investigate – employment, investment, sales, and labor productivity – as well as firm traits.

⁴Note that we extract the time series of firm-bank relationships from annual vintages of this database.

⁵Due to data availability we have to face gaps in the matching between firms and banks, which we describe in greater detail below. The average duration of a bank relationship documented in the literature is around 12 years for a German sample by [Harhoff and Körting \(1998\)](#) or more than 15 years for the case of Norway by [Ongena and Smith \(2001\)](#), which is substantially longer compared to our sample. Thus, we consider it a valid assumption that the majority of bank relationships is stable over time.

– Table 2 around here –

These differences in means, as shown in panel A of table 3, remain to be statistically significant for the period before and during SMP as well as the differences in means over time. But importantly, we do not find any differences in trends prior to the SMP according to panel B despite the differences in mean levels of firm observables. This result shows that treated firms differ from non-treated firms with respect to the levels of characteristics, but they do not regarding their development over time in the run-up to the policy shock. Both types of firms follow the same trends in time both before SMP as well as during the period of the monetary policy induced liquidity shock to banks.

– Table 3 around here –

This feature allows us to compare firms affected by the SMP through their bank to those firms not affected in a difference-in-difference setting. In addition to this baseline setting, we also show below virtually identical real effects for a sample of firms resulting from a propensity score matching procedure. Based on the construction of such a valid counterfactual group, we compare firms which are similar to each other regarding the levels of their characteristics.

– Table 4 around here –

Table 4 reports the descriptive statistics for this analysis, which will be an important part of the robustness tests we perform. Thus, we will not only base our analysis on the sample of firms aiming to cover the largest possible part of the German SME universe, but show also evidence for a very small and conservatively composed sample of firms. Thereby, we provide consistent estimates for a matched sample of firms based on a matched sample of small and specialized banks.

2.3. Empirical specification

To identify differences in real effect, we use a rich panel dataset which enables us to compare firms which are either affected by their bank holding peripheral European sovereign debt bought by the ECB under their asset purchase program or not. Furthermore, we compare outcomes over different time periods, that is before the SMP was put in place, 2008 and 2009, and during the intervention of the ECB from 2010 until 2012 and hereafter in 2013 and 2014. For our difference-in-difference setting we specify the following equation:

$$\text{Log}(Y)_{it} = \alpha_i + \alpha_{dt} + \beta_1 \text{Time}_t \times \text{Affected}_i + \delta X_{it} + \delta X_{bit} + \epsilon_{it} \quad (1)$$

The dependent variables, Y , are the logarithm of the level of employment, sales, investment, and productivity of firm i in period t . The coefficient of interest is β_1 , the interaction term between affected firms and time. Affected firms are defined as a dummy equal to 1 if the firm has a relationship with at least one bank that, at some point in time, holds assets bought by the ECB under the *SMP* and 0 otherwise. We interact this treatment dummy with a time dummy that equals 0 in the pre-SMP period 2008 and 2009 and 1 either during the years in which SMP takes place or in the two years after SMP.

To control for unobservable firm, and time-varying district traits we correspondingly include fixed effects for each firm, α_i , and district-year-combination α_{dt} . We observe firms in all 96 German agglomeration areas d . X_{it} is a matrix of firm-specific time varying characteristics. Following [Acharya et al. \(2014\)](#), we control for the size of firms by including their logarithm in assets, their leverage, net worth, fraction of tangible assets, ability to cover interest expenses, earnings, cash flow and outside financing opportunities by an indicator on whether they are a publicly listed company or not. The exact variable definitions are provided in table 19. Moreover, we control for time varying bank characteristics of those banks b with which firm i has a business relationship with in time t . In case of multiple bank relationships, bank characteristics are averaged. This vector of control variables includes the size of banks, their capitalization, the bank reserves ratio, its stock of hidden liabilities, fraction of customer loans, non-performing loans, cost-income ratio, return on equity, customer loan growth and balance sheet growth. Bank characteristics are available including 2013.

3. Data

3.1. Firm sampling

In our initial sample, we observe 1,562,526 German firms and their balance sheet information between 2005 and 2014 using Bureau van Dijks' Amadeus database. Our main period of analysis includes 2008 and 2009 as the pre-treatment period, the years 2010, 2011, and 2012 as the period of treatment in which the ECB conducted asset purchase programs as one of the main measures under unconventional monetary policy whose effect we analyze. Moreover, we observe firms during the post-treatment period in 2013 and 2014. We exclude firms of the mining industry due to large outliers. Moreover, we exclude firms of the financial and real estate industry, and other non-producing sectors. This leaves us with 902,416 firms.

Furthermore, we observe a second dataset consisting of 1,314,100 German firms together with the bank with which the firm has a business relationship. This information is retrieved from the yearly batches of Bureau van Dijks' Dafne database. Making use of data vintages for each year ensures that

firms exiting the market in a given year are included in our sample. Moreover, observing stable firm-bank relationships over time allows us to conclude that firms do not self select into banks exposed to additional liquidity and change their bank relationship accordingly.

The universe of banks these firms have a relationship with contains 6,369 different bank names. Following a manual match with information from Deutsche Bundesbank, we are able to match 5,094 bank-name observations with a unique identifier. These matches consist of 1,958 unique bank identifiers⁶ due to multiple spellings of the same bank occurring in the original sample of bank-name observations. By using data from Deutsche Bundesbank, we automatically exclude foreign banks and their branches in Germany.

Having uniquely identified a large fraction of banks being active in corporate banking, we add financial information available to 1,747 banks from Deutsche Bundesbank's database on bank supervision. Furthermore, for each year we know whether the bank was affected by unconventional monetary policy conducted as a response to the European sovereign debt crisis or not. Using the securities holdings statistic which includes each security by ISIN on a quarterly frequency, we observe each bank's asset portfolio of securities. From the European Central Bank, we have proprietary information on the assets which were bought under the SMP in each quarter. Matching this information with the securities holdings statistic makes us identify the treatment of each bank by SMP in each quarter. For the dataset on bank-firm relationships, we aggregate this information on bank treatment to the year-level.

We merge the dataset with information on firm-bank relationships on our dataset with firms' balance sheet information. Keeping only those firms for which there is information on their business relationship with banks at least at one point in time as well as information on the firm's location leaves us with a final sample of 502,580 firms and 2,435,629 observations between 2008 and 2014.

3.2. Firm outcome

The characteristics of firms we observe are depicted in table 2. Half of the firms in our sample have a business relationship with a bank that was affected by the SMP through its security holdings. Although we identify only one quarter of all banks to be directly affected by the SMP, these banks are overly represented in the firm-bank relationships we observe. While 61% of firms have only one bank-relationship, 36% of firms have at its maximum 2 or 3 bank relationships.

⁶As of 2014, there are 1990 banks in Germany. Although consolidation took place, we cover a large fraction of banks which were existent during the period in Germany.

In our analysis, we are interested in explaining differences in employment, investment, sales and productivity. The average firm in our sample employs 40 people. As our distribution is right-skewed, the median firm is much smaller and has 8 employees. The average wage an employee receives is 45,668.88 Euros (40,029.83 for the median employee). The median firm does not increase its fixed assets but reduces them on average by 1.4% between 2008 and 2014. Those firms which invest increase their assets by about 0.9 mln. EUR at the mean (18 k EUR at the median). Moreover, we investigate the sales of firms which is 12.312 mln. Euros, the median firm has sales of 1.2 mln. Euros. Additionally we investigate labor productivity which is the average turnover per employee. The mean employee contributes 0.404 mln. Euros and the median employee 0.125 mln. Euros in turnover. Comparing the firm averages by whether the firm was affected by the positive liquidity shock numerically in panel A of table 3, reveals a substantial difference between both types of firms and between the period prior to the SMP and during the SMP: affected firms employ on average more people, invest more, record more sales, and are more productive over the entire sample period. Nevertheless, both types of firms share the same trends over time, which is depicted in panel B of table 3.

We control for a large set of firm characteristics. Firms have on average 2.5 mln Euros worth of assets. Less than one percent of firms is listed at a stock exchange which is coincident with our sample consisting mainly of small and medium sized enterprises. Firms in the sample have on average negative equity and, therefore, a mean leverage ratio of 1.064. Moreover, firms have a networth of on average -1.185%. Tangible assets make on average one quarter of a firm's balance sheet. Firms' earnings are on average 404 times higher than their interest expenses while in the median 4 times. Earnings make on average 14.7% of a firm's assets, whereas cash-flow amounts to 10.6% of assets.

Our sample of firms is split into firms which have at least one relationship with a bank that was affected by the SMP and those with banks not affected. Table 2 shows that there are significant differences between both types of firms and between the period prior to the SMP and during the SMP. Firms which are affected through their bank holding assets which were at the central of the regulators asset purchase program, are on average larger, less levered, have a higher networth, and relatively fewer tangible assets. Their cash flow and earnings are on average lower. Nevertheless, the average wage is significantly higher at affected firms as well as the number of banks they have a relationship with.

3.3. Bank data

Our sample includes more than 80% of all German banks for which we observe characteristics along the concept of CAMEL including variables on banks' capital, asset quality, management, earnings, and liquidity whose descriptive statistics are stated in table 1a. Banks have a balance sheet of 4.982 bn. Euros on average. They are well capitalized with an average equity ratio of 14.138% and 2.2% of their assets as reserves. 15.7% of these banks possess hidden liabilities. The average fraction of customer loans on a bank's balance sheet is 55.473% and banks grow at an average rate of 8.105%. Out of those loans on average 4.159% are non-performing. Regarding management and profitability, the average bank has a cost-income ratio of 69.012% which means that it has to invest 69 cents to earn 1 Euro. Banks' average return on equity is 13.665%. Between 2008 and 2012 the banks in our sample grew on average by 2.536% measured by balance sheet size.

We are particularly interested in the exposure of banks to the ECB's unconventional monetary policy by their holding of assets bought under the SMP. Nearly one quarter of the banks is affected in at least one of the three years SMP was in place. Thus, we are able to identify around 400 banks which hold exactly those peripheral European sovereign bonds eligible to SMP. Comparing the mean control variables as shown in table 1a, we find that affected banks differ with respect to some aspects but not all from non-affected banks. Firstly, affected banks are significantly larger than non-affected banks. They hold a lower share in customer loans but a larger fraction of hidden liabilities than non-affected banks do. Banks exposed to the policy induced liquidity shock have a lower fraction of non-performing loans and grow at a smaller rate than banks without any asset holdings of those falling under SMP.

Although treated and non-treated banks do not differ with respect to their capitalization - equity ratio and bank reserve ratio - as well as their management characteristics - cost-income ratio, return and customer loan growth -, controlling for observed time-varying bank characteristics is the most conservative mechanism to limit the effect of differences in the whole sample of banks on firms.

For banks to be comparable it is not only sufficient to test for differences in means between those treated and not treated but also to test for differences with respect to time trends. To rule out systematic differences in trends, we compare the change of bank characteristics of both treated and not treated banks as already described in table 1b. Except for hidden liabilities we do not find any differences in trends.

4. Results

4.1. Employment

We first analyze the differential effect of a firm having a business relationship with at least one affected bank during and after the SMP took place compared to the time before SMP on employment. Employment increases for all firms during and after monetary policy was conducted compared to the time before. Being with a bank affected by the SMP has a significantly negative differential effect on firm employment both while unconventional monetary policy took place as well as thereafter. Thus, affected firms' employment grows at a lower rate compared to non affected firms.

– Table 5 around here –

Table 5 shows our baseline results for the employment of firms. Columns (1) to (5) compare the time period between 2010 and 2012, when the ECB conducted the SMP, with previous years, 2008 and 2009. We first conduct the regression as in equation (1) but without any fixed effects nor control variables. Firms which are with a bank that was exposed to SMP, have on average 50.7% more employees than non-treated firms. During the time SMP was in place, firms had on average 14.7% more employees than in the time period before, which hints to increasing average employment. Nevertheless, during the time when SMP was in place, treated firms experience a 3.5% lower increase in employment than the control group of firms which were not linked to affected banks. This effect is persistent if we add firm control variables in column (2). Moreover, we add both firm-fixed as well as district-year fixed effects to control for unobservable variation between districts and within districts over time in column (3). In this setting we are not able to report the constituent terms of being affected any more due to collinearity with the firm-fixed effects. Our result stays robust at -5.1% at the highest significance level and an overall R-squared of more than 30%. In the setting of columns (2) and (3) the analysis is performed with less observations due to the availability of control variables. We limit the firm control variables to those most frequently available which are the firm size, its leverage ratio, networth and tangibility. This leaves us with around 350,000 firms in the sample. The coefficient of the interaction term stays the same in magnitude and significance as shown in column(4). Adding control variables for banks in column (5) yields a highly significant differential decrease in employment at a rate of 1.8%.

For the longer term development of employment we compare the period after SMP was conducted

with the period before⁷. Column (6) shows the regression again solely for the time-dummy, the treatment-dummy and its interaction. The level difference between treated and non-treated firms is again slightly above 50%. In 2013 and 2014 the employment level is on average one third higher than 3 years earlier. And again, we find that treated firms increased employment less after SMP took place than the control group of firms with unaffected banks. This differential persists and is significant when we add firm controls in column (7), firm-fixed as well as district-year-fixed effects in column (8), reduce the amount of firm controls to the most frequent ones in column (9), and include bank control variables in column (10). The long-term differential employment effect of firms affected by the SMP in the two years following the unconventional monetary policy measure varies between minus 3.7% and 6.1% in our most conservative methodological approach fully saturated with fixed effects and control variables.

We find that firms which are affected by SMP experience positive but lower growth in employment than non affected firms. Being with a bank that was affected by the liquidity shock leaves those firms with 1.9% less growth in employment. At an average affected firm’s employment level of 40 employees a difference of growth by 1.9% equals 1 employee less. In other words, affected firms employ one worker less than they actually would. As compared to the period before SMP, we find a differential effect of up to 2 employees⁸ less at the average affected firm after the SMP took place.

4.2. Investment

Besides labor, the stock of capital is relevant for firms to generate output according to firm’s output function. We first investigate firms’ growth in assets (table 6) for the time during which the SMP was in place (columns (1)-(5)) and thereafter (columns (6)-(10)).

– Table 6 around here –

We find evidence that over time firms in general reduce their stock of assets. Moreover, treated firms have a lower level of investment growth than non-treated firms. In our baseline column (1) with the interaction term of time and treatment as well as with firm controls in column (2) we find no interaction effect on investment growth. Both with firm-fixed and district-year fixed effects as well as with a reduced

⁷We perform our baseline analysis with both time dummies interacting with treatment in one specification as well. Table 17 shows the results which are economically and statistically similar to our findings in this and the following result sections on investment, sales, and productivity.

⁸For the average firm its employment equals 40.4. $40.4 \times 0.061 = 2.46$. If we incorporate the fact that the average affected firm has 60 employees, this effect could be as large as 4 employees less in the longer term than otherwise not being affected.

set of firm controls we find evidence that firms which are exposed to the policy induced liquidity shock experience a significantly higher growth rate in investment of 9.8% in the latter specification relative to other firms. This effect does not persist if we add bank control variables in column (5). For the time period 2013 and 2014 we find evidence in even higher economic magnitude and same significance level for the same specifications in columns (8) - (10). Thus, there is some but no conclusive evidence on investment. Therefore, we investigate the level of investments only for those firms which actually invest through positive capital expenditures in table 7. Here, we consider only those firms which increase their level of assets and do not divest.

– Table 7 around here –

In table 7 we compare the level of investments undertaken during and after the ECB’s asset purchase program. In our baseline for both time periods (columns (1) and (6)) we find that investments increase over time and that the level of investment is on average higher for the group of treated firms.

We control for general differences between firms and differences over time and district by applying firm- and district-year fixed effects (columns (3) and (8)), a concentrated set of firm controls (columns (4) and (9)) and bank controls in column (5) and (10). Controlling for unobservables and unobserved heterogeneity we find a significantly positive interaction term between treatment and time. During the policy period, treated firms’ investments into assets grow at least 2% more than non-treated firms’ investment. This result holds in the period thereafter as well. For the years following the SMP we find a differential effect of between 8.9 and 11.7% more growth in assets for firms that were exposed to a positive liquidity shock through their bank in the years between.

According to our results, firms indirectly affected by a positive liquidity shock reduce employment but at the same time increase their level of assets. We further investigate how this shift in production factors is reflected in firm’s output in the following section.

4.3. Sales

We investigate whether there is an effect on the ability of firms to generate revenue we can trace back to the bank-relationship a firm has. Table 8 depicts our results from the difference-in-difference approach we select to identify any differential effect during the period of SMP that is due to banks being affected by expansionary unconventional monetary policy.

– Table 8 around here –

While columns (1) - (5) compare the time before SMP to the period during SMP, columns (6)-(10) compare the time before SMP to the follow-up period after SMP. In column (1) we solely include the interaction term between time and treatment as well as the constituent terms. Firms that have a business relationship with a bank affected by the crisis have on average 59.8% higher sales than the control group of firms. During the period of the SMP, average sales were 18.5% larger than during the two years before. Regarding the interaction effect we find a negative differential effect in the baseline, column (1). This effect becomes significant when controlling for unobservable firm and district-year traits as well as firm varying control variables in column (3) to (5).

Column (3) shows a relatively lower increase by 2.0% with highest statistical significance. Reducing the number of firm control variables in column (4) and adding bank control variables in column (5) yields a statistically negative coefficient of 1.5% and 0.6%, respectively. Thus, the increase in sales is between 0.6 and 2.0% lower for treated firms than for non-treated firms. Even in our most conservative estimation, firms with a treated bank experience 0.6% less sales than non-treated firms would which amounts for the average firm to 73,872 EUR less revenues.

To investigate whether this effect is long-term and observable for the years 2013 and 2014, we compare this period in columns (6)-(10) to the time period before SMP took place. The results of our most basic difference-in-difference regression are depicted in column (6). Both constituent terms indicate again the difference in levels of revenue between treated and non-treated firms. Moreover, firms' revenue is on average 79% higher in 2013 and 2014 as in 2008 and 2009. Coming to our main effect of interest, we find a significantly negative differential effect for those firms with treated banks for the period following SMP in our most conservative specifications. This effect amounts to -4.1%. Accordingly, firms with banks that hold monetary policy relevant assets in the period before experience 2.2-4.1% less sales than the reference group of firms.

Although both baseline specifications indicate that the overall time effect on sales is positive and larger than the differential effect of treated firms, our results show losses for the firms at hand. Although these are no losses that actually appear in any loss statement, these are foregone profits to the firm. For the average firm the economic magnitude of the differential effect amounts to nearly 20% of the average firm's total assets and about the complete assets owned by the firm after the SMP took place. For the average firm this effect is large and in its magnitude potentially harmful for business operations.

4.4. Productivity

Our results indicate that firms hit by policy induced additional liquidity through their bank relationship experience a relatively lower growth in employment as well as in sales. This effect is persistent during the period of SMP as well as thereafter. In terms of labor productivity it is unclear which effect relatively lower employment and sales have on the productivity coefficient. In other words, does this decline translate into a change in firm productivity or is it symmetric so that average productivity stays the same? We employ our difference-in-difference approach on the firm's labor productivity and find that firms with SMP affected banks experience a statistically positive differential effect on productivity. Table 9 shows our results.

– Table 9 around here –

The baseline difference-in-difference specification without any further control variables in column (1) indicates a generally higher level of productivity for treated firms and for all firms between 2010 and 2012 as compared to 2008 and 2009. Adding firm controls in column (2), and firm- as well as district-year fixed effects in columns (3) results into a statistically positive coefficient of the interaction effect between time and whether the firm is treated through its bank. Adding bank control variables confirms this finding by a positive differential effect of 1.8% higher growth in productivity than non-treated banks during the time SMP was in place.

Firms treated through their bank do experience this differential effect also in the following years after SMP. Firms with a bank that hold SMP eligible assets during the crisis experience a positive differential effect in productivity thereafter as well. Columns (6)-(10) show the results for the period of 2013 and 2014 compared to 2008 and 2009. Here the statistically significant differential effect we find varies between 3.5 and 2.2%.

This positive differential effect is very persistent. Firms with a treated bank manage to maintain higher levels of productivity than non treated firms. Our previous findings show that the ability to generate sales is statistically lower for treated firms. By implications this means that treated firms demand even less employees than their foregone profits in order to generate a higher level of labor productivity.

4.5. *The intensive margin of treatment*

So far, we indicate the treatment of a firm by an indicator equal to 1 if it has a business relationship with a bank which held assets eligible to the SMP in its portfolio at the time where this specific asset was bought under the SMP. This equals the extensive margin of what it means for a firm to be with a treated bank. Moreover, the intensive margin is of relevance which is a bank's exposure of SMP-relevant assets relative to its total exposure of assets. SMP-eligible assets amount on average to 0.178% of total assets in firm's bank portfolios of assets but could amount to up to 25% of average asset holdings. This statistic incorporates the security holdings averaged over all banks a firm has a relationship with. At its maximum, firms' banks invested 0.96% or at the maximum 37% of their asset portfolio into SMP eligible securities.

In table 10 we replace the dummy of being affected consecutively with three relative measures of treatment. *Affected weighted* depicts the share of affected banks over the total number of banks the firm has a relationship with. The second is *mean portfolioshare* which averages the relevant security holdings of all relationship banks for the current year. The third measure, *max portfolioshare*, averages the maximum relevant security holdings of all relationship banks for the current year. We interact all three measures with our time variable and analyze in detail the period during which SMP took place.

– Table 10 around here –

The interaction between a firm's degree of treatment and period 2010 to 2012 reflects our previous findings in terms of economic magnitude. We perform the analysis for our four independent variables employment (columns (1)-(3)), investment (columns (4)-(6)), sales (columns (7)-(9)), and productivity (columns (10)-(12)). Firms affected reduce their employment relative to non-affected firms. This relative decrease in employment depends on the intensity of treatment. It is larger the higher a firm's banks' exposure of SMP relevant assets to total assets is. For the average firm this means that an increase of their bank(s) relative exposure by one standard deviation leads to 0.4% less employment in addition to the differential negative effect of being treated at all. We find a statistical significant effect for investment which yields to the opposite direction. The policy induced liquidity shock should be higher for banks with more peripheral European countries' assets. Correspondingly, we find that the more relevant assets a bank holds, the higher is the level of firm's investments. Regarding sales, we find a negative differential effect of all three proxys for relative treatment. Reciprocal, the intensity of treatment adds significantly positively to the growth in productivity.

We find that it is the actual exposure and thereby the degree of affectedness which amplifies the effect on treated firms. While firms grow less in employment and output, they invest more and have a relatively higher level of productivity the higher the positive policy shock is they are exposed to through their bank.

5. External validity and further robustness tests

5.1. External validity

So far we show evidence on the real effects of the SMP on German firms for the universe of firms in our sample. Although we control for observed and unobserved firm variation, there is still the concern that our results are driven by structural differences between firms. As discussed in section 2 both types of firms, affected and not affected firms, do not differ in their trends over time but in the levels of their characteristics. Therefore, we show in this section that our results hold for three variations in matched firm samples depicted in table 11. All regressions are performed in the most stringent setting of firm- and district-year fixed effects as well as controlling for observable firm and bank traits.

– Table 11 around here –

Thinking in terms of our identification structure, we are concerned about both treated and not treated banks and firms being inherently different. Therefore, we firstly perform a propensity score matching procedure on all small and (regionally) specialized banks for which we can show that they are similar regarding their characteristics and time trends (tables 1a and 1b). Being as conservative as possible we then perform a 1-to-1 propensity score matching procedure on all firms which have a relationship with these matched firms. The results of this estimation are qualitatively and statistically similar to our baseline results. As stated in panel A we find negative differential effects for treated firms in terms of employment and sales in the magnitude of minus 1.7 and 1.2%, respectively. For the period after the shock we find a positive differential effect in terms of investment. Although the other coefficients are not significant, they point with the same magnitude into the same direction as our baseline results which might be caused by the substantial reduction in sample size by about 80%.

If we do not match the firms with respect to their characteristics but base our analysis on all firms that are with matched banks our results are confirmed again. This is shown in panel B of table 11. In this setting we find a highly significant positive differential effect for treated firms with respect to productivity during the time of SMP additionally.

Lastly, we perform a 1-to-1 propensity score matching procedure on the whole sample of firms using the firm covariates as estimators for the propensity score. As panel C of table 11 shows, results are alike our baseline results for the full sample of firms. For firm employment the interaction effect between treatment and time is strongly significantly negative both during and after SMP. The estimated long-run effect is even larger than our baseline results which is for treated firms a 3.9% lower employment growth than otherwise. Regarding firms' investment we find that treated firms invest relatively more in both the policy period as well as thereafter. Firms whose bank is affected by the ECB's SMP experience a lower growth in sales both during and after the SMP relative to non-treated firms. This effect is equal to 1.0% during SMP and 3.1% in 2013 and 2014. The opposite result in signs we find again for firms' productivity. Using the sample of firms created by the propensity score matching we find a significantly positive differential effect on productivity during the crisis of 1.0%. Although we also find a positive differential effect after the SMP of 1.3% higher productivity for affected firms, this is not significant.

The propensity score matching analysis matches treated and non-treated firms according to their characteristics and increases the homogeneity and with it the comparability of treated and non-treated firms in the sample we observe. Comparing more equal firms shows similar results in economic as well as statistical terms alike our previous analysis. Providing evidence that our findings are not driven by structural differences within the sample and between treated and non-treated firms confirms the validity of our results for statistically comparable firms on real effects of unconventional monetary policy and, therefore, the external validity of our results.

5.2. Robustness tests

Changes in employment, investment, sales, and productivity can also be a result from unobserved changes in firm demand. To approach this concern we follow Jiménez et al. (2014) and repeat the analysis for the not collapsed dataset in which we have multiple observations on the firm i and time t level depending on the number of banks b the firm has a relationship with in the respective year. In this setting the indicator of treatment varies over banks b and time t . Employing firm and bank fixed effects leaves variation within firm and between banks to be explained.

– Table 12 around here –

Table 12 shows that our results stay statistically and economically the same. Controlling for time

fixed effects in the even columns replicates the results although with less statistical significance. Given this approach where we disentangle demand and supply driven effects by fixed effects we find significant real effects on firms through the treatment of their bank in one given year.

To validate further that our findings are not driven by very large firms with unobserved external financing opportunities we limit our sample to only those firms which are classified as SMEs following the existing EU recommendations.

– Table 13 around here –

As shown in table 13, results for the subsample of SME are similar to those of our baseline specification with respect to all our dependent variables. Only for the period after SMP took place we find a negative but not significant differential effect on firm sales.

A further concern to our analysis is that our results are driven by firms dropping out of the market over time and, thus, bias results based on the unbalanced panel dataset we make use of. In table 14 we only include firms for which we have observations in each year between 2008 and 2013. As data completeness regarding our dependent variables varies, the observations for each regression and time panel vary as well.

– Table 14 around here –

If we analyze the balanced panel we find as well negative differential effects regarding employment and sales and positive differential effects with respect to investment and productivity for firms treated by the SMP.

6. Number and type of bank relationship

Firms' financing conditions, such as their financing costs and the availability of loans, have shown to be dependent on their bank relationship. We further study two aspects of the bank relationship.

Firms having multiple business relationships with banks might be able to offset any financing frictions they experience with one bank. In case of monetary policy, firms with multiple bank relationships might potentially benefit from more than one bank passing on additional liquidity provided by unorthodox

monetary policy. Following our line of analysis we include a third dummy into our regression, multi-bank-relationship (*MBR*), that equals one if a firm has business relationships with more than one bank in a given year. Table 15 shows our findings.

– Table 15 around here –

Again, we compare the period during which SMP was conducted and the period thereafter with the preceding years 2008 and 2009 with respect to firm employment, investment, sales, and labor productivity. Firms with multiple bank-relationships have a higher level of employment and sales but invest less and exhibit lower labor productivity than those firms with only one bank-relationship. This result holds for both periods investigated. We find that firms with treated banks grow relatively more in employment if they have more than one bank-relationship. During the time in which the policy shock hit, we find for treated firms highly significant differential effects. Treated firms with multiple bank-firm relationships face an additional 1.8% lower growth in employment. But and in light of the parallel liquidity shock, those firms invest relatively – 3.8% – more and perform at a significantly higher growth of labor productivity.

Thus, firms seem to benefit regarding their investments from additional liquidity especially if they have more than one bank-relationship. This finding goes along with our results derived by looking at the intensive margin of treatment.

For firms with only one bank-relationship we are interested in whether it matters with which type of bank the firm has a relationship with. In the German banking system there are large banks operating nation wide but also small banks which exclusively operate regionally, such as savings banks and cooperative banks. Operating regionally, those banks are supposed to be specialized on the regional economic characteristics but also on the firms they often have very long-lasting relationships with. In the following analysis we only investigate those firms with one bank and distinguish the ones with a relationship to an exclusively regionally operating bank from those with a nation- or state-wide operating bank.

– Table 16 around here –

Focusing on treated firms during the time of unconventional monetary policy that are with regionally operating banks we find a significantly positive differential effect with respect to employment and sales (table 16). Thus, firms that are treated – which means that their bank is hit by additional liquidity – have a 4.4% higher growth in employment and 3.9% higher growth in sales than firms that are also treated but finance with a nationwide operating bank. Banking with a regional bank instead of a large

bank mitigates large declines in employment and sales during and in the aftermath of the SMP.

For the real effects of additional liquidity through unconventional monetary policy it matters whether it is potentially transmitted via more banks or only one bank to a firm. Nevertheless for the majority of firms that has only one bank-relationship it matters with which bank they have business relations with. Although there is no difference with respect to investment, we find that employment and output growth is relatively higher in case of relationship-lending with regionally operating banks rather than nationwide operating banks.

7. Conclusion

We test if unorthodox monetary policy exerts any real effects in terms of firm employment, investment, sales, and productivity. We match detailed security-by-security transaction data for all purchases under the Security Market Program conducted by the European Central Bank with the security holdings of all German banks. Under the SMP, the ECB purchased more than 200 billion Euros worth of sovereign debt from Eurozone periphery countries that suffered from increasing debt spreads and mounting refinancing pressure between May 2010 and September 2012. We observe, which German banks actually held these securities that were purchased with this unconventional monetary policy instrument and were thus exposed to both a positive liquidity shock but also exposure to ailing sovereign debt.

By matching a large sample of half a million German firms to the population of all German banks, we can then identify whether this asset purchase program affected real economic activity. We use a simple difference-in-difference approach and compare firms with and without exposure to SMP through their bank relationship in the years prior to the SMP in 2008 and 2009 to both the period of the SMP (2010–2012) as well as two years after the program stopped (2013–2014). Our identification therefore exploits the fact that sovereign Eurozone periphery debt was not purchased by the ECB to help German banks or firms but rather as a means to reduce soaring debt spreads and funding pressure. Therefore, we argue that the SMP represents a nearly perfect exogenous monetary policy shock that we can trace to firms via banks' detailed asset holdings.

Our results indicate that corporates that were connected to banks with an exposure to SMP-affected securities increase their employment and sales relatively less after the program was launched. Nevertheless, treated firms invested relatively more and increased their level of productivity more than non-affected firms. These results suggest that German banks with exposure to sovereign debt from the periphery of

the Eurozone, which were the bonds purchased by the ECB under the SMP, passed on additional liquidity to firms which correspondingly invested more into their assets than other firms. Nevertheless, affected corporates experienced relatively lower sales growth. Still, these firms managed to significantly increase their labor productivity during and after the policy interventions. Thus, the SMP might have induced banks to conduct their monitoring function more stringently, ultimately leading to investment and productivity advancements among their corporate credit customers.

The evidence of these statistically and economically significant consequences of the SMP among German firms is robust to a range of alternative specifications and empirical tests.

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Appendix A Figures

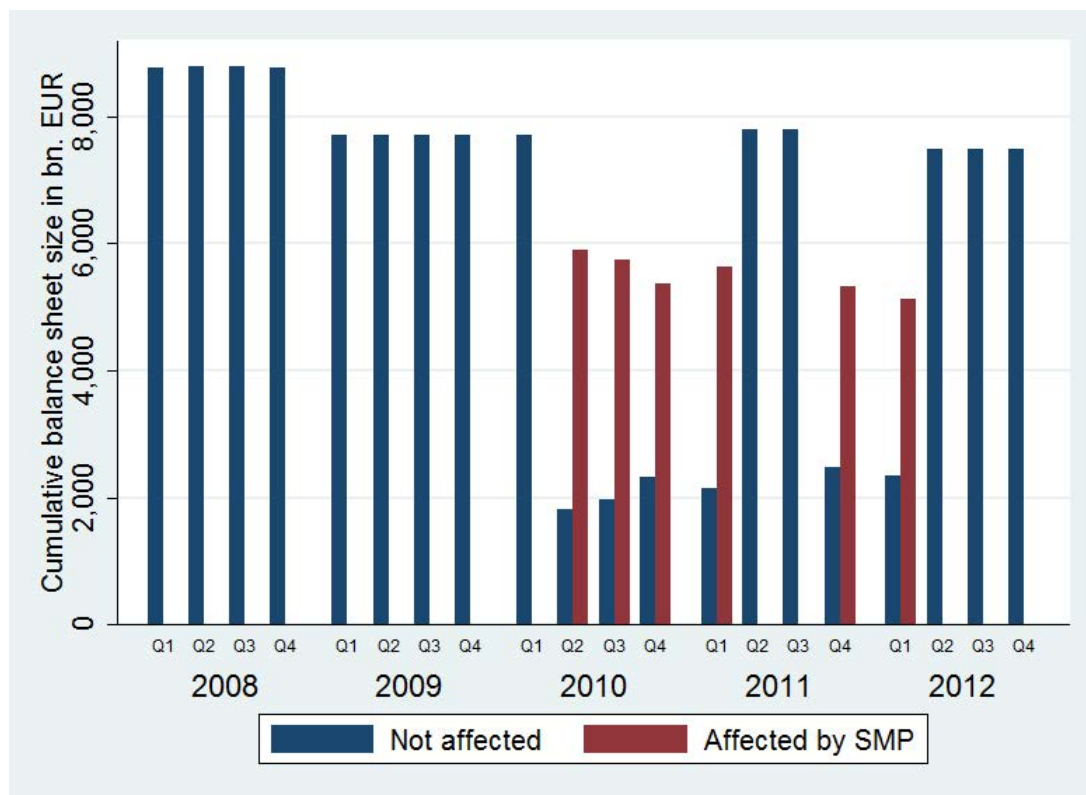


Figure 1: Note: This figure shows the cumulative balance sheet size of banks which are treated or not treated by the Securities Markets Programme (SMP) in each quarter between 2008 and 2012. A bank is treated by SMP in a given quarter if it has at least one asset in its portfolio which is bought under the ECB's securities markets program in the same quarter identified by a unique identification number (ISIN).

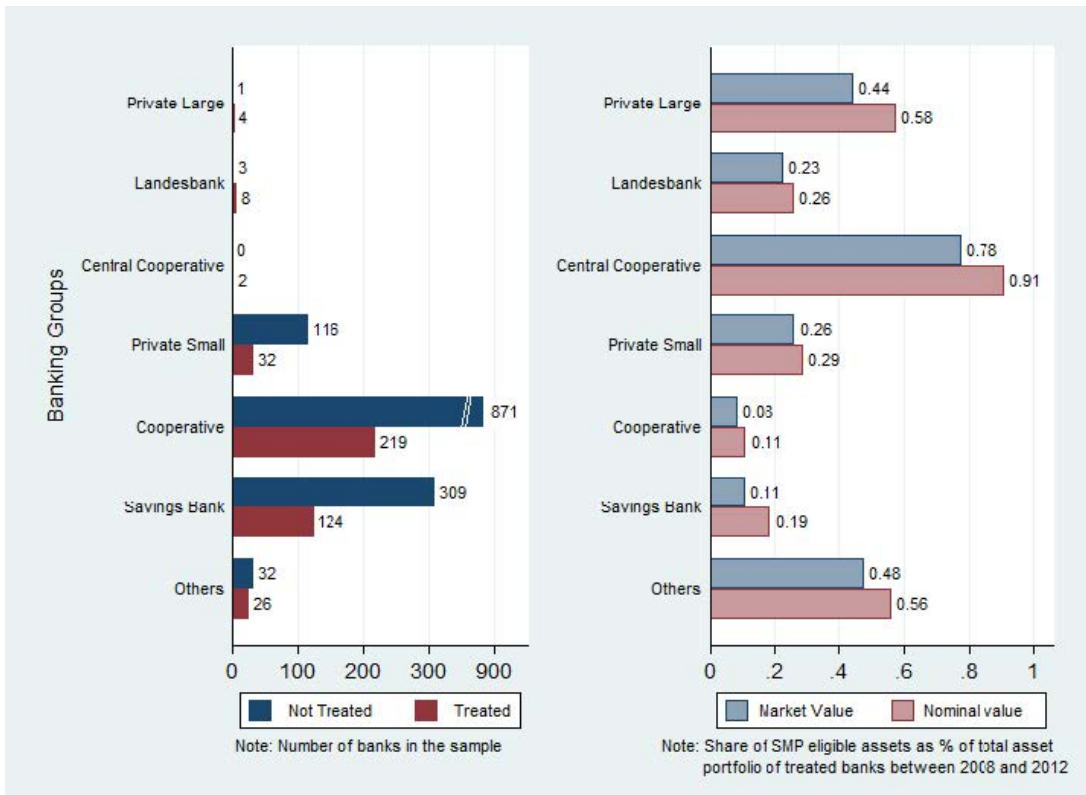


Figure 2: Note: This figure shows the number of banks identified to be affected by the Securities Markets Program (SMP) or not. A bank is treated by SMP in a given quarter if it has at least one asset in its portfolio which is bought under the ECB's securities markets program in the same quarter identified by a unique identification number (ISIN). The right part of the figure shows the average asset holdings eligible to SMP as a share of the total asset portfolio in % of affected banks between 2008 and 2012.

Appendix B Tables main body

Table 1a: **Bank summary statistics: differences in levels**

This table reports the means, standard deviations, and t-test statistic for banks identified to have business relationships with firms between 2008 and 2012 divided by whether the firm is treated or not and separately for the period before the Securities Markets Programme (SMP) (2008 and 2009) and during the SMP (2010-2012). The last column shows the difference-in-difference-test between the means of each control variable for the two subsamples of banks over both time periods. While the first panel includes all banks in the sample, panel B includes a subsample of banks determined by a propensity score matching. The 1-nearest neighbor matching is performed solely for banks that are either small private banks, savings banks or cooperative banks for each year separately. All explanatory variables stated in the table were used to determine the propensity score of treated and not treated banks. Statistical significance levels are reported as *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

	Pre-SMP						During-SMP						DiD				
	Non-affected			Affected			Non-affected			Affected			Delta				
	N	Mean	Std	N	Mean	Std	N	Mean	Std	N	Mean	Std	N	Mean	Std		
<i>Panel A: Full sample of banks</i>																	
Equity ratio	1205	0.132	0.003	383	0.134	0.006	1215	0.148	0.003	392	0.145	0.005	1218	-0.003	0.006	-0.004	0.009
Bank reserve ratio	1209	0.022	0.001	383	0.022	0.001	1218	0.022	0.000	393	0.022	0.001	1218	-0.000	0.001	0.000	0.002
Total liabilities	1209	0.001	0.001	383	0.017	0.002	1218	0.001	0.001	393	0.016	0.002	1218	0.014***	0.002	-0.001	0.003
Hidden liabilities	1209	0.165	0.007	383	0.283	0.013	1218	0.098	0.006	393	0.245	0.011	1218	0.148***	0.012	0.030	0.019
Customer loans	1209	0.560	0.003	383	0.519	0.005	1218	0.567	0.002	393	0.528	0.004	1218	-0.039***	0.005	0.002	0.008
NPL	1194	0.042	0.001	382	0.038	0.002	1193	0.043	0.001	390	0.040	0.001	1193	-0.003**	0.001	0.001	0.002
CHR	1209	0.729	0.016	383	0.695	0.028	1218	0.673	0.013	393	0.662	0.022	1218	-0.011	0.026	0.022	0.041
ROE	1209	0.108	0.002	383	0.108	0.004	1218	0.157	0.002	383	0.152	0.004	1218	-0.005	0.004	-0.005	0.007
Cust. loan growth	1203	0.107	0.016	370	0.101	0.028	1218	0.071	0.013	391	0.046	0.022	1218	-0.025	0.026	-0.019	0.041
Total asset growth	1204	0.033	0.002	380	0.024	0.004	1218	0.024	0.002	391	0.015	0.003	1218	-0.009**	0.004	-0.000	0.006
<i>Panel B: Matched sample of banks</i>																	
Equity ratio	532	0.123	0.004	346	0.122	0.004	709	0.135	0.003	357	0.139	0.003	709	0.003	0.004	0.004	0.006
Bank reserve ratio	532	0.022	0.001	346	0.022	0.001	709	0.021	0.001	357	0.022	0.001	709	0.000	0.001	0.001	0.001
Total liabilities	532	0.002	0.000	346	0.001	0.000	709	0.002	0.000	357	0.002	0.000	709	0.000	0.000	0.000	0.000
Hidden liabilities	532	0.206	0.016	346	0.229	0.016	709	0.178	0.012	357	0.181	0.012	709	0.003	0.018	-0.020	0.028
Customer loans	532	0.538	0.006	346	0.533	0.006	709	0.548	0.004	357	0.542	0.004	709	-0.006	0.006	-0.001	0.010
NPL	532	0.038	0.001	346	0.038	0.001	709	0.042	0.001	357	0.040	0.001	709	-0.001	0.001	-0.002	0.002
CHR	532	0.693	0.007	346	0.697	0.007	709	-0.002	0.006	357	0.657	0.006	709	-0.004	0.008	-0.008	0.013
ROE	532	0.109	0.005	346	0.115	0.005	709	-0.336	0.004	357	0.161	0.004	709	0.003	0.005	-0.004	0.009
Cust. loan growth	532	0.099	0.005	346	0.100	0.005	709	10.832	0.004	357	0.049	0.004	709	0.000	0.006	-0.001	0.010
Total asset growth	532	0.026	0.003	346	0.027	0.003	709	0.673	0.002	357	0.019	0.002	709	0.002	0.003	0.000	0.005

Table 1b: **Bank summary statistics: differences in trends**

This table reports the means, standard deviations, and t-test statistic of trends (growth rates) for banks identified to have business relationships with firms between 2008 and 2012 divided by whether the firm is treated or not and separately for the period before the Securities Markets Programme (SMP) (2008 and 2009) and during the SMP (2010-2012). Within the columns "Pre-SMP" we show growth rate of each variable between 2008 and 2009 whereas we show for "during-SMP" the growth rate between 2010 and 2012. Columns "delta" show the difference-tests between the mean growth rates of each control variable for the two subsamples of treated and not treated banks. While panel A includes all banks in the sample, panel B includes a subsample of banks determined by a propensity score matching. The 1-nearest neighbor matching is performed solely for banks that are either small private banks, savings banks or cooperative banks for each year separately. All explanatory variables stated in the table were used to determine the propensity score of treated and not treated banks. Statistical significance levels are reported as *** p<0.01, ** p<0.05, * p<0.1.

	Pre-SMP						During-SMP								
	Non-affected			Affected			Non-affected			Affected					
	N	Mean	Std	N	Mean	Std	Delta	N	Mean	Std	N	Mean	Std	Delta	
<i>Panel A: Full sample of banks</i>															
Equity ratio	1144	-0.00	0.003	372	0.023	0.009	-0.023***	1173	0.186	0.009	370	0.256	0.076	-0.071	0.046
Bank reserve ratio	1147	0.309	0.220	373	0.518	0.397	-0.209	1177	5.505	3.432	372	1.493	0.781	4.012	6.122
Total liabilities	1149	0.041	0.004	373	0.034	0.009	0.007	1177	0.077	0.004	372	0.058	0.006	0.019**	0.008
Hidden liabilities	1178	-0.092	0.008	370	-0.141	0.018	0.049***	1202	-0.047	0.006	376	-0.096	0.015	0.049***	0.014
Customer loans	1149	-0.001	0.004	373	-0.011	0.005	0.010	1177	0.048	0.012	372	0.031	0.005	0.016	0.022
NPL	1085	4.852	2.507	346	1.944	0.232	2.907	1153	0.343	0.270	368	0.006	0.136	0.336	0.484
CIR	1149	-0.039	0.010	373	-0.053	0.007	0.014	1177	0.047	0.011	372	0.063	0.015	-0.016	0.021
ROE	1149	0.971	0.352	362	0.621	1.835	0.350	1176	-0.230	0.230	371	1.365	1.072	-1.595	0.728
Cust. loan growth	1099	-17.449	14.851	336	-10.726	8.391	-6.723	1143	-2.887	2.605	358	0.372	0.819	-3.259	4.678
Total asset growth	1101	-1.584	0.831	343	-0.552	0.595	-1.031	1145	-0.829	0.564	358	-1.535	0.620	0.706	1.067
<i>Panel B: Matched sample of banks</i>															
Equity ratio	309	-0.000	0.005	318	0.003	0.006	0.001	343	0.211	0.014	335	0.179	0.011	0.032*	0.018
Bank reserve ratio	308	0.004	0.020	318	0.039	0.027	-0.035	343	0.487	0.541	335	0.684	0.706	-0.197	0.887
Total liabilities	309	0.028	0.005	318	0.026	0.005	0.002	343	0.065	0.006	335	0.069	0.005	-0.004	0.008
Hidden liabilities	305	-0.092	0.017	313	-0.147	0.020	0.055**	330	-0.048	0.012	328	-0.107	0.017	0.058***	0.021
Customer loans	309	-0.000	0.009	318	-0.012	0.005	0.012	343	0.028	0.005	335	0.034	0.005	-0.006	0.007
NPL	303	10.396	8.751	313	1.933	0.250	8.462	343	1.068	0.894	335	0.014	0.149	1.055	0.917
CIR	309	-0.061	0.006	318	-0.059	0.006	-0.002	343	0.075	0.037	335	0.042	0.006	0.033	0.038
ROE	309	0.367	0.413	317	0.704	2.092	-0.336	343	-0.386	0.544	335	1.550	1.186	-1.936	1.295
Cust. loan growth	302	-0.031	5.637	309	-10.862	9.109	10.832	336	-1.471	1.533	331	0.329	0.869	-1.800	1.769
Total asset growth	302	-0.081	0.392	309	-0.754	0.637	0.673	336	-1.479	0.873	331	-0.926	0.361	-0.553	0.949

Table 2: **Firm summary statistics**

This table reports for the number of observations and firms as well as means, medians, and standard deviations for all firms between 2008 and 2014 including only those firms with at least one observations between 2008 and 2009, and one between 2010 and 2012. Moreover, we report the means and standard deviations for all observed firms between 2008 and 2014 divided by whether the firm has a business relationship with a bank that is affected by the Securities Markets Programme (SMP). The last column shows the t-test between the means of each variable for the two subsamples of firms. Statistical significance levels are reported as *** p<0.01, ** p<0.05, * p<0.1.

Variable	All firms				Affected			Not Affected			ttest	
	Obs.	N firms	Mean	Median	Std. Dev.	N firms	Mean	Std. Dev.	N firms	Mean		Std. Dev.
<i>Treatment variables</i>												
Affected	2,435,629	502,580	0.505	1	0.500	250,042	242,597	1,302.874	252,538	17.932	103.088	-42.340***
Affected weighted	2,432,629	502,580	0.183	0	0.352		204,026	10.380		1.291	10.900	0.118***
Mean Portfolioshare	1,856,350	493,844	0.172	0	0.543		187,401	79.199		0.255	15.839	-1.220***
Max Portfolioshare	1,856,350	493,844	0.923	0	2.430		147,245	466.372		4.075	101.279	-15.860***
<i>Dependent variables</i>												
Employees	1,834,257	484,510	40.040	8.000	944.397		242,597	60.271		17.932	103.088	-42.340***
Investmentgrowth	1,848,480	409,181	1.231	-0.014	10.639		204,026	1.173		1.291	10.900	0.118***
Investment	966,708	372,788	0.897	0.018	56.337		187,401	1.475		0.255	15.839	-1.220***
Sales	1,045,850	290,247	12.312	1.200	343.434		147,245	19.935		4.075	101.279	-15.860***
Productivity	872,463	276,393	0.404	0.125	7.283		141,417	0.485		0.312	3.562	-0.173***
<i>Control variables</i>												
Total assets	2,016,998	426,131	2.508	0.419	9.392		212,183	13.266		12.684	1.665	-0.582***
Listed	2,435,629	502,580	0.009	0	0.095		250,042	0.012		0.006	0.079	-0.006***
Leverage	1,988,365	424,427	1.064	0.932	1.760		211,413	1.054		1.074	1.828	0.019***
Networth	1,853,818	419,082	-1.185	-0.650	3.609		208,712	-1.133		-1.239	3.723	-0.106***
Tangibility	2,005,005	425,867	0.248	0.161	0.250		212,072	0.246		0.251	0.253	0.005***
ICR	263,568	78,093	404.854	4.079	3261.612		48,785	408.673		397.275	3209.381	-11.398
Earnings	268,410	78,194	0.147	0.126	0.194		48,705	0.141		0.157	0.217	0.016***
Cash Flow	263,979	77,756	0.106	0.089	0.171		48,364	0.101		0.116	0.195	0.016***
<i>Further firm level characteristics</i>												
Wage	249,655	75,154	45,668.88	40,029.83	35,241.52		47,417	47,156.32		42,557.94	37,636.67	-4,598.38***
Bank-relationships	2,435,625	502,578	1.508	1	0.772		250,042	1.77		1.238	0.484	-0.535***

Table 3: Firm summary statistics

This table reports the means, standard deviations, and t-test statistic for all firms in the sample between 2008 and 2012 divided by whether the firm is treated or not and separately for the period before the Securities Markets Programme (SMP) (2008 and 2009) and during the SMP (2010-2012). Columns "delta" show the difference-tests between the mean of each control variable for the two subsamples of treated and not treated banks. The last column shows the difference-in-difference-test between the means of each control variable for the two subsamples of banks over both time periods. The first panel reports the levels of both dependent as well as explanatory variables. The second panel shows the growth rates of those variables between 2008 and 2009 ("pre-SMP") and between 2010 and 2012 ("during-SMP"). For the latter panel we do not report a difference-in-difference test. Statistical significance levels are reported as *** p<0.01, ** p<0.05, * p<0.1.

	Pre-SMP												During-SMP												DiD							
	Non-affected				Affected				Delta				Non-affected				Affected				Delta											
	N	Mean	Std	Std	N	Mean	Std	Std	Mean	Std	Mean	Std	N	Mean	Std	Std	N	Mean	Std	Mean	Std	Mean	Std	Mean	Std							
<i>Panel A: Differences in levels over time</i>																																
Employment	218,522	16,288	1.267	223,603	56,110	1.226	39,822***	1.763	223,173	18,795	1.085	230,784	57,516	1.032	38,720***	1.498	213,758	12,749	0.002	212,084	13,319	0.002	0.570***	0.003	-0.022***	0.005						
Investment	130,135	0.266	0.090	138,472	1.300	0.086	1.035***	0.124	153,552	0.248	0.075	158,538	1.240	0.071	0.992***	0.103	252,538	0.006	0.000	250,042	0.012	0.000	0.006***	0.000	0.000	0.000						
Sales	123,264	3.530	0.645	128,063	16,890	0.627	13,360***	0.899	120,935	4.435	0.565	127,317	20,473	0.542	16,039***	0.783	212,171	1.090	0.002	210,794	1.067	0.002	-0.023***	0.003	-0.009*	0.005						
Productivity	109,758	0.396	0.018	117,265	0.495	0.017	0.189***	0.025	111,493	0.316	0.015	120,326	0.483	0.015	0.166***	0.021	207,277	-1.227	0.005	206,617	-1.126	0.005	0.101***	0.007	-0.012	0.011						
Total assets	212,863	12,536	0.003	211,199	13,128	0.003	0.593***	0.004	213,758	12,749	0.002	212,084	13,319	0.002	0.570***	0.003	23,868	368.76	14.391	42,076	366.21	10.294	-2.581	17.694	-43.261	28.451						
Listed	252,538	0.006	0.000	250,042	0.012	0.000	0.006***	0.000	252,538	0.006	0.000	250,042	0.012	0.000	0.006***	0.000	24,180	0.159	0.001	42,151	0.143	0.001	-0.016***	0.001	-0.003	0.002						
Leverage	211,177	1.059	0.003	209,774	1.045	0.003	-0.014***	0.004	212,171	1.090	0.002	210,794	1.067	0.002	-0.023***	0.003	24,053	0.118	0.001	41,709	0.102	0.001	-0.016***	0.001	-0.003**	0.001						
Networth	202,178	-1.303	0.006	201,837	-1.191	0.006	0.112***	0.009	207,277	-1.227	0.005	206,617	-1.126	0.005	0.101***	0.007	213,304	0.249	0.000	211,831	0.243	0.000	-0.005***	0.000	-0.002**	0.001						
Tangibility	211,323	0.252	0.000	210,022	0.248	0.000	-0.004***	0.001	213,304	0.249	0.000	211,831	0.243	0.000	-0.005***	0.000	23,868	368.76	14.391	42,076	366.21	10.294	-2.581	17.694	-43.261	28.451						
ICR	20,293	439.36	18.266	38,439	480.04	12.759	40.680*	22.280	23,868	368.76	14.391	42,076	366.21	10.294	-2.581	17.694	24,180	0.159	0.001	42,151	0.143	0.001	-0.016***	0.001	-0.003	0.002						
Earnings	20,619	0.151	0.001	38,689	0.137	0.001	-0.014***	0.001	24,180	0.159	0.001	42,151	0.143	0.001	-0.016***	0.001	24,053	0.118	0.001	41,709	0.102	0.001	-0.016***	0.001	-0.003**	0.001						
Cash Flow	20,490	0.110	0.001	38,175	0.098	0.001	-0.013***	0.001	24,053	0.118	0.001	41,709	0.102	0.001	-0.016***	0.001																
<i>Panel B: Trends over time</i>																																
Employment	126,114	0.315	0.017	144,097	0.413	0.084	-0.098	0.091	102,534	0.460	0.021	125,441	0.483	0.036	-0.023	0.044	11,800	498.54	523.84	91,303	138.76	407.24	410.44	136,336	-0.090	0.162	150,002	0.206	0.139	-0.296	0.212	
Investment	40,106	77.353	29.973	51,586	108.45	44.013	-31.096	56.481	59,824	3.034	2.005	69,938	2.730	1.996	0.304	2.845	59,824	3.034	2.005	69,938	2.730	1.996	0.304	2.845	124,121	-0.011	0.244	137,769	0.388	0.783	-0.399	0.857
Sales	88,592	0.577	0.167	96,045	0.288	0.076	0.289	0.178	44,049	0.896	0.443	54,934	2.960	2.669	-2.064	3.007	44,049	0.896	0.443	54,934	2.960	2.669	-2.064	3.007	136,240	140.91	89.859	149,334	89.773	58.135	51.138	105.22
Productivity	60,413	-0.210	0.414	70,299	-0.537	0.167	0.327	0.424	141,453	0.009	0.000	154,640	0.007	0.000	0.002***	0.000	141,453	0.009	0.000	154,640	0.007	0.000	0.002***	0.000	34,971	31.090	34.971	31.090	15,664	7.602	19.307	23.246
Total assets	197,063	0.004	0.000	199,807	0.002	0.000	0.001***	0.000	197,063	0.004	0.000	199,807	0.002	0.000	0.001***	0.000	197,063	0.004	0.000	199,807	0.002	0.000	0.001***	0.000	10,117	34.971	31.090	15,664	7.602	19.307	23.246	
Listed	1,463	0.000	0.000	2,806	0.000	0.000	0.000	0.000	1,175	-0.013	0.003	2,406	-0.016	0.003	0.003	0.004	1,463	0.000	0.000	2,806	0.000	0.000	0.000	0.000	136,336	-0.090	0.162	150,002	0.206	0.139	-0.296	0.212
Leverage	193,780	-0.083	0.294	196,742	-1.284	0.859	1.201	0.914	136,336	-0.090	0.162	150,002	0.206	0.139	-0.296	0.212	193,780	-0.083	0.294	196,742	-1.284	0.859	1.201	0.914	124,121	-0.011	0.244	137,769	0.388	0.783	-0.399	0.857
Networth	160,387	0.100	0.198	165,811	0.107	0.176	-0.006	0.265	124,121	-0.011	0.244	137,769	0.388	0.783	-0.399	0.857	160,387	0.100	0.198	165,811	0.107	0.176	-0.006	0.265	136,240	140.91	89.859	149,334	89.773	58.135	51.138	105.22
Tangibility	185,467	30.232	5.282	189,176	40.518	10.786	-10.286	12.084	136,240	140.91	89.859	149,334	89.773	58.135	51.138	105.22	185,467	30.232	5.282	189,176	40.518	10.786	-10.286	12.084	10,117	34.971	31.090	15,664	7.602	19.307	23.246	
ICR	11,696	-5.876	5.206	27,122	3.067	1.355	-8.943**	3.993	10,117	34.971	31.090	15,664	7.602	19.307	23.246	11,696	-5.876	5.206	27,122	3.067	1.355	-8.943**	3.993	10,117	34.971	31.090	15,664	7.602	19.307	23.246		
Earnings	12,163	-2.571	2.066	27,942	-0.775	0.379	-1.796	1.479	10,496	0.499	0.330	24,923	1.897	1.789	-1.397	2.765	12,163	-2.571	2.066	27,942	-0.775	0.379	-1.796	1.479	10,496	0.499	0.330	24,923	1.897	1.789	-1.397	2.765
Cash Flow	11,939	-1.702	1.770	27,091	1.118	1.139	-2.820	2.080	10,283	-0.335	0.336	24,150	0.797	0.667	-1.132	1.046	11,939	-1.702	1.770	27,091	1.118	1.139	-2.820	2.080	10,283	-0.335	0.336	24,150	0.797	0.667	-1.132	1.046

Table 4: Firm summary statistics: differences in levels for bank-firm-matched samples

This table reports the means, standard deviations, and t-test statistic for firms between 2008 and 2012 divided by whether the firm is treated or not and separately for the period before the Securities Markets Programme (SMP) (2008 and 2009) and during the SMP (2010-2012). Columns "delta" show the difference-tests between the mean of each control variable for the two subsamples of treated and not treated firms. The last column shows the difference-in-difference-test between the means of each control variable for the two subsamples of firms over both time periods. The first panel reports the averages of dependent variables for the full sample of firms - analogously to table 3. The following four panels B to E report the statistics for matched samples of firms each with respect to one of the four dependent variables. We perform a 1-nearest neighbor matching for all firms which have a business relationship with a bank that is matched according to tables 1a and 1b. The explanatory variables used in the propensity score matching routine are the five dependent variables for which we report their statistics in each panel as well. Statistical significance levels are reported as *** p<0.01, ** p<0.05, * p<0.1.

	Pre-SMP										During-SMP										DiD									
	Non-affected					Affected					Non-affected					Affected					Delta		Mean		Std					
	N	Mean	Std	N	Mean	Std	N	Mean	Std	N	Mean	Std	N	Mean	Std	N	Mean	Std	N	Mean	Std	Mean	Std	Mean	Std					
<i>Panel A: Full sample of firms</i>																														
Employment	218,522	16.288	1.267	223,603	56.110	1.226	39.822***	1.763	223,173	18.795	1.085	1.085	230,784	57.516	1.032	38.720***	1.498	-1.102	2.313											
Investment	130,135	0.266	0.090	138,472	1.300	0.086	1.035***	0.124	153,552	0.248	0.075	158,538	1.240	0.071	0.992***	0.103	-0.043	0.162												
Sales	123,264	3.530	0.645	128,063	16.890	0.627	13.360***	0.899	120,935	4.435	0.565	127,317	20.473	0.542	16.039***	0.783	2.679**	1.192												
Productivity	109,758	0.306	0.018	117,265	0.495	0.017	0.189***	0.025	111,493	0.316	0.015	120,326	0.483	0.015	0.161***	0.021	-0.022	0.033												
<i>Panel B: Matched sample of firms for employment</i>																														
Employment	49,712	18.985	0.211	48,675	17.901	0.211	-1.084***	0.298	85,695	20.525	0.145	83,256	19.567	0.145	-0.958***	0.205	0.125	0.362												
ln(Employment)	49,712	2.156	0.005	48,675	2.154	0.005	-0.002	0.007	85,695	2.199	0.003	83,256	2.200	0.003	0.001	0.005	0.003	0.009												
Total assets	49,712	13.125	0.006	48,675	13.129	0.006	0.003	0.009	85,695	13.229	0.004	83,256	13.224	0.004	-0.005	0.006	-0.008	0.010												
Listed	49,712	0.008	0.000	48,675	0.007	0.000	-0.001***	0.000	85,695	0.007	0.000	83,256	0.006	0.000	-0.001***	0.000	0.000	0.001												
Leverage	49,712	1.010	0.004	48,675	1.008	0.004	-0.002	0.006	85,695	1.014	0.003	83,256	1.017	0.003	0.003	0.004	0.005	0.008												
Networth	49,712	-0.981	0.010	48,675	-0.975	0.010	0.006	0.014	85,695	-0.933	0.007	83,256	-0.946	0.007	-0.013	0.010	-0.018	0.017												
Tangibility	49,712	0.247	0.001	48,675	0.246	0.001	-0.001	0.001	85,695	0.250	0.001	83,256	0.249	0.001	-0.002*	0.001	-0.001	0.002												
<i>Panel C: Matched sample of firms for investment</i>																														
Investment	25,827	0.197	0.038	25,812	0.172	0.038	-0.026	0.053	53,129	0.212	0.024	52,891	0.238	0.024	0.026	0.034	0.052	0.063												
Total assets	25,827	13.374	0.008	25,812	13.375	0.008	0.001	0.012	53,129	13.475	0.005	52,891	13.473	0.005	-0.002	0.008	-0.003	0.014												
Listed	25,827	0.009	0.001	25,812	0.008	0.001	-0.001	0.001	53,129	0.008	0.000	52,891	0.006	0.000	-0.002***	0.000	-0.001	0.001												
Leverage	25,827	0.977	0.004	25,812	0.974	0.004	-0.002	0.006	53,129	0.968	0.003	52,891	0.970	0.003	0.003	0.004	0.005	0.007												
Networth	25,827	-0.826	0.010	25,812	-0.816	0.010	0.011	0.014	53,129	-0.734	0.006	52,891	-0.744	0.006	-0.010	0.009	-0.020	0.017												
Tangibility	25,827	0.271	0.001	25,812	0.269	0.001	-0.002	0.002	53,129	0.285	0.001	52,891	0.283	0.001	-0.002*	0.001	-0.000	0.002												
<i>Panel C: Matched sample of firms for sales</i>																														
Sales	34,138	2.744	0.078	33,350	2.719	0.078	-0.025	0.111	59,139	3.261	0.053	56,601	3.115	0.053	-0.147*	0.076	-0.122	0.134												
Total assets	34,138	13.052	0.007	33,350	13.046	0.007	-0.005	0.010	59,139	13.181	0.005	56,601	13.175	0.005	-0.006	0.007	-0.001	0.012												
Listed	34,138	0.006	0.000	33,350	0.005	0.000	-0.002***	0.001	59,139	0.006	0.000	56,601	0.004	0.000	-0.001***	0.000	0.000	0.001												
Leverage	34,138	1.006	0.005	33,350	1.004	0.005	-0.002	0.006	59,139	0.995	0.003	56,601	0.988	0.003	-0.007	0.004	-0.005	0.008												
Networth	34,138	-0.961	0.010	33,350	-0.950	0.010	0.011	0.015	59,139	-0.868	0.007	56,601	-0.855	0.007	0.014	0.010	-0.003	0.018												
Tangibility	34,138	0.242	0.001	33,350	0.241	0.001	-0.001	0.002	59,139	0.246	0.001	56,601	0.244	0.001	-0.002***	0.001	-0.001	0.002												
<i>Panel E: Matched sample of firms for productivity</i>																														
Productivity	28,555	0.263	0.011	28,169	0.251	0.011	-0.012	0.015	51,257	0.284	0.007	50,072	0.263	0.007	-0.022**	0.010	-0.010	0.019												
Total assets	28,555	13.169	0.007	28,169	13.168	0.007	-0.001	0.010	51,257	13.289	0.005	50,072	13.295	0.005	-0.003	0.007	-0.002	0.013												
Listed	28,555	0.006	0.000	28,169	0.004	0.000	-0.002**	0.001	51,257	0.006	0.000	50,072	0.004	0.000	-0.002***	0.000	0.000	0.001												
Leverage	28,555	1.000	0.005	28,169	0.996	0.005	-0.004	0.007	51,257	0.991	0.003	50,072	0.992	0.003	0.001	0.004	0.005	0.008												
Networth	28,555	-0.912	0.011	28,169	-0.911	0.011	0.001	0.015	51,257	-0.831	0.007	50,072	-0.838	0.007	-0.007	0.010	-0.008	0.018												
Tangibility	28,555	0.241	0.001	28,169	0.240	0.001	-0.002	0.002	51,257	0.247	0.001	50,072	0.244	0.001	-0.002*	0.001	-0.001	0.002												

Table 5: **Firm Employment**

Notes: We perform an difference-in-difference estimation, regressing the logarithm of employment on whether a firm has a business relationship with a bank eligible to the Securities Markets Programme (SMP) and its interaction with a time dummy. In columns 1-5 the time dummy is equal to 1 during the period the SMP took place - 2010 until 2012 - the periods 2013 and 2014 are omitted. In column 6-10 the time dummy equals 1 after SMP took place 2013 and 2014, and 0 in 2008 and 2009 - the SMP period 2010-2012 are omitted. If not omitted due to collinearity, we report the single terms of the interaction as well. For both time specifications we first conduct the regression without any further covariates. Hereafter, we add an extended set of explanatory variables at the firm level (column 2 and 7), firm-, and district-year fixed effects (column 3 and 8), omitting those explanatory variables which are least reported in our dataset (columns 4 and 9), and add explanatory variables on the bank-level (column 5 and 10). Due to data availability, the specification with bank control variable does not include observations in 2014. With district-year fixed effects we exclude the first and last 5% of district-time clusters in terms of their variation in firms treated. Moreover, we only include those district-year clusters contributing with at least 5 observations to the regression and where the average treatment is between 5% and 95% of the distribution of treatment across all district-year clusters. Both adaptations are made for reasons of variation for coefficient estimation. We only include firms with at least one observations between 2008 and 2009, and one between 2010 and 2012. Clustered standard errors at the firm-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Variable	During SMP					After SMP				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Time</i>	0.147*** (0.002)	0.014* (0.007)				0.315*** (0.005)	0.045*** (0.016)			
<i>Affected</i>	0.507*** (0.004)	0.154*** (0.010)				0.507*** (0.004)	0.146*** (0.011)			
<i>Affected</i> × <i>Time</i>	-0.035*** (0.002)	-0.020** (0.008)	-0.052*** (0.005)	-0.033*** (0.002)	-0.019*** (0.002)	-0.001 (0.008)	-0.040** (0.019)	-0.042*** (0.013)	-0.061*** (0.006)	-0.037*** (0.007)
Observations	1,700,743	214,502	192,231	1,183,714	923,467	845,850	94,095	84,250	531,465	344,784
Number of firms	484,156	71,170	65,098	358,557	330,851	450,001	55,228	50,168	315,264	233,343
R^2 overall	0.032	0.538	0.297	0.377	0.321	0.040	0.541	0.057	0.083	0.022
R^2 within	-	-	0.087	0.058	0.036	-	-	0.104	0.077	0.062
R^2 between	-	-	0.299	0.371	0.304	-	-	0.057	0.078	0.021
Firm FE	NO	NO	YES	YES	YES	NO	NO	YES	YES	YES
District-Year FE	NO	NO	YES	YES	YES	NO	NO	YES	YES	YES
Firm controls	NO	NO	NO	YES	YES	NO	NO	NO	YES	YES
Firm controls ext.	NO	YES	YES	NO	NO	NO	YES	YES	NO	NO
Bank controls	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES

Table 6: **Firms' investment growth**

Notes: We perform an difference-in-difference estimation, regressing the growth rate of investment on whether a firm has a business relationship with a bank eligible to the Securities Markets Programme (SMP) and its interaction with a time dummy. In columns 1-5 the time dummy is equal to 1 during the period the SMP took place - 2010 until 2012 - the periods 2013 and 2014 are omitted. In column 6-10 the time dummy equals 1 after SMP took place 2013 and 2014, and 0 in 2008 and 2009 - the SMP period 2010-2012 are omitted. If not omitted due to collinearity, we report the single terms of the interaction as well. For both time specifications we first conduct the regression without any further covariates. Hereafter, we add an extended set of explanatory variables at the firm level (column 2 and 7), firm-, and district-year fixed effects (column 3 and 8), omitting those explanatory variables which are least reported in our dataset (columns 4 and 9), and add explanatory variables on the bank-level (column 5 and 10). Due to data availability, the specification with bank control variable does not include observations in 2014. With district-year fixed effects we exclude the first and last 5% of district-time clusters in terms of their variation in firms treated. Moreover, we only include those district-year clusters contributing with at least 5 observations to the regression and where the average treatment is between 5% and 95% of the distribution of treatment across all district-year clusters. Both adaptations are made for reasons of variation for coefficient estimation. We only include firms with at least one observations between 2008 and 2009, and one between 2010 and 2012. Clustered standard errors at the firm-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Variable	During SMP					After SMP				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Time</i>	-0.441*** (0.025)	-0.253*** (0.076)				-0.905*** (0.046)	-0.403*** (0.130)			
<i>Affected</i>	-0.121*** (0.029)	-0.192** (0.075)				-0.121*** (0.029)	-0.153** (0.077)			
<i>Affected</i> × <i>Time</i>	0.012 (0.034)	0.101 (0.086)	0.418*** (0.097)	0.106*** (0.039)	0.003 (0.045)	-0.025 (0.060)	-0.035 (0.145)	0.423* (0.227)	0.297*** (0.099)	0.197* (0.119)
Observations	1,783,057	223,866	200,589	1,470,302	1,149,960	786,301	96,269	86,159	633,983	418,425
Number of firms	408,876	72,657	66,620	367,053	347,944	383,203	55,866	50,777	331,354	267,964
R^2 overall	0.000	0.005	0.000	0.000	0.001	0.001	0.007	0.002	0.000	0.000
R^2 within	-	-	0.018	0.019	0.022	-	-	0.016	0.026	0.023
R^2 between	-	-	0.001	0.005	0.003	-	-	0.004	0.001	0.001
Firm FE	NO	NO	YES	YES	YES	NO	NO	YES	YES	YES
District-Year FE	NO	NO	YES	YES	YES	NO	NO	YES	YES	YES
Firm controls	NO	NO	NO	YES	YES	NO	NO	NO	YES	YES
Firm controls ext.	NO	YES	YES	NO	NO	NO	YES	YES	NO	NO
Bank controls	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES

Table 7: Firms' level of investment

Notes: We perform an difference-in-difference estimation, regressing the logarithm of investment on whether a firm has a business relationship with a bank eligible to the Securities Markets Programme (SMP) and its interaction with a time dummy. In columns 1-5 the time dummy is equal to 1 during the period the SMP took place - 2010 until 2012 - the periods 2013 and 2014 are omitted. In column 6-10 the time dummy equals 1 after SMP took place 2013 and 2014, and 0 in 2008 and 2009 - the SMP period 2010-2012 are omitted. If not omitted due to collinearity, we report the single terms of the interaction as well. For both time specifications we first conduct the regression without any further covariates. Hereafter, we add an extended set of explanatory variables at the firm level (column 2 and 7), firm-, and district-year fixed effects (column 3 and 8), omitting those explanatory variables which are least reported in our dataset (columns 4 and 9), and add explanatory variables on the bank-level (column 5 and 10). Due to data availability, the specification with bank control variable does not include observations in 2014. With district-year fixed effects we exclude the first and last 5% of district-time clusters in terms of their variation in firms treated. Moreover, we only include those district-year clusters contributing with at least 5 observations to the regression and where the average treatment is between 5% and 95% of the distribution of treatment across all district-year clusters. Both adaptations are made for reasons of variation for coefficient estimation. We only include firms with at least one observations between 2008 and 2009, and one between 2010 and 2012. Clustered standard errors at the firm-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Variable	During SMP					After SMP				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Time</i>	0.274*** (0.006)	0.026** (0.011)				0.723*** (0.018)	-0.097** (0.024)			
<i>Affected</i>	0.653*** (0.010)	0.018 (0.013)				0.653*** (0.010)	0.006 (0.013)			
<i>Affected × Time</i>	-0.065*** (0.009)	-0.034** (0.014)	0.032** (0.015)	0.022*** (0.008)	0.017* (0.010)	-0.120*** (0.024)	0.001 (0.029)	0.117*** (0.042)	0.088*** (0.025)	0.089*** (0.031)
Observations	819,211	201,837	180,862	684,108	536,639	366,420	86,921	77,653	298,114	197,617
Number of firms	343,359	70,214	64,057	299,810	261,917	252,235	52,743	47,868	210,124	149,670
R^2 overall	0.020	0.645	0.595	0.594	0.587	0.025	0.639	0.497	0.393	0.351
R^2 within	-	-	0.186	0.211	0.207	-	-	0.188	0.201	0.194
R^2 between	-	-	0.626	0.618	0.597	-	-	0.510	0.386	0.344
Firm FE	NO	NO	YES	YES	YES	NO	NO	YES	YES	YES
District-Year FE	NO	NO	YES	YES	YES	NO	NO	YES	YES	YES
Firm controls	NO	NO	NO	YES	YES	NO	NO	NO	YES	YES
Firm controls ext.	NO	YES	YES	NO	NO	NO	YES	YES	NO	NO
Bank controls	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES

Table 8: **Firm Sales**

Notes: We perform an difference-in-difference estimation, regressing the logarithm of sales on whether a firm has a business relationship with a bank eligible to the Securities Markets Programme (SMP) and its interaction with a time dummy. In columns 1-5 the time dummy is equal to 1 during the period the SMP took place - 2010 until 2012 - the periods 2013 and 2014 are omitted. In column 6-10 the time dummy equals 1 after SMP took place 2013 and 2014, and 0 in 2008 and 2009 - the SMP period 2010-2012 are omitted. If not omitted due to collinearity, we report the single terms of the interaction as well. For both time specifications we first conduct the regression without any further covariates. Hereafter, we add an extended set of explanatory variables at the firm level (column 2 and 7), firm-, and district-year fixed effects (column 3 and 8), omitting those explanatory variables which are least reported in our dataset (columns 4 and 9), and add explanatory variables on the bank-level (column 5 and 10). Due to data availability, the specification with bank control variable does not include observations in 2014. With district-year fixed effects we exclude the first and last 5% of district-time clusters in terms of their variation in firms treated. Moreover, we only include those district-year clusters contributing with at least 5 observations to the regression and where the average treatment is between 5% and 95% of the distribution of treatment across all district-year clusters. Both adaptations are made for reasons of variation for coefficient estimation. We only include firms with at least one observations between 2008 and 2009, and one between 2010 and 2012. Clustered standard errors at the firm-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Variable	During SMP					After SMP				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Time</i>	0.185*** (0.003)	-0.003 (0.006)				0.785*** (0.010)	0.039*** (0.012)			
<i>Affected</i>	0.598*** (0.006)	0.063*** (0.008)				0.598*** (0.006)	0.061*** (0.009)			
<i>Affected</i> × <i>Time</i>	-0.003 (0.004)	0.001 (0.007)	-0.020*** (0.005)	-0.015*** (0.002)	-0.006*** (0.002)	0.024 (0.015)	-0.012 (0.015)	0.003 (0.013)	-0.041*** (0.007)	-0.022*** (0.007)
Observations	1,012,131	174,059	155,578	837,991	652,684	469,681	77,170	69,047	380,092	243,356
Number of firms	289,749	62,018	56,778	254,849	229,963	257,121	46,914	42,535	220,015	165,054
R^2 overall	0.040	0.830	0.718	0.628	0.622	0.055	0.831	0.156	0.097	0.026
R^2 within	-	-	0.234	0.113	0.080	-	-	0.281	0.121	0.126
R^2 between	-	-	0.708	0.623	0.615	-	-	0.158	0.092	0.024
Firm FE	NO	NO	YES	YES	YES	NO	NO	YES	YES	YES
District-Year FE	NO	NO	YES	YES	YES	NO	NO	YES	YES	YES
Firm controls	NO	NO	NO	YES	YES	NO	NO	NO	YES	YES
Firm controls ext.	NO	YES	YES	NO	NO	NO	YES	YES	NO	NO
Bank controls	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES

Table 9: **Firm Productivity**

Notes: We perform an difference-in-difference estimation, regressing the logarithm of productivity on whether a firm has a business relationship with a bank eligible to the Securities Markets Programme (SMP) and its interaction with a time dummy. In columns 1-5 the time dummy is equal to 1 during the period the SMP took place - 2010 until 2012 - the periods 2013 and 2014 are omitted. In column 6-10 the time dummy equals 1 after SMP took place 2013 and 2014, and 0 in 2008 and 2009 - the SMP period 2010-2012 are omitted. If not omitted due to collinearity, we report the single terms of the interaction as well. For both time specifications we first conduct the regression without any further covariates. Hereafter, we add an extended set of explanatory variables at the firm level (column 2 and 7), firm-, and district-year fixed effects (column 3 and 8), omitting those explanatory variables which are least reported in our dataset (columns 4 and 9), and add explanatory variables on the bank-level (column 5 and 10). Due to data availability, the specification with bank control variable does not include observations in 2014. With district-year fixed effects we exclude the first and last 5% of district-time clusters in terms of their variation in firms treated. Moreover, we only include those district-year clusters contributing with at least 5 observations to the regression and where the average treatment is between 5% and 95% of the distribution of treatment across all district-year clusters. Both adaptations are made for reasons of variation for coefficient estimation. We only include firms with at least one observations between 2008 and 2009, and one between 2010 and 2012. Clustered standard errors at the firm-level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Variable	During SMP					After SMP				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Time</i>	0.015*** (0.003)	-0.024*** (0.008)				0.129*** (0.009)	-0.062*** (0.016)			
<i>Affected</i>	0.138*** (0.004)	-0.116*** (0.011)				0.138*** (0.004)	-0.108*** (0.012)			
<i>Affected × Time</i>	0.004 (0.004)	0.017* (0.010)	0.039*** (0.007)	0.019*** (0.003)	0.018*** (0.003)	0.003 (0.011)	0.035* (0.019)	0.033** (0.016)	0.022*** (0.009)	0.025*** (0.009)
Observations	841,795	159,996	143,178	699,154	554,738	388,401	70,951	63,352	315,472	210,367
Number of firms	275,629	59,492	54,451	241,831	218,832	233,340	44,056	39,863	197,762	148,810
R^2 overall	0.005	0.250	0.110	0.097	0.063	0.006	0.241	0.070	0.009	0.003
R^2 within	-	-	0.076	0.018	0.015	-	-	0.110	0.028	0.033
R^2 between	-	-	0.108	0.097	0.060	-	-	0.069	0.008	0.003
Firm FE	NO	NO	YES	YES	YES	NO	NO	YES	YES	YES
District-Year FE	NO	NO	YES	YES	YES	NO	NO	YES	YES	YES
Firm controls	NO	NO	NO	YES	YES	NO	NO	NO	YES	YES
Firm controls ext.	NO	YES	YES	NO	NO	NO	YES	YES	NO	NO
Bank controls	NO	NO	NO	NO	YES	NO	NO	NO	NO	YES

Table 10: **The effect of the Securities Markets Programme (SMP) at its intensive margin**

Notes: We perform an difference-in-difference estimation, regressing the logarithm of employment, investment, sales, and productivity on whether a firm has a business relationship with a bank eligible to the SMP and its interaction with a time dummy. Moreover, we add two measures for the relative treatment the firm experiences. *Mean PortfolioShare* measures the yearly mean holdings of relevant assets relative to the firm's bank's total portfolio, and *max PortfolioShare* the maximum exposure of a firm's relationship banks within the year. The regression is performed for each outcome variable with a time dummy equal to 1 during the period the SMP took place - 2010 until 2012 -, and 0 in 2008 and 2009. The regressions include firm- and district-year-fixed effects as well as bank and the small set of firm control variables. Moreover, we only include those district-year clusters contributing with at least 5 observations to the regression and where the average treatment is between 5% and 95% of the distribution of treatment across all district-year clusters. Both adaptations are made for reasons of variation for coefficient estimation. We only include firms with at least one observations between 2008 and 2009, and one between 2010 and 2012. Clustered standard errors at the firm-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Variable	Employment			Investment			Sales			Productivity		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<i>Affected weighted</i>	-0.014*** (0.002)			0.006 (0.011)			-0.005*** (0.002)			0.012*** (0.003)		
<i>Mean PortfolioShare</i>		-0.009*** (0.001)		0.011* (0.006)				-0.007*** (0.001)			0.005*** (0.002)	
<i>Max PortfolioShare</i>			-0.004*** (0.000)		0.007*** (0.001)				-0.002*** (0.000)			0.002*** (0.000)
Observations	923,467	923,467	923,467	536,639	536,639	536,639	652,684	652,684	652,684	554,738	554,738	554,738
Number of firms	330,852	330,852	330,852	261,918	261,918	261,918	229,964	229,964	229,964	218,833	218,833	218,833
R ² overall	0.324	0.323	0.321	0.588	0.588	0.588	0.622	0.622	0.621	0.063	0.063	0.063
R ² within	0.036	0.036	0.036	0.207	0.207	0.207	0.080	0.080	0.080	0.015	0.015	0.015
R ² between	0.306	0.306	0.304	0.598	0.598	0.599	0.615	0.615	0.614	0.059	0.059	0.060
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
District-Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 11: **Firm outcomes implementing propensity score matching**

Notes: We perform an difference-in-difference estimation, regressing the logarithm of employment, investment, sales, and productivity on whether a firm has a business relationship with a bank eligible to the Securities Markets Programme (SMP) and its interaction with a time dummy. The regression is performed for each outcome variable with a time dummy equal to 1, firstly, during the period the SMP took place - 2010 until 2012 - and, secondly, after SMP took place - 2013 and 2014 -, and 0 in 2008 and 2009. The regressions include firm- and district-year-fixed effects as well as bank and the small set of firm control variables. Due to data availability, the specification with bank control variable does not include observations in 2014. In panel A we match all firms associated with matched banks by a 1-to-1 propensity score matching procedure. Table 4 provides the descriptive statistics of matched firms, their dependent variables and explanatory variables both for the propensity score as well as the regression. The second panel, panel B, is based on a subsample of firms which are with banks matched by a propensity score matching in the first place. Only small private banks, savings banks, and cooperative banks were included in the 1-to-1 neighbor matching procedure using all bank control variables as estimators. Table 1b provides descriptive statistics for the matched bank sample. The regressions in panel C are based on a matched sample of firms using the control firm traits controlled for as estimators for the 1-to-1 neighbor propensity score matching. For each estimation we include only those district-year clusters contributing with at least 5 observations to the regression and where the average treatment is between 5% and 95% of the distribution of treatment across all district-year clusters. We only include firms with at least one observations between 2008 and 2009, and one between 2010 and 2012. Clustered standard errors at the firm-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Variable	During SMP				After SMP			
	Employment	Investment	Sales	Productivity	Employment	Investment	Sales	Productivity
<i>Panel A: Propensity score matched sample of firms that are with banks matched by a propensity score matching</i>								
<i>Affected × Time</i>	-0.016*** (0.004)	0.006 (0.026)	-0.011*** (0.004)	0.008 (0.006)	-0.030 (0.020)	0.228* (0.131)	-0.004 (0.023)	0.002 (0.030)
Observations	318,792	170,026	219,774	181,560	109,941	53,325	73,934	61,198
Number of firms	189,482	122,562	131,888	116,473	93,909	48,924	63,751	53,876
R^2 overall	0.067	0.351	0.016	0.006	0.125	0.507	0.256	0.026
R^2 within	0.034	0.205	0.080	0.024	0.055	0.225	0.106	0.059
R^2 between	0.075	0.362	0.015	0.006	0.127	0.512	0.261	0.026
<i>Panel B: Subsample of firms that are with banks matched by a propensity score matching</i>								
<i>Affected × Time</i>	-0.016*** (0.003)	0.026 (0.0187)	-0.007** (0.003)	0.015*** (0.005)	-0.019 (0.013)	0.029 (0.058)	-0.014 (0.012)	0.013 (0.017)
Observations	466,194	273,605	334,138	285,060	177,438	100,990	125,137	107,769
Number of firms	221,426	160,240	157,722	144,078	133,693	82,939	94,864	84,129
R^2 overall	0.176	0.520	0.481	0.000	0.147	0.487	0.258	0.046
R^2 within	0.034	0.203	0.078	0.017	0.056	0.194	0.117	0.037
R^2 between	0.166	0.515	0.470	0.000	0.142	0.483	0.245	0.045
<i>Panel C: Propensity score matching on full sample of firms</i>								
<i>Affected × Time</i>	-0.020*** (0.002)	0.029** (0.011)	-0.015*** (0.012)	0.005* (0.003)	-0.034*** (0.008)	0.043 (0.038)	-0.039*** (0.008)	-0.001 (0.011)
Observations	771,590	427,479	545,214	458,644	286,500	156,787	201,299	171,263
Number of firms	311,992	235,918	219,124	203,822	205,418	126,453	144,663	127,786
R^2 overall	0.202	0.179	0.505	0.036	0.005	0.482	0.095	0.007
R^2 within	0.037	0.206	0.076	0.016	0.064	0.193	0.116	0.033
R^2 between	0.237	0.193	0.551	0.042	0.006	0.491	0.099	0.008
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
District-Y. FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES

Table 12: **Analysis based on firm-bank level**

Notes: Contrary to the previous analysis which are based on a panel dataset, this analysis is based on the not collapsed dataset in which observations exist on the firm-bank-year level. We perform an difference-in-difference estimation, regressing the logarithm of employment, investment, sales, and productivity on whether the bank a firm has a business relationship is eligible to the Securities Markets Programme (SMP) in the respective year and its interaction with a time dummy. *Affected* in this setting varies on the bank j and time t level and equals 1 if a bank is affected by the SMP in the respective year holding eligible assets during the period where exactly the same asset is bought under SMP. For panel A, the time dummy equals 1 during the period the SMP took place - 2010 until 2012 - and 0 else (not including 2013). For panel B, the time dummy equals 1 after the period the SMP took place - 2013 - and 0 else. The regressions include firm- and bank-fixed effects as well as bank and the reduced set of firm control variables. Columns 2, 4, 6, and 8 include year-fixed effects additionally. We only include firms with at least one observations between 2008 and 2009, and one between 2010 and 2012. The regression includes observations between 2008 and 2013. Clustered standard errors at the firm-level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

<i>Panel A: During SMP</i>								
Variable	Employment		Investment		Sales		Productivity	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Affected</i>	-0.022*** (0.001)	-0.002* (0.001)	0.052*** (0.008)	-0.004 (0.008)	-0.010*** (0.001)	-0.001 (0.001)	0.017*** (0.002)	0.004** (0.002)
Observations	1,482,859	1,482,859	876,145	876,145	1,048,191	1,048,191	898,998	898,998
R^2	0.971	0.971	0.873	0.874	0.984	0.984	0.934	0.934
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	NO	YES	NO	YES	NO	YES	NO	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES
<i>Panel B: After SMP</i>								
Variable	Employment		Investment		Sales		Productivity	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Affected</i>	-0.012*** (0.001)	-0.001 (0.001)	0.049*** (0.007)	-0.009 (0.007)	0.000 (0.001)	0.001 (0.001)	0.012*** (0.002)	0.003* (0.002)
Observations	1,564,154	1,564,154	925,131	925,131	1,098,536	1,098,536	945,327	945,327
R^2	0.969	0.970	0.868	0.868	0.983	0.983	0.931	0.931
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	NO	YES	NO	YES	NO	YES	NO	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES

Table 13: **Baseline results for the subsample of small and medium sized enterprises (SME)**

Notes: We perform an difference-in-difference estimation, regressing the logarithm of employment, investment, sales, and productivity on whether a firm has a business relationship with a bank eligible to the Securities Markets Programme (SMP) and its interaction with a time dummy. In columns 1-4 the time dummy is equal to 1 during the period the SMP took place - 2010 until 2012 - and in column 5-8 after SMP took place - 2013 and 2014 -, and 0 in 2008 and 2009. If not omitted, we report the single terms of the interaction as well. For both time specifications we control for firm level and bank level characteristics and include firm- and district-year fixed effects. Due to data availability, the specification with bank control variable does not include observations in 2014. Moreover, we only include those district-year clusters contributing with at least 5 observations to the regression and where the average treatment is between 5% and 95% of the distribution of treatment across all district-year clusters. Both adaptations are made for reasons of variation for coefficient estimation. We only include firms that have at least one observations between 2008 and 2009, and one between 2010 and 2012. Clustered standard errors at the firm-level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Variable	During SMP				After SMP			
	Employment	Investment	Sales	Productivity	Employment	Investment	Sales	Productivity
<i>Affected</i> × <i>Time</i>	-0.018*** (0.002)	0.018* (0.011)	-0.008*** (0.002)	-0.015*** (0.003)	-0.040*** (0.007)	0.088*** (0.032)	-0.026 (0.008)	0.025*** (0.009)
Observations	902,184	519,100	638,824	535,957	337,610	190,911	236,734	203,732
Number of firms	324,576	256,932	229,004	214,090	229,132	145,937	161,383	145,038
R^2 overall	0.272	0.545	0.540	0.046	0.016	0.224	0.016	0.002
R^2 within	0.036	0.208	0.077	0.015	0.063	0.195	0.123	0.032
R^2 between	0.263	0.567	0.547	0.045	0.015	0.220	0.016	0.003
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
District-Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES

Table 14: **Baseline results for the subsample of a balanced panel**

Notes: We perform an difference-in-difference estimation, regressing the logarithm of employments, investment, sales, and productivity on whether a firm has a business relationship with a bank eligible to the Securities Markets Programme (SMP) and its interaction with a time dummy. In columns 1-4 the time dummy is equal to 1 during the period the SMP took place - 2010 until 2012 - and in column 5-8 after SMP took place - 2013 and 2014 -, and 0 in 2008 and 2009. If not omitted, we report the single terms of the interaction as well. For both time specifications we control for firm level and bank level characteristics and include firm- and district-year fixed effects. Due to data availability, the specification with bank control variable does not include observations in 2014. Moreover, we only include those district-year clusters contributing with at least 5 observations to the regression and where the average treatment is between 5% and 95% of the distribution of treatment across all district-year clusters. Both adaptations are made for reasons of variation for coefficient estimation. We only include firms with an observation in the database in each year between 2008 and 2013. Clustered standard errors at the firm-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Variable	During SMP				After SMP			
	Employment	Investment	Sales	Productivity	Employment	Investment	Sales	Productivity
<i>Affected × Time</i>	-0.019*** (0.005)	0.053** (0.021)	-0.011** (0.004)	0.018*** (0.006)	-0.028*** (0.007)	0.073* (0.032)	-0.015* (0.008)	0.024** (0.010)
Observations	167,154	104,816	121,940	108,099	94,209	57,726	63,477	56,910
Number of firms	50,446	43,278	38,472	37,340	46,987	35,810	34,685	32,766
R^2 overall	0.081	0.329	0.247	0.003	0.026	0.176	0.069	0.008
R^2 within	0.052	0.196	0.121	0.028	0.099	0.192	0.205	0.039
R^2 between	0.078	0.343	0.241	0.002	0.024	0.169	0.066	0.008
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
District-Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES

Table 15: **Number of banks**

Notes: We perform an difference-in-difference estimation, regressing the logarithm of employment, investment, sales, and productivity on whether a firm has a business relationship with a bank eligible to the Securities Markets Programme (SMP) and its interaction with a time dummy. Moreover, we include a third interaction term, *MBR*, that equals one if the firm has business relationships with two or more banks. In columns 1-4 the time dummy is equal to 1 during the period the SMP took place - 2010 until 2012 - and in column 5-8 after SMP took place - 2013 and 2014 -, and 0 in 2008 and 2009. If not omitted, we report the single terms of the interaction as well. We control for firm level and bank level characteristics and include firm- and district-year fixed effects. Due to data availability, the specification with bank control variable does not include observations in 2014. Moreover, we only include those district-year clusters contributing with at least 5 observations to the regression and where the average treatment is between 5% and 95% of the distribution of treatment across all district-year clusters. Both adaptations are made for reasons of variation for coefficient estimation. We only include firms with at least one observations between 2008 and 2009, and one between 2010 and 2012. Clustered standard errors at the firm-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Variable	During SMP				After SMP			
	Employment	Investment	Sales	Productivity	Employment	Investment	Sales	Productivity
<i>MBR</i>	0.072*** (0.007)	-0.115*** (0.028)	0.047*** (0.007)	-0.032*** (0.009)	0.083*** (0.014)	-0.126** (0.062)	0.053*** (0.013)	-0.030* (0.017)
<i>Affected</i> × <i>Time</i>	-0.000 (0.003)	-0.029* (0.016)	-0.001 (0.003)	0.003 (0.005)	0.000 (0.012)	0.049 (0.051)	-0.010 (0.013)	-0.011 (0.016)
<i>Affected</i> × <i>MBR</i>	0.021** (0.009)	-0.013 (0.035)	-0.006 (0.008)	-0.020* (0.012)	0.023 (0.018)	-0.071 (0.080)	-0.002 (0.017)	-0.003 (0.022)
<i>Time</i> × <i>MBR</i>	-0.019*** (0.003)	0.051*** (0.016)	-0.010*** (0.003)	0.013*** (0.004)	-0.025** (0.010)	0.038 (0.049)	-0.030*** (0.011)	0.001 (0.015)
<i>Affected</i> × <i>Time</i> × <i>MBR</i>	-0.018*** (0.004)	0.038* (0.022)	-0.003 (0.004)	0.015** (0.006)	-0.036** (0.014)	0.034 (0.067)	0.001 (0.016)	0.045** (0.020)
Observations	923,467	536,639	652,684	554,738	344,784	197,617	243,356	210,367
Number of firms	330,852	261,918	229,964	218,833	233,344	149,671	165,055	148,811
<i>R</i> ² overall	0.342	0.586	0.626	0.063	0.024	0.338	0.001	0.003
<i>R</i> ² within	0.037	0.207	0.080	0.015	0.064	0.194	0.126	0.034
<i>R</i> ² between	0.324	0.597	0.619	0.060	0.023	0.330	0.001	0.004
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
District-Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES

Table 16: **Bank-relationship with regionally operating banks**

Notes: We perform an difference-in-difference estimation, regressing the logarithm of employment, investment, sales, and productivity on whether a firm has a business relationship with a bank eligible to the Securities Markets Programme (SMP) and its interaction with a time dummy. Moreover, we include a third interaction term, *Regional*, that equals one if the firm has business relationships with a bank that operates solely regional (savings bank or cooperative bank). In columns 1-4 the time dummy is equal to 1 during the period the SMP took place - 2010 until 2012 - and in column 5-8 after SMP took place - 2013 and 2014 -, and 0 in 2008 and 2009. If not omitted, we report the single terms of the interaction as well. For both time specifications we control for firm level and bank level characteristics and include firm- and district-year fixed effects. Due to data availability, the specification with bank control variable does not include observations in 2014. Moreover, we only include those district-year clusters contributing with at least 5 observations to the regression and where the average treatment is between 5% and 95% of the distribution of treatment across all district-year clusters. Both adaptations are made for reasons of variation for coefficient estimation. We only include firms that have a business relationship to only one bank, at least one observations between 2008 and 2009, and one between 2010 and 2012. Clustered standard errors at the firm-level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Variable	During SMP				After SMP			
	Employment	Investment	Sales	Productivity	Employment	Investment	Sales	Productivity
<i>Regional</i>	0.092* (0.049)	-0.162 (0.141)	-0.020 (0.053)	-0.095 (0.073)	-0.127* (0.077)	-0.184 (0.356)	-0.093 (0.195)	-0.236 (0.259)
<i>Affected</i> × <i>Time</i>	-0.039*** (0.015)	-0.098 (0.067)	-0.034** (0.016)	-0.011 (0.020)	-0.007 (0.052)	0.526*** (0.233)	-0.028 (0.054)	0.014 (0.074)
<i>Affected</i> × <i>Regional</i>	-0.129** (0.056)	0.120 (0.163)	0.008 (0.054)	0.061 (0.078)	0.009 (0.102)	0.028 (0.399)	0.030 (0.194)	0.251 (0.258)
<i>Time</i> × <i>Regional</i>	-0.022 (0.013)	-0.042 (0.062)	-0.026* (0.015)	-0.030* (0.018)	0.051 (0.050)	0.464*** (0.222)	-0.030 (0.049)	-0.052 (0.070)
<i>Affected</i> × <i>Time</i> × <i>Regional</i>	0.044*** (0.015)	0.082 (0.070)	0.039** (0.017)	0.012 (0.021)	0.024 (0.055)	-0.472* (0.241)	0.017 (0.057)	-0.059 (0.077)
Observations	503,692	282,291	352,046	291,358	176,365	97,418	123,620	103,690
Number of firms	215,770	158,751	144,194	133,768	130,122	79,763	90,275	79,154
<i>R</i> ² overall	0.169	0.012	0.462	0.014	0.004	0.393	0.115	0.003
<i>R</i> ² within	0.038	0.228	0.080	0.016	0.064	0.209	0.125	0.036
<i>R</i> ² between	0.166	0.012	0.474	0.016	0.004	0.394	0.116	0.004
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
District-Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES	YES	YES	YES	YES
Bank controls	YES	YES	YES	YES	YES	YES	YES	YES

Table 17: **Both time variables specified together**

Notes: We perform an difference-in-difference estimation, regressing the logarithm of employment, investment, sales, and productivity on whether a firm has a business relationship with a bank eligible to the Securities Markets Programme (SMP) and its interaction with time dummies. The regression is performed for each outcome variable with two time dummies: one equal to 1 during the period the SMP took place - 2010 until 2012 - and one equal to 1 after SMP took place - 2013 and 2014. The regressions include firm- and district-year-fixed effects as well as bank and the reduced set of firm control variables. Due to data availability, the specification with bank control variable does not include observations in 2014. Moreover, we only include those district-year clusters contributing with at least 5 observations to the regression and where the average treatment is between 5% and 95% of the distribution of treatment across all district-year clusters. Both adaptations are made for reasons of variation for coefficient estimation. We only include firms with at least one observations between 2008 and 2009, and one between 2010 and 2012. The regression includes observations between 2008 and 2013. Clustered standard errors at the firm-level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Variable	Employment	Investment	Sales	Productivity
<i>Affected</i> × <i>During SMP</i>	-0.020*** (0.002)	0.010 (0.010)	-0.007*** (0.002)	0.019*** (0.003)
<i>Affected</i> × <i>After SMP</i>	-0.037*** (0.005)	0.076*** (0.021)	-0.015*** (0.005)	0.032*** (0.006)
Observations	1,026,790	602,197	725,775	613,998
Number of firms	334,721	267,367	241,478	226,366
R^2 overall	0.356	0.597	0.661	0.084
R^2 within	0.043	0.201	0.100	0.018
R^2 between	0.329	0.605	0.632	0.076
Firm FE	YES	YES	YES	YES
District-Year FE	YES	YES	YES	YES
Firm controls	YES	YES	YES	YES
Bank controls	YES	YES	YES	YES

Appendix C Further tables

Table 18: Firm sectors

Notes: This table reports for the number of observations, means, and standard deviations for whether the firm is treated as well as for our four dependent variables employment, investment, sales and productivity between 2008 and 2014 separated for each industry sector in our sample. The statistics includes only those firms with at least one observations between 2008 and 2009, and one between 2010 and 2012.

Sector	Obs.	Treatment		Employment		Investment		Sales		Productivity	
		Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Agriculture	35,225	0.399	0.490	16.691	59.331	0.411	2.494	3.444	37.671	0.234	0.640
Food	43,204	0.469	0.499	74.643	250.702	0.924	7.865	24.873	120.715	0.509	5.702
Textiles	17,725	0.641	0.480	56.155	266.514	0.547	5.534	10.639	63.270	0.245	0.692
Wood	29,405	0.520	0.500	44.435	145.924	0.616	5.464	10.632	54.500	0.185	0.350
Paper	32,836	0.575	0.494	25.021	62.181	0.348	5.163	3.274	12.582	0.180	2.455
Chemicals	18,010	0.690	0.462	155.015	1,812.981	10.981	237.037	91.083	915.312	2.073	30.161
Rubber	26,038	0.616	0.486	71.971	318.119	1.087	26.242	14.157	82.327	0.203	0.709
Stone	23,984	0.540	0.498	50.758	431.228	2.648	114.086	14.928	236.204	0.241	0.589
Metal	111,039	0.541	0.498	50.289	509.947	0.622	7.538	10.330	117.147	0.188	2.860
Machinery	75,583	0.594	0.491	70.898	439.205	1.068	26.067	15.180	107.627	0.218	0.682
Electronics	54,173	0.609	0.488	90.498	2,222.721	1.340	37.208	24.512	606.194	0.270	3.036
Transport equipment	12,711	0.584	0.493	474.832	7,213.135	27.879	554.501	283.235	3,642.085	0.307	3.228
Misc. equipment	49,194	0.533	0.499	34.576	179.315	0.303	3.739	7.577	135.890	0.152	0.426
Utilities	56,711	0.469	0.499	41.753	237.636	4.046	49.740	54.016	393.920	1.881	14.683
Construction	435,500	0.438	0.496	16.393	168.190	0.142	3.965	2.300	23.991	0.178	0.787
Motor vehicles	134,560	0.476	0.499	19.542	98.927	0.168	1.832	7.694	59.816	0.367	1.420
Wholesale	386,638	0.560	0.496	29.125	535.119	0.349	7.650	15.543	166.050	0.853	13.935
Retail	335,532	0.485	0.500	28.712	715.506	0.202	4.445	6.513	99.723	0.298	2.422
Hotels	72,749	0.413	0.492	31.087	136.295	0.145	1.102	2.222	13.174	0.113	0.291
Transport	134,883	0.491	0.500	66.361	2,114.662	1.446	40.515	14.124	341.052	0.453	10.345
Telecommunication	150,887	0.536	0.499	36.747	889.520	1.213	71.134	9.247	292.497	0.230	1.222
Business Services	199,042	0.498	0.500	52.887	494.535	0.468	12.614	5.226	64.525	0.367	3.822

Table 19: Definition

Variable	Unit	Description
<i>Treatment variables</i>		
Affected	0/1	This variable is equal to one if the firm is reported to have a relationship with a bank that is eligible to Securities Markets Programme (SMP) by holding assets bought by the ECB in the respective quarter in its portfolio (aggregated by year).
Affected weighted	Number	This variable is equal to the number of banks associated to the firm and eligible to SMP by holding assets bought by the ECB in the respective quarter in its portfolio (aggregated by year) over the total number of banks the firm has a relationship with.
Mean Portfolioshare	%	Average yearly mean of relevant asset holdings over all banks a firm has a relationship with during the year in percentage*100.
Max Portfolioshare	%	Average yearly maximum of relevant asset holdings over all banks a firm has a relationship with during the year in percentage*100.
During SMP	0/1	Equals 1 in 2010, 2011, and 2012, and 0 in 2008 and 2009.
After SMP	0/1	Equals 1 in 2013 and 2014, and 0 in 2008 and 2009.
<i>Dependent variables of firm i in year t</i>		
Employees	Number	Absolute number of firm's employees in given year.
Investmentgrowth	%	Difference between fixed assets plus depreciation and last year's fixed assets over last years fixed assets winzorized at the 0.5% level.
Investment	EUR	Difference of this year's fixed assets and last year's fixed assets plus depreciation of fixed assets and depreciation in EUR million.
Sales	EUR	Turnover of the firm in EUR million.
Productivity	EUR	Annual turnover of the firm in EUR million over number of employees
<i>Control variables of firm i in year t: winzorized at the 0.5 % level</i>		
Total assets	EUR	Firm's total assets in million Euros.
Listed	0/1	Equals 1 if the firm is a listed company, else 0.
Leverage	%	Fraction of non-equity balance sheet over total assets.
Networth	%	Equity minus cash minus debt over total assets.
Tangibility	%	Firm's fraction of fixed assets over total assets.
ICR	%	Interest coverage ratio: firm's ability to cover interest expenses: EBIT over interest expenses.
Earnings	%	EBITDA over total assets.
Cash Flow	%	Cash flow over total assets.
Wage	EUR	Costs of employees over number of employees in Euros.

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Table 19 – Continued

Variable	Unit	Description
Bank-relationships	Number	Maximum number of banks a firm has a relationship with (not winzorized).
<i>Control variables of bank b in year t</i>		
Equity ratio	%	Tier 1 capital over risk weighted assets (scaled to 1=100%).
Bank reserve ratio	%	Cash reserves over total assets (scaled to 1=100%).
Total liabilities	EUR	Total liabilities of the bank in mrd. EUR.
Hidden liabilities	0/1	Dummy equal to 1 if hidden liabilities exist, else 0.
Customer loans	%	Customer loans over total assets (scaled to 1=100%).
NPL	%	Value adjusted (non-performing) loans over total loans (scaled to 1=100%).
CIR	%	Costs over income (Cost-Income-Ratio) (scaled to 1=100%).
ROE	%	Return on equity (scaled to 1=100%).
Customer loan growth	%	Growth rate of deflated customer loans (scaled to 1=100%).
Total asset growth	%	Growth rate of deflated total assets (scaled to 1=100%).