Effects of Bank Capital Requirements on Lending by Banks and Non-Bank Financial Institutions*

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Abstract

What is the impact of a sudden and sizeable increase in bank capital requirements on the lending activity by directly affected banks and by non-affected non-bank financial institutions (NBFIs)? To answer this question, we apply a difference-in-differences methodology around the capital exercise by the European Banking Authority (EBA) in 2011 with German credit register data. We find that NBFIs (i.e., insurance companies, financial enterprises, and factoring companies) and Non-EBA banks expand their corporate lending relative to EBA banks. In particular, NBFIs use the opportunity to expand their credit activities, in riskier and more competitive borrower segments. (96 words)

Keywords: non-bank financial intermediation, bank capital requirements, EBA capital exercise

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1 Introduction

In the last decades, the "Basel Framework" of international standards regulating the banking sector have become much more stringent. Implemented as a response to the instabilities revealed during the global financial crisis of 2008-2009, Basel III has further tightened bank regulation and, in particular, significantly increased bank capital requirements. Despite the long history of bank capital requirements, their overall economic effects remain ambiguous and stand at the heart of academic and policy debates. On the one hand, higher capital requirements are intended to mitigate excessive ex-ante risk-taking as well as to increase the ex-post loss-absorption capacity of banks, thereby lowering the risk of contagion and reducing the need for government interventions (see Admati et al. (2013), Thakor (2014)). On the other hand, tighter capital requirements could engender regulatory arbitrage opportunities and induce the growth of more fragile and less regulated non-bank financial institutions (Buchak et al., 2018; Chretien & Lyonnet, 2020; Irani et al., 2020; Luck & Schempp, 2014; Martinez-Miera & Repullo, 2019; Plantin, 2014).

The aim of this paper is to empirically investigate the effects of bank capital requirements on the lending activity of banks and non-bank financial institutions (NBFIs). Our work examines the spillover effects of the banking regulation and helps to assess its impact on the distribution of risks in the system and on the overall financial stability. This aspect has a very limited coverage in the previous literature and is particularly important in the environment of low interest rates, which could intensify the competition between commercial banks and NBFIs seeking positive yields. Moreover, our results contribute to the policy discussion on the growing importance of NBFIs. The emerging prominence of the NBFI sector reshapes the financial system, could give rise to new sources of risk and even impair the monetary policy transmission mechanism (Schnabel, 2021).

In this study, we exploit a sudden and sizeable increase in bank capital requirements imposed by the European Banking Authority (EBA) within the framework of its capital exercise in 2011. Employing data from the German credit register, we conduct a difference-in-differences analysis to compare the change in the lending activity of different types of lenders around the EBA capital exercise. The capital exercise included 13 German banks (EBA banks), while it did not have a direct effect on other banks (Non-EBA banks) and on NBFIs. In this paper, we specifically focus on the NBFIs that have exposure vis-à-vis real sector firms and are subject to the credit register reporting. These are financial services institutions, insurance companies, financial enterprises, non-monetary financial institutions, capital investment companies, equity-holding companies, and bad banks. Moreover, the credit register allows us to consider NBFIs not only as lenders but also as borrowers.

Focusing on the time period from 2010Q4 to 2013Q4, we estimate the change in the average growth rate of the real sector exposure of the NBFIs and the Non-EBA banks relative to the reference group of the EBA banks. The EBA capital exercise can be argued to be a quasi-natural experiment, in particular due to the severity of the capital requirement increase (from 5% to 9% core tier 1 ratio) and the exceptionally short time limits to fulfil it (8 months) (Degryse et al., 2019b; Gropp et al., 2019; Mesonnier and Monks, 2015; Ozsahin, 2020). Moreover, as we focus on the developments in NBFI exposure, the regulatory intervention targeting banks is even more

exogenous. In addition, we disentangle credit supply from credit demand relying on a modification of Khwaja and Mian methodology (Khwaja and Mian, 2008) and conducting fixed effects estimation within industry-location-size (ILS) borrower groups (Degryse et al., 2019a; Jonghe et al., 2019). In this way also single-bank borrowers are retained in the estimation. The estimation is performed both on intensive and extensive margins to evaluate the effect on the intensity of the NBFIs' exposure to their existing borrowers as well as on their probability to enter or exit the lending relationship.

Our main findings are as follows. First, estimating the impact on the intensive margin, we document that following the EBA capital exercise the NBFIs and the Non-EBA banks slowdown their lending to the real sector firms less than the EBA banks by an extra 2.2 and 1.6 percentage points (pp) per quarter, respectively. Among the NBFIs, the relative increase in lending to the real sector is the most evident for the insurance companies, the financial enterprises, and the factoring companies. Moreover, conducting an extensive margin analysis, we show that the NBFIs relatively increase their probability of granting credit to new borrowers and decrease the probability of terminating lending to the existing ones. Prevalence of the intensive or extensive margin effects differs across the NBFI categories.

Second, we study the impact of borrower characteristics on the change in bank and NBFI exposure. For instance, NBFIs might increase their lending more to the firms with the initially high share of credit from the EBA banks (EBA firms), as these firms might be stronger affected by the capital exercise. However, we do not find such evidence on the intensive margin. Moreover, during the time period considered, only the capital requirements applied to banks were risk-sensitive and with the exception of the insurance companies all other NBFIs considered in our sample had been unregulated. Motivated by such differences in regulatory standards, we split borrowers into segments depending on their riskiness. We show that, in comparison to the EBA banks, the NBFIs increase their lending activity in moderate- and high-risk borrower segments, while there is no significant difference between the two categories of lenders in the low-risk segment. Next, to shed light on the nature of relationship between the EBA banks and the NBFIs, we focus on the concentration of lending in borrower segments measured by the HHI index. We find that the most competitive segments exhibit the largest increase in the NBFIs' lending activity indicating that the NBFIs and the EBA banks might act as competitors.

Third, we conduct an analysis at the firm level to test whether the NBFIs pick up enough lending to compensate for the reduction in credit supply from the EBA banks. We find that, despite the growing lending activity of the NBFIs, firms with the high share of exposure from the EBA banks face a significant drop in the growth rate of their total exposure but less so in the higher credit quality and more competitive segments. Moreover, our results do not suggest that substitution towards NBFI funding is easier if a firm has an established lending relationship with an NBFI in the pre-treatment period. These firm-level results are in line with the previous studies that show that the EBA capital exercise leads to a reduction in credit and adverse real effects for firms that are reliant on the EBA banks (Degryse et al., 2019b; Gropp et al., 2019; Ozsahin, 2020).

Finally, we conduct a series of tests to investigate whether the EBA banks try to circumvent the increase in capital requirements by using NBFIs as intermediaries to grant credit to the real sector

borrowers. In this case, banks could potentially economize on the regulatory capital because, under the Basel II standardized approach, the risk-weights applied on the exposure to NBFIs are not higher than the ones applied on the exposure to corporate borrowers with the same credit risk. Moreover, the NBFIs tend to have lower probabilities of default than the real sector borrowers. We also test whether the EBA banks increase lending to certain NBFIs and whether these NBFIs, in turn, increase lending to the real sector firms. However, focusing on the corporate structure and credit exposures, we do not find strong evidence of such arrangements between the EBA banks and the NBFIs. Incentives to enter into such arrangements could be lower due to a temporary nature of the capital exercise and the short time frame for compliance. Moreover, these results provide auxiliary evidence of the competitive relationship between the EBA banks and the NBFIs.

Contribution of this study to the literature is twofold. First, building on the theoretical predictions (Harris et al., 2014; Martinez-Miera & Repullo, 2019; Plantin, 2014), we contribute to a rather limited stream of empirical literature on bank regulation and expansion of non-bank lending (Buchak et al., 2018; Irani et al., 2020). The most closely related paper is Irani et al. (2020). By exploiting surprise features of the U.S. implementation of Basel III, Irani et al. (2020) document a reallocation of credit from undercapitalised banks to non-banks through trading in the secondary loan market. Our study complements Irani et al. (2020) in several ways. First, reliance on the EBA capital exercise as a quasi-natural experiment allows us to further improve on their identification strategy. Moreover, the credit register covers multiple instruments and contains total exposures between lenders and borrowers that, in particular, allows us to study the impact on the total credit availability rather than its reallocation in the secondary market. The reporting threshold of 1.5 m EUR still gives us an opportunity to include in the analysis the relevant firms and NBFIs. Given the specifics of the German financial sector and the data reporting, the types of the NBFIs considered also differ.[1] Finally, the credit register data allows us to consider NBFIs as both lenders and borrowers and to analyse the lending activity between banks and NBFIs.

Second, analysing NBFIs and their link to banks, our study contributes to the broader literature on bank capital requirements, which mainly focuses on the effects on lending and risk-taking by banks (e.g., Imbierowicz et al. (2018), Aiyar et al. (2014), Conti et al. (2018); on the EBA capital exercise, Degryse et al., 2019; Gropp et al., 2018; Mesonnier & Monks, 2015; Ozsahin, 2020)). Gropp et al. (2019) document that banks participated in the capital exercise demonstrated a stronger increase in their core tier 1 capital ratios relative to other banks. The banks adjusted to the capital exercise requirements by reducing their risk-weighted assets, mainly through asset shrinking rather than risk reduction. Analysing euro-area bank monthly balance sheets, Mesonnier and Monks (2015) find that affected by the capital exercise banks experienced a relatively slower loan growth, which, at the country level, was not fully compensated by unconstrained banks. Focusing on corporate loans in Portugal, Degryse et al. (2019b) provide empirical evidence that banks that are subject to higher capital requirements, in order to save on regulatory capital, more often ask their borrowers to post collateral. Ozsahin (2020) sheds light on the cross-border effects

[1] NBFIs in Irani et al. 2020 include the following categories: hedge fund or private equity, mutual fund, insurance company, pension fund, broker-dealer, finance company, and CLO.

of the capital exercise by identifying a tightening of credit by operating in Slovenia subsidiaries of the affected banking groups.

The paper is organized as follows. Section 2 reviews the related literature. Section 3 describes the specifics of the EBA capital exercise. Section 4 provides details on the data and institutional settings. Section 5 introduces the methodology employed. Section 6 describes the main empirical results. Section 7 and Section 8 present a series of robustness checks and extensions, respectively. Section 9 concludes.

2 Related literature

Despite the long history of literature on the relation between bank capital requirements and banks' lending and risk-taking decisions, the effects beyond the banking sector are not well understood. While the current regulation tends to increase bank capital requirements, there are theoretical models showing that, in the presence of shadow banks, such an approach might be counterproductive (Harris et al., 2014; Martinez-Miera and Repullo, 2019; Plantin, 2014). Harris et al. (2014) show that, while substantially higher bank capital requirements could improve the total welfare, small increases might incentivise banks to shift lending from safe borrowers to risky ones, especially when competition from the non-bank sector is high. Martinez-Miera and Repullo (2019) find that tightening of capital requirements could reduce risks in the banking sector but increase the overall risks due to lower screening incentives of shadow banks. Considering both flat and risk-sensitive capital requirements, the authors show that tightening of the former leads to a shift of safer borrowers to the shadow banking system, while tightening of the latter induces a shift of riskier borrowers. Instead of focusing on the borrowers side, Plantin (2014) derives conditions for regulatory arbitrage that allows banks to bypass capital regulation by transferring riskier claims to shadow banking institutions.

However, bank and non-bank funding are not perfect substitutes and have different implications for financial stability. Denis and Mihov (2003) study the choice among bank debt, non-bank private debt, and public debt and show that non-bank private debt is an economically important financing source especially for firms with the lowest credit quality. Chernenko et al. (2019) investigate terms of direct lending by non-bank financial institutions and characteristics of their borrowers. The authors provide evidence that borrowers of non-banks are significantly less profitable, more levered, and more volatile than bank borrowers, suggesting that the commercial loan market is segmented. Lim et al. (2014) inspect a large sample of leveraged syndicated loans originated between 1997 and 2007 and find that facilities, which include non-bank institutions, are priced with premiums relative to bank-only facilities even when estimation is made within the same loan package. The non-bank premiums are higher when borrowers are financially constrained and when capital is less available from banks.

Buchak et al. (2018) provide empirical evidence suggesting that both increases in the regulatory burden on traditional banks, including capital requirements, and technological advantages have contributed to the expansion of shadow bank lending. Irani et al. (2020) document a lower loan retention by less-capitalised banks and the reallocation of credit to non-banks around the U.S. implementation of Basel III. The effect is stronger for loans that require higher capital reserves

and at times, when bank capital is scarce. Moreover, the authors highlight that, due to the fragility of the non-banks' liabilities, their participation in syndicates has a strong negative effect on credit availability during times of marketwide stress. Analysing in a cross-country setting a series of macroprudential policies targeting banks, Cizel et al. (2019) find a strong substitution towards non-bank credit especially in advanced economies with well-developed non-bank credit markets. Claessens et al. (2021) document a significant effect of macroprudential policies not only on the credit activity of non-banks but also on all non-bank economic functions that may involve bank-like financial stability risks according to the Financial Stability Board's classification (e.g., management of collective investment vehicles with features that make them susceptible to runs as well as intermediation of market activities that depend on short-term funding or on secured funding of client assets).

3 The EBA capital exercise

The European Banking Authority (EBA) conducted a capital exercise as a response to the sovereign debt crisis in Europe in order to restore confidence into the banking sector. The capital exercise was announced on the 26th of October in 2011 and involved 71 European banks. These banks were required to build "an exceptional and temporary capital buffer such that the Core Tier 1 capital ratio reaches a level of 9% by the end of June 2012" (EBA, 2011b). Based on the established target, the EBA identified an aggregated shortfall of 115 bn EUR.

The German banking system, in particular, was significantly affected by the capital exercise. The EBA methodology was designed in a way that the exercise had to cover "at least 50% of the national banking sectors in each EU Member State" and "banks have been included in the exercise in descending order of their market shares by total assets in each Member State" (EBA, 2011a). 13 German banks participated in the exercise, with an estimated aggregated shortfall of 13 bn EUR.

The empirical analysis of bank capital requirements is challenging, in particular, due to the lack of exogenous variation. The EBA capital exercise gives thus an ideal setting to apply a difference-in-differences methodology. It had been largely unanticipated by German banks and affected some parts but not the entire German baking system having no direct impact on the NBFIs. Several papers argue that the EBA capital exercise could be considered as a quasi-natural experiment (Degryse et al., 2019b; Gropp et al., 2019; Mesonnier and Monks, 2015; Ozsahin, 2020). The main arguments include the facts that the capital requirement increase imposed by the exercise was economically significant (from 5% to 9% core tier 1 ratio), it came just few months after the 2011 EU-wide stress test (with a broadly similar group of banks involved) and had to be satisfied in a remarkably short time period (in 8 months). Moreover, the EBA itself describes the exercise as an exceptional and temporary measure (EBA, 2011b). Finally, the increase in bank capital requirements is even more exogenous to the developments in the NBFI sector.

4 Data and institutional settings

4.1 Data description

Our main source of data is the German credit register. The credit register contains outstanding exposures between each individual lender and borrower at the end of each quarter if during that quarter the credit volume exceeded 1.5 m EUR.[2] The unique feature of our dataset is that we keep NBFIs both on lenders' and borrowers' sides and provide a detailed classification of them.

The classification of NBFIs as lenders is based on the credit register banking groups. We identify 7 groups of NBFIs: financial services institutions, insurance companies, financial enterprises, non-monetary financial institutions, capital investment companies, equity-holding companies, and bad banks. In addition to the NBFI lenders, we also consider banks that are subject to the EBA capital exercise (EBA banks) and the banks that are not (Non-EBA banks). These groups of lenders cover the entire population of the credit register.[3]

In our analysis, we focus on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The pre-treatment period is limited due to two reasons. First, financial service institutions did not fully report to the credit register before 2010. Second, the leasing industry in Germany was severely affected by the financial crisis of 2008-2009 and the corporate tax reform of 2008 that reduced the deductibility of leasing expenses. The drop in leasing activity was observed across different borrower sectors. The situation in the industry stabilized in 2010Q4 (see Figure A1, Appendix 1). Our sample period finishes at the end of 2013, since the classification of borrower sectors has been significantly changed afterwards.

Table 1 describes the composition of lending to the real sector in the pre-treatment period. The statistics reported correspond to the average values across time. We focus on the description of the lender with median characteristics. We find that lending is provided by 13 EBA banks,[4] 1,579 Non-EBA banks, and 525 NBFIs. The exposure of the EBA banks constitutes 38% of the total value. Due to the selection rule of the EBA capital exercise, the median EBA bank is significantly larger in terms of the total exposure (21 bn EUR) and the number of borrowers served (1,731) than the median lenders from the other categories. Moreover, the median EBA bank demonstrates the largest average exposure to a single borrower (8.7 m EUR). The group of the Non-EBA banks is the largest one in terms of the number of institutions (1,579) and the share in the total exposure (52%). However, the median Non-EBA bank finances only 29 borrowers and has the total exposure of 40 m EUR. The median NBFI is even smaller: it has three borrowers and a total exposure of 10 m EUR. Nonetheless, the average single-borrower exposure of the median NBFI is more than twice larger than the median Non-EBA bank's one (2.9 m EUR relative to 1.4 m

[2] Throughout the paper, we refer to the total exposure between each lender and each borrower as "credit".
[3] We exclude from the analysis only Special Purpose Institutions and the Federal Employment Agency.
[4] In the baseline analysis, the group of EBA banks includes the 13 main institutions only. We drop the banks that belong to their groups, since the increased capital requirements were applied at the consolidated level. As a robustness test, we show that the results hold when all banks from the affected groups are considered as EBA banks (Table 4).

EUR). The exposure of the NBFIs to the real sector amounts to 63.8 bn EUR, which corresponds to 9.6% of the total.

[Table 1 here]

4.2 The non-bank financial intermediation (NBFI) sector in Germany

Defining non-bank financial institutions that engage in financial intermediation activities is a difficult task to begin with, as there is a magnitude of ambiguous definitions of this sector. In this regard, the Financial Stability Board (FSB) has done the most extensive work. According to the FSB (2020) the most broad definition of the non-bank financial intermediation (NBFI) sector comprises all financial institutions that are not central banks, banks or public financial institutions. However, due to data availability, in our paper we explicitly focus on NBFIs, which provide credit to real sector firms and are either subject to the credit register reporting by themselves or through their head institution.[5] In this respect, our paper touches upon a narrow measure of NBFIs and focuses on institutions that perform economic bank-like functions of credit intermediation and lending.[6] The latter may pose bank-like financial stability risks, first and foremost attributed to the differences in regulation between some of those NBFIs and banks. Indeed, with the exception of banks and insurance companies the other financial institutions we consider in our paper are entities that are largely unregulated by the Germany's financial regulators.

Among the NBFIs, the most sizeable groups by the number of institutions and their total exposure to the real sector in the credit register are insurance companies (ISRs), financial services institutions (FSIs), and financial enterprises (FEs). Additionally, we also take into account a separate group of credit institutions that are not Monetary Financial Institutions (Non-MFIs). Moreover, there are differences between the NBFI groups too (see Table 1). The total lending provided by ISRs and FSIs is considerably larger than that of FEs. Lending of ISRs also seems to be more concentrated than that of FSIs. The median ISR lender has the largest exposure towards a single borrower while the median FSI serves the highest number of borrowers. Moreover, the median exposure of both ISRs and FSIs seems to be larger than that of FEs. Correspondingly, the exposure of the median institution of the last group is significantly larger than the ones of the remaining NBFI groups (not considered in this paper).

In the following, we provide more information on each group of institutions that are part of the NBFI sector.

Insurance companies (ISRs). Contrary to the US and the UK, ISRs play an important role in financing of real sector firms in Germany, besides banks (Bankenverband, 2013). In this regard, there are several possibilities such as, e.g., by holding shares, bonds and especially by promissory notes. Promissory note (Schuldscheindarlehen) is a non-traded debt instrument "made in Germany" that fits between a corporate bond and a bank loan. Normally, promissory notes are

[5] A head institution needs to report to the credit register for each institution that belongs to the group separately if one of the institutions under the roof is a subject to reporting to the credit register.

[6] During the considered time period, the NBFIs have very little exposure to the real sector through derivative contracts. Among the NBFIs, insurance companies have the largest derivatives positions. However, even for them, the share of derivatives does not exceed 3% of their total exposure. Thus, in our context, we do not expect derivatives to significantly amplify the exposure reported in the credit register and to pose additional threats to financial stability.

arranged by banks and passed on to a broader range of investors (among them are often insurance companies). That gives ISRs the opportunity to diversify their investment portfolios and to provide financing to German medium-sized enterprises, which are typically not listed. In terms of real sector firms, a promissory note represents an alternative to bank loans or corporate bonds as amongst other things it provides a possibility to attract long-term financing from a variety of different investors (UniCredit, 2016; Private Banking Magazine, 2016; Nord/LB, 2016; Financial Career, 2013).

Additionally, ISRs may facilitate credit creation by providing credit enhancements to loans made by real sector firms themselves in form of guarantees, credit derivatives, write insurance on structured securities, provide insurance on delivery of goods and/or services (credit insurance) (FSB, 2020). The German credit register allows us to adequately capture such exposures since those often appear as off-balance sheet positions.

ISRs are supervised by BaFin on the base of the German Insurance Supervision Act (Versicherungsaufsichtsgesetz). However, in the time period considered in our paper capital requirements for the German ISRs were under the European so-called Solvency I supervisory regime, which had already been in place since the 1970s. Under Solvency I, the capital requirements were not risk-sensitive and some major risks such as market risk, credit risk and operational risk were not explicitly taken into account. To overcome those drawbacks, the European supervisory regime Solvency II came into force at the beginning of 2016 (Rae et al., 2018).

In our dataset, ISRs account for 5.05% of the total exposure to the real sector in the pre-treatment period corresponding to 33.5 bn EUR. Among the 186 ISRs, there are 41 property and casualty insurers and 62 life insurers providing 61.2% and 29.7% of the total insurance companies' lending in our data, respectively. Relative to the group of life insurers, the group of property and casualty insurers has a considerably larger share, but it consists of less companies and its median company is smaller. This indicates that property and casualty insurers' lending is dominated by few large companies serving many borrowers.

Financial services institutions (FSIs). FSIs comprise entities that are not banks but carry out at least one bank-like business activity. FSIs do not hold a banking license but have the allowance to provide financial services. In the credit register, we mostly observe factoring and finance leasing companies.[7] Real sector firms may engage with a factoring company as part of their liquidity management. In this case, a firm sells its claims vis à vis its business partners to a factoring company which provides the firm with an immediate repayment of its claims against a particular fee, i.e., markdown. Finance leasing may in turn be used as an alternative to credit. Whereby a real sector firm borrows from a finance leasing company for a determined period of time rights of use for a particular object such as, e.g., a car or a production equipment and pays leasing rates for the rights of use.

[7] In Germany, the scope of activities of FSIs is defined in the German Banking Act (Kreditwesengesetz (KWG) §1 (1a)) and includes, among others, investment broking, investment advice, portfolio management, factoring, and finance leasing.

Similar to banks, FSIs are subject to the German Banking Supervision and supervised both by the German Federal Financial Supervisory Authority (BaFin) and by the Deutsche Bundesbank. Nevertheless, there are considerable differences between these two groups in terms of the regulation. The scope of regulation for FSIs is generally lower than for banks and the requirements to capital regulation for some groups of FSIs appear to be less sophisticated.[8] However, capital requirements do not apply to factoring and finance leasing companies, a group of FSIs that we directly observe in the credit register.

In our data, there are 186 FSIs active in lending with the total exposure of 19.7 bn EUR. Factoring and finance leasing companies encompass 18.18% and 81.82% of the FSI credit market exposure, respectively. While finance leasing companies cover a much larger share of the market, the median lenders in the two groups are comparable in terms of their total size, the number of borrowers, and the average exposure to a single one (see Table 1).

Financial enterprises (FEs). The next group we consider in the credit register are FEs. FEs that are subject to reporting to the credit register by themselves are the institutions that are involved in factoring. Other types of FEs come into the credit register through the reporting of their head institution. FEs form the group in the credit register that is regulated neither by the Deutsche Bundesbank nor by the German Federal Financial Authority (BaFin) and capital requirements comparable to those of banks do not apply to this group of entities. In our dataset, FEs account for 0.61% of the total exposure to the real sector that corresponds to 6.3% of the NBFIs' total exposure. Interestingly, FEs have the least diversified borrower base among the lender groups considered: the median FE serves only one borrower.

Non-Monetary Financial Institutions (Non-MFIs). Our last group comprises of credit institutions that are Non-MFIs. Such institutions do not hold deposits but nevertheless are involved in credit intermediation and are largely financed by banks themselves. At the same time these institutions are not a subject to the Capital Requirements Regulation (so called Non-CRR institutions), also. This last group includes 11 institutions with the total exposure of 1.7 bn EUR (0.26%). These institutions are relatively large. The median Non-MFI is larger in terms of the total exposure (120 m EUR) and the number of borrowers served (54) than the median institutions in the other NBFI groups and even the median Non-EBA bank.

The remaining three groups of NBFIs (capital investment companies, equity-holding companies, and bad banks) amount to 4.8 m EUR exposure, which corresponds to 0.73% of the total. These institutions are also quite different from the other ones discussed so far, and therefore, we exclude them from our further analysis.

4.3 Interconnectedness between banks and NBFIs: the Greensill Bank example

By performing different functions of credit intermediation banks and the various groups of NBFIs can have close ties with each other and be interconnected in rather sophisticated ways. However, this type of interconnectedness due to the lack of transparency remains largely unknown and as

[8] Most of FSIs that are defined as investment firms according to the Markets in Financial Instruments Directive (MiFiD) are normally also subject to the Capital Requirements Regulation (CRR investment firms).

the recent failure of the Greensill Bank in March 2021 in Germany shows can bear considerable financial stability risks from different angles and raise further regulatory issues.

Situated in Germany, the Greensill Bank has been a 100 percent subsidiary of the Australian Greensill Capital Pty Limited (GCAU), which has specialized on supply chain financing, also referred to as reverse factoring.[9] By this type of the supply chain transactions GCAU has acted in the role of an intermediary, whereby the Greensill Bank acted in the role of the financing provider by taking the loans also on its balance-sheet. Such loans have further been securitized and sold to other banks, which in their turn bundled them into funds and circulated among the investors. The biggest investors involved have been the Credit Suisse and the Swiss Asset Manager GAM. However, the Greensill Bank's business model has strongly been dependent on the insurance of such loans against of the default on the delivery of goods or services (also called credit insurance). As the large insurer of the Greensill Group, Tokio Marine has rejected to provide for such an insurance and the Credit Suisse and the GAM – the major conduits of funding for the Greensill business – froze their funds Greensill Bank came under pressure and the Germany's financial regulator froze the Greensill's operations. At the same time also the Greensill parent entered liquidation (Der Spiegel, 2021).

Since the Greensill Bank is a private bank in Germany the Germany's private banking association payed around 3.1 bn EUR to the customers from its deposit guarantee scheme. This has been the biggest challenge for the Germany's private banking association since the collapse of the Lehman Brothers in 2008. However, deposit guarantee scheme protects only individuals but not institutional investors. Public sector institutions, as well as, banks are not protected by the scheme. Therefore, some German towns experienced heavy problems due to their investments into the Greensill Bank (Financial Times, 2021). Moreover, the insolvency of the Greensill Group still raises further regulatory issues since the parent group is not regulated like a bank.

5 Methodology

We employ a (regular) difference-in-differences type methodology and assess the impact on both the loan amount granted (i.e., the intensive margin) and the likelihood a credit is granted (i.e., the extensive margin).

In our baseline analysis we compare on the intensive margin the lending activity of the banks involved in the capital exercise (EBA banks) the banks not involved in the exercise (Non-EBA banks) and the NBFIs. We analyse a change in the lending activity to the real sector firms of the Non-EBA banks and the NBFIs relative to the EBA banks by estimating the following collapsed difference-in-differences (henceforth, Diff-in-Diff) regression specification:

$$\Delta Growth_{lb} = \alpha + \beta_1 \cdot NBFI_l + \beta_2 \cdot Non\text{-}EBA_l + \mu_b + \varepsilon_{lb} \qquad (1)$$

[9] The advantage for firms to engage into a reverse factoring consists into the possibility to get cash from a bank or a fund without having to dip into their working capital in order to be able to pay on their obligations to the suppliers.

where $\Delta Growth_{lb}$ is the change in the average quarter-to-quarter growth rate of the exposure from lender l to borrower b between the post- and pre-treatment time periods.[10] We employ the growth rates and the collapsed approach in order to mitigate a standard errors' serial correlation problem that could arise due to the persistence of the outstanding levels of exposure. A dummy variable $Non\text{-}EBA_l$ equals 1 if the lender is a bank, which is not subject to the EBA capital exercise and 0 otherwise. A dummy variable $NBFI_l$ indicates whether the lender is an NBFI. We cluster standard errors at the lender level as it corresponds to the level of the treatment. For the extensive margin analysis, we replace the growth measure with a measure capturing if the lending is taking place or not.

To further disentangle the impact of the credit supply shock, we control for demand in the spirit of Khwaja and Mian (2008). A within-borrower estimation is possible only if a firm borrows from each type of lenders, i.e., an EBA-bank, a Non-EBA bank, and an NBFI. As this firm level requirement severely limits the sample size, in our baseline analysis, we allow it to hold at the firm-group level. For this purpose, we combine firms into groups by their industry, location, and size and keep only the groups that, in aggregate, borrow from each lender type.[11] Such way of grouping allows us to control for the common regional, sectoral, and size-related shocks. Borrower-group fixed effects are denoted by μ_b. This set of fixed effects captures observed and unobserved variation in credit demand within a group, shown by Degryse et al. (2019a) to capture firm specific credit demand well.

Table 2 characterizes the distribution of the growth rate across different lender groups in the pre- and post-treatment periods as well as provides summary statistics of the dependent variable. For instance, in the pre-treatment period, the growth rate of NBFIs varies from -7.65% (25^{th} percentile) to 5.05% (75^{th} percentile) with the median value of -0.33%. While for the EBA banks these values correspond to -3.47%, 1.69% and -0.50%, respectively.

[Table 2 here]

6 Results

6.1 Lending to the real sector

We start with the discussion of the results for the intensive margin and then enrich this discussion with the results for the extensive margin. In Table 3 we first consider the NBFIs as a single group and examine whether, around the capital exercise, they change their lending behaviour differently from the EBA banks. Columns of Table 3 differ in terms of the borrower-groups employed. Column 1 shows the results when employing an industry-location-size (ILS) borrower-group fixed

[10] Throughout the paper, by "growth rate" we refer to the difference in the natural logarithm of exposures. To compute the growth rates, we include in the sample only the observations characterized by "non-zero" lender-borrower exposures (Bertrand et al., 2004), i.e., we exclude the cases where exposure exceeded the threshold of 1.5 m EUR during the quarter but was zero at the end of the quarter.

[11] The real sector borrowers are divided into 72 industries, 51 locations, and 10 size-bins. As a measure of size, we employ the total amount borrowed by a firm in the time period when it first appears in the sample (between 2010Q1 and 2011Q3).

effects.[12] In Column 2, we apply a less strict control for demand by building borrower-groups based on the industry and location only. In Column 3, in contrast, we control for demand in a more granular way and perform a within-firm estimation. This sample includes only very special firms that borrow from all the three types of lenders (EBA banks, Non-EBA banks, and NBFIs).

The results in Column 1 suggest that the NBFIs slowdown their lending by 2.2 pp per quarter less than the EBA banks. Relative to the average NBFI growth rate of -0.3% per quarter before the treatment, the documented extra growth has a considerable economic significance. Moreover, we find that the growth rate of the Non-EBA banks' exposure decreases by 1.6 pp per quarter less when compared to the EBA banks as well. The growth rate of the Non-EBA banks' exposure in the pre-treatment period is comparable to the one of NBFIs and equals to -0.2% per quarter.

Although in the specification in Column 2, the sample size increases, the coefficients of interest almost do not change their magnitude and statistical significance. In Column 3, the sample size decreases to 15% of the baseline one. The NBFI coefficient remains nevertheless positive but insignificant. However, we focus on the ILS borrower-groups (Column 1), as this approach allows us to keep the largest number of the groups.[13]

[Table 3 here]

In Table 4 we discuss the effects of different types of NBFIs on the lending activity.[14] These effects appear to be heterogeneous. Columns 1 and 2 differ in terms of ways of winsorizaton employed. Since the NBFI groups are very heterogeneous, in Column 2 we substitute winsorization performed on the total sample with winsorization by group.[15] In Column 3, we check the robustness of our results by restricting the sample to the borrower-groups that borrow from each lender category (i.e., from each NBFI category, Non-EBA banks, and EBA banks).

Column 1 suggests that the relative increase in the lending activity of the NBFIs is mainly driven by the insurance companies, financial enterprises, and factoring companies.[16] The extra increase in the growth rates amounts to 5.4, 7.7, and 3.3 pp per quarter for insurance companies, financial enterprises, and factoring companies, respectively. Average pre-treatment growth rates for these lender categories (-0.20%, -0.79% and -2.05%, respectively) suggest a strong economic effect of the capital exercise. The effect on the Non-MFIs is positive but not significantly so, a finding that

[12] The magnitude and significance of the coefficients of interest also hold employing 1-99 and 5-95 winsorization levels. Further details on the distribution of the growth rates are presented in Table 2.

[13] The baseline sample includes about 38% of the borrower-lender couples active in the pre-treatment period and covers about 76% of the total exposure. The shares of the different lender groups are very similar to the ones based on the whole market and reported in Table 1 (42.08%, 47.99%, and 9.93% for the EBA banks, non-EBA banks, and NBFIs, respectively).

[14] We consider an alternative NBFI classification in Appendix 2. In Appendix 2 we define the group called Other NBFI which comprises Financial enterprises, Factoring companies, Leasing companies, and Non-MFIs. The choice of this sampling is driven by the motivation to define a separate group, which is close to the definition of "shadow banks" used by other papers (Wischnewsky and Neuenkirch (2021), Adrian and Jones (2018)). However, the results for the whole group Other NBFIs turn to be insignificant. This can be driven by a strong negative coefficient due to specific developments for Leasing companies in Germany, which is a big category. Since according to their definition "shadow banks" are rather heterogeneous entities, we prefer to consider them separately.

[15] Winsorization at 2-98 percentiles of the total sample leads to the following levels of winsorization by group: EBA banks 2.4-97.7, Non-EBA banks 1.9-98.1, ISRs 0.5-99.1, FEs 1-97.4, Factoring companies 4-94.8, Leasing companies 1.8-98.3, Non-MFI 1.4-95.3.

[16] The group of factoring companies includes all the financial services institutions excluding leasing companies.

partially could be associated with the small size of the group. The only group that does not demonstrate a relative increase in the lending activity are leasing companies. Negative but insignificant coefficients could still indicate a slow recovery from the crisis and the adverse effects of the corporate tax reform.

In the specification in Column 2, the coefficient for Non-MFIs becomes significantly positive, while the other coefficient of interest remains almost unchanged. Despite the much smaller sample size, the coefficients of interest for ISRs, FEs, and factoring companies remain in Column 3 significantly positive.

[Table 4 here]

Additionally, we perform an extensive margin analysis and compare the results with the intensive margin analysis. Table 5 presents the results of the extensive margin analysis. The results suggest that the NBFIs and the Non-EBA banks indeed increase the probability of entry and decrease the probability of exit more relative to the EBA banks. For the NBFIs, the extra increase in the probability of entry is 2.4 pp per quarter and the decrease in the probability of exit is 2.2 pp per quarter. In the pre-treatment period, the probabilities of entry and exit are equal to 8.9% per quarter and 10.8% per quarter, respectively. The results hold across several NBFI categories. The insurance companies increase their lending activity both at the intensive and extensive margins. For the financial enterprises, the intensive margin results are more pronounced. The factoring companies increase their probability of entry, while the results for exit are not significant. The insignificance of the exit results could be partially explained by the fact that lending contracts cannot be always immediately terminated, and the exposure levels are sticky. Interestingly, for the Non-MFIs and the leasing companies, the extensive margin results are more pronounced than the intensive margin ones. This finding indicates that these companies rather adjust their borrower base than change the amounts that they lend to a particular borrower.

[Table 5 here]

6.2 Lending to the real sector: borrower characteristics

In this subsection, we study whether the NBFIs change their lending differently depending on the characteristics of the real sector borrowers in the pre-treatment period. In particular, we consider whether a real sector firm was substantially borrowing from the EBA banks, its riskiness and the concentration of lending in its borrower-segment. To conduct these tests, we enrich Equation 1 with the borrower characteristics and the corresponding interaction terms.

First, we compare the change in lending to the real sector firms that were extensively borrowing from the EBA banks in the pre-treatment period to the ones that were not. Again, we compare the results on the intensive margin analysis with the results on the extensive margin analysis. We define EBA firms (*EBA_firm*) as firms for which the share of credit from the EBA banks in the total borrowing in the pre-treatment period was above the median.[17] As these firms are more dependent on the funding from the EBA banks, we expect a stronger substitution towards the credit

[17] We compute the median based on the positive values only, i.e., considering only the firms that were actually borrowing from the EBA banks. Following this definition, the median share of the EBA banks' funding is 51.2%.

from the NBFIs and from the Non-EBA banks. The results in Table 6 (Column 1) do not suggest such an effect on the intensive margin. Comparing to the Non-EBA firms, the EBA banks do not decrease the amount of credit to the EBA firms significantly more, while the NBFIs and the Non-EBA banks do not raise it significantly more. However, on the extensive margin (Table 6, Columns 2-3), the NBFIs and the Non-EBA banks demonstrate a larger increase in the probability of starting a new lending relationship with an EBA firm and a larger decrease in the probability of exiting it. As the EBA firms borrow a large part of their credit from the EBA banks, such results could be associated with relationship lending, when the EBA banks do not drop the amount of credit to certain borrowers but completely exit the relationship with the others. For instance, Degryse et al. (2019b) show that the EBA banks partially shield their relationship borrowers by increasing their collateral requirements less compared to the transactional borrowers.

[Table 6 here]

Second, we explore the impact of the borrowers' riskiness on the change in the lending activity of the different lender types on the intensive margin as well as on the extensive margin. We split industry-location-size borrower groups into the three segments depending on their probabilities of default.[18] The low/high risk segment includes 25% of the borrowers with the lowest/highest probabilities of default. The remaining borrowers are classified into a moderate-risk segment. In the intensive margin analysis, probabilities of default of the borrower groups in the low-risk segment are below 0.48% and in the high-risk category are above 1.98%. We find that, on the intensive margin, there is no significant difference between the EBA-banks' and the NBFIs' changes in lending activity to the low-risk firms (see Table 7). However, the NBFIs start to lend relatively more to the moderate-risk and high-risk firms. Such results, in particular, could be associated with a difference in the regulatory standards between banks and NBFIs. During the time period under study, banks were subject to the Basel II risk-sensitive capital requirements, that is higher risk-weights were applied on the lending to riskier corporates. However, as described in Section 4.2, the majority of the NBFIs (with the exception of the insurance companies) did not have any capital requirements and capital requirements for the insurance companies did not depend on the borrowers' credit quality. On the extensive margin, a relative increase in the lending activity of the NBFIs is pronounced also for the low-risk borrowers. Nonetheless, while the NBFIs lend more to the existing risky borrowers on the intensive margin, they are more reluctant to grant credit to the new ones. Combining the borrower characteristics by differentiation between EBA firms and Non-EBA firms, we find that, relative to the EBA banks, the NBFIs increase lending neither to the low-risk EBA firms nor to the low-risk Non-EBA firms (Appendix 3). In the moderate-risk segment, the NBFIs intensify lending to both groups of firms. In the high-risk segment, firms that are more dependent on the EBA-banks funding experience stronger substitution towards the credit from the NBFIs that are not subject to the risk-sensitive capital requirements. On the extensive

[18] Data on the probabilities of default is taken from the credit register and is provided by the banks employing internal ratings-based (IRB) approach. For each firm, we use the median probability of default based on the values reported by different banks. Since the probabilities of default are not reported for all the individual firms, we assume that the riskiness of the firms in the same industry-location-size (ILS) group is comparable and assign the median value to all the firms in the group. The computed values are averaged over the years in the pre-treatment period.

margin, the increase in the lending activity of the NBFIs is more pronounced for the EBA-firms regardless of their riskiness.

[Table 7 here]

Next, we test how the NBFIs adjust their lending depending on the concentration of borrower segments. Consistently with the employed fixed effects, we compute the pre-treatment concentration of lending for industry-location-size (ILS) borrower segments.[19] Results in Table 8 show that, on the intensive margin, the NBFIs increase lending significantly more into the segments that are the most competitive. Therefore, the NBFIs see themselves as competitors to the EBA banks and use the opportunity to increase lending in the more competitive segments when the banks face higher capital requirements. In borrower segments with the highly concentrated lending structure, the NBFIs even decrease lending activity relative to the EBA banks (although the coefficient is not significant). However, we do not find that the NBFIs adjust their probabilities of starting new lending differently depending on the borrower segments' concentration. In the moderate-concentration segments, the NBFIs even increase their probability of exit significantly more. Moreover, we find that the NBFIs increase lending on the intensive margin to both the EBA and Non-EBA firms but only in the low-concentration segment (Appendix 4). On the extensive margin, the NBFIs expand their lending activity only to the EBA firms but in all the concentration segments.

[Table 8 here]

6.3 Lending to the real sector: firm-level analysis

In this subsection, we investigate how stricter bank capital requirements affect total lending at the firm level. We analyse whether a relative increase in the NBFIs' lending activity, documented in the previous subsections, is sufficient to compensate the drop in lending by the EBA banks. The dependent variable in this analysis is a change in the growth rate of total lending to a particular real sector firm before and after the treatment. As in the baseline specification, we control for the borrower industry-location-size fixed effects. The results are reported in Table 9.

First, we find that the firms with the above-median share of credit from the EBA banks in the total borrowing in the pre-treatment period experience a significant reduction in the growth rate of credit relative to the other firms. This result indicates that despite the faster growth of the NBFIs' exposure to the real sector, it is not sufficient to fully support lending to the EBA firms. One reason could be smaller size and capacity of the NBFIs relative to the EBA banks. Moreover, as shown in Section 6.2, the NBFIs do not increase their lending to the EBA firms stronger than to the other real sector firms.

[19] Since we restrict the sample to the borrower groups that borrow from all the three types of lenders, the median concentration in the final sample (median HHI is about 10) is considerably smaller than in the full sample (median HHI is about 21). In line with the U.S. Department of Justice classification, high-concentration segments have HHI index above 25, moderate-concentration segments have HHI between 15 and 25, and low-concentration segments have HHI below 15.

Next, we check whether substitution towards NBFI funding is easier if a real sector firm is already borrowing from an NBFI in the pre-treatment period (*NBFI_pre*).[20] Our results show that the lending relationship with an NBFI established in the pre-treatment period does not have a strong effect on the total lending to the firm. A potential explanation could be that the NBFIs are active not only on the intensive margin but also on the extensive margin, as shown in Table 5. Considering the EBA firms, we find that the effect of the prior relationship with an NBFI is even negative. The fact that an EBA firm does not borrow from an NBFI in the pre-treatment period could indicate a closer connection to the EBA banks. Such firms could get a stronger support from the EBA banks even when the capital requirements increase.

[Table 9 here]

7 Robustness checks

7.1 Lending to the real sector: dynamics of the effect

We examine the dynamics of the effect by estimating the coefficients of interest with the rolling time windows. We estimate the baseline model on the time windows starting from 2010Q4 and finishing at different dates before 2013Q4. Figure 1 illustrates the results. The coefficients of interest are positive in each quarter of the post-treatment period and gain significance starting from 2012Q4 and after 2012Q3 for NBFIs and Non-EBA banks, respectively. As part of this exercise, we run a series of placebo tests assuming that the treatment happened at different times of the pre-period. Although due to the short pre-treatment period we obtain only two estimates which are relatively volatile, these results do not violate the parallel-trends assumption. Moreover, since the pre-treatment period does not include a growth rate for any 4th quarter, we drop the 4th quarters of each year from the post-treatment period and compute the growth rate from the 3rd quarter of one year to the 1st quarter of the next year to avoid any potential issues associated with the cyclicality of exposure within a year. Using this approach, the coefficients for NBFIs slightly decrease in magnitude and stay at the border of being significant. In contrast, the coefficients for Non-EBA banks become significantly positive starting from the first estimated quarter (i.e., from 2012Q1).

[Figure 1 here]

7.2 Lending to the real sector: extended sample of the EBA banks

As a robustness test, we expand the sample of EBA banks by including 13 main EBA banks and 26 banks from their consolidation circles. As shown in Table 10, the coefficients remain significantly positive for NBFIs as a single group as well as for insurance companies, financial enterprises, and factoring companies. Most of the coefficients of interest slightly decrease in their magnitude. This could indicate that the institutions from the consolidation circles were indeed less affected by the capital exercises than the main EBA banks.

[20] In our sample, about 32.7% of the real sector firms borrow from the NBFI lenders in the pre-treatment period.

[Table 10 here]

8 Extensions: The link between banks and non-bank financial institutions

In this section, we closely examine the link between the banks and the NBFIs. We test whether the affected banks use the NBFIs as intermediaries to transfer credit to the real sector borrowers in order to economize on the regulatory capital. In other words, whether after the capital exercise instead of lending directly to real sector firms, the EBA banks grant credit to NBFIs that, in turn, finance the real sector firms. One of the reasons could be the differential risk sensitivity due to the Basel II regulatory framework applied to the exposure of financial companies and to corporates. According to the Basel II standardized approach, the risk weights on exposure to financial companies appear to be not higher than on exposure to corporates in the same credit risk basket (BCBS, 2004). However, we observe that the NBFI borrowers in our sample, on average, have much lower probabilities of default than the real sector borrowers. This fact may induce banks applying IRB approach to lend more to the NBFI borrowers.

Affiliation to the EBA banking groups. First, we test whether the NBFIs that are affiliated with banking groups increase lending to the real sector more than the independent NBFIs. In our sample, about 17% of the NBFIs belong to the consolidation circles of the EBA banks in the pre-treatment period. Employing the dummy variable indicating such an affiliation (*NBFI_aff*), we do not find a differential effect on the lending of independent and affiliated NBFIs either on the intensive or on the extensive margins (Table 11). As the EBA banks might use the affiliated NBFIs to transfer credit to their own borrowers, we discriminate between the EBA firms and the Non-EBA firms. However, we do not find any significant differences in the lending patterns (Appendix 5).

[Table 11 here]

Intermediary NBFIs. To analyse whether the NBFIs transfer credit from the EBA banks to the real sector firms, we consider the intermediary NBFIs. We define intermediary NBFIs as the NBFIs that both borrow from the EBA banks and lend to the real sector firms in the pre-treatment period.

First, we test whether the intermediary NBFIs increase their lending to the real sector borrowers more than the NBFIs that do not borrow from the EBA banks. In our sample, about 77% of the NBFI observations correspond to the NBFIs borrowing from the EBA banks. Considering lending of the NBFIs to the real sector firms, we do not find that the intermediary NBFIs respond differently either on the intensive or extensive margin (Table 12). This finding does not change when we consider EBA and Non-EBA firms.

[Table 12 here]

Second, we consider the NBFIs as borrowers and compare the change in the EBA banks' lending to the intermediary NBFIs and to the NBFIs that only borrow. We estimate the specification in line with Equation 1. Since the sample of the NBFI borrowers is considerably smaller than the one of the real sector borrowers, we rely on the borrower fixed effects based on the industry and location (IL) groups only. The results in Table 13 reveal that, as in the case with the real sector

borrowers, the NBFIs increase their intensive margin lending after the capital exercise also to NBFI borrowers relative to the EBA banks. The extra change in the growth rate amounts to 3.1 pp per quarter. When we split the two groups of the NBFIs, we do not find that the EBA banks increase their lending to the intermediary NBFIs significantly more. Moreover, we do not observe such a differential effect also in the NBFIs' and the Non-EBA banks' lending.[21] The results on the extensive margin rather indicate a relative decrease in lending of the EBA banks to the intermediary NBFIs (Appendix 6). The NBFI lenders decrease the probabilities of entering as well as of exiting the relationship with both groups of the NBFI borrowers without a significant difference between them.

[Table 13 here]

NBFIs with the overlapping borrower base. We test whether the NBFIs that have a stronger overlap of the borrower base with the EBA banks, receive more credit from the banks and grant more credit to the common borrowers (Appendix 7). First, we consider the intermediary NBFIs as borrowers (Columns 1-2). For each lender-borrower couple, we identify common real sector firms, that are the firms that in the pre-treatment period borrow both from the lender and from the borrower (the intermediary NBFI). We compute the overlap measure as a share of the lender's exposure to the common firms in the lender's total exposure to the real sector. Enriching the baseline specification with the continuous overlap measure and the corresponding interaction terms, we find that, indeed, the EBA banks increase lending to the NBFIs with the higher degree of overlap. As the second part of this analysis, we consider lending to the common real sector borrowers (Columns 3-4). The overlap measure indicates to what extent the lender and the borrower are financed by the same EBA bank in the pre-treatment period. In other words, to what extent the EBA bank that lends to the intermediary NBFI lender also lends to the considered real sector firm. The constructed overlap measure takes into account the strength of the relationship between the EBA bank and the firm as well as between the EBA bank and the intermediary NBFI. The computed overlap measure is specific to each lender (NBFI) and borrower (real sector firm) couple. Across the different overlap measures employed, we do not find a strong and robust evidence of the NBFIs increasing their lending more to the real sector firms with whom they have a higher measure of overlap. The findings of this analysis suggest that the EBA banks might increase lending to the NBFIs with the common borrowers because the two lenders are active in the same borrower segments rather than as a way to transfer credit to the common borrowers.

Overall, we do not find strong evidence that, after the capital exercise, the EBA banks use the NBFIs to transfer credit to the real sector firms in a systematic way. A possible explanation could be that the capital exercise requirements had to be satisfied in unusually short time period (in 8 months) and were announced as a temporary measure.

9 Conclusion

The aim of this paper is to empirically investigate the effects of bank capital requirements on the lending activity of banks and non-bank financial institutions (NBFIs). Our work examines the

[21] In our sample, only 6.4% of the NBFI borrowers lend to the real sector firms in the pre-treatment period.

spillover effects of the banking regulation and helps to assess its impact on the distribution of risks in the system and on the overall financial stability.

We exploit a quasi-exogenous increase in bank capital requirements imposed by the EBA capital exercise on a subset of German EBA banks but not directly on the NBFIs. We carry out difference in differences investigations on both the intensive and extensive margins and draw comparisons on the results. We contribute to the extant literature with a sharper identification strategy, comprehensive measures of credit, and an investigation of bank to non-bank lending.

On the intensive margin, we document that, after the capital exercise, the NBFIs grow their exposure to the real sector firms 2.2 pp per quarter faster relative to the EBA banks. Considering different NBFI categories reveals that the effect is more pronounced for insurance companies, financial enterprises, and factoring companies. The increase in the lending activity of the NBFIs is also observed on the extensive margin: the NBFIs relatively increase the probability of entry and decrease the probability of exit the lending relationship. However, at the firm level, the increase in the NBFIs' lending activity is not sufficient to fully compensate the drop in lending to the firms that are substantially financed by the EBA banks.

We find that substitution towards the NBFI funding is stronger in riskier and more competitive borrower segments. Moreover, considering the corporate structure and credit exposures, we do not find a direct link between the banks and the NBFIs that could be used to transfer credit to the real sector borrowers. Our results suggest that banks do not engage in this type of regulatory arbitrage when an increase in bank capital requirements is temporary and has to be fulfilled in a short time frame. Instead, the NBFIs rather act as competitors and use the opportunity to expand their credit activities.

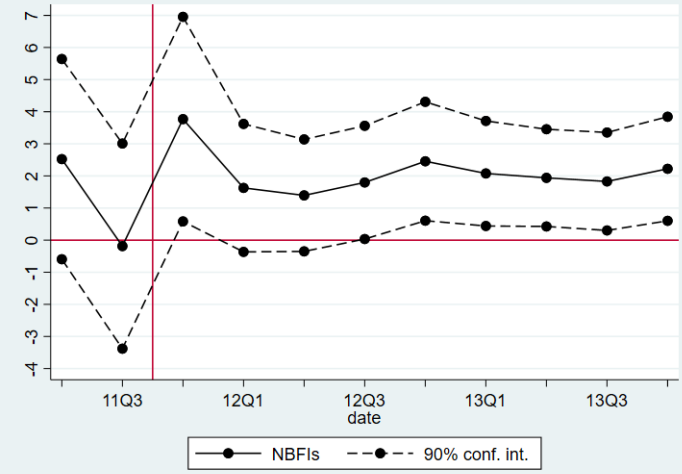
These results highlight spillover effects of the increased bank capital requirements that could be of interest to policymakers developing optimal financial stability policies. On the one hand, an increased activity of the NBFI sector could support credit to the real sector as well as lead to a more diverse financial system and a shift of exposure to less systemically important institutions. On the other hand, an increased exposure in less regulated and transparent. This could pose a damage the overall financial stability, especially in case NBFIs lack expertise to evaluate and manage the risks associated with lending activity.

Figures and Tables

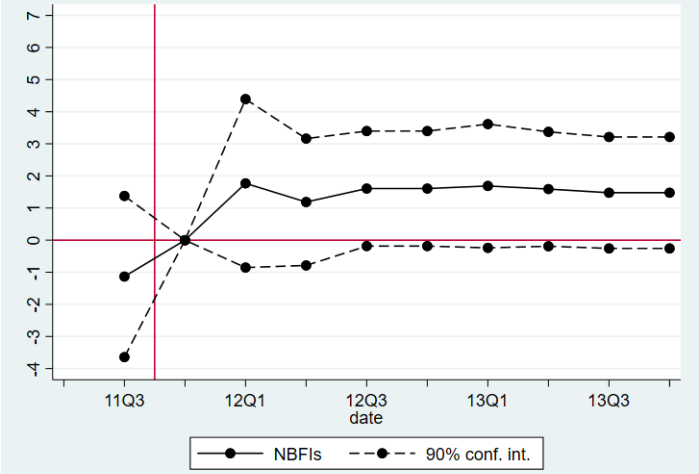
Figure 1. Estimates of time–varying coefficients

Panel A. Coefficients for NBFIs

Panel A1. Baseline model

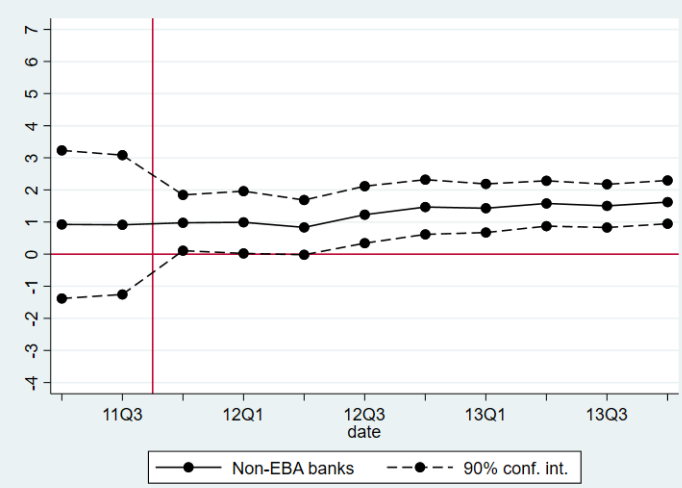


Panel A2. Excluding 4th quarters

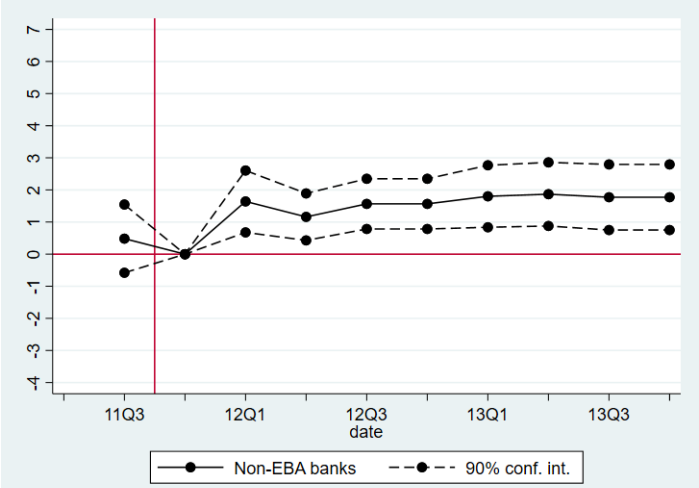


Panel B. Coefficients for Non-EBA banks

Panel B1. Baseline model



Panel B2. Excluding 4th quarters



Note: The charts illustrate the evolution of the coefficients estimated with the rolling time windows. The solid lines on Panel A and Panel B correspond to the coefficients in front of NBFIs and Non-EBA banks, respectively. The dashed lines indicate the 10% confidence intervals around the coefficients. The values in the pre-treatment period represent a series of placebo tests when the date on the x-axis is considered as a post-period and all the previous dates are considered as a pre-period. The values in the post-treatment period correspond to the estimates based on the time window between 2010Q4 and the date on the x-axis (e.g., the last estimate matches our baseline time window 2010Q4-2013Q4). In Panel A1 and Panel B1, the estimates are based on the same model as in Table 3 Column 1 and the corresponding time windows. In Panel A2 and Panel B2, we drop the 4th quarter of each year and compute the growth rate from the 3rd quarter of one year to the 1st quarter of the next year.

Table 1. Composition of lending to the real sector, 2010Q1-2011Q3

	N lenders	Total exp., m EUR	Share in total exp., %	Total lender exp., m EUR	Lender - borr. exp., m EUR	N borr. per lender
EBA banks	13	253,682.16	38.23	21,268.04	8.65	1,731
Non-EBA banks	1579	346,042.77	52.15	39.75	1.39	29
NBFIs	525	63,819.64	9.62	10.49	2.89	3
Financial services institutions	186	19,685.51	2.97	14.35	2.03	7
Finance lease companies	150	16,087.06	2.43	15.45	2.05	7
Factoring companies	34	3,579.96	0.54	12.93	1.99	6
Insurance companies	186	33,528.59	5.05	15.04	4.80	3
Property and casualty insurers	41	20,504.27	3.09	8.65	4.21	2
Life insurers	62	9,985.88	1.50	25.90	4.83	5
Financial enterprises	133	4,047.61	0.61	4.31	2.61	1
Non-MFIs	11	1,715.03	0.26	120.04	2.04	54

Note: For the each category of lenders, the table includes the average values over the time period 2010Q4-2011Q3 of the following variables: the number of lenders, the total exposure to the real sector firms, the share of a category in the total exposure, the median value of a single lender's total exposure, the median value of an average exposure to a single borrower, and the median number of borrowers financed by a lender.

Table 2. Descriptive statistics of the dependent variable: lending to the real sector

	Average quarter-to-quarter ln growth rate, %						
	p5	p25	p50	p75	p95	mean	sd
Pre-treatment period (2010Q4-2011Q3)							
EBA banks	-31.40	-3.47	-0.50	1.69	40.29	0.55	20.77
Non-EBA banks	-25.48	-2.81	-0.57	0.86	28.77	-0.18	18.00
NBFIs	-34.99	-7.65	-0.33	5.05	38.19	-0.27	21.33
Factoring comp.	-59.73	-17.69	-1.87	12.26	55.43	-2.05	29.73
Financial enterp.	-19.10	0.00	0.00	0.00	10.29	-0.79	15.12
Insurance comp.	-17.46	-1.80	0.00	1.70	16.30	-0.20	13.34
Non-MFIs	-45.81	-10.84	-1.93	6.65	37.47	-2.20	23.93
Leasing comp.	-32.69	-10.06	-2.20	8.86	49.30	0.60	23.14
Post-treatment period (2011Q4-2013Q4)							
EBA banks	-45.28	-6.54	-1.36	0.00	12.82	-6.05	17.96
Non-EBA banks	-37.65	-4.82	-1.06	0.00	11.72	-4.91	16.62
NBFIs	-40.55	-8.02	-1.02	1.63	15.12	-5.47	17.70
Factoring comp.	-62.59	-11.24	0.00	7.70	26.28	-5.51	23.23
Financial enterp.	-18.48	0.00	0.00	0.15	9.84	-1.76	12.62
Insurance comp.	-17.19	-2.68	-0.41	0.83	8.23	-2.12	10.68
Non-MFIs	-52.51	-9.75	-1.91	2.53	26.28	-6.96	21.08
Leasing comp.	-50.12	-13.33	-3.97	1.31	14.45	-8.66	19.51
Difference							
EBA banks	-73.47	-11.14	-0.67	0.77	33.80	-7.48	31.26
Non-EBA banks	-57.29	-7.08	-0.39	0.98	28.24	-5.34	27.80
NBFIs	-63.70	-13.06	-0.93	3.89	40.43	-5.78	30.43
Factoring comp.	-104.09	-24.40	0.00	20.64	72.88	-4.01	44.10
Financial enterp.	-25.80	-0.27	0.00	0.00	20.73	-1.06	21.23
Insurance comp.	-27.54	-4.44	-0.09	1.30	20.38	-2.12	18.73
Non-MFIs	-68.38	-15.39	-2.34	5.49	57.14	-5.12	32.96
Leasing comp.	-73.41	-20.85	-4.84	3.50	33.63	-10.25	31.89

Note: The statistics are presented for the variables that are winsorized at 2-98 percentiles of the total sample.

Table 3. Change in the growth rate of lending to the real sector: NBFIs as a single group

	Change in the average quarter-to-quarter ln growth rate, pp		
	(1)	(2)	(3)
NBFI	2.223**	2.006*	1.501
	(0.985)	(1.200)	(1.230)
Non-EBA	1.622***	1.648***	0.052
	(0.410)	(0.526)	(1.230)
Constant	-7.227***	-7.266***	-7.536***
	(0.317)	(0.468)	(1.140)
Observations	110,279	169,577	16,706
Borrowers	real sector	real sector	real sector
Borrower FE	ILS group	IL group	Firm
Number of FE	3,970	1,545	2,440
Standard errors	Clust. Lender	Clust. Lender	Clust. Lender
Number of clusters	1,917	2,019	1,206
R-squared	0.059	0.018	0.201
Within R-sq	0.0007	0.0005	0.0004

Note: The dependent variable (*ΔGrowth*) is the change in the ln growth rate of lending to the real sector (winsorized at the 2-98 level). The main explanatory variables are the dummies indicating the lender type: *NBFI* equals 1 if the lender is an NBFI; *Non-EBA* equals 1 if the lender is a Non-EBA bank. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). Columns 1-3 differ in terms of the borrower fixed effects included: ILS – groups based on the industry, location, and size; IL – groups based on the industry and location. Due to such fixed effects, firms in Column 3 are the ones that borrow from all three lender types before and after the treatment, thus constitute a rather special subsample. Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Table 4. Change in the growth rate of lending to the real sector: NBFIs by category

	Change in the average quarter-to-quarter ln growth rate, pp		
	(1)	(2)	(3)
Insurance comp.	5.374***	5.729***	6.762***
	(0.528)	(0.562)	(1.618)
Financial enterp.	7.713***	8.877***	7.485***
	(1.283)	(1.165)	(2.245)
Factoring comp.	3.259*	2.925*	5.676*
	(1.749)	(1.631)	(3.094)
Leasing comp.	-1.488	-1.465	-2.047
	(1.553)	(1.537)	(1.970)
Non-MFIs	2.533	4.320**	0.011
	(1.786)	(1.912)	(2.390)
Non-EBA	1.660***	1.715***	2.070***
	(0.426)	(0.425)	(0.800)
Constant	-7.252***	-7.314***	-9.240***
	(0.340)	(0.343)	(0.412)
Observations	110,279	110,279	13,194
Sample	Full	Full	Restricted
Borrowers	real sector	real sector	real sector
Borrower FE	ILS group	ILS group	IL group
Standard errors	Clust. Lender	Clust. Lender	Clust. Lender
Winsorization	2-98	2-98 by group	2-98
R-squared	0.061	0.061	0.008
Within R-sq	0.0022	0.0024	0.0027

Note: The dependent variable (*ΔGrowth*) is the change in the growth rate of lending to the real sector. The dependent variable is winsorized at the 2-98 level based on the total sample (Columns 1,3) and by group (Column 2). The main explanatory variables are the dummies indicating the lender type: EBA banks are taken as a reference group. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower fixed effects: ILS – groups based on the industry, location, and size; IL – groups based on the industry and location. Sample indicates whether borrower-groups are required to borrow from the three types of lenders (i.e., from NBFIs, Non-EBA banks, and EBA banks – Full) or from each lender category (i.e., from each NBFI category, Non-EBA banks, and EBA banks - Restricted). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Table 5. Extensive margin: change in the probability of entering/exiting lending relationship

	Change in the quarter-to-quarter probability of entering/exiting lending relationship, pp			
	entry		exit	
	(1)	(2)	(3)	(4)
NBFI	2.417***		-2.198***	
	(0.835)		(0.576)	
Insurance comp.		2.488***		-1.128**
		(0.922)		(0.469)
Financial enterp.		0.323		-1.967
		(1.370)		(1.905)
Factoring comp.		4.400***		-1.684
		(1.412)		(1.154)
Leasing comp.		1.527		-2.926***
		(0.931)		(0.859)
Non-MFIs		4.101*		-3.247***
		(2.099)		(1.147)
Non-EBA	1.364**	1.386**	-1.172	-1.164
	(0.650)	(0.651)	(0.751)	(0.752)
Constant	-5.839***	-5.859***	-4.172***	-4.229***
	(0.614)	(0.614)	(0.225)	(0.223)
Observations	286,539	286,539	286,539	286,539
Borrowers	real sector	real sector	real sector	real sector
Borrower FE	ILS group	ILS group	ILS group	ILS group
Number of FE	6,976	6,976	6,976	6,976
Standard errors	Clust. Lender	Clust. Lender	Clust. Lender	Clust. Lender
Number of clusters	2,535	2,535	2,535	2,535
R-squared	0.049	0.050	0.045	0.046
Within R-sq	0.002	0.003	0.002	0.003

Note: The dependent variable is the change in the lender's probability to enter/exit the lending relationship with real sector borrowers (winsorized at the 2-98 level). Entry is the situation when there is an exposure between a borrower and a lender in a current quarter but there was no exposure in the previous quarter. Exit is the situation when there is no exposure in the current quarter but there was an exposure in the previous quarter. The probability of entry/exit is computed as the number of quarters defined as entry/exit over the total number of quarters. The main explanatory variables are the dummies indicating the lender type: EBA banks are taken as a reference group. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry, location, and size (ILS). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Table 6. Change in lending to the real sector: EBA-dependent firms

	Intensive margin	Extensive margin	
		entry	exit
	(1)	(2)	(3)
EBA_firm	-0.811	-8.435***	4.955***
	(0.498)	(0.844)	(0.256)
NBFI	1.842*	-1.761**	0.425
	(1.087)	(0.757)	(0.596)
NBFI · EBA_firm	-0.227	10.262***	-6.897***
	(1.292)	(0.915)	(0.385)
Non-EBA	1.095**	-2.742***	1.747***
	(0.512)	(0.558)	(0.492)
Non-EBA · EBA_firm	0.673	9.920***	-9.791***
	(0.742)	(1.262)	(2.144)
Constant	-6.686***	-1.872***	-6.608***
	(0.441)	(0.530)	(0.263)
Observations	110,279	286,539	286,539
Borrowers	real sector	real sector	real sector
Borrower FE	ILS group	ILS group	ILS group
Standard errors	Clust. Lender	Clust. Lender	Clust. Lender
R-squared	0.059	0.064	0.057
Within R-sq	0.001	0.018	0.015

Note: The table includes intensive (Column 1) and extensive (Columns 2-3) margin analysis. The dependent variable for the intensive margin analysis (*ΔGrowth*) is the change in the growth rate of lending to the real sector firms (winsorized at the 2-98 level). The dependent variable for the extensive margin analysis is the change in the lender's probability to enter/exit the lending relationship with real sector borrowers (winsorized at the 2-98 level). Entry is the situation when there is an exposure between a borrower and a lender in a current quarter but there was no exposure in the previous quarter. Exit is the situation when there is no exposure in the current quarter but there was an exposure in the previous quarter. The probability of entry/exit is computed as the number of quarters defined as entry/exit over the total number of quarters. The main explanatory variables are the dummies indicating the lender type: *NBFI* equals 1 if the lender is an NBFI; *Non-EBA* equals 1 if the lender is a Non-EBA bank. *EBA_firm* is a dummy variable that equals 1 if the share of the EBA banks in total borrowing of the firm in the pre-treatment period is above the median (the median is computed based on the positive values only). The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry, location, and size (ILS). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Table 7. Change in lending to the real sector: Riskiness of firms

	Intensive margin	Extensive margin	
		entry	exit
	(1)	(2)	(3)
NBFI	0.128	3.624***	-2.266***
	(1.157)	(0.953)	(0.521)
NBFI · Mod-risk_firm	2.372***	-0.100	-0.242
	(0.680)	(0.496)	(0.338)
NBFI · High-risk_firm	4.612***	-1.222**	-0.813
	(1.608)	(0.569)	(0.623)
Non-EBA	0.787	1.499*	-1.448*
	(0.543)	(0.802)	(0.808)
Non-EBA · Mod-risk_firm	1.008**	0.031	0.468*
	(0.393)	(0.332)	(0.283)
Non-EBA · High-risk_firm	1.582*	-0.945**	1.344***
	(0.816)	(0.413)	(0.445)
Constant	-7.229***	-8.978***	-3.087***
	(0.305)	(0.898)	(0.226)
Observations	109,556	239,844	239,844
Borrowers	real sector	real sector	real sector
Borrower FE	ILS group	ILS group	ILS group
Standard errors	Clust. Lender	Clust. Lender	Clust. Lender
R-squared	0.071	0.060	0.063
Within R-sq	0.001	0.005	0.003

Note: The table includes intensive (Column 1) and extensive (Columns 2-3) margin analysis. The dependent variable for the intensive margin analysis (*ΔGrowth*) is the change in the ln growth rate of lending to the real sector firms (winsorized at the 2-98 level). The dependent variable for the extensive margin analysis is the change in the lender's probability to enter/exit the lending relationship with real sector borrowers (winsorized at the 2-98 level). Entry is the situation when there is an exposure between a borrower and a lender in a current quarter but there was no exposure in the previous quarter. Exit is the situation when there is no exposure in the current quarter but there was an exposure in the previous quarter. The probability of entry/exit is computed as the number of quarters defined as entry/exit over the total number of quarters. The main explanatory variables are the dummies indicating the lender type: *NBFI* equals 1 if the lender is an NBFI; *Non-EBA* equals 1 if the lender is a Non-EBA bank. Dummy variables *High-risk_firm* and *Mod-risk_firm* equal 1 for 25% of borrower groups with the highest probabilities of default and 75% of borrower groups with the moderate probabilities of default, respectively. The low-risk group includes 25% of borrower groups with the lowest probabilities of default and is taken as the reference group. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry, location, and size (ILS). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Table 8. Change in lending to the real sector: Concentration of lending to borrower groups

	Intensive margin	Extensive margin	
		entry	exit
	(1)	(2)	(3)
NBFI	-1.980	5.138	-3.100
	(2.812)	(3.162)	(3.223)
NBFI · Mod-HHI	2.232	2.425	6.558**
	(2.710)	(3.318)	(3.017)
NBFI · Low-HHI	4.548*	2.173	0.846
	(2.468)	(2.325)	(2.283)
Non-EBA	0.911	-1.287	-2.242
	(1.639)	(2.485)	(2.765)
Non-EBA · Mod-HHI	-0.348	0.584	5.746
	(1.753)	(3.133)	(3.683)
Non-EBA · Low-HHI	0.863	0.475	-1.904
	(1.496)	(1.878)	(1.820)
Constant	-7.264***	27.262***	33.254***
	(0.301)	(1.299)	(1.282)
Observations	110,279	286,539	286,539
Borrowers	real sector	real sector	real sector
Borrower FE	ILS group	ILS group	ILS group
Standard errors	Clust. Lender	Clust. Lender	Clust. Lender
R-squared	0.059	0.079	0.083
Within R-sq	0.001	0.004	0.001

Note: The table includes intensive (Column 1) and extensive (Columns 2-3) margin analysis. The dependent variable for the intensive margin analysis (*ΔGrowth*) is the change in the ln growth rate of lending to the real sector firms (winsorized at the 2-98 level). The dependent variable for the extensive margin analysis is the change in the lender's probability to enter/exit the lending relationship with real sector borrowers (winsorized at the 2-98 level). Entry is the situation when there is an exposure between a borrower and a lender in a current quarter but there was no exposure in the previous quarter. Exit is the situation when there is no exposure in the current quarter but there was an exposure in the previous quarter. The probability of entry/exit is computed as the number of quarters defined as entry/exit over the total number of quarters. The main explanatory variables are the dummies indicating the lender type: *NBFI* equals 1 if the lender is an NBFI; *Non-EBA* equals 1 if the lender is a Non-EBA bank. Dummy variables *Mod-HHI* and *Low-HHI* equal 1 for ILS borrower groups with the pre-treatment HHI of lending between 15 and 25 and below 15, respectively. The high-HHI group includes borrower groups with HHI above 25 and is taken as the reference group. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry, location, and size (ILS). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Table 9. Change in lending to the real sector: Firm-level analysis

	Change in the average quarter-to-quarter ln growth rate, pp		
	(1)	(2)	(3)
EBA_firm	-1.245***		-1.129***
	(0.282)		(0.287)
NBFI_pre		-0.072	-0.073
		(0.322)	(0.330)
EBA_firm · NBFI_pre			-2.624*
			(1.377)
Constant	-4.803***	-4.944***	-4.794***
	(0.034)	(0.037)	(0.054)
Observations	126,914	126,914	126,914
Borrowers	real sector	real sector	real sector
Borrower FE	ILS group	ILS group	ILS group
Standard errors	Clust. Lender	Clust. Lender	Clust. Lender
R-squared	0.118	0.118	0.118
Within R-sq	0.000	0.000	0.000

Note: The dependent variable (*ΔGrowth*) is the change in the ln growth rate of lending to the real sector (winsorized at the 2-98 level). *EBA_firm* is a dummy variable that equals 1 if the share of the EBA banks in total borrowing of the firm in the pre-treatment period is above the median (the median is computed based on the positive values only). *NBFI_pre* is a dummy variable indicating whether a firm was borrowing from an NBFI lender in the pre-treatment period. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry, location, and size (ILS). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Table 10. Change in the growth rate of lending to the real sector: EBA consolidation circle

Change in the average quarter-to-quarter growth rate, pp		
	(1)	(2)
NBFI	2.044**	
	(0.999)	
Insurance comp.		5.210***
		(0.518)
Financial enterp.		7.457***
		(1.264)
Factoring comp.		3.425*
		(1.828)
Leasing comp.		-1.845
		(1.555)
Non-MFIs		1.828
		(1.755)
Non-EBA	1.438***	1.450***
	(0.397)	(0.408)
Constant	-6.904***	-6.910***
	(0.309)	(0.326)
Observations	121,194	121,194
Reference group	EBA consol.	EBA consol.
Borrowers	real sector	real sector
Borrower FE	ILS group	ILS group
Number of FE	4,142	4,142
Standard errors	Clust. Lender	Clust. Lender
Number of clusters	1,946	1,946
R-squared	0.058	0.059
Within R-sq	0.001	0.002

Note: The dependent variable (*ΔGrowth*) is the change in the growth rate of lending to the real sector (winsorized at the 2-98 level). The main explanatory variables are the dummies indicating the lender type: EBA banks are taken as a reference group. Reference group includes 13 main EBA institutions and 26 banks from their consolidation circles. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry, location, and size (ILS). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Table 11. Change in lending to the real sector: Affiliation to the EBA banks

	Intensive margin	Extensive margin	
		entry	exit
	(1)	(2)	(3)
NBFI	1.939*	2.110**	-2.329***
	(1.089)	(0.866)	(0.681)
NBFI_aff	1.288	1.412	0.440
	(2.330)	(1.161)	(1.010)
Non-EBA	1.565***	1.430**	-1.266*
	(0.415)	(0.652)	(0.768)
Non-EBA_aff	1.193	-1.975***	2.863**
	(0.801)	(0.633)	(1.324)
Constant	-7.214***	-5.856***	-4.149***
	(0.321)	(0.611)	(0.227)
Observations	110,279	286,539	286,539
Borrowers	real sector	real sector	real sector
Borrower FE	ILS group	ILS group	ILS group
Standard errors	Clust. Lender	Clust. Lender	Clust. Lender
R-squared	0.059	0.049	0.046
Within R-sq	0.001	0.003	0.003

Note: The table includes intensive (Column 1) and extensive (Columns 2-3) margin analysis. The dependent variable for the intensive margin analysis (*ΔGrowth*) is the change in the ln growth rate of lending to the real sector firms (winsorized at the 2-98 level). The dependent variable for the extensive margin analysis is the change in the lender's probability to enter/exit the lending relationship with real sector borrowers (winsorized at the 2-98 level). Entry is the situation when there is an exposure between a borrower and a lender in a current quarter but there was no exposure in the previous quarter. Exit is the situation when there is no exposure in the current quarter but there was an exposure in the previous quarter. The probability of entry/exit is computed as the number of quarters defined as entry/exit over the total number of quarters. The main explanatory variables are the dummies indicating the lender type: *NBFI* equals 1 if the lender is an NBFI; *Non-EBA* equals 1 if the lender is a Non-EBA bank. The dummy variable *NBFI_aff* / *Non-EBA_aff* equals 1 if the NBFI / Non-EBA bank belongs to the consolidation circles of the EBA banks. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry, location, and size (ILS). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Table 12. Change in lending to the real sector: Intermediary NBFIs

	Intensive margin	Extensive margin	
		entry	exit
	(1)	(2)	(3)
NBFI	3.511***	2.877***	-2.203***
	(0.946)	(1.071)	(0.444)
NBFI_int	-1.711	-0.612	0.006
	(1.483)	(1.038)	(0.814)
Non-EBA	1.572***	1.364**	-1.173
	(0.407)	(0.651)	(0.751)
Constant	-7.169***	-5.838***	-4.172***
	(0.315)	(0.615)	(0.225)
Observations	110,074	286,539	286,539
Borrowers	real sector	real sector	real sector
Borrower FE	ILS group	ILS group	ILS group
Standard errors	Clust. Lender	Clust. Lender	Clust. Lender
R-squared	0.059	0.049	0.045
Within R-sq	0.001	0.002	0.002

Note: The table includes intensive (Column 1) and extensive (Columns 2-3) margin analysis. The dependent variable for the intensive margin analysis (*ΔGrowth*) is the change in the ln growth rate of lending to the real sector firms (winsorized at the 2-98 level). The dependent variable for the extensive margin analysis is the change in the lender's probability to enter/exit the lending relationship with real sector borrowers (winsorized at the 2-98 level). Entry is the situation when there is an exposure between a borrower and a lender in a current quarter but there was no exposure in the previous quarter. Exit is the situation when there is no exposure in the current quarter but there was an exposure in the previous quarter. The probability of entry/exit is computed as the number of quarters defined as entry/exit over the total number of quarters. The main explanatory variables are the dummies indicating the lender type: *NBFI* equals 1 if the lender is an NBFI; *Non-EBA* equals 1 if the lender is a Non-EBA bank. The dummy variable *NBFI_int* indicates the intermediary NBFIs and equals 1 if the NBFI both lends to the real sector firms and borrows from the EBA banks. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry, location, and size (ILS). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Table 13. Change in the growth rate of lending to the non-bank financial institutions

Change in the average quarter-to-quarter growth rate, pp		
	(1)	(2)
NBFI_BL		1.627
		(4.347)
NBFI	3.142*	3.758*
	(1.746)	(1.981)
NBFI · NBFI_BL		-3.147
		(5.553)
Non-EBA	0.841	1.590
	(1.569)	(1.889)
Non-EBA · NBFI_BL		-3.606
		(4.664)
Constant	-5.146***	-5.431***
	(1.515)	(1.710)
Observations	12,226	12,226
Borrowers	NBFIs	NBFIs
Borrower FE	IL group	IL group
Number of FE	105	105
Standard errors	Clust. Lender	Clust. Lender
Number of clusters	1,921	1,921
R-squared	0.024	0.024
Within R-sq	0.001	0.001

Note: The dependent variable (*ΔGrowth*) is the change in the ln growth rate of lending to the non-bank financial institutions (winsorized at the 2-98 level). The main explanatory variables are the dummies indicating the lender type: *NBFI* equals 1 if the lender is an NBFI; *Non-EBA* equals 1 if the lender is a Non-EBA bank. *NBFI_BL* is a dummy variable that is equal 1 if the NBFI both borrows and lends to the real sector in the pre-treatment period and is equal 0 if the NBFI is only a borrower. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry and location (IL). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

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Appendix

Appendix 1.

Figure A1. Exposure of financial services institutions to the real sector, 2008-2016

Figure A1.1. Total exposure of leasing and factoring firms to the real sector, in m EUR

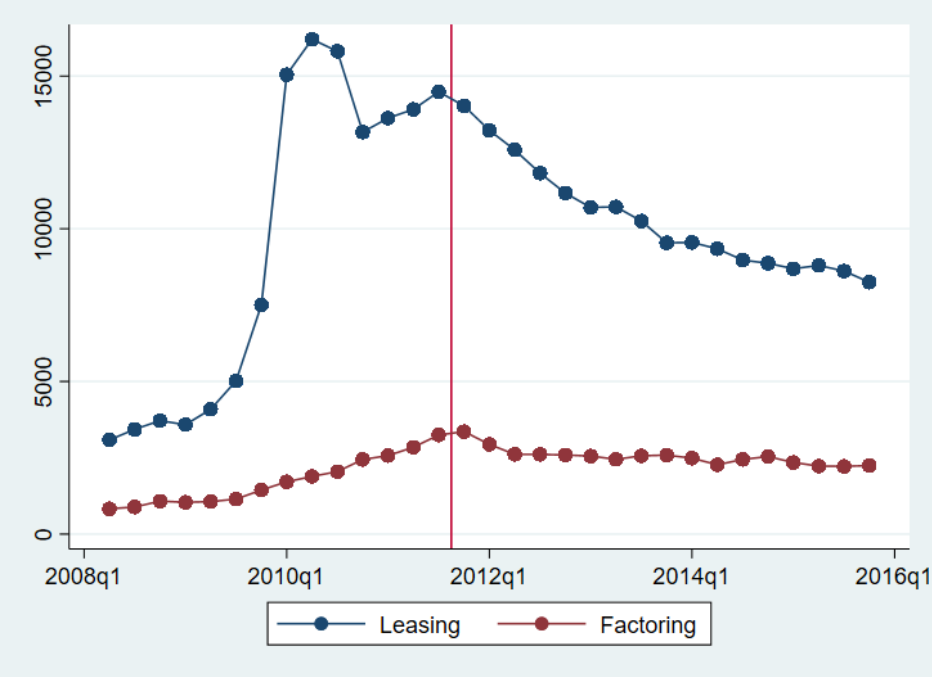
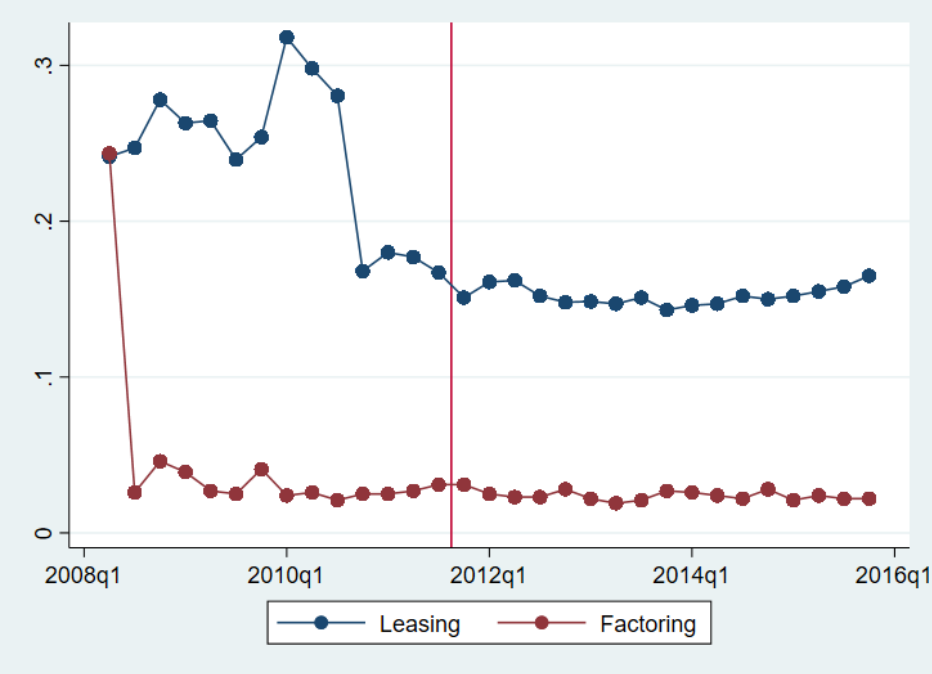


Figure A1.2. Median value of the lender-borrower exposure of leasing and factoring firms to the real sector, in m EUR



Note: The charts are based on the sample and sector classification used for the baseline analysis.

Appendix 2. Alternative classification of NBFIs

	Change in the average quarter-to-quarter ln growth rate, pp	
	(1)	(2)
Insurance comp.	5.368***	5.742***
	(0.529)	(0.559)
Other NBFIs	0.347	0.500
	(1.279)	(1.304)
Non-EBA	1.631***	1.705***
	(0.425)	(0.422)
Constant	-7.231***	-7.307***
	(0.336)	(0.336)
Observations	110,279	110,279
Sample	Full	Full
Borrowers	real sector	real sector
Borrower FE	ILS group	ILS group
Standard errors	Clust. Lender	Clust. Lender
Winsorization	2-98	2-98 by group
R-squared	0.060	0.060
Within R-sq	0.0015	0.0017

Note: The dependent variable (*ΔGrowth*) is the change in the growth rate of lending to the real sector. The dependent variable is winsorized at the 2-98 level based on the total sample (Columns 1) and by group (Column 2). The main explanatory variables are the dummies indicating the lender type: EBA banks are taken as a reference group. Other NBFIs include Financial enterprises, Factoring companies, Leasing companies, and Non-MFIs. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower fixed effects: ILS – groups based on the industry, location, and size. In the sample, borrower-groups are required to borrow from the three types of lenders (i.e., from NBFIs, Non-EBA banks, and EBA banks – Full). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Appendix 3. Lending to the real sector: EBA firms and borrowers' riskiness

Panel A. Intensive margin

	Low-risk firms		Mod-risk firms		High-risk firms	
	EBA firms	Non-EBA firms	EBA firms	Non-EBA firms	EBA firms	Non-EBA firms
	(1)	(2)	(3)	(4)	(5)	(6)
NBFI	-1.123	0.228	3.267**	2.081*	6.991**	2.854
	(1.566)	(1.289)	(1.640)	(1.199)	(3.507)	(1.917)
Non-EBA	0.675	0.578	3.068***	1.519**	3.095**	0.581
	(1.132)	(0.857)	(0.839)	(0.689)	(1.433)	(1.195)
Constant	-6.277***	-5.637***	-8.147***	-6.966***	-8.802***	-7.339***
	(0.643)	(0.732)	(0.453)	(0.628)	(0.563)	(1.039)
Observations	6,294	19,075	15,844	54,818	2,601	9,811
R-squared	0.162	0.096	0.145	0.070	0.233	0.134

Panel B. Extensive margin: change in the probability of entry

	Low-risk firms		Mod-risk firms		High-risk firms	
	EBA firms	Non-EBA firms	EBA firms	Non-EBA firms	EBA firms	Non-EBA firms
	(1)	(2)	(3)	(4)	(5)	(6)
NBFI	7.117***	1.202	8.270***	0.623	9.079***	-0.713
	(1.212)	(0.952)	(1.401)	(1.216)	(1.115)	(1.188)
Non-EBA	6.259***	-0.938	7.106***	-1.297	6.616***	-2.381**
	(1.089)	(0.810)	(1.498)	(1.075)	(1.380)	(1.099)
Constant	-9.621***	-6.748***	-10.714***	-6.904***	-11.364***	-6.112***
	(0.884)	(0.801)	(1.010)	(1.064)	(0.742)	(1.082)
Observations	14,751	48,271	30,862	117,001	3,924	23,694
R-squared	0.177	0.077	0.169	0.060	0.266	0.103

Panel C. Extensive margin: change in the probability of exit

	Low-risk firms		Mod-risk firms		High-risk firms	
	EBA firms	Non-EBA firms	EBA firms	Non-EBA firms	EBA firms	Non-EBA firms
	(1)	(2)	(3)	(4)	(5)	(6)
NBFI	-5.593***	-0.078	-6.779***	-0.049	-7.440***	-0.833
	(0.669)	(0.564)	(0.807)	(0.663)	(0.894)	(0.854)
Non-EBA	-7.802***	1.205*	-8.350***	1.853***	-7.527***	2.423***
	(2.059)	(0.618)	(2.959)	(0.695)	(2.746)	(0.810)
Constant	-1.166***	-4.550***	-1.121***	-5.370***	-0.597	-5.822***
	(0.370)	(0.310)	(0.348)	(0.304)	(0.511)	(0.532)
Observations	14,751	48,271	30,862	117,001	3,924	23,694
R-squared	0.201	0.079	0.192	0.066	0.311	0.118

Note: The table includes intensive (Panel A) and extensive (Panels B-C) margin analysis. The dependent variable for the intensive margin analysis (*ΔGrowth*) is the change in the ln growth rate of lending to the real sector firms (winsorized at the 2-98 level). The dependent variable for the extensive margin analysis is the change in the lender's probability to enter/exit the lending relationship with real sector borrowers (winsorized at the 2-98 level). Entry is the situation when there is an exposure between a borrower and a lender in a current quarter but there was no exposure in the previous quarter. Exit is the situation when there is no exposure in the current quarter but there was an exposure in the previous quarter. The probability of entry/exit is computed as the number of quarters defined as entry/exit over the total number of quarters. The main explanatory variables are the dummies indicating the lender type: NBFI equals 1 if the lender is an NBFI; Non-EBA equals 1 if the lender is a Non-EBA bank. EBA firms are firms with the above-median share of the EBA banks in their total borrowing in the pre-treatment period (the median is computed based on the positive values only). The group of low/high risk firms includes 25% of the borrower groups with the lowest/highest probabilities of default. The remaining borrowers are classified into a moderate-risk group. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry, location, and size (ILS). Standard errors (in parentheses) are clustered at the lender level; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix 4. Lending to the real sector: EBA firms and borrowers' concentration

Panel A. Intensive margin

	Low-HHI segments		Mod-HHI segments		High-HHI segments	
	EBA firms	Non-EBA firms	EBA firms	Non-EBA firms	EBA firms	Non-EBA firms
	(1)	(2)	(3)	(4)	(5)	(6)
NBFI	2.451*	2.000*	0.791	0.633	-3.512	-0.597
	(1.404)	(1.099)	(2.229)	(1.693)	(4.280)	(4.302)
Non-EBA	2.610***	1.254**	1.212	0.650	1.708	1.421
	(0.735)	(0.603)	(1.530)	(1.340)	(3.728)	(3.632)
Constant	-8.047***	-6.680***	-6.221***	-7.149***	-7.827***	-8.040**
	(0.413)	(0.535)	(0.763)	(1.093)	(1.525)	(3.179)
Observations	20,755	77,408	3,750	5,839	511	1,177
R-squared	0.151	0.063	0.135	0.124	0.249	0.183

Panel B. Extensive margin: change in the probability of entry

	Low-HHI segments		Mod-HHI segments		High-HHI segments	
	EBA firms	Non-EBA firms	EBA firms	Non-EBA firms	EBA firms	Non-EBA firms
	(1)	(2)	(3)	(4)	(5)	(6)
NBFI	8.221***	-1.738**	6.612***	-2.278***	8.323***	-2.633*
	(1.242)	(0.794)	(1.403)	(0.696)	(1.679)	(1.481)
Non-EBA	6.861***	-2.825***	6.316***	-2.813***	8.283***	-2.779**
	(1.418)	(0.595)	(0.960)	(0.492)	(1.787)	(1.333)
Constant	-10.634***	-1.741***	-9.491***	-1.634***	-11.038***	-1.355
	(1.010)	(0.582)	(0.602)	(0.414)	(1.189)	(1.237)
Observations	40,638	209,712	7,639	19,659	1,637	6,398
R-squared	0.164	0.050	0.174	0.093	0.268	0.145

Panel C. Extensive margin: change in the probability of exit

	Low-HHI segments		Mod-HHI segments		High-HHI segments	
	EBA firms	Non-EBA firms	EBA firms	Non-EBA firms	EBA firms	Non-EBA firms
	(1)	(2)	(3)	(4)	(5)	(6)
NBFI	-6.522***	0.311	-5.597***	0.871	-6.636***	0.032
	(0.720)	(0.582)	(0.941)	(0.807)	(1.208)	(0.955)
Non-EBA	-8.455***	1.611***	-6.201**	2.663***	-7.611***	1.912**
	(2.732)	(0.507)	(2.495)	(0.814)	(2.803)	(0.911)
Constant	-1.073***	-6.588***	-1.074***	-7.315***	-2.060***	-7.411***
	(0.367)	(0.258)	(0.291)	(0.435)	(0.591)	(0.481)
Observations	40,638	209,712	7,639	19,659	1,637	6,398
R-squared	0.188	0.043	0.200	0.091	0.279	0.135

Note: The table includes intensive (Panel A) and extensive (Panels B-C) margin analysis. The dependent variable for the intensive margin analysis (*ΔGrowth*) is the change in the ln growth rate of lending to the real sector firms (winsorized at the 2-98 level). The dependent variable for the extensive margin analysis is the change in the lender's probability to enter/exit the lending relationship with real sector borrowers (winsorized at the 2-98 level). Entry is the situation when there is an exposure between a borrower and a lender in a current quarter but there was no exposure in the previous quarter. Exit is the situation when there is no exposure in the current quarter but there was an exposure in the previous quarter. The probability of entry/exit is computed as the number of quarters defined as entry/exit over the total number of quarters. The main explanatory variables are the dummies indicating the lender type: NBFI equals 1 if the lender is an NBFI; Non-EBA equals 1 if the lender is a Non-EBA bank. EBA firms are firms with the above-median share of the EBA banks in their total borrowing in the pre-treatment period (the median is computed based on the positive values only). Low-HHI segments have HHI index below 15, Mod-HHI segments have HHI between 15 and 25, and High-HHI segments have HHI above 25. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry, location, and size (ILS). Standard errors (in parentheses) are clustered at the lender level; *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix 5. Change in lending to the real sector: Affiliation to the EBA banks, EBA firms

	Intensive margin	Extensive margin	
		entry	exit
	(1)	(2)	(3)
EBA_firm	-0.796	-8.457***	4.983***
	(0.497)	(0.840)	(0.252)
NBFI	1.495	-1.200**	0.260
	(1.176)	(0.794)	(0.692)
NBFI_aff	1.609	1.110	0.625
	(2.623)	(1.270)	(1.045)
NBFI · EBA_firm	0.285	9.789***	-6.655***
	(1.085)	(0.904)	(0.436)
NBFI_aff · EBA_firm	-2.693	1.919	-1.076
	(4.828)	(1.210)	(0.789)
Non-EBA	1.067**	-2.676***	1.681***
	(0.515)	(0.560)	(0.499)
Non-EBA_aff	0.801	-2.443***	2.351**
	(0.807)	(0.641)	(1.187)
Non-EBA · EBA_firm	0.476	9.938***	-10.065***
	(0.759)	(1.303)	(2.198)
Non-EBA_aff · EBA_firm	2.042	0.697	4.960**
	(1.311)	(1.180)	(2.389)
Constant	-6.685***	-1.882***	-6.598***
	(0.441)	(0.528)	(0.261)
Observations	110,279	286,539	286,539
Borrowers	real sector	real sector	real sector
Borrower FE	ILS group	ILS group	ILS group
Standard errors	Clust. Lender	Clust. Lender	Clust. Lender
R-squared	0.059	0.065	0.058
Within R-sq	0.001	0.019	0.016

Note: The table includes intensive (Column 1) and extensive (Columns 2-3) margin analysis. The dependent variable for the intensive margin analysis (*ΔGrowth*) is the change in the ln growth rate of lending to the real sector firms (winsorized at the 2-98 level). The dependent variable for the extensive margin analysis is the change in the lender's probability to enter/exit the lending relationship with real sector borrowers (winsorized at the 2-98 level). Entry is the situation when there is an exposure between a borrower and a lender in a current quarter but there was no exposure in the previous quarter. Exit is the situation when there is no exposure in the current quarter but there was an exposure in the previous quarter. The probability of entry/exit is computed as the number of quarters defined as entry/exit over the total number of quarters. The main explanatory variables are the dummies indicating the lender type: *NBFI* equals 1 if the lender is an NBFI; *Non-EBA* equals 1 if the lender is a Non-EBA bank. The dummy variable *NBFI_aff* / *Non-EBA_aff* equals 1 if the NBFI / Non-EBA bank belongs to the consolidation circles of the EBA banks. EBA firms are firms with the above-median share of the EBA banks in their total borrowing in the pre-treatment period (the median is computed based on the positive values only). The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry, location, and size (ILS). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Appendix 6. Change in the ln growth rate of lending to the non-bank financial institutions: Extensive margin

	Change in the quarter-to-quarter probability of entering/exiting lending relationship,pp			
	entry		exit	
	(1)	(2)	(3)	(4)
NBFI_BL		-13.324***		2.302***
		(1.204)		(0.536)
NBFI	-2.027**	-1.901*	-0.907**	-0.968**
	(0.905)	(0.985)	(0.439)	(0.471)
NBFI · NBFI_BL		1.809		-0.152
		(1.483)		(0.878)
Non-EBA	-0.431	-0.098	-1.794***	-2.048***
	(0.918)	(1.014)	(0.552)	(0.577)
Non-EBA · NBFI_BL		1.339		1.172*
		(1.335)		(0.634)
Constant	-3.436***	-1.973**	-4.690***	-4.952***
	(0.834)	(0.924)	(0.314)	(0.353)
Observations	31,592	31,592	31,592	31,592
Borrowers	NBFIs	NBFIs	NBFIs	NBFIs
Borrower FE	IL group	IL group	IL group	IL group
Standard errors	Clust. Lender	Clust. Lender	Clust. Lender	Clust. Lender
R-squared	0.049	0.050	0.045	0.046
Within R-sq	0.002	0.003	0.002	0.003

Note: The dependent variable is the change in the lender's probability to enter/exit the lending relationship with NBFI sector borrowers (winsorized at the 2-98 level). Entry is the situation when there is an exposure between a borrower and a lender in a current quarter but there was no exposure in the previous quarter. Exit is the situation when there is no exposure in the current quarter but there was an exposure in the previous quarter. The probability of entry/exit is computed as the number of quarters defined as entry/exit over the total number of quarters. The main explanatory variables are the dummies indicating the lender type: *NBFI* equals 1 if the lender is an NBFI; *Non-EBA* equals 1 if the lender is a Non-EBA bank. *NBFI_BL* is a dummy variable that is equal 1 if the NBFI both borrows and lends to the real sector in the pre-treatment period and is equal 0 if the NBFI is only a borrower. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower-group fixed effects based on the borrower's industry and location (IL). Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1

Appendix 7. Link between banks and NBFIs: Overlap measures

	Change in the growth rate, pp			
	(1)	(2)	(3)	(4)
Overlap	1.836***	1.377***		
	(0.367)	(0.482)		
NBFI	5.849***	6.494***	2.210**	1.753
	(1.532)	(1.674)	(0.986)	(1.230)
NBFI · Overlap	-1.867***	-1.414***	-0.699	-0.638
	(0.372)	(0.485)	(1.010)	(0.967)
Non-EBA	3.390**	4.434***	1.578***	1.587***
	(1.416)	(1.653)	(0.407)	(0.404)
Non-EBA · Overlap	-1.908***	-1.415***		
	(0.379)	(0.489)		
NBFI_BL		3.813		
		(3.534)		
NBFI · NBFI_BL		-3.596		
		(4.706)		
Non-EBA · NBFI_BL		-6.010*		
		(3.599)		
NBFI_L				0.675
				(1.262)
Constant	-8.003***	-8.548***	-7.174***	-7.180***
	(1.329)	(1.449)	(0.315)	(0.312)
Observations	12,651	12,651	110,074	110,074
Borrowers	NBFIs	NBFIs	real sector	real sector
Borrower FE	IL group	IL group	ILS group	ILS group
Standard errors	Clust. Lender	Clust. Lender	Clust. Lender	Clust. Lender
R-squared	0.024	0.025	0.059	0.059
Within R-sq	0.004	0.005	0.001	0.001

Note: The dependent variable (*ΔGrowth*) is the change in the ln growth rate of lending to the NBFIs (Columns 1-2) and to the real sector firms (Columns 3-4), winsorized at the 2-98 level. The main explanatory variables are the dummies indicating the lender type: *NBFI* equals 1 if the lender is an NBFI; *Non-EBA* equals 1 if the lender is a Non-EBA bank. In Columns 1-2 where NBFIs are considered as borrowers, *Overlap* is a continuous variable equal to a share of the lender's exposure to the common firms in the lender's total exposure to the real sector. Common firms are the real sector firms that in the pre-treatment period borrow both from the lender and from the borrower (the intermediary NBFI). In Columns 3-4 where real sector firms are considered as borrowers, *Overlap* is, first, computed for each EBA bank – NBFI – firm set as a share of the EBA bank's exposure to the common firm in the EBA bank's total exposure to the real sector. Then, the overlap measure is aggregated to the NBFI – firm level using a share of the EBA bank's exposure to the NBFI in the EBA bank's total exposure to the NBFI sector. The results do not quantitatively change when we use different ways of computing the overlap. Dummy variable *NBFI_BL* indicates the NBFI borrowers that also lend to the real sector in the pre-treatment period. Dummy variable *NBFI_L* indicates the NBFI lenders that do not borrow in the pre-treatment period. The reported results are estimated based on the time period which includes 4 quarters before the treatment (2010Q4-2011Q3) and 9 quarters after the treatment (2011Q4-2013Q4). The specifications include borrower fixed effects: ILS – groups based on the industry, location, and size; IL – groups based on the industry and location. Standard errors (in parentheses) are clustered at the lender level; *** p<0.01, ** p<0.05, * p<0.1