The causal effect of banks' equity stakes on their lending

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Abstract

We study how the lending relationship is affected if a bank holds equity in a borrower. Equity stakes and lending may be complements due to better monitoring and incentive alignment with equity holders or substitutes due to risk management incentives. Since equity stakes are endogenous, we use the German capital gains tax reform in 2000 as a natural experiment. The reform abolished the tax on capital gains, enabling banks to sell their equity stakes in industrial companies without paying taxes. After the tax reform, banks sell their holdings and subsequently increase lending to these companies. This finding suggests that equity and debt financing by banks are substitutes. The substitutability can be explained by banks trying to limit their exposure to a single creditor. Being able to sell their equity stakes allows banks to expand lending while keeping the overall exposure to the borrower's risk constant. Consistent with this explanation, we also find an increase in lending to other companies, whose risks are correlated with the risk of the firm in which the bank sells the equity stake. Using detailed loan level data, we are able to control for both firm-level and bank-level trends in a difference-in-difference set-up. Our findings show that banks' risk management, which regards loans and equity stakes as substitutes, is more important than potential monitoring benefits of banks' equity stakes.

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1. Introduction

With the repeal of the Glass-Steagall Act and the transformation of the main U.S. investment banks into bank holding companies during the recent financial crisis, the definition of "a bank" has become increasingly blurred. While commercial banks expand into investment banking, institutional investors such as hedge funds, pension funds or insurance companies participate in lending syndicates or acquire loans in the secondary loan market (Ivashina and Sun (2011)). These developments lead to an increase of the phenomenon of dual holders, i.e. investors holding both debt and equity in a firm (Jiang, Li and Shao (2010)). While being a new phenomenon in the U.S., such dual holdings were common in bank based economies such as Germany or Japan, where banks often held equity stakes in their borrowers (Allen and Gale (1995)).

The increase in dual holdings raises an important question: Should lenders hold equity stakes in their borrowers? Are debt and equity substitutes or complements? The voting rights associated with an equity stake allow the lender to better monitor the borrower (Santos and Wilson (2008)), while the cash flow rights help to align the incentives between the debt and the equity holders (John, John and Saunders (1994), Santos (1999), Mahrt-Smith (2006)). Thus, there are several reasons why debt and equity might be complements. On the other hand, investing also in equity exposes a lender to additional risk of the firm. Therefore, risk management concerns might make equity and debt substitutes. The question which of the two effects dominates asks for an empirical assessment, which is challenging as debt and equity holdings are determined jointly. For example, information from lending may lead a bank to invest in a firm's equity (*reverse causality*) or unobservable factors may drive both equity investment and lending to a firm (*omitted variable bias*).

In this paper, we address these endogeneity issues by studying how lending is affected by an exogenously triggered divestiture of the equity stake. We use the German capital gains tax reform in 2000 as a natural experiment. Before the reform, many German banks held minority stakes in industrial companies. For example, Deutsche Bank held equity stakes ranging from 0.25% to 30% of equity in 24 industrial companies with a total market value of 22.7 billion EUR (45% of its own market value). Many of these stakes had been established in the 50s and 60s and were mainly maintained to avoid capital gains taxation (Keen (2002)). Surprisingly to the market, the German government decided to abolish the capital gains tax in 2000, allowing banks to divest their equity stakes. Because equity stakes tie up much regulatory capital, one would expect banks to divest their stakes even in the case of potential benefits on the lending relationship. Indeed, 86% of banks' equity stakes were divested in the six years following the tax reform.

We use loan level data coming from the German large credit register provided by the Bundesbank to study how these divestitures affect lending to companies in which a bank held equity. As the decision

to divest an equity stake is endogenous, we only condition on the existence of an equity stake before the tax reform following Frydman and Hilt (2010). In other words, we instrument the sale of an equity stake with the existence of an equity stake prior to the reform. Our particularly detailed lending data on the bank-firm level allows us to use an innovative difference-in-difference (DID) set-up in which we can control for trends at the firm and bank level. Intuitively, this methodology identifies the effect of an equity link by comparing how the company's borrowing from the equity-linked bank changes relatively to its borrowing from other banks, and how the bank's lending to the equity-linked firm changes relative to its lending to other firms. Thus, changes in the economic environment that affect specific banks or firms differently will not distort our analysis. Only contemporaneous shocks affecting the specific bank-firm *pairs* with equity links would influence our identification strategy.

Using this specification, we find that lending volume increases on average by 71% for loans with an equity link after the tax reform (and the probable divestiture of the equity link). This increase corresponds on average to 5.5 percentage points of the firm's total borrowing. The probability that a bank issues a new loan to a firm in which it held an equity stake triples from 2.4% to 7.2%. The fact that banks increased their lending to borrowers in which they divest equity stakes suggests that equity and debt are substitutes. It contradicts the idea that the benefits of equity stakes in terms of monitoring and cash flow alignment were important. Rather, it suggests that the change in lending is caused by banks' risk management incentives. Being able to sell the equity stake allows banks to increase their exposure to the company on the debt side. Having been constrained to hold a certain amount of equity, banks now freely choose to replace equity with debt. Since the equity stakes are on average twice as large as the lending volume, our findings imply that there is approximately a one euro increase in lending for each three euros of equity divested.

Our difference in difference estimation yields results that go in the opposite direction of recent studies, which find that banks give more credit to companies in which they hold equity (Antão, Ferreira and Lacerda (2011)) or in which their mutual funds hold equity[1] (Ferreira and Matos (2012)). However, these studies only employ cross-sectional comparisons and are potentially affected by reverse causality and omitted variable bias. We can replicate their findings studying the cross-sectional correlation between equity stakes and lending volume. Before the tax reform, the existence of an equity link is associated with an increase in the probability of a lending relationship from 7.7% to 27.6% and conditional on a lending relationship, the amount of lending provided is more than twice as large. The opposing results in the cross-sectional and difference in difference analysis can be explained in two ways: First, omitted variable bias and reverse causality might generate a cross-sectional correlation that goes in the opposite direction of the causal effect. Second, the existence of an equity stake might facilitate the initiation of a lending relationship, but provide no further benefits

[1] For mutual fund holdings the diversification incentive should play a minor role, so our results are not directly comparable.

afterwards. We can only speculate which of the two mechanisms is at work, but the results from our difference in difference estimation clearly indicate that the cross-sectional evidence is misleading for established lending relationships and that debt and equity are substitutes rather than complements.

As explained above, the most probable channel which would make debt and equity substitutes is banks concerns about excess exposure to the company. To further examine this explanation, we study how an equity stake in firm A affects the lending to other firms that are correlated with A. If a bank cares about its risk exposure, the equity stake in A might induce it to not only curtail lending to A, but also curtail lending to other correlated firms Therefore, after a divestiture of the equity stake we would also expect the bank to increase lending to these firms. We test this idea in a difference in difference set-up similar to the one explained above. However, now the treated group consists of bank-firm pairs in which the firm is amongst the 10 firms whose returns are most correlated with a firm in which the bank holds an equity stake. Indeed, following the tax reform, we find a lending increase for these bank-firm pairs of 39% or 2 percentage points controlling once again for firm and bank trends.

Overall, our findings suggest that banks care about the risk exposure to individual borrowers and apply good risk management taking into account the high correlation of debt and equity of the same firm as well as correlations with other firms. This finding is even more notable as loans and equity were generally accounted at historical cost during our sample period, which implies that there were no regulatory incentives for such behavior. In addition, our findings show that the positive cross-sectional correlation between equity stakes and lending does not imply that banks' equity stakes benefit the lending relationship. Both of these findings have policy implications. First, we show that banks apply a comprehensive risk management that accounts for correlation structures between different assets without regulatory intervention. Second, our results indicate that the benefits of equity stakes for the lending relationship may be overstated in the literature. This implies that regulations which make it more difficult for banks to hold equity in their borrowers (as it is common in the U.S.) are not necessarily welfare decreasing.

Firstly, our research contributes to a growing stream of literature that studies the effect of equity holdings on the lending relationship[2]. Ferreira and Matos (2012) investigate the effect of equity stakes on the syndicated loan market world-wide. They find that banks are more likely to act as lead arrangers for companies in which they hold an equity stake through their mutual fund or asset management divisions. Santos and Wilson (2008) estimate the effect of U.S. banks' trust investment

[2] Our paper is also related to Dittmann, Maug and Schneider (2010), who study the effect of bankers on the board of German companies from 1994 to 2005. They find that many bankers kept their board seats even after the divestiture of the equity stake. This finding supports the idea that equity stakes are not immediately relevant for monitoring.

on the interest rates charged to borrowers. Jiang, Li and Shao (2010) study non-commercial banks that hold equity in their borrowers. They find that lower interest rates are charged if a member of the syndicate holds equity in the borrower. On the other hand, Lim, Minton and Weisbach (2012) find that non-commercial bank institutions that hold equity in a borrower receive higher interest rates on leveraged loans. Antão, Ferreira and Lacerda (2011) demonstrate that companies in Portugal are more likely to borrow from banks that are holding the firm's equity. Hellmann, Lindsey and Puri (2008) show that banks are more likely to grant credit to companies in which they held a venture capital investment in the past. We contribute to this line of research by studying the exogenously triggered divestitures of holdings thereby avoiding endogeneity problems of bank's equity stakes. The fact that this approach yields results opposite to the cross-sectional analysis underlines how important it is to account for the endogeneity of banks' equity holdings.

Secondly, our paper is also related to a second stream of research that studies banks' trade-offs between limiting their exposure to an individual borrower and having sufficient exposure to the borrower to motivate monitoring. Sufi (2007) shows that in the syndicated loan market, banks retain a larger share of the credit for loans of opaque borrowers. Drucker and Puri (2009) show that loans that are sold in loan sales contain more restrictive covenants to counter the lower incentive to monitor. Ivashina (2009) proposes that a lead arranger in a lending syndicate faces a trade-off between diversifying the credit risk and keeping a larger share of the loan to signal its quality to investors. She shows that by keeping a larger fraction of the loan, a bank can reduce the asymmetric information problem, but will demand a premium to be less diversified. We add to this literature by studying the trade-off between the monitoring benefits and risk exposure that are attached to equity stakes in the borrower. Different to the papers above, we see equity stakes not as an incentive to monitor, but as a mean to monitor through voting rights.

Thirdly, our paper is also related to a third stream of literature that studies the diversification of banks' loan portfolios. Acharya, Hasan and Saunders (2006) find that Italian banks which are diversified grant on average riskier loans and have lower profits. Berger, Hasan and Zhou (2010) analyze Chinese data and document an underperformance of diversified banks. On the other hand, Elsas, Hackethal and Holzhäuser (2010) show that there is no diversification discount for banks in an international sample. More recent studies try to address the endogeneity of bank diversification. Goetz, Laeven and Levine (2012) use changes in the interstate bank branching prohibitions from 1970 to 1990 to show that geographic diversification has a negative impact on bank valuation. Rather than studying how the diversification of banks is correlated with performance, we document that banks care about diversification by studying their reaction to an exogenously triggered sale of an equity position.

2. Institutional details

2.1 The German Tax Reduction Act of 2000

The change of the corporate capital gains tax in 2000 had a substantial impact on the German banking industry. Before the reform, many German banks held minority equity stakes in industrial companies. Especially the large financial institutions were at the center of the system of minority stakes and cross-holdings often called "Deutschland AG" (Germany Inc.) (Höpner and Krempel (2006)). Many of these holdings had been acquired in the distant past and thus had book values significantly below the market value (Edwards et al. (2004)). For example some of the holdings of Deutsche Bank in old industrial companies go back to the foundation of these companies before World War II. Others were acquired in the 60s and 70s, potentially to exercise control over industrial companies through board representation. But, in the 90s, German banks oriented themselves more towards investment banking and wanted to divest their equity holdings to free up capital (Beyer (2003)). However, corporate capital gains were taxed with 52% (Sautner and Villalonga (2010)), which implied that banks would have suffered a significant tax burden if they divested their holdings. This lock-in was completely lifted, when the tax reform reduced the corporate capital gains tax from 52% to 0%.

The plan to abolish the corporate capital gains tax was first revealed on 22 December 1999 and was announced with the explicit intention to facilitate the break-up of the network of minority holdings. It was part of a general tax reform reducing personal and corporate taxes. While the general tax reform was expected, the plan to abolish corporate capital gains tax came as a complete surprise to the market (Edwards et al. (2004)). Thus, there are fewer worries that the minority holdings of the banks are endogenous to the anticipation of the tax reform. The German parliament passed the general tax reform in the summer of 2000 to be effective from 1 January 2001. The abolishment of the capital gains tax did not enter into force until 1 January 2002. The capital gains tax reform affected only stakes in German companies. Capital gains on foreign holdings were already tax exempt before 2000.

2.2 The German banking system

The German banking system consists of three sectors: commercial sector banks, public[3] sector banks and cooperative sector banks (Hackethal (2004)). The commercial sector banks are for profit financial institutions and include large universal banks, regional banks as well as smaller private banks ("Privatbankiers"). The larger banks are usually publicly listed on the German stock exchange. Public sector banks include Landesbanken as well as savings banks ("Sparkassen"). Savings banks are smaller institutions with a regionally specified mandate. Landesbanken are larger and operate usually on a state level. They have in common that they are ultimately publicly owned. The cooperative sector consists of small credit cooperative as well as their head institutes (Genossenschaftliche

[3] Please note that "public" refers to state owned and not to publicly listed.

Zentralbanken). In 2005, the majority of German banks were in the public or cooperative sector (Kamp et al. (2007)). These banks usually do not compete with banks from their own sector, but otherwise offer all types of banking services including loans to companies.

2.3 The Regulatory Environment

Our full sample period is before the introduction of the Basel II accords in 2007. During this time, minimum capital requirements in Germany were enforced according to the "Principle I concerning the capital of institutions". Under this legislation, equity positions in industrial companies as well as loans were part of risk weighted assets, which banks had to back with 8% equity. The risk weight for equity stakes was 100%, while it was between 0% and 100% for loans and bonds depending on the collateral. Banks were applying German GAAP accounting rules at this time, and they valued equity stakes generally at their historical cost, i.e. the price at which it was bought (unless permanent impairment was anticipated). Loans were generally valued at the face value.

The regulatory and accounting treatment have the following economic consequences: First, the variation of market value in the holding did generally not affect bank equity or risk weighted assets. Thus, only a probably permanent impairment of the stake below its historical costs would have resulted in a decrease of regulatory capital of the bank holding the stake. Nonetheless, banks might have been concerned about their economic equity, which was affected by the market value of the equity stake. Second, banks had a large incentive to divest the holdings following the tax reform, because it increased their capital by the amount of the capital gains and reduced their risk weighted assets by the amount of the book value. Third, as loans had potentially a lower risk weight, they were less risky than equity from a regulatory standpoint.

3. Methodology

3.1 Identification strategy

The challenge in addressing the question whether equity stakes in the borrower benefit the lending relationship is that equity stakes are endogenously determined. There are three endogeneity issues that make the interpretation of any cross-sectional correlation between equity stakes and lending difficult. First, there might be reverse causality, i.e. banks might choose to invest more in companies that they know through their lending business. This concern is emphasized by several studies which show that lenders can use information from lending to make better investments in the borrowers equity. Massa and Rehman (2008) show that banks use the information from their lending business in the management of their mutual funds. Ivashina and Sun (2011) show that institutional investors invest more profitable in the equity of their borrowers. Massoud et al. (2011) find that hedge funds use the information from syndicated lending to make more profitable short sales. Second, there might be an omitted variable bias, i.e. unobservable factors, such as good personal relations between the CEOs of

the bank and the company (Engelberg, Gao and Parsons (2012)), might cause the bank to provide debt as well as equity. Third, even if the bank holds the equity stake first and its existence increases the probability of granting a loan, it does not necessarily mean that the equity stake facilitates lending afterwards. The equity stake may simply be a device for the bank to become acquainted with the company and once the lending relationship is established it provides no further benefits. Consistent with this view, Hellmann, Lindsey and Puri (2008) show that banks are more likely to give credit to companies in which they held a venture capital investment in the past. In particular, the last point cannot be addressed by classical IV estimation in the way applied in Ferreira and Matos (2012) and Antão, Ferreira and Lacerda (2011): If the instrumental variable just predicts the existence of an equity stake and the instrumented equity stake causes the initiation of a lending relationship, it may still be that it becomes irrelevant once the lending relationship is established.

We address these issues by applying difference in difference estimation comparing the change in lending for bank-firm pairs with and without equity links after the tax reform. Using the fact that we have data on the bank-firm-time level, we can control for both demand effects at the company level as well as supply effects on the bank level. We do this by adding bank fixed effects to the regression set-up applied in Khwaja and Mian (2008): Following their approach, we first compute the change in lending volume following the tax reform for each lending relationship as:

$$Change\ in\ Loan\ Amount_{b,f} = mean_{2000-2005}\left(Lending_{b,f}\right) - mean_{1998-1999}\left(Lending_{b,f}\right)$$

We use the Change in Loan Amount as our dependent variable and regress it on the equity link indicator variable as well as firm and bank fixed effects.

$$Change\ in\ Loan\ Amount_{b,f} = \alpha_b + \alpha_f + \beta * Equity\ Link_{b,f} + \gamma * X_{b,f} + \varepsilon_{b,f}$$

By taking the difference before and after the tax reform as the dependent variable, we directly control for any time invariant effects on the relationship level. This means that taking the first-differenced dependent variable is the analog to using bank*firm fixed effects in the panel difference in difference setting. Despite these strong controls for any time-invariant heterogeneity on the bank*firm level, there may be time varying effects on the firm or bank level such as changes in credit demand or credit supply, which are correlated with the existence of equity links. For example, it is plausible that banks might have used the additional capital from divesting their equity stakes to increase lending. We account for these issues by including bank-level and firm-level fixed effects in the differenced regression. Putting bank and firm fixed effects in the differenced data is the analogue of putting bank*time and firm*time fixed effects in the panel difference in difference setting. This means, the bank-level and firm-level fixed effects control for bank and firm specific trends. Intuitively, our methodology identifies the effect of an equity link by comparing how the company's borrowing from

the equity-linked bank changes relatively to the borrowing of the same firm from other banks, and how the lending to the equity-linked firm changes relative to the lending of the same bank to other firms. With this regression set-up, the only omitted variables that can potentially distort our results are relationship specific variables which are correlated with equity links and have a time varying effect. We include controls for the size of the loan before the tax reform as well as the geographic proximity to account for trends related with observable relationship specific characteristics.

3.2 Endogeneity of the divesting decision

While the tax reform was exogenous to the individual lending relationship, the decision to sell an equity stake following the tax reform is endogenous. For example, banks that expect business with the customer to decrease might have been more likely to sell the equity stake in that borrower. Therefore, we condition only on the existence of an equity link rather than its divestiture (following Frydman and Hilt (2010)). This procedure results in an underestimation of the true effect, since not all equity stakes were sold completely. We show in Table 1 Panel E that 86% of banks' equity stakes in industrial firms were divested until December 2005. This finding is consistent with prior evidence that many banks divested their minority holdings following the tax reform (Kengelbach and Roos (2006), Höpner and Krempel (2006)).

There are four reasons why banks divested their minority stakes following the tax law change: First, selling an equity holding reduces the amount of risky assets that need to be backed by capital. Second, banks realized large accounting gains by selling the holdings, improving their capital position. In addition, this might have been an incentive for managers, who cared about reporting a high accrual income. Third, divesting a holding leads to a cash proceed, which improves the liquidity position of the bank. Fourth, on 22 September 2002, Germany had a general federal election and the candidate of the opposition announced that he would reintroduce capital gains taxation in case of victory. In fact, he narrowly lost the election and corporate capital gains tax has not returned since, but during 2002 his chances looked good and some firms sold their holdings pre-emptively to front-run a potential return of the tax (Pauly and Schäfer (2002)).

3.3 Event Window

To study how the capital gains tax reform affected bank lending to firms in which they held an equity stake, we define 1998-1999 as the before event period and 2000-2005 as the after event period. We use the first announcement of the tax reform plan rather than the tax coming into force for the following two reasons[4]: First, anticipating the tax reform, banks may have chosen to reduce or increase their business with companies in which they planned to sell equity and thus the tax reform may have an effect already before the 1st of January 2002. Second, there were ways for companies to

[4] We show in Table 8 Panel G that our results are robust to an alternative post-event window from 2002-2005.

divest holdings already before 2002 and still capture the better tax treatment. For example, Deutsche Bank sold a stake in Allianz on 6th June 2000 and stated in its investor relations release:

"The economic disposal has been achieved by an innovative structure which allows Deutsche Bank to obtain the full benefits from the upcoming tax reform in Germany. The transaction will qualify as a disposal for the Deutsche Bank Group in its IAS accounts, giving rise to a capital gain in excess of EUR 2 billion, but without triggering a tax disposal in the current year."[5]

The length of our sample is determined by our data structure, which has breaks in the reporting format before 1998 and after 2005. Our data reports stock variables rather than flow variables, i.e. the level of loans rather than loans newly issued. Therefore we need only few periods before the event. However, after the event we need to consider a sufficiently long horizon for the banks to divest their holdings and for these divestitures to have an effect. Thus we extend our sample until 2005.

4. Data and Variables

In our study we use six data sources: Ownership data comes from "Wer gehört zu wem?" and Hoppenstedt Aktienführer. Balance sheet data for publicly listed firms is taken from Worldscope. We combine these public data sources with three databases of the Deutsche Bundesbank: Balance sheet data for private firms is taken from Jalys/USTAN, balance sheet data for banks is taken from BAKIS and loan level data is taken from the German large credit register (MiMiK). In the following sections we portray each dataset and the variables created with it in more detail.

4.1 Ownership Data

We obtain data on equity holdings of German companies from "Wer gehört zu wem?" as of July 1999 (who owns whom). This database contains roughly 18,000 private as well as publicly traded firms and their owners. It was originally published by Commerzbank, one of Germany's leading banks, but is now distributed by Picoware (www.picoware.de). The data is based on public sources such as balance sheets and additional self-reported information by companies. In addition to the percentages of ownership of equity, it also contains the companies' industry and address as well as its stated capital. In addition, we manually add holdings of banks reported in Hoppenstedt Aktienführer 2001 (these holdings are as of December 1999). We define an equity link as a holding by a bank in an industrial company of less than 50% equity. We include equity holdings of a bank's subsidiaries, as long as the subsidiary is at least held with a 75% share.[6] We exclude holdings in other banks, private equity companies and vehicles of project finance using the industry information provided in "Wer gehört zu

[5] "Der Umbau der Deutschland AG" Wirtschafts Woche 04.02.2005
http://www.wiwo.de/unternehmen/sinnvolle-loesungen-der-umbau-der-deutschland-ag/4902614.html

[6] We also include the equity holdings of lower levels of subsidiaries (i.e. subsidiaries of subsidiaries) as long as any link consists of at least 75%. The subsidiary can be a non-financial company. Results are robust to using a 50% cut-off instead.

wem?" as well as manual checks. Applying these filters, we are left with 135 equity links from 26 banks to 117 companies. Certainly the total number of equity holdings by banks is larger, but banks are not forced to publicly disclose their equity holdings.

4.2 Loan Level Data

Our loan level data comes from the German large credit register (MiMiK), which is provided by the Deutsche Bundesbank. According to section 14 of the German Banking Act (Kreditwesengesetz), all banks have to quarterly report their loan exposures to companies and individuals if this exposure exceeds 1.5 million EUR. This information is collected at the Bundesbank and structured into a panel dataset. The dataset has been used in several studies including Dittmann, Maug and Schneider (2010) and Behn et al. (2012). A more detailed description of the data can be found in Schmieder (2006).

The data contains the credit exposure of a bank to a company at the end of each quarter. This variable is broken down further into on-balance sheet items such as loans and bonds, as well as off-balance sheet exposure through credit derivatives and guarantees. To test theories of monitoring and risk diversification we are interested in the total credit risk a bank faces towards a borrower. Therefore we include on-balance sheet lending as well as off-balance sheet exposures through guarantees and derivatives. However, robustness checks show that our results hold also if we restrict our attention to classical on-balance sheet loans. Strictly speaking, the data is not broken down to the loan level, but shows the exposure towards an individual borrower. Following Khwaja and Mian (2008), for ease of interpretation, we refer to this exposure as a loan, even if it may consist of a collection of different loans and guarantees.

In each quarter, for each firm we aggregate the loans from all banks in the database to obtain total loans to the firm. We then divide the individual loan by this total to get the "bank share" which is our measure of loan importance to the company. Conceptually it is important to distinguish between a bank giving zero credit to a company and the value being missing due to the bank or company leaving the dataset. We assign a zero if both the company and the bank are in the dataset for other loans. Following Khwaja and Mian (2008), we average loans for each bank-firm pair across time in the pre-event period (1998-1999) and in the post-event period (2000-2005). We also compute the before/after bank share as the average of the quarterly bank share variable. Finally, we sort all borrowers of a bank by the average size of their loans in the pre and post event period and assign percentiles with the largest borrower receiving a one. This "borrower percentile" measures the importance of the loan to the bank.

4.3 Bank-level data

We reduce our attention to the 26 banks that hold equity stakes in industrial companies. For these banks, we obtain balance sheet data as of December 1999 from the Bankaufsichtliches Informationssystem (BAKIS). Banks need to report their balance sheets to the authorities on a monthly basis according to section 25 of the German Banking Act (Kreditwesengesetz). As a proxy for size, we use the natural logarithm of equity. We construct "lending focus" as the amount of loans to firms divided by total assets of the bank to proxy for how important corporate lending is to the specific bank. We also construct dummy variables indicating to which of the three sectors of the German banking system (commercial, public sector or cooperative) the bank belongs.

4.4 Firm-level data

We match the firms in the credit registry to the firms which are covered in "Wer gehört zu wem?". For publicly listed firms, we obtain balance sheet data of the last fiscal year ending before December 1999 from Worldscope and stock market data from Datastream and Compustat Global. For private companies we obtain balance sheet data from the Jalys/USTAN database, which was built up for the rediscount business of the Deutsche Bundesbank. We match USTAN to MiMiK using the links employed in Behn et al. (2012). USTAN is "the best and most comprehensive firm data set in Germany" for our time period (Stöss (2001)). However, its coverage is far from complete and many companies are not covered every year. If a company is not covered in 1999, we instead use the last balance sheet available in the dataset going back to 1995. We include in our sample the firms in which a banks holds an equity stake of 50% as well as any company for which we have balance sheet data and which has assets exceeding 5 million EUR.[7] We exclude any companies that are banks, venture capital companies or investment vehicles as well as any companies which are bank subsidiaries (a bank owns above 50% of equity). We are left with 4023 companies. We compute leverage as book value of debt divided by total assets. Tangibility of assets is defined as cash and equivalents plus net PPE divided by total assets. We measure the size of the firms using the natural logarithm of total balance sheet assets.

4.5 Summary Statistics

We report summary statistics in Table 1. In Panel A and B we display summary statistics on the firm level as of 1999. Comparing the firms with equity links to banks with the overall sample, we see that they are significantly larger[8]: On average, firms in the sample have assets of 663 million EUR (median 40 million EUR), while firms with equity-links have assets of 9128 million EUR (median

[7] We do not apply the filter to require balance sheet data on the firms in which banks hold equity stakes to avoid a reduction of our treated sample. In a robustness check we show that our main results hold when reducing the sample to firms in which banks hold equity stakes, alleviating worries about differences in the treated and control sample.

[8] We address this difference in size by using firm fixed effects and size controls. In addition, we show that our results are robust to including only companies with equity-links in our sample.

303 million EUR). In terms of leverage and tangibility of assets the two samples are similar. For the full sample the average leverage is 23% (median 19%) and the average tangibility of assets is 32% (median 29%). 50% of companies with equity links are publicly listed, while it is only 12% of the full sample. On average, the firms with equity links to banks have loans from 12.8 (median 7) different banks. This is larger than the value for the overall sample, which is 4.79 (median 3), which suggests that the number of bank relationships increases with size. In most cases only one bank holds equity in the firm. Firms with equity links, on average have 20% of the company's banks hold equity (median 10%)[9].

In Panel C we display summary statistics on the bank level. Of our 26 banks, 11 banks belong to the commercial sector, 11 banks belong to the public sector and 4 banks belong to the cooperative sector. The banks are large banks with mean assets of 107 billion EUR (median 53 billion EUR) and mean equity of 3.3 billion EUR (median 1.5 billion EUR). The lending reported in the credit register makes up a large portion of assets: On average banks grant 105 billion EUR of loans (median 43 billion) to 5986 (median 3135) creditors. Of this lending 66 billion (median 36 billion) occurs on-balance sheet. The mean ratio of firm loans to assets is 43 % (median 43%). The average return on equity is 5.4% (median 4.8%). On average a bank in the sample holds equity stakes in 5.2 companies (median 1.5). These equity stakes make up for 23% of the bank's equity on average (median 3.8%).

If there is an equity link, a bank holds 14.6% of equity on average (median 10.5%). The average market value of an equity stake is 459 million EUR (median 17.3 million EUR). For 66% of the equity links, the bank also provides a loan to the company. In this case, the market value of equity is typically twice as large as the loan, since the debt constitutes on average 36% (median 32%) of total financing. If there is a loan, it makes up on average 32% (median 18.7%) of the company's total borrowing. The size of the equity stake is smaller than the size of the loan from the same bank in only 22% of cases. Considering that equity is a lot more performance sensitive than debt, this implies that the risk to the bank comes mainly from the equity stake. We find that 86% of equity stakes are divested until December 2005[10].

The average loan in our sample is 12.2 million EUR (median 3.1 million EUR). For on-balance sheet loans the respective figures are 8.2 million and 1.7 million EUR. On average 64% of the exposure in a lending relationship comes from on-balance sheet lending (median 94.4%). On average a single bank provides 28% of a firm's total borrowing (median 24.7%).

[9] We have 6 companies that have only banks with equity links as lenders. We leave them in the sample, but they will not impact our results in the specifications with firm fixed effects.

[10] We define a stake as sold if both the company and the bank are still covered in the respective database ("Wer gehört zu wem?" or Hoppenstedt) and the stake is not listed in the database or has been decreased by at least 50%. If the company or the bank is not covered in these databases, we use regulatory data from the Bundesbank on equity stakes of banks. If we cannot find the stake in this database, but the bank is covered, we count the stake as divested, otherwise we set this information to missing.

5. Results

5.1 Probability of a lending relationship before the event

As a first step, to compare our datasets to prior studies, we examine how the existence of an equity link is correlated with lending before the tax reform. To address this question, we conduct a purely cross-sectional study for December 1999. Following Ferreira and Matos (2012) and Hellmann, Lindsey and Puri (2008), we create a dataset with all possible bank*firm combinations. Our dependent variable "lending relationship" is a dummy variable equal to one if the company received a loan from the bank in December 1999. The explanatory variable of interest is an indicator variable equal to one if there is an equity link between the bank and the firm. We add firm log (assets), leverage and tangibility of assets as firm controls. Controls on bank characteristics include return on equity, log(equity) and lending focus as well as dummy variables indicating to which sector of the German banking system the bank belongs (commercial, public or cooperative). We control for geographic proximity using dummy variables equal to one if bank and firm are located in the same city or the same region[11]. Since our dependent variables are binary, we use a logit specification. We cluster standard errors at the firm level[12]. We report our results in Table 2. We find that an equity link is associated with an average increase in the probability of a lending relationship from 7.7% to 27.6% (or from 2.0% to 16.1% at means). This result is significant at the 1% level. The result is robust to replacing bank controls with bank fixed effects.

To better control for unobserved heterogeneity amongst firms, we also want to include firm fixed effects. However, since our sample includes many firms, but only few banks, a simple non-linear probability model cannot be consistently estimated due to an incidental parameters problem (Chamberlain (1980); Puri, Rocholl and Steffen (2011), Greene (2004), Neyman and Scott (1948)). Therefore, following Puri, Rocholl and Steffen (2011) and Khwaja and Mian (2008), we employ a linear probability model estimated with OLS. Our results are robust to this alternative specification: Controlling for bank and firm fixed effects, the probability of a lending relationship increases by 37% if there is an equity link between the bank and the firm.

Next, we study the probability that the bank is the Hausbank of the firm, i.e. is the bank providing the most lending to the company. We employ the same regression set-up as above. In our logit specification, an equity link increases the probability of being a Hausbank from 2.3% to 6.8% (0.5% to 1.9% at means). Our linear probability model with bank and firm fixed effects predicts an increase

[11] As region we use the first digit of the German postal code.

[12] We do not cluster at the bank level, because we have only 26 banks in our sample and clustered standard errors are biased when the number of clusters is small (Thompson (2011)). However, our results are robust to double clustering at the firm and bank level (unreported).

in the probability of being chosen as the Hausbank by 23.3%. All results are significant at the 1% level.

5.2 Size of the lending relationships before the event

The findings above show that an equity link significantly increases the probability of a lending relationship. Next, we want to examine whether an equity link is also associated with larger loans conditional on the existence of a lending relationship. We run OLS regressions where each observation is a bank-firm pair for which average lending in 1998-1999 is positive. Thus instead of all 90168 possible bank-firm combinations, we concentrate on the 6953 combinations in which there actually is a lending relationship. We regress the size of the loan on a dummy variable indicating whether the bank holds an equity stake in the company. Control variables are the same as above and we also estimate specifications using bank and firm fixed effects. We cluster standard errors at the firm level. We display the results in Table 3.

In Panel A, we use the log of loan size as the dependent variable. The coefficient on the equity link dummy is 0.97 suggesting that an equity link increases the size of the lending relationship by 164%[13]. This result is significant at the 1% level and robust to including bank and firm fixed effects. In Panel B, we study the importance of the loan for the borrower by using the bank share, i.e. the percentage of the total company loans coming from this specific bank, as dependent variable. Even though this variable is censored at 0 and 1, we use OLS regressions to allow the inclusion of fixed effects. A bank that holds an equity stake in the company provides 8.3 percentage points more of the company's debt. This effect is robust to including controls and fixed effects as above and is significant at the 1% level. We cluster standard errors on the firm level. To measure the importance of the loan to the bank we use the borrower percentile, which we define as the fraction of a bank's loans being smaller than this specific loan. Using the same OLS regression set-up as before, we find that the existence of an equity link increases the borrower percentile by 10 percentage points. This result is significant at the 1% level.

Overall, the results in Table 2 and Table 3 indicate that there is a strong positive correlation between equity stakes and lending volume. The existence of an equity stake is associated with a higher probability of a lending relationship. Furthermore, in the case of a lending relationship, it is associated with larger loans, which are more important to both the bank and the firm. Thus, our findings are in line with prior results as in Ferreira and Matos (2012) or Antão, Ferreira and Lacerda (2011). However, as discussed in the introduction, this observation does not necessarily imply that equity links benefit the lending relationship. These results might also be driven by reverse causality or omitted variable bias. Most importantly, equity stakes might be helpful in establishing a lending

[13] An increase in log loans of 0.97 corresponds to an increase in loans of $e^{0.97} - 1 = 164\%$.

relationship, but provide no further value in the later stages of the lending relationship. To address these issues, we will now turn to the panel analyses using the tax reform as a natural experiment.

5.3 Change in the loan amount after the tax reform

In this section, we study how divestitures of equity holdings following the tax reform affect the lending relationship. As explained in section 3.2, we do not condition on whether companies actually sell their holding, but rather compare relationships with and without equity links before and after the tax reform. For this purpose, we compute the difference in average loan size before and after the tax reform for each bank-firm pair. We then regress this difference on a dummy variable equal to 1 if there was an equity link before the tax reform. The coefficient of this variable indicates how loan sizes of bank-firm pairs with equity links change after the tax reform relative to the control group. We only include bank-firm pairs with a lending relationship before the tax reform in our analysis.

As above, we start with a regression using bank, firm and relationship specific control variables and subsequently replace the firm and bank specific controls with fixed effects. While we use the same regression set-up as above, the interpretation is very different: Using a difference as the dependent variable is comparable to including bank*firm fixed effects in a panel regression. That means any time invariant bank, firm and relationship effects are already controlled for. In fact the control variables here account for time-varying effects of firm, bank and relationship characteristics. The firm and bank fixed effects control for firm and bank trends, i.e. supply and demand shocks.

As we have seen above, equity links are associated with larger loans. To control for this, we include the size of the loan before the event as an additional control variable. This way, we ensure that we compare loans with equity stakes to loans without equity stakes that have the same size. We always use as size of the loan the same variable, which is used to define the dependent variable. As above, we cluster our standard errors on the firm level.

We display the results of our regressions in Table 4. In Panel A, we use the difference in logarithm of loan size as the dependent variable. It can be interpreted as a percentage change in loan size. We find that the loan size of companies with an equity stake increases by 111% following the tax reform. This effect is reduced to 71% when we add firm fixed effects. These results are significant at the 1% level.

In Panel B and Panel C, we now turn to the size measures, which are standardized on the firm and bank level. The results carry through to these specifications: Following the tax reform, the importance of the lending relationship to the firm increases. The bank share, i.e. the share of credit extended by the linked bank, is increased by 5 percentage points. Also the importance to the bank increases, as the borrower percentile rises by 7%. This means that following the tax reform, firms with equity links

rank 7 percentage points higher amongst the bank's borrowers. These results are significant at the 5% level and robust to the inclusion of bank and firm fixed effects.

Overall, our findings suggest that the divestitures of equity stakes following the tax reform led to an increase in lending. This finding is not consistent with the idea that equity stakes benefit the lending relationship, i.e. that equity and debt investments are complements. Rather, banks seem to replace their equity investments with bank debt implying that equity and debt are substitutes. As we control for bank and firm fixed effects, these results cannot be explained by demand or supply effects. They are consistent with the idea that banks care about the risk exposure to individual companies. After the tax reform, they gain the flexibility to sell their holdings and reduce their risk, which allows them to increase their exposure on the loan side.

5.4 Probability of entering a new lending relationship after the tax reform

In the analysis above, we have seen that the size of loans with an equity link increases after the tax reform. After studying the change in the size of an existing loan, we now want to examine whether the probability of entering a new loan is also increased in case of an equity stake. Thus, we examine the 67094 bank firm pairs that do not have a lending relationship in December 1999. Our dependent variable is a dummy variable equal to one if there is a lending relationship in December 2005. As above, we first employ a logit specification and then add firm fixed effects in a linear probability model (OLS). We display the results of this analysis in Table 5.

We find that the probability of entering a lending relationship increases from 2.4% to 7.2% (0.5% to 2.1% at means) in case of an equity link. This result is robust to the inclusion of bank and firm fixed effects and significant at the 5% level. It suggests that some banks were exposed so much on the equity side that they decided to extend no debt to the company. Being able to sell the equity stake allows these banks to extend credit to these companies.

5.5 The effect on correlated borrowers

As we have seen above, banks increase their lending to borrowers whose equity they sell, consistent with a risk management explanation. If this explanation is true, the risk coming from the equity stakes might also lead the bank to reduce lending to companies whose credit risks are correlated with the equity stake. Thus, we would expect to see an increase in lending to other companies with correlated risk after the tax reform. To examine this prediction, we compute stock market correlations between firms in which banks hold equity and all other companies in our sample. We use daily stock returns from Datastream and Compustat Global[14] in the three years prior to the tax reform to compute the

[14] Since individual equity return data in Datastream can sometimes have severe errors (Ince and Porter (2004)), we set any return whose absolute value is above 20% to missing. There are many days on which either Datastream or Compustat Global

correlations. Relying on stock returns forces us to reduce our attention to the publicly listed companies in our sample. We define a bank-firm pair as correlated if the firm is amongst the 10 companies most correlated with a firm in which the bank holds equity. We repeat the regression set-up of Table 4, regressing changes in our three measures of loan size on a dummy variable equal to one if the bank-firm pair is correlated. We exclude all bank-firm pairs with an equity stake from our regressions. The results are presented in Table 6. As above, we study regressions with bank and firm fixed effects as well as regressions with bank and firm specific controls. As one would expect, the effect on correlated loans is smaller than on loans with an equity link. However, it is still economically and statistically significant in all specifications. After the tax reform, lending to correlated borrowers is increased by 39%. This corresponds to 2% in terms of bank share and 3.3% in borrower percentile. Thus the effect is roughly half as large as the effect on bank-firm pairs with an equity link.

5.6 Change in total borrowing following the tax reform

We have seen above, that banks extend their lending to companies in which they have held an equity stake after being able to divest the equity stake. We now want to determine whether this increase in lending crowds out lending from other banks or whether the total borrowing of the firms with equity links increases after the tax reform. Therefore, we now examine firm level changes in lending. As we have seen in section 4.5, companies with equity links are significantly larger. Since we cannot use firm fixed effects in this regression (since we identify the effect at the firm rather than the bank*firm level), the differences in size, industry, etc. might affect our results heavily. Therefore, we use propensity score matching (Heckman, Ichimura and Todd (1998)) to account for the differences in characteristics between firms with and without a bank as an equity holder.

In a first step, we run a probit regression of the treatment variable (having a bank as equity holder) on firm size, firm leverage, tangibility of assets and industry fixed effects using the 12 Fama French industry classification. Then we match on the propensity scores predicted by this regression. For each firm with a bank as equity holder we select a set of firms with a similar propensity of having a bank as an equity holder. We compute the average treatment of the treated by comparing the dependent variables between these matches. We present the results in Table 7. We use three different matching techniques. In regressions 1 and 2, we compare a firm with a bank as equity holder to the nearest 3 (or 10) neighbours according to the propensity score. In regressions 3 and 4, we compare it to a weighted average, where the weights are given by a tricube kernel with bandwidth 0.01 and 0.05 respectively. This kernel gives more weight on observations with a similar propensity score. In regressions 5 and 6,

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has missing return data. For each company and each month, we choose the source that has fewer missing observations in that month.

we compare each linked firm to the average of all firms with propensity scores within a radius of 0.01 and 0.05 respectively. In all analyses we remove all firms that are outside the area of common support to avoid bias (Heckman, Ichimura and Todd (1997)). We compute our standard errors using bootstrap with 200 repetitions following Hellmann, Lindsey and Puri (2008).

In Panel A, the dependent variable is the difference in the logarithm of total firm borrowing before and after the tax reform. We see that total borrowing increases by 7-15% for companies that have an equity link depending on the matching technique used. In Panel B, we study the difference in total borrowing as a share of assets. Here we also find a positive effect of 2.1 to 3.3 percentage points. While being economically sizeable, these results are not statistically significant due to the small number of companies with a bank as equity holder. Overall, these results suggest that more lending from banks with equity links somewhat increases total lending of a company. Thus, the credit increase of banks with equity links is not offset by credit reductions of banks without equity links.

6. Robustness checks

6.1 Change in the loan amount after the tax reform

In this section, we conduct several robustness checks for our main result that banks extend more credit to a company after being able to divest its equity holding. We use all three dependent variables as in the main specification, but restrict our attention to the set-up without fixed effects and the set up including bank and firm fixed effects.

In our main specification, we use all exposure of a bank to a company as a "loan", even if this exposure is off-balance sheet in form of guarantees or derivatives. In Panel A, we display a robustness check, where we re-compute all our variables using only on-balance sheet exposure. The results are comparable in terms of significance and economic magnitude: After the tax reform, on-balance sheet lending increases by 69% in case of an equity link. The bank share increases 4.7 percentage points and the borrower percentile 7.7 percentage points. All results are significant at the 5% cut-off. This finding suggests that our results are not driven by off-balance sheet lending.

In our main specification, we use the full sample of companies, even if companies with an equity stake are significantly larger. In the robustness check in Panel B, we reduce our sample to the companies in which a bank holds an equity stake. This means the control group consists of loans without an equity link of firms that have an equity link with another bank. Even though it reduces the number of bank-firm pairs in the sample, results remain significant at the 5% level and actually become slightly larger in the fixed effects regression. This suggests that our results are not driven by an inadequate control sample.

In our sample, we have privately held as well as publicly listed companies. In the robustness check in Panel C, we reduce our sample to publicly listed companies. The effects on the difference in log loan size, difference in loan size and bank share remain significant at the 5% level and similar in economic magnitude. Only the effect on borrower percentile is reduced to 2.6% and not significant anymore in the fixed effects specification. In general, these results suggest the effect is not only driven by small privately held companies.

In our main specification, we have large private banks, Landesbanken, as well as smaller savings and cooperative banks. In the robustness check reported in Panel D, we exclude savings banks and small cooperative banks from our sample. The results remain similar in economic magnitude and significant at the 5% level. This suggests that our results are not driven by very small banks.

In our main specification, we exclude banks as borrowers, but include non-bank financial institutions such as insurance companies. In the robustness check in Panel E, we exclude insurance companies as borrowers from the sample. The economic magnitude of the results remains largely the same and results continue to be significant at the 5% level. This suggests that findings are not driven by insurance companies.

To avoid an endogeneity bias, we generally condition on the existence of an equity holding rather than its divestiture. In the robustness check in Panel F, we exclude bank-firm pairs with equity stakes that were not divested from our regressions. The results remain the same in terms of economic and statistical significance.

In our tests, we use the surprise announcement of the tax reform in December 1999 as our event. However, the law did not come into force until January 2002. Therefore, in the robustness check in Panel G, we use an alternative after event period from 2002 to 2005. We keep the same before event period from 1998 to 1999 and leave the intermediate period (2000-2001) out of the analysis. The results are significantly larger than in our base specification suggesting that a large part of the effect is due to the time after the law became effective.

6.2 Cross-sectional analysis before the event

After conducting the robustness checks for our main result, we now repeat the same robustness checks for the cross-sectional results originally reported in Table 2 and Table 3. As above, we restrict our attention to the specification without fixed effects as well as the specification with bank and firm fixed effects. We first examine only on balance sheet loans: for the probability of having a lending relationship and being the Hausbank the results remain similar. For the size of the loan, the effects are smaller, but remain statistically significant at the 10% level for the bank share and borrower percentile. Next, we reduce the sample to firms with equity links and to publicly traded companies. In

both cases all results remain statistically significant at the 5% level. Finally, we reduce the sample to large banks and exclude insurance companies. Also these robustness checks do not alter results, which stay significant at the 1% level.

7. Conclusion

How equity stakes of banks affect the lending relationship is an important question from a research as well as a policy perspective. In this paper, we address whether debt and equity financing by banks are complements or substitutes. The voting rights of equity may allow the bank to better monitor the borrower and the cash flow rights of equity align the incentives of the bank with shareholders. Therefore, debt and equity may be complements. However, from a risk management perspective, banks might be concerned about an excessive exposure to a certain client. If this is the case, debt and equity become substitutes, as the bank will reduce its credit exposure to offset the risk through the equity stake. Consistent with prior research, we find that there is a positive association between equity stakes and lending volume in the cross-section. However, this finding does not imply that bank loans and equity are complements due to issues of reverse causality and omitted variable bias. Therefore, we use the German capital gains tax reform in 2000 as a natural experiment. Following the reform, banks were able to divest their equity stakes in industrial companies. Contradicting the cross-sectional evidence, we find that the divestitures following the tax reform let to an increase in lending rather than a decrease. In addition, we find a post-event increase in lending to borrowers whose risks are correlated with the firm in which the bank holds equity. Our finding suggests that equity and debt holdings of banks are substitutes and that the cross-sectional evidence is misleading. Thus, we show that the effect of risk management overshadows any monitoring benefits that equity stakes might provide.

Table 1: Summary statistics

This table displays the summary statistics of the variables as of 31st December 1999. Panel A displays the summary statistics on firm level for all firms in the sample, while Panel B displays the summary statistics of the subset of firms in which a bank holds an equity stake. Leverage is defined as book value of debt divided by total assets. Tangibility of assets is defined as cash and equivalents plus net PPE divided by total assets. Total loans is the sum of all loans in the credit registry for the specific firm, also exposure through guarantees or derivatives are counted as loans. Total loans on balance excludes guarantees and derivatives. Number of bank relationships gives the number of banks from which the company receives a loan. Bank as equity holder is a dummy variable equal to one if a bank holds an equity stake in this company. "Bank relationships with equity link" is the number of banks that hold equity in the company. "Bank relationships with equity link (%)" is the percentage of bank relationships in which the bank holds equity in the company. Panel C reports the summary statistics on bank level for the 26 banks, which hold equity in an industrial company. Total loans is the sum of all loans from this bank in the credit registry. Number of equity stakes is the number of industrial companies in which the bank holds equity. Value of equity stakes is the estimated market value of these stakes. Equity stakes / equity is defined as this value divided by the bank's equity. Capital ratio is the ratio of bank capital to risk weighted assets. Lending focus is loans to firms divided by total assets. Number of loans gives the number of firms who have a loan from this bank. Return on assets is defined as net profit divided by total assets. Return on equity is defined as net profits divided by equity. Commercial, public and cooperative sector bank are dummy variables indicating to which sector of the German banking system the bank belongs. Panel D reports the summary statistics on equity holding level. The size of the stake is given in million EUR and in percent of the company's equity. Existence of a loan is a dummy variable indicating whether the bank holding the equity gives a loan to the firm. Debt share of bank funding gives the loan value from the bank to the company divided by the total funding (debt + equity) only taking into account the 89 equity stakes with a loan. Bank share is the percentage of total firm borrowing that is provided by the bank. "Bank gives more debt than equity" is a dummy variable equal to one if the debt share is above 50%. Equity divested by 2005 is a dummy variable equal to 1 if the equity stake does not show up in its original source by the end of 2005. Panel E reports the summary statistics on "loan" level for all loans between the banks and firms in our sample. Following Khwaja, Mian (2008), we refer to a bank-firm pair as a loan, i.e. multiple loans are aggregated. On balance sheet is calculated as on balance sheet loans divided by total loans. Bank share is defined as loan value divided by the aggregated loan amount of this company.

Panel A: All firms

Variable	Mean	Median	Standard Deviation	25th Percentile	75th Percentile
Assets (million EUR)	663.3	40.4	7912.1	16.2	145.0
Leverage (%)	23	19	18	7.6	34
Tangibility of assets (%)	32	29	22	14	46
Publicly listed	0.12	0	0.32	0	0
Total loans (million EUR)	43.6	6.34	363.5	1.93	20.7
Total loans (million EUR) – on balance sheet	32.0	4.32	330.5	0.62	14.9
Number of bank relationships	4.79	3	16.4	2	5
Bank as equity holder	0.029	0	0.17	0	0
Observations	4023				

Panel B: Firms with bank as equity holder

Variable	Mean	Median	Standard Deviation	25th Percentile	75th Percentile
Assets (million EUR)	9128.8	303.7	41375.0	41.3	1697.7
Leverage (%)	22	21	16	6.7	35
Tangibility of assets (%)	34	35	16	22	43
Publicly listed	0.50	0	0.50	0	1
Total loans (million EUR)	265.5	31.0	684.3	4.68	159.1
Total loans (million EUR) – on balance sheet	159.5	24.2	358.9	2.34	114.4
Number of bank relationships	12.8	7	16.9	2	14
Bank relationships with equity link	1.10	1	0.34	1	1
Bank relationships with equity link (%)	20	10	25	5.6	25
Observations	117				

Panel C: Banks

Variable	Mean	Median	Standard Deviation	25th Percentile	75th Percentile
Assets (billion EUR)	107.0	53.3	128.1	12.4	207.6
Equity (million EUR)	3336.8	1523.7	4443.2	550.4	4820.5
Total loans (billion EUR)	105.4	42.1	129.0	8.91	193.7
Total loans (billion EUR) – on balance sheet	66.2	35.5	71.5	8.10	110.7
Number of equity stakes	5.19	1.50	6.25	1	9
Value of equity stakes (million EUR)	2382.3	36.4	6393.1	5.52	386.8
Equity stakes / Equity (%)	22.8	3.75	45.6	0.76	18.3
Capital ratio (%)	11.8	11.2	2.00	10.4	13.2
Lending focus (%)	43.4	43.4	15.5	33.7	54.4
Number of loans	5986.3	3135	7110.5	1271	7187
Return on assets (%)	0.19	0.17	0.15	0.075	0.25
Return on equity (%)	5.44	4.75	3.65	3.39	7.60
Commercial sector bank	0.42	0	0.50	0	1
Public sector bank	0.42	0	0.50	0	1
Cooperative sector bank	0.15	0	0.37	0	0
Observations	26				

Panel D: Equity holdings

Variable	Mean	Median	Standard Deviation	25th Percentile	75th Percentile
Size of equity stake (%)	14.6	10.5	12.0	5.52	21.6
Size of equity stake (million EUR)	458.8	17.3	1549.2	3.31	97.6
Existence of a loan	0.66	1	0.48	0	1
Debt share of bank funding (in case of loan, %)	35.9	32.2	29.9	6.06	58.1
Bank share (in case of loan, %)	31.8	18.7	32.6	8.17	43.5
Bank gives more debt than equity	0.22	0	0.42	0	0
Equity divested by December 2005	0.86	1	0.35	1	1
Observations	135				

Panel E: Loans

Variable	Mean	Median	Standard Deviation	25th Percentile	75th Percentile
Loan Amount (million EUR)	12.2	3.10	48.6	1.03	8.95
Loan Amount on balance sheet (million EUR)	8.16	1.73	38.6	0.0051	5.47
On Balance Sheet (%)	64.2	94.4	43.5	0.69	100
Bank share (%)	28.0	16.0	30.6	5.42	38.3
Bank share (%) - on balance sheet	24.7	12.5	30.6	1.28	34.2
Observations	6953				

Table 2: Probability of a lending relationship before the event

This table displays cross-sectional regressions as of December 1999 examining whether the existence of an equity link affects the probability of a lending relationship between a bank and a company. The observational unit in this regression is a bank-firm pair. For each firm in our sample, we create a line for each of our 26 banks. In Panel A, the dependent variable is a dummy variable equal to one if the bank provides a loan to the firm in December 1999. In Panel B, the dependent variable is a dummy variable equal to one if the bank provides more credit to the company than any other bank in our sample. In regressions 1 and 2 we estimate a logit model. In regressions 3 and 4 we estimate a linear probability model, i.e. OLS. The explanatory variable of interest is a dummy variable equal to one if the bank holds an equity stake in the company. Same city dummy and same region dummy are dummy variables equal to one if the bank is located in the same city or in the same region (same first digit of the German postal code). Firm size is the log of total assets. Bank size is the log of bank equity. Other variables are defined as above. All standard errors are clustered at the firm level. ***, **, * indicate significance at the 10%, 5%, and 1% level.

Panel A: Lending Relationship

	Lending relationship			
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	2.220***	2.200***	0.422***	0.374***
	(6.45)	(6.60)	(11.50)	(10.02)
Same city dummy	0.832***	0.998***	0.087***	0.119***
	(7.16)	(8.18)	(7.68)	(10.23)
Same region dummy	1.018***	0.948***	0.078***	0.069***
	(19.40)	(17.15)	(20.02)	(17.57)
Firm size (log)	0.407***	0.418***		
	(28.59)	(28.61)		
Firm leverage	0.535***	0.555***		
	(4.38)	(4.41)		
Firm tangibility of assets	-0.486***	-0.497***		
	(-4.89)	(-4.85)		
Bank Return on Equity	7.294***		-0.167***	
	(11.23)		(-9.77)	
Bank size (log)	1.100***		0.044***	
	(64.13)		(65.38)	
Lending focus of bank	-0.408***		0.113***	
	(-3.64)		(23.22)	
Public sector bank	-0.943***		-0.107***	
	(-24.43)		(-49.00)	
Cooperative sector bank	-0.648***		-0.088***	
	(-9.35)		(-35.29)	
Observations	89674	89674	90168	90168
Adjusted R^2			0.19	0.25
Regression Method	Logit	Logit	OLS	OLS
Firm Fixed Effects	No	No	Yes	Yes
Bank Fixed Effects	No	Yes	No	Yes

Economic effect based on regression 1: 7.7% (no hold) 27.6% (hold) at means: 2.0% (no hold) 16.1% (hold)

Panel B: Hausbank

	Hausbank			
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	1.283***	1.305***	0.252***	0.233***
	(3.62)	(3.80)	(5.64)	(5.21)
Same city dummy	0.715***	0.876***	0.025***	0.037***
	(5.38)	(6.17)	(3.69)	(5.35)
Same region dummy	0.889***	0.825***	0.028***	0.025***
	(14.35)	(12.94)	(12.82)	(11.09)
Firm size (log)	0.036***	0.036***		
	(3.67)	(3.65)		
Firm leverage	-0.043	-0.035		
	(-0.44)	(-0.36)		
Firm tangibility of assets	0.002	0.009		
	(0.03)	(0.11)		
Bank Return on Equity	9.286***		-0.066***	
	(7.27)		(-5.86)	
Bank size (log)	1.137***		0.015***	
	(32.22)		(55.26)	
Lending focus of bank	-0.497**		0.043***	
	(-2.45)		(15.33)	
Public sector bank	-0.856***		-0.038***	
	(-12.85)		(-31.67)	
Cooperative sector bank	-0.449***		-0.029***	
	(-3.23)		(-20.66)	
Observations	89674	86225	90168	90168
Adjusted R^2			0.03	0.06
Regression Method	Logit	Logit	OLS	OLS
Firm Fixed Effects	No	No	Yes	Yes
Bank Fixed Effects	No	Yes	No	Yes

Economic effect based on regression 1: 2.3% (no hold) 6.8% (hold) at means: 0.5% (no hold) 1.9% (hold)

Table 3: Importance of a lending relationship in 1999

This table displays cross-sectional OLS regressions as of 31st December 1999 examining whether the existence of an equity link affects the size of the loan. The observational unit in this regression is a loan (i.e. a bank-firm pair in which the bank provides credit to the firm). In Panel A the dependent variables is log loan size. In Panel B the dependent variables is bank share (loan value divided by the total borrowing of the firm). In Panel C, the dependent variables is the borrower percentile (the percentile at which this borrower ranks by loan amount amongst the bank's borrowers). Other variables are defined as above. All standard errors are clustered at the firm level. ***, **, * indicate significance at the 10%, 5%, and 1% level.

Panel A: Loan size

	Log of loan size			
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	0.970***	0.981***	1.068***	1.042***
	(4.07)	(4.03)	(4.94)	(4.82)
Same city dummy	0.069	0.077	0.084	0.099
	(0.50)	(0.52)	(0.56)	(0.59)
Same region dummy	-0.015	-0.027	0.173*	0.172*
	(-0.20)	(-0.34)	(1.94)	(1.86)
Firm size (log)	0.307***	0.303***		
	(15.34)	(14.97)		
Firm leverage	0.836***	0.803***		
	(4.29)	(4.14)		
Firm tangibility of assets	0.568***	0.547***		
	(3.59)	(3.42)		
Bank Return on Equity	5.461***		5.854***	
	(4.39)		(4.28)	
Bank size (log)	0.045		0.226***	
	(1.55)		(6.65)	
Lending focus of bank	-0.161		-0.319	
	(-0.58)		(-1.06)	
Public Sector Bank	0.498***		0.314***	
	(7.20)		(3.90)	
Cooperative Sector Bank	0.661***		0.453***	
	(5.33)		(3.28)	
Observations	6927	6927	6953	6953
Adjusted R^2	0.13	0.14	0.37	0.38
Firm Fixed Effects	No	No	Yes	Yes
Bank Fixed Effects	No	Yes	No	Yes

Panel B: Bank Share

	Bank Share			
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	0.100***	0.091***	0.084***	0.083***
	(3.75)	(3.47)	(3.78)	(3.74)
Same city dummy	0.025	0.031*	-0.007	-0.004
	(1.55)	(1.87)	(-0.46)	(-0.24)
Same region dummy	0.032***	0.033***	0.017*	0.014
	(3.14)	(3.18)	(1.74)	(1.45)
Firm size (log)	-0.061***	-0.059***		
	(-26.30)	(-25.61)		
Firm leverage	-0.108***	-0.107***		
	(-4.40)	(-4.41)		
Firm tangibility of assets	0.102***	0.106***		
	(5.12)	(5.35)		
Bank Return on Equity	-0.212		0.363**	
	(-1.28)		(2.56)	
Bank size (log)	0.030***		0.017***	
	(8.34)		(5.95)	
Lending focus of bank	-0.017		0.009	
	(-0.50)		(0.30)	
Public Sector Bank	-0.011		0.032***	
	(-1.25)		(4.20)	
Cooperative Sector Bank	-0.012		0.048***	
	(-0.74)		(3.77)	
Observations	6927	6927	6953	6953
Adjusted R^2	0.17	0.18	0.60	0.61
Firm Fixed Effects	No	No	Yes	Yes
Bank Fixed Effects	No	Yes	No	Yes

Panel C: Borrower Percentile

	Borrower Percentile			
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	0.103***	0.094***	0.111***	0.097***
	(2.94)	(2.68)	(3.57)	(3.18)
Same city dummy	0.022	0.019	-0.002	0.002
	(1.18)	(0.96)	(-0.10)	(0.10)
Same region dummy	-0.003	-0.005	0.033**	0.029**
	(-0.30)	(-0.43)	(2.53)	(2.22)
Firm size (log)	0.047***	0.049***		
	(18.31)	(18.90)		
Firm leverage	0.125***	0.128***		
	(4.64)	(4.69)		
Firm tangibility of assets	0.070***	0.073***		
	(3.14)	(3.23)		
Bank Return on Equity	0.187		0.242	
	(1.06)		(1.26)	
Bank size (log)	0.009**		0.032***	
	(2.32)		(6.97)	
Lending focus of bank	0.033		0.039	
	(0.85)		(0.92)	
Public Sector Bank	-0.057***		-0.078***	
	(-5.66)		(-6.76)	
Cooperative Sector Bank	-0.038**		-0.054***	
	(-2.07)		(-2.62)	
Observations	6927	6927	6953	6953
Adjusted R^2	0.12	0.12	0.33	0.35
Firm Fixed Effects	No	No	Yes	Yes
Bank Fixed Effects	No	Yes	No	Yes

Table 4: Change in loan amount after the tax reform

This table displays cross-sectional OLS regressions examining how the loan size changes after the tax reform. All quarterly loan data is collapsed to a pre- and post-tax reform period. The pre event period contains the average over the quarters in 1998 and 1999, while the post-event period contains the average over all quarters from 2000 to 2005. Bank and firms specific control variables are included as of December 1999. The observational unit in this regression is a loan (i.e. a bank-firm pair in which the bank provides credit to the firm). In Panel A the dependent variables is the difference in log loan size. In Panel B the dependent variable is the difference in bank share. In Panel C the dependent variable is the borrower percentile. Log of loan size (before event) is the average loan size in the period before the event (1998-1999). The same logic applies to the other variables labeled with "before event". Other variables are defined as above. All standard errors are clustered at the firm level. ***, **, * indicate significance at the 10%, 5%, and 1% level.

Panel A: Loan size

	Difference in log of loan size			
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	0.746***	0.768***	0.517***	0.539***
	(4.25)	(4.36)	(2.76)	(2.85)
Log of loan size (before event)	-0.349***	-0.342***	-0.459***	-0.454***
	(-18.66)	(-18.15)	(-20.06)	(-19.42)
Same city dummy	0.033	0.003	-0.045	-0.021
	(0.32)	(0.02)	(-0.34)	(-0.16)
Same region dummy	0.066	0.039	0.245***	0.248***
	(1.15)	(0.68)	(3.34)	(3.46)
Firm size (log)	0.157***	0.165***		
	(8.79)	(9.23)		
Firm leverage	0.142	0.124		
	(0.89)	(0.78)		
Firm tangibility of assets	0.462***	0.428***		
	(3.50)	(3.23)		
Bank Return on Equity	7.639***		7.585***	
	(7.47)		(6.91)	
Bank size (log)	0.040*		0.155***	
	(1.77)		(6.14)	
Lending focus of bank	0.119		-0.138	
	(0.50)		(-0.54)	
Public Sector Bank	0.364***		0.232***	
	(5.85)		(3.48)	
Cooperative Sector Bank	0.433***		0.229*	
	(4.07)		(1.95)	
Observations	7808	7808	7843	7843
Adjusted R^2	0.15	0.17	0.31	0.34
Firm Fixed Effects	No	No	Yes	Yes
Bank Fixed Effects	No	Yes	No	Yes

Panel B: Bank Share

	Difference in Bank Share			
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	0.048***	0.048***	0.053***	0.055***
	(2.64)	(2.70)	(2.72)	(2.90)
Bank share (before event)	-0.330***	-0.331***	-0.372***	-0.371***
	(-26.83)	(-26.72)	(-18.89)	(-18.72)
Same city dummy	0.007	0.013	-0.016	-0.014
	(0.84)	(1.56)	(-1.47)	(-1.33)
Same region dummy	0.024***	0.024***	0.036***	0.036***
	(4.57)	(4.45)	(4.93)	(4.91)
Firm size (log)	-0.009***	-0.008***		
	(-9.67)	(-8.84)		
Firm leverage	0.005	0.005		
	(0.52)	(0.46)		
Firm tangibility of assets	0.004	0.003		
	(0.49)	(0.31)		
Bank Return on Equity	0.528***		0.468***	
	(5.31)		(4.68)	
Bank size (log)	0.012***		0.009***	
	(6.31)		(4.77)	
Lending focus of bank	0.029		0.014	
	(1.44)		(0.66)	
Public Sector Bank	0.015***		0.006	
	(3.01)		(1.19)	
Cooperative Sector Bank	0.018**		0.016**	
	(2.45)		(2.02)	
Observations	8970	8970	9013	9013
Adjusted R^2	0.18	0.20	0.33	0.35
Firm Fixed Effects	No	No	Yes	Yes
Bank Fixed Effects	No	Yes	No	Yes

Panel C: Borrower Percentile

	Difference in Borrower Percentile			
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	0.107***	0.104***	0.072***	0.066**
	(4.62)	(4.66)	(2.69)	(2.52)
Borrower percentile (before event)	-0.277***	-0.280***	-0.348***	-0.360***
	(-24.35)	(-24.66)	(-22.71)	(-23.60)
Same city dummy	-0.003	0.001	-0.008	0.001
	(-0.22)	(0.05)	(-0.48)	(0.05)
Same region dummy	0.030***	0.023***	0.050***	0.046***
	(4.08)	(3.13)	(5.53)	(5.19)
Firm size (log)	0.013***	0.015***		
	(5.45)	(6.15)		
Firm leverage	0.028	0.027		
	(1.26)	(1.19)		
Firm tangibility of assets	0.058***	0.055***		
	(3.13)	(3.00)		
Bank Return on Equity	0.762***		0.834***	
	(5.27)		(5.62)	
Bank size (log)	0.026***		0.035***	
	(7.01)		(9.00)	
Lending focus of bank	0.102***		0.073**	
	(3.40)		(2.26)	
Public Sector Bank	0.001		-0.015*	
	(0.14)		(-1.68)	
Cooperative Sector Bank	0.065***		0.033**	
	(4.56)		(2.14)	
Observations	8970	8970	9013	9013
Adjusted R^2	0.10	0.11	0.29	0.30
Firm Fixed Effects	No	No	Yes	Yes
Bank Fixed Effects	No	Yes	No	Yes

Table 5: Probability of entering a lending relationship after the tax reform

This table examines how the probability that a new lending relationship is entered is affected by an equity link in 1999. The observational unit in this regression is a bank-firm pair. For each firm in our sample, we create a line for each of our 26 banks from which the firm did NOT receive a loan before the event. The dependent variable is a dummy variable equal to one if the firm receives a loan by 2005. Other variables are defined as above. In regressions 1 and 2 we estimate a logit model. In regressions 3 and 4 we estimate a linear probability model, i.e. OLS. All standard errors are clustered at the firm level. ***, **, * indicate significance at the 10%, 5%, and 1% level.

	Entry of lending relationship			
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	1.337**	1.399**	0.228***	0.217***
	(1.96)	(2.00)	(2.94)	(2.89)
Same city dummy	-0.127	0.074	-0.006	0.004
	(-0.65)	(0.35)	(-0.79)	(0.53)
Same region dummy	0.901***	0.843***	0.027***	0.025***
	(10.70)	(9.75)	(9.12)	(8.61)
Firm size (log)	0.386***	0.396***		
	(19.36)	(18.93)		
Firm leverage	-0.442**	-0.447**		
	(-2.26)	(-2.25)		
Firm tangibility of assets	-0.043	-0.075		
	(-0.28)	(-0.48)		
Bank size (log)	15.654***		0.087***	
	(11.90)		(7.00)	
Lending focus of bank	1.223***		0.017***	
	(33.31)		(32.42)	
Public Sector Bank	2.105***		0.075***	
	(9.23)		(19.00)	
Cooperative Sector Bank	-0.046		-0.028***	
	(-0.67)		(-18.01)	
Observations	66751	50395	67094	67094
Adjusted R^2			0.07	0.10
Regression Method	Logit	Logit	OLS	OLS
Firm Fixed Effects	No	No	Yes	Yes
Bank Fixed Effects	No	Yes	No	Yes

Probability change based on regression 1: 2.4% to 7.2% 0.5% to 2.1% (at means)

Table 6: Effect on correlated borrowers

This table displays cross-sectional OLS regressions examining how the loan size changes after the tax reform. All quarterly loan data is collapsed to a pre- and post-tax reform period. The pre-event period contains the average over the quarters in 1998 and 1999, while the post-event period contains the average over all quarters from 2000 to 2005. Bank and firms specific control variables are included as of December 1999. The observational unit in this regression is a loan (i.e. a bank-firm pair in which the bank provides credit to the firm). The explanatory variable of interest is Correlated firm dummy, which is equal to 1 if the firm is amongst the 10 firms most correlated with a firm in which the bank holds an equity stake. The correlations are computed during the 3 years before the event (1997-1999). Bank-firm pairs with an equity link are excluded from this regression. Log of loan size (before event) is the average loan size in the period before the event (1998-1999). The same logic applies to the other variables labeled with "before event". Other variables are defined as above. All standard errors are clustered at the firm level. ***, **, * indicate significance at the 10%, 5%, and 1% level.

	Difference log of loan size		Difference bank share		Difference borrower percentile	
	(1)	(2)	(3)	(4)	(5)	(6)
Correlated firm dummy	0.420**	0.391**	0.016*	0.020**	0.051**	0.033*
	(2.53)	(2.45)	(1.66)	(1.96)	(2.45)	(1.72)
Log of loan size (before event)	-0.350***	-0.452***				
	(-18.51)	(-19.04)				
Bank share (before event)			-0.331***	-0.370***		
			(-26.79)	(-18.51)		
Borrower percentile (before event)					-0.276***	-0.357***
					(-24.15)	(-23.27)
Same city dummy	0.076	0.050	0.009	-0.011	-0.000	0.003
	(0.74)	(0.37)	(1.05)	(-1.06)	(-0.01)	(0.18)
Same region dummy	0.063	0.231***	0.025***	0.035***	0.031***	0.047***
	(1.10)	(3.16)	(4.58)	(4.79)	(4.14)	(5.15)
Firm size (log)	0.147***		-0.009***		0.012***	
	(8.18)		(-9.54)		(5.07)	
Firm leverage	0.164		0.008		0.030	
	(1.03)		(0.75)		(1.34)	
Firm tangibility of assets	0.457***		0.003		0.057***	
	(3.47)		(0.37)		(3.06)	
Bank Return on Equity	7.638***		0.553***		0.781***	
	(7.43)		(5.56)		(5.43)	
Bank size (log)	0.031		0.012***		0.026***	
	(1.36)		(6.60)		(7.13)	
Lending focus of bank	0.139		0.026		0.102***	
	(0.58)		(1.30)		(3.42)	
Public sector bank	0.371***		0.015***		0.002	
	(5.93)		(3.04)		(0.21)	
Cooperative sector bank	0.432***		0.020***		0.064***	
	(4.04)		(2.65)		(4.49)	
Observations	7725	7744	8886	8912	8886	8912
Adjusted R^2	0.15	0.34	0.18	0.35	0.10	0.31
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

Table 7: Change in total borrowing after the tax reform

This table displays results examining the change of total firm borrowing by firms with equity links. We make use of propensity score matching. To estimate the propensity score, we compute unreported probit regressions of having a bank as an equity holder in 1999. The independent variables of this probit regression are log (assets), leverage, tangibility of assets and 12 Fama French industry dummies. We display the difference between firms with a bank as an equity holder and matched other firms. In regression 1 and 2 we compare each firm with an equity link to the average of the 3 (or 10) nearest neighbours in terms of propensity score. In regression 3 and 4, we compare the linked firms to a weighted average, where the weights are given by a tricube kernel with bandwidths of 0.01 and 0.05. This kernel gives more weight to firms with a more similar propensity score. In regressions 5 and 6, we compare the linked firms to an average of all firms within a propensity score radius with calipers of 0.01 and 0.05 respectively. In Panel A, the dependent variable is the difference of the logarithm of total borrowing. In Panel B the dependent variable is the difference in total borrowing divided by total assets in 1999. We compute standard errors using bootstrap with 200 repetitions. ***, **, * indicate significance at the 10%, 5%, and 1% level.

Panel A: Log of total borrowing

	Difference in log of total borrowing					
	3 Nearest Neighbor	10 Nearest Neighbor	Kernel 0.01 bandwidth	Kernel 0.05 bandwidth	Radius 0.01 Caliper	Radius 0.05 Caliper
	(1)	(2)	(3)	(4)	(5)	(6)
Bank as equity holder 1999 dummy	0.150	0.141	0.093	0.067	0.080	0.070
	(0.67)	(0.85)	(0.66)	(0.51)	(0.61)	(0.50)
Observations	3680	3680	3680	3680	3680	3680

Panel B: Borrowing by assets

	Difference in total borrowing / assets					
	3 Nearest Neighbor	10 Nearest Neighbor	Kernel 0.01 bandwidth	Kernel 0.05 bandwidth	Radius 0.01 Caliper	Radius 0.05 Caliper
	(1)	(2)	(3)	(4)	(5)	(6)
Bank as equity holder 1999 dummy	0.033	0.031	0.025	0.021	0.024	0.021
	(1.26)	(1.40)	(1.27)	(1.11)	(1.30)	(1.06)
Observations	3781	3781	3781	3781	3781	3781

Table 8: Robustness checks for Table 4

This table contains robustness checks to the regressions presented in Table 4. These are cross-sectional OLS regressions, where the unit of observation is a loan. In Panel A, we use only on balance sheet loans to construct our variables. In Panel B to F we run regressions as in Table 4 for different subsamples. In every regression we employ firm and bank fixed effects and control for same city as well as same region dummy. In regressions 1, 3 and 5, we use firm, bank and firm*bank controls. In regressions 2, 4, and 6 we use bank and firm fixed effects and firm*bank controls. Firm controls include size, leverage and tangibility of assets. Bank controls include ROE, size, lending focus and sector dummies. Firm*bank controls include same city and same region dummies and the respective dependent variable before the event. In Panel B, we include only firms in which a bank holds equity in the regression. In Panel C, include only public companies. In panel D, we include only large banks (no savings banks or Cooperative Sector Banks). In panel E, we exclude insurance companies. In panel F, we exclude firm*bank pairs in which the bank did not divest the equity. In Panel G we use an alternative post event window from 2002 to 2005 instead of 2000 to 2005. All standard errors are clustered at the firm level. ***, **, * indicate significance at the 10%, 5%, and 1% level.

Panel A: Only on balance sheet loans

	Difference log of loan size – on balance sheet		Difference bank share– on balance sheet		Difference borrower perc. – on balance sheet	
	(1)	(2)	(3)	(4)	(5)	(6)
Equity link 1999 dummy	0.659***	0.690***	0.044**	0.047***	0.108***	0.077***
	(2.64)	(3.48)	(2.34)	(2.63)	(3.68)	(2.69)
Log of loan size – on balance sheet (before event)	-0.373***	-0.488***				
	(-18.20)	(-19.33)				
Bank share – on balance sheet (before event)			-0.400***	-0.397***		
			(-28.98)	(-18.92)		
Borrower percentile – on balance sheet (before event)					-0.275***	-0.367***
					(-21.50)	(-21.39)
Same city dummy	0.123	0.084	0.017*	-0.001	0.005	0.018
	(1.00)	(0.48)	(1.79)	(-0.06)	(0.30)	(0.92)
Same region dummy	-0.052	0.100	0.011*	0.026***	0.022**	0.037***
	(-0.68)	(1.02)	(1.75)	(3.37)	(2.57)	(3.43)
Firm size (log)	0.098***		-0.014***		0.005*	
	(4.62)		(-12.93)		(1.91)	
Firm leverage	0.509**		0.019		0.079***	
	(2.50)		(1.45)		(3.07)	
Firm tangibility of assets	0.519***		0.002		0.051**	
	(3.43)		(0.22)		(2.54)	
Bank Return on Equity	10.212***		0.538***		0.753***	
	(8.32)		(4.67)		(4.81)	
Bank size (log)	0.028		0.008***		0.019***	
	(0.98)		(3.87)		(4.90)	
Lending focus of bank	-0.388		0.005		0.062*	
	(-1.31)		(0.20)		(1.84)	
Public sector bank	0.428***		0.033***		0.013	
	(5.67)		(5.65)		(1.35)	
Cooperative sector bank	0.437***		0.026***		0.061***	
	(3.35)		(2.93)		(3.82)	
Observations	6543	6573	7806	7844	7864	7902
Adjusted R^2	0.16	0.40	0.23	0.45	0.09	0.33
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

Panel B: Firms with bank as equity holder

	Difference Log of loan size		Difference bank share		Difference borrower percentile	
	(1)	(2)	(3)	(4)	(5)	(6)
Equity link 1999 dummy	0.414**	0.543***	0.057***	0.068***	0.065**	0.089***
	(2.31)	(2.85)	(3.01)	(3.24)	(2.16)	(3.12)
Observations	528	563	582	625	582	625
Adjusted R^2	0.30	0.43	0.14	0.21	0.19	0.39
Bank*Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

Panel C: Public firms

	Difference Log of loan size		Difference bank share		Difference borrower percentile	
	(1)	(2)	(3)	(4)	(5)	(6)
Equity link 1999 dummy	0.695***	0.449**	0.042***	0.041**	0.071***	0.026
	(3.54)	(2.24)	(2.66)	(2.51)	(2.61)	(0.91)
Observations	1792	1792	2029	2029	2029	2029
Adjusted R^2	0.25	0.43	0.24	0.36	0.16	0.39
Bank*Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

Panel D: Large Banks

	Difference Log of loan size		Difference bank share		Difference borrower percentile	
	(1)	(2)	(3)	(4)	(5)	(6)
Equity link 1999 dummy	0.828***	0.555***	0.041**	0.050***	0.112***	0.059**
	(5.00)	(2.95)	(2.45)	(2.85)	(5.03)	(2.29)
Observations	7736	7770	8877	8919	8877	8919
Adjusted R^2	0.15	0.34	0.18	0.35	0.10	0.31
Bank*Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

Panel E: Excluding Insurance Companies

	Difference Log of loan size		Difference bank share		Difference borrower percentile	
	(1)	(2)	(3)	(4)	(5)	(6)
Equity link 1999 dummy	0.752***	0.514***	0.048**	0.055***	0.112***	0.071***
	(4.63)	(3.29)	(2.47)	(2.62)	(4.77)	(3.09)
Observations	7754	7770	8905	8926	8905	8926
Adjusted R^2	0.15	0.34	0.18	0.35	0.10	0.31
Bank*Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

Panel F: Divested equity stakes

	Difference Log of loan size		Difference bank share		Difference borrower percentile	
	(1)	(2)	(3)	(4)	(5)	(6)
Equity link 1999 dummy	0.789***	0.551***	0.041**	0.052***	0.111***	0.064**
	(4.51)	(2.77)	(2.09)	(2.59)	(4.93)	(2.28)
Observations	7798	7828	8960	8998	8960	8998
Adjusted R^2	0.15	0.34	0.18	0.35	0.10	0.30
Bank*Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

Panel G: Alternative Event Window

	Difference Log of loan size – Alternative Event		Difference bank share – Alternative Event		Difference borrower percentile – Alternative Event	
	(1)	(2)	(3)	(4)	(5)	(6)
Equity link 1999 dummy	0.999***	0.873***	0.058***	0.066***	0.150***	0.087***
	(6.38)	(4.62)	(2.71)	(2.85)	(5.04)	(2.73)
Observations	6469	6498	8471	8509	8471	8509
Adjusted R^2	0.19	0.37	0.20	0.36	0.13	0.35
Bank*Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

Table 9: Robustness checks for Table 2

This table contains robustness checks to the regressions presented in Table 2. The observational unit in this regression is a bank-firm pair. For each firm in our sample, we create a line for each of our 26 banks. The dependent variables are lending relationship, which is equal to 1 if the bank extends a loan to the company and Hausbank, which is equal to 1 if the bank lends more to the company than any other bank. As in Table 2, these are cross-sectional regressions in December 1999. In Panel A, we use only on balance sheet loans to construct our variables. In Panel B to E we use the same regression set-up as in Table 2 for different subsamples. In regressions 1 and 3, we use logit regressions with firm, bank and firm*bank controls. In regressions 2 and 4 we use a linear probability model (OLS) with bank and firm fixed effects and firm*bank controls. Firm controls include size, leverage and tangibility of assets. Bank controls include ROE, size, lending focus and sector dummies. Firm*bank controls include same city and same region dummies. In Panel B, we include only firms in which a bank holds equity. In Panel C, we include only publicly traded companies. In panel D, we include only large banks (no savings banks or small cooperative banks). In panel E, we exclude insurance companies. All standard errors are clustered at the firm level. ***, **, * indicate significance at the 10%, 5%, and 1% level.

Panel A: Only on balance sheet loans

	Lending relationship - on balance sheet		Hausbank – on balance sheet	
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	2.011***	0.371***	1.395***	0.213***
	(5.97)	(8.99)	(4.04)	(4.87)
Same city dummy	0.748***	0.095***	0.752***	0.036***
	(6.06)	(8.47)	(5.52)	(5.21)
Same region dummy	0.942***	0.057***	0.867***	0.023***
	(16.94)	(15.34)	(13.31)	(10.36)
Firm size (log)	0.315***		-0.001	
	(22.07)		(-0.05)	
Firm leverage	1.026***		-0.101	
	(7.96)		(-0.99)	
Firm tangibility of assets	-0.113		0.123	
	(-1.06)		(1.47)	
Bank Return on Equity	7.359***		9.743***	
	(10.76)		(7.54)	
Bank size (log)	1.009***		1.134***	
	(57.07)		(31.71)	
Lending focus of bank	-0.202		-0.544***	
	(-1.64)		(-2.62)	
Public sector bank	-0.683***		-0.798***	
	(-16.08)		(-11.86)	
Cooperative sector bank	-0.353***		-0.326**	
	(-4.79)		(-2.36)	
Observations	89674	90168	89674	90168
Adjusted R^2		0.19		0.06
Regression Method	Logit	OLS	Logit	OLS
Firm Fixed Effects	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes

Panel B: Firms with bank as equity holder

	Lending relationship		Hausbank	
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	1.963***	0.337***	1.827***	0.252***
	(6.08)	(8.24)	(4.52)	(5.28)
Observations	2392	2886	2392	2886
Adjusted R^2		0.39		0.14
Regression Method	Logit	OLS	Logit	OLS
Bank*Firm Controls	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes

Panel C: Public firms

	Lending relationship		Hausbank	
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	2.082***	0.305***	1.202***	0.165***
	(5.82)	(7.11)	(3.13)	(2.79)
Observations	10998	10998	10998	10998
Adjusted R^2		0.34		0.06
Regression Method	Logit	OLS	Logit	OLS
Bank*Firm Controls	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes

Panel D: Large Banks

	Lending relationship		Hausbank	
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	2.091***	0.352***	1.231***	0.232***
	(6.26)	(9.11)	(3.50)	(5.10)
Observations	75878	76296	75878	76296
Adjusted R^2		0.20		0.08
Regression Method	Logit	OLS	Logit	OLS
Bank*Firm Controls	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes

Panel E: Excluding Insurance Companies

	Lending relationship		Hausbank	
	(1)	(2)	(3)	(4)
Equity link 1999 dummy	2.276***	0.355***	1.473***	0.228***
	(6.58)	(8.96)	(4.22)	(4.93)
Observations	89362	89674	89362	89674
Adjusted R^2		0.25		0.06
Regression Method	Logit	OLS	Logit	OLS
Bank*Firm Controls	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes

Table 10: Robustness checks for Table 3

This table contains robustness checks to the regressions presented in Table 3. The observational unit in this regression is a loan. The dependent variables are log of loan size, bank share and borrower percentile. As in Table 3, these are cross-sectional regressions in December 1999. In Panel A, we use only on balance sheet loans to construct our variables. In Panel B to E we use the same regression set-up as in Table 3 for different subsamples. In regressions 1, 3 and 5, we use firm, bank and firm*bank controls. In regressions 2, 4, and 6 we use bank and firm fixed effects and firm*bank controls. Firm controls include size, leverage and tangibility of assets. Bank controls include ROE, size, lending focus and sector dummies. Firm*bank controls include same city and same region dummies. In Panel B, we include only firms in which a bank holds equity. In Panel C, we include only publicly traded companies. In panel D, we include only large banks (no savings banks or small cooperative banks). In panel E, we exclude insurance companies. All standard errors are clustered at the firm level. ***, **, * indicate significance at the 10%, 5%, and 1% level.

Panel A: Only on balance sheet loans

	Log of loan size – on balance sheet		Bank share– on balance sheet		Borrower percentile – on balance sheet	
	(1)	(2)	(3)	(4)	(5)	(6)
Equity link 1999 dummy	0.588**	0.567	0.104***	0.056**	0.083**	0.076*
	(2.04)	(1.64)	(3.43)	(2.07)	(1.96)	(1.71)
Same city dummy	-0.087	0.049	0.031	0.018	0.010	0.006
	(-0.56)	(0.23)	(1.61)	(0.91)	(0.46)	(0.24)
Same region dummy	0.027	-0.021	0.026**	0.008	0.002	0.008
	(0.32)	(-0.19)	(2.22)	(0.66)	(0.16)	(0.55)
Firm size (log)	0.217***		-0.061***		0.045***	
	(7.91)		(-24.59)		(13.61)	
Firm leverage	1.478***		-0.155***		0.207***	
	(6.35)		(-5.44)		(6.70)	
Firm tangibility of assets	0.963***		0.064***		0.108***	
	(5.48)		(2.83)		(4.39)	
Bank Return on Equity	6.489***		-0.293		0.209	
	(4.60)		(-1.51)		(1.06)	
Bank size (log)	0.088**		0.030***		0.003	
	(2.50)		(6.82)		(0.57)	
Lending focus of bank	0.032		0.006		0.039	
	(0.09)		(0.14)		(0.88)	
Public sector bank	0.634***		0.009		-0.058***	
	(7.05)		(0.84)		(-4.98)	
Cooperative sector bank	0.762***		0.011		-0.031	
	(4.52)		(0.60)		(-1.52)	
Observations	5322	5346	5322	5346	5322	5346
Adjusted R^2	0.11	0.36	0.17	0.63	0.12	0.38
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

Panel B: Firms with bank as equity holder

	Log of loan size		Bank share		Borrower percentile	
	(1)	(2)	(3)	(4)	(5)	(6)
Equity link 1999 dummy	0.662***	0.865***	0.124***	0.085***	0.067**	0.095***
	(2.75)	(4.15)	(4.15)	(3.79)	(2.00)	(3.18)
Observations	466	492	466	492	466	492
Adjusted R^2	0.12	0.32	0.29	0.72	0.08	0.23
Bank*Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

Panel C: Public firms

	Log of loan size		Bank share		Borrower percentile	
	(1)	(2)	(3)	(4)	(5)	(6)
Equity link 1999 dummy	0.982***	0.926***	0.048*	0.054***	0.104***	0.072**
	(3.51)	(3.64)	(1.93)	(2.78)	(2.73)	(2.06)
Observations	1553	1553	1553	1553	1553	1553
Adjusted R^2	0.13	0.31	0.20	0.59	0.09	0.27
Bank*Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

Panel D: Large Banks

	Log of loan size		Bank share		Borrower percentile	
	(1)	(2)	(3)	(4)	(5)	(6)
Equity link 1999 dummy	1.013***	1.051***	0.093***	0.086***	0.111***	0.103***
	(4.20)	(4.88)	(3.67)	(3.95)	(3.15)	(3.38)
Observations	6860	6885	6860	6885	6860	6885
Adjusted R^2	0.14	0.38	0.17	0.61	0.12	0.35
Bank*Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

Panel E: Excluding Insurance Companies

	Log of loan size		Bank share		Borrower percentile	
	(1)	(2)	(3)	(4)	(5)	(6)
Equity link 1999 dummy	1.009***	0.944***	0.095***	0.082***	0.126***	0.100***
	(4.75)	(4.66)	(3.41)	(3.74)	(3.99)	(3.28)
Observations	6894	6907	6894	6907	6894	6907
Adjusted R^2	0.14	0.38	0.18	0.60	0.13	0.35
Bank*Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Firm Controls	Yes	No	Yes	No	Yes	No
Firm Fixed Effects	No	Yes	No	Yes	No	Yes
Bank Fixed Effects	No	Yes	No	Yes	No	Yes

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