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Nowhere Else to Go: The Determinants of Bank-Firm Relationship
Discontinuations after Bank Mergers

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Nowhere else to go:
The determinants of bank-firm relationship discontinuations after
bank mergers¹

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Abstract

The decision to change or terminate a bank-firm relationship has been demonstrated to be crucial to firm performance following bank mergers. We investigate what determines this decision and find both bank competition and the available firm collateral to be important factors. We additionally provide new evidence that firms that are able to *add* a bank relationship following a merger exhibit much stronger post-merger performance. Our findings are consistent with the interpretation that bank mergers cause a reduction in lending to most firms, leading them to search for alternative sources of finance.

JEL classification: G21, G34

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1. Introduction

Bank mergers constitute a significant event in the bank-firm relationship. As such, many studies have demonstrated that a bank merger can have negative effects on firms' access to credit [4] and as result, on their real outcomes in terms of investment, returns and productivity [8, 9, 11]. These effects are especially relevant where consolidation is significantly increasing and where non-financial firms are particularly dependent on bank lending. Europe appears to be an interesting case of study given the recent consolidation trends in most banking sectors, the expectations on new merger waves and the reliance of many small and medium enterprises on bank financing.⁴

Our paper considers the impact of mergers on credit availability for small- and medium-sized firms, by exploring firms' reactions to mergers by staying with, dropping, or switching to other banks. While previous studies have looked at the effects on firms' outcomes dependent on whether bank-firm relationships (dis-)continue after a bank merger [9, 8], we expand on this literature in two major respects: first, in line with Gopalan et al. [12], we demonstrate that forming additional post-merger bank relationships is extremely helpful for firms. Second, we investigate the determinants of post-merger bank-firm relationship changes. We provide evidence that bank mergers are more harmful for firms in regions where fewer alternatives exist and in cases where firms are more collateral constrained. Overall our findings point to the idea that bank-firm relationship changes following bank mergers may not be driven by banks cutting less profitable firms, but rather by profitable

⁴The Report on Bank Structures of the ECB shows that the number of credit institutions in the Eurozone declined from 8570 in 2008 to 6648 in 2016. Bank managers also seem to be very aware of this consolidation trend. A top official of a large European bank illustrated these concerns as follows: "Europe needs more pan-European banks. JPMorgan is the biggest bank in the US with a market capitalization of almost 380 billion dollars, but the biggest European bank is Santander, with a market cap of 80 billion Euros (...) and banks are the only viable way to finance the continent's large population of small- and mid-sized businesses" (Financial Times: <https://www.ft.com/content/a4ca22b8-6188-11e8-90c2-9563a0613e56>).

firms looking to replace post-merger lending reductions from their merged banks [4].

Specifically, we first show that firms generally experience a reduction in credit of 13% following any of their banks being the target of a bank merger. We then find that firms that manage to add an additional bank relationship following the merger receive 40% more credit and perform significantly better in terms of capital inputs and employment, whereas firms with dropped relationships perform significantly worse [8]. We then show that relationships are more likely to be dropped by about 1 percentage point (from a baseline of about 3%) if bank market concentration is high following a bank merger. Additionally, an increase in one standard deviation of available collateral will reduce the likelihood of a relationship drop by 1 percentage point.

In order to attain our findings we use a bank-firm level dataset from Germany, which comprises almost 500,000 firms and their banks. We merge this data with information on 526 German bank mergers from 2005 to 2014. We then first estimate the effects of a bank merger on firms' real outcomes using a difference-in-difference type approach. Additionally, we derive dummies on bank-firm relationship (dis-)continuations from the dataset and then estimate logit regressions to derive the impact of the competitive environment and the firms' collateral on the probability of staying with, switching, dropping or adding a bank relationship following a merger.

A large body of literature is concerned with the consequences of bank mergers, especially for lending to firms [4, 16, 20].⁵ The seminal paper by Boot and Thakor [7] directly relates changes in relationship lending following mergers to changes in market structure. Their

⁵The literature on the effect of bank mergers on bank lending is vast. [2] provides a nice overview of the early literature. Importantly, Erel [10] demonstrates for the US that bank mergers can increase or decrease interest rates depending on banks' market power after the merger. More recently, Nguyen [15] has explored the impact of branch closings after a merger on lending relationships.

theoretical approach suggests there is more transaction lending at lower levels of bank competition than at higher levels. They also indicate that bank competition increases relationship lending, which is in line with our finding that bank competition may enable previous relationship banking clients to find other alternatives. On the empirical side, Berger and Udell [5] survey a number of studies on relationship lending and find that there is mixed evidence on the reasons behind credit rationing following bank mergers, with small firms usually more negatively affected.⁶ Sapienza [19] studies the impact of merger activity on the availability of loans, examining the impact of consolidation on the probability of dropping prior bank-firm relations, controlling for the quality of the borrowers. She suggests that mergers and other forms of consolidation affect borrowers in different ways. If the borrowing firms have many available lenders, they may never suffer from merger activity, even if the merger involving one of their banks is very large. This suggests that those firms that have multiple relationships have more flexibility in redefining (switching, dropping) their relationships with the merged banks.

More recently, this literature has not only considered the effects on lending but also on firm outcomes. Montoriol-Garriga [14] provides evidence on the costs and benefits of bank mergers for small businesses using a sample of Spanish firms. The results show that mergers are harmful to small businesses because lending relationships are more likely to be disrupted following a merger. This study also identifies that small borrowers of target banks have a higher probability of having a relationship with the consolidated bank terminated and they will also find it harder to start new lending relationships with consolidated banks. Overall, her results suggest that a higher termination rate for existing borrowers is not compensated for by a higher initiation rate of new lending relationships with small businesses after the

⁶Beck et al. [3] conduct an international empirical study showing significant real effects of changes in lending relationships over the business cycle. They show that mergers can significantly amplify these effects.

merger. However, continuing borrowers are shown to benefit from mergers in terms of reduced loan rates.⁷

Importantly, Di Patti and Gobbi [9] analyze the medium-term effect of bank M&As on both firm-level credit volumes and the sensitivity of investment to cash flow. They find that relationship termination has a larger adverse impact on credit volumes – specifically, a reduction in credit of around 100% of the amount issued under the interrupted relationship. They also show that the effects of the M&A shocks last three years. They suggest that termination of some bank-firm relationships after mergers is a major friction in credit markets. Expanding on their result, Degryse et al. [8] demonstrate that negative effects occur mostly if the relationship termination is not replaced, i.e. the bank-firm relationship is dropped rather than switched to a different bank. They also show that firms that experience a post-merger bank relationship drop perform significantly worse in terms of profitability. Notably, they demonstrate that these drops cannot be explained by the fact that the merged bank is better at screening borrowers and thus efficiently drops borrowers from their portfolio, but rather that firms that should have been dropped, but were not, performed worse than the firms that were actually dropped. This indicates that the understanding of *why* firm-bank relationships are terminated following bank mergers remains an unanswered question, on which we intend to shed light with our findings.

⁷Importantly, real effects do not only emerge when a consolidation wave takes place. A single megamerger may also have a significant macroeconomic impact. Fraisse et al. [11] study the effect of a merger between two large banks on credit market competition. They find that the megamerger has a negative effect on lending, in particular through termination of relationships. They find that, in the average market, bank credit decreases by 2.7 per cent. On the real side, firm exit increases by 4 per cent, whereas firms that do not exit and firms that start up experience no adverse real effect on investment and employment.

2. Data

For our analysis we use a matched bank-firm-level dataset for Germany, which attaches bank-level balance sheet data from Bankscope to firm-level data from Dafne and Amadeus. All three databases are provided by Bureau van Dijk and contain balance sheet data of banks and firms, respectively. Matching of firm data to bank data takes place via (historical vintages) of the Dafne database. The same or similar datasets have recently been used in several studies [17, 13, 18].⁸ While this dataset does not provide loan-level data, it identifies roughly 1.1 million firms (and 2000 banks) for Germany and the corresponding bank-firm relationships. Thus we are able to exploit detailed information on small- and medium-sized enterprises and their banks, which are usually not included in loan-level databases.⁹ We merge this firm-bank-level data to 526 bank mergers for German banks between 2005 and 2014, using official data provided to us by the German Bundesbank.

From this merged dataset we drop all financial firms, firms for which we do not find any valid postcode, all inactive firms, all firms for which we can not observe at least total assets and all firms for which we have only one available year. We also apply some logic tests, and drop firms that fail them.¹⁰ We also drop all firms whose banks were the target of a merger more than once during our observation period, in order to remove potential concerns for overlapping merger effects and to make the effects of mergers comparable across firms. We also drop all observations for which we do not have data on our control variables. However, because the data coverage varies significantly over the firm-level variables, we choose not to restrict the sample along the lines of the dependent variables, thus keeping the sample

⁸The firm-bank-level matched database relies on a string match between the bank name in the firm-level-data and the bank name in the bank-level data. As a result, the match is not perfect although manual corrections lead to a 99% match of bank-firm relationships.

⁹As for example in DEALSCAN data for the US.

¹⁰For example if $\text{Total Assets} = \text{Total Liabilities} + \text{Total Equity}$, or if $\text{Equity} / \text{Liabilities} > 0$. Only a few firms in the database fail these tests and are dropped because of them.

for each regression as large as possible.¹¹

TABLE 1 AROUND HERE

Descriptive statistics for the firms used in the analysis are displayed in Table 1. About 8% of our observations occur after a firms' bank has been the target of a merger. Our discontinuation variables demonstrate that a change in bank relationships is relatively rare; only in 6% of cases a switch or drop of a bank relationship is observed, whereas adding bank relationships occurs in about 10% of cases. The mean HHI – our measure of banking market concentration – is .56, although there is considerable variation in the data. The firm-level outcome and control variables clearly demonstrate that the firms in the sample are very small; the average sum of total bank loans amounts to just 540,000 Euros at an average interest rate of 3%. Firms have 60 employees on average (median of 12), and are highly profitable, with an average return on equity of 34% (median 19%).

3. Effects of bank mergers on firm outcomes

3.1. Overall effect on firm outcomes

First, we aim to compare firms whose banks have been the target of a bank merger to firms whose banks have not.¹² Because firms can have more than one bank relationship, we identify all firms, that experienced a merger of any connected bank, and compare them to firms that did not experience a bank merger during the sample period. To this end,

¹¹There is strong indication that this lack of reporting of variables is non-random. Smaller firms generally have more missing variables. As a result this choice is also made to restrict selection bias in the sample.

¹²This is because target mergers are significantly more important for firms. We also report all presented results for buying mergers (i.e. if the firms' banks have been the buying party of a merger) in the Online Appendix.

we create a dummy variable that is 0 before the merger and 1 after a merger has taken place. In order to capture all post-merger effects this dummy remains at 1 for the rest of the periods in the sample. Di Patti and Gobbi [9] and Degryse et al. [8] estimate similar firm-level regressions of bank mergers, although their dummy is set to one for only a few periods after the merger. We provide a number of robustness tests to ensure that our results are independent of how long the effects of the merger are taken into account.

As a result we formally estimate the following initial regression:

$$\ln Y_{jt} = \alpha_j + \alpha_r \times \alpha_t + \beta_1 \text{merger}_{jt} + \beta_2(\text{firmcontrols}) + \epsilon_{jt} \quad (1)$$

where Y_{jt} are the variables of interest for which we expect the bank merger to have significant effect: $\ln(\text{loans})$, interest rate, $\ln(\text{trade credit})$, $\ln(\text{tangible fixed assets})$, $\ln(\text{employees})$ and return on equity. We choose loans and the interest rate (proxied by total interest expense/loans) by firms in order to investigate whether the price and the volume of credit changes on the firm level after a merger. We then use trade credit to see if firms substitute a change in bank lending by adjusting their level of trade credit. We then investigate whether the merger also had any effect on firms' input factors: capital (tangible assets) and labor (employees), and finally whether it affected their return.

In addition to firm fixed effects we also control for region \times time fixed effects in order to ensure that regional (demand) trends are not driving the frequencies of bank mergers. These fixed effects also control for numerous other potential confounding variables, such as regional economic development and all other potential policy changes. Usage of these fixed effects implies that the regression is strictly within county. Thus we compare firms without

any bank being subject to a merger to firms in the same region and year whose banks have been subject to a merger. We focus on target mergers in the main regressions, but report all effects of buyer mergers in the Appendix. We further include a number of lagged firm control variables: cash, total assets, current liabilities (all in logs) and the firms' capital ratio. All firm control variables are lagged by one period.

TABLE 2 AROUND HERE

Our results demonstrate that target bank mergers have a significant effect on firms' real effects. However, contrary to Degryse et al. [8] and Di Patti and Gobbi [9], our results point to a larger overall economic impact. Column (1) and (2) of Table 2 indicate that firms whose banks were the target of a merger experienced a decrease in lending by roughly 13% and an increase in the interest rate by 7 basis points. There is some suggestion that firms substitute this decrease in funding by increasing trade credit financing, although the effect is not statistically significant (Column (3)). Interestingly, the decrease in bank funding does not lead to a decrease in capital inputs, as tangible fixed assets remain unchanged (Column(4)). However, labor inputs are negatively affected, as firms reduce employment by about 1.4% (Column (5)). Firms' returns appear to be unaffected by the merger.¹³

Overall these results are in line with the previous literature, although we show larger negative effects of bank mergers on credit and performance, independent of whether the firm-bank relationship is continued or discontinued, as in Di Patti and Gobbi [9], and also independent of whether the firm is dropped or not dropped, as in Degryse et al. [8]. We are the first to test whether firms substitute lost credit not only with lending from other

¹³For buying mergers (Table OA1), we find only positive effects on employment. However, the effect is economically small with an increase in employment of 0.9%. All other dependent variables appear to be unaffected by the merger.

banks [4] but in fact also substitute trade credit for the shortfall of bank lending. We are also the first to document the effect on firms' input factors.¹⁴ Curiously, we find that firms do not decrease assets, but rather *decrease* employment, despite the fact that lending is generally thought to affect capital inputs before employment. However, if firms believe the restricted access to credit is short-term only (which is supported by the findings in Di Patti and Gobbi [9]), it might be easier to reduce the more flexible labor input.

3.2. Real effects by post-merger relationship status

Next, we test whether the findings by Degryse et al. [8]— that firms are most negatively affected by a bank merger if they drop their bank relationship in the aftermath of the merger — hold for our sample. We do this by interacting our merger dummy with a categorical variable indicating the firm-bank relationship status after the merger. This categorical variable takes the value of 0 if the firm stays with the bank, 1 if the firm switches to another bank, 2 if it drops a bank relationship and 3 if the firm adds another bank to their portfolio. The variable is grouped over the merger dummy, such that a change in any period after/before the merger is set to this value, independent of when it occurs. For example, if a firm-bank relationship is dropped after the merger, this variable will take value 0 before the merger and 2 after the merger. It thus captures the post-/pre- merger bank-firm relationship changes (or continuations in the case of stays). Interacting this variable with our merger dummy thus indicates whether a merging firm that dropped its bank relationship will perform better or worse than a firm that experienced a bank merger but stayed with its bank.

TABLE 3 AROUND HERE

¹⁴Di Patti and Gobbi [9] only investigate credit and Degryse et al. [8] investigate only asset (growth), bankruptcy and profitability.

Table 3 indicates that additional negative effects of target bank mergers arise if the bank-firm relationship is dropped after a bank was a target of a merger and such negative effects are mitigated if the firm adds another bank to its portfolio. Column (1) shows that in addition to the negative baseline effect on lending of about 12%, firms that drop their relationship at some point after the merger experience a decrease in bank loans of an additional 54%, while firms that are able to add another bank increase their bank loans by roughly 43%. Dropping firms also reduce employment significantly more than firms that stay with their bank; the negative baseline effect of 1.0% decreases by a further 7.9% for dropping firms. Adding a bank relationship also compensates for the negative employment effect, as such firms increase employment by 5.3% over the baseline. Interestingly, dropping firms do not perform worse, instead they increase their return on equity by more than 8%. This is in line with findings by [8] that target dropper firms' profitability increases. Importantly, we show that firms that are able to add an additional bank to their portfolio perform much better along most outcomes. In addition to more bank loans, they also receive 41% more trade credit (Column(3)) and increase their tangible assets by roughly 9% (Column (4)), although their profitability remains unchanged.¹⁵

The regressions suggest two main interpretations. First, firms that drop their bank relationship after the merger perform significantly worse than firms that stay with or switch their bank. This finding is similar to those in Degryse et al. [8]. Our regressions additionally demonstrate a novel effect: adding an additional bank relationship after the merger has very strong positive effects for firms, both in terms of lending and input factors. This is a strong indication that firms may be systematically supplied fewer loans than they

¹⁵For banks that are the buying party in a merger (Table OA2), all firms exhibit a small decrease in bank loans of 6%. Adding an additional bank is highly effective in mitigating this negative effect, as it increases bank loans by roughly 45% (Column (1)). Furthermore, trade credit and input factors increase most for firms that add a bank (Columns (3-5)).

actually demand after a bank merger. Firms adding another bank are able to compensate by borrowing from an additional bank.¹⁶ Some lighter evidence to that effect is provided by the fact that firms may also substitute trade credit for the shortfall of bank lending, although while positive, these effects are not statistically significant. If it is in fact true that banks under-supply their firm clients after a bank merger, there is much reason to suspect that bank-firm relationship termination is perhaps not driven by the banks' decision to cut risky and unprofitable firms,¹⁷ but by the firms' decision to change lenders, because they demand more loans than they are able to get from their post-merger bank.

4. Why bank-firm relationships change after mergers

Figure 1 illustrates descriptively that bank-firm relationships change more frequently after bank mergers.¹⁸ We display the relative frequency of “stays”, “switches”, “drops” and “adds” on the y-axis, differentiated by firms that are affected by a bank merger (after the merger) and those firms that are not. The figure suggests that after a merger, firm-bank relationships are almost twice as likely to be dropped. There is thus strong indication that in addition to firm outcomes suffering in the event of a dropped relationship after a merger, this drop is also more likely. The goal of this section is to test whether this finding holds up to statistical tests, and why we find more drops after a merger.

Figure 1 AROUND HERE

¹⁶Note that these findings are in line with [9]: firms with fewer lenders also experience a higher reduction in credit, presumably because they lack alternatives for obtaining additional credit.

¹⁷Degryse et al. [8] show very nicely that dropped firms are actually *better* than non-dropped firms. This would be in line with the idea that profitable firms are looking for a new lender, because they are not served sufficient loans, but perhaps are unable to find one.

¹⁸Because we omitted firms with multiple changes these relative frequencies add up to 1.

4.1. Do firm-bank relationships change more frequently after mergers?

We next estimate if the decision to terminate the bank-firm relationship is influenced by mergers using separate logit regressions for each decision: staying and not staying, switching and not switching, dropping and not dropping, and adding and not adding. We chose to estimate four separate logit models instead of one multinomial logit model (which we estimate as robustness in section 4.3), because it allows us to investigate all four decisions independently instead of estimating each decisions against a reference category. However, in the robustness tests, we also provide results of a multinomial logit estimation, which are substantially similar. Again, because we estimate at the firm level, the decision refers to *any* firm-bank relationship. This method of identification allows us to investigate the decision to *add* a bank. We thus specify the following logit model:

$$\ln \left[\frac{p(\text{RelStatus}_{it} = 1)}{1 - p(\text{RelStatus}_{it} = 1)} \right] = \alpha_t + \beta_0 + \beta_1 \text{merger} + \beta_2(\text{firmcontrols}) + \epsilon_{jt} \quad (2)$$

where RelStatus_{it} refers to a staying, switching, dropping and adding dummy, which is set equal to 1 if before/after the merger a firm-bank relationship stayed, switched, dropped or was added, and 0 otherwise. As in equation 1, β_1 is our coefficient of interest and merger can be a dummy for any of the firms' banks being subject to either the target or the buyer in a bank merger. We include the same controls as in equation 1.¹⁹

¹⁹Note that high level fixed effects are impossible in logit models, because the models are less likely to converge and because the computational effort cannot be handled by the resources available to us. However we run OLS regressions using the full set of fixed effects as robustness and report them in Table OA3. The direction of coefficients remains the same, although the effect sizes are somewhat larger.

TABLE 4 AROUND HERE

Table 4 displays the results of the regression of the merger dummy on the decision to stay with, switch, drop or add a bank relationship for the firm. Displayed coefficients are marginal effects. The results indicate that the probability to switch decreases by about 0.9 percentage points due to a target merger, which is a sizable effect given that the base probability of non-merger firms is roughly 4% (Figure 1). Firms are also significantly more likely to drop their bank relationship by 3 percentage points. This indicates that after target mergers, firms either stay with their bank or have to drop the relationship completely.²⁰ Thus, there is significant evidence that firms drop their bank relationship after their bank has been the target of a merger, but this again does not appear to be explained by lower post-merger performance by firms, which is inconsistent with the idea that merged banks may drop inefficient clients. This puzzle was previously highlighted by [8] and we find the same effect for our set of German SMEs.

4.2. Why do firm-bank relationships change after mergers?

Given that relationship changes are unlikely to be induced by banks for efficiency reasons, in this section we consider the firms' perspective. Are there contributing factors to the decision to stay with, switch, drop or add a bank? We investigate this key question by interacting the merger dummy with two key aspects that play a role in the decision to stay with, switch, drop or add a bank relationship: competition and firm collateral. We measure competition by the bank-level Herfindahl Hirschman Index (HHI) in the *firms'* county and collateral by the log of firms' tangible fixed assets. Note that both factors are relevant for the firms' ability to change banks, allowing us to gather evidence for the idea

²⁰The results for buying mergers can be found in Table OA2.

that post-merger bank-firm relationship changes may be driven by firm decisions.

The marginal effect of the target merger on the decision to stay with, switch, drop or add at different levels of bank-competition is given in Figure 2, with the corresponding Table in the online appendix (without marginal effects, Table OA4).²¹ The figure shows that there is an increase in the probability of keeping the bank-firm relationship after a merger, but that effect does not vary much with the level of competition. Additionally, firms are slightly less likely to switch banks after a merger, especially if concentration in the banking market is high.

Crucially, firms are also much more likely to drop their relationship at higher levels of bank concentration. The probability of dropping the bank-firm relationship after the merger increases by about 3 percentage points for the most competitive markets and by about 4 percentage points for the least competitive ones, implying an increase of roughly 33%. This is a sizable, statistically significant effect. Also note that higher concentration does not lead to fewer added relationships, which indicates that firms in general do not have greater problems finding additional banks. Overall, the results appear to confirm that firms' decision to stay with, switch or drop depends strongly on the alternatives available to the firm. The more concentrated the banking market, the less likely firms are to switch banks and the more likely they are to drop their relationship. This is in line with the prior interpretation that firms may be underserved by their post-merger bank; if firms are in a more concentrated market and have fewer alternatives, they cannot switch to other banks and instead either stay with or drop their relationship.

Figure 2 AROUND HERE

²¹The margin-plot is also available for buying mergers in Figure OA1.

Figure 3 AROUND HERE

If firms experience a drop in loan supply following a bank merger that induces them to seek a switch of banks or financing more generally, those that can offer more collateral should have an easier time finding another bank and as a result experience fewer drops and more switches. We test this by interacting the merger dummy with firm collateral. Because we are limited to balance sheet data for firms, we use the log of tangible fixed assets as a proxy for the firms' assets that can be credibly pledged as collateral. We show the marginal effects of this interaction in Figure 3.²²

The results show that the decision to stay is negatively correlated with the level of available collateral. Having one standard deviation above the mean collateral (from 11 to 14.5) implies a slightly smaller probability of staying of 0.02 percentage points. Importantly, firms are less likely to switch after their bank has been subject to a target merger, and this probability increases significantly with the level of available collateral. While below-mean-collateral firms are at least 1 percentage point less likely to switch to a different bank, for above-mean collateral firms, this probability can decrease by up to half.

Most importantly, low-collateral firms are more likely to drop their relationship by 5 percentage points, high collateral firms are much less likely to drop their relationship after a firm's bank has been the target of a merger, reducing the overall probability of dropping after a merger to as low as 1.5 percentage points. In relative terms, this is a very large decrease and strongly implies that more collateral will enable the firm to avoid relationship drops after bank mergers. Interestingly, "adds" are also less frequent with increasing collateral, indicating that available collateral is specifically important for the ability to switch

²²The corresponding output of the logit regression without marginal effects can be found in Table OA5 and the plot for buying mergers can be found in Figure OA2.

from one bank to the other, rather than for obtaining post-merger funding in general.

4.3. Robustness

Because the merger events may not be the same over time, our pre- and post- merger periods may be systematically different across the time dimension. This may be problematic for the estimation of the standard errors. Similar concerns are also raised by the difference-in-difference style setup of our regression [6]. As a result, we test whether our results hold if we remove the time dimension from the estimation. In order to do so, we collapse the sample to pre- and post-merger periods, and re-estimate our regressions. The results for the marginal effects at different levels of HHI are displayed in Figure 4.²³ The results of these regressions are very similar to the results of the previous estimations for the target mergers. We proceed the same way with our interactions regarding firm collateral. The results are given in Table OA7 and Figure 5. All marginal effects graphs look almost identical in the collapsed and non-collapsed sample, leading us to conclude that our results are robust with regard to collapsing the sample.²⁴

TABLE 5 AROUND HERE

Because the decisions to stay with, switch, drop or add banks following a bank merger are not really independent from each other, we also estimate our baseline decision regression (Table 4) using a multinomial logit model. While this model lends itself to investigating the relationship decision after the merger, using it in conjunction with our competition and collateral measure produces findings that are difficult to interpret. As a result, we only estimate the basic interaction as a multinomial logit, to confirm that our baseline

²³The table for this robustness check for our competition interaction is provided in Table OA6.

²⁴The same plots can again be found for buying mergers in Figure OA3 and Figure OA4.

results hold. Table 5 confirms that this is indeed the case. Firms are less likely to switch to another bank following a bank merger, more likely to drop their bank relationship and marginally more likely to add another bank.

5. Conclusion

Our paper adds to the literature finding that bank mergers can be harmful for firms. In line with Di Patti and Gobbi [9] and Degryse et al. [8], we demonstrate that firms suffer most extensively when their bank relationship is dropped following a bank merger. We add to this literature in two significant ways. First, we are the first to show that firms that are able to add a bank relationship after a merger can benefit from the merger, as they perform much better than firms that stayed with, switched or dropped their bank. This finding is new and somewhat unexpected, because bank mergers should be unrelated to the firms' demand (to add another bank). We suggest that this finding can be explained by the fact that post-merger firms are subject to a lending reduction from the merging bank, and as a result adding another bank to compensate the funding shortfall is highly beneficial. These findings are in line with the idea that bank mergers destroy bank-customer relationships [1] and as a result induce firms to seek alternative financing means. We thus provide a potential explanation for the puzzle highlighted in Degryse et al. [8] that bank mergers lead to the dropping of high-quality borrowers instead of low-quality borrowers.

We then demonstrate that the ability to find other such means of financing in the banking system crucially depends on the available competition and the available collateral. Firms in more competitive banking environments are more likely to switch and less likely to drop their bank relationship than other firms. Similar findings hold for collateral; firms with more collateral have an easier time switching to different banks. In light of the continuing consolidation trend in banking, our results have significant implications for anti-trust policy

in banking, because they imply that bank mergers have increasingly harmful effects for firm financing. The more concentrated the banking market already is, the more likely the negative economic effects of an additional merger.

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Figures and Tables

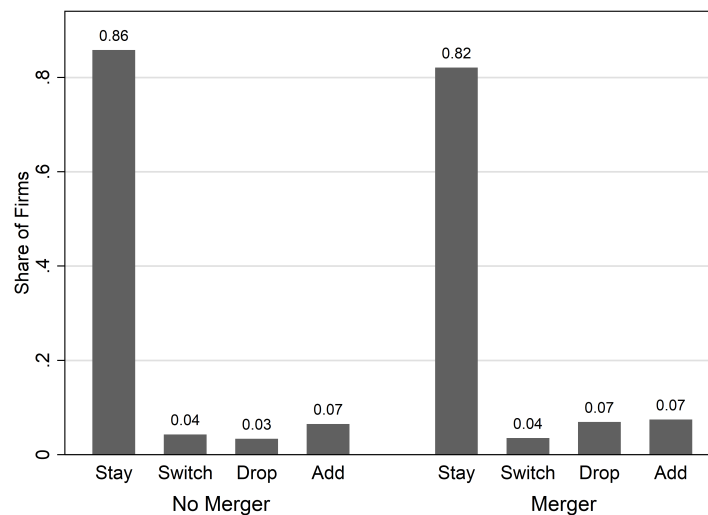


Figure 1: Bank relationship decisions after target bank merger

This figure shows the relative share of relationship continuations (Stay), switches to another bank (Switch), dropping a bank relationship (Drop) and adding an additional bank relationship (Add) at any point in time, by firms whose banks are the target of a merger. Share of firms sums to one for each respective group, as we exclude all firms for which switches, drops and adds occur multiple times.

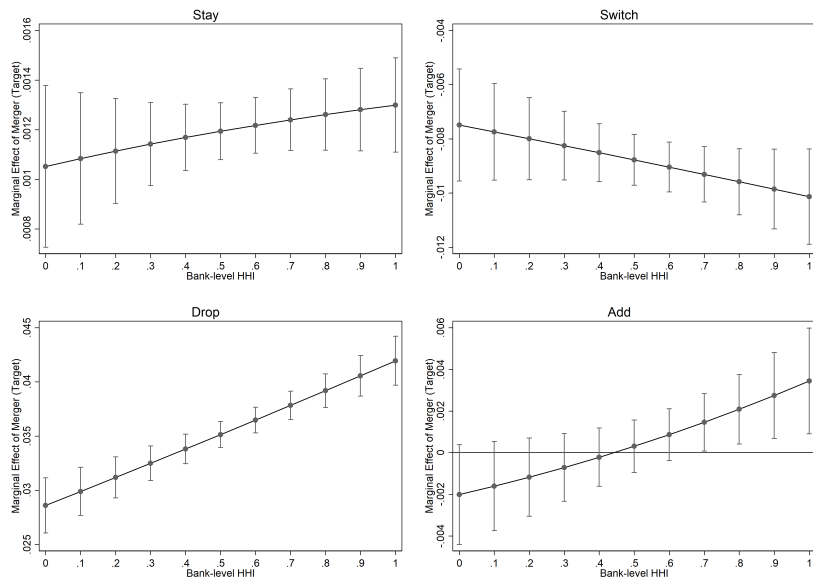


Figure 2: Marginal Effect of target merger on relationship decision, by level of banking market concentration

This figure plots the marginal effect of a firm's bank being the target of the merger on the firm's decision to stay with, switch, drop or add a bank at different levels of banking concentration in the firm's county. The corresponding table without marginal effects is given in Table OA4. The error bars represent the 90% confidence intervals. HHI is the banking market Herfindahl Hirschman Index; the closer the index is to 1, the more concentrated the banking market.

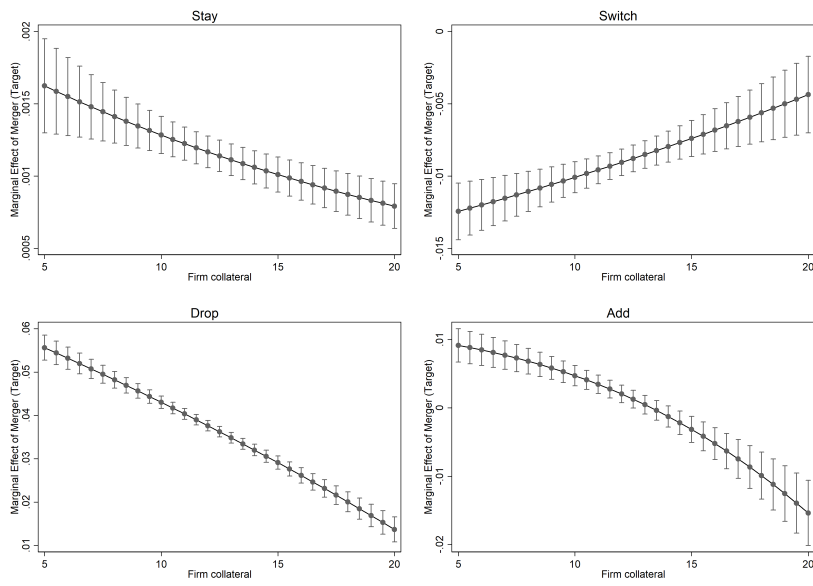


Figure 3: Marginal Effect of target merger on relationship decision, by firms' collateral

This figure plots the marginal effect of a firm's bank being target in a bank merger on the firms decision to stay with, switch, drop or add a bank, at different levels of the firm's available collateral. Collateral is defined as the log of tangible fixed assets of the firm. The corresponding table without marginal effects is given in Table OA5. The error bars represent the 90% confidence intervals.

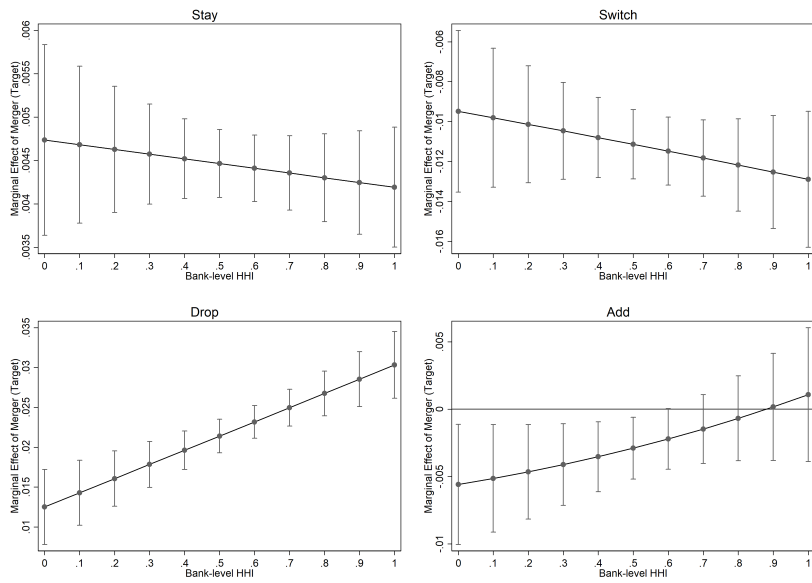


Figure 4: Marginal Effect of target merger on relationship decision, by level of banking market concentration: collapsed sample

This figure plots the marginal effect of a firm's bank being target of the merger on the firm's decision to stay with, switch, drop or add a bank at different levels of banking concentration in the firm's county, using a collapsed sample. The corresponding table without marginal effects is given in Table OA6. The error bars represent the 90% confidence intervals. HHI is the banking market Herfindahl Hirschman Index; the closer the index is to 1, the more concentrated the banking market.

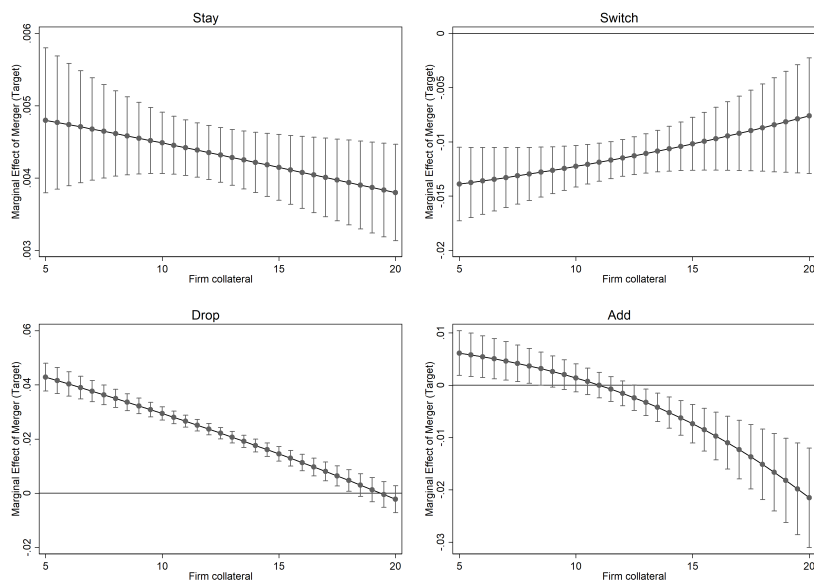


Figure 5: Marginal Effect of target merger on relationship decision, by firms' collateral: collapsed sample

This figure plots the marginal effect of a firm's bank being target in a bank merger on the firm's decision to stay with, switch, drop or add a bank, at different levels of the firm's available collateral, using a collapsed sample. Collateral is defined as the log of tangible fixed assets of the firm. The corresponding table without marginal effects is given in Table OA7. The error bars represent the 90% confidence intervals.

Table 1: Descriptive Statistics

	N	Mean	SD	Min	Max
Merger Variables					
Merger Target	2024025	0.08	0.27	0.00	1.00
Merger Buyer	2024025	0.36	0.48	0.00	1.00
Relationship (dis-)continuation Variables					
Switch (Target)	2024025	0.06	0.23	0.00	1.00
Drop (Target)	2024025	0.06	0.24	0.00	1.00
Add (Target)	2024025	0.10	0.30	0.00	1.00
Switch (Buyer)	2024025	0.05	0.23	0.00	1.00
Drop (Buyer)	2024025	0.06	0.24	0.00	1.00
Add (Buyer)	2024025	0.09	0.29	0.00	1.00
Interaction Variables					
HHI	2024025	0.56	0.26	0.12	1.00
Collateral	2024025	10.97	3.40	0.00	23.77
Firm Outcome Variables					
Loans (mil.EUR)	1203880	0.54	15.63	0.00	5255
Interest Rate	354116	0.03	0.73	-0.10	395
Trade Credit (mil.EUR)	1203774	0.81	23.71	0.00	6119
Total Fixed Assets(mil.EUR)	2024025	2.94	65.70	0.00	21127
Number of Employees	1315985	60.06	984.95	1.00	276418
Return on Equity	337095	0.34	1.17	-10.00	10.00
Firm Control Variables					
L.Cash (mil.EUR)	2024025	0.85	27.30	0.00	15119
L.Total Assets (mil.EUR)	2024025	12.59	414.56	0.00	126562
L.Capital Ratio	2024025	0.34	0.28	0.00	1.00
L.Current Liabilities (mil.EUR)	2024025	3.10	122.42	0.00	30052

This table presents summary statistics for all variables of interest. Merger Target and Merger Buyer are dummy variables set equal to 1 after the firms' bank has been target or buyer in a merger, respectively, and 0 otherwise. Switch (Target/Buyer) is a dummy variable set equal to 1 if a post or pre-merger change of the bank relationship has taken place. Drop (Target/Buyer) is a dummy variable set equal to 1 if the bank relationship is dropped before or after the merger. Add (Target/Buyer) is a dummy set equal to 1 if another bank relationship is added before or after a merger. All dummy variables are 1 before or after the merger has taken place, never both. HHI is the bank-level Herfindahl Hirschman Index (with the county as the regional unit), based on the concentration of bank assets. Collateral is the log of tangible fixed assets. Interest rate is calculated as interest income / total loans. Firm control variables are lagged by one period.

Table 2: Unconditional target merger regressions

	(1)	(2)	(3)	(4)	(5)	(6)
	Loans	Interest rate	Trade Credit	Collateral	Employees (ln)	Return on Equity
Merger Target	-0.130*** (0.042)	0.007** (0.004)	0.050 (0.042)	0.015 (0.010)	-0.014*** (0.004)	-0.016 (0.012)
L.Cash	-0.036*** (0.003)	-0.001 (0.001)	-0.006** (0.003)	0.012*** (0.001)	0.003*** (0.000)	0.006*** (0.002)
L.Total Assets	0.257*** (0.012)	0.010*** (0.003)	0.133*** (0.013)	0.452*** (0.006)	0.096*** (0.002)	-0.137*** (0.009)
L.Capital Ratio	-0.681*** (0.034)	-0.041** (0.019)	-0.395*** (0.038)	0.101*** (0.013)	0.013*** (0.004)	-0.918*** (0.024)
L.Current Liabilities	0.012*** (0.001)	-0.000 (0.000)	0.017*** (0.001)	0.001*** (0.000)	0.001*** (0.000)	-0.000 (0.000)
N	1,203,880	354,116	1,203,774	2,024,025	1,315,985	337,095
NumberofFirms	378,352	98,061	378,876	463,740	387,139	91,927
Treatment Group	29,535	11,538	29,553	36,125	32,381	11,145
R ²	0.792	0.905	0.814	0.944	0.979	0.690
Adjusted R ²	0.696	0.866	0.727	0.927	0.970	0.567
WithinR ²	0.002	0.000	0.001	0.030	0.018	0.012
Firm FE	YES	YES	YES	YES	YES	YES
County×time FE	YES	YES	YES	YES	YES	YES

This table displays the effect of a target bank merger on firm-level outcomes, as formally shown in equation 1. Merger Target is a dummy variable set equal to 0 if the firms' banks have not been the target of a merger and set equal to 1 after any of the firms' banks have been the target of a merger. Loans is the log of all firms' bank loans (borrowing). Interest rate is total interest expense divided by total loans. Trade credit is the log of firms' trade credit. Collateral is the log of firms' tangible fixed assets. Employees is the log of the firm's employees. RoE is firms' return on equity. Firm and county×year fixed effects are included. Clustered standard errors on the firm level of the point estimates are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 3: Real effects of target bank mergers by relationship changes

	(1)	(2)	(3)	(4)	(5)	(6)
	Loans	Interest rate	Trade Credit	Collateral	Employees (ln)	Return on Equity
Merger Target	-0.121** (0.048)	0.007* (0.004)	-0.005 (0.050)	0.019 (0.012)	-0.010** (0.005)	-0.028* (0.017)
Merger Target×Switch	-0.024 (0.327)	0.006 (0.015)	0.046 (0.370)	-0.041 (0.083)	-0.002 (0.035)	0.063 (0.068)
Merger Target×Drop	-0.548*** (0.202)	0.006 (0.006)	-0.007 (0.190)	-0.048 (0.048)	-0.079*** (0.024)	0.087** (0.042)
Merger Target×Add	0.427* (0.236)	-0.002 (0.005)	0.417* (0.231)	0.088* (0.046)	0.053** (0.025)	-0.052 (0.050)
N	1,083,401	310,713	1,083,382	1,930,476	1,208,497	295,225
Number of Firms	287,223	74,563	287,719	414,629	311,650	69,166
Treatment Group	28,102	10,547	28,121	34,522	30,810	10,184
R ²	0.784	0.435	0.805	0.942	0.977	0.636
Adjusted R ²	0.704	0.245	0.733	0.926	0.969	0.516
Withi nR ²	0.002	0.000	0.001	0.029	0.017	0.013
Controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
County×time FE	YES	YES	YES	YES	YES	YES

This table shows the effects of target bank mergers on firms, given that the firm switched, dropped or added a bank relationship after the merger. Switch, drop and add are values from 1, 2 and 3 from a categorical variable indicating the post-merger relationship status. Staying is the base category. Merger Target is a dummy variable set equal to 0 if the firms' banks have not been the target of a merger and set equal to 1 after any of the firms' banks have been the target of a merger. Loans is the log of all firms' bank loans (borrowing). Interest rate is total interest expense divided by total loans. Trade credit is the log of firms' trade credit taken. Collateral is the log of firms' tangible fixed assets. Employees is the log of firms' employees. RoE is firms' return on equity. Firm-level control variables are included, but not displayed. Non-interaction dummies of switching decisions are estimated but not displayed. Firm and county×year fixed effects are included. Clustered standard errors on the firm level of the point estimates are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 4: Decision to change bank relationship after merger: marginal effects

	(1) Stay	(2) Switch	(3) Drop	(4) Add
Merger Target	0.002*** (0.000)	-0.009*** (0.001)	0.030*** (0.001)	0.001 (0.001)
N	2,024,019	2,024,019	2,024,019	2,024,019
Number of Firms	463,736	463,736	463,736	463,736
Pseudo R ²	0.052	0.015	0.053	0.037
Firm Controls	YES	YES	YES	YES
Bank Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

This table presents logit regressions for the decision to stay with, drop, switch or add a bank relationship conditional on the participation of the firms' banks in a merger. Stay is set equal to 1 if the firm does not change its bank relationships at any point in time before or after the merger. Switch, drop and add are set equal to 1 if at any point in time after or before the merger, the firm decides to switch to another bank, drop a bank relationship or add an additional relationship. Merger Target is a dummy variable set equal to 0 if the firms' banks have not been the target of a merger and set equal to 1 after any of the firms' banks have been the target of a merger. The reported coefficients are marginal effects of the independent variable on the probability of staying with, switching, dropping or adding the lending relationship respectively. Standard errors (delta method) are displayed in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 5: Robustness: multinomial logit model

	(1) Switch vs. Stay	(2) Drop vs. Stay	(3) Add vs. Stay
Merger Target	-0.003*** (0.000)	0.005*** (0.000)	0.001** (0.000)
Merger Buyer	0.002*** (0.000)	0.011*** (0.000)	0.003*** (0.000)
N		2,024,025	
Number of Firms		463,736	
Stays		1,934,828	
Switches		25,537	
Drops		22,660	
Adds		40,994	
Pseudo R ²		0.030	

This table presents the marginal effect of a multinomial logit regression on the decision to switch, drop or add a bank relationship compared to the base category (stay). The dependent variable is a variable that takes the value of 1 if the firm stayed with their bank relationship in any particular year, 2 if it switched to another bank, 3 if it dropped a bank relationship and 4 if it added a bank relationship. Merger Target is a dummy variable set equal to 0 if the firms' banks have not been the target of a merger and set equal to 1 after any of the firms' banks have been the target of a merger. Merger Buyer is a dummy set equal to 0 if the firms' banks have not been the buying party in a merger and set equal to 1 if any of the firms' banks have been the buying party in a bank merger. The reported coefficients are marginal effects. Clustered standard errors are displayed in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Appendix

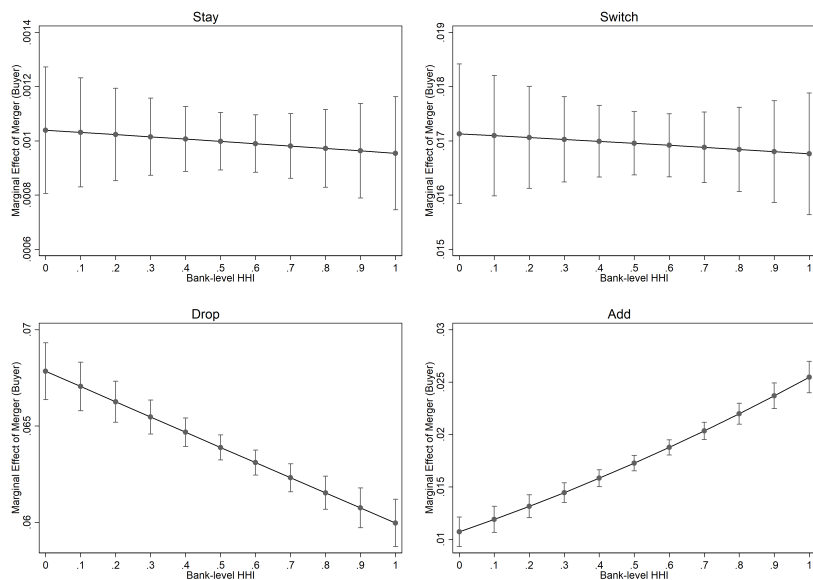


Figure OA1: Marginal Effect of buying merger on relationship decision, by level of banking market concentration

This figure plots the marginal effect of a firm's bank being the buyer in a bank merger on the firm's decision to stay with, switch, drop or add a bank, at different levels of banking concentration in the firm's county. The error bars represent the 90% confidence intervals. HHI is the banking market Herfindahl Hirschman Index; the closer the index is to 1, the more concentrated the banking market.

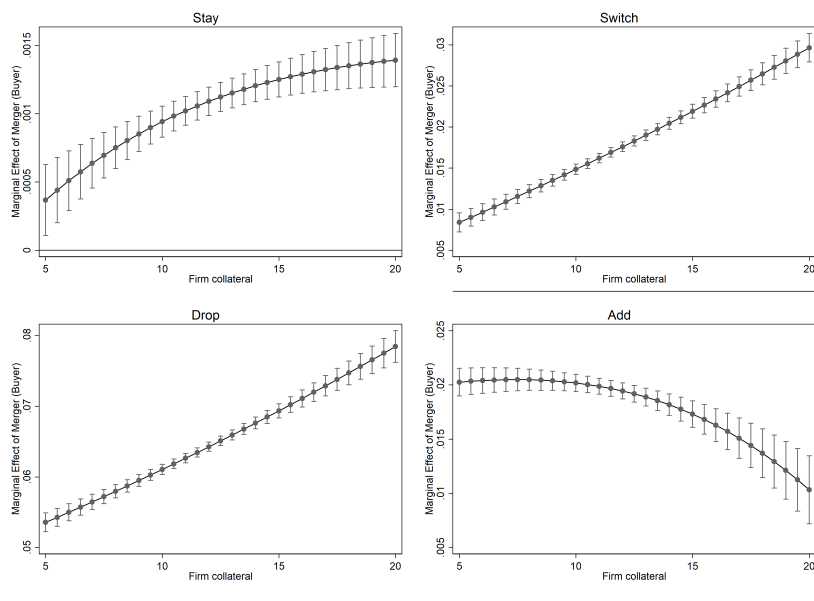


Figure OA2: Marginal Effect of buying merger on relationship decision, by firms' collateral

This figure plots the marginal effect of a firm's bank being the buyer in a bank merger on the firm's decision to stay with, switch, drop or add a bank, at different levels of the firm's available collateral. Collateral is defined as the log of tangible fixed assets of the firm. The error bars represent the 90% confidence intervals.

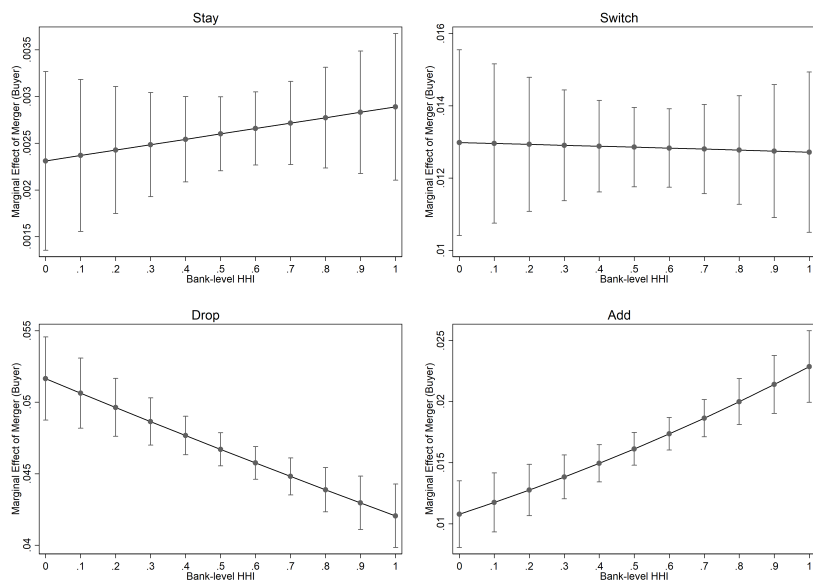


Figure OA3: Marginal Effect of merger (target) on relationship decision, by level of banking market concentration: collapsed sample

This figure plots the marginal effect of a firm's bank being the buyer in a bank merger on the firm's decision to stay with, switch, drop or add a bank at different levels of banking concentration in the firm's county, using a collapsed sample. The error bars represent the 90% confidence intervals. HHI is the banking market Herfindahl Hirschman Index; the closer the index is to 1, the more concentrated the banking market.

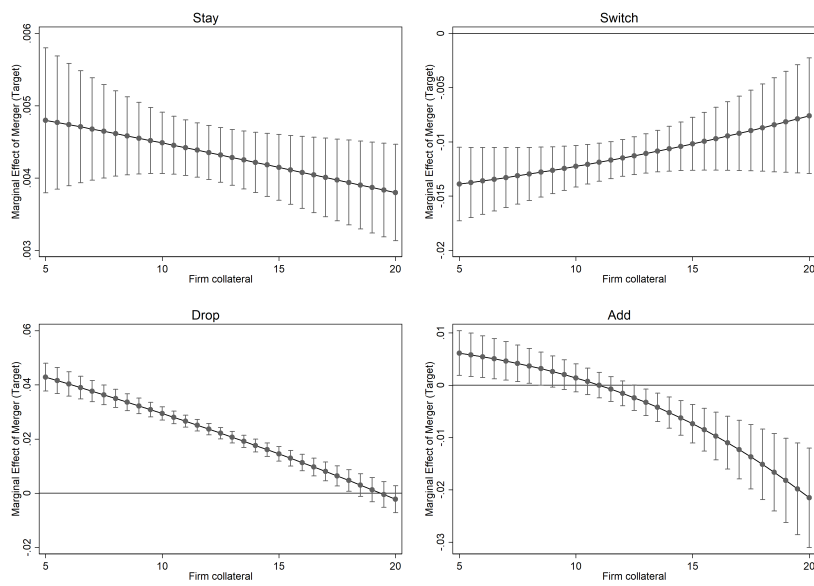


Figure OA4: Marginal Effect of merger (target) on relationship decision, by firms' collateral: collapsed sample

This figure plots the marginal effect of a firm's bank being buyer in a bank merger on the firm's decision to stay with, switch, drop or add a bank, at different levels of the firm's available collateral, using a collapsed sample. Collateral is defined as the log of tangible fixed assets of the firm. The error bars represent the 90% confidence intervals.

Table OA1: Unconditional merger regressions: buying mergers

	(1)	(2)	(3)	(4)	(5)	(6)
	Loans	Interest rate	Trade Credit	Collateral	Employees (ln)	Return on Equity
Merger Buyer	-0.032 (0.023)	0.002 (0.003)	-0.003 (0.024)	0.009 (0.006)	0.009*** (0.002)	-0.012 (0.009)
L.Cash	-0.036*** (0.003)	-0.001 (0.001)	-0.006** (0.003)	0.012*** (0.001)	0.003*** (0.000)	0.006*** (0.002)
L.Total Assets	0.258*** (0.012)	0.010*** (0.003)	0.133*** (0.013)	0.452*** (0.006)	0.096*** (0.002)	-0.137*** (0.009)
L.Capital Ratio	-0.681*** (0.034)	-0.041** (0.019)	-0.395*** (0.038)	0.101*** (0.013)	0.013*** (0.004)	-0.918*** (0.024)
L.Current Liabilities	0.012*** (0.001)	-0.000 (0.000)	0.017*** (0.001)	0.001*** (0.000)	0.001*** (0.000)	-0.000 (0.000)
N	1,203,880	354,116	1,203,774	2,024,025	1,315,985	337,095
NumberofFirms	378,352	98,061	378,876	463,740	387,139	91,927
Treatment Group	29,535	11,538	29,553	36,125	32,381	11,145
R ²	0.792	0.905	0.814	0.944	0.979	0.690
Adjusted R ²	0.696	0.866	0.727	0.927	0.970	0.567
WithinR ²	0.002	0.000	0.001	0.030	0.018	0.012
Firm FE	YES	YES	YES	YES	YES	YES
County×time FE	YES	YES	YES	YES	YES	YES

This table displays the effect of buying bank mergers on firm-level outcomes. Merger Buyer is a dummy variable set equal to 0 if the firms' banks have not been the buying party in a merger and set equal to 1 after any of the firms' banks have been the buying party in a merger. Loans is the log of all firms' bank loans (borrowing). Interest rate is total interest expense divided by total loans. Trade credit is the log of firms' trade credit. Collateral is the log of firms' tangible fixed assets. Employees is the log of firms' employees. RoE is firms' return on equity. Firm and county×year fixed effects are included. Clustered standard errors on the firm level of the point estimates are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table OA2: Real effects of bank mergers by relationship changes: buying mergers

	(1)	(2)	(3)	(4)	(5)	(6)
	Loans	Interest rate	Trade Credit	Collateral	Employees (ln)	Return on Equity
Merger Buyer	-0.060** (0.024)	0.001 (0.004)	-0.035 (0.027)	-0.006 (0.007)	-0.000 (0.003)	-0.004 (0.012)
Merger Buyer×Switch	0.048 (0.164)	0.018** (0.009)	0.158 (0.166)	0.030 (0.042)	0.017 (0.015)	-0.072 (0.057)
Merger Buyer×Drop	-0.355* (0.203)	0.006 (0.007)	0.221 (0.200)	0.012 (0.046)	0.005 (0.019)	-0.008 (0.047)
Merger Buyer×Add	0.450*** (0.125)	0.001 (0.005)	0.264** (0.130)	0.150*** (0.026)	0.082*** (0.011)	-0.029 (0.036)
N	1,084,377	311,120	1,084,379	1,932,037	1,209,573	295,559
Number of Firms	287,488	74,704	287,983	414,929	311,941	69,287
Treatment Group	28,102	10,547	28,121	34,522	30,810	10,184
R ²	0.783	0.435	0.804	0.942	0.977	0.636
Adjusted R ²	0.703	0.245	0.732	0.926	0.969	0.517
Within R ²	0.002	0.000	0.001	0.029	0.017	0.013
Controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
County×time FE	YES	YES	YES	YES	YES	YES

This table shows the effects of buying bank mergers on firms, given that the firm switched, dropped or added a bank relationship after the merger. Switch, drop and add are values from 1,2 and 3 from a categorical variable indicating the post-merger relationship status. Staying is the base category. Merger Buyer is a dummy variable set equal to 0 if the firms' banks have not been the buying party in merger and set equal to 1 after any of the firms' banks have been the buying party in a merger. Loans is the log of all firms' bank loans (borrowing). Interest rate is total interest expense divided by total loans. Trade credit is the log of firms' trade credit taken. Collateral is the log of firms' tangible fixed assets. Employees is the log of firms' employees. RoE is firms' return on equity. Firm-level control variables are included, but not displayed. Non-interaction dummies of switching decisions are estimated but not displayed. Firm and county×year fixed effects are included. Clustered standard errors on the firm level of the point estimates are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table OA3: Decision to change bank relationship after target merger: OLS

	(1)	(2)	(3)	(4)
	Stay	Switch	Drop	Add
Merger Target	0.038*** (0.001)	0.004** (0.002)	-0.081*** (0.004)	-0.004 (0.003)
N	1,983,501	1,983,501	1,983,501	1,983,501
Number of Firms	423,281	423,281	423,281	423,281
Treatment Group	36,125	36,125	36,125	36,125
R ²	0.523	0.984	0.957	0.978
Adjusted R ²	0.392	0.980	0.945	0.972
Within R ²	0.029	0.000	0.023	0.000
Controls	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
County × time FE	YES	YES	YES	YES

This table presents OLS regressions for the decision to stay with, drop, switch or add a bank relationship conditional on the firms' banks being the target of a merger. Stay is set equal to 1 if the firm does not change its bank relationships at any point in time before or after the merger. Switch, drop and add are set equal to 1 if at any point in time after or before the merger, the firm decides to switch to another bank, drop a bank relationship or add an additional relationship. Merger Target is a dummy variable set equal to 0 if the firms' banks have not been the target of a merger and set equal to 1 after any of the firms' banks have been the target of a merger. Clustered standard errors on the firm level of the point estimates are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table OA4: Decision to change bank relationship after target merger: competitive environment

	(1)	(2)	(3)	(4)
	Stay	Switch	Drop	Add
Merger Target	0.957*** (0.284)	-0.153*** (0.027)	0.440*** (0.021)	-0.027 (0.020)
HHI	0.015 (0.070)	0.090*** (0.012)	-0.042*** (0.012)	0.370*** (0.009)
Merger Target × HHI	0.522 (0.481)	-0.042 (0.043)	0.179*** (0.033)	0.062** (0.031)
N	2,024,019	2,024,019	2,024,019	2,024,019
Number of Firms	463,736	463,736	463,736	463,736
Affected Firms	36,125	36,125	36,125	36,125
Pseudo R ²	0.052	0.015	0.053	0.039
Firm Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

This table presents logit regressions for the decision to stay with, drop, switch or add a bank relationship conditional on the firms' banks participation in a merger and the banking concentration (HHI) in the firm's county. Stay is set equal to 1 if the firm does not change its bank relationships at any point in time before or after the merger. Switch, drop and add are set equal to 1 if at any point in time after or before the merger, the firm decides to switch to another bank, drop a bank relationship or add an additional relationship. Merger Target is a dummy variable set equal to 0 if the firms' banks have not been the target of a merger and set equal to 1 after any of the firms' banks have been the target of a merger. Note that the coefficients are not marginal effects. Refer to Figure 2 for the marginal effects of the merger at different levels of HHI. Standard errors are displayed in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table OA5: Decision to change bank relationship: firm collateral

	(1) Stay	(2) Switch	(3) Drop	(4) Add
Merger Target	1.053*** (0.375)	-0.328*** (0.045)	1.110*** (0.034)	0.232*** (0.036)
Collateral	0.055*** (0.006)	0.007*** (0.001)	0.037*** (0.001)	0.073*** (0.001)
Merger Target×Collateral	0.016 (0.031)	0.012*** (0.004)	-0.046*** (0.003)	-0.017*** (0.003)
N	2,024,019	2,024,019	2,024,019	2,024,019
Number of Firms	463,736	463,736	463,736	463,736
Affected Firms	36,125	36,125	36,125	36,125
Pseudo R ²	0.054	0.015	0.054	0.041
Firm Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

This table presents logit regressions for the decision to stay with, drop, switch or add a bank relationship conditional on the firms' banks participation in a merger and the firms' available collateral. Collateral is defined as the log of firms' tangible fixed assets. Stay is set equal to 1 if the firm does not change its bank relationships at any point in time before or after the merger. Switch, drop and add are set equal to 1 if at any point in time after or before the merger, the firm decides to switch to another bank, drop a bank relationship or add an additional relationship. Merger Target is a dummy variable set equal to 0 if the firms' banks have not been the target of a merger and set equal to 1 after any of the firms' banks have been the target of a merger. Note that the coefficients are not marginal effects. Refer to Figure 3 for the marginal effects of the merger at different levels of firms' collateral. Standard errors are displayed in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table OA6: Robustness: Collapsed sample for HHI interaction

	(1) Stay	(2) Switch	(3) Drop	(4) Add
Merger Target	1.243*** (0.308)	-0.234*** (0.066)	0.237*** (0.050)	-0.096** (0.048)
HHI	0.191** (0.081)	0.104*** (0.028)	-0.176*** (0.030)	0.389*** (0.023)
Merger Target×HHI	0.188 (0.517)	-0.064 (0.107)	0.337*** (0.081)	0.109 (0.075)
N	482,813	482,813	482,813	482,813
Number of Firms	463,736	463,736	463,736	463,736
Affected Firms	36125	36125	36125	36125
Pseudo R ²	0.015	0.014	0.055	0.042
Firm Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

This table presents logit regressions for the decision to stay with, drop, switch or add a bank relationship conditional on the participation of the firms' banks in a merger and the banking concentration (HHI) in the firm's county, using a collapsed sample of the data. Stay is set equal to 1 if the firm does not change its bank relationships at any point in time before or after the merger. Switch, drop and add are set equal to 1 if at any point in time after or before the merger, the firm decides to switch to another bank, drop a bank relationship or add an additional relationship. Merger Target is a dummy variable set equal to 0 if the firms' banks have not been the target of a merger and set equal to 1 after any of the firms' banks have been the target of a merger. Note that the coefficients are not marginal effects. Refer to Figure 4 for the marginal effects of the merger at different levels of HHI. Standard errors are displayed in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table OA7: Robustness: Collapsed sample for collateral interaction

	Target			
	(1) Stay	(2) Switch	(3) Drop	(4) Add
Merger Target	1.005** (0.396)	-0.442*** (0.103)	1.149*** (0.075)	0.227*** (0.080)
Collateral	0.026*** (0.006)	0.013*** (0.003)	0.044*** (0.003)	0.081*** (0.003)
Merger Target×Collateral	0.030 (0.033)	0.014* (0.008)	-0.059*** (0.006)	-0.021*** (0.006)
N	482,813	482,813	482,813	482,813
Number of Firms	463,736	463,736	463,736	463,736
Affected Firms	36,125	36,125	36,125	36,125
Pseudo R ²	0.016	0.014	0.057	0.045
Firm Controls	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

This table presents logit regressions for the decision to stay with, drop, switch or add a bank-relationship conditional on the participation of the firms' banks in a merger and the firms' available collateral, using a collapsed data sample. Collateral is defined as the log of firms' tangible fixed assets. Stay is set equal to 1 if the firm does not change its bank relationships at any point in time before or after the merger. Switch, drop and add are set equal to 1 if at any point in time after or before the merger, the firm decides to switch to another bank, drop a bank relationship or add an additional relationship. Merger Target is a dummy variable set equal to 0 if the firms' banks have not been the target of a merger and set equal to 1 after any of the firms' banks have been the target of a merger. Note that the coefficients are not marginal effects. Refer to Figure 5 for the marginal effects of the merger at different levels of firms' collateral. Standard errors are displayed in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.