

# Banks and Regional Economic Activity

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Preliminary and incomplete - **do not quote!**

**Abstract:** In this paper we revisit the question whether negative shocks to banks have adverse real economic effects. We propose a new identification strategy to overcome endogeneity problems. We analyze German savings banks. These banks are small, but are only active in a defined region. Within their area of activity they are large. When a savings bank is in financial distress it is often merged with a neighbouring savings bank. We interpret the distressed merger as an exogenous negative shock to the *acquiring* savings bank and find that the growth rates of investments and GDP decrease while the number of insolvencies increases in the years after the merger. Several robustness checks support our claim that there is indeed a causal effect from shocks to savings banks to regional economic activity.

JEL classification: E44, G21

Keywords: Bank distress, Merger, Growth

## I Introduction

The debate whether financial markets affect economic growth (dubbed the "finance-growth nexus" by Jayaradne and Strahan 1996) goes back to (at least) Schumpeter (1912). The literature, to be surveyed briefly in section 2, has addressed this issue at different levels. Several papers have analyzed whether the state of a country's financial system affects the growth rate in that country. Other papers exploit regional (e.g. state-level) differences in banking regulation and investigate how they affect regional growth. Finally, several papers analyze shocks to individual banks and how they affect the behavior (most importantly the lending behavior) of these banks. Empirical studies of the finance-growth nexus are plagued by endogeneity problems. While it is plausible that the state of the financial system affects the real economy, the reverse causality cannot be ruled out. Therefore, a clean identification strategy is called for.

The present paper analyses whether negative shocks to regional banks adversely affect the regional economy. Its main contribution is a new identification strategy that permits us to make causal statements. Our analysis is performed at the county level. In particular, we analyze German savings banks. These banks are small, but are only active in a defined region. Within their area of activity they are large. When a savings bank is in financial distress it is often merged with a neighboring savings bank. We interpret the distressed merger as an exogenous negative shock to the *acquiring* savings bank and analyze the effect of the merger on real economic variables in the region of the acquiring bank. The variable of prime interest is the change in the level of investment because it is most closely related to the lending behavior of the bank. In addition, we also consider changes in the regional GDP growth rate and in the number of insolvencies.

Our results indicate that the growth rates of investments and GDP decrease while the number of insolvencies increases in the years after the merger. We perform a number of robustness checks to rule out alternative explanations, most importantly regional contagion effects. We show that there are no adverse real effects in placebo regions, defined as regions that are also adjacent to the region of the distressed savings bank but in which no merger took place. We further show that the performance of the acquiring savings bank deteriorates relative to the performance of (1) the savings bank in the placebo region and (2) the largest cooperative bank in the region of the acquiring savings bank. In summary, our empirical evidence allows the conclusion that there is indeed a causal effect from shocks to savings banks to regional economic activity.

The remainder of the paper is organized as follows. Section 2 contains a brief summary of the literature. Section 3 describes the institutional background while section 4 describes our data set. Section 5 presents our main analysis. In Section 6 we investigate whether regional economic contagion can explain our results. Section 7 tests whether distressed mergers result in a persistent deterioration of the performance of the acquiring bank. Section 8 concludes.

## **II Literature**

Levine (1997) provides a comprehensive survey on the older literature on the finance-growth nexus. Drawing on cross-country comparisons as well as individual country studies, industry and firm-level analyses he concludes that "the functioning of financial systems is vitally linked to economic growth".

A series of papers exploit the relaxation of intrastate branching in the U.S (e.g. Jayaratne and Strahan 1996, Demyanyk et al. 2007, Rice and Strahan 2010, Hoffmann and Shcherbakova-Stewen 2011). The relaxation is interpreted as a positive shock to the banking system in the respective state. These papers agree on the conclusion that liberalization had positive real economic effects. In particular Rice and Strahan (2010) and Hoffmann and Shcherbakova-Stewen (2011) find that deregulation results in an expansion of credit supply.

The papers by Jimenez et al. (2015) and Behn et al. (2016a) are related to the aforementioned papers insofar as they also exploit changes in regulation. However, they consider time-series variation rather than cross-sectional variation. Jimenez et al. (2015) analyze pro-cyclical bank capital regulation in Spain and find that policy-induced relaxations of capital buffers (arguably a positive shock to banks) have positive economic consequences. Behn et al. (2016a) analyze the introduction of model-based capital regulation by (predominantly large) banks in Germany. The model-based approach resulted in lower capital charges for those banks that employed them. This can again be interpreted as a positive shock to those banks. The banks responded by an expansion of their lending activity.

Several papers analyze (negative) shocks to individual banks and how they affect economic activity. In such a setting it is difficult to rule out reverse causality. Gilbert and Kochin (1989) provide evidence that bank failures adversely affect sales and employment in the communities where the failed banks are located. Ramirez and Shively (2005) use pre-depression era data and also find that bank failures affect real economic activity. Kandrac, using U.S. county-level data, confirms the adverse economic consequences of bank failures. He addresses the endogeneity concern by

using propensity score matching and by exploiting cross-sectional variation in bank failures. Ashcraft (2005) analyzes two cases in which healthy subsidiaries of bank holding companies failed for reasons that were essentially unrelated to local economic conditions. He finds that bank failures have permanent effects on economic activity, and that these effects can be explained by a contraction in bank lending. Several more recent papers use the financial crisis as a source of external variation. These papers argue that banks which rely more on wholesale funding have been hit harder by the financial crisis. It should be noted that this identification strategy is based on the implicit assumption that a bank's funding structure is exogenous. Using U.S. data, Gozzi and Goetz (2010) find that banks relying more on wholesale funding reduced lending activity more than banks with a higher fraction of retail deposits. They further find adverse real effects in areas in which banks rely more on wholesale liabilities. Iyer et al. (2014) and Cingano et al. (2016) analyze data from Portugal and Italy, respectively, and arrive at similar conclusions. Our paper is related to this line of research because we also analyze real economic consequences of bank distress. However, we rely on a different identification strategy.

Puri et al. (2011) analyze (as we do) German savings banks and exploit cross-sectional variation in their holdings in Landesbanken. As some of the Landesbanken had substantial subprime exposure, savings banks with higher Landesbank holdings were more heavily affected by the crisis. Puri et al. (2011) find that these savings banks reduce their credit supply. While they perform a detailed analysis of bank lending behavior, they do not analyze the impact on regional economic activity.

The papers by Elsas (2007) and Behn et al. (2016b) are related to ours because they also analyze distress resolution in German savings banks. Elsas (2007) uses a large

sample of mergers among savings and cooperative banks and finds that pre-emptive distress resolution through mergers appears to be generally beneficial. However, he only considers implications for the bank and does not analyze implications for regional economic activity. Behn et al. (2016b) analyze the conditions under which local politicians avoid distress of a savings bank by injecting taxpayers' money. Such a bailout (at least temporarily) avoids a distressed merger or other measures that would capture public attention.

### **III Institutional Background**

The Federal Republic of Germany consists of 16 states. 14 of these states are further subdivided into administrative regions which are either cities ("kreisfreie Stadt") or rural areas ("Landkreis").<sup>1</sup> There are approximately 400 of these regions. In the sequel we refer to the "Landkreise" and "kreisfreie Städte" as "regions" or "administrative regions". Each region has a legislative body the members of which are elected in regional-level elections. These elections take place on the same date for all regions within a state.

The German banking system consists of three pillars, private banks, cooperative banks and public savings banks. Private banks are for-profit firms and do not face restrictions as to the areas in which they can be active. We therefore do not consider them in this paper. The cooperative banking group consists of a large number<sup>2</sup> of mostly small banks. These are organized as cooperatives and are active only within a specified area. This restriction assures that cooperative banks do not compete with each other. For

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<sup>1</sup> The two remaining states (Berlin and Hamburg) are cities.

<sup>2</sup> The number has decreased from approximately 7,000 in 1970 to 1,034 at year-end 2014 (the end of our sample period).

most cooperative banks the area of activity is smaller than an administrative region. We use cooperative banks as a control group in one of the robustness checks we perform.

Our analysis focuses on public savings banks. The savings banks as a group are the largest of the three German banking groups. At year-end 2015 they accounted for 37.4% of retail customer deposits and for about 22% of the total lending volume. They are particularly important for small firms and start-ups, with a market share in the market for credit to self-employed entrepreneurs of above 40% (source Bundesbank monthly reports).

Each savings bank is active only in a specified area. This area often, but not always, coincides with an administrative region.<sup>3</sup> Given their regional scope of operations individual savings banks are typically small institutions. The average savings bank in our sample had total assets of 10.2 billion Euro in 2012 (the largest savings bank had total assets of 40 billion Euro in that year). However, their regional market shares are substantial, and in many cases the savings bank is the largest bank in its area of activity. This, in turn, suggests that financial distress of a savings bank may at least temporarily affect the access to credit of small firms and consequently result in reduced investments and possibly also lower growth and an increased number of insolvencies. This line of reasoning is consistent with Hakenes et al. (2015). These authors argue that small regional banks are more effective than large banks in promoting local economic growth.

The number of savings banks decreased from 578 at the end of 1999 (the beginning of our sample period) to 416 at the end of our sample period. This implies that there

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<sup>3</sup> Deviations can occur both ways. First, individual municipalities within an administrative region can operate a savings bank. Consequently, there can be more than one savings bank in a region. Second, mergers among savings banks may result in savings banks which are active in two or more administrative regions. Our empirical analysis focuses on these mergers.

were more savings banks than administrative regions at the beginning of our sample period.

#### **IV Data and Descriptive Statistics**

Our analysis combines data on local banks with data on the state and dynamics of the local economy. Data on local economic activity is sourced from the “Genesis” regional data platform maintained by the German Federal Statistical Institute (Statistisches Bundesamt). This database contains a comprehensive set of variables at the level of the administrative regions such as regional GDP, the level of investments and the number of insolvencies. We further obtain data on the shares of construction and manufacturing in regional GDP. The data is available in a uniform format from 2000 onwards. Consequently, our sample period starts in 2000 and extends until 2014. Data on insolvencies is only available from 2007 onwards. Therefore, all regressions that include the number of insolvencies are based on a shorter sample period ranging from 2007 to 2014.

We obtained a list of all savings banks from Deutscher Sparkassen- und Giroverband (DSGV). This list also includes information on all mergers, including the names and identification numbers of the merging banks and the year of the merger. We identify the acquiring bank in a merger as the bank which retains its savings bank id. In most cases the acquiring bank is larger than the target. In our analysis we differentiate between distressed mergers and non-distressed mergers. We define a merger as distressed if at least one of the following three criteria applies to the target bank: (i) the target bank’s equity to total assets ratio was in the lowest quartile of the respective yearly equity-to-total assets distribution in at least one of the two years prior to the



merger; (ii) the return on equity was in the lowest quartile of the respective yearly ROE distribution in at least one of the two years prior to the merger; or (iii) the loan loss provisions to total loans ratio is in the highest quartile of the respective yearly LLP-to-total-loans distribution in at least one of the two years prior to the merger.

We merge this data with accounting data obtained from Bureau van Dijk's Bankscope database. Out of the 531 savings banks initially present in the DSGV list BankScope provides information on 449. However, for many of these (approximately 130) information is available for only 1 or 2 consecutive years. Our panel regressions (which use first-differenced variables and include lags of some variables) therefore only include information on 303 savings banks in 320 administrative regions. This number decreases during the sample period because of mergers. As already noted above, these mergers also result in the creation of savings banks that are active in an area that is larger than an administrative region. At the end of the sample period our data set contains 135 of these banks.

As noted previously we use cooperative banks as a control sample in one of our robustness checks. We identify the largest cooperative bank in each administrative region and obtain accounting data on these banks from the Bankscope data base.

## **V Main Results**

We examine the effect of the quality of financial institutions on real economic activity by estimating the changes in key real economic variables at the regional level following the merger of the corresponding regional savings bank. More specifically,

following Bruno and Hauswald (2013) and Hofmann and Stewen (2011) we estimate the following fixed-effects panel regression:

$$\Delta real_{r,t} = \alpha_r + \beta_1 Acquirer\_distressed_{r,t} + \beta_2 Acquirer_{r,t} + \gamma controls_{r,t} + \delta_t + \varepsilon_{r,t} \quad (1)$$

where  $\Delta real_{r,t}$  is a measure of the change in regional real economic activity in region  $r$  and year  $t$ . Specifically, we use the first difference of the logarithms of regional GDP, investments, and the number of insolvencies.

In order to isolate the effect of distressed mergers we include two separate dummy variables in the model: “Acquirer<sub>r,t</sub>” is set to 1 if the region is the host of an acquiring savings bank in either a distressed or a non-distressed merger in the current year or one of the two preceding years, and is set to zero otherwise. “Acquirer\_distressed<sub>r,t</sub>” is set to 1 if the region is the host of an acquiring savings bank in a distressed merger in year  $t$ ,  $t-1$  or  $t-2$ , and is set to zero otherwise. Thus, the coefficient on the variable “Acquirer\_distressed” captures the differences, if any, between non-distressed mergers and distressed mergers.

Since we are interested in detecting the effect of the merger on the regions of the acquiring bank we exclude the target banks' regions from all regression specifications. We also exclude from the control group all regions that have experienced a merger (distressed or non-distressed) in any prior year of the sample period. Thus, we only use regions as controls which have not experienced a merger.

Controls<sub>r,t</sub> is a vector of control variables. It includes the lagged levels of our three measures of regional economic activity. It further includes the shares of manufacturing and construction in local GDP as proxies for the sensitivity of local economic activity to

bank lending.<sup>4</sup> Besides the region fixed effects we also include year fixed effects (denoted  $\delta_t$ ) to account for federal-level macroeconomic dynamics as well as for changes in bank regulation.

The results of the baseline regressions are presented in Table 1. The first column of the table reveals that investments in regions affected by a distressed merger decrease significantly (the log growth rate declines by 10 percentage points). The results in column 2 indicate that the number of insolvencies in regions which are affected by a distressed merger increases significantly. Finally, column 3 reveals that the log growth in GDP in regions affected by a distressed merger drops by 1.4 percent, significant at the 10% level.

Insert Table 1 about here

The model specification shown in Table 1 assumes that real economic effects of a distressed merger are already observable in the year of the merger. However, these effects may only materialize with a delay. We therefore estimate an alternative specification in which we measure the effects of a merger only in the two years after the merger. Otherwise the specification is as before. The results, shown in Table 2, are very similar to those presented above.

Insert Table 2 about here

Taken together the results of our baseline regression model indicate that a distressed merger has adverse real economic implications for the region that is affected by the merger. GDP growth and investments slow down while the number

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<sup>4</sup>Englmaier and Stowasser (2015) have shown that savings banks in Germany adjust their lending policies in response to regional-level elections. We re-ran the model including a dummy variable that is set to one if regional-level elections took place in region  $r$  and year  $t$ . of a bank in the respective year. The coefficient of this dummy variable was insignificant in all three models. Therefore we report results of a specification that excludes the dummy.

of insolvencies increases relative to control regions which are not affected by a distressed merger.

## **VI Distressed Mergers versus Regional Contagion**

We argue that it is the adverse shock to the acquiring bank that negatively affects regional economic activity. However, it is conceivable that the economic downturn is a consequence of regional economic contagion. The argument is as follows. The economic problems originate in the target bank region and cause the distress of the target bank. The economic slowdown then spreads across regions because of real economic linkages between regions such as interregional demand for output. Consequently, the region of the acquiring bank would have been adversely affected even without the distressed merger taking place.

In order to address this concern we perform a placebo test. We replace the actual region of the acquiring bank by a nearby region. This "placebo region" is selected such that (a) it is in close proximity to the actual acquiring region and to the region of the distressed target bank and (b) it was not affected by a merger (neither distressed nor non-distressed) in any year of the sample period. The placebo region, because it is in geographical proximity to the actual acquiring region, should be exposed to the same general economic conditions. Therefore, if our main results were caused by contagion across regions rather than by the distressed merger, we should find adverse real economic effects after the distressed merger also in the placebo region.

The results of these tests are presented in Table 3. The distressed merger does not have significant impact on investments, GDP growth or the number of insolvencies in

the placebo regions. We therefore conclude that regional contagion does not explain our main results.

Insert Table 3 about here

## VII Is a Distressed Merger a Negative Shock to the Acquirer?

Up to now we have shown that the regions of the acquiring banks “suffer” after a merger with a distressed target. Our interpretation of this result is that the merger adversely affects the quality of the acquiring bank. So far we have not provided any evidence that the quality of the acquiring bank deteriorates, nor have we analyzed which dimensions of bank quality might be affected.

Therefore, we now explore the changes in key balance sheet characteristics following distressed bank mergers. We focus on (log) changes in three measures of performance, namely capitalization (the ratio of total equity to total assets), the average quality of loans (measured by the ratio of loan loss provisions to total loans), and profitability (measured by the return on equity)<sup>5</sup>. We estimate the panel regression

$$\Delta \text{perf}_{r,t} = \alpha_r + \beta_1 \text{Acquirer\_distressed}_{r,t} + \gamma \text{controls}_{r,t} + \delta_t + \varepsilon_{r,t} \quad (2)$$

The independent variable of main interest is a dummy variable that identifies acquiring banks after distressed mergers. We apply the definition of distressed mergers introduced earlier. Obviously, in the year of the merger the first-time consolidation of the acquirer and the target bank will result in significant (and, most likely, negative) changes in key balance sheet ratios of the acquiring bank. We therefore concentrate on

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<sup>5</sup> We have estimated alternative models using the return on assets instead of the return on equity. The results were qualitatively similar and are thus omitted.

the two years after the merger and exclude the merger year from the regression. What we test is, therefore, whether the negative shock to the acquiring bank persists after the distressed merger.<sup>6</sup> We include as additional independent variables bank-level control variables (the lagged levels of the three performance measures, total assets, the ratio of retail deposits to total assets, the ratio of loans to total assets) and a dummy variable that indicates whether regional elections took place in the region in the year under consideration.

The results are shown in Table 4. They imply that the equity ratios of acquirers in distressed mergers decrease significantly while the loan loss provisions increase significantly. We do not find evidence of reduced RoE.

Insert Table 4 about here

The results presented above indicate that acquiring banks in distressed mergers show persistently poor performance in the years after the merger. However, the poor performance may be caused by other reasons than the merger (e.g. regional economic contagion as described above). We perform two additional sets of regressions to rule out these alternative explanations.

If regional contagion causes the poor performance of the acquiring bank we should also find deteriorating performance in the savings banks in the placebo regions introduced above. We therefore estimate (otherwise unchanged) regressions with two dummy variables. The first dummy identifies both true and placebo acquiring banks in the two years after the (true or placebo) merger. The second dummy only identifies the

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<sup>6</sup> One reason why the shock could be persistent is that the distressed target bank may have underreported its loan loss provisions. Consequently, additional loan loss provisions may be required after the merger and may result in reduced profitability and lower equity ratios in the acquiring bank. The cost of integrating the target bank may also cause persistent negative performance.

true acquirers and thus captures the performance differences between the true and placebo acquiring banks. The results, presented in Table 5, indicate that the true acquirers show significantly smaller changes in their equity ratios and significantly stronger growth in their loan loss provisions than the placebo acquirers. We do not find significant differences in the RoE.

Insert Table 5 about here

If it is indeed the distressed merger which causes the poor performance of the acquiring banks other banks in the same region should not display deteriorating performance. If, on the other hand, causality ran from local economic conditions to bank quality we would expect to find that all banks active in the region of the acquiring savings bank in a distressed merger were negatively affected.

To analyze whether this is the case we compile a sample of cooperative banks and analyze whether the quality of cooperative banks in regions affected by a distressed merger deteriorates. Cooperative banks are, on average, smaller than savings banks and often operate in a local area that is smaller than the regions we use in our analysis. In these cases we choose the largest cooperative bank that is active in a region.<sup>7</sup>

We estimate regressions similar to those described above. We include two dummy variables. The first dummy identifies both the savings and the cooperative bank in the distressed acquirer region in the two years after the merger. The second dummy only identifies the acquirers and thus captures the performance differences between the acquiring savings bank and the cooperative bank that is active in the same region. The results are shown in Table 6. They imply that the acquiring savings banks show

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<sup>7</sup> One problem that we encounter is that BankScope does not cover all cooperative banks. The problem is mitigated by the fact that we select the largest cooperative bank in each region (and coverage in BankScope is more likely for larger banks). Still, we lose 108 regions for which data on cooperative bank balance sheets is unavailable.

significantly stronger growth in their loan loss provisions than the cooperative banks. The difference in the changes in the equity ratio has the expected negative sign but is not significant. As in the previous regressions we do not find significant differences in the change in RoE.

Insert Table 6 about here

The results in this section provide evidence that the distressed merger is indeed a negative shock for the acquiring bank. The observation that acquirers in distressed mergers show worse performance than the cooperative banks active in the same region and the savings banks in the placebo regions support our claim that the real effects we have documented in section 5 are caused by the shock to the regional savings bank and not by regional contagion.

## **VIII Conclusion**

In this paper we provide new evidence that negative shocks to banks have adverse real economic effects. The main contribution of the paper is its identification strategy. We consider savings banks in Germany. These banks, although small in terms of absolute size, are large banks and, in fact, often the market leaders in their regional area of activity. When a savings bank is in financial distress it is often merged with a neighboring savings bank. We interpret the distressed merger as an exogenous negative shock to the acquiring bank and analyze how the merger affects real economic activity in the region of the acquiring bank. Our results indicate that the growth rates of investments and GDP decrease while the number of insolvencies increases in the years after the merger.



We perform a number of robustness checks to rule out alternative explanations, most importantly regional contagion effects. We show that there are no adverse real effects in placebo regions, defined as regions that are also adjacent to the region of the distressed savings bank but in which no merger took place. We further show that the performance of the acquiring savings bank deteriorates relative to the performance of (1) the savings bank in the placebo region and (2) the largest cooperative bank in the region of the acquiring savings bank. In summary, our empirical evidence allows the conclusion that there is indeed a causal effect from shocks to savings banks to regional economic activity.

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**Table 1: Changes of real economic variables in the regions of the acquiring bank**

| VARIABLES                          | (1)<br>Log change investments | (2)<br>Log change insolvencies | (3)<br>Log change per<br>capita GDP |
|------------------------------------|-------------------------------|--------------------------------|-------------------------------------|
| Acquirer region (t;t+2) distressed | -0.101*<br>(0.060)            | 0.142*<br>(0.078)              | -0.014*<br>(0.008)                  |
| Acquirer region (t;t+2)            | 0.028<br>(0.040)              | -0.043<br>(0.081)              | -0.001<br>(0.004)                   |
| L.investment                       | -0.077***<br>(0.020)          |                                | 0.002*<br>(0.001)                   |
| L.insolvencies                     |                               | -0.011***<br>(0.001)           |                                     |
| L.GDP                              | 0.023**<br>(0.010)            | 0.025<br>(0.029)               | 0.013***<br>(0.003)                 |
| manufacturing                      | 0.187<br>(0.306)              | -1.118**<br>(0.532)            | 0.690***<br>(0.042)                 |
| construction                       | 0.214<br>(1.084)              | -1.602<br>(2.373)              | -0.035<br>(0.157)                   |
| Constant                           | -0.074<br>(0.107)             | 0.889***<br>(0.264)            | 0.038<br>(0.028)                    |
| Observations                       | 3,007                         | 1,523                          | 3,079                               |
| R-squared                          | 0.130                         | 0.276                          | 0.432                               |
| Number of regions                  | 312                           | 320                            | 318                                 |

**Table 2: Changes of real economic variables in the regions of the acquiring bank  
(year of the merger excluded)**

| VARIABLES                            | (1)<br>Log change investments | (2)<br>Log change<br>insolvencies | (3)<br>Log change per<br>cap GDP |
|--------------------------------------|-------------------------------|-----------------------------------|----------------------------------|
| Acquirer region (t+1;t+2) distressed | -0.113*<br>(0.063)            | 0.168*<br>(0.089)                 | -0.006<br>(0.012)                |
| Acquirer region (t+1;t+2)            | 0.009<br>(0.045)              | -0.070<br>(0.082)                 | -0.004<br>(0.005)                |
| L.investment                         | -0.077***<br>(0.020)          |                                   | 0.002*<br>(0.001)                |
| L.insolvencies                       |                               | -0.011***<br>(0.001)              |                                  |
| L.GDP                                | 0.023**<br>(0.010)            | 0.025<br>(0.029)                  | -0.730***<br>(0.107)             |
| manufacturing                        | 0.187<br>(0.306)              | -1.119**<br>(0.533)               | 0.688***<br>(0.042)              |
| construction                         | 0.183<br>(1.088)              | -1.583<br>(2.375)                 | -0.037<br>(0.156)                |
| Constant                             | -0.073<br>(0.107)             | 0.889***<br>(0.264)               | 0.039<br>(0.028)                 |
| Observations                         | 3,007                         | 1,523                             | 3,079                            |
| R-squared                            | 0.130                         | 0.276                             | 0.432                            |
| Number of regions                    | 312                           | 320                               | 318                              |

**Table 3: Changes of real economic variables in placebo acquiring regions**

| VARIABLES                                  | (1)<br>Log change investments | (2)<br>Log change<br>insolvencies | (3)<br>Log change per cap<br>GDP |
|--|-------------------------------|-----------------------------------|----------------------------------|
| Placebo acquirer region (t;t+2) distressed | 0.001<br>(0.062)              | 0.090<br>(0.114)                  | -0.006<br>(0.012)                |
| Placebo acquirer region (t;t+2)            | -0.006<br>(0.044)             | -0.027<br>(0.084)                 | 0.002<br>(0.011)                 |
| L.investment                               | -0.077***<br>(0.020)          |                                   | 0.000<br>(0.001)                 |
| L.insolvencies                             |                               | -0.012***<br>(0.001)              |                                  |
| L.GDP                                      | 0.022**<br>(0.010)            | 0.089**<br>(0.040)                | -0.012***<br>(0.003)             |
| manufacturing                              | 0.161<br>(0.302)              | -0.881*<br>(0.523)                | 0.597***<br>(0.039)              |
| construction                               | 0.179<br>(1.082)              | -1.601<br>(2.434)                 | -0.032<br>(0.160)                |
| Constant                                   | -0.061<br>(0.106)             | 0.520<br>(0.331)                  | -0.080***<br>(0.024)             |
| Observations                               | 3,018                         | 1,506                             | 3,098                            |
| R-squared                                  | 0.131                         | 0.286                             | 0.385                            |
| Number of regions                          | 313                           | 313                               | 314                              |

**Table 4: Changes to the balance sheet of the acquiring saving banks**

| VARIABLES                           | (1)<br>Indequity_ratio | (2)<br>IndLoan loss<br>provisions | (3)<br>IndROE         |
|-------------------------------------|------------------------|-----------------------------------|-----------------------|
| Acquiring bank (t+1;t+2) distressed | -0.028**<br>(0.012)    | 0.360***<br>(0.102)               | -0.151<br>(0.117)     |
| L.equity ratio                      | -1.700***<br>(0.245)   |                                   | -12.811***<br>(1.871) |
| L. Loan loss provisions             |                        | -13.843<br>(10.115)               |                       |
| L.ROE                               | -0.003***<br>(0.001)   | 0.041***<br>(0.010)               | -0.128***<br>(0.008)  |
| Total assets                        | 0.061***<br>(0.018)    | -0.421***<br>(0.097)              | -0.114**<br>(0.055)   |
| Retail deposits/total assets        | 0.012<br>(0.047)       | -2.706***<br>(0.479)              | 0.607**<br>(0.250)    |
| Loans/total assets                  | -0.038<br>(0.048)      | 0.349<br>(0.478)                  | 0.073<br>(0.251)      |
| Local election                      | -0.006*<br>(0.003)     | -0.150***<br>(0.041)              | -0.065**<br>(0.027)   |
| Constant                            | -0.290**<br>(0.145)    | 4.603***<br>(0.900)               | 1.646***<br>(0.423)   |
| Observations                        | 4,067                  | 3,310                             | 3,718                 |
| R-squared                           | 0.271                  | 0.095                             | 0.363                 |
| Number of bank*regions              | 524                    | 500                               | 506                   |

**Table 5: Changes to the balance sheet of acquiring and placebo “acquiring” banks**

| VARIABLES                                   | (1)<br>Indequity     | (2)<br>IndLLP_ta     | (3)<br>IndROE        |
|---|----------------------|----------------------|----------------------|
| Acquiring bank (t+1;t+2) distressed         | -0.028**<br>(0.013)  | 0.360***<br>(0.102)  | -0.125<br>(0.119)    |
| Placebo acquiring bank (t+1;t+2) distressed | 0.021*<br>(0.013)    | -0.063<br>(0.231)    | -0.088<br>(0.082)    |
| L.equity ratio                              | -1.695***<br>(0.245) |                      |                      |
| L. Loan loss provisions                     |                      | -13.833<br>(10.115)  |                      |
| L.ROE                                       | -0.003***<br>(0.001) | 0.041***<br>(0.010)  | -0.121***<br>(0.007) |
| Total assets                                | 0.060***<br>(0.018)  | -0.420***<br>(0.097) | -0.185***<br>(0.060) |
| Retail deposits/total assets                | 0.011<br>(0.048)     | -2.709***<br>(0.479) | -0.252<br>(0.247)    |
| Loans/total assets                          | -0.039<br>(0.048)    | 0.355<br>(0.478)     | -0.062<br>(0.239)    |
| Local election                              | -0.006*<br>(0.003)   | -0.150***<br>(0.041) | -0.064**<br>(0.027)  |
| Constant                                    | -0.284**<br>(0.144)  | 4.591***<br>(0.902)  | 2.109***<br>(0.445)  |
| Observations                                | 4,067                | 3,310                | 3,739                |
| R-squared                                   | 0.271                | 0.095                | 0.338                |
| Number of bank*regions                      | 524                  | 500                  | 506                  |



**Table 6: Changes to the balance sheet of the largest cooperative bank operating in the area of the acquirer saving bank**

| VARIABLES   | equity_ratio         | Loan loss provisions | ROE                  |
|---|----------------------|----------------------|----------------------|
| Coop bank in acquirer's district (t+1;t+2) distressed       | -0.003<br>(0.013)    | -0.345<br>(0.273)    | 0.135***<br>(0.042)  |
| Coop bank in a placebo acquiring region (t+1;t+2) distresse | 0.016<br>(0.026)     | 0.271<br>(0.292)     | 0.029<br>(0.170)     |
| L.equity ratio  | -3.031***<br>(0.376) |                      |                      |
| L. Loan loss provisions                                     |                      | -0.001***<br>(0.000) |                      |
| L.ROE   | -0.000<br>(0.001)    | 0.008<br>(0.007)     | -0.096***<br>(0.007) |
| Total assets  | 0.065***<br>(0.014)  | -0.388**<br>(0.151)  | -0.021<br>(0.079)    |
| Retail deposits/total assets                                | -0.042<br>(0.080)    | -0.680<br>(0.731)    | -0.103<br>(0.435)    |
| Loans/total assets  | -0.036<br>(0.046)    | 1.112<br>(0.699)     | -0.239<br>(0.211)    |
| Local election  | 0.003<br>(0.006)     | 0.095<br>(0.070)     | -0.000<br>(0.035)    |
| Constant  | -0.074<br>(0.114)    | 2.199**<br>(1.094)   | 0.734<br>(0.539)     |
| Observations  | 1,438                | 974                  | 1,393                |
| R-squared   | 0.268                | 0.170                | 0.360                |
| Number of bank*regions                                      | 217                  | 189                  | 215                  |