The Real Effects of Distressed Bank Mergers*

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Abstract

In this paper we revisit the question whether negative shocks to banks have adverse real economic effects. We analyze German savings banks and propose a new identification strategy. We consider distressed mergers and interpret them as exogenous shocks to the (initially non-distressed) acquiring bank. We find that in the years after a distressed merger (i) the performance of acquiring savings banks deteriorates; (ii) the shock is transmitted to firms in the acquirer's region who cut back their investments and (iii) the overall macroeconomic dynamics in the region of the acquirer deteriorates, leading to lower investment and employment growth. To justify a causal interpretation of our results we perform several additional tests that establish the exogeneity of the shock to the acquiring bank with respect to local economic dynamics.

Keywords: Bank distress, merger, growth, real effects

JEL Classification: E44, G21

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1 Introduction

The debate whether financial markets affect economic growth (dubbed the "finance-growth nexus" by Jayaratne and Strahan (1996)) goes back to (at least) Schumpeter (1912). The empirical examination of this nexus is challenged 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. As we will show in Section 2, the existing literature explores various identification strategies, many of which focus on analyzing exogenous shocks to the performance of financial institutions. However, given the interweaving between finance and the real economy, finding convincing evidence of the exogeneity of these shocks is challenging.

In this paper we exploit an institutional setting which allows us to identify exogenous shocks to financial institutions and thus permits us to make causal statements. More specifically, we focus on the following set up in the framework of the German savings banks system. Savings banks in Germany are only active in a defined geographic region. When a savings bank is in substantial financial distress, regulations which will be discussed in detail in Section 3, require that it is merged with a neighboring savings bank. We interpret the resulting distressed merger as an exogenous negative shock to the acquiring savings bank and analyze the effect of the merger on real economic activities at both the firm and the aggregate level in the region of the acquiring bank. We expect these effects to emerge because savings banks - even though they are often small institutions in terms of absolute size - are large in terms of market share in their regional markets. Consequently, shocks to these banks cannot be quickly absorbed by other banks.

We proceed as follows. First, we establish that distressed mergers indeed constitute a negative shock to the acquiring bank by providing evidence that, following the merger, acquiring banks have worse performance in terms of capitalization relative to banks which have not been involved in a merger, but also relative to banks which act as acquirer in mergers that are not driven by distressed conditions of the target. In addition, we document an immediate drop in the propensity to lend for acquiring banks in distressed mergers relative

to both control groups. Further, we empirically track how firms in the region of the acquiring bank are affected by the distressed merger. Last but not least we document the effects on real economic activity at the regional level. For both the firm-level and the regional-level analysis we focus on changes in investments since this is the real economic variable most closely related to the lending behavior of banks. We find that firms located in the region of an acquiring bank of a distressed merger reduce their investment growth by 3.0%, while aggregate investment growth on the regional level drops by 5.8%. At the firm level we also track several other variables related to investments and access to credit, such as changes in inventories and current assets, while at the regional level we also consider GDP and employment dynamics. We find that most real economic variables both at the firm and at the regional level are negatively and statistically significantly affected by distressed mergers.

A drop in economic activity in the region of the distressed target could spread to the region of the acquirer even without the distressed merger. Thus, in order to establish that the distressed merger is indeed causal for the change in regional economic activity we have to rule out that regional economic contagion is driving our results. To this end, we first show that the deterioration of performance is observed only for the distressed acquirer but not for banks which are subject to similar real economic dynamics. For this purpose, we examine the performance of two sets of banks facing similar economic conditions: first, cooperative banks in the same geographical region[1] and second, the saving banks in placebo regions, defined as regions that (1) are also adjacent to the region of the distressed target bank, (2) had similar economic dynamics as the acquiring bank's region prior to the merger and (3) did not experience a savings bank merger.

Further, by showing that there are no adverse real effects (neither at the firm nor at the regional level) in the placebo regions, we support our argument that the deterioration of real economic conditions in the region of the distressed acquirer is not driven by real economic contagion. In summary, our empirical evidence allows the conclusion that there is indeed a causal effect from shocks to savings banks to regional economic activity. We thus contribute

[1] Just as savings banks, cooperative banks operate in closely defined regions. These regions are, however, often smaller than those of the savings banks. More institutional details will be provided in Section 3.

to the literature on the relation between finance and real economic activities by providing an innovative strategy allowing the identification of the impact of finance on the real economy. In particular, we provide explicit evidence on the exogenous shocks to the affected financial institutions and then carefully trace how these shocks are transmitted to relevant dimensions of real economic performance, both at the firm and at the aggregate regional level.

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 with regard to post-merger dynamics. This section also presents the tests constructed in order to rule out the possibility of regional economic contagion. Section 6 concludes.

2 Related 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". This finding has been corroborated by a vast amount of academic research such as Beck *et al.* (2000), Bekaert *et al.* (2005) or Hsu *et al.* (2014), just to name a few. The channels through which financial development impacts economic growth are manifold, ranging from improving resource allocation (Boyd and Prescott (1986) to reducing the cost of external financing to firms (Rajan and Zingales, 1998). In countries with bank-dominated financial systems such as Germany (see Harhoff and Körting, 1998), external financing is usually obtained in the form of bank debt, often from only a few lenders or even only one lender. This financing pattern highlights the importance of a banking relationship (e.g. Diamond, 1991; Berger and Udell, 1995; Elsas and Krahnen, 1998; Schenone, 2009; Bolton *et al.*, 2016; Schwert, 2018). Firms that have a dominant lender are subject to a "credit channel" whereby (positive and negative) shocks are transmitted from banks to their corporate customers, possibly causing real economic consequences (e.g. Chava and

Purnanandam, 2011; Chodorow-Reich, 2013; Acharya *et al.*, 2018; Gropp *et al.*, 2018).

While it is plausible that the state of the financial system affects the real economy, a major concern is the presence of reverse causality where real economic conditions affect financial development (Goldsmith, 1969). To mitigate this concern the literature has proposed various strategies to identify the relation between finance and growth. Rajan and Zingales (1998) consider industries that rely heavily on external finance and find that these industries grow faster in countries with more developed financial markets. An alternative way to overcome the identification challenge is to study the effect of exogenous shocks to the financial system on economic growth. In this context, the literature distinguishes between positive and negative shocks. A series of papers exploit the relaxation of intrastate branching in the U.S. which is interpreted as a positive shock to the banking system in the respective state (e.g. Jayaratne and Strahan, 1996; Demyanyk *et al.*, 2007; Rice and Strahan, 2010; Hoffmann and Shcherbakova-Stewen, 2011; Bai *et al.*, 2018). 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. Most recently, Bai *et al.* (2018) provide evidence that local banks shifted their composition of credit supply towards more productive firms, which led to a significant increase in relative employment and capital growth.

Jiménez *et al.* (2017) and Behn *et al.* (2016b) also exploit changes in regulation as (arguably) positive shocks to banks. However, they consider time-series variation rather than cross-sectional variation. Jiménez *et al.* (2017) analyze pro-cyclical bank capital regulation in Spain and find that policy-induced relaxations of capital buffers have positive economic consequences. Behn *et al.* (2016b) 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, which can be interpreted as a positive shock to those banks. The banks responded with an expansion of their lending activity.

Acharya *et al.* (2019) and Grosse-Rueschkamp *et al.* (2019) study the indirect recapitalization of European banks through the European Central Bank (ECB)'s unconventional

monetary policy as a positive shock to banks. Acharya *et al.* (2019) analyze the Outright Monetary Transactions (OMT) which substantially reduced yields on periphery sovereign debt, translating into "windfall profits" for banks holding these assets. While credit supply to the corporate sector increased at the aggregate level, the authors document that banks (which were still weakly capitalized post-OMT) predominantly lent to "zombie firms", and that this credit misallocation slowed down the economic recovery. Grosse-Rueschkamp *et al.* (2019) consider the ECB's Corporate Sector Purchasing Program (CSPP) where weakly capitalized banks regained lending capacity as CSPP-eligible firms shifted from bank to bond financing. Banks reacted by lending to private firms, thereby reducing the financial constraints of these firms and increasing their investments.

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 find that bank failures affect real economic activity. Kandrac (2014), 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, Goetz and Gozzi (2010) find that banks relying more on wholesale funding reduced their 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

funding. Iyer *et al.* (2013) and Cingano *et al.* (2016) analyze data from Portugal and Italy, respectively, and arrive at similar conclusions. Huber (2018) exploits a lending cut by a large German bank during the financial crisis that was unrelated to domestic factors. He documents worse economic outcomes for domestic firms and counties that depended more on the respective bank. Most recently, Gropp *et al.* (2018) use the 2011 European Banking Authorities' capital exercise as a quasi-natural experiment to explore banks' reactions to increased capital requirements. Banks included in the exercise experienced a negative shock to their (regulatory) capital compared to untreated banks. The authors find that treated banks reduced lending to corporate and retail customers, causing lower asset growth, investments and sales for firms that depended more on treated banks. Acharya *et al.* (2018) study the credit crunch that followed the European sovereign debt crisis. The authors find that banks with substantial losses on their sovereign bond holdings (representing a negative shock to those banks) significantly reduced credit supply, and that this contraction in lending depressed investment, employment and sales growth of firms which had a pre-crisis relationship with affected banks. 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 which has at least two advantages. First, we present substantial evidence that the shocks to the financial institutions are exogenous with respect to real economic dynamics. This is not the case in the studies reviewed above where the pre-crisis or pre-policy intervention exposure of the affected banks to certain assets is not necessarily exogenous to the real economic environments faced by these banks. Second, because the savings banks we analyze have high market shares in their regional markets we can focus on tracing how shocks to these banks affect the real economic dynamics in the regions that depend on these banks.

Finally, our paper is related to research on the German banking sector, and on German savings banks in particular. Puri *et al.* (2011) analyze German savings banks (as we do) and exploit cross-sectional variation in their holdings in Landesbanken. Some of the Landesbanken had substantial subprime exposure. Savings banks with higher Landesbank holdings were thus 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. Dam and Koetter (2012) and Bersch *et al.* (2019) both study bailouts in the German banking sector. Dam and Koetter (2012) investigate the relationship between bailout expectations and risk-taking behavior of banks and find strong evidence in favor of a moral hazard problem arising from the existence of safety nets. Bersch *et al.* (2019) analyze the real effects of bank bailouts and find that bailouts of distressed banks lead to a bank-induced increase in the probability of default of their customers and reduced sales. Finally, the papers by Elsas (2007), Koetter *et al.* (2007) and Behn *et al.* (2016a) 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. Koetter *et al.* (2007) find that strengthening the financial performance of savings banks and cooperative banks reduces the probability of these banks to be subject to acquisition. However, these authors do not explore the channel through which the financial situation of the banks is strengthened. Behn *et al.* (2016a) develop the analysis further and examine 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.

3 Institutional Background

Administrative regions in Germany

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").[2] There are approximately 400 of these regions. In the sequel, we refer to the "Landkreise" and "kreisfreie Staedte" as "regions" or "administrative regions". The

[2] The two remaining states (Berlin and Hamburg) are cities.

administrative regions are the smallest geographical units for which the German Federal Statistics reports macroeconomic data.

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.

Public regional banks

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[3] of mostly small banks.[4] 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 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.[5] The savings banks as a group are the largest of the three German banking groups. At year-end 2017 they accounted for 36.8% of retail customer deposits and for about 19.7% of the total retail 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 28.7%.[6]

Each savings bank is active only in a specified area and is typically owned by the munic-

[3] The number has decreased from approximately 7,000 in 1970 to 1,034 at year-end 2014 (the end of our sample period).

[4] Few larger central institutions, which coordinate and pool the activities of the smaller cooperative banks are also part of the cooperative banking group, but because of their inter-regional and even international activities will not be part of the analysis presented here.

[5] The "Landesbanken", which are co-owned by the saving banks and are thus also part of the public savings bank sector in Germany are excluded from the analysis because they (just as the central institutions of the cooperative banking sector) have an interregional scope of operations.

[6] See the Financial Report (2017), pp.42-44, of the DSGV.

ipality(ies) in this area.[7] This area often, but not always, coincides with an administrative region. Given their regional scope of operations, individual savings banks are typically small institutions. The average savings bank in our sample had total assets of 2.6 billion Euro in 2014 (the largest savings bank had total assets of 27.4 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.* (2014). 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 in 2014.[8] This implies that there were more savings banks than administrative regions at the beginning of our sample period while towards the end of the sample period the number of regions and the number of banks were comparable. For most administrative regions this implies a correspondence between region and a savings bank's area of activity, but there still are administrative regions with more than one savings bank as well as savings banks serving more than one region.

Savings bank mergers

There are two motives for savings bank mergers. The first is to increase efficiency through economies of scale. This is a plausible motive for mergers among savings banks given the small size of some of these institutions. Efficiency-motivated mergers involve savings banks which are not in distress, and which try to extract synergies from reduced overheads and/or from exploiting advantages due to complementary business models, e.g. a bank in a region

[7] 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.

[8] Source: Statista, accessed March 5, 2019.

with a lot of lending opportunities merging with a neighboring bank with a solid volume of deposits.

The second merger motive is distress resolution. We refer to these mergers as distressed mergers, and they are in the focus of our paper. Their occurrence among savings banks is, in part, due to a structural characteristic of the German savings bank sector. Savings banks operate a safety net system which is coordinated at the state level by a state-level savings bank association ("Sparkassenverband"). The system requires that, whenever one savings bank is in distress, the other member banks step in and provide support (see Behn *et al.* (2016a) for details). Specifically, once a distress situation in a savings bank is detected, the savings bank association may assist in the arrangement of a merger with a suitable acquirer bank. The acquirer is usually a savings bank from a neighboring region within the same state.

There are two types of distressed mergers. Type one occurs when the target bank has been officially identified as a distressed institution by the German Banking Supervision (BaFin). This typically happens when a bank violates minimum equity requirements or other regulatory restrictions. In this case the savings bank association, together with the owner of the distressed bank (i.e. the municipality owning the target bank), has to develop a restructuring plan. The plan may stipulate financial support by the association[9] and may involve a merger. A merger, in turn, requires approval by the owner and by the management of the acquiring savings bank. The second type of distressed merger occurs when the owners of the savings banks, usually coordinated by the savings bank association, pro-actively organize a merger before the target is officially identified as a distressed institution by the BaFin. In this paper we use a broad definition of distressed mergers that includes both types. Specifically, we categorize a merger as distressed whenever the target bank performs poorly in terms of capitalization, non-performing loans or profitability. Details will be presented in the next section.

A merger with a distressed target will be a negative shock to the acquirer. Therefore, in

[9] Ultimately the funds would come from the other member banks of the savings bank association.

both types of distressed mergers an important criterion for the choice of the acquirer is its financial strength. This is important in the context of our analysis because it implies that any post-merger deterioration of the financial strength of the merged entity is likely to be caused by the merger rather than by the pre-merger condition of the acquirer.

For the management of the acquiring bank the decision whether to approve the merger is driven by a trade-off. On the one hand the merger will increase the assets under control of the managers, and most likely will also result in higher remuneration. On the other hand a distressed merger adversely affects the financial strength of the bank. While less risk-averse or more overconfident managers may be more prone to agree to a merger, the fact that the savings bank association and the political leaders of the municipalities owning the target and the acquirer bank have to approve the merger should largely alleviate the concern that managerial characteristics are the driving force of acquirer selection.

Our empirical approach is based on the argument that a distressed merger is a negative shock to the acquirer which then transmits to the real economy in the region. To identify this effect we compare the post-merger development of the bank and the economic dynamics in its area of activity to the development of savings banks and the economic dynamics in otherwise similar regions that did not experience a merger. However, a non-distressed merger may also adversely affect the acquiring bank because the integration of the target puts strain on the management and on the whole organization. To disentangle the effect on the acquiring bank of a distressed merger from the general effect of a merger we create a second control sample consisting of acquiring banks in non-distressed mergers and their region of activity.

4 Data and descriptive statistics

We combine information on local banks, data on local firms and macroeconomic variables describing the state and dynamics of the local economy. Our sample period covers the years 2000 to 2014. Prior to 2000 data on regional economic activity is unavailable.

Bank-level data

We collect data on local banks from two different source. First, we obtained a list containing all savings banks and the administrative regions they are operating in from "Deutscher Sparkassen- und Giroverband" (DSGV). This list also includes information on all mergers, i.e. the names and identification codes of the merging banks and the year of the merger. There were 127 unique transactions between 2000 and 2012. We do not consider mergers occurring after 2012 because we require at least two years of data subsequent to the year of the merger. We identify the acquiring bank in a merger as the bank which retains its savings bank id. For two mergers we were either unable to match target and acquirer to the bank-level accounting data, or key data like the merger year was missing. This leaves us with 125 mergers that were undertaken by 93 unique acquiring savings banks.

We obtain detailed accounting data from Bureau van Dijk's Bankscope database (now known as Bank Focus) and match it to the data provided by the DSGV. Out of the 545 savings banks initially present in the DSGV list Bankscope provides information on 507. These banks operate in 439 distinct administrative regions. The number of savings banks decreases during our sample period because of the mergers. Some of the these mergers 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 (i.e. as of 2014) our data set contains 394 of these banks.

We also source information on cooperative banks from BankScope. We use these banks as a control sample in one of our robustness checks. Bankscope provides information on 1 411 unique cooperative banks operating in 401 different administrative regions during our sample period. After dropping banks with insufficient accounting data in Bankscope we identify the largest cooperative bank in each administrative region.

Table 1 shows descriptive statistics for the acquiring banks, for all other savings banks, and for our sample of cooperative banks. The only noticeable difference between acquirers and other savings banks is that the former are, on average, much larger (total assets 3.4 bn euros as compared to 1.96 bn).

Table 1: Bank descriptives (2000-2014)

Table 1 presents the distribution of various bank characteristics over our whole sample period, from 2000 to 2014, among the three different groups of banks we use in our analysis. Panel A consist of all savings banks that engaged in a merger as acquirer bank, independent of the type of merger. Panel B contains all other savings banks that that never engaged in a merger (neither as acquirer nor as target). Panel C consists of the largest cooperative banks operating in the same region as a corresponding savings bank. Target savings banks are included in neither of the group and omitted from the Table as we do not use them in our analysis at any point.

	(1) Acquirer Savings Bank				(2) Other Savings Banks				(3) Cooperative Banks			
	N	Mean	p50	Std. Dev.	N	Mean	p50	Std. Dev.	N	Mean	p50	Std. Dev.
Total Assets (EURm)	1,442	3,183	2,270	2,923	4,575	1,995	1,318	2,534	3,294	869	595	860
Asset Growth	1,343	0.0396	0.0164	0.1275	4,270	0.0147	0.0140	0.0411	3,032	0.0489	0.0261	0.1201
Equity / Total Assets	1,430	0.0581	0.0550	0.0167	4,559	0.0606	0.0556	0.0198	3,294	0.0644	0.0602	0.0187
Total Customer Deposits / Total Assets	1,442	0.6963	0.7047	0.0934	4,575	0.6860	0.6950	0.0946	3,294	0.7493	0.7537	0.0709
Gross Loans / Total Assets	1,442	0.5884	0.6092	0.1319	4,571	0.5992	0.6105	0.1211	3,292	0.5708	0.5946	0.1296
Total Debt / Equity	1,430	17.6509	17.1841	5.5005	4,559	17.1145	16.9759	5.5691	3,294	15.7496	15.6000	4.4794
Current Assets / Total Assets	1,430	0.1194	0.1051	0.0705	4,559	0.1183	0.1010	0.0738	3,294	0.1441	0.1307	0.0783
Loan Loss Provisions / Gross Loans	1,442	0.0067	0.0073	0.0111	4,570	0.0057	0.0067	0.0108	3,282	0.0068	0.0068	0.0106
Gross Loans / Total Customer Deposits	1,442	0.8738	0.8774	0.2685	4,571	0.9011	0.8889	0.2590	3,292	0.7762	0.7977	0.2161
Return on Average Assets	1,442	0.0017	0.0015	0.0019	4,574	0.0018	0.0016	0.0014	3,293	0.0026	0.0023	0.0025
Return on Average Equity	1,441	0.0301	0.0266	0.0302	4,574	0.0322	0.0283	0.0251	3,293	0.0415	0.0363	0.0412

Savings banks mainly refinance themselves with customer deposits (on average 68% of total assets) which they utilize for their lending activities that account for 59% of total assets. Savings banks are well capitalized, with an average equity ratio of 5.9% during our sample period. The equity ratio strongly increases during this period, starting from 4.4% in 2000 and increasing to 8.7% by 2014 (figures not shown in the table). The cooperative banks are much smaller than the savings banks, have higher deposit ratios and are also well-capitalized.

Given the information on savings bank mergers and the respective accounting data, we differentiate between distressed mergers and non-distressed mergers in our analysis. We define a merger as distressed if at least one of the following three criteria applies to the target bank (relative to the universe of German savings banks):

(i) the target bank's equity to total assets ratio was in the lowest quintile 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 quintile of the respective yearly ROE distribution in at least one of the two years prior to the merger or

(iii) the loan loss provisions (LLP) to total loans ratio is in the highest quintile of the respective yearly LLP-to-total-loans distribution in at least one of the two years prior to the merger.

Based on this definition, we classify 88 mergers as distressed mergers, while the remaining 37 mergers are presumably due to other reasons like economies of scale or the consolidation of administrative regions.[10] The distribution of distressed and other mergers during our sample period is displayed in Figure 1. The 125 mergers affected 177 unique administrative regions, either as acquiring or as target region, or both. Because we want to identify the impact of a distressed merger on the acquiring bank's region and distinguish it from contagious effects

[10] During our sample there were three major consolidations of administrative regions ("Gebietsreform") in the states of Sachsen-Anhalt (2007), Sachsen (2008) and Mecklenburg-Vorpommern (2011). We treat all mergers in these states that occur in the two years surrounding the year of the consolidation as non-distressed mergers.

Figure 1: Distribution of distressed and other mergers between 2000 and 2012

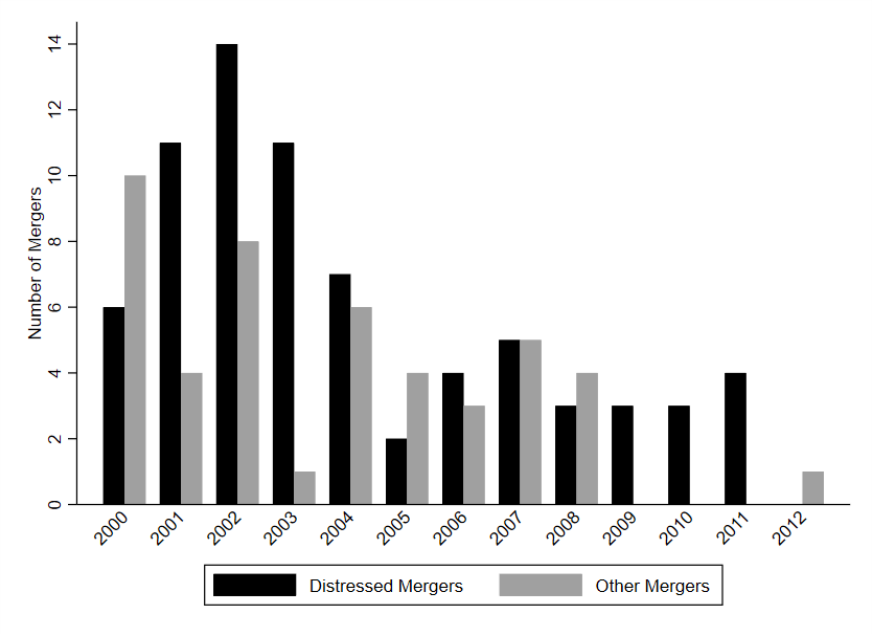

Figure 1 depicts the distribution of savings bank mergers between 2000 and 2012. Mergers are classified as distressed if in either of the two years prior to the merger, the target savings bank figures for equity ratio, return on equity or LLP to total loans ratio was in the worst quintile relative to the universe of German savings bank.

we remove all administrative regions that have hosted a target savings bank at any point in time from our analysis. From the initially available 469 distinct administrative regions, we remove 126 target regions. Out of the remaining 343 regions, 61 host an acquiring savings bank while the other 282 regions have never experienced a merger (neither on the acquiring nor on the target side).

Firm-level data

We obtain firm-level data from Bureau van Dijk's ORBIS global database which provides detailed information, including industry affiliation and accounting data, for public and private firms. In order to obtain a representative dataset we use ORBIS Flat File data and clean it in accordance with the instructions provided in Kalemli-Ozcan *et al.* (2015).[11] ORBIS provides information on more than two million unique German firms, of which more

[11] We thank Peter Severin for sharing the dataset with us.

than one million firms have non-missing information on total assets over the period 2000 to 2014. We match each firm to an administrative region based on its headquarter's zip code. We include in our sample firms from the manufacturing and service sectors which are identified by the two-digit industry codes 5-82 in NACE Rev.2 (excluding 64-66).[12] We further exclude firms with total assets in excess of EUR 100 000 000 as well as listed firms because we assume that these firms predominantly rely on refinancing sources other than borrowing from local savings banks. This size restriction eliminates less than 3% of all observations from our sample.

One of our objectives is to compare post-merger loan supply to firms located in the acquirer bank's region to loan supply to a sample of control firms. To create the control sample we first select, for each acquirer bank region, a placebo region according to the following selection process:

(i) the region needs to share a common border with the target bank region and belong to the same state as the target bank region and

(ii) the region never experienced a merger, neither as acquirer nor as target;

(iii) for the regions that meet the two conditions we compute the Euclidean distance (ED) relative to the region of the actual acquirer based on observable macroeconomic variables. The ED is computed as the square root of the sum of the squared differences of the matching variables GDP growth, GDP per capita and population. The differences are standardized by the respective variable's sample standard deviation. The region with the lowest ED is selected as placebo region, except if the so selected region has an ED large than one in which case we exclude it from the placebo sample[13].

[12] The excluded sectors are agriculture (01-04), finance (64-66), public administration (84), education (85), human health (86-88), arts (90-93) and other activities (94-99). See NACE Rev.2 for details on the European Classification of Economic Activities.

[13] An Euclidean distance larger than one exemplifies a "bad" match, i.e. that the only remaining placebo region is substantially different from the acquirer region. This is most often the case where a rural area ("Landkreis") is matched to metropolitan area ("Stadtkreis/kreisfreie Stadt"), or vice versa. In these cases the matching variables differed by a factor of five to seven.

Starting with 125 unique merger and 653 available (not unique) neighboring regions, we loose 45 merger (130 neighbors) as our data indicates that the target and acquirer bank were operating in at least one common region. Next, we remove 341 neighbors that were themselves subject to a merger (target or acquirer) at any point during our sample period, reducing the number of mergers to 60. Subsequently, we drop those neighbors that are located in a different state than the target bank and those with missing macro data in the year prior to the merger, reducing the number of mergers to 43 and the number of available neighbors to 118. Among these we compute the ED as described above so that using our procedure, we are able to match 30 placebo regions to the 61 acquirer regions. A detailed overview of the selection process can be found in Table A1. These placebo regions are used throughout our analysis, i.e. in the bank level, firm level as well as macro level analyses.

More than 25 000 unique firms in our ORBIS data set are headquartered either in the region of an acquiring bank or in the matched placebo region. For each of these firms we identify up to five control firms from other regions according to the following protocol:

(i) the firm operates in the same 2-digit NACE industry and

(ii) the region the firm is located in did not experience a merger at any time, neither as acquirer nor as target and

(iii) we require that data is available for years $t-2$ to $t+2$ where t is the year of the merger;

(iv) for all firms that fulfill these two criteria we calculate the Euclidean distance relative to the firm in the acquirer or placebo region based on total assets, long-term leverage and firm age, where all variables are measured in the year prior to the merger. The Euclidean distance is computed as the square root of the sum of the squared differences of the matching variables, where each difference is standardized by the sample standard deviation of the respective variable within the 2-digit NACE industry. We keep the five firms with the lowest distance.

Table 2: Firm descriptives

Table 2 display the distribution of various firm characteristics for (1) firms located in the region of the acquiring savings bank, (2) the firms matched to each acquirer region firm as well as (3) for firms located in placebo regions. The matched firms (up to four per acquirer firm) are selected such that they operating in the same 2-digit NACE industry and are closest to the acquirer region firm in terms of total assets, long-term leverage and firm age in the year prior to the merger. Placebo firms are located in placebo regions, i.e. regions that (i) share a common border with the target region; (ii) were never affected by a merger and (iii) are similar to the actual acquirer region in terms of investments per employee, GDP per capita, gross value added of manufacturing and construction as well as insolvencies (if available) Panel A provides descriptive statistics for the complete sample while Panel B only provides descriptives for the year prior to the merger, which is used for the matching.

Panel A: Firm Descriptives (complete sample)

	(1) Acquirer Firms				(2) Matched Firms				(3) Placebo Firms			
	N	Mean	p50	Std. Dev.	N	Mean	p50	Std. Dev.	N	Mean	p50	Std. Dev.
Total Assets (EURm)	83,832	3.8689	0.6097	10.1110	386,506	3.4508	0.5934	9.0333	28,572	3.3502	0.7343	8.3917
Firm Age (Years)	83,832	18.4909	12.0000	20.6393	386,506	17.7814	12.0000	19.2617	28,572	21.0867	15.0000	21.9020
Cash / Total Assets	83,130	0.2081	0.1033	0.2482	383,441	0.2023	0.1029	0.2389	28,418	0.1789	0.0971	0.2101
Current Assets / Total Assets	83,832	0.7083	0.8336	0.3077	386,506	0.7031	0.8191	0.3027	28,572	0.7171	0.8103	0.2749
Fixed Assets / Total Assets	83,829	0.2917	0.1664	0.3077	386,486	0.2969	0.1809	0.3027	28,564	0.2830	0.1898	0.2749
Inventories / Current Assets	83,130	0.5002	0.5240	0.3154	383,441	0.5008	0.5184	0.3079	28,418	0.5384	0.5679	0.2871
Current Liabilities / Total Assets	83,832	0.2143	0.0682	0.2789	386,506	0.2212	0.0829	0.2793	28,572	0.2232	0.0859	0.2790
Long-term Debt / Total Assets	83,832	0.3820	0.3021	0.3176	386,506	0.3822	0.3096	0.3096	28,572	0.4174	0.3604	0.3089
Equity / Total Assets	83,832	0.4010	0.3587	0.3175	386,506	0.3942	0.3547	0.3084	28,572	0.3578	0.3171	0.2843
Total Debt / Equity	80,275	10.6810	1.6369	39.8033	371,346	10.3111	1.6800	38.0751	27,583	11.0661	2.0092	37.9606

Panel B: Firm Descripitves (one year prior to the merger)

	(1) Acquirer Firms				(2) Matched Firms				(3) Placebo Firms			
	N	Mean	p50	Std. Dev.	N	Mean	p50	Std. Dev.	N	Mean	p50	Std. Dev.
Total Assets (EURm)	18,637	3.6312	0.5491	9.7385	91,986	3.3149	0.5432	8.8277	6,778	3.2892	0.6858	8.3247
Firm Age (Years)	18,637	17.2094	10.0000	20.4688	91,986	16.6227	11.0000	19.2174	6,778	20.0326	14.0000	22.0032
Cash / Total Assets	18,636	0.2085	0.1023	0.2500	91,984	0.2046	0.1040	0.2418	6,778	0.1797	0.0973	0.2124
Current Assets / Total Assets	18,637	0.7060	0.8312	0.3103	91,986	0.7023	0.8182	0.3043	6,778	0.7173	0.8133	0.2777
Fixed Assets / Total Assets	18,636	0.2941	0.1689	0.3104	91,976	0.2977	0.1819	0.3043	6,776	0.2828	0.1868	0.2777
Inventories / Current Assets	18,636	0.4969	0.5195	0.3182	91,984	0.4974	0.5163	0.3096	6,778	0.5376	0.5705	0.2898
Current Liabilities / Total Assets	18,637	0.2165	0.0761	0.2747	91,986	0.2249	0.0957	0.2742	6,778	0.2382	0.1218	0.2784
Long-term Debt / Total Assets	18,637	0.3698	0.2886	0.3098	91,986	0.3679	0.2960	0.3001	6,778	0.3945	0.3261	0.3024
Equity / Total Assets	18,637	0.4133	0.3591	0.2987	91,986	0.4069	0.3556	0.2905	6,778	0.3670	0.3158	0.2703
Total Debt / Equity	18,637	12.4712	1.7847	44.2771	91,986	11.6607	1.8124	41.6158	6,778	13.1344	2.1704	44.0982

Table 2 shows descriptive statistics for three groups of firms, namely (1) firms located in a region hosting the acquiring savings bank, (2) firms matched to the firms in the first group, and (3) firms located in a placebo region.[14] In total, we consider more than 100 000 unique firms in our analysis. Panel A provides the figures for the whole sample period, i.e. ($t-2$ to $t+2$) surrounding the merger year, while Panel B reports the same variables for the year prior to the merger ($t-1$), which was used for the matching.

All three groups show very similar characteristics. The median firm size (as measured by total assets) is slightly higher than EUR 500 000 and the median firm age is twelve years. The firms in our sample have low ratios of fixed assets to total assets (on average less than one third) and, correspondingly, high current assets ratios. The median equity ratio ranges between 34% and slightly more than 40%.

Macro-level data

We source data on local economic activity 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 employment. We further obtain data on the shares of construction and manufacturing in regional GDP. The data is available in a uniform format from 2000 to 2014.

Table 3 displays various macroeconomic variable, separately for acquiring regions, placebo regions, and all other regions (excluding target regions) over the sample period. On average, acquirer regions and placebo regions have higher population than other regions. The main reason is that acquiring savings bank are usually larger than the target banks, and the size of savings banks is positively related to the population in their region of activity.

[14] The fourth group consists of the firms matched to the firms located in placebo region and is omitted for the sake of clarity and brevity.

Table 3: Macro descriptives (2000-2014)

Table 3 presents macroeconomic characteristics among three different groups of regions that we use in our analysis in the period from 2000 to 2014. The first group consists of all regions that hosted an acquiring savings bank of both distressed and non-distressed mergers. The second group contains all regions that never experienced a merger (neither of an acquiring nor a target savings bank) and that are not identified as a placebo region of a merger. The third group display the same characteristics for regions that we identified as placebo regions, i.e. regions that (i) share a common border with the target region; (ii) were never affected by a merger and (iii) are similar to the actual acquirer region in terms of their macroeconomic characteristics (investments per employee, GDP per capita, gross value added of manufacturing and construction as well as insolvencies (if available)). Information on insolvencies are only available from 2007 onwards. GVA stands for gross value added.

	(1) Acquirer Region				(2) Other Regions				(3) Placebo Regions			
	N	Mean	p50	Std. Dev.	N	Mean	p50	Std. Dev.	N	Mean	p50	Std. Dev.
Population	765	213,390	151,588	171,387	3,642	177,543	139,326	146,959	321	179,679	140,463	91,995
Labor Force	785	112,341	69,960	116,937	3,752	86,747	63,508	83,289	331	84,011	59,713	56,801
Unemployed People	719	9,691	5,315	10,945	3,480	7,450	5,819	6,460	309	6,848	4,739	5,358
Investments (TEUR)	772	133,600	64,408	203,509	3,589	106,721	66,586	136,852	324	122,606	75,844	124,056
Investments per Unit Labor (TEUR)	741	1.2189	0.9199	0.9964	3,494	1.2672	1.0484	1.0979	322	1.3005	1.2508	0.7775
Insolvencies (2007 onwards)	398	86	39	124	1,932	55	37	58	174	63	34	67
GDP (TEUR)	785	7,059,057	3,766,085	9,055,973	3,752	5,129,717	3,428,226	6,056,771	331	4,943,379	3,370,588	3,909,901
GDP per Unit Labor (TEUR)	785	57.2250	55.2030	13.4834	3,752	54.9436	53.4130	11.5679	331	56.0309	55.5400	8.5601
GDP per Capita (TEUR)	765	29.7793	25.9920	14.6864	3,642	28.2308	24.6035	13.5879	321	25.9442	24.6090	8.8464
GVA Manufacturing / GDP	765	0.2005	0.1789	0.0996	3,630	0.2148	0.2016	0.1021	321	0.2331	0.2351	0.0871
GVA Construction / GDP	765	0.0458	0.0436	0.0193	3,642	0.0491	0.0469	0.0217	321	0.0477	0.0456	0.0154

Because we deliberately select placebo regions which are similar to the acquirer region, placebo regions are of similar size as acquirer regions. Average unemployment is similar across acquirer, placebo and other regions. Investments per employee, GDP per unit employee, GDP per capita, the share of gross value added (GVA) of manufacturing to GDP and the share of GVA of construction are also similar across all three groups of regions. Nevertheless, in our regressions we will control for differences across regions in these variables by including them as controls and by adding region fixed effects.

5 Results

5.1 Bank-level analysis

5.1.1 A distressed merger is a negative shock to the acquirer

We start the empirical analysis by providing evidence that a distressed merger generates adverse effects for the acquiring bank. For this purpose, we explore the changes in key accounting variables following distressed bank mergers. Given that a distressed merger is a merger with a target which has weak capitalization, risky loans and very low profitability, we first analyze whether the capitalization of the bank (measured by the ratio of total equity to total assets), the quality of the loan portfolio (measured by the ratio of loan loss provisions to total loans), and the profitability (measured by the return on equity and return on assets) of the acquiring bank are deteriorated after the merger. Next, we focus on exploring whether the acquiring bank responds to the negative shock caused by the merger by reducing its loan supply. To test this hypothesis we also estimate the effect of the merger on the ratio of loans (excluding interbank loans) to assets. We estimate the following panel regression model:

$$\Delta perf_{r,t+1} = \beta_1 \cdot Acquirer\ bank\ distressed_{r,t} + \beta_2 \cdot Acquirer\ bank_{r,t} + \gamma \cdot controls_{r,t-1} + \delta_t + \vartheta_r + \varepsilon_{r,t}. \quad (1)$$

The dependent variable, denoted $\Delta perf_{r,t+1}$ in equation (1), is the log growth rate of capitalization, non-performing loans ratio, return on equity, return on assets, and loan-to-assets ratio, respectively. r and t denote the region and the year. The independent variable of main interest is *Acquirer bank distressed*$_{r,t}$, a dummy variable that identifies acquiring banks in the two years 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 accounting ratios of the acquiring bank.[15] We therefore concentrate on the two years after the merger, excluding the merger year.[16] In other words, we test whether the negative shock to the acquiring bank *persists* after the distressed merger.[17] In order to differentiate between distressed mergers and non-distressed mergers we also include a dummy variable *Acquirer bank*$_{r,t}$, indicating whether the bank has been an acquirer in *any* type of merger (distressed or non-distressed). As with, *Acquirer bank distressed*$_{r,t}$, *Acquirer bank*$_{r,t}$ is equal to one in the two years after the merger, excluding the merger year.

We include as additional independent variables bank-level control variables (the lagged levels of the three performance measures and the relative lending volumes, 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 respective region in the year under consideration. Bank fixed effects, ϑ_r control for unobservable heterogeneity across banks. Also, time fixed effects, δ_t, are included to account for federal-level macroeconomic dynamics as well as for changes in bank regulation. Since we are interested in detecting the effect of the merger on the acquiring bank we exclude all target banks from all regression specifications. Target bank performance is likely to be lower than the performance of the average savings banks. Their inclusion might thus bias our estimates.

[15] We manually checked the consistency of the merger year as provided by the DSGV and the year of consolidation in Bankscope to avoid the inclusion of any effect resulting from the consolidation that might bias our results.

[16] Our findings are robust to completely excluding the merger year from the regression analysis.

[17] 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.

Table 4: Bank performance - distressed vs. all mergers

Table 4 displays the results for the fixed effect panel regression described in equation (1) over the period 2000 to 2014. The dependent variables are the log changes in banks' equity ratio (CAR). return on average equity (ROE), return on average assets (ROA), loan loss provisions to gross loans (LLP) and gross loans to total assets (Loans). Acquirer bank (t+1;t+2) is a dummy indicating whether the bank has been an acquirer in any type of merger (distressed or non-distressed) in the two years subsequent to the merger year. Acquirer bank distressed (t+1;t+2) is equal to one only for acquirer banks of distressed mergers in the two years after the merger. The control variables are the lagged values of the dependent variables as well as lagged values of the log of total assets, the ratio of total customer deposits to total assets and a dummy indicating whether there was regional elections in the banks' region in the respective year. Year and bank fixed effects are included in all specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1) CAR	(2) ROE	(3) ROA	(4) LLP	(5) Loans
Acquirer bank distressed (t+1;t+2)	-0.0254**	-0.0075	-0.0650	0.1152	-0.0232**
	(0.0111)	(0.1226)	(0.1216)	(0.1079)	(0.0113)
Acquirer bank (t+1;t+2)	0.0077	-0.1817*	-0.1359	0.1183**	0.0087
	(0.0082)	(0.0982)	(0.0980)	(0.0546)	(0.0085)
CAR_{t-1}	-3.2630***	-8.8792***	-9.1191***	-17.8833***	-0.4534***
	(0.2810)	(1.7001)	(1.6504)	(3.4208)	(0.1330)
ROE_{t-1}	-1.3721***	-12.2282***	-9.8191***	-2.5766	-0.0985
	(0.4049)	(2.5151)	(2.4416)	(1.8659)	(0.0785)
ROA_{t-1}	23.2649***	-18.1057	-51.6647	132.8477**	2.5607
	(7.1384)	(46.3124)	(44.9865)	(56.9349)	(1.9024)
LLP_{t-1}	-0.3540***	-0.0786	-1.9484*	-15.8470***	-0.2848***
	(0.1279)	(1.0176)	(1.0093)	(3.9522)	(0.0878)
$Loans_{t-1}$	-0.0823***	0.1653	0.1802	0.6723*	-0.2478***
	(0.0280)	(0.2016)	(0.1955)	(0.3974)	(0.0211)
$Log(Total\ Assets)_{t-1}$	0.0169	-0.1966	-0.1545	-0.2213	0.0266**
	(0.0108)	(0.1458)	(0.1255)	(0.1381)	(0.0106)
Local Election	-0.0014	-0.0491	-0.0450	-0.1660***	-0.0017
	(0.0027)	(0.0329)	(0.0292)	(0.0328)	(0.0017)
Bank FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	4363	4304	4292	3363	4363
Adjusted R^2	0.4083	0.2415	0.2385	0.1072	0.1526

The results are shown in Table 4. Given the fact that the regressions include both *Acquirer bank*$_{r,t}$, a dummy for the acquirer of all (distressed and non-distressed) mergers,

and *Acquirer bank distressed*$_{r,t}$, a dummy only for the acquirer in distressed mergers, the coefficients of *Acquirer bank*$_{r,t}$ measure the effect in the two years after a merger for the acquirer in non-distressed mergers (when *Acquirer bank distressed*$_{r,t} = 0$) relative to the control group of non-merging banks. The coefficients on this dummy variable are insignificant, except for an increase in loan loss provisions and the drop in return on equity, which are significant at the 5% and 10% level, respectively, and most likely indicate a shift in post-merger accounting policy characterized by higher loan loss provisions and thus lower profitability. More important in our context are the coefficients of the dummy *Acquirer bank distressed*$_{r,t}$, as well as the sums of the coefficients of *Acquirer bank distressed*$_{r,t}$ and *Acquirer bank*$_{r,t}$. The former represents an estimate of the differences between acquirer in distressed and non-distressed mergers, while the later indicate the effect of the distressed acquisition relative to the control group of banks not involved in mergers. The results with this regard clearly indicate that the equity ratios of acquirer in distressed mergers decrease significantly following the merger. This effect is not only statistically, but also economically significant, with acquirer in distressed mergers experiencing about 2.5%[18] lower growth in capitalization relative to the group of acquirer in non-distressed mergers. As previously pointed out, the profitability of acquirer in distressed mergers also deteriorates (significantly so for the return on equity and marginally insignificant for the return on assets), albeit only relative to non-merging banks.[19]

Last but not least we find that a distressed merger is not only associated with a deterioration of the acquirer's performance, but also with an immediate drop in a bank's propensity to lend. As shown in column (5) of Table 4, the growth of the loan-to-assets ratio in the balance sheets of acquiring banks in distressed mergers decreases by approximately 2.3%

[18] Since the dependent variable is defined as the logarithmic growth rate, the effect of the explanatory variables is obtained by $100 \cdot (\exp(-0.0254) - 1) = 2.5\%$.

[19] In additional tests which we do not report here for the sake parsimonious exposition we also track the changes of bank performance by using two separate dummy variables for the non-distressed and for the distressed acquirer, so we directly compare acquiring savings bank performance of distressed and non-distressed mergers to all other savings bank. Consistently with the estimates of the coefficients of the *Acquirer bank distressed*$_{r,t}$ and Acquirer bank dummies presented in Table 4 in this case we again find that the ROE decrease and LLP increase not only for the acquirer in distressed but also for the acquirer in non-distressed mergers with the difference between the estimated coefficients for the distressed and the non-distressed acquirer being not statistically significant.

in the years following the merger, while there is no significant change in the loan-to-assets ratios of acquirer in the general category of distressed and non-distressed mergers.

In sum, the results so far are consistent with our hypothesis that a distressed merger deteriorates the performance of the acquiring bank. Distressed acquirers' capitalization is negatively affected, with an immediate effect for the propensity to lend, which is significantly reduced. Later in the paper we will analyze how the reduced performance and lending supply of the acquiring bank affect regional firms and the regional economy.

5.1.2 Alternative explanations / robustness

Before we analyze the effect of the merger on regional firms and the regional economy, we present some additional tests to strengthen the evidence that the distressed merger is the driving force behind the deterioration of the acquiring bank's balance sheet. Specifically, we wish to rule out that the changes we have documented are caused by regional economic contagion rather than by the merger. Real economic distress in the region of the target bank could spread to neighboring regions, including the region of the acquiring bank. We would then observe deteriorated acquirer bank balance sheet relations even without a merger. We estimate two additional sets of regressions to rule out the alternative of real economic contagion.

In the first set of regressions explore whether other banks in the region of the acquiring bank in a distressed merger also suffer a deterioration of their performance. 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 real economic conditions to bank performance, we would expect to find that all banks active in the region of the acquiring savings bank in a distressed merger were negatively affected.

We implement our approach by adding two dummy variables to model (1). The first dummy variable, *Acquirer & placebo bank distressed*$(t+1; t+2)$, is set to 1 for both the ac-

Table 5: Bank performance - actual vs. placebo acquirer

Table 5 displays the results for the re-estimated fixed effect panel regression described in equation (1), comparing true and placebo acquirer of distressed mergers, where the later is the savings bank that operates in the placebo region as identified in Section 4. The dependent variables and control variables are defined as described in Table 4. Acquirer & placebo bank distressed (t+1;t+2) is a dummy identifying the true and the placebo acquiring bank of a distressed merger in the two years subsequent to the merger. Acquirer bank distressed (t+1;t+2) is equal to one only for the true acquirer banks of distressed mergers in the two years after the merger. Year and bank fixed effects are included in all specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1) CAR	(2) ROE	(3) ROA	(4) LLP	(5) Loans
Acquirer bank distressed (t+1;t+2)	-0.0186*	-0.2366*	-0.2536**	0.2657**	-0.0141*
	(0.0105)	(0.1272)	(0.1262)	(0.1209)	(0.0083)
Acquirer & placebo bank distressed (t+1;t+2)	0.0006	0.0552	0.0582	-0.0381	-0.0008
	(0.0070)	(0.0983)	(0.0985)	(0.0675)	(0.0041)
Bank Controls	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	4363	4304	4292	3363	4363
Adjusted R^2	0.4082	0.2409	0.2382	0.1070	0.1523

tual acquiring bank and the bank in the placebo region in the two years following a distressed merger (and is set to 0 for all other banks and in all other periods). The second dummy, *acquirer bank distressed*$(t+1;t+2)$, is set to 1 only for the actual acquiring bank and thus captures any performance differences between the true and placebo acquiring banks. Consequently, the first dummy will capture the effect on bank performance of regional economic contagion while the second dummy will pick up the additional effect of the merger on the acquiring bank.

The results, presented in Table 5, indicate that the performance of saving banks operating in the placebo regions is not significantly different from that of the reference group of banks not located in either target, nor acquirer, nor placebo regions. In contrast, the performance of the true acquirers significantly deteriorates relative to the placebo acquirers in all dimension we explore here. Namely, the growth rates of capital ratios, profitability, and loan volumes relative to total assets drop, while those of loan loss provisions increase. These results, therefore, suggest that the negative shock to the performance of the acquiring bank is not

due to the spread of real economic distress, but is rather directly related to the distressed merger.

To differentiate between these two cases we take advantage of the fact that, parallel to the regional saving banks, there is also a network of cooperative banks which have a similar geographical scope of activity. We examine the performance of cooperative banks operating in the region of the acquiring saving banks. If the performance of the acquiring savings bank deteriorates because of regional economic contagion we expect the performance of the cooperative bank to also deteriorate. If, on the other hand, the merger causes the deterioration of the acquirer's balance sheet we expect the cooperative bank to be unaffected.

We compile a sample of all cooperative banks for which information is provided by Bankscope (1 411 cooperative banks operating throughout the sample period). The overlap between the regions of the savings banks and those of the cooperative banks is not perfect, in the sense that 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 (see Table 1 for details). Oftentimes (in 283 of the regions) more than one cooperative bank operates in a region served by a savings bank. In these cases we choose the largest cooperative bank that is active in the respective region.[20] Moreover, we drop all cooperative banks that operate in a target bank region so that we end up with 280 unique cooperative banks.

To analyze the relative difference between the changes in the performance of cooperative banks and savings banks in the same region, we modify model (1) by including two dummy variables. The first dummy variable, *coop & savings bank distressed*$(t+1;t+2)$, identifies both the savings and the cooperative bank in the distressed acquirer region in the two years following the merger year. The second dummy, *savings bank distressed*$(t+1;t+2)$, only identifies the acquiring savings bank, and thus captures the performance differences between the acquiring savings bank and the cooperative bank which is active in the same region. The results, shown in Table 5, indicate that the performance of the cooperative banks in the

[20] 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 better for larger banks). Still, we lose 39 regions for which data on cooperative bank balance sheets is unavailable.

acquirer' regions does not deteriorate relative to the control group of banks in non-merger regions. This is evidence against regional contagion. The savings banks which are acquirer in a distressed merger, on the other hand, do markedly worse. Their capitalization, profitability and loan-to-assets ratios decrease significantly relative to the cooperative banks in the same region while their loan loss provisions increase.

In the second set of regressions we modify the model described in equation (1) to include a comparison between the performance of acquiring banks and the performance of the savings banks in the placebo regions defined in section 4. The placebo regions are also neighbors to the target region, are in the same state, have not experienced a savings bank merger, and are deliberately selected to be similar to the region of the acquiring bank in terms of macroeconomic characteristics. Consequently, should real economic contagion be the channel behind the deterioration of the acquiring bank performance, the savings bank in the placebo region should also be affected.

Similar to the test including the cooperative banks, we implement our approach by adding two dummy variables to model (1). The first dummy variable, *Acquirer & placebo bank distressed*$(t+1;t+2)$, is set to 1 for both the actual acquiring bank and the bank in the placebo region in the two years following a distressed merger (and is set to 0 for all other banks and in all other periods). The second dummy, *acquirer bank distressed*$(t+1;t+2)$, is set to 1 only for the actual acquiring bank and thus captures any performance differences between the true and placebo acquiring banks. Consequently, the first dummy will capture the effect on bank performance of regional economic contagion while the second dummy will pick up the additional effect of the merger on the acquiring bank.

The results, presented in Table 6, indicate that the performance of saving banks operating in the placebo regions is not significantly different from that of the reference group of banks not located in either target, nor acquirer, nor placebo regions. In contrast, the performance of the true acquirer significantly deteriorates relative to the placebo acquirer in all dimension we explore here. Namely, the growth rates of capital ratios, profitability, and loan volumes relative to total assets drop, while those of loan loss provisions increase. These results,

Table 6: Bank performance - coop vs. savings banks

Table 6 displays the results for the re-estimated fixed effect panel regression described in equation (1), comparing acquirer savings bank of distressed mergers with the largest cooperative bank operating in the same region. The dependent variables and control variables are defined as described in Table 4. Coop & savings bank distressed (t+1;t+2) is a dummy identifying the actual acquiring bank of a distressed merger as well as the largest cooperative bank operating in the same region in the two years subsequent to the merger. Acquirer bank distressed (t+1;t+2) is equal to one only for the actual acquirer banks of distressed mergers in the two years after the merger. Year and bank fixed effects are included in all specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1) CAR	(2) ROE	(3) ROA	(4) LLP	(5) Loans
Acquirer bank distressed (t+1;t+2)	-0.0243**	-0.2496***	-0.2739***	0.2891**	-0.0168*
	(0.0105)	(0.0920)	(0.0903)	(0.1149)	(0.0100)
Coop & savings bank distressed (t+1;t+2)	0.0131	0.0732	0.0923*	-0.1301*	0.0058
	(0.0082)	(0.0502)	(0.0509)	(0.0675)	(0.0063)
Bank Controls	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	7570	7425	7413	5701	7570
Adjusted R^2	0.3088	0.2321	0.2248	0.0941	0.1748

therefore, suggest that the negative shock to the performance of the acquiring bank is not due to the spread of real economic distress, but is rather directly related to the distressed merger.

In the appendix (Table B1) we also provide an additional set of tests where we compare the performance of savings banks between the regions which serve as a placebo for the region of the acquirer in a distressed merger and all the regions defined as placebos for the regions of all acquirers (distressed and non-distressed). These tests show no statistically significant difference between the two groups of savings banks and thus speak against the argument of regional economic contagion. Furthermore, we also provide a robustness test of our main analysis with respect to the post merger period by extending the treatment from two to three years subsequent to the merger. The results in Table B2 are quantitatively and qualitatively similar to those of our main specification.

In sum, the results in this section provide evidence that the distressed merger is indeed a negative shock for the acquiring savings bank. The observation that acquirer 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 distressed merger, and not real economic contagion, are the cause of the deterioration of the acquiring banks' performance.

5.2 Firm-level analysis

5.2.1 The acquirer transmits the shock to the firms

In the previous sections we have shown that a distressed merger indeed represents a negative shock to the acquiring bank. The next logical step is to ask whether the shock to the acquiring savings bank is transmitted to the firms in its region, affecting their real economic outcomes. To this end, we employ the ORBIS dataset with its rich information on firm fundamentals. This data is especially useful as ORBIS covers a wide range of (very) small private firms which are much more likely to suffer from a negative shock to a regional bank than large firms with several bank-relationships and capital market access.

We utilize this data in several ways. We start by performing an analysis analogous to that in Section 5.1.1 by comparing firms in the acquirer region to similar firms in other administrative regions as a control group.[21] The sample of control group firms consists of up to five matched firms which we select using the procedure described in Section 4. Accordingly, the control group firms are operating in the same 2-digit NACE industry, are situated in a region that did not experience a savings bank merger, and are closest to the acquirer region firm in terms of observable firm characteristics in the year prior to the merger.[22] We estimate

[21] We include all firms in the region and not only those whose main banking relation is to the savings bank since our purpose is to track the impact of the shock to acquiring banks on the the population of firms as a whole. Focusing on firms with pre-existing relations to the affected savings banks would have generated biases due to the omitting the possibility of firms to change their main bank in response to changes of this bank's lending policy.

[22] In addition, we include firms from the placebo regions in the control group in order to account for a potential regional contagion effect. However, our findings are robust to excluding placebo firms from the analysis.

the following fixed effect panel regression for the period $t-2$ to $t+2$:

$$\Delta perf_{r,t} = \beta_1 \cdot Acquirer\ firm\ distressed_{r,t} + \beta_2 \cdot Acquirer\ firm_{r,t} + \gamma \cdot controls_{r,t-1} + \delta_t + \vartheta_r + \varepsilon_{r,t}. \quad (2)$$

The dependent variable $\Delta perf_{r,t}$ is the log change in a measure of firm performance (to be described below). $Acquirer\ firm\ distressed_{r,t}$ is a dummy variable which takes the value one if a firm operates in a distressed acquirer region in the post-merger period $t+1$ to $t+2$, $Acquirer\ firm_{r,t}$ is a dummy variable which takes on the value one if a firm operates in any acquirer region (i.e. in a region experiencing a distressed or a non-distressed merger) in the post-merger period $t+1$ to $t+2$, $controls_{r,t}$ are firm-level controls (lagged leverage, lagged log(total assets), log(firm age) as well as log(GDP) to control for local economic activity). To control for unobservable heterogeneity across firms we also include firm fixed effects, ϑ_r. Also, time fixed effects, δ_t, are included to account for federal-level macroeconomic dynamics. The coefficient of main interest is β_1.

In terms of dependent variables, our main interest lies in the change of firms' investment behavior subsequent to the merger year because this is the real economic variable most closely related to the lending behavior of banks. Accordingly, we first analyze the effect of a distressed merger on firms' overall investment, measured as the log change in total assets minus cash. Subsequently, we split total investments into investments in fixed assets and investments in current assets as well as inventory growth (as a part of investments in current assets) in order to obtain additional insights into firms' specific reaction to the (financial) constraints imposed by the distressed merger. This separation is motivated by existing literature such as Fazzari and Petersen (1993) who find that firms engage in fixed investment smoothing using working capital if confronted with a negative (cash flow) shock, or Kashyap *et al.* (1994) who find that financial constraints have an impact on inventory movements. Finally, we are also interested in the effect on debt financing. We therefore use the changes in the current debt and the long-term debt ratios as additional dependent variables.

Table 7: Firm performance - distressed vs. all mergers

Table 7 displays the results for the fixed effect panel regression described in equation (2). The dependent variables are the log changes in total assets minus cash (Investments), fixed assets (FA Growth), current assets (CA Growth), inventories (Inventory Growth), current liabilities (CL Growth) and long-term debt (LTD Growth). Acquirer firm (t+1;t+2) is a dummy identifying all firms that are located within the region of an acquiring savings bank of any type of merger (distressed or non-distressed) in the two years subsequent to the merger. Acquirer firm distressed (t+1;t+2) is equal to one only for firms that are located within the region of an acquiring savings bank of a distressed merger in the two years after the merger. The control variables include firm age, and lagged values of leverage (defined as total debt over equity), the log of total assets and the respective levels of the dependent variables (indicated as "Levels"). Year and firm fixed effects are included in all specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1) Investments	(2) FA Growth	(3) CA Growth	(4) Inventory Growth	(5) CL Growth	(6) LTD Growth
Acquirer firm distressed (t+1;t+2)	-0.0358***	0.0081	-0.0316***	-0.0363**	0.0131	-0.0514**
	(0.0133)	(0.0126)	(0.0098)	(0.0168)	(0.0329)	(0.0244)
Acquirer firm (t+1;t+2)	0.0052	-0.0196*	0.0229**	0.0193	-0.0137	0.0380*
	(0.0120)	(0.0113)	(0.0090)	(0.0152)	(0.0306)	(0.0221)
Leverage_{t-1}	-0.0003***	-0.0002***	-0.0001	-0.0002*	0.0003***	0.0003***
	(0.0001)	(0.0000)	(0.0000)	(0.0001)	(0.0001)	(0.0001)
$\text{Log(Total Assets)}_{t-1}$	-0.7367***	0.1041***	0.0940***	0.1694***	0.1053***	0.1926***
	(0.0090)	(0.0058)	(0.0072)	(0.0102)	(0.0128)	(0.0108)
$\text{Log(Firm Age)}_{t-1}$	-0.0196**	-0.0711***	0.0361***	0.1445***	0.0109	0.0376***
	(0.0081)	(0.0073)	(0.0059)	(0.0111)	(0.0179)	(0.0132)
Log(GDP)_{t-1}	0.1973***	0.1171***	0.0759***	0.1361***	0.0332	0.0911
	(0.0391)	(0.0382)	(0.0278)	(0.0489)	(0.0935)	(0.0726)
Local Election	0.0008	-0.0004	-0.0022	-0.0011	0.0001	-0.0006
	(0.0029)	(0.0027)	(0.0021)	(0.0036)	(0.0064)	(0.0053)
Levels	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	399399	373249	404286	391002	212329	251401
Adjusted R^2	0.2259	0.3080	0.3528	0.4328	0.3914	0.3547

Columns (1) to (6) of Table 7 show the results for the log change in total assets minus cash (Investments), fixed assets (FA Growth), current assets (CA Growth), inventories (Inventory Growth), current liabilities (CL Growth) and long-term debt (LTD Growth) as dependent variables.[23] The results in the first four columns indicate that firms located in an acquirer

[23] We approximate inventories by deducting cash and accounts receivable from current assets.

region of a distressed merger have lower total investments, lower current asset growth and lower inventory growth, all statistically significant at the 1% level. Adding both dummy coefficients in column (1), the net investment effect for firms in distressed acquirer regions is equal to −2.29%.

Columns (2) to (4) reveal that this change is mainly driven by lower investments in current assets, and specifically in inventories, while investments in fixed asset do not change significantly. Given that our sample predominantly consists of SMEs (the mean (median) firm size amounts to approximately EUR 3 300 000 (510 000)) which hold most of their assets in the form of current assets, it is reasonable to find a stronger effect on current than on fixed assets.[24] This is particularly true when firms engage in fixed investment smoothing using working capital as Fazzari and Petersen (1993) suggest. This view is supported by the results in column (4) which shows that inventory growth of firms in the region of a distressed acquirer decreases by 1.77% which is both statically and economically significant. This finding is also in line with Kashyap *et al.* (1994) who find that financial constraints have an impact on inventory movements.

The last two columns of Table 7 analyze the growth in current liabilities and long-term debt. The coefficient in column (6) is negative and statistically significant, implying that firms located in distressed acquirer regions experience a lower growth in long-term debt, amounting to a net effect of −0.89%. The corresponding coefficient for current liability growth is displayed in column (5) and is positive but indistinguishable from zero. Thus, firms do not increase short-term lending in order to compensate for the reduced access to long-term debt. One implication of this results is that firms do not use trade credit as a substitute for bank loans.

Overall, the findings in Table 7 are consistent with the notion that acquiring banks of distressed mergers transmit the negative shock to the firms located in their region of operation. These firms react to the tightening credit conditions by cutting back their investments.

[24] The mean (median) ratio of current to total assets one year prior to the merger is 71%(83%).

5.2.2 Alternative explanations / robustness

In order to provide further evidence that the effect that we document in Table 7 is actually driven by the distressed merger and not by regional contagion, we perform placebo tests similar to those presented at the bank level.

More specifically, we compare firms from the actual region of the distressed acquirer directly to the firms located in the respective (distressed) placebo regions in order to further strengthen our point that the acquiring savings bank in a distressed merger transmits the negative shock to the firms in its region. Because the placebo regions are selected such that they (i) share a common border with the target region; (ii) were never affected by a merger and (iii) are similar to the actual acquirer region in terms of their macroeconomic characteristics, we would expect that we do not find a difference in performance between these firms if the effect was driven by regional contagion. In contrast, finding an effect for firms in distressed acquirer regions would suggest that it is the transmission of the negative shock to the acquiring bank to the firms in its region that causes the effect shown in Table 7.

In analogy to the bank-level analysis, we re-estimate equation (2) and replace the two dummy variables in order to identify the difference between firms in the actual acquirer region and firms in the placebo regions. The first dummy variable, *Acquirer & placebo firm distressed*$_{r,t}$, identifies firms from both the true and placebo distressed acquiring region in the two years following the year of the merger. The second dummy, *Acquirer firm distressed*$_{r,t}$, only identifies the firms located in the true distressed acquirer region and thus captures the performance differences between firms in the true and the placebo distressed acquirer regions. The control group consists of all firms that were either matched to an acquirer or a placebo region firm. The results are presented in Table 8.

The results shown in columns (1) to (4) are similar to those in Table 7. Firms located in a distressed acquirer region have significantly lower investment growth, current asset growth and inventory growth. The effect on fixed asset growth is negative but just falls short of being statistically significant. These findings are in line with the previous results and strongly

Table 8: Firm performance - acquirer vs. placebo firms

Table 9 displays the results for the re-estimated fixed effect panel regression described in equation (2), comparing firms in true and placebo regions (as identified in Section 4) of distressed mergers. The dependent variables and control variables are defined as described in Table 7. Acquirer & placebo firm distressed (t+1;t+2) is a dummy identifying all firms that are located within the region of the true or placebo region of a distressed merger. Acquirer firm distressed (t+1;t+2) is equal to one only for firms that are located within the true acquirer region of a distressed merger. Year and firm fixed effects are included in all specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1) Invest-ments	(2) FA Growth	(3) CA Growth	(4) Inventory Growth	(5) CL Growth	(6) LTD Growth
Acquirer firm distressed (t+1;t+2)	-0.0245***	-0.0129	-0.0123*	-0.0220*	0.0037	-0.0108
	(0.0094)	(0.0099)	(0.0071)	(0.0124)	(0.0257)	(0.0192)
Acquirer & placebo firm distressed (t+1;t+2)	-0.0079	-0.0005	0.0026	0.0027	-0.0113	-0.0053
	(0.0072)	(0.0082)	(0.0058)	(0.0098)	(0.0225)	(0.0158)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Levels	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	511511	480641	517389	501711	270159	326943
Adjusted R^2	0.2293	0.3057	0.3518	0.4297	0.3893	0.3502

point towards the bank, and not regional contagion, as the transmitter of the negative shock. The coefficient on the long-term debt ratio is negative but, unlike its counterpart in Table 7, is not significant.

Also similar to the bank level analysis we present an additional set of tests in Table C1 in the appendix, where we also analyze the effect of a placebo merger on the firms located in the placebo regions as defined in Section 4, by comparing distressed and non-distressed placebo regions. The results, which show that firms in distressed merger placebo regions do, if anything, *better* than firms in non-distressed merger placebo regions, again speaking against the argument of regional economic contagion. Moreover, we again extend the treatment period in our main specification from two to three years subsequent to the merger. The results in Table C2 are again similar to those of our main specification.

These findings of this subsection provide strong support for the notion that it is the shock to the acquiring bank, and not regional contagion spreading to the neighboring regions, that

is causing the effect on investments and long-term debt documented in Section 5.2.1. We can therefore conclude that the results of the two robustness checks support our conclusion that the acquiring savings bank passes on the negative shock from the distressed merger to the firms in its region, which, in turn, react to the tightening loan supply by cutting back on their investments.

5.3 Macro-level analysis

Having established that distressed mergers negatively affect the performance of the acquiring banks and result in reduced investments of firms in the region of the acquiring bank, we now turn to exploring aggregate effects of the distressed merger on the real economic dynamics in the region of the acquirer. More specifically, we document how real economic variables change following a distressed merger. Since we have already proven that the shock to the acquiring bank is exogenous with respect to real economic conditions in the acquirer region, we thus provide well-identified evidence on how distress of financial institution affects macroeconomic outcomes.

5.3.1 Distressed mergers affect macroeconomic dynamics in the acquirer region

We examine the effect of the quality of financial institutions on real economic activity by estimating the dynamics of real economic variables at the regional level following mergers of regional savings banks. More specifically we estimate the following fixed effects panel regression:[25]

$$\Delta real_{r,t} = \beta_1 \cdot acquirer\ distressed_{r,t} + \beta_2 \cdot acquirer_{r,t} + \gamma \cdot controls_{r,t-1} + \rho \cdot real_{(r,t-1)} + \delta_t + \vartheta_r + \varepsilon_{r,t}. \quad (3)$$

Following the literature on the real effects of bank performance the set of dependent

[25] Bruno and Hauswald (2013) and Hoffmann and Shcherbakova-Stewen (2011) use a similar empirical strategy.

variables, denoted $\Delta real_{(r,t)}$, includes the log changes in region r and year t in (1) the regional per capita gross domestic product (GDP) in thousand Euro, (2) investments per business establishment (plant) in million Euro[26] and (3) employment, defined as employees over population.

As independent variables we include the lagged level of the aforementioned real variables, denoted $real_{(r,t-1)}$. They account for the fact that the growth rates of the macro variables might depend on the level in the preceding period. $Controls_{r,t}$ is a vector of lagged control variables. It includes the joint shares of manufacturing and construction in local GDP (*Industrial Production Share*) as proxies for the sensitivity of local economic activity to bank lending as well as a dummy variable indicating whether there has been a local election in a certain year.[27] To control for unobservable heterogeneity across regions, we also include regional fixed effects, ϑ_r. Also, time fixed effects, δ_t, are included to account for federal-level macroeconomic dynamics as well as for changes in bank regulation.

Analogous to the bank- and firm-level analysis, we isolate the effect of distressed mergers by including two separate dummy variables in the model: $acquirer_{r,t}$ is set to one if the region is the host of an acquiring savings bank in either a distressed or a non-distressed merger which took place in one of the two preceding years, and is set to zero otherwise. Similarly, *acquirer distressed*$_{r,t}$ is set to one if the region is the host of an acquiring savings bank in a distressed merger in year $t+1$ or $t+2$, and is set to zero otherwise. Thus, the coefficient on the variable *acquirer distressted*$_{r,t}$ 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 region of the acquiring bank, we exclude the target banks' regions from all regression specifications. We also exclude from the control group all target banks' 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 never hosted a target bank.

[26] The investment volume per business establishment stems from a representative survey by the German Statistical Office.

[27] Englmaier and Stowasser (2017) have shown that savings banks in Germany adjust their lending policies in response to regional-level elections.

The results of these regressions are presented in Table 9. Similar to previous tables, the coefficients on the dummy $acquirer_{r,t}$ measures real economic dynamics in regions with acquirer in non-distressed mergers relative to the control groups of regions without mergers. The coefficient on the dummy $acquirer\ distressed_{r,t}$ compares regions of acquiring banks in distressed mergers to regions experiencing a non-distressed merger, while the sum of the coefficients of $acquirer_{r,t}$ and $acquirer\ distressed_{r,t}$ informs us about the effect of a distressed merger on the macroeconomic dynamics of the acquirer region relative to the regions without mergers. The results in the second line of Table 9 indicate that a non-distressed merger does not negatively affect the real economy. All coefficients are positive, and the coefficient on GDP growth is statistically significant. Regions experiencing a distressed merger do much worse, as is evidenced by the results in the first line of the table. All coefficients are negative and significant, implying that distressed mergers have adverse real effects compared to non-distressed mergers. The magnitude of the coefficients suggests that the differences are not only statistically but also economically significant. The growth rate of investments is approximately 1% lower and the growth rate of the fraction of the population employed is about 1.7% lower relative to regions experiencing a non-distressed merger.

We note that the results on GDP growth rates are somewhat inconclusive. Relative to the group of regions experiencing a non-distressed merger, GDP growth in the region of the acquiring bank of a distressed merger is significantly lower. However, the regions experiencing a non-distressed merger have higher GDP growth rates relative to the reference group of all regions not affected by savings bank mergers. Consequently, the total effect on GDP growth of a distressed merger relative to growth in regions without a merger (estimated by the sum of the coefficients in lines 1 and 2) is close to zero.[28]

Taken together the results of our baseline regression model indicate that a distressed merger has adverse real economic implications for the region of the acquiring bank. This

[28] A potential reason is that it takes time before the reduced access to credit of firms in the region is reflected in lower GDP. In unreported regressions we have re-estimated model (3) considering the second to fourth year after the merger (instead of the first and the second year). In these specifications the coefficient of $acquirer_{r,t}$ is no longer significant, while the coefficient of $acquirer\ distressted_{r,t}$ is still negative and statistically significant.

Table 9: Real economic activity - distressed vs. all mergers

Table 9 displays the results for the fixed effect panel regression described in equation (3). The dependent variables are the log changes in GDP per capita, investments and employment (defined as employees over population). Acquirer region (t+1;t+2) is a dummy identifying all region that hosted an acquiring savings bank of any type of merger (distressed or non-distressed) in the two years subsequent to the merger. Acquirer region distressed (t+1;t+2) is equal to one only for regions of acquiring savings banks, where the merger is classified as distressed. The control variables are (depending on the specification) lagged values of GDP, GDP per capita, investments and employment. In addition, we control for population and the shares of manufacturing and construction, relative to GDP. Year and region fixed effects are included in all specifications. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1) GDP per Capita	(2) Investments	(3) Employment
Acquirer region distressed (t+1;t+2)	-0.0095	-0.1068**	-0.0171*
	(0.0058)	(0.0516)	(0.0099)
Acquirer region (t+1;t+2)	0.0130**	0.0468	0.0117
	(0.0051)	(0.0426)	(0.0083)
GDP per Capita$_{t-1}$	-0.2924***	0.2440*	0.0382
	(0.0230)	(0.1325)	(0.0276)
Investments$_{t-1}$	0.0027	-0.6519***	0.0054
	(0.0025)	(0.0226)	(0.0043)
Employment Rate$_{t-1}$	0.7990***	1.1293	-1.3687***
	(0.1439)	(0.8766)	(0.1986)
Industrial Production Share$_{t-1}$	-0.0427***	0.3498***	0.0117
	(0.0123)	(0.0938)	(0.0211)
Local Election	-0.0008	-0.0217	-0.0058**
	(0.0015)	(0.0152)	(0.0023)
Region FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	4001	4001	4001
Adjusted R^2	0.3842	0.3351	0.3198

result confirms that the deterioration of the performance of the acquiring bank, following a distressed merger, not only aggravates the access to credit by firms in the region of the acquiring bank, but also generates negative effects at the aggregated regional level. This result present strong support for a causal effect of the quality of financial institutions on real economic dynamics.

5.3.2 Alternative explanations / robustness

In this subsection we again explicitly focus our attention on providing evidence that real economic deterioration in the region of the acquirer in a distressed merger is driven by the adverse shock to the acquiring bank, rather than by real economic contagion which affects neighboring regions. More specifically as in Section 5.1.2, we address the following argument: 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 inter-regional demand for output. Consequently, the region of the acquiring bank would have been adversely affected even without the distressed merger taking place. Contrary to Section 5.1.2, here we do not explore the dynamics of neighboring regional banks' performance but directly look at the dynamics of real economic activities in neighboring regions that can serve as placebo regions for the region of the acquirer in a distressed merger and the distressed acquirer region itself.

We again define the placebo regions as described in Section 4 and construct additional tests showing that the relation between a distressed merger and real economic dynamics in the region of the acquiring bank is not just the outcome of real economic contagion. For this purpose we re-estimate model (3) considering specifically the actual distressed regions of the acquiring banks and the respective distressed placebo regions. Thus, we again have two dummy variables of interest. The first is the *Acquirer region distressed*$(t+1;t+2)$, which takes the value of one if the region is a region of an acquirer in a distressed merger and zero otherwise.

The second dummy *Acquirer & placebo region distressed*$(t+1;t+2)$, takes on the value one if the region is placebo for the region of acquirer in a distressed merger or if it is the distressed acquirer region itself.

As with the placebo tests at the bank and at the firm level given this regression design, if our main results were caused by contagion across regions rather than by the distressed merger, we should find no difference in the adverse real economic effects between the actual

Table 10: Real economic activity - acquirer vs. placebo regions

Table 10 displays the results for the re-estimated fixed effect panel regression described in equation (3) comparing true and placebo distressed region (as identified in Section 4). The dependent variables and control variables are defined as described in Table 9. Acquirer & placebo region distressed (t+1;t+2) is a dummy equal to one for the true distressed acquirer region and its respective placebo in the two years subsequent to the merger year. Acquirer region distressed (t+1;t+2) is equal to one only for the true regions of an acquiring savings banks, where the merger is classified as distressed. Year and region fixed effects are included in all specifications. Standard errors (in parentheses) are clustered on the regional level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1)	(2)	(3)
	GDP per Capita	Investments	Employment
Acquirer region distressed (t+1;t+2)	0.0075	-0.0650*	-0.0147*
	(0.0085)	(0.0374)	(0.0086)
Acquirer & placebo region distressed (t+1;t+2)	-0.0045	0.0032	0.0090
	(0.0078)	(0.0219)	(0.0071)
Region Controls	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	4001	4001	4001
Adjusted R^2	0.3833	0.3349	0.3196

and placebo region of a distressed merger. The results of these tests are presented in Table 10, which clearly illustrate that investments' and employment dynamics[29] in the region of the acquirer in a distressed merger clearly deteriorate relative to the dynamics in the joint group of the regions of true and placebo acquirer in distressed mergers for which the dynamics of the macroeconomic variables is not statistically significantly different from the control group of regions not involved in savings banks mergers. These results are again a clear indication against the concern that regional economic contagion rather than the adverse shock to the acquiring bank is at the core of the worsening macroeconomic outcomes.

Also similar to the bank and firm level analysis we present an additional set of tests in Table D1 in the appendix, where we analyze the effect of a placebo merger on the placebo regions as defined in Section 4, by comparing distressed and non-distressed placebo regions. The extension of the treatment period is presented in Table D2 and yields similar results to our main specification.

[29] As with the main tests GDP per capital growth enters the regression with a statistically insignificant coefficient suggesting that the short-term effect of the merger is mainly limited to investments and employment.

The results of these tests again indicate that the distressed placebo merger does not have significant impact on GDP, investment, or employment growth rates. This result confirms our argument that the deterioration of real economic activities in the region of an acquirer in a distressed merger can be attributed to the adverse shock to the performance of the acquiring bank and is not the result of regional contagion, thus providing strong support for a causal relation between the performance of financial institutions and real economic dynamics.

6 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, which is based on distressed mergers of savings banks in Germany. These banks, although small in terms of absolute size, are, in fact, often the market leaders in their regional area of activity. When a savings bank is in financial distress it is likely to be merged with a neighboring savings bank. We interpret the distressed merger as an exogenous shock to the acquiring bank and show that this shock (1) negatively affects the performance of the acquiring bank, (2) results in reduced investments of firms in the region of the acquiring bank and (3) negatively affect regional economic dynamics in the region of the acquirer. Our results indicate a particularly robust and strong negative impact on regional investments, but employment and firm-level access to long-term debt are also substantially affected.

We perform a number of tests to rule out alternative explanations, most importantly regional contagion effects. We show that the performance of the acquiring savings bank deteriorates relative to the performance of (1) the largest cooperative bank in the region of the acquiring savings bank and (2) the savings bank in placebo regions defined as regions that are also adjacent to the region of the distressed savings bank and had similar real economic dynamics prior to the merger, but in which no merger took place. We further show that while firms in the region of the acquiring bank in a distressed merger are engaged in less

investments and the region of the acquiring bank as a whole suffers from lower investment and employment growth relative to a control group of firms and regions, there are no adverse real economic effects in placebo regions, either at the firm nor at the regional level.

In summary, our empirical evidence allows the conclusion that there is indeed a causal effect from shocks to savings banks to regional economic activity.

References

Acharya, V. V., Eisert, T., Eufinger, C. and Hirsch, C. (2018). Real effects of the sovereign debt crisis in europe: Evidence from syndicated loans. *Review of Financial Studies*, **31** (8), 2855–2896.

—, —, — and Hirsch, C. W. (2019). Whatever it takes: The real effects of unconventional monetary policy. *Review of Financial Studies*, **32** (9), 3366–3411.

Ashcraft, A. B. (2005). Are banks really special? new evidence from the fdic-induced failure of healthy banks. *American Economic Review*, **95** (5), 1712–1730.

Bai, J., Carvalho, D. and Phillips, G. M. (2018). The impact of bank credit on labor reallocation and aggregate industry productivity. *Journal of Finance*, **73** (6), 2787–2836.

Beck, T., Levine, R. and Loayza, N. (2000). Finance and the sources of growth. *Journal of Financial Economics*, **58** (1-2), 261–300.

Behn, M., Haselmann, R., Kick, T. and Vig, V. (2016a). The political economy of bank bailouts. *SAFE Working Paper, No. 133*.

—, Haselmann, R. F. and Vig, V. (2016b). The limits of model-based regulation. *ECB Working Paper, No. 1928*.

Bekaert, G., Harvey, C. R. and Lundblad, C. (2005). Does financial liberalization spur growth? *Journal of Financial Economics*, **77** (1), 3–55.

Berger, A. N. and Udell, G. F. (1995). Relationship lending and lines of credit in small firm finance. *Journal of Business*, pp. 351–381.

Bersch, J., Degryse, H., Kick, T. and Stein, I. (2019). The real effects of bank distress: Evidence from bank bailouts in germany. *Journal of Corporate Finance*, p. 101521.

Bolton, P., Freixas, X., Gambacorta, L. and Mistrulli, P. E. (2016). Relationship and transaction lending in a crisis. *Review of Financial Studies*, **29** (10), 2643–2676.

Boyd, J. H. and Prescott, E. C. (1986). Financial intermediary-coalitions. *Journal of Economic Theory*, **38** (2), 211–232.

Bruno, V. and Hauswald, R. (2013). The real effect of foreign banks. *Review of Finance*, **18** (5), 1683–1716.

Chava, S. and Purnanandam, A. (2011). The effect of banking crisis on bank-dependent borrowers. *Journal of Financial Economics*, **99** (1), 116–135.

Chodorow-Reich, G. (2013). The employment effects of credit market disruptions: Firm-level evidence from the 2008–9 financial crisis. *Quarterly Journal of Economics*, **129** (1), 1–59.

Cingano, F., Manaresi, F. and Sette, E. (2016). Does credit crunch investment down? new evidence on the real effects of the bank-lending channel. *Review of Financial Studies*, **29** (10), 2737–2773.

Dam, L. and Koetter, M. (2012). Bank bailouts and moral hazard: Evidence from germany. *Review of Financial Studies*, **25** (8), 2343–2380.

Demyanyk, Y., Ostergaard, C. and Sørensen, B. E. (2007). Us banking deregulation, small businesses, and interstate insurance of personal income. *Journal of Finance*, **62** (6), 2763–2801.

Diamond, D. W. (1991). Monitoring and reputation: The choice between bank loans and directly placed debt. *Journal of Political Economy*, **99** (4), 689–721.

Elsas, R. (2007). Preemptive distress resolution through bank mergers. *Working Paper, Goethe University Frankfurt.*

— and Krahnen, J. P. (1998). Is relationship lending special? evidence from credit-file data in germany. *Journal of Banking & Finance*, **22** (10-11), 1283–1316.

Englmaier, F. and Stowasser, T. (2017). Electoral cycles in savings bank lending. *Journal of the European Economic Association*, **15** (2), 296–354.

Fazzari, S. M. and Petersen, B. C. (1993). Working capital and fixed investment: new evidence on financing constraints. *RAND Journal of Economics*, pp. 328–342.

Gilbert, R. A. and Kochin, L. A. (1989). Local economic effects of bank failures. *Journal of Financial Services Research*, **3** (4), 333–345.

Goetz, M. R. and Gozzi, J. C. (2010). Liquidity shocks, local banks, and economic activity: Evidence from the 2007-2009 crisis. *Working Paper, Brown University*.

Goldsmith, R. W. (1969). Financial structure and development. *Yale University Press*.

Gropp, R., Mosk, T., Ongena, S. and Wix, C. (2018). Banks response to higher capital requirements: Evidence from a quasi-natural experiment. *Review of Financial Studies*, **32** (1), 266–299.

Grosse-Rueschkamp, B., Steffen, S. and Streitz, D. (2019). A capital structure channel of monetary policy. *Journal of Financial Economics*, **133** (2), 357–378.

Hakenes, H., Hasan, I., Molyneux, P. and Xie, R. (2014). Small banks and local economic development. *Review of Finance*, **19** (2), 653–683.

Harhoff, D. and Körting, T. (1998). Lending relationships in germany–empirical evidence from survey data. *Journal of Banking & Finance*, **22** (10-11), 1317–1353.

Hoffmann, M. and Shcherbakova-Stewen, I. (2011). Consumption risk sharing over the business cycle: the role of small firms' access to credit markets. *Review of Economics and Statistics*, **93** (4), 1403–1416.

Hsu, P.-H., Tian, X. and Xu, Y. (2014). Financial development and innovation: Cross-country evidence. *Journal of Financial Economics*, **112** (1), 116–135.

Huber, K. (2018). Disentangling the effects of a banking crisis: evidence from German firms and counties. *American Economic Review*, **108** (3), 868–98.

Iyer, R., Peydró, J.-L., da Rocha-Lopes, S. and Schoar, A. (2013). Interbank liquidity crunch and the firm credit crunch: Evidence from the 2007–2009 crisis. *Review of Financial Studies*, **27** (1), 347–372.

Jayaratne, J. and Strahan, P. E. (1996). The finance-growth nexus: Evidence from bank branch deregulation. *Quarterly Journal of Economics*, **111** (3), 639–670.

Jiménez, G., Ongena, S., Peydró, J.-L. and Saurina, J. (2017). Macroprudential policy, countercyclical bank capital buffers, and credit supply: evidence from the Spanish dynamic provisioning experiments. *Journal of Political Economy*, **125** (6), 2126–2177.

Kalemli-Ozcan, S., Sorensen, B., Villegas-Sanchez, C., Volosovych, V. and Yesiltas, S. (2015). How to construct nationally representative firm level data from the orbis global database. *NBER Working Paper, No. 21558*.

Kandrac, J. (2014). Bank failure, relationship lending, and local economic performance. *Finance and Economics Discussion Series Working Paper, No. 41*.

Kashyap, A. K., Lamont, O. A. and Stein, J. C. (1994). Credit conditions and the cyclical behavior of inventories. *Quarterly Journal of Economics*, **109** (3), 565–592.

Koetter, M., Bos, J. W., Heid, F., Kolari, J. W., Kool, C. J. and Porath, D. (2007). Accounting for distress in bank mergers. *Journal of Banking & Finance*, **31** (10), 3200–3217.

Levine, R. (1997). Financial development and economic growth: views and agenda. *Journal of Economic Literature*, **35**, 688–726.

Puri, M., Rocholl, J. and Steffen, S. (2011). Global retail lending in the aftermath of the us financial crisis: Distinguishing between supply and demand effects. *Journal of Financial Economics*, **100** (3), 556–578.

Rajan, R. G. and Zingales, L. (1998). Financial dependence and growth. *American Economic Review*, **88** (3), 559–586.

Ramirez, C. D. and Shively, P. A. (2005). Do bank failures affect real economic activity? state-level evidence from the pre-depression era. *FDIC Center for Financial Research Working Paper, No. 2005-06*.

Rice, T. and Strahan, P. E. (2010). Does credit competition affect small-firm finance? *Journal of Finance*, **65** (3), 861–889.

Schenone, C. (2009). Lending relationships and information rents: Do banks exploit their information advantages? *Review of Financial Studies*, **23** (3), 1149–1199.

Schumpeter, J. (1912). Theorie der wirtschaftlichen Entwicklung.

Schwert, M. (2018). Bank capital and lending relationships. *Journal of Finance*, **73** (2), 787–830.

Appendices

A Description of placebo region selection

Table A1: Placebo region selection

Table A1 displays the selection procedure for out placebo region sample. The number of neighbouring regions for the whole sample of target regions ranges from one to twelve neighbours with a mean (median) of five neighbours per target region. The Euclidean distance is computed as the square root of the sum of the squared differences of the matching variables GDP growth, GDP per capita and population. The differences are standardized by the respective variable's sample standard deviation.

Placebo Region Selection Description	**Unique Merger**	**Available Neighbours**
Complete Merger Dataset (DSGV)	125	653
Remove merger where Acquirer and Target operate in the same region	80	523
Remove neighbours that are subject to a merger (target or acquirer) at any time during the sample period	60	182
Remove neighbours that are located in a different state	47	126
Remove neighbours with missing macro variables	43	118
Keep neighbour with smallest Euclidean Distance (ED) to the actual acquirer	43	43
Remove bad matches, i.e. ED > 1	31	31

B Additional bank performance analysis

Table B1: Bank performance - placebo banks

Table B1 displays the results for the fixed effect panel regression described in equation (1) over the period 2000 to 2014. The dependent variables and control variables are defined as described in Table 4. Placebo bank (t+1;t+2) is a dummy indicating whether the bank is associated with an acquirer in any type of merger (distressed or non-distressed) in the two years subsequent to the merger year. Placebo bank distressed (t+1;t+2) is equal to one only for banks associated with a bank of distressed mergers in the two years after the merger. Year and bank fixed effects are included in all specifications. Standard errors (in parentheses) are clustered on the bank level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1) CAR	(2) ROE	(3) ROA	(4) LLP	(5) Loans
Placebo bank distressed (t+1;t+2)	-0.0014	0.1212	0.1335	-0.1555	0.0039
	(0.0099)	(0.1134)	(0.1128)	(0.1310)	(0.0055)
Placebo bank (t+1;t+2)	0.0024	-0.0640	-0.0732	0.1158	-0.0046
	(0.0079)	(0.0598)	(0.0586)	(0.1160)	(0.0051)
Bank Controls	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	4363	4304	4292	3363	4363
Adjusted R^2	0.4075	0.2397	0.2366	0.1058	0.1508

Table B2: Bank performance - distressed vs. all mergers

Table B2 displays the results for the fixed effect panel regression described in equation (1) over the period 2000 to 2014. The dependent variables and control variables are defined as described in Table 4. Acquirer bank (t+1;t+3) is a dummy indicating whether the bank has been an acquirer in any type of merger (distressed or non-distressed) in the three years subsequent to the merger year. Acquirer bank distressed (t+1;t+3) is equal to one only for acquirer banks of distressed mergers in the three years after the merger. Year and bank fixed effects are included in all specifications. Standard errors (in parentheses) are clustered on the bank level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1) CAR	(2) ROE	(3) ROA	(4) LLP	(5) Loans
Acquirer bank distressed (t+1;t+3)	-0.0246**	-0.0315	-0.0315	0.1767*	-0.0206**
	(0.0110)	(0.0911)	(0.0834)	(0.0998)	(0.0089)
Acquirer bank (t+1;t+3)	0.0083	-0.1176*	-0.0969	0.0820	0.0093
	(0.0080)	(0.0663)	(0.0696)	(0.0565)	(0.0061)
Bank Controls	Yes	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Observations	4363	4304	4292	3363	4363
Adjusted R^2	0.4085	0.2410	0.2376	0.1079	0.1525

C Additional firm-level placebo test

Table C1: Firm performance - placebo firms

Table C1 displays the results for the re-estimated fixed effect panel regression described in equation (2) for firms located in placebo regions (as identified in Section 4). The dependent variables and control variables are defined as described in Table 7. Placebo firm (t+1;t+2) is a dummy identifying all firms that are located within the region of a placebo region of any type of merger (distressed or non-distressed) in the two years subsequent to the merger. Placebo firm distressed (t+1;t+2) is equal to one only for firms that are located within a placebo region, where the corresponding actual acquiring region is subject to a distressed merger. Year and firm fixed effects are included in all specifications. Standard errors (in parentheses) are clustered on the firm level. Standard errors (in parentheses) are clustered on the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1) Investments	(2) FA Growth	(3) CA Growth	(4) Inventory Growth	(5) CL Growth	(6) LTD Growth
Placebo firm distressed (t+1;t+2)	-0.0011	0.0080	0.0210**	-0.0013	0.0375	-0.0429
	(0.0129)	(0.0151)	(0.0105)	(0.0176)	(0.0396)	(0.0299)
Placebo firm (t+1;t+2)	0.0037	0.0017	-0.0117	0.0049	-0.0572*	0.0365
	(0.0101)	(0.0124)	(0.0084)	(0.0140)	(0.0306)	(0.0244)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Levels	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	138715	132703	139924	136857	69597	92346
Adjusted R^2	0.2376	0.3132	0.3519	0.4262	0.3786	0.3401

Table C2: Firm performance - distressed vs. all mergers

Table C2 displays the results for the fixed effect panel regression described in equation (2). The dependent variables and control variables are defined as described in Table 7. Acquirer firm (t+1;t+3) is a dummy identifying all firms that are located within the region of an acquiring savings bank of any type of merger (distressed or non-distressed) in the three years subsequent to the merger. Acquirer firm distressed (t+1;t+3) is equal to one only for firms that are located within the region of an acquiring savings bank of a distressed merger in the three years after the merger. Year and firm fixed effects are included in all specifications. Standard errors (in parentheses) are clustered on the firm level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1) Investments	(2) FA Growth	(3) CA Growth	(4) Inventory Growth	(5) CL Growth	(6) LTD Growth
Acquirer firm distressed (t+1;t+3)	-0.0230*	0.0123	-0.0279***	-0.0333**	0.0086	-0.0179
	(0.0126)	(0.0121)	(0.0093)	(0.0163)	(0.0321)	(0.0233)
Acquirer firm (t+1;t+3)	-0.0010	-0.0222**	0.0224***	0.0210	-0.0093	0.0167
	(0.0115)	(0.0110)	(0.0086)	(0.0148)	(0.0301)	(0.0212)
Firm Controls	Yes	Yes	Yes	Yes	Yes	Yes
Levels	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	464540	437508	471130	455518	249055	298398
Adjusted R^2	0.2072	0.2820	0.3287	0.4050	0.3690	0.3356

D Additional macro-level placebo test

Table D1: Real economic activity - placebo regions

Table D1 displays the results for the re-estimated fixed effect panel regression described in equation (3) for the placebo region (as identified in Section 4). The dependent variables and control variables are defined as described in Table 9. Placebo region (t+1;t+2) is a dummy identifying all placebo region for any type of merger (distressed or non-distressed) in the two years subsequent to the merger year. Placebo region distressed (t+1;t+2) is equal to one only for placebo regions, where the corresponding actual acquiring region is subject to a distressed merger. Year and region fixed effects are included in all specifications. Standard errors (in parentheses) are clustered on the regional level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1) GDP per Capita	(2) Investments	(3) Employment
Placebo region distressed (t+1;t+2)	-0.0043	-0.0386	-0.0009
	(0.0118)	(0.0731)	(0.0118)
Placebo region (t+1;t+2)	-0.0002	0.0441	0.0101
	(0.0090)	(0.0686)	(0.0099)
Region Controls	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	4001	4001	4001
Adjusted R^2	0.3832	0.3344	0.3195

Table D2: Real economic activity - distressed vs. all mergers

Table D2 displays the results for the fixed effect panel regression described in equation (3). The dependent variables and control variables are defined as described in Table 9. Acquirer region (t+1;t+3) is a dummy identifying all region that hosted an acquiring savings bank of any type of merger (distressed or non-distressed) in the three years subsequent to the merger. Acquirer region distressed (t+1;t+3) is equal to one only for regions of acquiring savings banks, where the merger is classified as distressed. Year and region fixed effects are included in all specifications. Standard errors (in parentheses) are clustered on the regional level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%.

	(1) GDP per Capita	(2) Investments	(3) Employment
Acquirer region distressed (t+1;t+3)	-0.0088*	-0.1090**	-0.0178**
	(0.0052)	(0.0537)	(0.0075)
Acquirer region (t+1;t+3)	0.0117**	0.0728	0.0140**
	(0.0045)	(0.0469)	(0.0063)
Region Controls	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Observations	4001	4001	4001
Adjusted R^2	0.3843	0.3352	0.3201