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May the force be with you: Exit barriers, governance shocks, and profitability sclerosis in banking

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Non-technical summary

Research Question

Hostile takeovers and cross-border mergers are rare in the banking industry. Consequentially, conventional governance forces that discipline management are limited and the level of consolidation is low. Inefficiencies and sustained excess capacities might arise in such a setting, which in turn could hamper the realization of sustainable profits. We ask if market exit barriers exist and hamper the industrial dynamics in banking and whether the alleviation of such exit frictions enhances profitability.

Contribution

This study contributes to the literature on corporate governance and M&A by using a novel strategy to identify inefficient resource allocation due to impediments to the free transfer of ownership rights. We exploit a legal setting that forces German savings banks to merge after county reforms. We compare the profitability effects of these events to those of mergers among private banks in reformed counties and both savings and non-savings bank mergers in non-reformed counties. This approach allows us to identify the counterfactual of "forced" bank exits, which is usually not observable. We also contribute to the scant evidence on the causal role of alternative governance mechanisms to impose managerial discipline if no free market for corporate control exists. Finally, we speak to spillovers to the real economy.

Results

We find that the alleviation of exit frictions has a significant positive differential effect on post-merger profitability of savings banks relative to cooperative banks if the merger was induced by a county reform. This effect is economically large and persists up to 8 years after a merger. Further analyses show that this effect stems mostly from a decline in capitalization and an increase of credit risk. Non-performing loan ratios are larger and loan loss provisions are lower. Therefore, differential risk-adjusted return improvements are lower than gross equity return hikes and might even turn negative for individual banks if the increase in risk is excessive. Less important drivers are mild cost efficiency improvements and moderate gains in interest income. For a sample of corporate customers of savings banks we further document significant reductions in the cost of borrowing as well as increasing investment and employment volumes.

Nichttechnische Zusammenfassung

Fragestellung

Feindliche Übernahmen und grenzüberschreitende Fusionen sind im Bankensektor selten. Marktmechanismen, die das Management disziplinieren, wirken generell nur eingeschränkt, was zu Ineffizienzen und letztlich nicht auskömmlichen Renditen führen kann. Vor diesem Hintergrund stellt sich daher die Frage, ob Marktaustrittsbarrieren die Wettbewerbsdynamik im Bankenmarkt behindern und der Wegfall solcher Friktionen die Profitabilität stärken kann.

Beitrag

Mit dieser Studie tragen wir zur Literatur über das Zusammenspiel von Corporate Governance und Bankfusionen bei. Um ineffiziente Ressourcenallokation aufgrund von Marktaustrittsbarrieren zu identifizieren, haben wir eine neue Strategie entwickelt. Hierfür wird das gesetzliche Rahmenwerk ausgenutzt, welches deutschen Sparkassen vorschreibt nach einer Kreisgebietsreform zu fusionieren. Diese Fusionen werden mit solchen von Genossenschaftsbanken in denselben reformierten sowie den nicht-reformierten Kreisen verglichen. Dieser Ansatz erlaubt es, den Fusionseffekt isoliert zu betrachten. Wir liefern zudem einen Nachweis für die wichtige Rolle alternativer Disziplinierungsmaßnahmen in Märkten ohne freien Wettbewerb um Eigentumsrechte. Desweiteren quantifizieren wir realwirtschaftliche Implikationen.

Ergebnisse

Die Ergebnisse zeigen einen positiven Effekt auf die Profitabilität der Sparkassen nach einer Fusion relativ zu Genossenschaftsbanken, wenn die Fusion der Sparkassen durch eine Gebietsreform induziert wurde. Der gemessene Effekt ist ökonomisch von Relevanz und hält bis zu acht Jahre nach einer Fusion an. Weitere Analysen zeigen, dass der Effekt vor allem durch eine geringere Kapitalisierung, riskantere Kredite und geringerer Rückstellungen für Kreditrisiken erzielt wird. Somit fallen die Verbesserungen risiko-adjustierter Renditen relativ zur Kontrollgruppe geringer aus als die relativen Steigerungen der Bruttorenditen. Im Einzelfall ist es denkbar, dass sie sogar negativ ausfallen, wenn die durch Kreisreformen induzierte Risikozunahme zu hoch ausfällt. Weniger wichtige Treiber sind hingegen die Verbesserungen der Kosteneffizienz und der Zinsmargen. Beide steigen nach einer Fusion nur moderat an. Für eine Stichprobe von Unternehmenskunden im Sparkassensektor zeigen wir eine signifikante Reduktion der Fremdkapitalkosten sowie einen Anstieg der Investitionen und der Beschäftigtenzahlen.

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Abstract

We test whether limited market discipline imposes exit barriers and poor profitability in banking. We exploit an exogenous shock to the governance of government-owned banks: the unification of counties. County mergers lead to enforced government-owned bank mergers. We compare forced to voluntary bank exits and show that the former cause better bank profitability and efficiency at the expense of riskier financial profiles. Regarding real effects, firms exposed to forced bank mergers borrow more at lower cost, increase investment, and exhibit higher employment. Thus, reduced exit frictions in banking seem to unleash the economic potential of both banks and firms.

Keywords: Political frictions, governance, excess capacity, banking, market exit

JEL classification: G21, G29, O16

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1 Introduction

The banking industry is traditionally characterized by a very limited role played by financial (equity) markets to impose managerial discipline (Manne, 1965; Jensen and Meckling, 1976; de Haan and Vlahu, 2016). Widespread nationalization waves in the wake of recent financial crises (Bosma et al., 2016) paired with increasingly large holdings of sovereign debt by national banking systems (Acharya et al., 2015) have further increased the direct and indirect reciprocal dependence of governments and "their" banking systems. In line with these observations, hostile and cross-border takeovers are virtually absent (DeYoung et al., 2009), and national banking systems might suffer from too little churn, the resulting excess capacities, and sluggish technology adoption (Jensen, 1993; Tinn, 2010; Titman, 2013). Such governance frictions may partly explain why profits remain notoriously low according to policy makers that are concerned with the resilience of financial systems (see also ESRB, 2014; ECB, 2016, 2017; EBA, 2017).

We exploit in this paper a unique governance shock experienced by local government-owned savings banks (SB, *"Sparkassen"*) in Germany that eliminated exit frictions faced by these banks within counties across federal states in a staggered fashion but not for privately owned cooperative banks (CB, *"Genossenschaftsbanken"*). The main challenge to identify whether differences in the governance of SB and CB constitute an impediment to inefficient attrition is the innate unobservability of non-occurring exits: by definition, a non-event. We therefore use a novel strategy to isolate a causal mechanism for how exit frictions impede industrial dynamics. Our approach exploits that SB are forced to merge if their county of residence is merged with another county during regional reforms. We test whether those bank exits that occur once the shelter from consolidation pressure in the form of government ownership disappears exhibit significantly different post-merger performance. Significantly improved performance would indicate more efficient allocation of resources by the bank compared to the situation prior to county reforms when the regional market was protected. Thus, we contrast sharply with the abundant literature regarding the role of political ties to receive government support of some type that might impede creative destruction (Brown and Dinç, 2005; Duchin and Sosyura, 2012; Dam and Koetter, 2012; Behn et al., 2015). Our identification strategy instead relies on exogenous shifts in the government ownership of some local banks during non-crisis times that reveal the conventionally missing counterfactual of banks leaving the market.

Ownership shifts emerge in our quasi-experimental setting from the fact that local SB are the property of the regional government where they reside, usually one of the 402 counties ("Kreise") nested in the 16 German federal states. Savings bank laws ("Sparkassengesetze") are issued by the state and stipulate, in addition to county ownership, that local SB are *de jure* not allowed to operate outside "their" regional market. During our sample period from 1993 until 2015, the number of counties declined drastically from 542 to 402. Importantly, these county mergers are decided on at the level of the *state* – usually for administrative efficiency reasons – and represent as such an exogenous ownership shock to the *counties* that own local SB.[1] The latter are required by law to merge after the unification of counties. In other words, these mergers are forced upon the involved SB very much like raider investors take control of inefficiently managed assets in a frictionless market for corporate control.

Our focus is thus on mergers as the exit event of interest, thereby also accounting for

[1]Note that county consolidation does not reflect a gerrymandering process ignited by governing parties to maximize their odds of re-election.

the fact that banks rarely exit markets due to outright insolvencies or voluntary closure during recessions or sector-specific shocks, as is common for non-financial sectors.[2] To answer the question of whether exit frictions due to limited market governance are a significant roadblock to sustainable profits in banking, we use a difference-in-differences model that explains post-merger bank performance according to three main comparisons. First, we only consider reformed counties, within which we compare SB to CB that are not subject to government involvement.[3] Second, we compare merging local SB with merging CB in both reformed and unreformed counties. Third, we compare merging banks to non-merging banks across reformed and unreformed counties.

We estimate an economically and statistically large increase in the post-merger profitability of local SB if the merger was induced by a reform of the counties in which these banks were residing. Depending on the reference group – CB mergers in reform counties, any merging bank, or all non-merging banks – we find an increase in the return on gross equity (RoE) ranging between 3.8 and 5.7 percentage points. Against the backdrop of mean RoE on the order of 8% in our sample, this effect is economically large.

The decomposition of this profitability development reveals that the RoE improvements are mainly driven by a decline in capitalization and credit risk increases, as reflected by slightly larger non-performing loan ratios and lower loan-loss provisioning. Profits also improve, mostly due to larger interest revenues that reflect larger realized markups of the merged entity in its local market. We do not detect, however, large cost efficiency gains. Whereas the number of full-time equivalents (FTEs) per branch declines after county-reform-induced SB mergers, the differential effects on both the absolute number of FTEs and the wage bill are positive. Hence, we find no empirical indications that forced mergers induce large-scale layoff waves to realize efficiency potential. The headline result is robust to alternative evaluation windows around mergers, robust estimation methods accounting for potential serial correlation of performance, randomized treatment of mergers with placebo county reforms, and explicitly accounting for distressed mergers and observable differences in the strengths of political ties.

To shed light on the real economy implications of eliminating exit barriers to banking consolidation, we first assess corporate and consumer lending volumes by local SB after reform-induced mergers. We document significant lending increases in these categories. Thus, at least in the German banking system, the elimination of regional lenders did not constrain credit access. Similarly, we do not find a reduction in deposits, a crude measure of retail customer access to financial services. Another potential social cost inflicted by reform-induced mergers could be that post-merger banks return political favors by increasing (local) government lending. We find no support for this type of undesirable credit allocation. To shed more direct light on the real implications, we then use detailed information about a sample of corporate clients of local SB. We demonstrate that corporations that are connected to SB that were forced to merge after county reforms incur lower external financing cost. Connected corporations also increase investment and employment after forced bank mergers. In sum, our results indicate not only direct

[2] Caballero and Hammour (1994, 1996) provide theoretical evidence for the importance of firm exits to foster re-allocation of production factors, particularly during recessions, when switching costs in the labor market are lower. A number of empirical firm- and plant-level studies indeed show that besides spurring investment, the exit of unproductive units is especially crucial for aggregate output and productivity growth; see, for example, Baden-Fuller (1989) regarding the UK steel casting industry, Petrin and Levinsohn (2012) for plant data about Chilean manufacturers or Foster et al. (2006) for the U.S. retail sector.

[3] CB are comparable in size to SB and also adhere to self-imposed regional market demarcation.

positive bank profitability effects after reducing governance roadblocks to market exit but also important indirect gains realized by the associated corporate sector due to county reforms.

Our paper connects several strands of the the literature. First, we complement studies investigating the performance implications of government ownership in banking. Many studies that are based on pre-crisis data report undesirable effects, such as preferred bailout treatment (Behn et al., 2015); political lending (Sapienza, 2004; Halling et al., 2016), especially around elections (Gropp and Saadi, 2015; Englmaier and Stowasser, 2017); inferior risk-management skills of management (Hau and Thum, 2009; Cuñat and Garicano, 2010); and ultimately, poor fulfillment of banks' roles as delegated monitors of corporate lending and guardians of managerial discipline (Berger et al., 2005; Ivashina et al., 2009), which deters economic growth (La Porta et al., 2002). In response to the Great Financial Crisis, governments around the globe systematically prevented bank exits by injecting equity (Duchin and Sosyura, 2012), which caused a plethora of subsequent effects that further impeded "natural" forces of competition to guide entry and exit into the industry.[4] However, whereas the large and quick U.S. support of banks was followed by an equally rapid retreat of the government from its banking system (Hoshi and Kashyap, 2010; Calomiris and Khan, 2015), the German system remains characterized by a continuously large share of government ownership in banking. Rather than focusing on the effect of government interventions and ownership on bank performance as such, our paper is the first to test directly whether unleashing potential impediments to consolidation due to government ownership induced exits through mergers that subsequently enhanced bank performance.

Second, our study speaks to the literature about the corporate governance of banks in general and the role of mergers and acquisitions (M&As) in particular. An important insight from the deregulation wave in the United States was that the elimination of market barriers enhanced technology adoption and competitive pressure in the banking industry, which in turn increased idiosyncratic bank efficiency and shaped market structure toward a more concentrated and profitable banking system (Berger and Mester, 2003; Stiroh and Strahan, 2003). However, strengthened shareholder rights due to more transparent, deregulated, and competitive markets for corporate control are no panacea to better governance and subsequent bank performance. Beltratti and Stulz (2012) document for a cross-country sample that banks managed by boards that were more shareholder-friendly in fact exhibited worse performance during and after the Great Financial Crisis of 2007/2008. Moreover, Morck et al. (2011) report that for Korean banks, it might not be government ownership per se that leads to poor bank governance – and consequently performance – but rather other concentrated control rights, such as family or tycoon influence. Prior studies about German bank mergers have yielded fairly mixed results regarding post-merger performance developments, often failing to report efficiency or profitability gains (Lang and Welzel, 1999; Koetter, 2008; Behr and Heid, 2011). These studies, however, fail to identify the causal reasons why banks merged to begin with. If past bank performance co-determined a merger in the first place, any post-merger comparison of performance is subject to a selection bias and possibly reverse causality. Our paper sharpens the insights into the bank governance literature because we exploit a

[4]See, for example, Gropp et al. (2011) and Berger and Roman (2015) in regard to developments regarding competition due to bank bailouts in Europe and the United States, respectively, and Duchin and Sosyura (2014) and Dam and Koetter (2012) in regard to additional risk-taking due to the moral hazard exerted by government bailouts of banks.

clearly exogenous rupture of (government) ownership structures that shield management from a free market for corporate control. Thereby, we are able to isolate performance differences compared with an otherwise identical set of merging banks.

Third, most prior studies of the governance effects of M&As are confined by definition to transactions in free markets for corporate control, in which more efficiently managed banks identify weak competitors as targets (Hannan and Rhoades, 1987; Wheelock and Wilson, 2000). In the presence of agency problems, bank managers might be inclined to engage in mergers even though they are not value-enhancing, such as if CEO compensation depends on bank size (Bliss and Rosen, 2001) or if CEOs overestimate their ability to manage the merged bank (Roll, 1986). Our study of regional banks run by managers that are prohibited (and protected) by law from merging at will thereby helps to exclude a plethora of potentially rivaling merger motives in free capital markets as possibly confounding explanations of post-merger performance differences. Prior empirical studies of the efficiency of SB by Altunbas et al. (2001) and Micco et al. (2007) did not find significant efficiency differences between government and other banks in Germany. In fact, government-owned banks might fulfill important functions that private banks fail to provide. Berger et al. (2005) provide evidence that the monitoring techniques of small banks are better suited for lending to opaque small and medium-sized enterprises (SMEs). Similarly, Hakenes et al. (2014) show theoretically that small regional banks foster local economic growth and confirm this prediction empirically for German savings banks. Likewise, Berger et al. (2017) demonstrate that small banks possess a comparative advantage to provide liquidity insurance to SMEs, thereby helping to alleviate financing constraints, especially for those firms that conventionally depend the most on bank credit. Importantly, Degryse et al. (2011) show that small bank mergers have the worst implications for SMEs with only a single relationship. Their banking contact is usually dropped and not replaced if their relationship lender turns out to be the target in a bank M&A, a result similar to one documented before in the United States (Berger et al., 1998). Thus, it is a priori unclear whether forced SB mergers induced by county reforms only unlock previously unrealized profitability potential or whether they generate worse conditions for an important group of these banks' customers.

Our paper contributes to the scant evidence regarding the causal role of alternative mechanisms to impose managerial discipline and exert corporate control if no free market to transfer ownership rights exists. As such, we also shed light on the political economy of government involvement and adjustment dynamics of industrial structures in the financial sector, which also affects the market structure of non-financial industries (Bertrand et al., 2007; Cetorelli and Strahan, 2006; Morck et al., 2011). A firmer understanding regarding the drivers of – and impediments to – efficient attrition in the financial industry aids a better management and policy process to face the ongoing challenges to significantly change banks' business models.

2 Institutional background and identification

2.1 Local savings banks

In 2015, the German government-owned banking sector comprised 414 local SB that managed an aggregate balance sheet of EUR 1,145 billion assets (see Deutsche Bundesbank, 2016). The average SB has a balance sheet of EUR 2.8 billion and serves a regional market approximately the size of one county. Jointly, these banks cater to every region in Germany, operate an extensive network of branches, and are owned by regional municipalities or counties.[5]

In addition to national regulation governing all credit institutions, they are subject to federal law regulating ownership, governance structure, and their business model.[6] These laws impose institutional frictions on competition and consolidation in the government-owned banking sector. The geographical scope of business is confined to the territory of the owning locality, also known as regional demarcation (*Regionalprinzip*), *de facto* eliminating competition with other SB in credit and deposit markets. Likewise, a free market for corporate control does not exist. Mergers are only permitted between neighboring SB and only within the government-owned banking sector. Decisions about closure and mergers are neither taken by the management nor the supervisory board but by the local governing politicians of the owning county or municipality, to whom we refer henceforth as local politicians. Decisions are subject to approval by the savings bank association and the federal regulator, which is one of the federal ministries. The savings bank association sometimes recommends mergers between distressed and healthy banks as a measure of last resort in order to avoid closure (Koetter et al., 2007; Behn et al., 2015).

The important aspect of regulation with regard to our identification is that each region must not own more than one SB after county reforms. Federal laws or the reform bills themselves state that in case any of the newly formed counties owns more than one SB after a spatial reform, these banks have to merge.[7] Often, the reform bills contain a deadline of two or three years within which this consolidation process has to be completed (see Table A.1 in the Appendix). Importantly, it is federal and not local politicians who vote on county reforms. The reform-induced mergers are therefore forced on local governments and their SB.

In addition to the decision about mergers and closures, local politicians exercise control over SB via the supervisory board. The composition of the supervisory board is regulated in detail. The chairman has to be the elected governor of the region. The remaining board seats are distributed among other local politicians, bureaucrats, and representatives of employees. The degree of influence by local politicians is sufficient to influence lending, merger patterns, the dismissal of employees, in addition to whether and whom to bail

[5]The legal concept of government ownership (*Trägerschaft*) shares key features of private ownership but is not identical. The relevant differences are discussed in the text. We refer henceforth to local politicians who represent the relevant region over the election cycle as the owners of the SB. Exceptions are so-called free savings banks, which are however also member of the National Association of German Savings banks and subject to very similar exit frictions described below, on which we focus.

[6]We distinguish between the local, federal, and national levels. The federal level refers to the 16 German states.

[7]See Mecklenburg-Vorpommern: §28 Abs.1a SpkG of Mecklenburg-Vorpommern, §25 LNOG from July 1, 1993, and §41 LNOG from July 12, 2010; Saxony-Anhalt: §30 Gesetz zur Kreisgebietsreform from July 20, 1993, and §18 LKGebNRG from November 11, 2005; Saxony: §22 SächsKrGebRefG from June 24, 1993, and §25 SächsKrGebNG January 29, 2008; Thuringia: §11 ThüMaßnG; Brandenburg §35 BbgSpkG, and §26 KNGBbg December 24, 1992.

out around elections (Hackethal et al., 2012; Behn et al., 2015; Englmaier and Stowasser, 2017). The timing of these phenomena around elections stresses that local politicians that control SB pursue vested interests. These interests could also pertain to social and welfare benefits due to owning and managing a bank on behalf and in the interest of the region itself. By constitution, SB serve the public by providing banking services to all regions and promoting the local economy. Often, they engage in charity and foster cultural and sports events.

At the same time, the institutional setting allows for the extraction of pecuniary rents on behalf of the county. Since 2002, regional owners do not participate in the losses of the bank anymore by issuing guarantees or bailouts because the EU commission ruled it to be a distortion of competition. However, counties are allowed to participate in the profits, which at times give rise to conflicts between savings bank managers and politicians (Correctiv Recherchen für die Gesellschaft gGmbH, 2015). The federal laws prescribe a maximum share of distributable profits. The management board proposes the allocation of earnings to the supervisory board, which has to affirm it. If the supervisory board is split between representatives of more than one county after a merger, extracting rents for one group of owners becomes increasingly difficult. In conclusion, the institutional background sets incentives for local politicians to prevent mergers in their own private interests in addition to genuine public interest.

2.2 German county reforms

Spatial reforms change how the national territory is divided among federal and local political entities. In Germany, they occur only on the local level within federal states. The local governmental layer is divided into counties and municipalities. In 2015, there existed 11,168 municipalities that formed 402 counties instead of the 543 counties that existed after reunification in 1990 (Statistisches Bundesamt, 2015). We focus on county-level reforms, which are initiated and decided on by the federal states' parliaments, not by local politicians on the county level. They are usually linked to functional reforms of the state's administration and accompanied by municipality-level spatial reforms. The main motives are to increase the efficiency of administration and to ease fiscal budgets by forming fewer and consequently larger counties out of comparable regional entities regarding their socioeconomic structure (BBSR, 2010).

Since German reunification, eight major reforms occurred in five Eastern German states, each of which reduced the number of counties on average by half. Appendix Table A.1 reports the number of counties, savings, and cooperative banks before and after each reform. In West Germany, two metropolitan areas were created: Aachen in North Rhine-Westphalia and Hanover in Lower Saxony. Both county-level reforms implied that two cities were combined with their surrounding counties. These 10 county reforms serve to identify treated savings banks.

Local politicians usually oppose reform plans since they lose their autonomy. Therefore, reforms are heatedly discussed both before and after their legislative passage. Reform bills are issued by a majority vote of federal politicians. In light of our identification strategy, it is noteworthy that the allocation mechanism of seats in state parliaments implies that a dominant role of federal politicians with the same local interests as local politicians is extremely unlikely. Only approximately half of the seats of the state parliaments are allocated to politicians who directly represent voting districts. These voting districts are not equal to counties. They are set in such a manner that they represent a certain

population (approximately 60,000 voters). Therefore, less-populated rural counties are combined into voting districts, and large cities are divided into several voting districts. Since large cities usually maintain their status even after county reforms, treated rural counties are underrepresented in state parliaments. The other half of the seats are allocated to politicians that are chosen from a ranked list compiled by each political party. These members of state parliaments therefore do not have to represent any particular local interest per se. They are often "professional" politicians, and parties assign better ranks to these experts – or long-serving party members – to increase their odds of becoming a member of parliament.

Regarding SB, politicians can lobby upfront for an exemption ruling. This lobbying led to a suspension of the coercion to merge in the reforms in Saxony in 2008 and Mecklenburg-Vorpommern in 2011. We observe two counties in Saxony and two counties in Mecklenburg-Vorpommern that own more than one bank after the reforms. The Saxonian banks merged eventually (in 2010 and 2012), whereas the Pommeranian have not.[8]

2.3 Identification

We illustrate the baseline and alternative identification strategies in Figure 1. In the baseline specification, we focus only on merging banks from either the cooperative or the savings bank sector, which are shown in the left-hand panel.

We start by considering only merging banks i, which reside in (pre-reform) counties k_1' and k_2'. That is, we disregard both non-merging banks and those that merge but do so in non-reforming counties. Our focus is thus on those counties that form a single geographical entity k – and hence owner of local SB – after county reforms. Observed savings bank (SB_i) mergers are therefore forced upon the management and owners of either pre-reform, independent banking entity i' as a result of the legal requirements of the savings bank laws of the respective state. In contrast, observed cooperative bank (CB_i) mergers occur voluntarily. This identification approach therefore compares post-merger performance of the four pre-reform banks $i' = 1, 2, 3, 4$ in the upper-left panel of Figure 1, which merge into banks $i = 1, 2$ in the lower-left panel. These two banks face otherwise identical, unobserved regional conditions, such as sluggish demand for banking products that might fuel consolidation pressures. Consequently, we attribute any significant performance difference to the abandoning of having separate SB per county.[9]

The second identification strategy acknowledges the abundant literature regarding conflicting merger motives, such as cherry picking versus the "silent" resolution of bank distress via pre-emptive mergers. Therefore, we also sample merging banks in non-reforming counties: $i' = 5, 6, 7, 8$ in the upper-right panel depicting the non-reformed counties $k = 2$ and $k = 3$. These mergers than give rise to a new SB $i = 3$ and a new CB $i = 4$, each of which catering to both counties simultaneously. The post-merger performance comparison between banks $i = 1, 2, 3, 4$ relies now on both the within-county variation between SB and CB, as in the baseline identification, and the between-county, between-merged bank variation of regions $k = 2, 3$ and $k = 1$.

[8] We treat these two Saxonian mergers as treated by reform, which can only harm our results. As a robustness check, we split the sample in the year 2000 and use only the early reforms.

[9] We demonstrate in Table 3 that the sampled SB and CB are for the most part not statistically different in terms of the level of observable financial traits and exhibit no statistically discernible trend in any of the controls we specify and discuss in more detail below.

The third identification strategy includes non-merging SB and CB, also. In terms of Figure 1, we add banks such as $i = 5, 6$ to the post-reform control group to assess whether SB that are subject to a governance shock through county reforms also unleash profitability potential relative to incumbent competitors that maintain the size of their operations.

3 Methodology and data

3.1 Methodology

To test whether mergers enforced by the elimination of exit frictions enhance profitability, we compare post-merger banks to a synthetic pre-merger entity that are constructed as follows. Almost all banks in our sample exit the market via M&As. Thus, the assets of exiting banks remain within the (savings or cooperative) banking sector and end up with one surviving bank at the end of our sample period in 2015. We identify acquiring banks and any subsequent acquirers up to a maximum of four layers of acquisition history for each exiting bank until we identify this ultimate survivor. For each of these surviving banks, we construct a synthetic pre-merger bank. We aggregate the assets, liabilities, and income statement positions from the first until the last available report before the M&As of all exiting banks whose acquisition history leads to the ultimate survivor bank. We then specify a difference-in-differences model to test whether county-reform-induced M&As unleash profitability potential among previously constrained banks:

$$\begin{aligned} \mathit{Profitability}_{i,t} = \; & \alpha_i + \delta_{s,t} + \gamma \, \mathbf{X}_{(i,c),t-1} + \beta_1 \left(\mathit{Merger}_{i,t} \right) + \beta_2 \left(\mathit{Reform}_{i,t} \right) \\ & + \beta_3 \left(\mathit{Merger}_{i,t} \times \mathit{Reform}_{i,t} \right) + \beta_4 \left(\mathit{Merger}_{i,t} \times \mathit{SB}_i \right) + \beta_5 \left(\mathit{Reform}_{i,t} \times \mathit{SB}_i \right) \\ & + \beta_6 \left(\mathit{Merger}_{i,t} \times \mathit{Reform}_{i,t} \times \mathit{SB}_i \right) + \epsilon_{i,t} \end{aligned} \tag{1}$$

The main dependent variable $\mathit{Profitability}_{i,t}$ is measured as the return on equity of synthetic bank i in year t residing in county c in state s, and it equals operating profits before taxes over gross book-value equity.

$\mathit{Merger}_{i,t}$ is an indicator variable equal to one in all years after an M&A. Since events occur at different points in time for each unit under observation, $\mathit{Merger}_{i,t}$ is defined in terms of event time, which is set to zero for all merging banks in the year of the merger. This is the first year in which the acquiring bank issued accounts incorporating the target and the target stopped reporting. We exclude the merger year itself from the estimation.The indicator variable equals zero up to four years before the transaction, and it equals one up to four years after the event.

On average, synthetic banks merge more than once, and cooperative banks merge even more than twice. Consequently, the treatment dummy $\mathit{Reform}_{i,t}$ is defined per transaction and bank, and it is equal to one in the pre- and post-periods if the merger occurred within three years after a county reform. For example, for banks headquartered in a county in Saxony-Anhalt, which was reformed in 1994, any deal in 1994, 1995, or 1996 would be treated. By using a three-year window, we account for the deadlines fixed in the reform bill (Table A.1 indicates that in the case of Saxony-Anhalt 1994, this was 1^{st}January 1997) and the fact that we use end-of-year bank data.

SB_i is a dummy variable indicating whether the bank is a government-owned savings

bank (as opposed to CB_i). The coefficient of interest is β_6 of the triple interaction term, and it measures the difference in the effect of merging with or without a reform on profitability for savings relative to cooperative banks.

3.2 Data

We use bank-level data from annual accounts and regulatory statements, supplemented with event data regarding mergers and distress events provided by Deutsche Bundesbank, for the period from 1993 to 2015.[10] We observe the whole universe of government-owned savings and cooperative banks in Germany. The private banking sector is excluded because we cannot attribute financial data of nationwide operating private banks to local banking markets. The sample comprises 714 reporting savings banks and 2,782 reporting cooperative banks, resulting in 80,868 bank-year observations. We complement these data with macroeconomic information at the county level provided by the Federal Statistical Office of Germany and spatial data provided by the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR), which we use to construct a reform indicator on the county level. We match this regional information based on the location of banks' headquarters using a county-level identifier.

We estimate Equation (1) with a sample of transactions, i.e., each bank included in the sample merges eventually. We accumulate all transactions of an acquirer during a year and treat them as one transaction with multiple targets. All in all, we observe 1,820 deals. These deals involve 286 savings and 1,740 cooperative banks as targets and 182 savings and 889 cooperative banks as acquirers.[11] By considering these transactions, we capture 98.5% of all exits in the population.[12] Of these, we must discard 193 transactions because of missing covariates. Our sample then consists of 1,627 transactions, 233 of which occurred in the government-owned banking sector. We observe 48 reform-induced mergers of government-owned banks and 26 corresponding mergers of cooperative banks in reformed counties. Table 1 depicts the dynamics over time.

A possible concern is that savings and cooperative banks are significantly different and therefore constitute poor comparison groups. Previous studies suggest that acquirers are different from targets (Hannan and Rhoades, 1987) and that, in particular, stressed savings banks are merged rather than closed (Koetter et al., 2007). Hence, banks that merge voluntarily – cooperatives – might be different from savings banks that are forced to merge due to a county reform. However, a few of the features of our setting alleviate concerns about spurious comparisons.

First, and most importantly, Figure 2 corroborates that the average profitability of treated and untreated banks within a banking group evolves similarly in the pre-merger time window but differs starkly for savings banks only.

Table 2 provides a comparison of average means of the levels and first differences of the profitability measure in the pre-merger period over treatment and ownership status. The difference-in-differences of means is significant neither in levels nor in changes before the event occurs (last row in Columns (3) and (6)). Both savings and cooperatives that

[10] The database regarding distress events is available from 1995 to 2013.

[11] Approximately 24% of the acquiring savings banks and 46% of the acquiring cooperative banks merge more than once. However, some acquirers are themselves targets later on.

[12] Bank exit is defined as stopping to report total assets to Deutsche Bundesbank. Only 30 exits of regional banks over the sample period cannot be attributed to a merger. However, an Internet search reveals that all seven savings banks that exited without record were also acquired despite the transactions not being listed in the merger data.

are treated and untreated and treated cooperative banks do not differ significantly before the merger. The profitability differences between cooperative and savings banks that are untreated and between treated and untreated savings banks are significant. Note, however, that the latter differences only appear in levels; thus, the fixed effects and covariates control for the difference.

Second, the use of synthetic pre-merger bank-entities levels out some of the performance differences between target and acquiring banks. Third, below, we exclude and control for mergers in which a party was in distress as a robustness test. Fourth, we are interested in the effect of the reform as an alleviation of frictions, not the effect of merging per se. Therefore, any potential selection bias between non-merging and merging banks is less likely to bias our test.

The matrix $\mathbf{X}$ in Equation (1) gauges macroeconomic and bank-specific conditions, which are defined in Appendix Table A.13. Bank-level fixed effects account for unobserved time-invariant heterogeneity across banks. To address time-varying variation between banks, we add CAMEL financial ratios, proxies for banks' business models, and size (Wheelock and Wilson, 2000). The summary statistics reported in Table 3 demonstrate that despite some significant differences in the differences of levels (Column (9) upper part), the difference-in-differences of all covariates' changes are insignificant (Column (9) lower part) except for loan loss provisions.

We measure financial profiles with (i) the equity to total assets ratio to gauge capital adequacy (*Equity*), (ii) loan loss provisions to total loans for asset quality (*LLP*), (iii) cost-to-income ratio for management quality (*CIR*), and (iv) liquid to total assets for liquidity profile (*Liquidity*). In the baseline estimation, we exclude proxies for earnings because these are strongly correlated with the dependent variable. To capture the business model, we add (v) consumer loans to total assets ratio (*Loans*) and (vi) non-interest-income to total income (*NII*). Finally, we specify (vii) size as an annual decile indicator of the total asset distribution (*Size*). All covariates are lagged by one year. To account for macroeconomic differences, which affect business opportunities and the demand for banking services, we add year × state fixed effects. In addition, we control for GDP at the county level, which is one of the few macroeconomic measures also available at granular regional levels in Eastern Germany since the early 1990s.

4 Effects of reform-induced mergers on bank performance

4.1 Profitability sclerosis

Table 4 reports our baseline regression results from estimating Equation (1). We start in Column (1) with a sample of merging banks that resided only in reformed counties. In terms of the illustration in Figure 1, we thus consider banks $i' = 1, 2, 3, 4$ in the upper-left panel. The results in Column (1) show that our coefficient of interest, the triple interaction term β_6 between government ownership, the occurrence of a merger, and a spatial reform affecting banks' home counties, is positive and statistically significant.

In fact, the economic magnitude of this "unleashing potential" effect is large. Government-owned savings banks that merge after a county reform exhibit a positive differential return of equity (RoE) effect on the order of 5.7 percentage points relative to the comparison group. The peers to which we compare post-merger performance in Column (1) are not-

yet-merged savings and cooperative banks before the reform. The total relative effect of the reform on savings bank profitability is one-third of a percentage point (−0.024+0.057). Compared to a sample mean RoE of 7.9%, this estimate implies that savings banks increase their RoE after a reform-induced merger relative to other merging banks that are still in the pre-merging period by approximately 41%. In contrast, cooperative banks – which were not subject to any potential political frictions that held them back from realizing optimal profits prior to the county reform – exhibit a RoE effect that is 2.4 percentage points lower than before the reform.

These results are unlikely to reflect fundamentally different business models between savings and cooperative banks, which are absorbed by bank-fixed effects. In addition, recall that we specify time-varying control variables at both the bank and county levels, which limits the danger that other (time-variant) unobserved effects bias our estimate. Another concern is that county reforms may not occur randomly but correlate, for example, with electoral and/or budgetary cycles at the national and sub-national levels of the states.[13] Dire state-specific macro and credit demand conditions could ignite both county reforms and bank mergers. Because of this valid potential reservation, we specify state-by-year fixed effects. Thereby, the coefficients in Table 4 result from a within state-year comparison of banks which controls for between-state differences in terms of economic surroundings, political influences, and other unobservable demand effects. Given this encompassing saturation of the model with fixed effects to gauge unobservable drivers of post-merger bank profitability, it is remarkable that the within-county variation in covariates identifies approximately one-third of the total variation in bank RoE.[14]

The tight specification in Column (1) provides a very clean identification of the RoE differential effect. However, it does not permit any inference beyond locally merging banks in counties that actually experienced a spatial reform at some stage.[15] Since the majority of reforms – and hence reform-induced mergers – pertain to Eastern German states (see Table A.1), we expand the control group in Column (2) by merging savings and cooperative banks from non-reforming counties. This specification therefore also gauges cases of savings (and cooperative) bank mergers that occurred without an exogenous change forced upon the local politicians that own savings banks and thus the governance exerted by them. This specification is based on a sample of bank-year observations that is almost three times as large yet yields virtually identical results concerning statistical significance, the direction of effects, and economic magnitudes.

An alternative scenario for why government bank performance is unleashed is that county reforms themselves lead to profitability improvements. It is not unreasonable to suspect that county reforms in pursuit of unrealized administrative efficiency gains extend in particular to banks supervised and owned by that very government. As such, any profitability gains from ceased political frictions would apply to non-merging savings banks, also. In that case, confining the sample to merging banks might give rise to spurious RoE effects of reform-induced consolidation. To test whether RoE effects are at work through the elimination of excess capacities due to enforced mergers, we therefore also include banks that did not merge at all in Column (3). In terms of Figure 1, this

[13] See, for example, Seitz (2000) and Galli and Rossi (2002) for evidence at the sub-national level of German states and Katsimi and Sarantides (2012) or Efthyvoulou (2012) for national evidence in Europe.

[14] In Table A.2 in the Appendix, we also provide these headline results when including the lagged natural logarithm of public debt (L(Debt)) at the county level, which we manually collected from state statistical office publications. The results are unaffected by cross-county heterogeneity in public debt at this granular macro level.

[15] We provide details about alternative samples in Tables A.10 and A.11.

specification corresponds to banks $i = 5, 6$. The main effects remain qualitatively intact for this sample also, although the economic magnitudes of both the total effect of reforms and the triple differential effect reflected by β_6 are somewhat smaller. Overall, these results corroborate the robustness of the main findings: savings banks are significantly more profitable after a merger that was forced upon them by a county reform. Henceforth, we focus on the specification in Column (2), which compares only merging savings and cooperative banks, but from both reformed and non-reformed counties.

The headline result implies that a reduction in political frictions induced by county mergers increases the profitability of savings banks by fueling consolidation in this part of the banking sector. In light of alleged excess capacities prevailing in European banking (ESRB, 2014), increased direct and indirect government stakes in European banks after the Great Financial Crisis, and notoriously low profitability, the reduction in political governance frictions appears an effective and potentially important way forward for the financial industry.

An important open issue to completely assess the potential policy implications of our results is whether reform-induced mergers actually yield sustained profitability improvements compared to other merging banks that did not experience a hike in governance pressure. Therefore, we specify increasingly long post-merger reform periods to assess if and for how long reform-induced M&As enhance RoE. Figure 3 plots these effects for post-reform periods of up to eight years.

The left panel depicts the estimated double and triple interaction effects and corresponding 95% confidence intervals based on estimations of Equation (1) for the main sample (Column (2) in Table 4) across increasing lag lengths that are depicted on the x-axis. The differential RoE effect between government-owned and cooperative banks remains significant for up to eight years after a reform-induced merger. The right panel plots the overall effect of county reforms on the profitability of savings bank, which is also significantly positive for the entire period. Thus, the profitability improvements of government-owned banks that are unleashed by removing exit shelters in place prior to county reforms do not vanish quickly. Instead, profitability gains are statistically significant and economically meaningful for a considerable period of time.

4.2 Robustness of the effect on profitability

We conduct a number of robustness checks for our baseline results and provide all corresponding tables in the Appendix.

First, Table A.3 presents regression results for different bank profitability measures and alternative samples. For comparison, Column (1) provides the regression results for the sample of merging banks in all counties from Table 4. We check in Columns (2) and (3) whether our results hinge on the choice in our baseline regression to use gross equity in the denominator of bank profitability. Gross equity contains some reserve positions that allow for fairly particular valuation treatments under German accounting rules according to the commercial code (*Handelsgesetzbuch*). Therefore, we also gauge profitability relative to net equity or total assets. In both cases, the triple interaction term remains positive and significant, which confirms that savings banks become more profitable compared to cooperative banks after county reforms. Columns (4) and (5) test whether the headline results are driven by a particular time period. Since most of the county reforms occurred in the 1990s, Column (2) provides results for the years from 1994 until 2000. The results are qualitatively almost identical regarding significance

and magnitude compared to the baseline case. However, when we confine the analysis to the years between 2000 and 2009, the results are insignificant. This feature mirrors the fact that much fewer county reforms that affected a substantially smaller number of banks occurred after the turn of the century. Next, we exclude distressed banks from the sample in Column (6) of Table A.3. Supervisory orders to restructure might be a confounding channel to unlock profitability potential after the successful recovery of the merged entity (Kick et al., 2016). The size of the triple interaction term declines to an increase of RoE on the order of 4.6 percentage points. This result therefore still indicates an economically large role played by regional government ownership acting as a roadblock to unlocking profitability potential. In Column (7), we acknowledge that savings banks might be connected to local politicians to varying degrees through credit connections. We therefore exclude banks with a municipality lending share of total loans above the average of their banking groups to account for possibly very close political ties in Column (7). This specification leaves the main results untouched. Finally, we sample in the vein of Huang (2008) only banks from reforming counties and banks from adjacent non-reforming counties. This contiguous county specification ensures that those unobservable factors possibly not captured by the fixed effects are muted. Column (8) shows that savings banks still exhibit higher profitability after reform-induced mergers. In Column (9), we address possible concerns related to the time-series correlation of bank mergers and profitability in our sample. A typical concern with difference-in-differences regressions applied to panel data with many periods is correlation of the dependent variable. In such a case, standard errors may be low enough to imply a systematic over-rejection of the null hypothesis of differential effects after the treatment (Bertrand et al., 2004). Note that the merger events analyzed here do not occur for all banks in one particular year. Therefore, the pre- and post-periods are not equal for each treated and control bank. Consequently, a standard OLS regression on the collapsed sample is inadequate. We follow Bertrand et al. (2004) and regress the dependent variable RoE on the covariates, fixed effects, and the reform indicator, which defines the treatment status. Only the residuals of the treated banks are then distinguished into two groups, thereby eliminating the time dimension: residuals from the pre-reform years and residuals from post-reform years. Column (9) reports the results when we estimate the impact of the reform on the treated banks in this two-period panel. The interaction effect of the merger indicator and the indicator that separates savings from cooperative banks are both significant. Consequently, this procedure to eliminate potential concerns regarding serial dependence contaminating our estimates does leave our main effect of interest intact.

Second, in Table A.4, we provide the results from placebo reform treatments to verify whether the differential effect in returns was induced by reform or chance. We run two simulations with 1,000 replications and extract the probabilities to be treated by reform for each banking group separately. We separate by banking group because the probability to be treated for savings banks is significantly higher than for cooperative banks. The reason is that most of the reforms occurred in Eastern Germany, but there exist disproportionately more cooperative banks in Western Germany, especially in the south of Germany. If we were not to account for these differences, we would over-sample cooperative banks. We assign reform treatment randomly over all years to other merger events, re-estimate our baseline specification (corresponding to Column (2) in Table 4) and test in each repetition the hypothesis that the coefficient on the triple interaction between reform, post-merger and government owned bank is equal to 0. We calculate the rejection rates of this test at 1%, 5%, and 10%, which are reported in Table A.4. We assign

treatments randomly over all reporting banks, including those that were actually treated. Overall, Table A.4 indicates that for these random placebo treatments, our main effect is only significant within the range of statistical noise. This outcome thus strongly supports our results from Table 4. The RoE increase due to county-reform-induced mergers is very unlikely to be due to statistical noise driven by other factors than the actual county reforms followed by reform-induced bank mergers.

4.3 Decomposition and economic channels of the effect on profitability

At first sight, profitability improvements after reform-induced mergers bode well to enhance the resilience of a banking system that exhibits sclerotic profitability developments since the Great Financial Crisis. In this section, we seek to shed light on the channels of positive bank RoE effects. We begin by decomposing return on equity from an accounting perspective to identify the source of profitability hikes: equity, profits, and cost. Then, we test for the economic drivers of post-merger performance documented in previous literature: risk, efficiency, and market power.

Equity decomposition A simple means to improve the profitability in terms of RoE is to increase leverage, clearly an undesirable strategy from a financial stability perspective if this risk-taking turns excessive. Table 5 therefore provides a decomposition of a bank's gross equity positions, which is the numerator of our main performance metric. We reproduce the main results for return on equity in the first column and show subsequently results for gross equity and its components: net equity, accruals, and other equity. We specify the log level of these level variables to accommodate the heterogeneous distribution in absolute sizes and to ease the interpretation of the coefficients as semi-elasticities.

County reform-induced mergers exert no significant differential effect on banks' gross equity (Column (2)) but decrease savings banks' net equity position significantly. Column (3) shows that savings banks' net equity decreases by approximately 8.6% by the reform-induced merger relative to cooperative banks. We provide more detailed results in Table A.5 in the Appendix. Here, we find that the decrease in net equity is potentially driven by nominal equity (Column (2)) and retained earnings from the current accounting period (Column (5)). Both coefficients are negative, which might indicate that the new owners of the merged entity force it to disperse some of its accumulated earnings. Note, however, that in the more detailed decomposition, the individual effects are not statistically significant.

The two remaining components in Table 5 that are part of gross equity are accruals and other equity. Column (4) demonstrates that there is no significant triple interaction effect indicating that accruals are not driving our results. However, Table A.5 in the Appendix highlights that this absence of an effect is likely the result from counteracting effects of increasing tax accruals and decreasing accruals for risk. The latter effect reflects lower loan loss provisions and a reduction in accruals for pensions. Again, the low power that poses challenges to estimate a statistically significant effect prohibits stronger inference. However, a possible narrative in line with these indications is that merged banks increase their operational risks as far as retaining earnings to cover the potential realizations of risks in the distant future – such as pension obligations and more conventional credit risk – is concerned. At the same time, such banks might receive advantageous tax treatments

that are reflected in increasing equity accruals for taxes.[16]

The residual category is other equity. The triple interaction coefficient is significantly negative and at first sight very large. However, the magnitude of 350% must be regarded in the light of a very high difference in this category between savings and cooperative banks in the pre-treatment period. As Table A.9 in the Appendix indicates, this pre-treatment difference is approximately 576%. This result therefore instead indicates that mergers induced by county reforms alleviate some of these pre-treatment differences. The more detailed breakdown provided in Table A.5 indicates that the overall effect appears to be primarily driven by an increase in subordinated debt.

In sum, an important source of increasing return on equity appears to accrue among merging savings banks from choosing lower capitalization ratios. Clearly, this might result from previously too high levels of capital that were inefficient. We cannot evaluate with our approach the adequacy of capital levels and limit ourselves to conclude from a purely partial equilibrium perspective that improved post-merger bank performance results *ceteris paribus* from accepting riskier balance sheet structures.

Profit decomposition If county reforms are the (positive) governance shock that we conjecture them to be, we should see, in particular, profits increased and costs cut as a consequence of rectifying previously amassed operational slack, for example, due to a Hicksian quiet life (see Koetter et al., 2012, for evidence regarding how U.S. regulation sheltered banks from enforcing efficient operations). Alternatively, a substantial reduction in geographically diversified bank portfolios might aggravate agency conflicts and thereby reduce the value of surviving banks, as pointed out by Goetz et al. (2013) for the case of U.S. banks. To test whether one of these possibilities is at play in our sample, we turn to the numerator of bank RoE and investigate banks' revenues, profits, and cost components in Table 6. All variables are specified again in log-levels.

Column (1) indicates that besides reducing capitalization, merged savings banks in reformed counties also substantially increased their profits before taxes. Mergers that are induced by county reforms increased savings banks' profits by approximately 330% compared to cooperative banks. This increase in profits is not due to an increase in revenues (Column (2)) but rather due to lower total costs that savings banks incur relative to their cooperative counterparts after county reform-induced mergers. Our findings are corroborated by Table A.6, which confirms that the revenues of treated banks are barely affected by the county reforms. However, Table A.7 indicates that lower costs of savings banks are mainly driven by reduced interest expenses and other operating costs.

Bank risk In addition to the somewhat mechanistic decomposition of bank profitability from an accounting perspective, we test three economic channels proposed in previous literature as determinants of post-merger performance. Against the background of well-known risk-taking incentives associated with higher banking market concentration (e.g., Keeley, 1990; Müller and Noth, 2018), a first important question is whether the improved profitability of savings banks after reform-induced mergers also bears implications for overall bank risk.

We document in Table 7 that higher profitability is associated with significantly more volatile return on assets (Column (2)). However, in combination with unchanged Tier 1

[16] An important share of corporate taxes are levied at the county level (Statistische Ämter des Bundes und der Länder, 2014, *Gemeindesteuer*), which correlates with the political cycle (Foremny and Riedel, 2014).

capital ratios (Column (3)), the reform-induced mergers have no significant differential effects on banks' z-scores. However, we find a significant reduction in loan loss provision shares and an increase in non-performing loan shares for savings banks in comparison to cooperative banks. These results are in line with the finding in Goetz et al. (2016) that regional diversification in U.S. banking increased financial stability gauged in terms of the z-score. In economic terms, our results suggest that the overall effect of reform-induced mergers on savings banks is a reduction in loan provisions of approximately 0.6 percentage points and an increase in non-performing loans of 1.9 percentage points. In light of mean values of 0.01 for provisions and 0.06 for non-performing loans, these effects reveal a change in economic magnitude of approximately two- and one-third for both measures, respectively. Consistent with the relative reduction of capitalization, this increase in credit risk indicates that the realization of profitability potential is generally associated with riskier financial profiles compared to pre-merger conditions.

Bank efficiency The second channel relates to the role of cost efficiency as a driver of consolidation, such as by eliminating excess employment of labor or physical capital in the form of branches (Lang and Welzel, 1999) or the realization of scale economies (Berger et al., 1999).

Table 8 accordingly reports the effects of reform-induced mergers on the number of branches and the number of employees (both in relation to total assets), the ratio of employees per branch, wages per employee, and the cost-income ratio.

Column (1) indicates that there is no significant reduction of the number of branches relative to bank size for government-owned and cooperative banks. Furthermore, savings banks have more staff relative to bank size than cooperative banks after the reform-induced mergers (Column (2)). However, when we contrast employees with branches, we find that savings banks manage to reduce the number of employees per branch by approximately 18% compared to the group of cooperative banks (Column (3)). This reduction is cost-neutral since the overall effect on labor costs (wages per employee) for savings banks is zero (Column (4)). Finally, Column (5) of Table 8 indicates that the differential effect on the cost-to-income ratio between government and cooperative banks is negative but insignificant. Thus, cost reductions do not seem to result in a significant higher efficiency of savings banks after reform-induced mergers.

Bank market power The third economic channel of potential importance is that banks merge to gain market power, thereby permitting them to extract rents, either from mere monopoly power (Canales and Nanda, 2012) or enhanced abilities to generate and use private information from larger average customer pools per bank (Hauswald and Marquez, 2006). To test for any post-merger market power implications, we therefore explore net interest margins and their components and the market share of banks in terms of loans to customers of a bank within its business area. We provide the results in Table 9.

Our results suggest that the net interest margin serves as an explanation for the higher profitability ratio for savings banks. Reform-induced mergers of government-owned banks lead to an increase of 0.2 percentage points, which is significantly higher compared to the change of cooperative banks (Column (1)). Relative to mean net interest margins on the order of 3 percentage points, this estimated magnitude amounts to an increase of 6.7%. We further find that the higher net interest margin results from an increase in interest income (Column (2)). Interest expenses, in turn, remain statistically unchanged (Column (3)). The results further indicate that savings banks decrease their interest-bearing lia-

bilities significantly (Column (4)), which suggests that they manage to increase interest income ratios with fewer interest-bearing assets. The more detailed analysis of components in Table A.8 in the Appendix shows that the reduction of interest-bearing liabilities reflects lower customer loans and investments in bonds and securities of savings banks after reform-induced mergers. Column (5) of Table 9 demonstrates that reform-induced merges do not enable savings banks to gain market shares compared to cooperative banks.

5 Real effects of reform-induced bank mergers

Thus far, the evidence unequivocally suggests a positive differential effect on bank profitability after reform-induced mergers. However, whether a governance shock that eliminates exit hurdles is desirable from the perspective of real economic implications remains an open question. To this end, we consider next both banks' and non-financial firms' responses in greater detail.

5.1 Bank responses

First, we address the question of if and how the hike in profitability of forced savings bank mergers is associated with some frequently voiced concerns that such a consolidation brings along: the limited provision of access to financial (retail) services in non-urban areas, support of local economic policy makers, and constrained credit access, especially for SMEs. Therefore, we specify according alternative dependent variables in baseline Equation (1).

Column (1) of Table 10 specifies retail deposits of savings banks as the dependent variable. Due to the lack of more-direct measures of providing financial services to retail customers, we want to gauge whether forced savings bank mergers entail fewer retail customer accounts and lead instead to more wholesale-oriented sources of funding that do not require administering many relatively small denomination accounts. We do not find any such tendency. The triple interaction term of the merger indicator, the county reform dummy, and the savings bank indicator exhibits no significant difference relative to the comparison group of cooperative banks.

Next, we test for the possibility that savings banks either reduce or grant more municipality or state loans after their reform-induced mergers. A reduction in lending to the local municipality or the host state of government-owned banks would support concerns that the statuary obligation of savings banks to serve their local community might be undermined. Expanding local government lending, in turn, could give rise to entrenchment concerns between local politicians and bankers. Both outcomes would indicate some economic costs that would juxtapose the benefits from enhanced bank profitability after reform-induced mergers. The empirical evidence, however, bears no indication for such concerns. The triple interaction terms for both forms of government lending (Columns (2) and (3)) are not significant. As such, the absence of a significant differential effect bodes well.

A third potential concern regarding undesirable real effect could be an overall credit restriction to local business or at a politically motivated allocation to potentially less productive sectors of the economy. Columns (4) through (8) therefore specify loans to different sectors, in addition to total private sector lending in Column (9). The only category that exhibits a significant effect is industrial loans (Column (6)), i.e., loans to firms in the industrial sector. The triple interaction coefficient is positive and highly significant.

Savings banks that experienced a reform-induced merger increase their industrial loans by approximately 2% in comparison to cooperative banks. In contrast, the merged cooperative banks reduced their lending in this category by approximately 0.9% compared to the time before the reform which leads to a gross increase of 0.9% in industrial lending by savings banks after reform-induced mergers. Thereby, our results suggest a positive spillover effect of county reforms on the real sector in the form that savings banks use the improvements in their profitability to encourage firm lending after being forced to merge.

5.2 Non-financial firm responses

To further zoom into such positive externalities of reform-induced mergers to the real economy, we mobilize detailed firm-level data regarding corporations connected to savings banks. Specifically, we use detailed balance sheet and profit and loss data for firms that held a credit relation with a savings bank between 1995 and 2006. These data have been used before (Puri et al., 2011; Gropp et al., 2013; Behr et al., 2013; Inklaar et al., 2015) and feature an important link between savings banks and firms: the share of loans provided by savings banks (relative to total loans) SB. In comparison to the other studies, we restrict our data in two dimensions. First, we only use regions in Eastern Germany because these were subject to county reforms between 1995 and 2006. Second, we delete all firms with missing information for the main variables, which leads to a sample of 51,792 observations for 18,664 firms. With these data at hand, we estimate the following:

$$Outcome_{j,t} = \alpha_j + \gamma_{r,t} + \alpha_1 \ (SB_{j,t}) + \alpha_2 \ (RM_{i,r,t-h} \times SB_{j,t}) + \epsilon_{j,t}. \tag{2}$$

Equation (2) measures the impact of a reform-induced merger of a savings banks RM in region r on firm j conditional on the share of savings bank loans SB that a firms holds in year t. RM is an indicator variable equal to one in the year when a savings bank in a firm's region merges due to a reform. We specify different post-merger spells that are indicated by the subscript h.

We specify four outcome variables to assess the real effects of reform-induced bank mergers: firms' external financing cost measured as total interest expense over total liabilities, the natural logarithm of firms' gross real investments, the natural logarithm of firms' number of employees, and firms' leverage ratio measured as total liabilities over total assets. We use firm fixed effects α_j and region-year fixed effects $\gamma_{r,t}$ to control for constant factors on the firm level and for regional effects that vary over time. The coefficient of interest is α_2, and it gauges the differential effects on the outcome variables for firms located in regions that exhibit a reform-induced savings bank merger in a given year with respect to the closeness of the firm's credit relation to this savings bank. We present our results in Figure 4. The associated (detailed) regression results and descriptive statistics for all variables are reported in Table A.12 in the Appendix.

Each graph in Figure 4 shows the marginal effect of $SB \times RM$ from Equation (2) for realizations of SB between 0.1 and 1. For each value of SB, we provide the marginal effect pertaining to four different post-merger spells: (i) the contemporaneous year (solid black dot), (ii) the contemporaneous and the subsequent year (black circle), (iii) the contemporaneous and subsequent two years (solid gray dot), and (iv) the contemporaneous and subsequent three years (gray circle). For each estimate, we also provide the 95% confidence interval.

The upper-left graph shows the marginal effects of reform-induced savings bank mergers on the external financing costs of firms. Across the entire distribution of values for

SB, we estimate a negative and significant marginal effect for the two specifications of short-term effects, i.e., up to the first subsequent post-merger year. This effect ranges between 10 and 25 basis points, which represents a contraction of approximately 5.5% compared to the average external funding cost in the sample of 4.6 percentage points. The marginal effects turn insignificant for spells up and until the second and third year after reform-induced mergers. We further find that the reduction of external financing cost is larger for those firms that borrow larger loan shares from savings banks. As such, these results provide strong evidence against concerns that the exit of local banks after the elimination of governance frictions embodied in government ownership impose tighter credit conditions especially on those SMEs that are very dependent on local government-owned banks. Importantly, this result does not necessarily contradict those of Berger et al. (1998), Degryse et al. (2011) or Berger et al. (2017), who emphasize the importance of small, local lenders to provide credit and liquidity insurance to SMEs. Instead, our result provide important indications that government-owned local lenders that are shielded from market forces incur unrealized profitability potential, which in turn also benefit SMEs when released after the elimination of political frictions.

The upper-right graph reveals that corporations that are more intensive users of savings bank loans invest significantly more after a reform-induced merger of government-owned banks in the firm's region. This effect is long-lived, exhibiting a significantly positive response during the entire three year spell after the merger. In economic terms, firms that borrow 50% of their loans from a savings bank increase their investments by around 50% in the years after a reform-induced merger. Thus, this result corroborates the notion that county reforms unleash potential in the local financial sector that was held back by additional frictions associated with fragmented local governments' interests of many counties. Taken together, the results indicate that post-reform merged savings banks lend more to industry customers at lower cost of credit, which is channeled by these corporations into additional investment in fixed assets.

The first two graphs of Figure 4 show that savings bank mergers due to a reform are beneficial for connected firms. Reform-induced consolidation seems to increase the supply of resources by banks that fuel corporate investment (Amiti and Weinstein, 2018). Significant differential effects thus indicate that the elimination of political barriers to bank exit in Germany also sparked meaningful real economic spillovers.

The lower-left graph of Figure 4 signals mildly positive employment effects in the range of 1% to 2% for the period three years after the mergers. Longer adjustment responses are commensurate with the notion of labor market frictions that are more binding compared to physical capital markets, for example because of more restrictive labor laws that limit the ability of corporations to adjust wages downward or to lay-off staff in economic downturns. The lower-right graph finally shows that these real expansionary effects are at the same time not associated with any significant effects on firms' leverage ratios.

In sum, the factor market for physical capital – and with some delay, also labor markets – respond significantly positive to improved local financial market development, whereas we find no support for concerns of larger banks fueling an over-indebtedness of local firms. Thus, reforms that force government-owned savings banks into mergers appear to be beneficial because connected firms can increase investments and employment due to lower financing costs. At the same time, these real expansionary effects do not increase corporate leverage ratios in the years after the mergers.

6 Conclusion

This paper sheds light on the question of if and to what extent a governance shock that eliminates exit barriers in banking (i) spurs consolidation and thus (ii) unleashes profitability potential in the banking industry.

To identify any causal effect of subdued exits, which in turn might or might not hold back profitability, is a daunting task that faces a battery of serious econometric challenges. First, if government ownership impedes "natural" governance mechanisms, we aim to unveil a non-event, namely, those bank exits that should have occurred but did not. Second, and somewhat more mundane and well-known, it is unclear whether banks do merge because of poor performance or whether mergers induce differential performance. Third, a number of additional unobservable factors that have little to nothing to do with post-merger performance might drive profitability, ranging from aggregate demand to credit market frictions to political and regulatory differences across regimes.

Our setting is unique because it exploits a number of features that address these challenges. We consider local savings and cooperative bank mergers in Germany from 1993 until 2015. Our identification rests on three decisive features of German banking. First, local savings banks are owned by their regional political entity, usually one of the 402 counties that existed in 2015. Second, whenever these political entities are combined, residing savings banks are forced to merge also because each county must not own more than one savings bank. In total, 10 spatial reforms occurred since the unification of Germany, thereby leading to numerous "forced" savings banks mergers. We compare these reform-induced mergers to transactions among cooperative banks – which are privately owned and thus not subject to government-ownership shelter regarding corporate governance – in both reformed and non-reformed counties. We also compare forced to voluntary savings bank mergers that happened without county reforms inducing them. Third, these county reforms are decided upon at the federal level in the parliaments of each of the 16 states. As such, they represent truly exogenous governance shocks to local savings banks that are required by law to merge. If the pre-merger entities were therefore inefficient and unprofitable because of shelter from governance forces by "their" local political owners, a merger of counties should unleash profitability potential after the forced merger occurred.

Our analyses confirm indeed that savings bank profitability increased substantially relative to that of cooperative banks in both reformed and non-reformed counties. For up to eight years after mergers that were induced by county reforms, return on equity increased by approximately 5 to 6 percentage points, which is substantial in light of mean profitability on the order of 8 percentage points. These improvements, however, appear to be associated with increasing risk indicators. Merging savings banks reduced their capitalization and loan-loss provisioning. Likewise, we find evidence of increasing non-performing loan shares after such county-reform induced mergers. Hence, the relative enhancement of risk-adjusted returns due to the elimination of exit barriers is lower than improvements in gross returns. In individual cases where additional risk-taking is excessive, differential risk-adjusted return effects may even turn negative. Market power concerns are in turn not confirmed. If anything, bank refinancing expenses are reduced, which might in fact indicate improvements in managerial efficiency. However, other indicators of operational efficiency – such as employment and the number of branches – do not exhibit recognizable declines.

Based on detailed non-financial firm data of savings bank customers, we further show

that affected savings banks increase their lending to corporations. Small and medium-sized enterprises connected to reform-induced merged banks exhibit lower external financing costs. We also document important real responses by these corporations in terms of higher real investments and employment in the aftermath of reform-induced mergers by savings banks.

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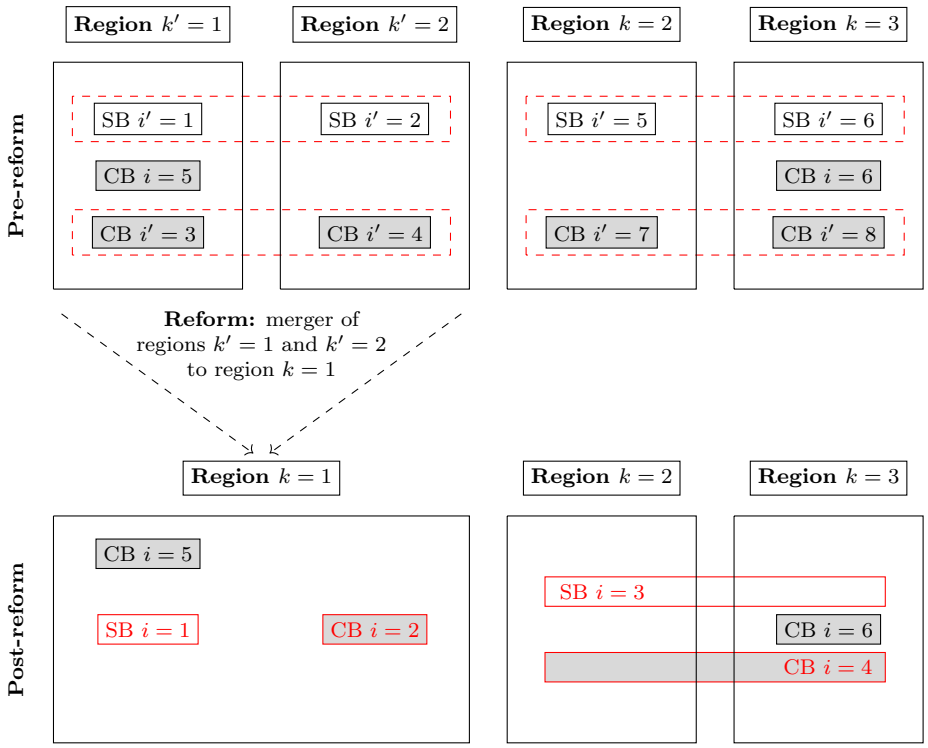
Figures

Figure 1: Identification illustrated – county reforms and bank mergers.

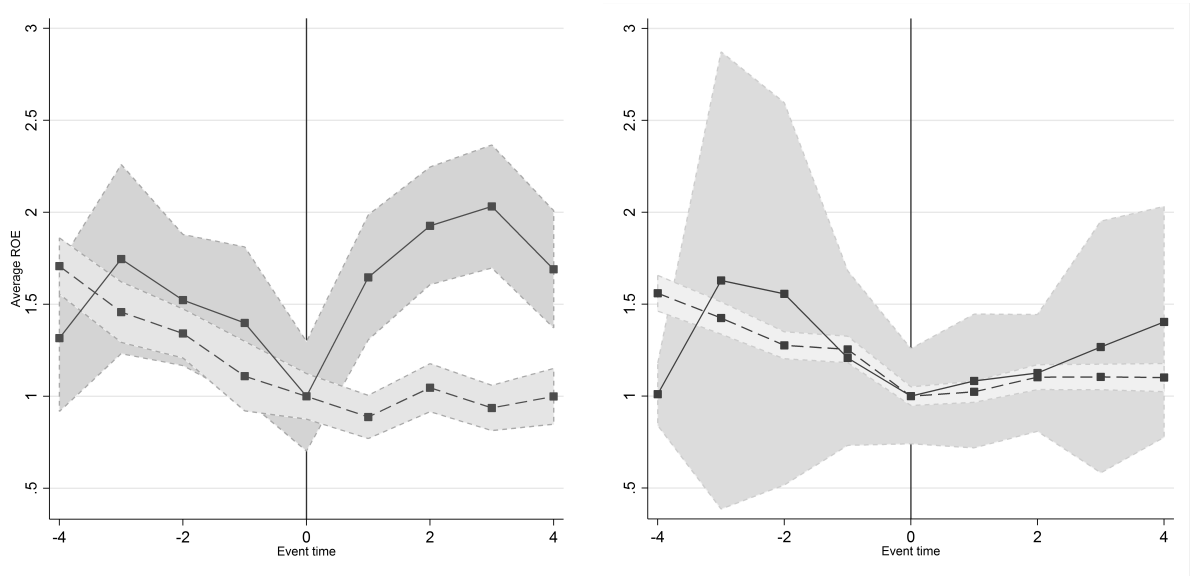


Notes: This figure shows savings banks (white rectangles) and cooperative banks (gray rectangles). The banks are active in regions $k' = 1, \ldots, 4$ before a regional reform. Through a regional reform, the two regions $k' = 1, 2$ merge to region $k = 1$, whereas the regions $k = 2, 3$ are not reformed. The savings banks $i' = 1, 2$ and cooperative banks $i' = 3, 4$ merge into savings bank $i = 3$ and cooperative bank $i = 4$ in the non-reforming regions. However, the savings banks $i' = 5, 6$ and cooperative banks $i' = 7, 8$ merge into savings bank $i = 3$ and cooperative bank $i = 4$ in the reforming regions. The dashed areas that span around the savings and cooperative banks before the regional reform indicated that for the analysis, the banks are synthetically combined already before their mergers. The two cooperative banks $i = 5, 6$ active in reforming region $k'1 = 1$ and non-reforming region $k = 2$ do not merge.

Figure 2: Bank profitability around merger events by ownership and treatment status.

(a) Merging savings banks

(b) Merging cooperative banks

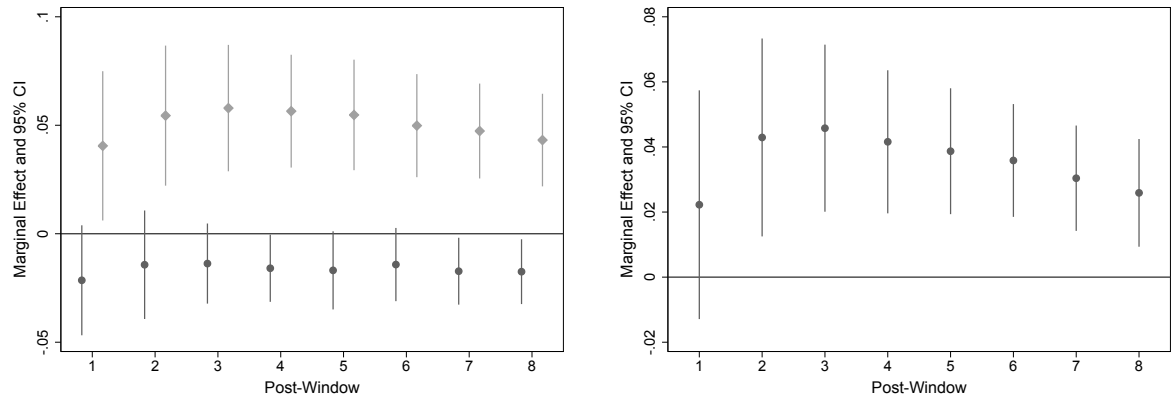


Notes: This figure shows average return on gross equity (lines) ±2 standard errors (shaded area) in event time for the sample of merging banks by ownership status rescaled to 1 at event time 0. The solid line represents treated banks, and the dashed line depicts non-treated banks.

Figure 3: Long-term effects on profitability

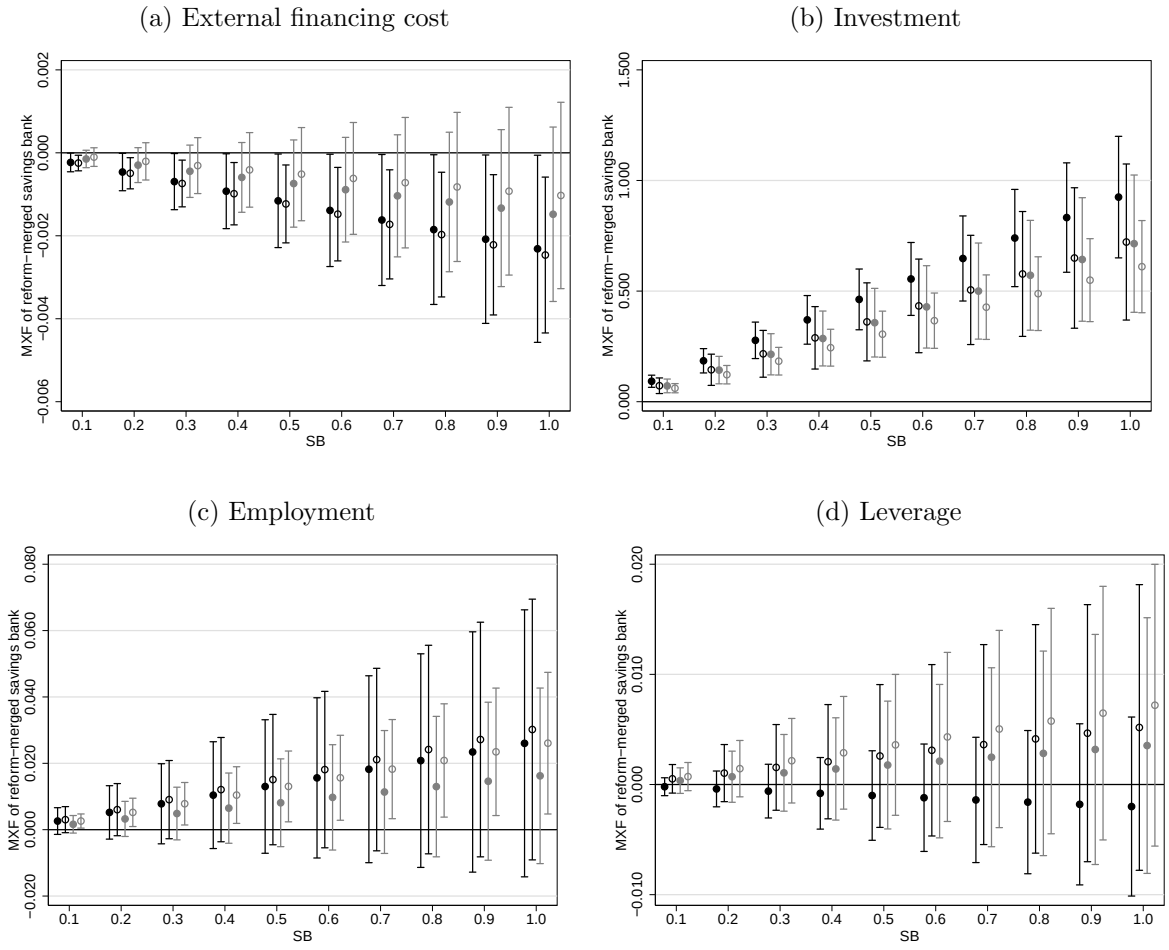
(a) Double and triple interaction effect

(b) Differential effect



Notes: This figure shows coefficients and 95% confidence intervals of the effect of reform on merging savings banks for different time windows (0-8). The left graph displays the double and triple interaction effect, i.e., β_3 (dark gray) and β_6 (light gray) in Equation (1). The right graph shows the differential effect of reform on the effect of merging for savings banks, i.e., $\beta_3 + \beta_6$ in Equation (1).

Figure 4: Real effects of reform-induced savings bank mergers



Notes: The graphs depict the marginal effects of a reform-induced savings bank merger (in a region) on firm outcomes (of firms in that region) conditional on the firms' share of savings banks' loans to total loans. The dots represents the marginal effects and the solid line the 95% confidence interval. We show the effects for shares of savings banks' loans between 0.1 and 1. For each level, we show four marginal effects: first, the marginal effect from the contemporaneous year (solid black dot); second, the marginal effect from the contemporaneous and the subsequent year (black, unfilled dot); third, the marginal effect from the contemporaneous and the subsequent two years (solid gray dot); and fourth, the marginal effect from the contemporaneous and the subsequent three years (gray, unfilled dot). We calculate the effects from regressions of Equation (2) and provide the detailed results in Table A.12.

Tables

Table 1: Frequency distribution of banks and M&A transactions over years according to treatment and ownership status

	Observations				Banks	Transactions			
	Savings		Cooperatives			Savings		Cooperatives	
	Non Treated	Treated	Non Treated	Treated	Total	Non Treated	Treated	Non Treated	Treated
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1993-1999	286	164	2016	47	2513	48	39	545	21
2000-2015	774	72	3914	27	4787	137	9	823	5
Total	1,060	236	5,930	74	7,300	185	48	1,368	26

Notes: This table reports observations, number of banks, and number of M&A transactions in each year for the sample of merging banks according to treatment and ownership status. In Columns (1) to (4), observations of synthetic or original banks are counted. In Column (5), observations are summed up per year, giving the number of banks (original and synthetic) each year. In Columns (6) to (9), mergers are counted in the year in which they occurred.

Table 2: Pre-merger tests for return on gross equity

	Untreated by Reform (1)	Treated by Reform (2)	Diff. in Treatment (3)	Untreated by Reform (4)	Treated by Reform (5)	Diff. in Treatment (6)
	Levels			*First-Differences*		
Savings	0.075	0.058	0.016	-0.010	-0.017	0.007
	(0.057)	(0.045)	(0.019)	(0.045)	(0.055)	(0.368)
Cooperative	0.080	0.068	0.011	-0.004	0.007	-0.012
	(0.063)	(0.050)	(0.325)	(0.052)	(0.055)	(0.364)
Diff. in Ownership	0.005	0.010	-0.005	0.006	0.024	-0.019
	(0.087)	(0.448)	(0.707)	(0.016)	(0.104)	(0.195)

Notes: This table reports the summary statistics for return on equity by ownership and treatment in the pre-merger period of merging banks. Columns (1), (2), (4), and (5) present the mean and standard deviation in parentheses. Columns (3) and (6) report the difference in means and the p-value of a difference-in-means test in parentheses.

Table 3: Summary statistics of explanatory variables

	Savings			Cooperative			Diff.	Diff.	Diff.
	NT	T	Diff.	NT	T	Diff.	NT	T	Diff.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Levels									
Equity	0.046	0.039	0.007	0.053	0.048	0.005	-0.008	-0.009	-0.002
	(0.009)	(0.009)	(0.000)	(0.011)	(0.009)	(0.016)	(0.000)	(0.000)	(0.445)
LLP	0.009	0.024	-0.016	0.007	0.010	-0.003	0.001	0.014	0.013
	(0.007)	(0.014)	(0.000)	(0.009)	(0.007)	(0.070)	(0.000)	(0.000)	(0.000)
CIR	0.669	0.630	0.039	0.739	0.737	0.002	-0.070	-0.107	-0.037
	(0.068)	(0.068)	(0.000)	(0.139)	(0.080)	(0.900)	(0.000)	(0.000)	(0.067)
Liquidity	0.043	0.067	-0.023	0.064	0.097	-0.033	-0.021	-0.031	-0.010
	(0.024)	(0.022)	(0.000)	(0.028)	(0.028)	(0.000)	(0.000)	(0.000)	(0.151)
Loans	0.607	0.365	0.242	0.596	0.415	0.180	0.012	-0.050	-0.062
	(0.107)	(0.093)	(0.000)	(0.093)	(0.120)	(0.000)	(0.030)	(0.105)	(0.038)
NII	0.172	0.177	-0.005	0.184	0.232	-0.048	-0.012	-0.055	-0.043
	(0.034)	(0.052)	(0.481)	(0.058)	(0.074)	(0.009)	(0.000)	(0.005)	(0.015)
Size	4.052	3.509	0.542	3.833	3.850	-0.017	0.218	-0.341	-0.559
	(1.104)	(0.973)	(0.000)	(1.091)	(1.089)	(0.946)	(0.000)	(0.230)	(0.044)
Log(GDP)	8.594	8.161	0.433	8.405	8.467	-0.062	0.190	-0.306	-0.495
	(0.902)	(0.667)	(0.000)	(0.778)	(0.818)	(0.740)	(0.000)	(0.146)	(0.016)
First-Differences									
Equity	0.001	0.000	0.000	0.001	0.000	0.001	-0.000	-0.000	0.000
	(0.002)	(0.002)	(0.137)	(0.002)	(0.003)	(0.332)	(0.000)	(0.636)	(0.841)
LLP	0.000	0.004	-0.003	-0.000	-0.002	0.002	0.000	0.006	0.006
	(0.007)	(0.015)	(0.102)	(0.009)	(0.009)	(0.300)	(0.260)	(0.040)	(0.049)
CIR	0.007	-0.031	0.039	0.004	-0.027	0.030	0.004	-0.005	-0.008
	(0.057)	(0.094)	(0.005)	(0.141)	(0.058)	(0.033)	(0.356)	(0.794)	(0.648)
Liquidity	0.002	-0.003	0.005	0.000	-0.007	0.007	0.001	0.004	0.003
	(0.019)	(0.020)	(0.119)	(0.024)	(0.033)	(0.338)	(0.152)	(0.602)	(0.723)
Loans	0.001	0.009	-0.008	0.002	0.010	-0.008	-0.001	-0.002	-0.000
	(0.019)	(0.023)	(0.022)	(0.023)	(0.024)	(0.156)	(0.193)	(0.811)	(0.969)
NII	0.005	0.007	-0.002	0.006	-0.001	0.006	-0.000	0.008	0.008
	(0.017)	(0.016)	(0.382)	(0.045)	(0.025)	(0.271)	(0.759)	(0.188)	(0.156)
Size	-0.002	-0.057	0.054	-0.002	0.050	-0.052	-0.000	-0.107	-0.106
	(0.213)	(0.305)	(0.210)	(0.188)	(0.394)	(0.565)	(0.966)	(0.284)	(0.269)
Log(GDP)	0.020	0.073	-0.054	0.027	0.062	-0.035	-0.007	0.012	0.019
	(0.033)	(0.065)	(0.000)	(0.035)	(0.072)	(0.045)	(0.000)	(0.530)	(0.304)

Notes: This table reports the summary statistics of explanatory variables by ownership and treatment in the period before the merger. Columns (1), (2), (4), and (5) present the means and standard-deviation in parentheses by treatment and ownership. Columns (3) and (6) report the difference in means by treatment with p-value of t-test in parentheses within each banking sector. Columns (7) and (8) report the difference in means by ownership with p-value of t-test in parentheses within treatment status. Column (9) presents the difference-in-differences with p-value of t-test in parentheses. Equity, loan loss provisions (LLP), liquidity, and loans are defined as ratios to total assets. Non-interest income (NII) is defined as the ratio relative to interest-bearing assets. Size is a categorical variable indicating the quintile of the banking groups size distribution in terms of total assets. Cost-to-income ratio (CIR) is defined as administrative costs to total income. L(GDP) is the logarithm of GDP at the county level of the bank's headquarters.

Table 4: Baseline results: Effect of reform-induced mergers on RoE

	Merging Reformed (1)	Merging (2)	Incl. Non-merging (3)
Merger	0.001	-0.003*	0.000
	(0.002)	(0.001)	(0.001)
Reform	0.011*	0.007	-0.003
	(0.007)	(0.007)	(0.007)
Merger*Reform	-0.024***	-0.016**	-0.016**
	(0.008)	(0.008)	(0.008)
Merger*SB	-0.014**	-0.014***	-0.011***
	(0.006)	(0.004)	(0.003)
Reform*SB	-0.006	-0.008	0.005
	(0.013)	(0.012)	(0.008)
Merger*Reform*SB	0.057***	0.056***	0.038***
	(0.015)	(0.013)	(0.011)
Observations	2,441	7,300	20,893
Banks	291	788	1,438
Savings Banks	85	163	414
Cooperative Banks	206	625	1,024
Treated Deals	74	74	74
Non-treated Deals	466	1,553	1,553
Mean	0.079	0.078	0.083
Median	0.075	0.078	0.078
Standard Deviation	0.056	0.062	0.067
Bank & County Controls	yes	yes	yes
Bank, Year-State FE	yes	yes	yes
R-squared (within)	0.415	0.324	0.322

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Difference-in-differences estimation with a 4-year event window (pre- and post-merger), where all available observations within the window are included. Merger is a dummy indicating the post-period. Reform is a dummy indicating the treatment status constant over event time for any transaction. In Column (1), only banks merging in Eastern Germany, Lower Saxony, and North-Rhine-Westphalia are included. In Column (2), all merging banks are included. In Column (3), all banks are included, and the treatment status of the Reform dummy lasts 8 years before and after a reform for non-merging banks. Bank controls are lagged by one year and comprise LLP, CIR, liquidity, loans, NII, size, and L(GDP) at the county level. Equity is excluded due to collinearity.

Table 5: Reform effects on equity and its components of merging banks

	RoE	L(Gross Eq)	L(Net Eq)	L(Accruals)	L(Other Eq)
	(1)	(2)	(3)	(4)	(5)
Merger	-0.003*	-0.014***	-0.006*	-0.008	-0.299***
	(0.001)	(0.004)	(0.004)	(0.008)	(0.116)
Reform	0.007	0.045	0.037	0.130	-1.954
	(0.007)	(0.040)	(0.024)	(0.113)	(1.844)
Merger*Reform	-0.016**	0.045	0.026	-0.115	2.398
	(0.008)	(0.042)	(0.023)	(0.097)	(1.690)
Merger*SB	-0.014***	-0.021*	-0.014	0.029*	0.347*
	(0.004)	(0.013)	(0.010)	(0.017)	(0.197)
Reform*SB	-0.008	-0.250***	-0.039	-0.258*	0.990
	(0.012)	(0.069)	(0.046)	(0.142)	(1.704)
Merger*Reform*SB	0.056***	-0.007	-0.086**	0.091	-3.571**
	(0.013)	(0.057)	(0.034)	(0.124)	(1.675)
Observations	7,300	7,300	7,300	7,300	7,300
Banks	788	788	788	788	788
Mean	0.08	17.66	17.32	15.59	14.39
Median	0.08	17.56	17.25	15.55	15.37
Standard Deviation	0.06	1.15	1.08	1.24	4.41
Bank & County Controls	yes	yes	yes	yes	yes
Bank, Year-State FE	yes	yes	yes	yes	yes
R-squared (within)	0.324	0.816	0.818	0.624	0.163

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Difference-in-differences estimation with a 4-year event window (pre- and post-merger), where all available observations within the window are included. Merger is a dummy indicating the post-period. Reform is a dummy indicating the treatment status constant over event time. Controls are lagged by one year and comprise LLP, CIR, liquidity, loans, NII, size, and L(GDP). The dependent variables are logarithms and defined as follows: *Gross Eq* is *Net Eq* plus *Accruals* plus *Other Eq*. *Net Eq* is nominal equity plus retained earnings. *Accruals* are total accruals, including accruals for pensions, taxes and those formed by loan loss provisions. *Other Eq* is other equity, including subordinated debt and other tier 2 equity.

Table 6: Reform effects on profit and its components of merging banks

	L(Profit) (1)	L(Total Rev) (2)	L(Op Rev) (3)	L(Non-Op Rev) (4)	L(Total Cost) (5)	L(Op Cost) (6)	L(Non-Op Cost) (7)
Merger	-0.102	-0.007**	-0.005	-0.898***	-0.005	-0.010***	-0.109*
	(0.091)	(0.004)	(0.003)	(0.166)	(0.004)	(0.003)	(0.062)
Reform	0.971	0.022	0.035	-1.426	0.017	0.021	-0.071
	(0.916)	(0.032)	(0.029)	(1.442)	(0.031)	(0.027)	(0.191)
Merger*Reform	-0.174	0.043	0.027	2.705	0.049	0.032	0.028
	(0.856)	(0.030)	(0.026)	(1.714)	(0.030)	(0.029)	(0.272)
Merger*SB	-0.319	-0.032***	-0.023***	-1.688***	-0.014	-0.005	0.139
	(0.203)	(0.008)	(0.008)	(0.531)	(0.009)	(0.008)	(0.104)
Reform*SB	-2.749**	-0.094**	-0.093***	0.682	-0.071*	-0.076**	0.276
	(1.249)	(0.038)	(0.036)	(1.783)	(0.039)	(0.035)	(0.269)
Merger*Reform*SB	3.285***	-0.027	-0.020	-0.915	-0.077**	-0.044	-0.232
	(1.223)	(0.038)	(0.035)	(2.026)	(0.038)	(0.038)	(0.343)
Observations	7,300	7,300	7,300	7,300	7,300	7,300	7,300
Banks	788	788	788	788	788	788	788
Mean	14.26	17.57	17.55	9.54	17.48	17.39	14.62
Median	14.99	17.49	17.47	11.81	17.39	17.3	14.74
Standard Deviation	3.6	1.08	1.08	5.71	1.08	1.07	1.96
Bank & County Controls	yes	yes	yes	yes	yes	yes	yes
Bank, Year-State FE	yes	yes	yes	yes	yes	yes	yes
R-squared (within)	0.150	0.420	0.455	0.301	0.549	0.575	0.245

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Difference-in-differences estimation with a 4-year event window (pre- and post-merger), where all available observations within the window are included. Merger is a dummy indicating the post-period. Reform is a dummy indicating the treatment status constant over event time. Controls are lagged by one year and comprise LLP, CIR, liquidity, loans, NII, size, and L(GDP). The dependent variables are logarithms and defined as follows: *Profit* is profit before taxes. *Total Rev* is total revenue, and *Total Cost* is total costs. *Op Rev* is operating revenues, consisting of revenues earned on interest, commissions and fee income, revenues earned on the trading book, other operating revenues, and current revenues. *Op Cost* is operating costs, consisting of interest expenses, costs from commissions and fees, costs from the trading book, other operating costs, and administrative costs. *Non-Op Rev* is non-operating revenues consisting of appreciations and extraordinary revenues. *Non-Op Cost* is non-operating costs, consisting of depreciation and extraordinary costs.

Table 7: Reform effects on financial stability of merging banks

	L(zscore) (1)	SD(RoA) (2)	Tier1 (3)	LLP (4)	NPL (5)
Merger	0.014	-0.000	0.000**	0.000	0.000
	(0.033)	(0.000)	(0.000)	(0.000)	(0.001)
Reform	0.460	-0.000	-0.001	-0.004	-0.046**
	(0.300)	(0.001)	(0.002)	(0.003)	(0.023)
Merger*Reform	-0.123	-0.000	-0.001	0.006*	-0.011
	(0.274)	(0.000)	(0.002)	(0.004)	(0.017)
Merger*SB	0.285***	-0.000**	0.001**	-0.001	0.001
	(0.088)	(0.000)	(0.000)	(0.000)	(0.002)
Reform*SB	-0.197	-0.001	0.002	0.008**	0.034
	(0.333)	(0.001)	(0.002)	(0.004)	(0.025)
Merger*Reform*SB	-0.187	0.001**	-0.003	-0.012***	0.030*
	(0.292)	(0.001)	(0.002)	(0.004)	(0.018)
Observations	7,206	7,206	7,300	7,300	5,153
Banks	788	788	788	788	748
Mean	3.65	0.00	0.05	0.01	0.06
Median	3.60	0.00	0.05	0.01	0.05
Standard Deviation	0.84	0.00	0.01	0.01	0.05
Bank & County Controls	yes	yes	yes	yes	yes
Bank, Year-State FE	yes	yes	yes	yes	yes
R-squared (within)	0.127	0.169	0.751	0.235	0.426

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Lagged covariates are L(GDP) at the county level and CIR, liquidity, NII, loans, and size at the bank level. In Columns (4) to (5), equity is added as a control, whereas in Columns (3) to (5), RoA is used. LLP is excluded as a control due to endogeneity. The dependent variables are the following: *zscore* is defined as return on assets plus the *Tier 1* ratio over *SD(RoA)*. *SD(RoA)* is the standard deviation of return on assets calculated with a rolling window of three years, which results in a decrease in observations in Column (1) and (2). *Tier 1* is the ratio of regulatory tier 1 equity to total assets. *LLP* are loan-loss provisions. *NPL* are non-performing loans over total loans. *NPL* are available from 1999-2015, which causes the decrease in observations and reduces the number of treated deals to 39 and the number of non-treated deals to 1,245.

Table 8: Reform effects on efficiency of merging banks

	Branch	Empl	Empl/ Branch	Wages/ Empl	CIR
	(1)	(2)	(3)	(4)	(5)
Merger	-0.003	0.008	-0.218	0.001	-0.009***
	(0.003)	(0.005)	(0.441)	(0.001)	(0.003)
Reform	-0.011	0.001	1.102	-0.002	-0.019
	(0.062)	(0.010)	(1.750)	(0.002)	(0.014)
Merger*Reform	0.035	-0.017	-1.040	-0.008**	0.004
	(0.041)	(0.012)	(1.659)	(0.004)	(0.020)
Merger*SB	0.031***	-0.017*	19.527**	-0.001	0.026***
	(0.006)	(0.009)	(9.880)	(0.001)	(0.005)
Reform*SB	-0.084	-0.021*	8.103*	0.007*	0.035*
	(0.059)	(0.012)	(4.557)	(0.004)	(0.019)
Merger*Reform*SB	0.007	0.050***	-18.130*	0.008*	-0.021
	(0.045)	(0.015)	(9.475)	(0.004)	(0.024)
Observations	6,958	7,228	6,958	7,228	7,300
Banks	788	788	788	788	788
Mean	0.43	0.3	10.5	0.11	0.73
Median	0.38	0.29	8.11	0.07	0.71
Standard Deviation	0.27	0.08	19.22	0.13	0.13
Bank & County Controls	yes	yes	yes	yes	yes
Bank, Year-State FE	yes	yes	yes	yes	yes
R-squared (within)	0.127	0.169	0.751	0.235	0.426

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Lagged covariates are L(GDP) at the county level and equity, LLP, RoA, liquidity, NII, loans, and size at the bank level. In Columns (1) to (4), CIR is added as a control. Dependent variables are as follows. *Branch* is the ratio of number of branches to total assets in millions. *Branch* is available from 1993-2012, resulting in a decrease in observations in Columns (1) and (3). *Empl* is the ratio of number of employees over total assets in millions. *Empl* is missing for many banks in 2015, resulting in a decrease in observations in Columns (2) and (4). *Empl/Branch* is the average number of employees per branch. *Wages/Empl* is the average personnel costs spend per employee. *CIR* is the cost-to-income ratio.

Table 9: Reform effects on market power of merging banks

	NIM	Int. earned	Int. paid	L(IBA)	Market share
	(1)	(2)	(3)	(4)	(5)
Merger	0.000***	0.000***	0.000	-0.011***	-0.000
	(0.000)	(0.000)	(0.000)	(0.004)	(0.001)
Reform	-0.001	-0.001	-0.000	0.034	0.015
	(0.001)	(0.001)	(0.001)	(0.029)	(0.017)
Merger*Reform	-0.001	0.001	0.001*	0.060*	0.013
	(0.001)	(0.001)	(0.001)	(0.032)	(0.014)
Merger*SB	-0.000	-0.000	-0.000	0.000	0.002
	(0.000)	(0.000)	(0.000)	(0.009)	(0.005)
Reform*SB	0.002	0.000	-0.002*	-0.102***	-0.142***
	(0.001)	(0.001)	(0.001)	(0.039)	(0.046)
Merger*Reform*SB	0.003***	0.003**	-0.000	-0.101***	-0.004
	(0.001)	(0.001)	(0.001)	(0.039)	(0.031)
Observations	7,300	7,300	7,300	7,300	6,965
Banks	788	788	788	788	788
Mean	0.03	0.06	0.03	20.21	0.15
Median	0.03	0.06	0.03	20.13	0.08
Standard Deviation	0.01	0.01	0.01	1.1	0.18
Bank & County Controls	yes	yes	yes	yes	yes
Bank, Year-State FE	yes	yes	yes	yes	yes
R-squared (within)	0.687	0.949	0.949	0.602	0.194

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Lagged covariates are L(GDP) at the county level and equity, LLP, CIR, liquidity, and size at the bank level. In Column (5), RoA and NII are added as control variables. Dependent variables are the following. *NIM* is the net-interest margin, defined as *Int earned* minus *Int paid* over *IBA*. *Int earned* are interest revenues over total income. *Int paid* are interest costs over total income. *IBA* are interest bearing assets consisting of loans to customers and banks and securities. *Market share* is the market share of loans to customers of a bank within its business area. Business area is defined by aggregating all counties where a bank has branches. Total loans on the bank level are split among counties according to the share of own branches located in that county. Branch data are available from 1993-2012, resulting in a decrease in observations in Column (5).

Table 10: Reform effects on deposits and credit provision of merging banks

	L(Deposits)	Public Loans		Private Sector Loans					
		L(Municipal)	L(State)	L(Consumer)	L(Comm)	L(Industrial)	L(Agri)	L(Real estate)	L(Loans)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Merger	0.001	-0.000	-0.000	0.007***	0.011***	0.004***	0.002***	0.004*	0.003*
	(0.001)	(0.000)	(0.000)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)
Reform	-0.001	0.010	0.002	-0.011	-0.007	0.008	0.008	-0.003	-0.010
	(0.006)	(0.008)	(0.010)	(0.014)	(0.025)	(0.005)	(0.006)	(0.009)	(0.013)
Merger*Reform	-0.003	-0.004	0.001	0.003	0.015	-0.009*	-0.006	-0.001	0.019
	(0.009)	(0.008)	(0.009)	(0.015)	(0.017)	(0.005)	(0.006)	(0.011)	(0.012)
Merger*SB	0.013***	0.005***	-0.001	0.014***	0.009	0.004**	-0.001	-0.005	0.014***
	(0.004)	(0.002)	(0.001)	(0.004)	(0.006)	(0.002)	(0.002)	(0.005)	(0.005)
Reform*SB	0.032**	-0.024	0.018	0.038**	0.016	-0.023***	-0.007	0.002	-0.039**
	(0.016)	(0.017)	(0.014)	(0.019)	(0.025)	(0.008)	(0.010)	(0.014)	(0.018)
Merger*Reform*SB	-0.005	0.009	0.006	-0.005	0.012	0.018***	0.009	0.012	-0.028*
	(0.012)	(0.011)	(0.010)	(0.015)	(0.024)	(0.007)	(0.007)	(0.016)	(0.015)
Observations	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300
Banks	788	788	788	788	788	788	788	788	788
Mean	0.74	0.02	0	0.13	0.23	0.06	0.04	0.12	0.59
Median	0.75	0.01	0	0.12	0.22	0.05	0.02	0.11	0.61
Standard Deviation	0.08	0.03	0.01	0.07	0.09	0.03	0.04	0.09	0.1
Bank & County Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bank, Year-State FE	yes	yes	yes	yes	yes	yes	yes	yes	yes
R-squared (within)	0.331	0.347	0.181	0.469	0.546	0.550	0.455	0.599	0.333

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Lagged covariates are L(GDP) at the county level and equity, LLP, CIR, liquidity, and size at the bank level. In Column, (5) RoA and NII are added as control variables. The dependent variables are the following: *L(Deposit)* is the logarithm of deposits to costumers; *L(Loans)*, the logarithm of total loans to non-bank customers; *L(Consumer)*, the logarithm of loans to private households (excl. real estate); *L(Comm)*, the logarithm of loans to firms and private businesses (excl. the industrial and agricultural sector); *L(Industrial)*, the logarithm of loans to firms in the industrial sector; *L(Agri)*, the logarithm of loans to firms in the agricultural sector; *L(Real Estate)*, the logarithm of loans to private households for the purpose of real estate; *L(Municipal)*, the logarithm of loans to the public sector on the municipal level; and *L(State)*, the logarithm of loans to the public sector on the state level.

A Appendix

Table A.1: Overview of county reforms

Date	Federal State			Dead-line	Counties N	Counties Δ	Savings N	Savings Δ	Cooperatives N	Cooperatives Δ
12/06/1993	Brandenburg	*pre*	1992	2	44	-59%	30	-30%	36	-14%
		post	1995		18		21		31	
06/12/1994	Mecklenburg-Vorpommern	*pre*	1993	3	37	-51%	26	-38%	32	-19%
		post	1997		18		16		26	
07/01/1994	Saxony-Anhalt	*pre*	1993	3	40	-40%	36	-31%	41	-20%
		post	1997		24		25		33	
07/01/1994	Thuringia	*pre*	1993	-	40	-45%	33	-45%	50	-18%
		post	1996		22		18		41	
08/01/1994, 06/16/1996	Saxony	*pre*	1993	2-3	54	-46%	45	-47%	53	-15%
		post	1997		29		24		45	
11/01/2001	Lower Saxony	*pre*	2000	-	46	-2%	61	-20%	228	-32%
		post	2003		45		49		156	
07/01/2007	Saxony-Anhalt	*pre*	2006	2	24	-42%	22	-32%	17	0%
		post	2009		14		15		17	
08/01/2008	Saxony	*pre*	2007	-	29	-55%	15	0%	25	-4%
		post	2010		13		15		24	
10/21/2009	North-Rhine Westphalia	*pre*	2008	-	54	-2%	110	-2%	195	-7%
		post	2011		53		108		181	
09/04/2011	Mecklenburg-Vorpommern	*pre*	2010	-	18	-56%	10	0%	11	0%
		post	2013		8		10		11	

Notes: This table reports an overview of county-reforms since German reunification with the number of counties, savings and cooperative banks before and after the reform. Date refers to the date of enactment. The numbers of counties are presented before and after this date. Deadline states whether there was a deadline in years. Pre-year is the last year before a reform and post-year marks the year after the deadline expired or – if no deadline was given – two years after the reform. The numbers of banks are counted in these years. The reductions in counties and banks between respective pre- and post-years are given as percentages. In Saxony, most counties were reformed on the 1st of August, 1994. Lawsuits were filed, which resulted in three amendments to the original reform bill, the last of which was on the 16th of June, 1996. The ordinary deadline in Saxony was two years, but banks located in counties involved in the lawsuits were exempted.

Table A.2: Baseline results: Effect of reform-induced mergers on RoE

	Merging Reformed (1)	Merging (2)	Incl. Non-merging (3)
Merger	0.001	-0.003*	0.001
	(0.002)	(0.002)	(0.001)
Reform	0.012*	0.007	-0.003
	(0.007)	(0.007)	(0.007)
Merger*Reform	-0.024***	-0.016**	-0.016**
	(0.008)	(0.008)	(0.008)
Merger*SB	-0.014**	-0.014***	-0.011***
	(0.006)	(0.004)	(0.003)
Reform*SB	-0.006	-0.008	0.005
	(0.013)	(0.012)	(0.008)
Merger*Reform*SB	0.058***	0.056***	0.037***
	(0.015)	(0.013)	(0.011)
L(Debt)	0.001*	0.003*	0.000
	(0.001)	(0.001)	(0.001)
Observations	2,441	7,300	20,893
Banks	291	788	1,438
Savings Banks	85	163	414
Cooperative Banks	206	625	1,024
Treated Deals	74	74	74
Non-treated Deals	466	1,553	1,553
Mean	0.079	0.078	0.083
Median	0.075	0.078	0.078
Standard Deviation	0.056	0.062	0.067
Bank & County Controls	yes	yes	yes
Bank, Year-State FE	yes	yes	yes
R-squared (within)	0.415	0.324	0.320

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Difference-in-differences estimation with a 4-year event window (pre- and post-merger), where all available observations within the window are included. Merger is a dummy indicating the post-period. Reform is a dummy indicating the treatment status constant over event time for any transaction. In Column (1), only banks merging in Eastern Germany, Lower Saxony, and North-Rhine-Westphalia are included. In Column (2), all merging banks are included. In Column (3), all banks are included, and the treatment status of the Reform dummy lasts 8 years before and after a reform for non-merging banks. Bank controls are lagged by one year and comprise LLP, CIR, liquidity, loans, NII, size, L(GDP), and L(Debt) at the county level. Equity is excluded due to collinearity.

Table A.3: Robustness checks for return on gross equity

	Baseline	Baseline RoNE	Baseline RoA	90s	00s	Excl. Distress	Excl. Ties	Cont. Counties	Collapse Time Dim.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SB									-0.015
									(0.009)
Merger	-0.003*	-0.004*	-0.000	-0.002	-0.004*	-0.002	-0.005**	-0.010**	-0.020**
	(0.001)	(0.002)	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.009)
Reform	0.007	0.014	0.000	-0.003	0.003	0.002	0.002	0.004	
	(0.007)	(0.010)	(0.000)	(0.019)	(0.010)	(0.011)	(0.010)	(0.015)	
Merger*Reform	-0.016**	-0.028**	-0.001	-0.007	-0.006	-0.005	-0.012	-0.017	
	(0.008)	(0.013)	(0.000)	(0.017)	(0.013)	(0.010)	(0.010)	(0.021)	
Merger*SB	-0.014***	-0.021***	-0.001***	-0.013	-0.010**	-0.021***	-0.012**	-0.031	0.032***
	(0.004)	(0.006)	(0.000)	(0.009)	(0.005)	(0.004)	(0.005)	(0.026)	(0.011)
Reform*SB	-0.008	-0.035*	-0.001**	0.001	-0.052***	-0.002	-0.006		
	(0.012)	(0.020)	(0.001)	(0.030)	(0.010)	(0.017)	(0.029)		
Merger*Reform*SB	0.056***	0.103***	0.003***	0.060***	-0.011	0.046***	0.078***	0.076**	
	(0.013)	(0.022)	(0.001)	(0.021)	(0.013)	(0.017)	(0.017)	(0.036)	
Observations	7,300	7,300	7,300	2,513	4,787	4,220	5,428	485	310
Banks	788	788	788	632	724	501	591	63	67
Govern. Banks	163	163	163	124	128	123	121	19	43
Mutual Banks	625	625	625	508	596	378	470	44	24
Treated Deals	74	74	74	60	20	44	46	20	74
Non-treated Deals	1,553	1,553	1,553	801	1,162	800	1,173	90	0
Mean	0.078	0.11	0.006	0.089	0.067	0.085	0.08	0.062	0.061
Median	0.078	0.11	0.006	0.093	0.065	0.085	0.079	0.065	0.061
Standard Deviation	0.062	0.089	0.005	0.059	0.063	0.056	0.064	0.072	0.047
Bank & County Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bank & Year*State FE	yes	yes	yes	yes	yes	yes	yes	no	no
R-squared (within/[overall])	0.324	0.326	0.326	0.354	0.260	0.403	0.328	0.467	[0.039]

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Column (1) reproduces the baseline results. Column (2) specifies *net equity* instead of *gross equity* as the dependent variable. *Net Eq* is nominal equity plus retained earnings. In Column (3), the dependent variable is return on gross total assets. In Column (4), the sample period is from 1994 to 2000. In Column (5), the sample period is from 2001 to 2015. In Column (6), all banks that once reported a distress event are excluded. In Column (7), all banks with a ratio of loans to municipalities to total loans above their banking groups' average ratio are excluded. In Column (8), only banks on the boarders between reformed and non-reformed states are included. Fixed effects for each neighboring county-pair are added. In Column (9), the residuals of a regression of RoE on reform treatment, year*state fixed effects, and the main covariates are regressed on the post-dummy for treated deals only, following Bertrand et al. (2004). The controls are lagged by one year and comprise LLP, CIR, liquidity, loans, NII, and size at the bank level and L(GDP) at the county level.

Table A.4: Placebo treatments for the effect on RoE

Rejection rate at 1%	at 5%	at 10%
0.013	0.069	0.114

Notes: This table reports the average rejection rates for 1,000 repetitions of placebo-treatments over the cross-section and time. In each repetition, *Reform* was randomly assigned to other mergers among all mergers including the actually treated tests $H_0 : \beta_6 = 0$ using the baseline specification.

Table A.5: Effects on gross equity and its components

	L(Gross Eq)	Net Equity			Accruals				Other Equity		
		L(Nom Eq)	L(Retained E)	L(Other R)	L(Current R)	L(A Pension)	L(A Taxes)	L(A Risk)	L(Special Items)	L(Subordinated)	L(Participate)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Merger	-0.014***	0.002	-0.170	-0.012**	-0.008	0.017	-0.581***	-0.035***	0.005	-0.396***	-0.011
	(0.004)	(0.032)	(0.114)	(0.005)	(0.017)	(0.038)	(0.118)	(0.011)	(0.174)	(0.151)	(0.150)
Reform	0.045	0.708	-0.926	0.002	-0.394	-1.665	0.246	0.009	-1.139	0.425	1.188
	(0.040)	(0.694)	(1.134)	(0.036)	(0.338)	(1.698)	(0.577)	(0.136)	(0.713)	(2.342)	(2.259)
Merger*Reform	0.045	-0.316	0.600	0.047	0.344	1.436	-0.383	0.044	1.836***	0.362	-0.250
	(0.042)	(0.502)	(0.848)	(0.033)	(0.278)	(1.371)	(0.576)	(0.104)	(0.680)	(2.062)	(1.789)
Merger*SB	-0.021*	0.065	-0.158	-0.096***	-0.160	-0.104*	0.218	0.264***	-1.360***	1.720***	0.838*
	(0.013)	(0.371)	(0.284)	(0.032)	(0.102)	(0.057)	(0.315)	(0.030)	(0.423)	(0.249)	(0.458)
Reform*SB	-0.250***	-1.341	3.440**	-0.093	0.575	1.527	-0.536	-0.174	0.024	-1.381	-4.569**
	(0.069)	(1.085)	(1.333)	(0.067)	(0.550)	(1.298)	(0.637)	(0.198)	(1.378)	(2.038)	(2.201)
Merger*Reform*SB	-0.007	-0.193	0.288	0.037	-0.244	-1.399	1.423**	-0.368**	0.519	-2.660	-0.650
	(0.057)	(0.715)	(0.972)	(0.051)	(0.607)	(1.247)	(0.640)	(0.145)	(0.954)	(1.818)	(1.823)
Observations	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300
Banks	788	788	788	788	788	788	788	788	788	788	788
Mean	17.66	13.79	1.67	16.93	13.86	14.2	11.84	14.79	5.12	10.92	7.38
Median	17.56	15.54	0.00	16.82	13.84	14.73	12.7	14.77	0.00	14.37	10.24
Standard Deviation	1.15	5.25	4.48	1.19	1.32	3.02	3.65	1.13	6.2	7.06	7.37
Bank & County Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Bank, Year-State FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
R-squared (within)	0.816	0.147	0.281	0.728	0.084	0.193	0.177	0.445	0.415	0.280	0.356

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Dependent variables are logarithms and defined as follows: *Nom Eq* is nominal equity. *Retained E* are retained earnings. *Other R* are other retained earnings. *Current R* are retained earnings from the current accounting period. *A Pensions* are accruals for pensions. *A Taxes* are accruals for taxes. *A Risk* are other accruals including those formed by loan loss provisions. *Subordinated* is subordinated debt. *Participate* are debt obligations that participate in profits. *Special Items* are special items due to currency conversion and the funds for banking risk. Bank controls are lagged by one year and comprise LLP, CIR, liquidity, loans, NII, size, and L(GDP).

Table A.6: Effects on revenue and its components

	L(Total Rev)	Operating Revenue					Non-operating Revenue	
		L(Int Rev)	L(Com Rev)	L(Fin Rev)	L(Other Rev)	L(Curr Rev)	L(Appr Rev)	L(Exord Rev)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Merger	-0.007**	-0.008**	0.004	-0.360***	0.020	0.019	-1.016***	-0.314**
	(0.004)	(0.003)	(0.004)	(0.125)	(0.021)	(0.024)	(0.174)	(0.143)
Reform	0.022	0.023	0.011	1.098	-0.035	0.067	-0.822	-2.322
	(0.032)	(0.032)	(0.027)	(1.226)	(0.125)	(0.439)	(1.451)	(1.988)
Merger*Reform	0.043	0.065**	0.003	0.623	-0.066	-0.448	1.986	2.355
	(0.030)	(0.032)	(0.027)	(1.402)	(0.162)	(0.444)	(1.459)	(2.204)
Merger*SB	-0.032***	-0.007	-0.023**	0.182	-0.162***	-0.164***	-1.371***	-0.124
	(0.008)	(0.008)	(0.009)	(0.292)	(0.040)	(0.056)	(0.528)	(0.294)
Reform*SB	-0.094**	-0.092**	-0.013	-3.846**	0.027	0.090	-0.285	1.701
	(0.038)	(0.038)	(0.038)	(1.538)	(0.156)	(0.621)	(1.782)	(1.996)
Merger*Reform*SB	-0.027	-0.050	-0.010	-0.093	0.011	0.087	-0.824	-1.672
	(0.038)	(0.039)	(0.037)	(1.519)	(0.184)	(0.498)	(1.874)	(2.122)
Observations	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300
Banks	788	788	788	788	788	788	788	788
Mean	17.57	17.38	15.25	7.79	13.41	13.24	8.89	1.99
Median	17.49	17.3	15.27	9.89	13.39	13.1	11.45	0.00
Standard Deviation	1.08	1.07	1.14	5.25	1.41	1.87	5.82	4.69
Bank & County Controls	yes	yes	yes	yes	yes	yes	yes	yes
Bank, Year-State FE	yes	yes	yes	yes	yes	yes	yes	yes
R-squared (within)	0.420	0.629	0.800	0.472	0.324	0.414	0.297	0.266

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Dependent variables are logarithms and defined as follows: *Int Rev* are revenues earned on interest-bearing assets. *Com Rev* are revenues earned on commissions and fees. *Fin Rev* are revenues earned on the trading book. *Other Rev* are other operating revenues. *Curr Rev* are current revenues. *Appr Rev* are revenues earned on appreciations. *Exord Rev* are extraordinary revenues. Bank controls are lagged by one year and comprise LLP, CIR, liquidity, loans, NII, size, and L(GDP).

Table A.7: Effects on total costs and their components

	L(Total Cost)	Operating Costs					Non-operating Costs	
		L(Int Cost)	L(Com Cost)	L(Fin Cost)	L(Other Cost)	L(Admin Cost)	L(Depr Cost)	L(Exord Cost)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Merger	-0.005	-0.015***	0.001	-0.315**	0.005	-0.006*	-0.163**	0.070
	(0.004)	(0.005)	(0.009)	(0.144)	(0.027)	(0.003)	(0.066)	(0.127)
Reform	0.017	0.019	0.192***	0.825	-0.251*	0.032	-0.042	0.234
	(0.031)	(0.037)	(0.072)	(1.190)	(0.152)	(0.026)	(0.417)	(1.365)
Merger*Reform	0.049	0.114**	-0.035	0.758	0.293	-0.041	-0.508	0.454
	(0.030)	(0.046)	(0.075)	(1.202)	(0.180)	(0.027)	(0.796)	(1.829)
Merger*SB	-0.014	0.027**	0.015	-0.297	0.048	-0.012*	0.264**	-0.453
	(0.009)	(0.011)	(0.034)	(0.333)	(0.050)	(0.007)	(0.110)	(0.347)
Reform*SB	-0.071*	-0.147***	-0.238**	-3.523***	0.174	-0.003	0.099	0.567
	(0.039)	(0.053)	(0.095)	(1.222)	(0.182)	(0.031)	(0.525)	(1.526)
Merger*Reform*SB	-0.077**	-0.134**	0.046	-0.469	-0.449**	0.027	0.366	-0.644
	(0.038)	(0.055)	(0.113)	(1.256)	(0.200)	(0.035)	(0.835)	(1.898)
Observations	7,300	7,300	7,300	7,300	7,300	7,300	7,300	7,300
Banks	788	788	788	788	788	788	788	788
Mean	17.48	16.72	12.64	2.77	12.46	16.58	14.57	1.66
Median	17.39	16.62	12.66	0.00	12.45	16.52	14.7	0.00
Standard Deviation	1.08	1.14	1.13	4.79	1.78	1.02	2.02	4.22
Bank & County Controls	yes	yes	yes	yes	yes	yes	yes	yes
Bank, Year-State FE	yes	yes	yes	yes	yes	yes	yes	yes
R-squared (within)	0.549	0.831	0.677	0.239	0.300	0.456	0.247	0.283

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Dependent variables are logarithms and defined as follows: *Int Cost* are costs paid on interest-bearing assets. *Com Cost* are costs paid on commissions and fees. *Fin Cost* are costs paid on the trading book. *Other Cost* are other operating costs. *Admin Cost* are administrative costs. *Depr Cost* are costs paid on depreciations. *Exord Cost* are extraordinary costs. Bank controls are lagged by one year and comprise LLP, CIR, liquidity, loans, NII, size, and L(GDP).

Table A.8: Effects on net interest margins

	NIM	L(IBA)	Interest-Bearing Assets		
			L(Interbank)	L(Costumer)	L(Bonds & Sec)
	(1)	(2)	(3)	(4)	(5)
Merger	0.000***	-0.013***	-0.008**	-0.015***	-0.100***
	(0.000)	(0.003)	(0.003)	(0.005)	(0.015)
Reform	-0.001	0.039	0.023	0.019	-0.057
	(0.001)	(0.030)	(0.032)	(0.037)	(0.128)
Merger*Reform	-0.001	0.057*	0.065**	0.114**	0.125
	(0.001)	(0.033)	(0.032)	(0.046)	(0.111)
Merger*SB	-0.000**	0.003	-0.007	0.027**	0.087
	(0.000)	(0.008)	(0.008)	(0.011)	(0.068)
Reform*SB	0.002**	-0.109***	-0.092**	-0.147***	0.023
	(0.001)	(0.038)	(0.038)	(0.053)	(0.164)
Merger*Reform*SB	0.003***	-0.096**	-0.050	-0.134**	-0.393***
	(0.001)	(0.039)	(0.039)	(0.055)	(0.140)
Observations	7,300	7,300	7,300	7,300	7,300
Banks	788	788	788	788	788
Mean	0.03	20.21	17.38	16.72	18.04
Median	0.03	20.13	17.3	16.62	18.0
Standard Deviation	0.01	1.1	1.07	1.14	1.15
Bank & County Controls	yes	yes	yes	yes	yes
Bank, Year-State FE	yes	yes	yes	yes	yes
R-squared (within)	0.693	0.594	0.629	0.831	0.194

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Dependent variables are logarithms and defined as follows: *IBA* are interest-bearing assets, consisting of *Interbank*, *Customer*, and *Bonds & Sec*. *Interbank* are total loans to credit institutions. *Customer* are total loans to customers. *Bonds & Sec* are total of bonds and securities. Bank controls are lagged by one year and comprise LLP, CIR, liquidity, loans, NII, size, and L(GDP).

Table A.9: Summary statistics of dependent variables by treatment and ownership status

Levels	Savings Non-T (1)	Savings Treat (2)	Savings Diff. (3)	Cooperatives Non-T (4)	Cooperatives Treat (5)	Cooperatives Diff. (6)	Diff. Non-T (7)	Diff. T (8)	Diff. Diff. (9)
Equity Decomposition									
L(Gross Eq)	19.166	18.585	0.581	17.347	17.352	-0.005	1.820	1.233	-0.586
	0.771	0.823	0.000	0.961	0.968	0.980	0.000	0.000	0.016
L(Net Eq)	18.665	18.038	0.628	17.037	17.029	0.008	1.629	1.009	-0.620
	0.780	0.743	0.000	0.912	0.978	0.972	0.000	0.000	0.010
L(Accruals)	17.036	16.248	0.789	15.292	15.432	-0.141	1.744	0.815	-0.929
	0.757	0.920	0.000	1.106	0.983	0.532	0.000	0.003	0.000
L(Other Eq)	17.387	17.287	0.100	13.762	11.529	2.233	3.625	5.758	2.133
	2.283	1.236	0.619	4.468	6.891	0.164	0.000	0.001	0.160
Profit Decomposition									
L(Profit)	15.941	13.503	2.437	13.952	13.873	0.079	1.989	-0.369	-2.358
	2.967	5.819	0.004	3.566	3.514	0.921	0.000	0.743	0.034
L(Total Rev)	19.021	18.514	0.507	17.265	17.333	-0.067	1.756	1.181	-0.575
	0.760	0.603	0.000	0.887	0.908	0.745	0.000	0.000	0.008
L(Op Rev)	19.006	18.507	0.499	17.247	17.305	-0.059	1.759	1.201	-0.558
	0.758	0.599	0.000	0.885	0.906	0.776	0.000	0.000	0.010
L(Non-Op Rev)	11.072	8.377	2.694	9.256	10.251	-0.995	1.816	-1.874	-3.689
	6.015	6.530	0.006	5.578	5.707	0.447	0.000	0.237	0.018
L(Total Cost)	18.931	18.431	0.500	17.170	17.246	-0.076	1.761	1.184	-0.577
	0.761	0.608	0.000	0.880	0.886	0.705	0.000	0.000	0.007
L(Op Cost)	18.829	18.262	0.566	17.087	17.121	-0.034	1.741	1.141	-0.600
	0.759	0.627	0.000	0.875	0.895	0.867	0.000	0.000	0.006
L(Non-Op Cost)	16.423	16.445	-0.022	14.221	14.891	-0.670	2.202	1.554	-0.648
	0.990	0.713	0.839	1.898	1.209	0.024	0.000	0.000	0.024
Risk Channel									
L(zscore)	3.217	3.165	0.053	3.364	3.652	-0.288	-0.147	-0.488	-0.341
	0.655	0.453	0.517	0.638	0.969	0.269	0.000	0.080	0.182
SD(RoA)	0.002	0.002	0.000	0.002	0.002	0.000	0.000	-0.000	-0.000
	0.002	0.001	0.400	0.002	0.002	0.920	0.651	0.935	0.877
Tier1	0.044	0.038	0.005	0.050	0.045	0.005	-0.006	-0.006	-0.001
	0.010	0.011	0.001	0.012	0.010	0.043	0.000	0.020	0.802
LLP	0.009	0.024	-0.016	0.007	0.010	-0.003	0.001	0.014	0.013
	0.007	0.014	0.000	0.009	0.007	0.070	0.000	0.000	0.000
NPL	0.063	0.100	-0.037	0.061	0.097	-0.036	0.002	0.002	0.000
	0.039	0.045	0.000	0.046	0.073	0.088	0.452	0.911	0.981
Efficiency Channel									
Branch	0.213	0.305	-0.092	0.480	0.656	-0.176	-0.268	-0.352	-0.084
	0.113	0.117	0.000	0.273	0.343	0.033	0.000	0.000	0.273
Empl	0.252	0.304	-0.052	0.305	0.359	-0.053	-0.053	-0.055	-0.002
	0.047	0.088	0.000	0.083	0.097	0.023	0.000	0.035	0.950
Empl/Branch	22.665	10.641	12.024	8.093	6.394	1.699	14.572	4.247	-10.325
	44.738	3.148	0.000	4.424	2.111	0.002	0.000	0.000	0.000
Wages/Empl	0.017	0.020	-0.003	0.128	0.087	0.041	-0.111	-0.067	0.043
	0.014	0.010	0.103	0.130	0.063	0.011	0.000	0.000	0.002
CIR	0.669	0.630	0.039	0.739	0.737	0.002	-0.070	-0.107	-0.037
	0.068	0.068	0.000	0.139	0.080	0.900	0.000	0.000	0.067
Market Power Channel									
NIM	0.024	0.031	-0.006	0.029	0.031	-0.002	-0.005	-0.000	0.005
	0.004	0.009	0.000	0.005	0.006	0.251	0.000	0.997	0.010
Int earned	0.060	0.061	-0.001	0.061	0.059	0.002	-0.001	0.002	0.003
	0.009	0.015	0.767	0.011	0.015	0.567	0.267	0.603	0.507
Int paid	0.036	0.030	0.006	0.032	0.028	0.004	0.004	0.002	-0.002
	0.007	0.009	0.000	0.009	0.010	0.136	0.000	0.440	0.407
L(IBA)	21.651	21.121	0.530	19.903	19.882	0.021	1.748	1.239	-0.509
	0.776	0.646	0.000	0.906	0.903	0.918	0.000	0.000	0.020
Market share	0.442	0.481	-0.039	0.081	0.091	-0.010	0.360	0.390	0.029
	0.210	0.210	0.202	0.061	0.044	0.327	0.000	0.000	0.354

continued.

First-Differences	Savings Non-T (1)	Savings Treat (2)	Savings Diff. (3)	Cooperatives Non-T (4)	Cooperatives Treat (5)	Cooperatives Diff. (6)	Diff. Non-T (7)	Diff. T (8)	Diff. Diff. (9)
Equity Decomposition									
L(Gross Eq)	0.056	0.092	-0.036	0.060	0.071	-0.011	-0.004	0.021	0.025
	0.071	0.113	0.028	0.058	0.087	0.592	0.230	0.406	0.310
L(Net Eq)	0.050	0.035	0.016	0.056	0.054	0.002	-0.006	-0.019	-0.014
	0.056	0.029	0.001	0.042	0.047	0.842	0.034	0.096	0.230
L(Accruals)	0.044	0.107	-0.063	0.044	0.057	-0.013	-0.000	0.050	0.050
	0.151	0.370	0.227	0.195	0.239	0.814	0.985	0.503	0.494
L(Other Eq)	0.068	1.406	-1.338	0.230	0.030	0.199	-0.162	1.375	1.537
	1.588	3.859	0.015	2.374	0.415	0.067	0.067	0.013	0.004
Equity Decomposition									
L(Profit)	-0.350	-1.423	1.073	-0.007	0.148	-0.154	-0.344	-1.570	-1.227
	2.970	6.879	0.266	3.081	0.638	0.332	0.024	0.106	0.201
L(Total Rev)	0.012	0.011	0.001	0.002	0.027	-0.025	0.010	-0.016	-0.025
	0.073	0.060	0.946	0.078	0.093	0.248	0.010	0.489	0.251
L(Op Rev)	0.008	0.013	-0.005	-0.000	0.017	-0.018	0.009	-0.004	-0.013
	0.062	0.055	0.577	0.043	0.057	0.181	0.004	0.767	0.376
L(Non-Op Rev)	0.609	-0.716	1.325	0.027	0.749	-0.722	0.583	-1.465	-2.047
	6.451	6.956	0.190	6.628	7.674	0.679	0.077	0.461	0.294
L(total Cost)	0.017	0.015	0.002	-0.000	0.013	-0.013	0.017	0.002	-0.015
	0.086	0.084	0.876	0.079	0.104	0.575	0.000	0.934	0.555
L(Op Cost)	0.011	-0.012	0.023	-0.001	-0.006	0.005	0.012	-0.007	-0.019
	0.073	0.076	0.038	0.060	0.061	0.744	0.001	0.707	0.281
L(Non-Op Cost)	0.088	0.242	-0.154	-0.026	0.153	-0.179	0.114	0.089	-0.025
	0.672	0.787	0.175	1.859	1.356	0.564	0.021	0.785	0.937
Risk Channel									
L(zscore)	-0.058	-0.041	-0.018	-0.003	-0.066	0.063	-0.055	0.026	0.081
	0.430	0.458	0.832	0.466	0.414	0.580	0.018	0.852	0.550
SD(RoA)	0.000	0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.001	0.001	0.718	0.001	0.001	0.753	0.079	0.344	0.621
Tier1	0.001	0.002	-0.001	0.002	0.001	0.001	-0.001	0.002	0.002
	0.003	0.003	0.003	0.003	0.004	0.439	0.000	0.179	0.045
LLP	0.000	0.004	-0.003	-0.000	-0.002	0.002	0.000	0.006	0.006
	0.007	0.015	0.102	0.009	0.009	0.300	0.260	0.040	0.049
NPL	0.001	-0.009	0.010	-0.002	-0.027	0.025	0.003	0.019	0.015
	0.013	0.020	0.009	0.024	0.033	0.013	0.002	0.065	0.098
Efficiency Channel									
Branch	-0.012	-0.017	0.004	-0.028	-0.058	0.031	0.015	0.042	0.026
	0.016	0.030	0.314	0.045	0.083	0.117	0.000	0.040	0.157
Empl	-0.010	-0.005	-0.005	-0.006	0.015	-0.021	-0.004	-0.020	-0.016
	0.016	0.054	0.543	0.063	0.109	0.435	0.008	0.476	0.550
Empl/Branch	2.067	0.249	1.818	0.208	0.303	-0.095	1.859	-0.054	-1.913
	14.005	1.450	0.009	1.758	0.998	0.702	0.005	0.871	0.009
Wages/Empl	-0.000	-0.001	0.000	-0.016	-0.066	0.051	0.016	0.066	0.050
	0.001	0.005	0.706	0.176	0.270	0.452	0.000	0.330	0.431
CIR	0.007	-0.031	0.039	0.004	-0.027	0.030	0.004	-0.005	-0.008
	0.057	0.094	0.005	0.141	0.058	0.033	0.356	0.794	0.648
Market Power Channel									
NIM	-0.001	-0.001	0.000	-0.001	-0.001	0.000	-0.000	0.000	0.000
	0.002	0.002	0.856	0.002	0.003	0.417	0.056	0.709	0.504
Int earned	-0.002	-0.004	0.002	-0.003	-0.004	0.002	0.000	-0.000	-0.001
	0.003	0.006	0.011	0.003	0.006	0.262	0.001	0.935	0.701
Int paid	-0.001	-0.003	0.002	-0.002	-0.003	0.001	0.001	-0.000	-0.001
	0.003	0.005	0.009	0.003	0.005	0.358	0.000	0.776	0.431
L(IBA)	0.035	0.053	-0.018	0.034	0.058	-0.024	0.001	-0.005	-0.006
	0.060	0.076	0.095	0.045	0.071	0.148	0.812	0.790	0.759
Market share	0.003	0.003	-0.000	-0.000	0.000	-0.001	0.003	0.003	-0.000
	0.025	0.049	0.953	0.007	0.007	0.647	0.005	0.657	0.966

Notes: This table reports the summary statistics of dependent variables in the pre-period by ownership and treatment status. Tier1, NPL, Branch, Empl, Salaries, and Admin are defined as ratios to total assets. NIM, I-Inc., and I-Cost are defined as ratios relative to interest-bearing assets. NI-Inc. and NI-Cost are defined relative to total income.

Table A.10: Frequency distribution of banks and M&A transactions over years according to treatment and ownership status for the full sample, including non-merging banks

	Non-Merging					Merging								
	Observations				Banks	Observations				Banks	Deals			
	Savings		Cooperatives			Savings		Cooperatives			Savings		Cooperatives	
	Non-T	Treat	Non-T	Treat	Total	Non-T	Treat	Non-T	Treat	Total	Non-T	Treat	Non-T	Treat
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1993-1999	1,242	36	2,059	95	3,432	286	164	2,016	47	2,513	48	39	545	21
2000-2015	3,806	130	5,954	271	10,161	774	72	3,914	27	4,787	137	9	823	5
Total	5,048	166	8,013	366	13,593	1,060	236	5,930	74	7,300	185	48	1,368	26

Notes: This table reports the observations, number of banks, and deals each year for the full sample of banks according to treatment and ownership status. In Columns (1) to (4) and (6) to (9), observations of synthetic or original banks are counted. In Columns (5) and (10), observations are summed up per year. In Columns (11) to (14), mergers are counted in the year in which they occurred.

Table A.11: Frequency distribution of banks and M&A transactions over years according to treatment and ownership status for the sample merging banks in reformed states only

	Observations				Banks	Deals			
	Savings		Cooperatives			Savings		Cooperatives	
	Non Treated	Treated	Non Treated	Treated	Total	Non Treated	Treated	Non Treated	Treated
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1993–1999	75	164	414	47	700	17	39	119	21
2000–2015	329	72	1,313	27	1,741	61	9	269	5
Total	404	236	1,727	74	2,441	78	48	388	26

Notes: This table reports the observations, number of banks, and deals each year for the sample of merging banks in reformed states according to treatment and ownership status. In Columns (1) to (4), observations of synthetic or original banks are counted. In Column (5), observations are summed up per year. In Columns (6) to (9), mergers are counted in the year in which they occurred.

Table A.12: Real effects on related firms.

	Panel A							
	External financing cost				Investment			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SB	0.0046***	0.0048***	0.0048***	0.0048***	-0.6931***	-0.7318***	-0.7810***	-0.8153***
	(0.0011)	(0.0011)	(0.0011)	(0.0012)	(0.1062)	(0.1196)	(0.1272)	(0.1199)
RM (t=0)=1 × SB	-0.0023*				0.9249***			
	(0.0012)				(0.1402)			
RM (t=0,1)=1 × SB		-0.0025**				0.7218***		
		(0.0010)				(0.1800)		
RM (t=0,1,2)=1 × SB			-0.0015				0.7144***	
			(0.0011)				(0.1583)	
RM (t=0,1,2,3)=1 × SB				-0.0010				0.6105***
				(0.0011)				(0.1063)
Observations	51792	51792	51792	51792	51792	51792	51792	51792
Firms	18664	18664	18664	18664	18664	18664	18664	18664
Groups	12	12	12	12	12	12	12	12
Mean			0.0460				10.5330	
Median			0.0451				10.5330	
Standard Deviation			0.0314				10.5330	
Firm, Year-Region FE	yes	yes	yes	yes	yes	yes	yes	yes
R-squared (within)	0.0020	0.0021	0.0020	0.0020	0.0034	0.0035	0.0039	0.0038
R-squared (adjusted)	0.6862	0.6862	0.6862	0.6862	0.5700	0.5700	0.5702	0.5701

continued.

	Panel B							
	Employment				Leverage			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SB	-0.0511***	-0.0535***	-0.0528***	-0.0571***	0.0092	0.0084	0.0083	0.0070
	(0.0158)	(0.0166)	(0.0166)	(0.0162)	(0.0062)	(0.0059)	(0.0059)	(0.0063)
RM (t=0)=1 × SB	0.0260				-0.0020			
	(0.0205)				(0.0041)			
RM (t=0,1)=1 × SB		0.0302				0.0052		
		(0.0200)				(0.0066)		
RM (t=0,1,2)=1 × SB			0.0162				0.0035	
			(0.0135)				(0.0059)	
RM (t=0,1,2,3)=1 × SB				0.0261**				0.0072
				(0.0109)				(0.0065)
Observations	51792	51792	51792	51792	51792	51792	51792	51792
Firms	18664	18664	18664	18664	18664	18664	18664	18664
Groups	12	12	12	12	12	12	12	12
Mean			2.9304				0.7178	
Median			2.8904				0.7621	
Standard Deviation			2.8904				0.2242	
Firm, Year-Region FE	yes	yes	yes	yes	yes	yes	yes	yes
R-squared (within)	0.0008	0.0009	0.0008	0.0009	0.0003	0.0003	0.0003	0.0004
R-squared (adjusted)	0.9532	0.9532	0.9532	0.9532	0.8398	0.8398	0.8398	0.8399

Notes: Clustered standard errors at the bank level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The table reports results for regressions of Equation (2). We use four dependent variables: firms' (average) external financing cost calculated as total interest expenses over total liabilities; firms' investment, which is the logarithm of total gross real investment; employment as the logarithm of the number of firms' employees; and leverage, which is the ratio of total liabilities to total assets. The regression results for the first two sets are presented in Panel A, and the other two sets, in Panel B. Standard errors in parentheses are clustered on the regional level.

Table A.13: Description of the main variables.

Variable	Description
Main dependent variables	
RoE	Return on Gross Equity: Profit before Taxes to Total Gross Equity (See also *Profit, Equity Decomposition*)
RoNE	Return on Net Equity: Profit before Taxes to Total Net Equity (See also *Profit, Equity Decomposition*)
RoA	Return on Assets: Profit before Taxes to Total Assets
Main independent variables	
L(GDP)	Log (county GDP): Logarithm of GDP per county
Equity	Net Equity Ratio: Net Equity to Total Assets
LLP	Loan Loss Provisions: Loan Loss Provisions to Total Loans
CIR	Cost-to-income Ratio: Administrative Costs to Operating Income
Liquidity	Liquidity Ratio: Liquid Assets (Cash, Accounts receivable of banks with daily maturity) to Total Assets
Loans	Loans Ratio: Total Loans to Non-Bank Costumers to Total Assets
NII	Non-Interest-Income Ratio: Non-Interest Income to Operating Income
Size	Quintile of Total Asset Distribution of resp. banking group
L(Debt)	Regional public debt: Logarithm of public debt per county
Equity Decomposition	
L(Gross Eq)	Log (Gross Equity): Sum of Net Equity, Total Accruals, and Other Equity
L(Net Eq)	Log (Net Equity): Sum of Nominal Equity, Retained Earnings, Current Earnings, and Other Retained Profits
L(Accruals)	Log (Total Accruals): Sum of Accruals for Pensions, Taxes, and Other Accruals incl. for Risks
L(Other Equity)	Log (Total Other Equity): Sum of Subordinated Debt, Participating Debt Obligations, and Equity-like Special Items
Profit Decomposition	
L(Profits)	Log (Profits before taxes): Operating and Non-operating Result
L(Total Rev)	Log (Total Revenues): Operating and Non-operating Revenues
L(Op Rev)	Log (Operating Revenues): Revenue earned on IBA, on Commissions, on the Trading Book, Other Operating Revenue, and Current Revenues
L(Non-Op Rev)	Log (Non-operating Revenues): Extraordinary Revenue, Appreciations, and Special items
L(Total Cost)	Log (Total Costs): Operating and Non-operating Costs
L(Op Cost)	Log (Operating Costs): Costs paid on IBA, on Commissions, on the Trading Book, Other Operating, and Administrative Costs
L(Non-Op Cost)	Log (Non-operating Costs): Extraordinary Costs, Depreciation, Special items
Risk Channel	
L(zscore)	Log (z-score): Profits minus Tier 1 equity over assets divided by Standard deviation of RoA based on a 5-year window
SD(RoA)	Standard Deviation of RoA: Standard Deviation of RoA based on a 5-year rolling window (min. 3 years available)
Tier1	Tier 1 Capital Ratio: Tier1 to Total Assets
LLP	Loan Loss Provisions Ratio: Loan Loss Provisions to Total Loans
NPL	Non-Performing-Loans Ratio: Non-Performing-Loans to Gross Loans to Costumers

continued.

Variable	Description
Cost Channel	
Branch	Branch Ratio: Number of Branches to Total Assets (in Mil.)
Empl	Employees Ratio: Number of Employees to Total Assets (in Mil.)
Empl/Branch	Employees per Branch: Number of Employees per Branch
Wages/Empl	Wage Costs per Employee Ratio: Personnel Costs per Employee to Total Assets
CIR	Cost-Income-Ratio: Administrative Costs to Operating Income
Market Power Channel	
NIM	Net Interest Margin: Net Interest Income to Interest bearing Assets
Int. Earned	Average Interest earned on IBA: Interest Income to Interest bearing Assets
Int. Paid	Average Interest paid on IBA: Interest Costs to Interest bearing Assets
L(IBA)	Log (Interest Bearing Assets): Interbank Loans, Customer Loans, and Bonds and Securities
Market share	Market share of loans: Average share over all counties of banks' business area of average loans per branch of all branches in one county
Deposits and loans	
L(Deposit)	Log (Deposits): Logarithm of Deposits to Costumers
L(Loans)	Log (Loans): Logarithm of Total Loans to (Non-Bank) Costumers
L(Consumer)	Log (Consumer Loans): Loans to private households (excl. real estate)
L(Comm)	Log (Commercial Loans): Loans to firms and private businesses (excl. the industrial and agricultural sector)
L(Industrial)	Log (Industrial Loans): Loans to firms in the industrial sector
L(Agri)	Log (Agricultural Loans): Loans to firms in the agricultural sector
L(Real Estate)	Log (Real Estate Loans): Loans to private households for the purpose of real estate
L(Municipal)	Log (Municipal Loans): Loans to the public sector on the municipal level
L(State)	Log (State Loans): Loans to the public sector on the state level
Decomposition of Gross Equity	
L(Nom Eq)	Log (Nominal Equity): Nominal Equity
L(Retained E)	Log (Retained Earnings): Retained Earnings
L(Other R)	Log (Other Retained Profits): Other Retained Earnings
L(Current R)	Log (Current Retained Profits): Profits from the P&L of the current accounting period
L(A Pension)	Log (Accruals for Pensions): Accruals for Pensions and similar obligations
L(A Taxes)	Log (Accruals for Taxes): Accruals for Taxes
L(A Risk)	Log (Other Accruals incl. for Risk): Other Accruals incl. accruals for credit risk made by LLP
L(Special Items)	Log (Special Items): Special Items incl. hidden accruals for "Special Banking Risk"
L(Subordinated)	Log (Subordinated Debt): Subordinated Debt
L(Participate)	Log (Debt with Participation Rights): Debt Obligations with Participation Rights

continued.

Variable	Description
Decomposition of Total Costs	
L(Int Cost)	Log (Interest Costs): Costs of Interest-Bearing Assets
L(Com Cost)	Log (Commission Costs): Costs on Commissions
L(Fin Cost)	Log (Financial Costs): Costs on Instruments on the Trading Book
L(Other Cost)	Log (Other Costs): Other operating costs
L(Admin Cost)	Log (Administrative Costs): Wage costs, other administrative costs, depreciation costs, and other taxes
L(Depr Cost)	Log (Depreciation Costs): Costs for Depreciation of Durables and Immaterial Goods
L(Exord Cost)	Log (Extraordinary Costs): Extraordinary Non-Operating Costs
Decomposition of Total Revenues	
L(Int Rev)	Log (Interest Revenues): Revenues on Interest-Bearing Assets
L(Com Rev)	Log (Commission Revenues): Revenues on Commissions
L(Fin Rev)	Log (Financial Revenues): Revenues on Instruments on the Trading Book
L(Other Rev)	Log (Other Revenues): Other operating Revenues
L(Current Rev)	Log (Current Revenues): Other Current Operating Revenues
L(Appr Rev)	Log (Appreciation Revenues): Revenues on Appreciation of Durables and Immaterial Goods
L(Exord Rev)	Log (Extraordinary Revenues): Extraordinary Non-Operating Revenues
Decomposition of NIM	
L(Interbank)	Log (Interbank Loans): Total Interbank Loans
L(Customer)	Log (Customer Loans): Total Loans to Non-Bank Customers
L(Bonds & Sec)	Log (Bonds & Securities): Total Holdings of Fixed Income Bonds and Securities