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THE EFFECTS OF BANK MERGERS ON SMALL BUSINESS LENDING IN GERMANY[†]

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Abstract

In this paper, we examine the impact of mergers among German savings banks on the extent to which these savings banks engage in small business lending. The ongoing consolidation in the banking industry has sparked concerns about the continuous availability of credit to small businesses which has been further fueled by empirical studies that partly confirm a reduction in small business lending in the aftermath of mergers. However, using a proprietary data set of German savings banks we find strong evidence that in Germany merging savings banks do not significantly change the extent to which they lend to small businesses compared to prior to the merger or compared to the contemporaneous lending by non-merging banks. We investigate the merger related effects on small business lending in Germany from a *bank-level* perspective. Furthermore, we estimate small business lending and its continuous adjustment process simultaneously using recent General Method of Moments (GMM) techniques for panel data as proposed by Arellano and Bond (1991).

1. Introduction

The substantial reduction in the number of small banks in line with the ongoing consolidation in the banking industry has sparked concerns about the credit availability to small businesses. A number of empirical studies have further fueled these concerns by finding that bank mergers may under certain circumstances indeed reduce the availability of bank credit to small businesses (e.g. Berger *et al.* (1995), Keeton (1995, 1996), Berger and Udell (1996), Peek and Rosengren (1996, 1998)). Small banks typically specialize in lending to small businesses and are also found to have advantages in overcoming problems of asymmetric information accompanied with lending to small, often informationally opaque firms compared to large banks. Hence, if consolidation leads to a decline in the number of small banks or a change of the extent to which small banks engage in small business lending small businesses may find it difficult to satisfy their financing needs, especially in the absence of access to capital markets.

In this regard we investigate the impact of bank mergers on small business lending for the German case. An analysis of the consequences of bank mergers in Germany is particularly relevant for a number of reasons: First, small and medium sized businesses in Germany, the so-called *Mittelstand*, have a stronger macroeconomic weight than in most other countries as they account for 99.7% of German businesses, employ approximately 70% of Germany's workforce and generate almost 50% of GDP.[3] Second, the German *Mittelstand* almost exclusively relies on bank loans which can be attributed to firm size and the lack of informational transparency but also to the bank-based structure of the German financial system (Schmidt and Tyrell (2004)). Finally, no other country in the European Union has experienced such a sharp decline in the number of banks – the number of banks in Germany has fallen by over 50% from 4,719 in 1990 to 2,300 in 2006.[4]

While the effects of bank mergers on the availability of credit to small businesses has been extensively studied for the US this subject has received only limited attention for other markets, probably mainly due to data constraints. We are the first to investigate merger related effects on small business lending from a *bank-level* perspective in Germany. For the purposes of this study we are able to draw on a unique proprietary panel data set made

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[3] Source: Institut für Mittelstandsforschung Bonn.
[4] Source: Deutsche Bundesbank.

available by the German Savings Banks Association containing detailed financial and operating statistics of all 457 German savings banks that existed at the end of 2006 as well as information on all mergers among savings banks that took place between 1994 and 2006. Compared to other available data sources for bank financials this data set is superior in terms of the completeness and the level of detail, especially with regards to the detailed breakdown of each bank's lending activities otherwise not available in statutory accounts. Besides the uniqueness of our data we contribute to the existing empirical research by being the first in this context to specify a dynamic framework that simultaneously estimates the extent to which banks engage in small business lending and its adjustment behavior using recent General Method of Moments (GMM) techniques developed for dynamic panel data analyses by Arellano and Bond (1991).

We find strong evidence that banks involved in mergers do not reduce the extent to which they lend to small businesses post-merger compared with their respective lending prior to the merger or compared to the lending by those banks not involved in mergers at the same time. Thereby we observe the extent to which banks engage in small business lending using three measures, namely the volume of small business loans measured in absolute terms, as percentage of bank's total assets and as percentage of bank's total lending to non-banks. For all three measures we do not find significant changes to merging banks' small business lending. We further investigate whether merging banks reduce the funds available to the smallest of the small business borrowers, mainly craftsmen and small trade, but find consistent results of no merger related effects on small business lending. Generally, our results are robust across different model specifications.

Our findings imply that mergers among savings banks do not have an adverse effect on the availability of credit to small businesses in Germany. From a bank perspective, merging savings banks continue to lend to small businesses following mergers to the same extent as they did prior to the merger or as other non-merging banks do. These findings are in line with those of Marsch *et al.* (2007) who investigate merger related effects on the availability of credit for businesses from a firm perspective based on data from the German Central Bank's Credit Register. In the only other study for the German market, they conclude that bank consolidation in Germany does not have a significant negative impact on the credit availability for small business borrowers. Their results are consistent across the three pillars

of the German banking market, i.e. private banks, public savings banks and cooperative banks.

The remaining paper is structured as follows: Section 2 outlines why small banks are better able to engage in small business lending and discusses how bank mergers may influence the extent to which small banks lend to small businesses. Section 3 summarizes the findings of previous empirical studies in this field. Section 4 introduces both our unique panel data set of German savings banks as well as our dynamic panel model specifications. Section 5 summarizes the empirical results and highlights the robustness of our findings. Finally, section 6 concludes and discusses potential policy implications from our analysis.

2. Small business lending and how bank mergers may change banks' propensity to lend to small businesses

Small businesses almost entirely rely on banks as a primary source of funding. Since small firms tend to be informationally opaque for outside investors they are generally not able to access capital markets in the way large firms do. In order to overcome such problems of asymmetric information banks develop close relationships with borrowers. Thereby they invest in obtaining borrower-specific, often proprietary, information through screening and monitoring and learn about the credit quality of the borrower by means of multiple interactions over time (Boot (2000)). The nature of these bank-borrower lending relationships is a key feature of lending to small businesses as it reduces banks' associated costs of issuing loans and provides small firms with access to bank funding.[5]

Berger and Udell (1996) propose that lending to small businesses is distinctly different from lending to large businesses. While small business lending tends to rely on long-term relationships and an intensive exchange of proprietary information lending to large, informationally transparent borrowers is more generic in nature, transaction-driven and often involves more than one financial institution. Hence, lending to small and large firms requires two different sets of technology in terms of the policies and procedures associated with screening, credit approvals and monitoring.

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[5] See Ongena and Smith (1998) and Boot (2000) for an extensive overview of theoretical and empirical evidence regarding relationship banking.

Small banks in general may have an advantage in lending to small businesses compared to large banks. For example, small banks can leverage their close links to the local community to obtain additional information about the borrower and the condition of the local economic environment – an advantage large banks even with an extensive branch network may not be able to replicate due to centralized credit approval processes (Berger *et al.* (1998)). Stein (2002) provides formal evidence that soft information – a key feature of small business lending – can be better dealt with by decentralized organizations (such as small banks) while large organizations act better upon hard transferable information. Furthermore, senior management of small banks is able to monitor lending decisions and subsequent monitoring more closely enabling small banks to authorize non-standard, relationship loans more easily than large banks. The costs associated with managing and monitoring these locally-based processes may be too high for large banks to actively engage in small business lending (Strahan and Weston (1998)). Large banks may also be exposed to diseconomies of scale associated with the simultaneous provision of multiple services in complex organizations (e.g. lending to both small and large businesses) as suggested by Williamson (1988). The ability of large banks to better diversify credit risks across borrowers may even be offset by these diseconomies (Strahan and Weston (1998)). Besides a superior access to credit information and a better organizational setup to facilitate effective monitoring Carter *et al.* (2004) argue that small banks that operate in less competitive markets also have a greater incentive to invest in loan relationships because there is less chance that the borrower will switch to a competing lender. A number of empirical studies show that small banks are able to earn higher (risk-adjusted) returns on small business loans than large banks and therefore suggest that small banks indeed have a competitive advantage in small business lending (e.g. Berger and Udell (1996), Sapienza (2002), Carter *et al.* (2004)). Furthermore, consistent with other evidence that small banks are better able to engage in small business lending Berger *et al.* (2005) find that large banks lend at a greater distance, interact with borrowers more impersonally, have shorter and less exclusive borrowing relationships, and do not mitigate credit constraints as effectively as small banks do. Besides these competitive disadvantages large banks may also decide to abstain from small business lending because they have more extensive alternative lending opportunities. For example, large banks have the ability to invest in lending to large borrowers as they are not as restricted by regulatory lending limits as small banks are. Also, large banks do not rely on small borrowers to achieve a desired level and composition of commercial lending while small banks can only spread their risks sufficiently

by making a larger number of small loans (Keeton (1996)). Lastly, large banks may be in a position to take advantage of other business opportunities not available to small banks (e.g. underwriting) and relocate funds away from small business lending.

Empirical findings mostly support the notion that small banks actually engage more heavily in small business lending than large banks for above reasons and show that small banks allocate a larger share of their assets to small business loans than large banks (e.g. Walraven (1997), Peek and Rosengren (1998), Strahan and Weston (1998)).[6] Berger and Udell (1996) and Keeton (1996) find that also more organizationally complex banks provide less credit to small borrowers. However, Berger and Udell (1996) find at the same time that bank size is a much more predominant factor for the extent to which banks engage in small business lending than organizational complexity which, according to Sapienza (2002), is generally a function of size.

In line with the majority of other researchers in this field (e.g. Walraven (1997), Peek and Rosengren (1998), Strahan and Weston (1998)) we expect the impact of bank mergers on the availability of credit to small businesses to be largely driven by the bank's changes in lending focus in response to the increased size and a more complex organizational setup. Increasing size, especially in the course of M&A, may change a bank's ability and/or willingness to engage in small business lending for the same reasons that large banks focus less on small business lending than small banks. For example, the enlarged organization may require more layers of management and centralized decision-making while eliminating the organizational structure required to effectively conducting small business lending. Also, branch consolidation may compromise the bank's proximity to its borrowers and, henceforth, its ability to obtain private information about the customer and the local economic environment – the basis for relationship-driven small business lending.[7]

Furthermore, a revision and refocusing of the bank's lending policy in terms of risk appetite and target customers may also affect the extent to which the combined bank engages in small business lending. The assessment and restructuring of a bank's loan portfolio in terms of

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[6] We do not confirm the notion that small banks engage more heavily in small business lending than large banks do because our data set comprises only of savings banks for which we assume that they solely engage in small business lending and not in lending to large borrowers.

[7] Amel *et al.* (2004) suggest that mergers may also induce shifts in market power and therefore cause adverse price effects for certain products, most likely for deposits and loans to small businesses. Although, the analysis of merger related effects on prices poses an interesting subject for further research it is not subject of this study.

borrower quality and diversification is central to bank mergers. This may involve the modification of the terms and conditions on existing loan contracts or even the termination of selected relationships if the bank does not have a comparative advantage in making certain types of loans any more. According to Berger *et al.* (1998), post-merger organizational changes may also aim at improving the value maximizing behavior and economic efficiency in terms of improving corporate governance and eliminating loans that the bank has entered into under non-value maximizing choices. Furthermore, the merger motives will clearly affect the bank's decision to which extent it will continue to lend to small businesses in the future. For example, if the acquiring bank aims at decreasing funding costs by accessing more deposits, higher market shares in particular segments, improved geographic diversification and coverage, special knowledge including private information from lending relationships, they may not expand or even limit the extent to which it engages in small business lending (Keeton (1996), Peek and Rosengren (1998)).

Although most of the potential consequences of bank mergers addressed above imply that bank mergers negatively impact the credit availability to small businesses they do not yet account for the reaction of other market participants, both banks and non-banks, that may be able to mitigate or even offset the negative merger related effects by picking up any small business lending business dropped by merging banks. In the following we will provide an overview of findings of previous empirical research and then investigate the consequences of bank mergers on small business lending for the German market.

3. Review of empirical literature on the effects of bank mergers on small business lending

The effect of bank mergers on the availability of credit to small and medium sized businesses has attracted a growing attention by researchers since the mid-1990s. However, while most authors find that small banks invest a higher share of their assets in small business loans than large banks (e.g. Berger and Udell (1996), Walraven (1997), Peek and Rosengren (1998), Strahan and Weston (1998)), studies on the impact of bank mergers on small business lending provide mixed results. Previous empirical results appear to depend on the type of M&A, the sizes of the participating banks, the pre-merger small business lending propensity of the acquiring bank, the econometric methodology and the time horizon observed following the transaction. Furthermore, the results seem to be also driven by the point of view taken by the

respective study and, in particular, whether the analysis accounts for the reaction of other market participants to potential shifts in credit supply due to bank consolidation. Depending on the data used we distinguish below between the *bank-level view* with analyses based on banks' balance sheet data, the *firm-level view* with analyses using firms' balance sheet data and the *market-level view* based on loan contract data across banks.

The majority of existing empirical research on the impact of bank M&A on small business lending has focused on the US market using *bank-level* balance sheet data and a breakdown of each bank's lending activities from the June version of the FDIC's Reports of Condition and Income (June Call Reports).[8] Using June Call Report data Walraven (1997), Peek and Rosengren (1998) and Strahan and Weston (1998) find in contrast to the widespread concern that mergers among banks reduce the credit availability to small businesses that bank mergers may even increase the availability of small business credit. Although they confirm that the bank's small business lending activities relative to the bank's total assets decrease with bank size[9] they highlight that, first, most bank mergers are conducted among small banks because large banks typically do not acquire small banks that heavily engage in small business lending and, second, that merging banks tend to exhibit a larger share of small business lending than non-merging banks comparable in size. In particular, Strahan and Weston (1998) compare pre-merger small business lending shares of the pro-forma consolidated banks' total assets with the respective post-merger shares of the consolidated institution and find that the availability of small business credit from merging banks increases in the aftermath of small bank mergers. For mergers or acquisitions of larger banks the authors do not find evidence for significant changes in small business lending. Walraven (1997) and Peek and Rosengren (1998) investigate the impact of the extent to which banks participating in mergers engage in small business lending before the merger and find that the post-merger small business lending share converges quickly towards the pre-merger small business lending share of the acquirer. Because they also find that, on average, acquiring banks allocate a larger share of their assets to small business lending than their targets their empirical results suggest that in a merger context small business lending does not decrease but may even increase post-merger.

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[8] June Call Reports include all US commercial and state-chartered banks that are insured by the Federal Deposit Insurance Corporation (FDIC). June Call Reports are available since June 1993 on an annual basis.

[9] Strahan and Weston (1998) also highlight that while the share of small business loans of total assets decreases with bank size the absolute volume of small business lending increases monotonically with bank size.

In the probably most extensive *bank-level* study Berger *et al.* (1998) analyze the effects of bank mergers on small business lending by decomposing the net impact into static and dynamic effects as well as the effect of mergers on small business lending by other banks in the same local market. Specifically, the authors measure the following four effects: First, the *static effect* presents the difference between the small business lending share of total lending of the pro-forma consolidated bank and the small business lending share of total lending of the acquiring bank. Second, the *restructuring effect* accounts for post-merger restructuring related changes of bank's size, bank's financial characteristics and local market competitive position. Third, the *direct effect* describes the consolidated bank's change in lending focus beyond any changes that can be associated to either the static or the restructuring effect. The direct effect is thereby measured as the difference in lending between the restructured institution and comparable banks that have not been involved in M&A. Last, the *external effect* captures the changes in local competitors' lending activity in response to bank mergers. Using a sample of more than 6,000 bank mergers in the period from 1980 to 1995 Berger *et al.* (1998) find that the static effect significantly reduces merging banks' small business lending, i.e. the pro-forma consolidated entity exhibits a lower share of total lending that is dedicated to small business lending than the acquiring bank. However, this static effect is largely offset by the dynamic effects. Furthermore, other banks in the same local market pick up small business loan volumes dropped by the merging banks, a finding also confirmed by firm-level and market-level studies (e.g. Craig and Hardee (2007), Bonaccorsi di Patti and Gobbi (2007), Avery and Samolyk (2003)). This positive external effect can possibly be explained by *de novo* banks that tend to lend more to small businesses as a percentage of total assets than other small banks comparable in size (Goldberg and White (1998), DeYoung (1998), DeYoung *et al.* (1999)). Finally, Berger *et al.* (1998) verify, at least for the case of bank mergers (not for bank acquisitions), that if static, dynamic and external effects are taken into account small and medium sized bank mergers are linked with increases in small business lending, while larger bank mergers are generally still associated with a decrease in small business lending.

Taking a *firm-level* view Bonaccorsi di Patti and Gobbi (2007) find that firms that borrow from banks involved in M&A as an acquirer or as a target experience a temporary reduction in credit (but not credit lines) of approximately 1.5% and 2.0%, respectively. The negative shock is absorbed after 3 years in line with findings by Berger *et al.* (1998). Craig and Hardee (2007) find that other market participants partially, although not fully, offset the merger

related contraction in small business credit availability. Sapienza (2002) finds evidence that small business borrowers of merging banks are less likely to borrow from the consolidated entity in the future than borrowers of banks not involved in M&A. Furthermore, while controlling for other observable characteristics of the borrower he confirms that large banks that acquire small banks tend to reduce their post-merger small business lending exposure more than other banks. Degryse *et al.* (2005) use information from individual loan contracts in Belgium and partly confirm results by Sapienza (2002). They find that lending relationships are more likely to be terminated for borrowers of target banks. However, they also show that relationship termination is less likely for merging banks' borrowers, in particular for those who borrow from both banks involved, compared to borrowers from non-merging banks. In the only study on the impact of bank mergers on the credit availability for small businesses in Germany Marsch *et al.* (2007) also verify a temporary negative shock to small business lending which is quickly absorbed in the years following the merger. Using a dataset combining credit register and balance sheet data of both German firms and banks Marsch *et al.* (2007) further investigate the relationship between bank size and firm indebtness, which they find statistically but not economically significant. The authors show further that merger related changes in market concentration do not (negatively) affect the supply of small business credit. Their results are consistent across all three pillars of the German banking market, i.e. they hold for private, public savings and cooperative banks.

Finally, *market-level* studies broadly confirm *firm-level* findings: Bonaccorsi di Patti and Gobbi (2001) investigate the impact of mergers and market entry of banks on the volume and the quality of credit at the local market level using data constructed from the Italian Central Credit Register. The authors find that mergers result in a temporary reduction in small business lending and in an increase in bad loans. However, they do not find evidence for a permanent reduction in small business lending due to changes in bank size. Because they observe the market-level they do not infer any conclusions about the behaviour of individual banks involved in M&A and those market-participants not involved in M&A. Avery and Samolyk (2003) find that mergers of large banks lead to lower small business loan growth in the respective market while mergers of small banks do increase small business loan growth. Generally, small (community) banks mitigate the negative effects of consolidation.

4. Empirical specifications

Description of data set

Our analyses are based on a proprietary data sample provided by the German Savings Banks Association comprising detailed financials and operating statistics of German public savings banks for the period from 1996 until 2006. At the end of 2006 there were 457 savings banks in Germany for all of which annual records for each year of the observation period are included in the sample. For each bank and year we have added data on the local economic environment as well as the local market concentration. The data set is unique because it includes all savings banks active in Germany. In comparison, BvD's BankScope only covers approximately 80% of the savings banks in terms of total assets and number. Also, contrary to general accounting practice balance sheet data in our data set is based on arithmetic averages of monthly balance sheets. This poses a more realistic picture of the actual balances of the different asset and liability accounts throughout the respective year. Furthermore, our sample contains a breakdown of total loans to customers by retail, small business, craftsmen and trade (smallest businesses, "Handwerk"), public and foreign customers. A complete list of mergers and acquisitions among savings banks not all of which are publicly available complements our data set.

For several reasons savings banks in Germany pose a very interesting subject for economic research. First, besides the cooperative banks savings banks have been responsible for the majority of mergers and acquisitions among banks in Germany, accounting for almost 150 mergers between 1996 and 2006 while reducing the number of savings banks from more than 620 at the beginning of 1996 to less than 460 at the end of 2006 (see Panel A in Table 4). Second, together with cooperative banks savings banks are still the dominant provider of credit and banking services to individuals and small and medium sized enterprises in Germany, accounting for approximately 40% of assets in the banking system. Third, savings banks follow what is known as the "Regionalprinzip" (regional principle), i.e. each institution exclusively (for the savings banks sector) serves a well defined and separated regional business area that often corresponds to one of the 440 administrative districts in Germany. This allows us to account for the local rather than the national market concentration and economic environment. Moreover, due to the regional principle consolidation among savings banks does not induce changes in market power and, hence, should not induce changes to the behavior of non-merging banks in the same local market. This is argued to be one of the

problems of studies using sample groups of merging and non-merging banks operating in the same region (see Amel *et al.* (2004)). Fourth, all banks operate based on the same business model and an almost identical product offering. Fifth, all banks use the same accounting and reporting principles and almost all operate on the basis of the same legal foundation. Finally, all savings banks are independent institutions with their own business strategy and operational setup. As a result, these banks form a large group of highly comparable but independent entities – an ideal setup to analyze the implications of mergers as well as different bank and market characteristics with econometric models.

Financials are available on a pro forma adjusted basis that accounts for mergers and acquisitions. Thereby financials of acquiring and acquired banks have been pro forma consolidated over the whole observation period as if the merging banks have always operated as one entity. Hence, contrary to general accounting practice financials have not only been consolidated in the period following a merger but also in the years prior to the actual transaction.[10] [11] Although the backwards aggregation of the financials of all banks involved in mergers within the observation period eases the comparability of the pre- and post-merger performance and small business lending share of the combined bank, it does not allow for observing the characteristics of the banks participating in a merger separately before the merger. In order to overcome this shortcoming of our data set and at least to distinguish between merger types we append additional financial data such as total assets, total loan volumes and total deposit volumes for acquirers and targets in the pre-merger year. Nevertheless, because the additional data is derived from savings banks' financial statements it does not provide any breakdown on banks' lending activities except for their total lending exposure.

The information on mergers among savings banks comprises details on the timing and the parties involved for each transaction. The data set contains 147 mergers for which financials for an average post-merger time of 4.7 years are available.

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[10] Elsas (2004) points out that the approach of consolidation of balance sheet data by backwards aggregation dilutes merger related effects in case of subsequent mergers because financials of banks absorbed by subsequent mergers are included in consolidated financials already at the time of the first merger. In line with Elsas (2004) we argue that this problem is only relevant for a small sub-sample of our data; in our sample only 24 banks are repeatedly involved in mergers. Our robustness tests show that results remain unaffected even when excluding banks involved in multiple transactions.

[11] Berger and Humphrey (1992), Linder and Crane (1992), Rhoades (1993) and Elsas (2004) use a similar approach in their post-merger operating performance studies while Strahan and Weston (1998) use a similar approach in their analysis on the impact of bank mergers on small business lending.

Economic data was provided by the German Statistical State Offices. Information on market concentration is based on regional bank branch statistics provided by the German Central Bank. The economic data and the concentration measures are reported on the level of the respective administrative districts ("Landkreise" and "kreisfreie Städte") the bank is headquartered in. Germany comprises of 440 such administrative districts. Thomson Financial's Datastream is used to obtain interest rate data.

Descriptive statistics of the data applied in our empirical analysis are provided below following the introduction of the empirical model and variables.

Empirical model and variables

This paper focuses on analyzing the impact of bank mergers on the extent to which banks lend to small borrowers. Following the extensive summary of the different findings of previous research we design an empirical model to evaluate the consequences of mergers among German savings banks on their provision of loans to small businesses in Germany. Thereby we regress different measures of banks' small business lending (SBL) as dependent variable on a set of explanatory variables that account for merger events (M&A), bank specific characteristics (BS) as well as the local market (LM) and the capital markets environment (CM). As suggested by Wooldridge (2002) and Arellano and Bond (1991) we also include dummy variables for each year in the observation period to account for any secular changes that are not being modeled (υ). The constant term is represented by c.

The general form of the models we propose is as follows:

$$SBL_{i,t} = c + \upsilon_t + \sum \beta_j SBL_{i,t-j} + \sum \beta_\tau M\&A_{i,\tau} + \sum \beta_k BS_{k,i,t} + \sum \beta_l LM_{l,i,t} + \sum \beta_m CM_{m,i,t} + \varepsilon_{i,t}$$

In order to account for the fact that merger related effects on banks' small business lending are not realized instantaneously but over time we conduct a dynamic analysis and therefore include lags of the dependent variable (see Elsas (2004)).[12] Adjustments to shocks to lending can generally only materialize over time due to the medium to long-term nature of debt contracts, and changes to a bank's credit and credit risk policy may take a number of years to come into effect (Marsch *et al.* (2007)).

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[12] We include more than one lag of the dependent variable for technical reasons to ensure the validity of our model specification as laid out in our discussion of empirical results.

We use three measures of small business lending as dependent variables in order to evaluate whether potential effects on small business lending originate from changes to the bank as a whole, the lending business as a whole or the small business lending in particular. First, we employ the natural logarithm of the absolute level of bank's small business lending (*Ln(Small Business Lending)*), similar to Strahan and Weston (1998) for *bank-level* analyses and Bonaccorsi di Patti and Gobbi (2007) and Marsch *et al.* (2007) who observe the effect of bank mergers on the absolute level of firms' bank liabilities. Second, we measure small business lending as a percentage share of bank's total assets (*Small Business Lending as % of Total Assets*) in line with the majority of studies in this field (e.g. Walraven (1997), Strahan and Weston (1998), DeYoung *et al.* (1999), Focarelli *et al.* (2002)). Third, we measure small business lending as percentage share of bank's total lending to non-banks (*Small Business Lending as % of Total Lending to Non-banks*) to account for any post-merger shifts within the bank's lending portfolio.

While most papers define small business loans as non-residential, non-farm commercial and industrial loans with an original nominal amount of less than USD 1 million (e.g. Walraven (1997), Berger *et al.* (1998), Strahan and Weston (1998)), we take an approach similar to the one used by Keeton (1996) who only considers those banks for his analyses that focus on small business lending and typically cannot provide large loans (or loans to large borrowers) due to regulatory lending limits and problems of diversification. German savings banks operate in a defined local market and specifically aim at providing credit to local small and medium sized companies. Regulatory lending limits are equally responsible for savings banks' focus on small rather than large business loans. Hence, we assume that all of savings banks' business lending relates to small business lending which is also confirmed by an average business loan size of approximately EUR 100,000 as shown in our descriptive statistics in Panel B of Table 2. Our approach of taking all loans into account without further differentiating between different loan size classes also does not suffer from loans being classified as non-small business loans as customers grow (see DeYoung *et al.* (1999)). Nevertheless, in order to highlight the robustness of our findings we investigate the merger impact on lending to the smallest of the small business borrowers, mainly craftsmen and trade ("Handwerk"), thereby applying the same measures for small business lending as introduced above.

Our key explanatory variables are dummy variables that indicate when a bank was involved in a merger (*M&A*), i.e. it takes the value 1 if the respective bank was involved in a merger or an acquisition in the respective year.[13] First of all, we include one *M&A* dummy variable that indicates whether the respective bank was involved in a merger in the current year ($\tau = t$). In order to account for the fact that adjustments to small business lending due to mergers are only realized over time we also include lagged values of the *M&A* dummy variable. Specifically, we include one dummy variable that reflects whether a merger took place in any of the four years before the year of the respective observation ($\tau = t - 1$; $\tau = t - 2$; $\tau = t - 3$; $\tau = t - 4$) and one for merger involvement in any year before that ($\tau < t - 4$). The lag structure of *M&A* dummy variables varies across empirical studies, however, it generally goes in line with the authors' expectations of the time required for changes to small business lending to fully materialize. For example, Bonaccorsi di Patti and Gobbi (2007) find that the merger related shock to the availability of credit to small businesses is absorbed after three years while Strahan and Weston (1998) and Marsch *et al.* (2007) only test for effects in the merger year and the first two subsequent years, partly due to the paucity of a longer time frame in their data. Focarelli *et al.* (2002) and Elsas (2004) propose an alternative lag structure for *M&A* dummy variables. They distinguish between short-term effects ($\tau = t$), medium-term effects ($\tau \in [t - 1; t - 3]$) and long-term effects ($\tau = t \leq - 4$). In robustness tests we also apply their lag structure but arrive at consistent results. Based on the design of our *M&A* dummy variables the reference group for the observations of merging banks comprises implicitly all observations of banks that have not been involved in mergers throughout the observation period and observations of pre-merger years of merging banks. The control group does not include any observations of banks that have been involved in mergers in any previous year of the observation period. This is in line with Calomiris (1999) who suggests that the inclusion of observations of post-merger years into the control group limits the time horizon of merger adjustments and can lead to substantial underestimation of the merger related effects.[14]

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[13] Multiple transactions in any one year or single transactions with multiple parties involved are treated as one transaction since annual data is used for the evaluation of post-merger effects on lending (see Linder and Crane (1992) for analyses on banks' post-merger performance and Peek and Rosengren (1998) for analyses of the impact of bank mergers on small business lending). Furthermore, we do not distinguish between mergers and acquisitions because economically all transactions among savings banks are mergers. Hence, the expressions "merger" and "M&A" are used interchangeably.

[14] Also see Calomiris (1999) for a detailed discussion of the construction of counterfactuals in post-merger performance analyses.

In order to control for other determinants of banks' small business lending we include a number of bank specific characteristics. First, we control for bank size by including total assets (*Total Assets*) and the square to total assets (*Sq(Total Assets)*) as Peek and Rosengren (1998), Strahan and Weston (1998) and DeYoung (1998) find a non-linear relationship between bank size and small business lending measured as percentage of total assets. In particular, Strahan and Weston (1998) find that small business lending measured as a percentage of total assets first rises and then falls with bank size. Thereby the authors argue that small banks are excluded from lending to large borrowers until they reach a critical size. Beyond this point banks engage more heavily in large business lending which simultaneously decreases the relative share of small business lending. DeYoung *et al.* (1999) suggest that small business lending will negatively affect lending to small borrowers if the bank has USD 100 to USD 300 million in total assets. Focarelli *et al.* (2002) and Elsas (2004) also include total assets and the square of total assets to control for general bank heterogeneity. However, they do not control for any other bank specific characteristics as we do. Other than size we control for banks' business mix and product focus by including the share of non-interest revenues to total operating revenues (*Non-Interest Revenues/Operating Revenues*). Furthermore, we control for bank's average business loan size (*Average Loan Size*) as a proxy for borrower size. Furthermore, we control for the riskiness of the bank's overall loan portfolio (*Loan Loss Provisions/Total Lending*) that may influence bank's credit and credit risk policy especially if re-considered following a merger. Finally, we include the equity ratio (*Equity/Total Assets*) to account for the capitalization of the respective bank that determines a bank's ability to grow its lending business.

In line with Berger *et al.* (1999) we consider market concentration on a local bank market level (*Local HHI*).[15] We control for market power but do not assume major shifts in local market concentration from mergers in our sample as German savings banks by law operate in exclusive (for the savings banks sector), non-overlapping local markets. As data for total assets, loan and deposit volumes is not available on an administrative district level for all (especially private) banking groups, we determine the local market concentration as the Hirschman-Herfindahl-Index on the basis of individual banks' market shares calculated as the number of own branches in each administrative district over the total number of bank

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[15] US studies focus on local bank markets analogous to US policy guidelines for merger approval processes and also because research finds that both households and small businesses almost always choose banks that are present nearby (see Kwast *et al.* (1997) and Kwast (1999)).

branches in the respective district (see Fischer and Hempell (2006)). Savings banks in Germany hold a dominant market position in higher concentrated, typically rural, local bank markets. In rural areas savings banks and cooperative banks are often the only banks present while private banks maintain branch networks only in urban or more densely populated areas. We also implicitly control for the local demand for credit as determinant of bank's lending volume by including the bank's average interest received (price) on its business loans adjusted for risk and current interest rate level (*Local Loan Interest Rate*). In order to control for the local economic environment and because demand for credit is driven by local economic prospects we also include GDP per inhabitant (*Local GDP per Inhabitant*).

In terms of the capital markets environment we control for the bank's ability to benefit from term transformation (i.e. funding long-term loans with short-term deposits while maximizing the average interest spread) approximated by the *Yield Curve Slope*.

Table 1 provides a summary overview of variables included in our analyses as well as their respective calculation. The following section provides a descriptive analysis of the variables employed in our analysis.

Descriptive statistics

Tables 2, 3 and 4 provide detailed descriptive statistics on the data employed in our empirical analysis. Panel A of Table 2 outlines the development of the overall German savings banks sector and of the average bank and market characteristics of the 457 savings banks in our sample on a year-by-year basis for our observation period from 1996 to 2006. Panel B of Table 2 provides similar statistics for the full sample across all years.[16] Table 3 describes the lending activities of savings banks as well as the differences in the degree to which savings banks engage in small business lending across different size quartiles. Table 4 provides an overview of the merger activity of German savings banks during our observation period from 1996 to 2006.

During the observation period the average German savings bank grew from EUR 1,768 million in total assets at an average inflation-adjusted annual growth rate of 1.4% to EUR

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[16] Please note that descriptive statistics in Panel B of Table 2 are based on observations for the years 2001 to 2006. This is in analogy to our main regression analysis which only accounts for observations in these years because in our regression analysis four years of observations are lost due to the inclusion of four lags of the respective dependent variable and one further year of observations is lost due to first differencing.

2,025 million in 2006.[17] In terms of *Total Assets* and *Small Business Lending* the sector had steadily grown until 2002. Since then, the sector has declined by approximately 3% and 6%, respectively. This decline was mainly driven by the recession that followed the 2002 stock market crash and the increasing competition by foreign *de novo* banks in Germany. *Small Business Lending* declined faster than *Total Assets* as their share of total lending to non-banks (*Small Business Lending as % of Total Lending to Non-banks*) decreased over time while total loans to non-banks as percentage of total assets remained fairly constant at around 60%. Lending to the smallest of the small business borrowers ("Handwerk") declined even faster than overall small business lending by an average of approximately 2.1% per year between 1996 and 2006. While each savings bank on average held EUR 93 million (9.4% of lending to non-banks) of "Handwerk" loans in 1996, in 2006 they only held EUR 75 million (6.9% of lending to non-banks). Also the *Average Loan Size* declined over the observation period. The visible decline in small business lending, both in total and average volumes, gives support to concerns of a potential decrease in credit availability to small business borrowers. Nevertheless, one needs to point out that the extent to which savings banks engage in small business lending differs significantly across banks as indicated by the 25% and 75% quantiles in Panel B of Table 2.

One of the other key developments of bank specific characteristics is the increase of *Non-Interest Revenues/Operating Revenues* from 15% in 1996 to 22% in 2006. Both, a relatively flat interest rate yield curve reducing net interest revenues as well as the increased importance of non-interest bearing products are responsible for this development. *Loan Loss Provisions/Total Lending* varies in magnitude according to the respective phase in the credit cycle. Especially the 2002 economic downturn was accompanied by an increasing number of delinquencies and write-offs also leading to higher provisions made by savings banks. However, *Loan Loss Provisions/Total Lending* do not only vary across time but also across savings banks as indicated in Panel B, highlighting the heterogeneity of savings banks' credit and credit risk policies. Finally, *Equity/Total Assets* increased from 4.0% to 5.0% during the observation as a sign of an improving capitalization at savings banks, principally enabling savings banks to grow their lending activities. Increases in equity have been achieved through the accumulation of retained earnings because only a few savings banks actually distribute earnings.

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[17] Absolute values in EUR are presented at 2000 prices in order to adjust for inflationary effects.

The control variables employed to describe the local market environment do not exhibit any particular changes over time: The risk-adjusted *Local Loan Interest Rate* fluctuates between 0.8% and 1.7% while the average *Local GDP per Inhabitant* increased in line with overall economic growth while maintaining significant differences across administrative regions as exhibited in Panel B of Table 2. The *Yield Curve Slope* as our relevant indicator for the general capital markets environment fluctuated throughout the observation period, however, it decreased towards the end of our observation period indicating a flat yield curve.

Table 3 provides a breakdown of savings banks' lending activities and indicates how the extent to which savings banks engage in small business lending differs across bank size classes. On average, a savings bank's total lending to non-banks amounts to approximately 61% of bank's total assets. The share of total lending to non-banks differs slightly across banks, however, the smallest and largest banks exhibit the highest lending share. Total lending to non-banks comprises of small business lending (43.3% of total lending to non-banks or 26.4% of total assets) and lending to retail, and to a lesser extent public and foreign customers. Small business lending increases monotonically with bank size in absolute terms as well as relative to total assets or relative to total lending to non-banks suggesting that larger banks engage more heavily in small business lending than small banks, presumably because of lending restrictions at small banks. In turn, possibly because of lending restrictions, the smallest banks seem to engage more heavily in lending to retail customers implied by their share of total lending to non-banks being higher than the respective average share of any other size class while their small business lending share being the lowest. The loans to the smallest of the small business borrowers ("Handwerk"), a part of small business lending, make up 4.5% of total assets and 7.6% of total lending to non-banks. While lending to this sub-group of small business borrowers increases monotonically in absolute terms its relative share to both total assets and total lending to non-banks decreases with size (except for the quartile of smallest savings banks, which exhibits a low share of lending to the smallest borrowers presumably again due to lending restrictions). The decline in the relative share of lending to the "Handwerk" may be explained by the fact that each market only hosts a given number of this kind of firms and demand is expected to slow once the funding needs of all of them are satisfied.

Table 4 depicts the M&A activity among German savings banks. As shown in Panel A of Table 4, the number of savings banks in Germany declined from 607 at the end of 1996 to

457 at the end of 2006. This reduction in the number of German savings banks was solely subject to mergers among savings banks, although some of the mergers were actually pursued as a preemptive distress resolution (see Elsas (2004) and Koetter *et al.* (2005)). The number of savings banks dissolved through M&A is not equal to the M&A activity among savings banks because some M&A transactions involve more than two savings banks, also some savings banks were involved in more than one transaction in any one year which we do not account for in our analysis. Panel B presents a break down of how many savings banks have been involved in M&A once or multiple times. Out of a total of 457 savings banks 341 banks have not been involved in M&A during the observation period, 92 banks have been involved once while 24 banks have been involved several times.

5. Empirical results and discussion

Below we test whether mergers among German savings banks affect the extent to which these banks lend to small business borrowers post-merger. First, we compare differences in means of lending volumes and lending shares of total assets between merging and non-merging banks in the years respectively following bank mergers. Second, we estimate the dynamic adjustment process of bank lending volumes in response to mergers using the General Methods of Moments dynamic panel data estimator proposed by Arellano and Bond (1991). Various robustness tests highlight the robustness of our findings.

Differences in means

As a first analysis of the impact of bank mergers on small business lending we compare the average development of merging banks' lending activities in the merger year and up to four years thereafter with the simultaneous average lending behavior of the 341 banks in our sample that have not been involved in M&A.[18] For the purpose of comparing merging with non-merging banks' lending performance we do not use a matched sample because differences in the extent to which savings banks engage in lending are not solely driven by size but most importantly by the banks' economic environment and the individual bank's credit and risk strategy. Furthermore, the number of available savings banks not involved in

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[18] The number of observations decreases over the post-merger horizon because the longer-term post-merger effects of mergers conducted in the last years of our observation period (e.g. in 2005) cannot yet be observed. Furthermore, we exclude banks involved in M&A more than once to avoid the interference of effects associated with different mergers. The figures for the control group always present the mean for all 341 banks not involved in mergers throughout the observation period.

mergers limits the possibility to match merging and non-merging banks according to a more refined set of characteristics such as a combination of size, profitability and local economic environment. As metrics of banks' lending activities we use total lending to non-banks, small business lending and in order to capture the smallest of the small business borrowers we also use lending to "Handwerk". All three metrics are measured both in absolute terms and as their respective percentage share of total bank assets. Small business lending and lending to "Handwerk", a sub-category of small business lending, are also measured as percentage of total lending to non-banks. Besides these three metrics for bank's lending activities we also observe the post-merger development of the combined bank's size measured in terms of total assets. Thereby we intend to observe whether changes to the absolute level of lending is a result of changes specific to lending or a consequence of bank wide restructuring.

For our comparison we use an index with the pre-merger year as base year to analyze average post-merger development in order to ensure that the effects at all banks are equally weighted and that the differences between merging and non-merging banks are not size-driven. This methodology yields the same results as a comparison of growth rates between lending levels pre-merger and in respective post-merger years, an analysis conducted by a number of other studies (e.g. Strahan and Weston (1998)). We also adjust absolute lending volumes for inflation. A *t*-test confirms whether differences in lending performance between merging and non-merging banks are statistically significant.

Our analysis suggests that merging banks grow at a lower rate than non-merging banks. As shown in Table 5, the merger induced differences in bank size persist not only in the year of the merger but for all four years observed following the merger and they are significant at the 5% and 1% levels, respectively. One alternative reason for this result may be that non-merging banks grow at a higher rate than merging (typically) larger banks, an explanation for which we control in a robustness check as part of our dynamic regression analysis below. Compared to the simultaneous development of non-merging banks merging banks' total lending to non-banks in absolute terms does not perform significantly different in the merger year and the first post-merger year. The growth in total lending to non-banks of merging banks slows in the second, third and fourth year after the merger compared to non-merging banks. In the fourth year following a bank merger non-merging banks exhibit approximately 7% higher lending volumes than merging banks. The differences between merging and non-merging banks' total lending volumes are statistically significant at the 1% level in the years 2

to 4 following the merger. The emergence of merger related effects in the second post-merger year suggests that merger related effects on lending seem to only kick in after some time. This result is in line with Focarelli *et al.* (2002) who show that the merger related effect on loans to small firms emerge between the first and the third year following mergers and even only thereafter in the case of acquisitions. If we measure total lending to non-banks as a percentage of total assets we do not observe statistically significant differences between merging and non-merging years in any post-merger year. Above results suggest that banks reduce their lending exposure in absolute terms, however, other assets seem to be reduced proportionally as indicated by the significant negative development of total assets post-merger as well as the constant percentage share of total lending to non-banks to total assets.

For our three measures for small business lending we find consistent results. In terms of the absolute level of small business lending all savings banks develop similarly in the merger year and the first subsequent year. However, thereafter merging banks decrease their small business lending faster than non-merging banks. The difference between merging and non-merging banks is significant at the 5% level. In terms of the timing of the merger related effects their emergence after the first post-merger year again confirm that changes to lending occur only over time. The overall decline in absolute small business lending is probably not merger related but subject to the overall trend in the savings banks sector of decreasing lending to small business borrowers as exhibited in Panel A of Table 2. If we measure small business lending as a percentage of total assets or as percentage of total lending to non-banks merging banks do not perform statistically different from their non-merging peers. Although merging banks reduce their small business lending in absolute terms this reduction does not seem to be driven by factors specific to small business lending but rather, similar to total lending to non-banks, by restructuring measures affecting the overall institution.

In terms of small business lending to "Handwerk" we do not find that its post-merger development is significantly different between merging and non-merging banks. This finding holds for all measures observed for small business lending to "Handwerk". Our analysis of differences in means suggests that mergers do not impact banks' extent to which they lend to this group of small business borrowers. This finding is somehow contrary to our descriptive analysis which finds a decreasing share of small business lending to both total assets and total lending to non-banks with increasing size. Our dynamic regression analysis below will shed more light on the impact of mergers on lending to "Handwerk" while controlling for other

potential determinants of the extent to which banks engage in this type of lending. Similar to small business lending in general lending to "Handwerk" declines over time consistent with the industry-wide trend of a decline in lending in this field as exhibited in Panel A of Table 2.

Regression analysis

In the following we test whether bank mergers affect the extent to which merging banks lend to small business borrowers using multivariate regression analysis for dynamic panel data. Thereby, we estimate the empirical model we introduced above. Including lags of the dependent variable on the right side, specifically accounts for the fact that adjustments to merger induced shocks on small business lending do not materialize immediately but over time. Technically, we employ the General Methods of Moments dynamic panel data estimator proposed by Arellano and Bond (1991) because results from ordinary least squares (OLS) and fixed-effects estimations lead to results that are inconsistent. Bond (2002) discusses econometric techniques available for dynamic panel data models extensively and proves both theoretically and empirically that results from OLS or fixed-effects are likely to be biased for panels with a large number of cross-sections and a small number of time periods, the same characteristics that apply for our data set. [19]

We apply the one-step GMM estimator with robust standard errors for inference on coefficients as proposed by Arellano and Bond (1991), however, we find that the two-step estimator also leads to consistent results. For GMM coefficient estimates to be consistent the differenced error terms may not be serially correlated and the specified instruments must be valid. Hence, for each regression we test the null hypotheses of a) no second order autocorrelation using the respective test proposed by Arellano and Bond (1991) and b) of no correlation between instrumental variables and residuals using the Sargan test based on the two-step GMM estimator which, as suggested by Arellano and Bond (1991), is better suited for testing model specifications because the Sargan test over-rejects in the one-step setting. Consistency of our model and resulting findings is only provided if we fail to reject the aforementioned tests. Because in some specifications these tests are rejected we include four lags of the respective dependent variable. The additional lags of our dependent variable are included solely for econometrical reasons, namely to ensure consistency of both instruments

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[19] Bond (2002) shows that results from alternative estimation techniques are inconsistent because of the correlation of the lagged explanatory variable with the error term due to the presence of fixed effects and the correlation between first-differenced lagged dependent variables and first-differenced error terms, respectively.

and coefficient estimates, hence, we do not report or interpret their coefficient estimates (e.g. see Drobetz *et al.* (2006)).[20]

We analyze the effects of bank mergers on small business lending by estimating the determinants of our three measures of banks' small business lending, namely *Ln(Small Business Lending)*, *Small Business Lending as % of Total Assets* and *Small Business Lending as % of Total Lending to Non-banks*. Coefficient estimates and p-values of the determinants of our small business lending metrics are reported in Table 6. Table 7 presents the results for small business lending to "Handwerk" using a similar estimation setup in a robustness check (in Panel C of Table 7 we show lending to "Handwerk" as percentage of small business lending instead of total lending to non-banks). In our base model we observe each bank six times for every year between 2001 and 2006. Regressions do not include observations available for the years 1996 to 2000 as five time series observations are lost per bank: one due to first differencing as suggested by Arellano and Bond (1991) and four due to the aforementioned inclusion of four lags of the respective dependent variable.

Our key explanatory variables are the *M&A* dummy variables that control for the lending impact of the observed banks' merger involvement in either the observed year ($\tau = t$), in each of the four previous years ($\tau = t - 1$; $\tau = t - 2$; $\tau = t - 3$; $\tau = t - 4$) or any year before that ($\tau < t - 4$).[21] The results in Column (1) of Panel A of Table 6 show that merger involvement does not affect the total volume of small business loans lent to small borrowers in the merger year or in subsequent year. The coefficient estimates for all *M&A* dummy variables are not significantly different from zero. The result of no impact from M&A in the merger year and the immediate years thereafter is in line with expectations as most previous studies such as Bonaccorsi di Patti and Gobbi (2007) and Focarelli *et al.* (2002) find that potential merger induced changes to small business lending become visible only after a number of years as restructuring measures take time to be implemented and realized. Nevertheless, even after allowing for

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[20] Generally, at least the first two lags of our dependent variable are positive and statistically significant while the third and fourth lag vary in direction depending on the measure for small business lending but are not statistically significant.

[21] As a robustness test we re-run all regression using a M&A dummy variable structure that distinguishes between short, medium and long term effects as suggested by Focarelli *et al.* (2002) and Elsas (2004). Thereby, we include one dummy variable that reflects whether a merger took place in the year currently observed ($\tau = t$). Medium-term effects are captured by a M&A dummy variable that indicates whether the respective bank was involved in a merger during the last one to three years ($\tau \in [t - 1; t - 3]$). Long-term effects are accounted for using a dummy variable that reflects whether the respective bank participated in a merger in any year more than three years ago ($\tau = t \leq -4$). Nevertheless, this alternative specification leads to consistent results.

some time for changes to materialize we do not find any evidence of merger related changes to small business lending, neither positive nor negative.

In Columns (2) and (3) of Panel A of Table 6 we explicitly control for the state of the local market environment in terms of its strength and its position in the economic cycle as well as the local loan demand by including GDP per inhabitant and the average risk-adjusted yield on small business loans in the market, respectively. In the absence of alternative data, the latter is based on the average SME loan interest rate charged by the respective savings bank adjusted for both risk and the current interest rate level. We add the two aforementioned control variables for the local market environment separately in two separate model specifications as limited data availability for these two variables reduces the time-series observations available for each bank and, hence, results in loss of information. In these two model specifications coefficient estimates for all *M&A* variables are not significantly different from zero which underlines the robustness of our finding of no negative (or positive) impact of mergers among German savings banks on small business lending volumes. Panel B and Panel C of Table 6 present estimation results for our two alternative measures of small business lending which provide broadly the same results. The results for small business lending to "Handwerk" as presented in Table 7 are broadly in line with the findings for overall small business lending. For *Ln(Small Business Lending to "Handwerk")* as dependent variable *M&A* dummy variables are negative and statistically significant. However, we cannot interpret the estimates as a proof for a negative influence from mergers on small business lending to "Handwerk" because the choice of instruments in this particular setting is not valid as shown by the Sargan test.

In each regression we control for a number of individual bank characteristics, the local market environment and the capital markets environment. Except for the bank-specific controls for size (*Total Assets* and *Ln(Total Assets)*), generally, controls have limited explanatory power because the lagged dependent variables incorporate all determinants of the previous years' lending propensity and, hence, the other explanatory variables only pose innovations (Greene (2003)). Because one might argue that bank-specific variables are not likely to be strictly exogenous and that merger induced shocks may also impact some of the explanatory variables, in robustness tests that are not reported for conciseness reasons, we include bank-specific variables at the second lag as instruments to control for endogeneity. Results are consistent to those presented here.

In our estimations of the determinants of *Ln(Small Business Lending)* and *Small Business Lending as % of Total Lending to Non-banks* the coefficient for *Total Assets* is positive and statistically significant, while *Sq(Total Assets)* is negative and in almost all cases also significant. Hence, small business lending volumes initially increase monotonically but at a slowing rate with bank size and decline following a certain size threshold. This is contrary to Strahan and Weston (1998) and our descriptive analysis both of which show that absolute small business lending volumes increase monotonically with bank size. Nevertheless, considering the economic impact the change in size must be very large to significantly alter a bank's small business lending volumes. For example, *Total Assets* and *Ln(Total Assets)* coefficients in Column (1) of Panel A of Table 6 suggest that an increase in total assets by one billion (i.e. 50% asset growth for the average savings bank) would result in an expansion in small business lending of approximately 6.6%. For *Small Business Lending as % of Total Assets* (Panel B of Table 6) the coefficients for *Total Assets* and *Sq(Total Assets)* are negative and positive, respectively, and both statistically significant at the 5% level. These findings suggest that the relative share of total assets allocated to small business lending initially decreases with bank size but stabilizes and reverts beyond a certain size threshold. Interestingly, this result is also contrary to findings by Strahan and Weston (1998) and DeYoung (1998) who find that small business lending as a percentage of total assets first increases up to a certain threshold but decreases thereafter with bank size.

Small business lending measured both in absolute and in relative terms is negatively related to the *Yield Curve Slope* indicating that the wider the spread between long-term and short-term market interest rates the more companies lend at the short end or, alternatively, banks reduce the extent to which they pursue term transformation. Finally, small business lending is negatively related to GDP and positively to the average local loan yields. The latter indicates that banks in markets with high loan demand can attract more lending business in both absolute and relative terms.

In robustness tests that are not reported for conciseness reasons we also test whether the impact of bank mergers on small business lending differs dependent on whether the respective bank is located in an urban or in a rural area or whether the bank is situated in an Eastern or a Western German state. While we do not observe differences between banks in rural and urban areas we find for the sub-sample of East German banks that mergers are followed by an expansion in small business lending in absolute terms – both relative measures of small

business lending do not indicate merger related effects. Results for *Ln(Small Business Lending)* are valid and significant at the 5% level for all M&A dummy variables. For West German savings banks we find that mergers negatively affect the extent to which saving banks lend to small business borrowers, however, results hold only for small business lending in absolute terms and are not valid because we reject the Sargan test of no overidentifying restrictions. In a further robustness test we include total assets growth in order to control for the possibility that merging (larger) banks grow at a lower rate than non-merging banks as suggested by our differences in means analysis. We find results consistent with our main finding of no merger related effect on small business lending from mergers among savings banks in Germany.

In their studies on the causes and consequences of bank mergers in Germany Elsas (2004) and Koetter *et al.* (2005) highlight that a non-negligible share of mergers among savings banks and cooperative banks are in fact preemptive moves to resolve distress. In order to rule out that results are driven by post-merger adjustments to banks' small business lending that are different for potentially distressed and healthy banks we control for the likelihood of a merger being motivated by imminent distress. Because we do not know for sure which mergers were initiated as a preemptive distress resolution we define an interaction term as the product of the *M&A* dummy variable and the relative frequency of distress among savings banks in the respective year of the merger. Estimation results show that the impact of bank mergers conducted in years of increased distress frequency lead to a reduction in small business lending in absolute terms by approximately 5%. However, we are not able to find comparable results for *Small Business Lending as % of Total Assets* or *Small Business Lending as % of Total Lending to Non-banks*. We suggest that banks that merge with distressed peers reduce not only the respective bank's loan portfolio but its overall balance sheet as already suggested by our differences in means analysis.

Finally, we distinguish mergers by the relative size differences between participating banks. Thereby we account for whether two banks of equal size merge or whether a larger (measured as being 25% larger in terms of total assets) bank merges with a smaller bank. Contrary to previous studies we do not find any significant merger related effects and infer that savings banks mergers do not affect small business lending irrespective of the size difference between merging parties. Following Peek and Rosengren (1998) we also exclude all transactions where

one merger partner is smaller than 20% of the total asset size of the other participating bank. Still we arrive at consistent results of no merger related effects on small business lending.

6. Conclusion

In this paper, we investigate the impact of mergers among German savings banks on the extent to which these savings banks engage in small business lending. Based on dynamic panel regression analyses we find robust evidence that German savings banks mergers do not negatively (or positively) affect the credit availability to small business borrowers. Merging savings banks continue to lend to small businesses to the same extent compared to before the merger or to other non-merging savings banks. Thereby they do not only provide the same absolute amount of credit but also allocate the same share of their assets or the same share of their total funds attributed to lending to non-banks to lending to small businesses. Results also hold for the most bank-dependent of the small business borrowers, the German "Handwerk". Our results are robust across model specifications and do not show any significant impact from savings banks mergers on small business lending whatsoever. Our findings are in line with the results of the only other study on the merger related effects on small business lending in the German market by Marsch *et al*. (2007). In their study, the authors take a *firm-level* view and find that banking consolidation in Germany has, if at all, only a very limited negative effect on the financing of small and medium sized businesses in Germany. Hence, our findings as well as those brought forward by Marsch *et al*. (2007) mitigate any concerns about a merger induced decline in the credit availability to Germany's small and medium sized businesses. We argue that savings banks continue to focus on small business lending as part of their public mandate of providing financial services to individuals and small and medium sized companies in their respective business districts to promote economic growth and stability. Furthermore, we propose that the regional principle and the fact that merged savings banks remain still comparatively small in size limit the extent to which they can engage in other businesses or allocate resources away from small business lending. However, it remains unclear und subject to further research at what consolidation stage merger related effects might actually turn out to be negative because savings banks become too large to maintain their advantage in small business lending.

With this paper we are the first to investigate merger related effects on small business lending from a *bank-level* perspective in Germany. Although this subject has been extensively studied

for the US it has generally received only limited attention for other markets. Furthermore, for the purposes of this study we are able to draw on a unique proprietary panel data set provided by the German Savings Banks Association. Compared to other data sources for bank financials this data set is superior in terms of the completeness and the level of detail, especially with regards to the detailed breakdown of each bank's lending activities otherwise not available in statutory accounts. Finally, we contribute to the existing empirical research by being the first in this context to specify a dynamic framework that simultaneously estimates the extent to which banks engage in small business lending and its adjustment behavior using recent General Method of Moments (GMM) techniques developed for dynamic panel data analyses by Arellano and Bond (1991).

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Table 1: Description of variables

Variable	Unit	Description
Dependent variables		
Ln(Small Business Lending)	EUR million	Natural logarithm of total loans to SME customers.
Small Business Lending as % of Total Assets	%	Total loans to SME customers divided by the bank's average total assets.
		Calculation: *Total loans to SME customers / total assets * 100*
Small Business Lending as % of Total Lending to Non-banks	%	Total loans to SME customers divided by the bank's average lending to non-banks.
		Calculation: *Total loans to SME customers / total lending to non-banks * 100*

Note: For Small Business Lending to "Handwerk", as alternative dependent variable we apply the same measures as stated above.

Variable	Unit	Description
Explanatory variables		
M&A activity		
M&A	dummy variable	Dummy variable equal to 1 if the respective bank has been involved in mergers and acquisitions in the respective year.
Bank characteristics		
Total Assets	EUR billion	Bank's average total assets.
Sq(Total Assets)	EUR billion	Square of bank's average total assets.
Average Loan Size	EUR million	Average loan size of loans to SME customers.
		Calculation: *Total loans to SME customers / total number of loans to SME customers*
Non-Interest Revenues / Operating Revenues	%	Percentage share of non-interest revenues of bank's total operating revenues comprising of net interest revenues and non-interest revenues (i.e. fee, commission and other revenues) before deduction of any operating expenses.
		Calculation: *Non-interest revenues/ (net interest revenues + non-interest revenues) * 100*
Loan Loss Provisions / Total Lending	%	Percentage share of bank's loan loss provisions to bank's average total loans.
		Calculation: *Loan loss provisions / total loans * 100*
Equity / Total Assets	%	Percentage share of average total shareholders' equity of bank's average total assets.
		Calculation: *Equity / total assets * 100*
Local market environment		
Local HHI	#	Hirschmann-Herfindahl-Index of market shares used to estimate market concentration and competition. Since total assets for all German banks are not available on a district level, we approximate the market share with the share of branches (compare Fischer and Hempell (2006)).
		Calculation: $\sum_{j=1}^{n}(ms_j)^2 * 100;$
		n=number of banks in local market, ms_j=market share (in terms of branches) of jth bank
Local Yield on Small Business Lending	%	Average loan interest rate for small business loans in local market adjusted for credit risk and current interest rate level. Calculated based on data available for respective local savings bank.
		Calculation: *(Interest income from total loans to SME customers - loan loss provisions) / total loans to SME customer) – 1-year interest rate*
Local GDP per Inhabitant	EUR thsd.	Gross Domestic Product (GDP) divided by the number of inhabitants per administrative district.
Capital markets environment		
Yield Curve Slope	%	Difference in yields between short- (1-month) and long-term (10-year) maturities.
		Calculation: *10-year government bond rate – 1-month EURIBOR rate*

Note: Assets and liabilities represent average monthly balance sheet data for the respective year. Profit and loss items are as of the end of the respective year.

Table 2: Descriptive statistics – Bank and market characteristics

This table presents descriptive statistics for the sample of 457 public savings banks in Germany that existed at the end of 2006. Financials are pro forma adjusted for mergers by fully consolidating merging banks not only in the years following the merger but in all years of the observation period. Panel A presents the means of individual bank and market characteristics for each year for the period 1996 to 2006. Panel B presents the means and 25% and 75% percentiles for each variable and for the full sample applied in our regression analyses for the years 2001 to 2006 (observation period as per our regression analyses). Absolute values in EUR are presented at 2000 prices to adjust for inflationary effects. The Compounded Annual Growth Rate (CAGR) in Panel A is presented for the period 1996 to 2006.

Panel A: Descriptive statistics for full sample of 457 savings banks by year

Variables	Unit	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	CAGR
Bank characteristics (mean)													
Total Assets	EUR million	1,768	1,843	1,923	2,003	2,038	2,052	2,079	2,073	2,055	2,035	2,025	1.4%
Small Business Lending	EUR million	526	540	564	578	602	611	606	590	573	556	550	0.4%
as % of Total Assets	%	28.2%	28.1%	28.1%	27.3%	27.9%	28.0%	27.1%	26.5%	26.0%	25.5%	25.4%	N/A
as % of Total Lending to Non-banks	%	46.3%	45.5%	45.6%	44.8%	45.3%	45.3%	44.5%	43.3%	42.7%	42.2%	42.1%	N/A
Small Business Lending to "Handwerk"	EUR million	93	93	96	96	98	96	93	87	80	78	75	-2.1%
as % of Total Assets	%	5.5%	5.4%	5.3%	5.2%	5.2%	5.1%	4.9%	4.5%	4.2%	4.2%	4.1%	N/A
as % of Total Lending to Non-banks	%	9.4%	9.0%	8.9%	8.7%	8.7%	8.5%	8.2%	7.6%	7.1%	7.1%	6.9%	N/A
Average Loan Size	EUR	96,524	98,499	93,847	93,282	94,448	94,068	96,858	94,760	94,565	94,842	92,032	-0.5%
Non-Interest Revenues / Operating Revenues	%	15.2%	16.0%	17.4%	18.9%	20.5%	19.4%	18.5%	19.3%	20.4%	20.8%	21.9%	N/A
Loan Loss Provisions / Total Lending	%	0.8%	0.7%	0.6%	0.2%	0.5%	0.6%	0.8%	0.8%	0.8%	0.6%	0.4%	N/A
Equity / Total Assets	%	4.0%	4.1%	4.2%	4.2%	4.4%	4.4%	4.4%	4.5%	4.7%	4.9%	5.0%	N/A
Local market environment (mean)													
Local HHI	#	1,802	1,694	1,686	1,657	1,642	1,669	1,711	1,658	1,658	1,658	1,658	N/A
Local Yield on Small Business Lending	%	N/A	N/A	N/A	N/A	N/A	0.8%	0.8%	1.6%	1.5%	1.7%	1.0%	N/A
Local GDP per Inhabitant	EUR	22,078	22,514	23,112	23,629	24,205	24,685	25,003	25,202	25,877	N/A	N/A	N/A
Capital markets environment (mean)													
Yield Curve Slope	%	2.9%	2.5%	1.1%	1.6%	1.1%	0.4%	1.5%	1.7%	2.0%	1.2%	0.8%	N/A

Panel B: Descriptive statistics for full sample of 457 savings banks

Variables	Unit	25%	Mean	75%
Bank characteristics				
Total Assets	EUR million	686	2,053	2,377
Small Business Lending	EUR million	163	581	666
as % of Total Assets	%	21.4%	26.4%	31.3%
as % of Total Lending to Non-banks	%	38.3%	43.3%	48.5%
Small Business Lending to "Handwerk"	EUR million	28	85	102
as % of Total Assets	%	3.0%	4.5%	5.6%
as % of Total Lending to Non-banks	%	5.2%	7.6%	9.6%
Average Loan Size	EUR	75,996	94,521	106,047
Non-Interest Revenues / Operating Revenues	%	18.0%	20.0%	22.0%
Loan Loss Provisions / Total Lending	%	0.3%	0.7%	0.9%
Equity / Total Assets	%	4.0%	4.6%	5.2%
Local market environment				
Local HHI	#	1,264	1,668	2,024
Local Yield on Small Business Lending	%	0.7%	1.2%	2.2%
Local GDP per Inhabitant	EUR	19,511	25,192	27,666
Capital markets environment				
Yield Curve Slope	%	0.8%	1.3%	1.7%

Table 3: Descriptive statistics – Banks' lending activities by bank size

This table presents descriptive statistics on banks' lending activities for the sample of 457 public savings banks in Germany that existed at the end of 2006. Financials are pro forma adjusted for mergers by fully consolidating merging banks not only in the years following the merger but in all years of the observation period. The table presents the means for each variable for the years 2001 to 2006 (observation period as per our regression analyses) by size quartile based on bank's total assets as well as for the full sample. Absolute values in EUR are presented at 2000 prices to adjust for inflationary effects.

| Variables | Unit | Size quartiles based on total assets (mean) | | | | Full sample Mean |
		(1)	(2)	(3)	(4)	
Total Assets	EUR million	406	877	1,528	4,762	2,053
Total Lending to Non-banks	EUR million	248	515	929	2,951	1,260
as % of Total Assets	%	62.5%	58.6%	60.6%	61.7%	60.8%
Small Business Lending	EUR million	101	223	404	1,405	581
as % of Total Assets	%	24.9%	25.3%	26.4%	28.5%	26.4%
as % of Total Lending to Non-banks	%	39.7%	43.0%	43.6%	46.1%	43.3%
Small Business Lending to "Handwerk"	EUR million	18	42	72	183	85
as % of Total Assets	%	4.3%	4.7%	4.7%	4.2%	4.5%
as % of Total Lending to Non-banks	%	7.1%	8.3%	8.0%	6.8%	7.6%

Table 4: Descriptive statistics – M&A activity among German savings banks

This table presents descriptive statistics of the merger activity of the 457 German public savings banks included in our sample for the years 1996 to 2006. Panel A presents the number of savings banks at the end of each year, the number of savings banks dissolved through M&A in each year and the number of savings banks involved in M&A in every year during the observation period. The latter is presented for the whole of Germany as well as for West and East Germany separately. The number of savings banks dissolved through M&A does not equal the M&A activity among savings banks because some M&A transactions involve more than two savings banks, also the number of M&A transactions of the individual bank in any one year is not taken into account. Panel B presents a breakdown of the number of saving banks involved in M&A by the frequency of their involvement. The sum of savings banks involved in M&A in each year during the observation period is 147 which is greater than the total number of savings banks involved in M&A during the observation period of 116 due to repeated M&A activity by 24 of the 116 merging savings banks.

Panel A: Development of number of savings banks and M&A activity among savings banks by year

	Total	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Savings banks	N/A	607	598	594	578	562	537	519	489	477	463	457
Savings banks dissolved through M&A	167	17	9	4	16	16	25	18	30	12	14	6
M&A activity per year	147	13	8	4	12	14	21	17	27	11	14	6
M&A activity per year - West Germany	123	6	6	4	10	14	21	17	23	6	10	6
M&A activity per year - East Germany	24	7	2	0	2	0	0	0	4	5	4	0

Panel B: Number of savings banks involved in M&A by activity between 1996 and 2006

	Total
Savings banks involved in M&A in at least 1 year	116
Savings banks not involved in M&A during observation period	341
Savings banks involved in M&A in 1 year	92
Savings banks involved in M&A in more than 1 year	24
Savings banks involved in M&A in 2 years	19
Savings banks involved in M&A in 3 years	3
Savings banks involved in M&A in 4 years	2
Savings banks involved in M&A in 5 years	0
Savings banks involved in M&A in 6 years	0

Table 5: Differences in means – Post-merger development of banks' lending activities

This table presents results for t-tests of differences in means for the simultaneous development of Total Assets, Total Lending to Non-banks, Small Business Lending and Small Business Lending to "Handwerk" (measured in absolute terms, as percentage of total assets and as percentage of total lending to non-banks) of merging banks and 341 savings banks not involved in mergers during the observation period from 1996 and 2006. We do not include all 92 savings banks involved in M&A once during the observation period to ensure a more balanced sample for each post-merger year observed. The number of observations (n) refers to the number of merging banks included in the analysis. The number of observations of merging banks decreases over time as a performance history of up to 4 years is not yet able for most recent mergers. Savings banks repeatedly involved in M&A are not included in order to avoid interfering effects from repeated M&A in the post-merger period of the first merger. We use an index with the year prior to the merger (t = -1) as base year to ensure that savings banks of different sizes are equally weighted. Performance is reported for the merger year (t = 0) and respective years after the merger (t = +1, t = +2, t = +3, t = +4).

Variables	Post-merger development (index based on pre-merger year (t = -1); merger in t = 0)					
	t = -1 (n = 59)	t = 0 (n = 67)	t = +1 (n = 65)	t = +2 (n = 62)	t = +3 (n = 49)	t = +4 (n = 39)
Total Assets						
Merging banks	100	100	100	99	99	99
Non-merging banks (control group)	100	100	101	102	105	106
Difference	0	-1**	-2***	-3***	-5***	-7***
Total Lending to Non-banks						
Merging banks	100	103	102	99	99	98
Non-merging banks (control group)	100	101	101	101	104	105
Difference	0	2	1	-3***	-5***	-7***
Total Lending to Non-banks as % of Total Assets						
Merging banks	100	103	103	100	100	99
Non-merging banks (control group)	100	100	100	99	99	99
Difference	0	3	3	0	0	0
Small Business Lending						
Merging banks	100	102	100	95	96	96
Non-merging banks (control group)	100	100	99	98	101	101
Difference	0	2	1	-3**	-5**	-5**
Small Business Lending as % of Total Assets						
Merging banks	100	102	101	96	97	97
Non-merging banks (control group)	100	99	98	96	95	94
Difference	0	3	3	0	1	2
Small Business Lending as % of Total Lending to Non-banks						
Merging banks	100	99	98	96	97	97
Non-merging banks (control group)	100	99	98	96	96	95
Difference	0	0	0	0	1	2**
Small Business Lending to "Handwerk"						
Merging banks	100	100	94	87	86	83
Non-merging banks (control group)	100	95	89	85	81	78
Difference	0	5	4	2	4	5
Small Business Lending to "Handwerk" as % of Total Assets						
Merging banks	100	100	94	88	86	84
Non-merging banks (control group)	100	97	92	89	86	84
Difference	0	4	2	-1	0	0
Small Business Lending to "Handwerk" as % of Total Lending to Non-banks						
Merging banks	100	97	91	88	86	84
Non-merging banks (control group)	100	96	92	89	86	84
Difference	0	0	-1	-1	0	0

***significant at 0 to 1 percent level, **significant at 1 to 5 percent level, *significant at 5 to 10 percent level, others: significant at above 10 percent level

Table 6: The effects of bank mergers on small business lending

This table presents coefficient estimates and p-values (reported in brackets) from dynamic panel regressions relating M&A activity to the extent to which banks engage in small business lending. Dependent variables are banks' loans to small business borrowers measured as Ln(Small Business Lending) (Panel A), Small Business Lending as % of Total Assets (Panel B) and Small Business Lending as % of Total Lending to Non-banks (Panel C). All regressions are applied to the full sample using detailed financials of 457 German savings banks for the period 2001 to 2006. Regressions do not account for data available for the years 1996 to 2000 due to the inclusion of up to four lags of the respective dependent variable (not reported) as well as first differencing as per Arellano and Bond (1991). Further variations in sample size are due to potential data limitations. As estimation technique, we use the General Methods of Moments (GMM) dynamic panel data estimator with heteroskedasticity robust standard errors proposed by Arellano and Bond (1991). All coefficients are based on the one-step estimator as recommended by Arellano and Bond (1991). The 2nd order autocorrelation test statistics test the null hypothesis of no second order correlation in the residuals as required for the consistency of the GMM estimator. The Sargan test statistics test the null hypothesis of valid overidentifying restrictions based on the Arellano and Bond (1991) two-step estimator.

Variables	Panel A: Ln(Small Business Lending)			Panel B: SBL as % of Total Assets	Panel C: SBL as % of Lending to Non-banks
	(1)	(2)	(3)	(1)	(1)
M&A activity					
M&A ($\tau = t$)	0.014	0.020	0.021	0.267	0.179
	[0.335]	[0.269]	[0.190]	[0.511]	[0.357]
M&A ($\tau = t - 1$)	0.004	0.019	0.009	0.471**	0.268
	[0.705]	[0.288]	[0.499]	[0.032]	[0.208]
M&A ($\tau = t - 2$)	-0.007	0.010	-0.005	0.075	-0.078
	[0.557]	[0.601]	[0.708]	[0.839]	[0.755]
M&A ($\tau = t - 3$)	0.001	0.006	0.005	0.370	0.282
	[0.911]	[0.754]	[0.673]	[0.271]	[0.343]
M&A ($\tau = t - 4$)	-0.002	-0.007	-0.001	0.284	0.058
	[0.839]	[0.738]	[0.924]	[0.300]	[0.832]
M&A ($\tau < t - 4$)	-0.013	-0.020	-0.007	0.393	0.147
	[0.421]	[0.388]	[0.638]	[0.259]	[0.666]
Bank characteristics					
Total Assets	0.066***	0.056**	0.068***	-6.590**	0.711
	[0.008]	[0.041]	[0.005]	[0.012]	[0.237]
Sq(Total Assets)	-0.002**	-0.001	-0.002**	0.129**	-0.019
	[0.021]	[0.102]	[0.014]	[0.042]	[0.176]
Average Loan Size	0.320	0.258	0.234	7.563	7.762
	[0.225]	[0.254]	[0.220]	[0.213]	[0.152]
Non-Interest Revenues / Operating Revenue	-0.001	-0.001	-0.001	0.023	-0.026
	[0.541]	[0.316]	[0.697]	[0.524]	[0.496]
Loan Loss Provisions / Total Lending	0.013***	0.009	-0.050	0.084	0.336***
	[0.007]	[0.150]	[0.111]	[0.473]	[0.001]
Equity / Total Assets	0.007	0.003	0.006	0.557***	0.159
	[0.247]	[0.674]	[0.391]	[0.000]	[0.321]
Local market environment					
Local HHI	0.000	0.000	0.000	0.000	0.000
	[0.326]	[0.343]	[0.489]	[0.281]	[0.862]
Local Yield on Small Business Lending			-0.025*		
			[0.053]		
Local GDP per Inhabitant		-0.006***			
		[0.008]			
Capital markets environment					
Yield Curve Slope	-0.018***	-0.023***	0.006	-0.274***	-0.554***
	[0.000]	[0.006]	[0.608]	[0.002]	[0.000]
Observations	2,728	1,815	2,270	2,728	2,728
Number of banks	457	457	457	457	457
2nd order autocorrelation test (p-value)	0.499	0.512	0.321	0.574	0.487
Sargan test (p-value)	0.225	0.136	0.130	0.111	0.111

***significant at 0 to 1 percent level, **significant at 1 to 5 percent level, *significant at 5 to 10 percent level, others: significant at above 10 percent level

Table 7: The effects of bank mergers on small business lending to "Handwerk"

This table presents coefficient estimates and p-values (reported in brackets) from dynamic panel regressions relating M&A activity to the extent to which banks engage in lending to the smallest of the small businesses, namely "Handwerk". Dependent variables are banks' loans to small business borrowers measured as Ln(Small Business Lending to "Handwerk") (Panel A), Small Business Lending (SBL) to "Handwerk" as % of Total Assets (Panel B) and Small Business Lending (SBL) to "Handwerk" as % of Small Business Lending (Panel C). All regressions are applied to the full sample using detailed financials of 457 German savings banks for the period 2001 to 2006. Regressions do not account for data available for the years 1996 to 2000 due to the inclusion of up to four lags of the respective dependent variable (not reported) as well as first differencing as per Arellano and Bond (1991). Further variations in sample size are due to potential data limitations. As estimation technique, we use the General Methods of Moments (GMM) dynamic panel data estimator with heteroskedasticity robust standard errors proposed by Arellano and Bond (1991). All coefficients are based on the one-step estimator as recommended by Arellano and Bond (1991). The 2nd order autocorrelation test statistics test the null hypothesis of no second order correlation in the residuals as required for the consistency of the GMM estimator. The Sargan test statistics test the null hypothesis of valid overidentifying restrictions based on the Arellano and Bond (1991) two-step estimator.

Variables	Panel A: Ln(Small Business Lending to "Handwerk")			Panel B: SBL to "Handwerk" as % of Total Assets	Panel C: SBL to "Handwerk" as % of Total SBL
	(1)	(2)	(3)	(1)	(1)
M&A activity					
M&A (τ = t)	0.007	0.045*	0.012	0.059	-0.184
	[0.723]	[0.091]	[0.616]	[0.620]	[0.566]
M&A (τ = t - 1)	-0.033	0.020	-0.029	-0.021	-0.298
	[0.130]	[0.484]	[0.257]	[0.781]	[0.272]
M&A (τ = t - 2)	-0.060**	0.025	-0.061**	-0.086	-0.471
	[0.015]	[0.400]	[0.034]	[0.423]	[0.198]
M&A (τ = t - 3)	-0.058**	0.017	-0.055*	0.014	-0.357
	[0.030]	[0.592]	[0.066]	[0.883]	[0.385]
M&A (τ = t - 4)	-0.088***	-0.011	-0.081**	-0.012	-0.471
	[0.008]	[0.729]	[0.023]	[0.921]	[0.338]
M&A (τ < t - 4)	-0.132***	-0.004	-0.121**	0.121	0.016
	[0.005]	[0.923]	[0.015]	[0.421]	[0.980]
Bank characteristics					
Total Assets	-0.018	0.010	-0.001	-1.232**	-0.044
	[0.684]	[0.838]	[0.979]	[0.010]	[0.936]
Sq(Total Assets)	0.001	0.001	0.001	0.030**	0.015
	[0.483]	[0.356]	[0.713]	[0.011]	[0.186]
Average Loan Size	0.098	0.140	0.075	0.723	-2.728
	[0.495]	[0.402]	[0.576]	[0.337]	[0.267]
Non-Interest Revenues / Operating Revenue	-0.002	0.003	-0.003	0.013	0.075
	[0.484]	[0.407]	[0.399]	[0.320]	[0.217]
Loan Loss Provisions / Total Lending	-0.009	-0.038	-0.086*	0.012	0.029
	[0.743]	[0.382]	[0.086]	[0.750]	[0.851]
Equity / Total Assets	0.022	0.015	0.042	0.011	-0.102
	[0.407]	[0.671]	[0.358]	[0.861]	[0.657]
Local market environment					
Local HHI	0.000	0.000	0.000	0.000*	-0.001
	[0.349]	[0.259]	[0.431]	[0.098]	[0.275]
Local Yield on Small Business Lending			-0.028		
			[0.115]		
Local GDP per Inhabitant		0.002			
		[0.806]			
Capital markets environment					
Yield Curve Slope	-0.046***	-0.030***	-0.017	-0.094**	-0.309***
	[0.000]	[0.008]	[0.344]	[0.025]	[0.006]
Observations	2,722	1,811	2,265	2,722	2,722
Number of banks	456	456	456	456	456
2nd order autocorrelation test (p-value)	0.180	0.339	0.698	0.775	0.758
Sargan test (p-value)	0.022**	0.408	0.010***	0.077*	0.191

***significant at 0 to 1 percent level, **significant at 1 to 5 percent level, *significant at 5 to 10 percent level, others: significant at above 10 percent level

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