# Cyclicality of SME Lending and Government Involvement in Banks*


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**Abstract**

Recent regulatory efforts aim at lowering the cyclicality of bank lending because of its detrimental effects on financial stability and the real economy. We investigate an alternative explanation: Government involvement in banks. We examine the cyclicality of SME lending of local banks with vs. without a public mandate, controlling for location, size, loan maturity, funding structure, liquidity, profitability, and credit demand-side factors. The public mandate is set by local governments and stipulates a deviation from strict profit maximization and a sustainable provision of financial services to the local economy. We obtain a strong result: Banks with a public mandate are 25 percent less cyclical than other local banks. The result is credit supply-side driven and especially strong for savings banks with high liquidity. Our findings have implications for the banking structure, financial stability and the finance-growth nexus in a local context.



**Keywords:** G20, G21

**JEL-Classification:** Banks, Loan growth, SME finance, Business cycles, Financial stability



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# 1 Introduction

The cyclicality of bank lending may create undesirable feedback effects that potentially reduce allocative efficiency in the economy. Too many (too few) firms may obtain credit in a boom (recession). Regulations like the risk-sensitive capital requirements introduced with the Basel II Accord may further increase cyclical bank lending behavior. In a recession, the higher ex ante default risk of bank borrowers triggers higher capital requirements for banks under risk-sensitive capital rules, which may lead to a decrease of credit supply and a tightening of lending standards. Fewer firms and households obtain credit. This mechanism lowers corporate investments and consumer spending, and thereby amplifies the recession. The opposite effect operates during an economic boom, where excessive credit expansion may lead to an overheating of the economy and to an increase of inflation. In recent years, policymakers and regulators have therefore undertaken significant efforts to reduce the cyclicality of bank lending. These comprise, for instance, macro-prudential policy tools such as dynamic loan loss provisioning rules (Spain, Colombia and Peru), countercyclical capital buffers (Basel III Accord), loan-to-value caps (Japan), time-varying systemic liquidity surcharges, and stressed value-at-risk requirements (International Monetary Fund 2011; Lim et al. 2011).

In this paper we investigate whether the cyclicality of lending depends on government involvement in banks. We focus in our analysis on lending to small and medium-sized enterprises (SMEs) for several reasons. SMEs represent the vast majority of all firms and they contribute significantly to overall employment and growth in many countries. However, SMEs are more opaque, riskier, more financially constrained and more bank-dependent than large firms (e.g., Petersen and Rajan 1994). Therefore, bank lending to SMEs has always been prone to market failure because of problems arising from severe information asymmetries and its unattractive risk return profile. Financial institutions with special business objectives have emerged to overcome the market failure (e.g., local savings banks and credit cooperatives in Europe; credit unions in the U.S.; international and domestic development banks). In addition, government-led lending programs including direct subsidies and/or guarantees (e.g., the Small Business Administration (SBA) in the U.S.), and special lending technologies such as small business credit scoring and relationship lending help overcome the inherent fragility of SME lending.

Bank business objectives, including the profit orientation and other goals, fundamentally influence their lending behavior, in particular their scale, scope and

timing. The main hypothesis of this paper is that government involvement in banks in form of a "public mandate" lowers the cyclicality of SME lending. The public mandate is included in the banks' by-laws by local governments and stipulates a deviation from strict profit maximization and a sustainable provision of financial services to the local economy. Banks with such a public mandate likely follow the business cycle as other banks but we conjecture that they do this to a lesser degree than other banks. If such banks effectively follow their public mandate, the lower cyclicality should be credit supply-side driven and not a consequence of differences in their borrower structures. Recent studies show that these banks help reducing financial constraints of SMEs (Behr et al., 2013) and that the performance of these banks is positively related to local economic development (Hakenes et al., 2015).

To test our hypothesis, we use panel data from around 800 German banks spanning the period from 1987 to 2007. Germany provides a particular useful environment to test our hypothesis because of two institutional features. First, 96 percent of all firms in the German economy are SMEs according to the definition of the European Commission (2006), which enables us to focus on SME lending. Second, Germany has a banking system in which local banks with a public mandate and banks without a public mandate have been co-existing for more than 200 years (e.g., Allen and Gale, 2000; Krahnen and Schmidt, 2004). The local banks with a public mandate are known as savings banks, the others local banks are credit cooperatives. Both types of banks are small, local, and follow simple business models (deposit taking and lending). They are also both geographically constrained as their by-laws allow them to provide loans only to borrowers from the same county. Importantly, the savings banks were founded by local governments in the 18$^{th}$ and 19$^{th}$ century (i.e., municipalities or county governments) and the public mandate is a binding legacy incorporated by the founders in the by-laws.[1]

Using this institutional setting we compare the cyclicality of SME lending of savings banks with that of credit cooperatives from the same location. We measure lending cyclicality by estimating the sensitivity of banks' growth in SME lending to GDP growth and various alternative proxies. Our empirical set-up keeps bank size and geographic focus constant and enables us to directly test whether banks' business objectives that derive from the public mandate affect the cyclicality of the lending behavior. To the best of our knowledge, ours is the first study that establishes a link between the cyclicality of SME lending and government involvement in local banks.

[1] Furthermore, local politicians usually fulfil important supervisory functions in the savings banks and can therewith exert influence on their lending behavior. In the remainder of the paper, we will refer to the savings banks as public mandate banks and banks with government involvement interchangeably.

We obtain a surprisingly strong result. We find that the SME lending of savings banks is on average 25 percent less sensitive to GDP growth than that of the cooperative banks from the same area. The effect is economically large and statistically significant. Such strong difference in the cyclicality of SME lending is surprising because savings banks and cooperative banks are both local banks and focus on basic financial services. We control for bank location, size, funding structure, profitability and credit demand-side factors using interacted region-year fixed effects. The result remains robust when we use alternative measures of cyclicality such as regional GDP growth, real growth in investments and the credit demand indicator from the European Central Bank Lending survey. We further rule out that the lower cyclicality of savings banks' SME lending is due to bank size. One could argue that smaller banks are less cyclical because the credit demand of their borrowers is less cyclical. However, the less cyclical savings banks are on average bigger than the credit cooperatives in our sample. We also find that all size groups within the savings bank sector are less cyclical than credit cooperatives, and we do not find that smaller credit cooperatives are less cyclical than bigger ones. Interestingly, we find that savings banks with the highest liquidity exhibit the lowest cyclicality in SME lending, suggesting that these banks are the ones that are best able to follow the public mandate. Moreover, the main result is credit supply-side driven. We document that the lower cyclicality of savings banks is significantly more pronounced in regions where bank competition is low. This is plausible because the observed lending should be closer to the intended credit supply in regions in which bank competition is relatively low as the bargaining power of banks vis-à-vis their borrowers is relatively high in such areas. We also show that political influence, which affects to some extent the lending behavior of the savings banks, cannot explain the difference in the lending cyclicality between savings and cooperative banks. Finally, we rule out that the lower cyclicality of savings banks is associated with additional risk taking.

Overall, the evidence suggests that differences in business objectives of small local banks are the main driver of differences in their lending cyclicality. This conclusion has several important policy implications. First, policymakers can determine the cyclicality of local banking markets by deciding on the mix of banks that follow strict profit maximization and those that deviate from strict profit maximization to follow sustainability goals. This decision results in banking systems characterized by high risk-high return, low risk-low return, or intermediate solutions. Second, one possibility to promote local economic growth is to promote SME lending. This can be achieved with local banks that follow a public mandate or similar institutional arrangements such as government-sponsored or guaranteed lending, as done by the Small Business Administration in the U.S. Our findings suggest that the public mandate reaches the

goals envisaged by the banks' founders. Third, counter-cyclical regulations such as capital buffers or dynamic loan loss provisions are less necessary for banks that already exhibit a lower cyclicality because of their business objectives.

Our study contributes to research on the cyclicality of credit and research on government involvement in banks. First, recent research shows that public debt (corporate bonds) and private debt (bank loans) exhibit a different cyclicality. Becker and Ivashina (2014) examine the cyclicality of overall credit supply using data on new debt issuances of large, publicly listed U.S. firms. Firms switch from bank loans to bonds in times of tight lending standards, reduced aggregate lending, poor bank performance and monetary contraction. They show that this substitution effect from private debt to public debt has predictive power for funding provided by banks and corporate investments. Our paper focuses on an important component of the credit market that was excluded from their work, i.e., lending to SMEs.

Second, our work relates more generally to research on government involvement in banks. On the one hand, there is evidence from cross-country studies that compare the lending behavior of privately owned banks with that of government-owned or government-controlled banks (e.g., La Porta et al., 2002; Brei and Schlcarek, 2013; Bertay et al., 2014). These banks mainly lend to large international firms, the public sector, and the government. The main finding is that these large, central government-owned banks exhibit underperformance and inefficient credit allocation because of agency problems, political influence, fraud and corruption (e.g., La Porta et al., 2002; Sapienza, 2004; Dinç, 2005; Illueca et al., 2014; Carvalho, 2014). We note that virtually all studies in this field are based on data from relatively large, central or regional government-owned banks.

On the other hand, there are studies that document positive aspects of government involvement in banking in the context of economic development (e.g., Stiglitz, 1993; Burgess and Pande, 2005; Ostergaard et al., 2009). Government involvement in commercial or consumer banking aims at ensuring credit supply to SMEs, promoting homeownership through mortgage lending, or fighting poverty. The reason for government involvement is a market failure, i.e., capital markets and privately owned banks failed to offer certain financial services. Behr et al. (2013) show that the lending behavior of small local banks in Germany that follow a public mandate helps reducing financial constraints of SMEs. These banks neither underperform nor do they take more risks than other banks. Moreover, Hakenes et al. (2015) find that the performance of savings banks in Germany is positively related to local economic development. They document a beneficial effect of local banking on economic growth, while we document

a beneficial effect on the cyclicality of SME lending. Our result is consistent with their findings but our explanation is different. We show that the lower cyclicality of SME lending of savings banks is not due to a bank size effect but due to the public mandate of savings banks that defines their business objectives. Moreover, Shen et al. (2014) analyze banks from more than 100 countries during 1993-2007 and find that government-owned banks' performances are at par with that of private banks. Underperformance is only found if government-owned banks are required to purchase a distressed bank because of political factors. In addition, there is evidence that the outcomes of government involvement in banks depend on the legal and political institutions of the country (e.g., Körner and Schnabel, 2011; Bertay et al., 2014). Our study contributes to this literature by showing that the cyclicality of small local banks' SME lending differs and that this difference largely depends on their business objectives.

The remainder of this paper is organized as follows. In Section 2 we describe the institutional background. In Section 3 we describe the data and provide descriptive statistics. In Section 4 we explain our empirical strategy, report the main results, and summarize findings from robustness tests. In Section 5, we present tests that explore the channels through which small local banks with a public mandate achieve a lower cyclicality of SME lending than other banks. Section 6 concludes.

## 2 Institutional background

The German financial system provides an ideal setting to test whether the cyclicality of SME lending of public mandate banks differs from that of banks without a public mandate. The German economy is dominated by SMEs that account for about 96 of all firms (European Commission, 2006). These SMEs largely depend on bank financing, in particular provided by small local banks. The German banking system can be characterized as a typical universal banking system comprising three major pillars: the private credit banks, the credit cooperatives, and the banks with government involvement. Banks from these three pillars have different business objectives, governance, and organizational structures, but they all have to comply with the same regulatory and supervisory standards.

The sector of banks with government involvement consists of a large number of relatively small savings banks and a small number of large money center banks, known as "Landesbanks" (and excluded from our study).[2] According to official data from the

[2] Landesbanks serve as regional money center banks for savings banks in their region, as housebanks for regional governments, and are active in complex financial services and international banking. The recent

Deutsche Bundesbank approximately 27 percent of total bank assets in Germany are held by banks with government involvement in 2013 and 13 percent by savings banks. Savings banks account for 19 percent of lending to non-banks. Specific rules in the by-laws and regional banking laws constrain savings banks to operate locally and to focus the provision of basic financial services like deposit taking and lending. Savings banks were established and are controlled by the municipalities of the geographic area in which they operate (i.e., city or county council). They do not have any owners. The key characteristic of these banks is their public mandate that is stated in their by-laws. It stipulates to ensure non-discriminatory provision of financial services to all citizens and particularly to SMEs in the region, to strengthen competition in the banking business (even in rural areas), to promote savings, and to sponsor a broad range of social commitments (Deutscher Sparkassen- und Giroverband, 2014). Furthermore, the by-laws require the savings banks to operate only in the city or county they are headquartered in. It is noteworthy that these banks are not idiosyncratic to Germany. Banks with similar characteristics, governance and business objectives exist in many other countries, for example, Austria, France, Norway, Spain, and Switzerland.

The privately owned cooperative banking sector, which consists of a large number of small credit cooperatives, accounted for 9 percent of total bank assets and for 13 percent of total lending to non-banks by the end of 2013.[3] The size of this sector in the German banking system is, thus, comparable to that of the savings banks. The size and the business model of the credit cooperatives are similar to those of the savings banks. They are regionally oriented and focus almost entirely on lending to local SMEs. Credit cooperatives are thus comparable to the savings banks except that there is no government involvement and no public mandate for cooperative banks. Their private ownership implies that they follow strict profit maximization for their members. Similar to savings banks the credit cooperatives are not idiosyncratic to the German banking system but can be found in many countries around the world. For instance, the sister of the German credit cooperative in the U.S. is the credit union. What is special to the German banking system is the long-run historic coexistence of savings banks and credit cooperative, which creates an ideal setting to test our main hypothesis.

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history of the Landesbanks shows the conditions under which government involvement in the banking sector leads to underperformance and negative real effects (e.g., misallocation of credit, negative impact on real growth, political influence; e.g., La Porta et al., 2002). Because of their hybrid business model we do not consider these banks in our study.

[3] There are also head institutions in the cooperative banking sector. Like the Landesbanks, these cooperative head institutions are not included in our analysis.

# 3 Data

We base our analysis on yearly bank-level data on balance sheets and income statements of German savings and cooperative banks[4] from the period 1987–2007.[5] The raw dataset is an unbalanced panel. To be able to analyze bank behavior over the business cycle, we consider only banks with least five consecutive bank-year observations. In case of a merger or an acquisition, the observation for the respective year in which the event occurs is excluded from the data. The final sample comprises 461 savings and 330 cooperative banks, resulting in 12,698 bank-year observations from 791 banks. This sample covers 85% of the assets held by German savings banks and 63% of the assets held by German cooperative banks by the end of 2013. Table 1 reports summary statistics, calculated from average values over the time series for each bank. We report the mean and standard deviation separately for savings and cooperatives banks as well as the difference in means and a t-test for significance of these differences.

Insert Table 1 here

Our dependent variable is the growth in lending to SMEs, defined as the percentage change of total loans to SMEs: $SME\_LG_{i,t} = \frac{total\ SME\ loans\ (t) - total\ SME\ laons\ (t-1)}{total\ SME\ loans\ (t-1)}$. This variable is computed using bank- and year-specific total lending and the sector-wide and year-specific fraction of loans to SMEs. Lending to banks is excluded because this is a separate business activity with a fundamentally different risk-return structure. We de-trend the growth rates to adjust them for inflation and to make them comparable to our business cycle indicators which represent real numbers. We further winsorize SME loan growth at the 0.5% and 99.5%-percentile.[6] On average, SME_LG for savings banks is significantly higher for savings banks (1.29%) than for cooperative banks (0.49%). We further see that savings banks are on average significantly larger than cooperative banks, as indicated by total assets (*TOTASSET*) and total customers loans (*CUSTLOAN*). The relative interest income ($RII_{i,t} = \frac{interest\ income\ from\ loans\ (t)}{average\ total\ loans\ (t-1,t)}$) is an indirect measure of the average loan interest rate and not significantly different between savings banks (6.89%) and cooperative banks (6.84%). The relative net interest result

[4] Investment advisory firms, building societies, branches of foreign banks, and other specialized banks (also Landesbanks and head institutions of cooperatives) are excluded as well as atypical banks with a ratio of total customer loans over total assets below 25%.

[5] Our sample period ends before the start of the financial crisis of 2007-2009 because during these years extraordinary events in the financial system confounded the usual link between loan growth and GDP growth, making it impossible to study cyclicality of bank lending during this time period.

[6] This transformation does not influence the results presented below.

($RNIR_{i,t}$) is similarly defined except that in the numerator interest expenses as the bank's refinancing costs and loan loss provisions in the respective year are subtracted. This bank profitability measure is significantly higher for cooperative (1.50%) than for savings banks (0.74%). Furthermore, the equity-to-total assets ratio ($ETA_{i,t}$) - a key measure of bank solvency - is on average 4.40% for savings banks and 5.12% for cooperative banks. The liquid assets ratio ($LIQTA_{i,t}$) is slightly smaller in savings banks (2.53%) than in cooperative banks (2.68%). Additionally, we control for the maturity structure of a bank's loan portfolio by defining the long term loan ratio ($LTLR_{i,t} = \frac{customer\ loans\ with\ maturity>5\ years}{total\ customer\ loans}$), which is significantly higher for savings banks (69.3%) than for cooperative banks (59.3%). The interbank loan ratio ($IBLR_{i,t} = \frac{interbank\ loans}{total\ lending}$) indicates that cooperative banks (17.2%) are on average more active in interbank lending than savings banks (13.3%). It can be seen that cooperative banks rely significantly more on deposit funding during the sample period. The statistically significant differences of these variables between savings and cooperative banks indicate that they should be included in the regression analyses because they might (at least partially) explain the variation in SME loan growth rates.

Finally, we use the real GDP growth rate in Germany as standard indicator of the business cycle. Our results are similar when we use alternative indicators of the business cycle. The GDP growth rate is computed using macroeconomic data from OECD statistics. Its development over the period 1987-2007 is displayed in Figure 1. As can be seen our sample period covers two economic booms (1988-1990 and 1997-2000) and two recessions (1992-1993 and 2001-2003).

Insert Figure 1 here

# 4 Empirical analysis

## 4.1 Model specification

We estimate the following regression model with data on bank i in year t:

$$SME\_LG_{i,t} = \alpha + \beta_1 \Delta GDP_t + \beta_2 (SAV_i * \Delta GDP_t) + \beta_3 SAV_i + \beta_4 SME\_LG_{i,t-1} + \beta_5 SME\_LG_{i,t-2} + \delta X_{t-1} + \gamma_{c,t} + \varepsilon_{i,t}.$$

The bank-year-specific growth rate of lending to SMEs ($SME\_LG_{i,t}$) is regressed on the year-specific German real GDP growth rate ($\Delta GDP_t$). In order to distinguish the differential impact of macroeconomic fluctuations on loan growth between savings banks and cooperative banks, we interact an indicator variable that takes on the value of one in case of a savings bank with the real GDP growth rate ($SAV_i * \Delta GDP_t$). As argued

above, our hypothesis does not imply that the savings banks do not display any cyclical behavior but only that savings banks are less cyclical than cooperative banks. Hence, we expect a positive coefficient $\beta_1$ and a negative coefficient $\beta_2$ for the interaction term.

We note that bank-specific SME loan growth rates exhibit second-order autocorrelation, for which we control by including the SME loan growth rates of the two preceding years ($SME\_LG_{i,t-1}$ and $SME\_LG_{i,t-2}$). From an econometric perspective, the estimation of coefficients for lagged dependent variables with panel data suffers from the dynamic panel bias (Nickell, 1981). Therefore, we apply the dynamic one-step System GMM dynamic panel estimator of Blundell and Bond (1998) with Windmeijer's (2005) finite sample correction, where bank-specific fixed effects are purged by the forward orthogonal deviations transformation of GMM–type instruments.

We add a vector of bank-specific control variables ($X_{t-1}$) that correspond to the ones reported in Table 1. Due to the potentially significant correlation between these variables some model specifications include only a subset of them. Further, in some specifications we include year fixed effects ($\gamma_t$) or interacted year*region fixed effects ($\gamma_{c,t}$), where the regions are the federal states in which the banks are located. The inclusion of interacted year*region fixed effects controls for region- and time-specific demand side shocks that might hit savings and cooperative banks differently and therefore explain their different SME loan growth independent of the growth of the real GDP.

## 4.2 Baseline results

Table 2 presents the baseline results. In column 1 we report results for the specification without any control variables except the lagged SME real loan growth rates. The interaction term $SAV_i * \Delta GDP_t$ is negative and statistically significant at the 1%-level. This finding shows that savings banks display a significantly lower cyclicality in SME lending than cooperative banks, which is in line with our hypothesis. The result also shows that, while the savings banks seem to be less cyclical than the cooperative banks, they still engage to some extent in cyclical lending behavior because the total effect of $\Delta GDP_t$ and $SAV_i * \Delta GDP_t$ is positive (0.487 - 0.316 = 0.171). This is, again, in line with our expectation.

Insert Table 2 here

In column 2 we add variables to control for observed heterogeneity between savings banks and cooperative banks. The main result does not change. In column 3 we add year fixed effects to control for time trends that may affect credit supply. Again, the main

result is confirmed. In column 4 we report the results of a model specification with a full set of year*region fixed effects and two additional control variables. The year*region fixed effects control for any region-specific demand-side shocks in any given year that might affect SME loan growth of savings banks and cooperative banks differently and therefore explain our findings. Adding these fixed effects makes it possible for us to interpret the differences in cyclicality as credit supply-side driven rather than credit demand-side driven (e.g., stemming from differences in the borrowers of the banks). Again, we find a significantly positive coefficient for $\Delta GDP_t$ and a significantly negative coefficient for $SAV_i * \Delta GDP_t$, implying that the credit supply of savings banks is approximately 25 percent less sensitive to GDP growth than that of cooperative banks ($\beta_2 = -0.256$). In all subsequent analyses we consider the specification in column 4 as our baseline model.

The estimates presented in column 5 are based on the same explanatory variables as in column 4, but they are estimated using an ordinary least-squares estimator with bank-level fixed effects instead of the System GMM dynamic panel estimator applied in columns 1-4. The coefficients show that all previous results are confirmed.

In column 6 we re-estimate the specification from column 4 on a propensity score-matched sample (PSM) of savings and cooperative banks. The matching is based on the bank variables displayed in Table 1. We use Kernel matching to create the two samples. The PSM procedure should alleviate concerns that, despite controlling for observable differences in key bank variables, the comparability of the two bank types is limited because of unobserved differences in the two samples.[7] Again, we find a significant difference in the cyclicality of SME lending of the savings banks and cooperative banks.[8] Both bank types display a cyclical lending behavior, but the savings banks are significantly less cyclical than the cooperative banks. These results are consistent with the conjecture that the deviation from strict profit maximization reduces the extent to which banks exhibit cyclical lending behavior.

[7] We acknowledge that the matching procedure is based on observable characteristics only and the two samples might still differ along unobservable characteristics that we are not able to control for in the regressions. To the extent that such characteristics are correlated with the real GDP growth, they might affect our results.

[8] In additional analyses we compare savings banks and cooperative banks with privately owned commercial banks in Germany, respectively. Commercial banks exhibit significantly higher cyclicality than the two other types of banks. However, considering that the commercial banks are not comparable to savings banks and cooperative banks in terms of size and business model we do not report the results here. The results are available from the authors on request.

## 4.3 Further evidence and robustness tests

One could argue that the indicator for the business cycle - GDP growth - does not fully reflect the state of the economy. Moreover, it is possible that the lower cyclicality of savings banks is stage-dependent and potentially asymmetric. It could be that the average result is driven by a particular lending behavior in one stage of the business cycle, i.e., smaller increase of lending in a boom or smaller decrease of lending in a recession. We address these concerns in two steps.

First, we repeat our analysis with alternative indicators for the business cycle. As mentioned before, we use in all subsequent analyses - whenever econometrically possible - the specification from column 4 in Table 2.

Insert Table 3 here

In column 1 of Table 3 we use the IFO business climate index as alternative to GDP growth. This is a widely used survey-based index that indicates the state of the German economy. The IFO index tends to a leading indicator of the actual GDP growth. Most importantly, we find that the coefficient of the interaction term $SAV_i$*IFO is significantly negative, which is consistent with our baseline results. In column 2 we use the regional real GDP growth rate rather than the country-wide real GDP growth rate. Again, we obtain the same findings: the coefficient of the real regional GDP growth rate is positive and the coefficient of the interaction with the savings banks dummy is negative and significant. In column 3 we use the growth rate of real investments and confirm our main result. In column 4 we use data from the Bank Lending Survey conducted by the European Central Bank.[9] In this specification we can directly rule out credit demand-side explanations for the differences in cyclicality across banks because the survey only gauges the credit supply side. Again, we find that SME lending of savings banks exhibits a significantly lower cyclicality than that of cooperative banks. While the economic magnitudes of the effects are not directly comparable to the baseline result, we find that the composite effect is still positive in all four specifications, indicating again that both bank types engage in cyclical lending behavior, but the savings banks do so to a lesser degree. These results confirm that our main finding remains robust when we use alternative indicators of the business cycle.

[9] The Bank Lending Survey from the ECB contains 17 specific questions on past and expected credit market developments. It is addressed to senior loan officers of a representative sample of euro area banks and is conducted on a quarterly basis. We use the survey results for Germany for our analysis. More details about the survey can be found here: https://www.ecb.europa.eu/stats/money/surveys/lend/html/index.en.html.

Second, we replace GDP growth by two indicator variables that take on the value of one in periods with HIGH or LOW GDP growth, respectively, and zero otherwise. We use Germany's mean real GDP growth during the sample period as one split criterion to identify periods with relatively high or low growth and GDP growth = 0% as another split criterion to identify periods with absolute growth or decline. This analysis makes is possible to examine whether the reduced cyclicality in SME lending is symmetric through the cycle or asymmetric, i.e., only present in certain phases. Table 4 presents the results.

Insert Table 4 here

In column 1 of Table 4 we use the mean real GDP growth rate as split criterion for HIGH and LOW periods. We find that the growth of SME lending of savings banks is significantly lower than that of cooperative banks during booms (coefficient of SAV*ΔGDP_HIGH = -0.389). We further find that the coefficient of SAV*ΔGDP_LOW is positive but not statistically significant. In column 2 of Table 4 we use the 0% as split criterion and find a strong and symmetric effect through the business cycle: SME lending of savings banks grows at a lower rate than that of cooperative banks in periods with positive GDP growth and, interestingly, it grows even during periods with negative GDP growth. The latter finding suggests that savings banks are not only less cyclical but counter-cyclical during negative GDP growth periods. Such behavior is sustainable because it is symmetric through the business cycle, leading to an inter-temporal smoothing of credit supply.

# 5 Channels

## 5.1 Bank size, loan maturity, funding structure and liquidity

We examine whether the different cyclicality of savings banks and credit cooperatives is due to differences in bank size, loan maturity structure, funding structure and liquidity. First, one could argue that the SME lending of smaller banks is less cyclical because the latter are more closely tied to the local economy, which might be less volatile over time than the country-wide economy. However, our main result (i.e., savings banks are on average significantly less cyclical than cooperative banks) in combination with the fact that the average savings bank is almost twice as big as the average cooperative bank speaks against this reasoning. We nevertheless carry out a formal test of a potential size effect. Note that we normalized all bank variables by total assets in the previous analysis but this procedure does not allow us to directly detect a size effect. To do so, we create size terciles using average total assets of the savings banks (*AVGSIZE*). We interact these size terciles with the $SAV_i*\Delta GDP_t$ variable. The resulting triple

interaction term informs us whether the lower cyclicality of savings banks is driven by savings banks in a particular size tercile.[10] The comparison group in this regression is the average sized cooperative bank. We conduct the same analysis for banks' average long term loan ratio (*AVGLTLR*) to examine whether maturity structure matters and banks' share of deposit funding (*AVGRELDEP*) as potential channels through which lower cyclicality can be achieved. We also investigate whether bank liquidity (*AVGLIQTA*) is a potential channel. Table 5 presents the results.

Insert Table 5 here

In column 1 of Table 5, the coefficient of the interaction term $SAV_i*\Delta GDP_t$ is significantly negative, confirming our baseline result for the savings banks from Tercile 1. The coefficient of the triple interaction term with Tercile 2 is positive, but not statistically significant, but the one for Tercile 3 is significantly positive. This finding indicates that the average effect is also present at mid-sized savings banks, and to a smaller extent at larger savings banks.

In column 2 of Table 5 we study whether loan maturity might be a channel through which savings banks achieve lower cyclicality. We differentiate by savings banks' average long term loan ratio (*AVGLTLR*) and find that the lower cyclicality of savings banks cannot be explained with the maturity structure of bank lending. The coefficients of the triple interaction terms (with Tercile 2 and 3) are not statistically significant, but their difference is (p-value of 0.004). This result indicates that the lower cyclicality is not due to a higher fraction of long-term lending of savings banks compared to cooperative banks. Instead, there are differences in the loan maturity structure within the savings banks sector.

In column 3 of Table 5 we investigate whether the bank funding structure, in particular banks' reliance on deposit funding - compared to capital market funding - is a channel to achieve lower cyclicality in lending. We differentiate by savings banks' share of deposit funding relative to overall funding. Similar to the test for bank size effects (column 1) we find that the coefficient of the triple interaction term is positive and not statistically significant for Tercile 2, but it is significantly positive for Tercile 3 (banks with the highest share of deposit funding). The difference between both triple interaction terms is weakly statistically significant (p-value of 0.087). The cyclicality of the latter savings banks is similar to that of the average credit cooperatives. This finding is plausible because on average cooperative banks exhibit a higher deposit funding ratio than savings banks (see Table 1).

[10] Instead of using a continuous interaction variable, we apply a discrete classification into terciles to control for non-linear interaction effects.

In column 4 of Table 5 we investigate whether bank liquidity affects the cyclicality of SME lending. A higher liquidity might make it possible for savings banks to better follow their public mandate. We measure bank liquidity with the liquidity ratio (*AVGLIQTA*), following Puri et al. (2011, p. 569). We find a very strong and significant coefficient for savings banks in Tercile 3 (-0.449; highest liquidity ratio), while the baseline effect (-0.043) and the interaction term with Tercile 2 (-0.201) display the expected negative sign but are not statistically significant. This result provides an important additional insight: Our baseline result becomes much stronger for savings banks that have sufficient liquidity to be able to lower the cyclicality of their credit supply to SMEs.

In sum, we find that our main result is most pronounced at savings banks with highest liquidity ratios. Furthermore, we find some evidence that the lower cyclicality of SME lending of savings banks is not present when they are large and heavily reliant on deposit funding. We also show that the lower cyclicality is unrelated to the maturity structure of bank lending.

## 5.2 Credit supply and bank competition

We now provide a more direct examination of the question whether the lower cyclicality of savings banks is a credit supply-side effect or a credit demand-side effect. A credit demand-side effect could come from differences in the borrower structure of savings banks and cooperative banks. If savings banks lend to local borrowers that exhibit a less cyclical demand for credit than those of cooperative banks, then our findings might not be driven by the public mandate of savings banks but rather a selection effect in borrower clienteles. However, the main hypothesis of this paper is that the *credit supply* to SMEs of savings banks is less cyclical because of their goal to provide sustainable credit to the local economy and their deviation from strict profit maximization (as expressed by the "public mandate" in their by-laws).

The previous results already indicate that the difference in lending cyclicality between savings and cooperative banks is a supply-side effect. First, when we include region*year fixed effects to control for time-varying regional demand for credit this did not affect our findings. Second, when we use the credit demand-related indicator for Germany from the European Central Bank's bank lending survey instead of GDP growth (column 4 of Table 3) we obtain the same result.

We now provide an additional test that helps rule out that differences in credit demand drive our findings. In this test, we take advantage of the cross-sectional and inter-temporal variation in bank competition to identify whether the lower cyclicality of

savings banks is credit supply-side or credit demand-side driven. We split our sample in observations with high and low bank competition. We argue that the observed credit is more closely related to the credit supply function rather than the credit demand function when the bargaining power of local banks vis-à-vis its local borrowers is high. Bank bargaining power is high when local bank competition is low because borrowers have fewer alternatives to obtain credit (e.g., Petersen and Rajan, 1995). If the lower cyclicality of savings banks is a credit supply-side effect, then we should observe that this effect is stronger (i.e., savings banks are even less cyclical) when bank competition is low. To test this prediction, we augment our baseline model (column 4 of Table 2) by adding the triple interaction term $SAV_i$*$logHHI$*$\Delta GDP_t$ (or: $SAV_i$*$COMP3$*$\Delta GDP_t$; $SAV_i$*$COMP5$*$\Delta GDP_t$), in which we use the Herfindahl-Hirschmann Index (HHI) or concentration ratios C3 and C5 as measures of regional bank competition.[11] Recall that higher values of the HHI and the concentration ratios indicate lower bank competition. Based on the above reasoning we expect to find a significantly negative coefficient of this triple interaction term if the lower cyclicality of savings banks is a deliberately chosen supply side effect and not due to differences in credit demand. Table 6 reports the results.

Insert Table 6 here

In column 1 of Table 6 we find a negative and highly significant coefficient of the triple interaction term $SAV_i$*$logHHI$*$\Delta GDP_t$ (-0.325). We obtain similar results for the triple interaction terms with the concentration rates C3 and C5 in columns 2 and 3 of Table 6. These results indicate that savings banks are even less cyclical in their SME lending than cooperative banks when bank competition is low. This finding together with the evidence presented above suggests that our main result is related to the credit supply function of savings banks, which is ultimately defined by the public mandate in their by-laws, and not driven by differences in credit demand affecting savings and cooperative banks differently.

## 5.3 Political influence

We investigate the role of political influence on the cyclicality of savings banks in more detail. One could argue that because of their prominent role in the supervision of savings banks' activities, local politicians use the savings banks to expand lending in election periods to increase the likelihood of becoming re-elected and that this is the fundamental driver of the differences in lending cyclicality between savings banks and credit cooperatives. Political influence on lending behavior of public banks has been

[11] For this test, the regions correspond to the federal states in Germany.

widely documented in the literature (e.g., La Porta et al., 2002; Sapienza, 2004; Dinç, 2005; Carvalho, 2014). As described earlier, most of these studies focus on large public banks that are owned or controlled by central governments.

In our setting, it is unlikely that political influence plays a role in explaining our main result. If political influence affects the lending behavior of savings banks, we should expect to see an expansion of the lending volume in election years, for instance, to please voters. Such politically motivated expansion of bank lending should be asymmetric: it should take place in recessions but not in booms.

We can rule out this explanation because of three reasons. First, political influence does not explain why the savings banks increase their lending volume *less* than the private cooperative banks *in booms*. Second, municipal elections take place every four to five years in Germany, but they are not scheduled simultaneously. There is no systematic correlation between the occurrence of election years and the state of the economy. Hence, political influence cannot explain why savings banks are less cyclical on average. Third, the analysis reported in Table 4 shows that the lower cyclicality is due to a symmetric (and not an asymmetric) lending behavior of savings banks: they expand credit less in booms and they contract credit less in recessions.

In the remainder we provide a direct test whether and how the differences in the lending cyclicality of savings banks and cooperative banks can be explained with political influence on savings banks. We collect information about the years in which municipal elections take place during our sample period.[12] We create a dummy variable *ELECTION* that equals one if a municipal election takes place in the county in which the respective bank is located in that year. We interact this dummy variable with the savings banks dummy and GDP growth (*SAV**Δ*GDP***ELECTION*) and add all other necessary terms to the baseline regression model as additional controls. The results are reported in Table 7.

Insert Table 7 here

Most importantly, in column 1 of Table 7 we find a positive and significant coefficient for Δ*GDP* and a significantly negative coefficient for *SAV**Δ*GDP*, confirming our baseline result that savings banks are less cyclical than the cooperative banks. We also obtain a significantly negative coefficient for *SAV**Δ*GDP***ELECTION*. Most important, this triple interaction effect does not reduce the baseline effect of *SAV**Δ*GDP* but it rather comes on top of it. In column 2 of Table 7 we exclude election

[12] Elections on the level of the municipality take place at the same time in all municipalities in a given federal state in a given year in Germany. However, these elections do not take place at the same time across different federal states.

years from our sample and test whether our baseline results persist. We find that this is the case: the coefficient of *SAV**Δ*GDP* is significantly negative and has the same order of magnitude as in Table 2.

Overall, these tests suggest that despite some political influence on the lending behavior of savings banks, the cyclicality of savings banks' SME lending is still significantly lower than the one of privately owned cooperative banks.

## 5.4 Risk taking

Finally, we examine whether the lower cyclicality of savings banks is related to risk taking. The results reported in Table 4 suggest that the lower cyclicality of savings banks is *symmetric*, i.e., they exhibit a higher loan growth than cooperative banks in recessions and lower loan growth in booms. These results may imply that there is no risk taking effect because the lending behavior is symmetric over the stages of the business cycle. If we assume that ex ante borrower risk is higher in booms (because of the pooling of high and low risk borrowers) than in recessions (because of the separation of high and low risk borrowers), then the lower (higher) participation of savings banks in booms (recessions) ensures that their lending does not come with additional risks. However, it is possible that the higher loan growth of savings banks in recessions implies that these banks lend relatively more to riskier borrowers. It is an empirical question whether this higher risk taking in recessions outweighs the lower risk taking because of lower loan growth in booms.

We now provide a more direct examination of the potential link between cyclicality and risk taking. For this purpose, we collect yearly bank-level information on write-offs and loan loss provisions and create the indicator variable HIGHRISK that equals one if the write-offs and loan loss provisions relative to total assets exceed a certain threshold, and zero otherwise. The yearly information on the bank-level allows us to explore the cross-sectional as well as the time series dimension in the variation of write-offs and loan loss provisions. In Model 1 (Model 2) we set this threshold to the median (75%-quantile) of the *year-specific* write-offs and loan loss provisions relative to total assets. This classification allows banks to switch between the high risk and low risk category. In Model 3, we set the threshold to the 75%-quantile of the *average* write-offs and loan loss provisions relative to total assets.[13] Under this classification we assume that banks risk taking behavior is time-invariant. We include bank controls as before. We then study whether the lower cyclicality is mainly present at banks that lend to riskier borrowers by adding a full set of interaction terms of the variables *SAV*, *HIGHRISK* and

[13] We obtain similar results if we use higher quantiles instead of the 75%-quantile.

$\Delta GDP_t$ to our baseline regression model from Table 2. If the lower cyclicality comes with additional risk taking we should find a significantly negative coefficient of the triple interaction term *SAV*HIGHRISK**$\Delta GDP$. Table 8 reports the results.

Insert Table 8 here

The evidence speaks against the risk taking hypothesis. The coefficient of *SAV*HIGHRISK**$\Delta GDP$ is significantly positive in Model 1 and 2. This means that the loan growth of high risk savings banks exhibits a higher sensitivity to $\Delta GDP$ than the one of low risk savings banks. This finding implies that the former are more cyclical than the latter, which is the opposite of our prediction under the risk taking hypothesis. In Model 3, we apply the time-invariant risk classification of banks and find that the coefficient of *SAV*HIGHRISK**$\Delta GDP$ is not statistically significant. There is no link between the cyclicality of savings banks' SME lending and their risk taking. Finally, we confirm our main result in all three models because we find a significantly negative coefficient of *SAV**$\Delta GDP$. Overall, we can rule out that the lower cyclicality of savings banks' SME lending comes with an additional risk taking.

# 6 Conclusion

Bank lending has become more cyclical than ever in the past twenty years. In the aftermath of the global financial crisis policymakers and regulators have undertaken various efforts to lower the cyclicality of bank lending because of its alleged detrimental effects on financial stability and the real economy. We examine whether the cyclicality of SME lending depends on government involvement in local banks, controlling for location, size, loan maturity structure, funding structure, liquidity, profitability, and credit demand-side factors. Comparing local savings banks that follow a public mandate and local cooperative banks without such a mandate in Germany provides an ideal setting to test whether government involvement affects the lending cyclicality because SMEs are credit-constrained and bank-dependent.

Our main result is that SME lending of banks that follow a public mandate is on average 25 percent less cyclical than that of other banks from the same location. Various robustness tests confirm this finding. We also provide several pieces of evidence that the effect we identify is a supply-side effect and cannot be explained by differences in credit demand vis-à-vis different types of banks. We finally rule out that the lower cyclicality comes with an additional risk taking.

The lower cyclicality of SME lending of small local banks that follow a public mandate can be explained as follows. First, they do not pursue strict profit maximization

but pursue goals related to the sustainable provision of financial services to the local economy. Second, savings banks with high liquidity exhibit the lowest cyclicality of SME lending. Third, the lower cyclicality can be achieved through time-varying differences in bank lending standards. Banks with government involvement approve relatively more loan applications in recessions, but they reject relatively more applications in booms. We cannot test the latter with our bank level data but we view this as an avenue for future research.

Our study highlights an important link between local banking structure and SME lending and has several policy implications. First, policymakers can determine the cyclicality of the banking system (or local banking markets) by influencing the mix of banks that follow strict profit maximization and those that deviate from strict profit maximization to pursue sustainability goals. Second, one possibility to promote local economic growth is to promote SME lending. This can be achieved through local savings banks or similar institutional arrangements such as government-sponsored or guaranteed lending. Third, counter-cyclical regulations such as capital buffers or dynamic loan loss provisions are less necessary and less effective for banks that already exhibit a lower cyclicality because of their business objectives.

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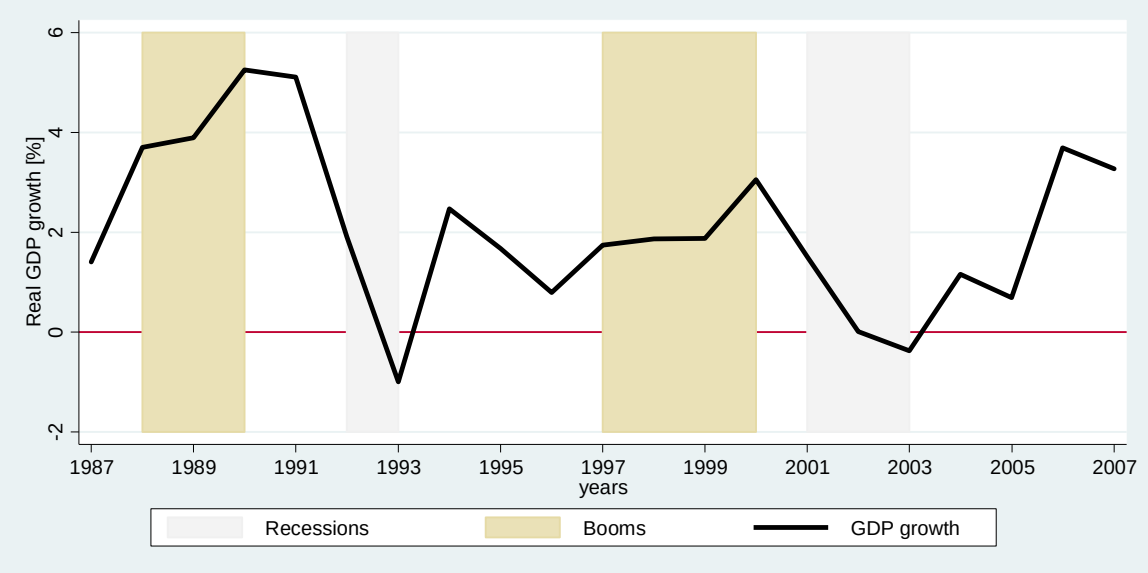
## Figure 1: Real GDP growth during 1987-2007

The figure displays the time series of real GDP growth of Germany. The grey-shaded areas indicate the two major recession periods (1992-1993 and 2001-2003), the brown-shaded areas the two boom periods (1988-1990 and 1997-2000).



## Table 1: Summary statistics

This table reports the mean and standard deviation of key variables for savings banks and cooperative banks in Germany. All statistics are based on the average values per bank over time. ΔSME_LG is de-trended and winsorized at the 0.5% and 99.5%-percentile. The sample period is 1987-2007.

| Variable description | Variable | Savings banks | | Cooperative banks | | Difference | |
|---|---|---|---|---|---|---|---|
| | | Mean | St.Dev. | Mean | St.Dev. | Mean | *t*-stat. |
| SME loan growth (%) | *SME_LG* | 1.30 | 1.84 | 0.49 | 3.22 | -0.80*** | -4.43 |
| Total assets (billion EUR) | *TOTASSET* | 1.85 | 2.03 | 0.99 | 2.79 | -0.86*** | -5.05 |
| Total customer loans (billion EUR) | *CUSTLOAN* | 1.11 | 1.29 | 0.63 | 2.00 | -0.48*** | -4.10 |
| Relative interest income (%) | *RII* | 6.89 | 0.58 | 6.84 | 0.66 | -0.05 | -1.23 |
| Relative net interest result (%) | *RNIR* | 0.74 | 0.86 | 1.50 | 0.91 | 0.76*** | 12.01 |
| Equity to assets ratio (%) | *ETA* | 4.40 | 0.75 | 5.12 | 1.11 | 0.72*** | 10.89 |
| Liquid assets ratio (%) | *LIQTA* | 2.53 | 0.51 | 2.68 | 0.69 | 0.15*** | 3.54 |
| Long term loan ratio (%) | *LTLR* | 69.29 | 4.80 | 59.34 | 10.77 | -9.95*** | -17.55 |
| Interbank loan ratio (%) | *IBLR* | 13.32 | 6.57 | 17.24 | 6.68 | 3.92*** | 8.21 |
| Deposit funding ratio (%) | *DEPR* | 69.82 | 7.24 | 74.64 | 8.33 | 4.82*** | 8.68 |
| Number of bank-year observations | | 7,629 | | 5,069 | | | |
| Number of banks | | 461 | | 330 | | | |

## Table 2: Differences in the cyclicality of SME lending of small local banks

The dependent variable is the real growth rate of loans to SMEs ($\Delta LG\_SME_{i;t}$). Models (1)-(4) are estimated using the one-step *System GMM* estimator introduced by Blundell and Bond (1998), where bank-specific fixed effects are purged by the forward orthogonal deviations transform of *GMM*–type instruments. These instruments are created for our main regressors $LG_{i;t-2}$, $\Delta GDP_{t-1}$ and ($\Delta GDP_t * SAV_i$), and in order to bring the number of instruments in line with our finite sample size, the number of lags used is limited accordingly. Furthermore, we create a collapsed set of *GMM*–type instruments for the control variables $RII_{i;t-1}$, $ETA_{i;t-1}$, $RNIR_{i,t-1}$, $LIQTA_{i,t-1}$, $LTLR_{i,t-1}$, $IBLR_{i,t-1}$ and $DEPR_{i;t-1}$. Year, region and bank type dummies are included in the regressions as *IV*–type instruments. Region fixed effects are on the level of federal states. Model (5) is a least-squares estimate with bank-level fixed effects. Additionally, in the least-squares-estimate of Model (6), observations are weighted by their frequency in a propensity score-matched sample (PSM). We report robust standard errors using Windmeijer's (2005) finite sample correction in parentheses below coefficients. Significance levels *: 10% **: 5% ***: 1%.

| Model | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Sample | 1987-2007 | 1987-2007 | 1987-2007 | 1987-2007 | 1987-2007 | PSM |
| Estimator | Sys. GMM | Sys. GMM | Sys. GMM | Sys. GMM | Least Squares Fixed Effects | Weighted Least Squares |
| $\Delta GDP_t$ | 0.487*** | 0.434*** | 0.320* | 1.027*** | 0.689*** | 0.681*** |
| | (0.056) | (0.056) | (0.172) | (0.119) | (0.110) | (0.108) |
| $SAV_i * \Delta GDP_t$ | -0.316*** | -0.317*** | -0.351*** | -0.256*** | -0.410*** | -0.246*** |
| | (0.063) | (0.063) | (0.061) | (0.071) | (0.063) | (0.047) |
| $LG\_SME_{i,t-1}$ | 0.574*** | 0.576*** | 0.428*** | 0.371*** | 0.250*** | 0.299*** |
| | (0.021) | (0.022) | (0.035) | (0.044) | (0.035) | (0.010) |
| $LG\_SME_{i,t-2}$ | 0.132*** | 0.148*** | 0.150*** | 0.168*** | 0.035*** | 0.018* |
| | (0.019) | (0.020) | (0.026) | (0.031) | (0.011) | (0.010) |
| $SAV_i$ | 0.619*** | 1.519*** | 0.712*** | 0.951*** | | |
| | (0.145) | (0.172) | (0.167) | (0.304) | | |
| $RII_{i,t-1}$ | | 0.074 | 0.257 | 0.500* | 0.084 | 0.426*** |
| | | (0.056) | (0.254) | (0.277) | (0.174) | (0.143) |
| $RNIR_{i,t-1}$ | | | | 0.371*** | 0.356*** | 0.076 |
| | | | | (0.139) | (0.090) | (0.054) |
| $ETA_{i,t-1}$ | | 0.406*** | -0.212** | -0.598*** | -0.196* | -0.225*** |
| | | (0.098) | (0.087) | (0.146) | (0.104) | (0.083) |
| $LIQTA_{i,t-1}$ | | 0.258*** | 0.081 | 0.187* | 0.141** | 0.130*** |
| | | (0.065) | (0.070) | (0.099) | (0.070) | (0.050) |
| $LTLR_{i,t-1}$ | | | | 0.033*** | 0.014* | 0.016*** |
| | | | | (0.011) | (0.007) | (0.006) |
| $IBLR_{i,t-1}$ | | 0.074*** | 0.015 | 0.015 | 0.052*** | 0.062*** |
| | | (0.009) | (0.011) | (0.016) | (0.011) | (0.008) |
| $DEPR_{i,t-1}$ | | 0.046*** | -0.006 | 0.031 | 0.069*** | 0.026*** |
| | | (0.014) | (0.014) | (0.027) | (0.013) | (0.010) |
| Intercept | -0.710*** | -8.663*** | 1.583 | -7.839 | -5.097** | -4.826*** |
| | (0.132) | (1.030) | (2.091) | (3.689) | (2.164) | (1.430) |
| Year fixed effects | no | no | yes | no | no | no |
| Year-region fixed effects | no | no | no | yes | yes | yes |
| Number of observations | 9743 | 9740 | 9740 | 8376 | 8376 | 9975 |
| Number of banks | 791 | 791 | 791 | 786 | 786 | 527 |
| Test for AR(1): Pr > $z$ | 0.000 | 0.000 | 0.000 | 0.000 | | – |
| Test for AR(2): Pr > $z$ | 0.974 | 0.556 | 0.422 | 0.107 | | – |
| Hansen test: Pr > $\chi^2$ | 0.123 | 0.117 | 0.495 | 0.572 | | – |
| Number of instruments | 728 | 728 | 749 | 782 | | – |
| Wald test for $\beta_1 + \beta_2 = 0$: Pr > $F$ | 0.000 | 0.000 | 0.432 | 0.275 | 0.013 | 0.000 |

## Table 3: Alternative indicators of the business cycle

The dependent variable is the real growth rate of loans to SMEs ($\Delta LG\_SME_{i;t}$). All models have been estimated for the full sample (1987-2007) using the one-step *System GMM* estimator introduced by Blundell and Bond (1998) as in model (4) of Table 2. *GMM*-style instruments are created for our main regressors $LG_{i;t-2}$, $MACRO_{t-1}$ and ($MACRO_t * SAV_i$). As macro variable serves the first lag of the IFO business climate index ($IFO_{t-1}$), the real regional GDP growth rate ($\Delta RegGDP_t$), real investment growth ($\Delta INVEST_t$), and the loan demand by SMEs as measured by European Bank Lending Survey data ($BLS\_SME_t$). We report robust standard errors using Windmeijer's (2005) finite sample correction in parentheses below coefficients. Significance levels *: 10% **: 5% ***: 1%.

| Model | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| $IFO_{t-1}$ | 0.077 | | | |
| | (0.057) | | | |
| $SAV_i * IFO_{t-1}$ | -0.048*** | | | |
| | (0.017) | | | |
| $\Delta RegGDP_t$ | | 0.106 | | |
| | | (0.073) | | |
| $SAV_i * \Delta RegGDP_t$ | | -0.152*** | | |
| | | (0.059) | | |
| $\Delta INVEST_t$ | | | 0.283*** | |
| | | | (0.038) | |
| $SAV_i * \Delta INVEST_t$ | | | -0.133*** | |
| | | | (0.030) | |
| $BLS\_SME_t$ | | | | 3.825*** |
| | | | | (1.060) |
| $SAV_i * BLS\_SME_t$ | | | | -2.337** |
| | | | | (0.949) |
| $LG\_SME_{i,t-1}$ | 0.431*** | 0.430*** | 0.376*** | 0.300*** |
| | (0.040) | (0.039) | (0.043) | (0.054) |
| $LG\_SME_{i,t-2}$ | 0.148*** | 0.141*** | 0.180*** | 0.165*** |
| | (0.029) | (0.030) | (0.032) | (0.051) |
| $SAV_i$ | 5.067*** | 1.019*** | 0.761*** | 7.827*** |
| | (1.728) | (0.284) | (0.269) | (2.869) |
| Bank controls and fixed effects | yes | yes | yes | yes |
| Number of observations | 8735 | 7386 | 8376 | 2365 |
| Number of banks | 787 | 784 | 786 | 665 |
| Test for AR(1): Pr > *z* | 0.000 | 0.000 | 0.000 | 0.000 |
| Test for AR(2): Pr > *z* | 0.273 | 0.521 | 0.070 | 0.299 |
| Hansen test: Pr > $\chi^2$ | 0.134 | 0.158 | 0.536 | 0.001 |
| Number of instruments | 767 | 728 | 764 | 289 |
| Wald test for $\beta_1 + \beta_2 = 0$: Pr > *F* | 0.587 | 0.509 | 0.000 | 0.026 |

## Table 4: High and low GDP growth

The dependent variable is the real growth rate of loans to SMEs ($\Delta LG\_SME_{i,t}$). All models are estimated for the full sample (1987-2007) using the one-step *System GMM* estimator introduced by Blundell and Bond (1998) as explained above. *GMM*-style instruments are created for our main regressors $\Delta GDP\_HIGH_t$, $\Delta GDP\_LOW_t$ and their interactions with $SAV_i$. As macro variable serves the real GDP growth rate, which is divided into periods of high growth ($\Delta GDP\_HIGH_t$) and periods of low growth ($\Delta GDP\_LOW_t$). Column (1) shows the results for a mean split and column (2) for a positive/negative split (i.e., at ΔGDP=0%). We report robust standard errors using Windmeijer's (2005) finite sample correction in parentheses below coefficients. Significance levels *: 10% **: 5% ***: 1%.

| Model | (1) | (2) |
|---|---|---|
| Split criterion for HIGH vs. LOW | Mean GDP | 0% |
| $\Delta GDP\_HIGH_t$ | 0.582*** | 0.638*** |
| | (0.068) | (0.083) |
| $SAV_i * \Delta GDP\_HIGH_t$ | -0.388*** | -0.554*** |
| | (0.073) | (0.092) |
| $\Delta GDP\_LOW_t$ | -0.218 | -0.008*** |
| | (0.173) | (0.539) |
| $SAV_i * \Delta GDP\_LOW_t$ | 0.223 | 1.401** |
| | (0.191) | (0.602) |
| $LG\_SME_{i,\,t-1}$ | 0.391*** | 0.347*** |
| | (0.027) | (0.028) |
| $LG\_SME_{i,\,t-2}$ | 0.091*** | 0.113*** |
| | (0.023) | (0.024) |
| $SAV_i$ | 0.684** | 1.567*** |
| | (0.267) | (0.308) |
| $RII_{i,t-1}$ | 0.395*** | 0.500*** |
| | (0.092) | (0.093) |
| $RNIR_{i,t-1}$ | -0.071 | -0.080 |
| | (0.127) | (0.134) |
| $ETA_{i,t-1}$ | -0.458*** | -0.493*** |
| | (0.152) | (0.162) |
| $LIQTA_{i,t-1}$ | 0.089 | 0.229*** |
| | (0.081) | (0.086) |
| $LTLR_{i,t-1}$ | 0.041*** | 0.032*** |
| | (0.007) | (0.007) |
| $IBLR_{i,t-1}$ | 0.023* | 0.026* |
| | (0.013) | (0.014) |
| $DEPR_{i,t-1}$ | 0.031 | 0.042** |
| | (0.019) | (0.019) |
| Intercept | 6.835*** | -8.526*** |
| | (1.471) | (1.539) |
| Bank controls and fixed effects | yes | yes |
| Number of observations | 8376 | 8376 |
| Number of banks | 786 | 786 |
| Test for AR(1): Pr > *z* | 0.000 | 0.000 |
| Test for AR(2): Pr > *z* | 0.785 | 0.767 |
| Hansen test: Pr > $\chi^2$ | 0.419 | 0.399 |
| Number of instruments | 782 | 782 |

## Table 5: Results by bank size, loan maturity, funding structure, and liquidity

The dependent variable is the real growth rate of loans to SMEs ($\Delta LG\_SME_{i,t}$). All models are estimated using the one-step *System GMM* estimator introduced by Blundell and Bond (1998), where bank-specific fixed effects are purged by the forward orthogonal deviations transform of *GMM*–type instruments. These instruments are created for our main regressors $LG_{i,t-2}$, $\Delta GDP_t$ and their interaction terms. We study the impact of four bank characteristics (size: $AVGSIZE_i$, long-term lending: $AVGLTLR_i$, deposit funding: $AVGRELDEP_i$, and liquid assets: $AVGLIQTA_i$). We create dummy variables for banks in the lower, mid and upper tercile (*Tercile1*, *Tercile2* and *Tercile3*), which we interact with $\Delta GDP_t$ and $SAV_i$. In order to bring the number of instruments in line with our finite sample size, the number of lags used is limited accordingly. Furthermore, we create a collapsed set of *GMM*–type instruments for the control variables $RII_{i,t-1}$, $ETA_{i,t-1}$, $LIQTA_{i,t-1}$, $LTLR_{i,t-1}$, $IBLR_{i,t-1}$ and $DEPR_{i,t-1}$. We report robust standard errors using Windmeijer's (2005) finite sample correction in parentheses below coefficients. Significance levels *: 10% **: 5% ***: 1%.

| Model | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Discriminant variable | $AVGSIZE_i$ | $AVGLTLR_i$ | $AVGRELDEP_i$ | $AVGLIQTA_i$ |
| $\Delta GDP_t$ | 1.109*** | 0.983*** | 1.138*** | 0.856*** |
| | (0.136) | (0.150) | (0.140) | (0.153) |
| *Tercile2* * $\Delta GDP_t$ | -0.078 | 0.189*** | -0.022 | 0.177 |
| | (0.142) | (0.150) | (0.141) | (0.142) |
| *Tercile3* * $\Delta GDP_t$ | -0.256* | -0.235* | -0.405*** | 0.345** |
| | (0.134) | (0.142) | (0.153) | (0.164) |
| $SAV_i$ * $\Delta GDP_t$ | -0.396*** | -0.235* | -0.473*** | -0.043 |
| | (0.117) | (0.131) | (0.122) | (0.113) |
| $SAV_i$ * *Tercile2* * $\Delta GDP_t$ | 0.152 | -0.226 | 0.178 | -0.201 |
| | (0.167) | (0.172) | (0.165) | (0.167) |
| $SAV_i$ * *Tercile3* * $\Delta GDP_t$ | 0.312* | 0.242 | 0.455*** | -0.449** |
| | (0.160) | (0.171) | (0.172) | (0.188) |
| $LG\_SME_{i,\,t-1}$ | 0.431*** | 0.408*** | 0.424*** | 0.398*** |
| | (0.042) | (0.044) | (0.044) | (0.043) |
| $LG\_SME_{i,\,t-2}$ | 0.163*** | 0.160*** | 0.151*** | 0.173*** |
| | (0.034) | (0.035) | (0.033) | (0.033) |
| *Tercile2* | 0.522 | -0.337 | -0.299 | -0.553 |
| | (0.336) | (0.385) | (0.350) | (0.360) |
| *Tercile3* | 0.959** | 1.093*** | 0.872** | -1.263*** |
| | (0.383) | (0.393) | (0.405) | (0.418) |
| $SAV_i$ | 1.309*** | 0.941*** | 1.346*** | 0.542 |
| | (0.336) | (0.357) | (0.343) | (0.373) |
| $SAV_i$ * *Tercile2* | -0.471 | 0.649 | -0.468*** | 0.377 |
| | (0.389) | (0.426) | (0.404) | (0.407) |
| $SAV_i$ * *Tercile3* | -0.751 | -0.898* | -1.363*** | 0.888* |
| | (0.431) | (0.467) | (0.453) | (0.463) |
| Bank controls and fixed effects | yes | yes | yes | yes |
| Number of observations | 8376 | 8511 | 8376 | 8376 |
| Number of banks | 786 | 787 | 786 | 786 |
| Test for AR(1): Pr > *z* | 0.000 | 0.000 | 0.000 | 0.000 |
| Test for AR(2): Pr > *z* | 0.287 | 0.257 | 0.365 | 0.332 |
| Hansen test: Pr > $\chi^2$ | 0.182 | 0.379 | 0.196 | 0.1497 |
| Number of instruments | 713 | 713 | 713 | 718 |
| Wald test for $\beta_2 = \beta_3$: Pr > *F* | 0.222 | 0.003 | 0.006 | 0.314 |
| Wald test for $\beta_5 = \beta_6$: Pr > *F* | 0.336 | 0.004 | 0.087 | 0.200 |

## Table 6: Cyclicality and bank competition

The dependent variable is the real growth rate of loans to SMEs ($\Delta LG\_SME_{i,t}$). Model 1 corresponds to specification (4) of Table 2 and we apply the one-step *System GMM* estimator introduced by Blundell and Bond (1998) as explained above. As macro variable serves the real GDP growth rate ($\Delta GDP_t$). *GMM*-style instruments are created for our main regressors $LG_{i,t-2}$, $\Delta GDP_t$, and their interactions with the Savings banks dummy ($SAV_i$) and a measure for competition at the level of federal states in Germany. This is the natural logarithm of the Herfindahl-Hirschman Index ($logHHI_{c,t}$) in Model 1, the concentration ratio based on the top 3 banks ($COMP3_{c,t}$) in Model 2 and the concentration ratio based on the top 5 banks ($COMP5_{c,t}$ ) in Model 3. We report robust standard errors using Windmeijer's (2005) finite sample correction in parentheses below coefficients. Significance levels *: 10% **: 5% ***: 1%.

| Model | (1) | (2) | (3) |
|---|---|---|---|
| Competition measure | Herfindahl-Hirschman Index | Concentration ratio (top 3) | Concentration ratio (top 5) |
| $\Delta GDP_t$ | 0.991** | 0.702*** | 0.725*** |
| | (0.408) | (0.213) | (0.278) |
| $SAV_i * \Delta GDP_t$ | 1.321*** | 0.208 | 0.246 |
| | (0.486) | (0.166) | (0.191) |
| $logHHI_{c,t} * \Delta GDP_t$ | -0.014 | | |
| | (0.086) | | |
| $COMP3_{c,t} * \Delta GDP_t$ | | 1.247 | |
| | | (0.866) | |
| $COMP5_{c,t} * \Delta GDP_t$ | | | 0.832 |
| | | | (0.951) |
| $SAV_i * logHHI_{c,t} * \Delta GDP_t$ | -0.325*** | | |
| | (0.103) | | |
| $SAV_i * COMP3_{c,t} * \Delta GDP_t$ | | -1.706** | |
| | | (0.699) | |
| $SAV_i * COMP5_{c,t} * \Delta GDP_t$ | | | -1.432** |
| | | | (0.618) |
| $LG\_SME_{i,\ t-1}$ | 0.442*** | 0.447*** | 0.454*** |
| | (0.044) | (0.043) | (0.044) |
| $LG\_SME_{i,\ t-2}$ | 0.170*** | 0.146*** | 0.137*** |
| | (0.032) | (0.031) | (0.031) |
| $SAV_i$ | -2.502** | 0.359 | -0.289 |
| | (1.106) | (0.415) | (0.464) |
| $logHHI_{c,t}$ | 0.173 | | |
| | (0.274) | | |
| $COMP3_{c,t}$ | | -6.696*** | |
| | | (2.336) | |
| $COMP5_{c,t}$ | | | -5.802** |
| | | | (2.320) |
| $SAV_i * logHHI_{c,t}$ | 0.667*** | | |
| | (0.229) | | |
| $SAV_i * COMP3_{c,t}$ | | 2.525* | |
| | | (1.466) | |
| $SAV_i * COMP5_{c,t}$ | | | 2.240* |
| | | | (1.315) |
| Intercept | -8.033** | -4.330 | -4.297 |
| | (3.589) | (3.658) | (3.624) |
| Bank controls and fixed effects | yes | yes | yes |
| Number of observations | 7079 | 7921 | 7921 |
| Number of banks | 621 | 782 | 782 |
| Test for AR(1): Pr > $z$ | 0.000 | 0.000 | 0.000 |
| Test for AR(2): Pr > $z$ | 0.164 | 0.953 | 0.788 |
| Hansen test: Pr > $\chi^2$ | 0.437 | 0.241 | 0.343 |
| Number of instruments | 622 | 757 | 757 |

## Table 7: Cyclicality and political influence

The dependent variable is the real growth rate of loans to SMEs ($\Delta LG\_SME_{i,t}$). Model (1) corresponds to specification (2) of Table 2 and we apply the one-step *System GMM* estimator introduced by Blundell and Bond (1998) as explained above. This model is estimated for our full sample. As macro variable serves the real GDP growth rate ($\Delta GDP_t$). *GMM*-style instruments are created for our main regressors $LG_{i;t-2}$, $\Delta GDP_t$, and their interactions with the Savings banks dummy ($SAV_i$) and a binary variable $ELECTION_{c,t}$. This variable takes on a value of 1 if there was an election in the respective year and county the bank is located. Model (2) corresponds to specification (4) of Table 2, where we also include region-year fixed effects. This model is estimated for all observations where $ELECTION_{c,t}$. takes a value of zero. We report robust standard errors using Windmeijer's (2005) finite sample correction in parentheses below coefficients. Significance levels *: 10% **: 5% ***: 1%.

| Model | (1) | (2) |
|---|---|---|
| | Full sample | $ELECTION_{c,t} = 0$ |
| $\Delta GDP_t$ | 0.558*** | 1.069*** |
| | (0.068) | (0.132) |
| $SAV_i * \Delta GDP_t$ | -0.356*** | -0.258*** |
| | (0.075) | (0.078) |
| $SAV_i * ELECTION_{c,t} * \Delta GDP_t$ | -0.512*** | |
| | (0.148) | |
| $LG\_SME_{i,\ t-1}$ | 0.554*** | 0.376*** |
| | (0.025) | (0.039) |
| $LG\_SME_{i,\ t-2}$ | 0.143*** | 0.181*** |
| | (0.021) | (0.032) |
| $SAV_i$ | 1.494*** | 1.091*** |
| | (0.214) | (0.307) |
| $ELECTION_{c,t}$ | 0.369 | |
| | (0.389) | |
| $ELECTION_{c,t} * \Delta GDP_t$ | -0.512*** | |
| | (0.148) | |
| $SAV_i * ELECTION_{c,t}$ | 0.096 | |
| | (0.414) | |
| Intercept | -9.298*** | -10.811*** |
| | (1.208) | (3.487) |
| Bank controls | yes | yes |
| Region-year fixed effects | no | yes |
| Number of observations | 9740 | 6739 |
| Number of banks | 791 | 786 |
| Test for AR(1): Pr > $z$ | 0.000 | 0.000 |
| Test for AR(2): Pr > $z$ | 0.969 | 0.368 |
| Hansen test: Pr > $\chi^2$ | 0.549 | 0.401 |
| Number of instruments | 798 | 775 |

## Table 8: Cyclicality and default risk

The dependent variable is the real growth rate of loans to SMEs ($LG\_SME_{i;t}$). The regressions correspond to Model (2) of Table 2 where we apply the one-step *System GMM* estimator introduced by Blundell and Bond (1998) as explained above. We use the real GDP growth rate ($\Delta GDP_t$) to measure cyclicality. *GMM*-style instruments are created for our main regressors $LG\_SME_{i;t-2}$, $\Delta GDP_t$, and their interactions with the Savings banks dummy ($SAV_i$) and a binary variable $HIGHRISK_i$. The latter equals one if the write-offs and loan loss provisions relative to total assets exceed a certain threshold, and zero otherwise. In Model 1 (2), this threshold is the 50% (75%)-quantile of the *year-specific* write-offs and loan loss provisions relative to total assets. In Model 3, this threshold is the 75%-quantile of the *average* write-offs and loan loss provisions relative to total assets. We include bank controls and fixed effects. We report robust standard errors using Windmeijer's (2005) finite sample correction in parentheses below coefficients. Significance levels *: 10% **: 5% ***: 1%.

| Model | (1) | (2) | (3) |
|---|---|---|---|
| Definition of *HIGHRISK* | Year-specific (50%) | Year-specific (75%) | Time-invariant (75%) |
| $\Delta GDP_t$ | 1.046*** | 1.005*** | 1.005*** |
| | (0.134) | (0.121) | (0.125) |
| $HIGHRISK_i * \Delta GDP_t$ | -0.115 | -0.070 | -0.061 |
| | (0.135) | (0.171) | (0.121) |
| $SAV_i * \Delta GDP_t$ | -0.442*** | -0.369*** | -0.260*** |
| | (0.100) | (0.087) | (0.085) |
| $SAV_i * HIGHRISK_i * \Delta GDP_t$ | 0.271* | 0.370** | 0.183 |
| | (0.151) | (0.187) | (0.158) |
| $LG\_SME_{i,\,t-1}$ | 0.385*** | 0.419*** | 0.415*** |
| | (0.040) | (0.036) | (0.045) |
| $LG\_SME_{i,\,t-2}$ | 0.143*** | 0.141*** | 0.144*** |
| | (0.032) | (0.030) | (0.033) |
| $HIGHRISK_i$ | -0.829** | -1.176*** | -0.609* |
| | (0.351) | (0.392) | (0.356) |
| $SAV_i$ | 1.021*** | 0.783*** | 0.825*** |
| | (0.278) | (0.242) | (0.252) |
| $SAV_i * HIGHRISK_i$ | -0.339 | -0.340 | 0.159 |
| | (0.385) | (0.437) | (0.427) |
| Bank controls and fixed effects | yes | yes | yes |
| Number of observations | 7950 | 7950 | 8376 |
| Number of banks | 786 | 786 | 786 |
| Test for AR(1): Pr > *z* | 0.000 | 0.000 | 0.000 |
| Test for AR(2): Pr > *z* | 0.325 | 0.419 | 0.426 |
| Hansen test: Pr > $\chi^2$ | 0.255 | 0.414 | 0.535 |
| Number of instruments | 761 | 761 | 761 |