The Role of State-Owned Banks in Crises: Evidence from German Banks during COVID-19*

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Abstract

By adopting a difference-in-differences specification combined with propensity score matching, we provide evidence using the microdata of German banks that state-owned savings banks have lent less than credit cooperatives during the COVID-19 crisis. In particular, the weaker lending effects of state-owned banks are pronounced for long-term and nonrevolving loans but insignificant for short-term and revolving loans. Moreover, the negative impact of government ownership is larger for borrowers who are more exposed to the COVID-19 shock and in regions where the ruling parties are longer in office and more positioned on the right side of the political spectrum.

Keywords: state-owned banks; bank credit; COVID-19
JEL codes: G21; D72; P16

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1 Introduction

The coronavirus (COVID-19) disease outbreak developed into a global pandemic. Medical professionals have been racing against time to save lives and control the death toll; at the same time, economists and policymakers are facing economic ruin and trying to rescue the economy. For firms and businesses that have been hit by containment policies as well as people's fear of physical contact, their broken funding chain has induced a massive need for access to credit to survive. When the stock market is also depressed or is unavailable to small businesses, bank lending is life saving.

Research on bank lending during the COVID-19 crisis is rapidly expanding (e.g., Berger and Demirgüç-Kunt, 2021; Chodorow-Reich et al., 2021; Beck and Keil, 2021; Kapan and Minoiu, 2021; Kwan et al., 2021; Li et al., 2020). While there is already abundant evidence showing that lending is heterogeneous across bank traits such as size, liquidity and capitalization, technology adoption, and exposure to the virus, there are few findings on the role of government ownership of banks during the crisis, which is an important factor in determining banks' funding allocation that has substantial real effects (La Porta et al., 2002; Carvalho, 2014; Sapienza, 2004; Dinç, 2005; Coleman and Feler, 2015) and is highly relevant for policy implementation aimed at rescuing the economy.

In this paper, we investigate the change in banks' corporate lending before and after the COVID-19 shock and in particular examine the role of government-owned banks during the crisis. Specifically, we use the microdata of German banks, which allows the observation of the universe of bank lending and provides a granular breakdown of loans by maturity, revolving characteristics, and economic sectors, and adopt a difference-in-differences (DID) specification to test whether state-owned banks' lending behavior has been stronger or weaker during the COVID-19 crisis.

The identification strategy is to compare the lending practices of treated and control banks that are similar to each other in all characteristics except for government ownership, conditional on the parallel trend before the shock and the control of credit demand. To sharpen this procedure, we first conduct propensity score matching between state-owned savings banks and credit

cooperatives. The two types of banks are similar in terms of their mandate, which is to serve the economic interests of the local community, and both are relatively small and local banks. Through the matching approach, we further mitigate their differences in terms of size, capital ratio, and deposit-to-asset and liquidity-to-asset ratios, thus strengthening the assumption that they form comparable treated (savings banks) and control (credit cooperatives) groups. Second, we test the parallel trend assumption through dynamic specification and show the relative effects month-by-month. The results show that savings banks and credit cooperatives did not behave significantly differently prior to the COVID-19 shock; meanwhile, the differences are material and persistent after the shock. Third, we disentangle credit supply and demand by including state-time and/or sector-time fixed effects to saturate the change in firms' credit demand.

The main findings are threefold. First, state-owned banks lend significantly less to firms than credit cooperatives. The overall corporate lending-to-asset ratio of savings banks is smaller than that of credit cooperatives after the COVID-19 shock by a magnitude of 0.25 percentage points. In addition, the weaker lending effects are more pronounced on long-term and nonrevolving loans, while the differences in short-term and revolving loans are very small or insignificant. Second, savings banks' credit supply is in particular tightened to sectors that are more exposed to the pandemic, either in terms of their work-from-home capacity or abnormal reduction of employment. Specifically, when sector exposure increases by one standard deviation, the gap in lending between savings banks and credit cooperatives increases by 0.020 to 0.028 percentage points, which is more than 20% of the normalized difference. Third, the severity of the coronavirus spread and the political environment also play an important role in the weaker lending observed by savings banks. The more infection rates and restrictive lockdown policies the region has, and the longer time in office and more positioned on right side of the political spectrum the ruling parties are, the less savings banks lend relative to credit cooperatives.

This study contributes to three branches of the literature. The first is studies on the role of political connections and ownership of banks.[1] On the one hand, there are papers, including but not

[1] A comprehensive overview of bank ownership and economic development can be found in Cull et al. (2018).

limited to La Porta et al. (2002), Demirgüç-Kunt and Detragiache (2002), Khwaja and Mian (2005), Carvalho (2014), Sapienza (2004), Dinç (2005), Iannotta et al. (2013), Englmaier and Stowasser (2017), Koetter and Popov (2021), Bircan and Saka (2021), and Finan and Mazzocco (2021), suggesting that government-owned banks tend to pursue political rather than social goals, as they are affected by electoral cycles and systems, which induces instability and distorts the proper allocation of funds. On the other hand, there is evidence of the social role of government ownership, as state-owned banks could finance projects for which private banks are unable or unwilling to provide financing (Gerschenkron, 1962; Stiglitz, 1993; Behr et al., 2013), exhibit lower lending cyclicality than privately owned banks and promote local economic development (Bertay et al., 2015; Hakenes et al., 2015; Behr et al., 2017), and studies such as Altunbas et al. (2001) and Boubakri et al. (2020) find little evidence that private-owned banks are more efficient or less risk-prone than government-owned banks. Similar to this paper, Coleman and Feler (2015) and Aghabarari et al. (2021) investigate the relative performance of government-owned banks and credit unions, respectively, during crisis periods. Both studies use Brazilian data and look at the responses to the financial crisis of 2008/2009, with the former showing that localities with a high share of government banks received more loans and the latter finding that credit unions tightened credit to a lesser extent than other banks.

Second, this paper relates to the rapidly growing literature on bank performance during the COVID-19 pandemic. At present, most studies in this area use the sample of cross-country listed banks due to data limitations, as granular data with detailed coverage is only partially available for U.S. research, such as the paycheck protection program (PPP) which only covers special public-guaranteed loans, and Y-14Q which only covers large loans and lenders. This paper is among the first endeavors to utilize the universe of banks in a country. In terms of research questions in this literature, the focuses are mainly on four aspects. The first is the massive drawdown of existing credit lines, which is documented as the "dash for cash" phenomenon in Acharya and Steffen (2020), Greenwald et al. (2021), Li et al. (2020), and Chodorow-Reich et al. (2021), among many others. The second is the inclusion of lending, deposit growth, and instability in terms of systemic risk, loss provinces and non-performing loans in bank business performance. Examples

include but are not limited to Berger et al. (2021a), Berger et al. (2021b), Levine et al. (2021), Colak and Öztekin (2021), Dursun-de Neef and Schandlbauer (2021), Beck and Keil (2021), Duan et al. (2021), Kapan and Minoiu (2021), Norden et al. (2021), Core and De Marco (2021), and Li and Strahan (2021). Moreover, the heterogeneity among many bank characteristics and the role of relationship banking are also discussed in these studies. The third is the bank stock performance such as abnormal returns in Demirguc-Kunt et al. (2021) and Acharya et al. (2021). And the fourth is that the effects of bank lending on small businesses and employment, which mainly focus on evidence from the PPP (Chodorow-Reich et al., 2021; Chetty et al., 2020; Autor et al., 2020; Berger et al., 2021c; Karakaplan, 2021). As summarized in Berger and Demirgüç-Kunt (2021), finance research related to COVID-19 is booming, and the list of papers mentioned here is only a small representation of that. That being said, the evidence from German banks in this paper is in line with the recommendation of Berger and Demirgüç-Kunt (2021) to conduct further research in non-U.S. economies.

Finally, this paper also speaks to recent studies on the role of politics during the COVID-19 crisis. Using U.S. evidence outside of the banking sector, Barrios and Hochberg (2021) show that politics and the media are important in forming risk perceptions, thus affecting both economic and health-related reactions to unanticipated health crises, Duchin and Hackney (2021) find that businesses in electorally important locations and sectors have received more loans following the onset of the COVID-19 crisis, and Berger et al. (2021d) find that the partisan political connections of banks and nonpartisan connections of small businesses are important for securing PPP funds. On the other hand, there is evidence that the pandemic will also affect individuals' trust in government. For instance, Eichengreen et al. (2021) show that epidemic exposure in an individual's impressionable years has a persistent negative effect on confidence in political institutions and leaders, and this effect is stronger in countries characterized by weak governments.

This study contributes to the literature by demonstrating that state-owned banks have had a weaker lending role in reaction to the COVID-19 crisis, which is still developing and could have far-reaching impacts on every aspect of the economy. Additionally, the evidence of the political role of government-owned banks based on German credit registry data has important implications

for policy designs intended to improve efficient fund allocations in other economies.

The rest of the paper is structured as follows. Section 2 describes the institutional background of the German banking system and the data used in this study. Sections 3 and 4 illustrate the identification strategies and report the empirical results. Section 5 provides further discussion. Section 6 concludes.

2 Institutional Background and Data

2.1 The German Banking Industry

Germany's banking sector provides a good laboratory to study the role of government ownership in banks' behavior (Altunbas et al., 2001; Englmaier and Stowasser, 2017; Koetter and Popov, 2021). It is composed of three pillars: government-owned banks, credit cooperatives, and commercial banks. We briefly describe the characteristics of each pillar below, and more details about the system can be found in Brunner et al. (2004).

First, government-owned banks include Landesbanks (Landesbanken) and savings banks (Sparkassen). We do not include Landesbanks in this study because they are the head banking institution of savings banks and their business is predominantly wholesale banking.[2] The mandate of government-owned savings banks is to foster economic development in the region and subsidize local public goods. For savings banks, profitability is not their main objective, and retained earnings are their main source for funding new business. Their business is restricted to the local region, and they are not allowed to open branches in each other's business regions. Second, credit cooperatives also do not seek profit maximization. They are owned by members, who are also their depositors and borrowers. They use the retained earnings and equity contributions from new members as their main source to fund new business. The mandate of credit cooperatives is to serve the interests of their owners. They are the main competitors of savings banks in the same region. Third, commercial banks are privately owned banks with a mandate to maximize profitability. They can raise funding on the equity market, while savings banks and credit

[2]There are only six Landesbanks as of end-of-year 2020.

cooperatives cannot, and profits are their main source of new capital.

In this paper, we focus on the comparison between savings banks and credit cooperatives to examine the role of government ownership during the COVID-19 crisis without analyzing the role of commercial banks. Our reasons are threefold. First, the mandates of credit cooperatives are similar to those of savings banks, that is, to foster local economic development and serve local credit needs, and do not include profit maximization, unlike commercial banks. Second, their business is focused on the local region, while commercial banks have branches nationwide. Thus, we are able to compare the lending by savings banks and credit cooperatives in the same state at the same time to capture a substantial part of credit demand, which is not an approach that can be applied to commercial banks. Third, during the COVID-19 crisis, they have been subject to the same emergency rescue policies, including prudential regulations, monetary policy, liquidity support, and borrower assistance. Meanwhile, commercial banks stand out, as they are specifically targeted by some policies. For instance, an expansion of short-term liquidity provision to companies through the public development bank KfW (*Kreditanstalt für Wiederaufbau*) is in partnership with commercial banks.[3]

We show the statistics for savings banks and credit cooperatives separately in the following section and address their differences in Section 3.

2.2 Data

We use microlevel bank data from the German central bank, *Deutsche Bundesbank*, and the dataset covers the universe of banks and bank lending in the economy. The sample period is from October 2019 to December 2020. As of the end of 2020, there were 6 Landesbanks, 377 savings banks, 815 credit cooperatives, and 257 commercial banks. In this study, savings banks are the treated group, and credit cooperatives are the control group. Together, they account for 79.4% of the total number of banks and 28.2% of total assets in the German banking system, and their assets are equivalent

[3]Source: IMF Policy Tracker. https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19

to more than three quarters of German GDP.[4]

Specifically, we access the monthly balance sheet statistics (BISTA, "Bilanzstatistik") from the Bundesbank, which allow for the observation of total corporate lending by each bank and provide breakdowns by loan maturity and other characteristics. Particularly, at the bank-month level, we observe total loans and distinguish between short- and long-term loans and between revolving and nonrevolving loans. Short-term loans mature within five years, and long-term loans mature in more than five years.[5] Revolving loans take the form of credit issued by banks that provides the borrower with the ability to draw down or withdraw, repay, and withdraw again, while non-revolving loans are all others. Revolving loans are more flexible and have played an important role during the COVID-19 crisis, since firms immediately utilize unused credit lines to cover large losses in cash flows and profits (Acharya and Steffen, 2020; Chodorow-Reich et al., 2021; Li et al., 2020). In our main analysis, we use the ratio of each category of corporate loans to bank assets as the dependent variable, which is in line with Koetter and Popov (2021).

We focus on corporate loans instead of household and government loans since firms have been most significantly affected by the COVID-19 crisis. Additionally, we access the further breakdown of corporate loans by sector; thus, we can investigate the heterogeneity of exposure to the crisis by sector and isolate credit supply from demand. Specifically, we make use of another database from the Bundesbank, the quarterly borrowers statistics (VJKRE, "Vierteljährliche Kreditnehmerstatistik"), which provides bank-sector-quarter-level information on banks' lending to each of the 22 nonfinancial sectors by quarter. A list of the 22 sectors is shown in Appendix Table A2.[6] The VJKRE database covers the same sample of banks as that included in the BISTA database. It is more granular in terms of sector breakdown but differs from BISTA in two aspects: the frequency is quarterly instead of monthly, and it includes the classification of short- and long-term loans but

[4]The number of banks and total assets for each type of credit institutions in each month of the sample period in this study, i.e., 2019M10 to 2020M12, are reported in the Appendix in Table A1.

[5]Note that the "short-term" loan here is the combination of two categories of loans in the original data: short-term loans that mature within one year and medium-term loans that mature in more than one year but within five years. We combine them because the original medium-term loan occupies a very small portion of the bank assets and is much smaller than that of the loans maturing within one year.

[6]The full coverage is 23 sectors, but we exclude the financial intermediations and insurance companies and focus on the 22 nonfinancial real sectors.

not that of revolving and nonrevolving loans.

For control variables, we use bank size measured by the natural logarithm of total assets, capital-to-asset ratio, deposit-to-asset ratio, and liquidity-to-asset ratio in which the liquid assets are defined as the sum of cash in hand and balance with the central bank.

Panel A of Table 1 shows the summary statistics of each variable for savings banks and credit cooperatives separately and reports the normalized differences (Imbens and Wooldridge, 2009) between the two types of banks. It is based on the collapsed dataset for difference-in-differences estimation, therefore there is one observation of the average in the pre-period and one in the post-period for each bank. The details of the collapsed dataset and the matched sample will be provided in Section 3.

Table 1: Summary Statistics

	Panel A: Raw Data					Panel B: Matched Data				
	Savings Banks		Credit Cooperatives		Normalized	Savings Banks		Credit Cooperatives		Normalized
	Mean	SD	Mean	SD	Difference	Mean	SD	Mean	SD	Difference
Panel A: BISTA Data										
Dependent Variables										
Total Loan (% Asset)	16.585	5.337	11.279	7.443	0.579	16.814	4.986	16.323	8.160	0.051
Short-term Loan (% Asset)	3.248	1.727	3.328	3.207	-0.022	3.363	1.657	4.738	3.482	-0.357
Long-term Loan (% Asset)	13.337	4.169	7.951	5.339	0.795	13.451	3.926	11.580	6.350	0.251
Revolving Loan (% Asset)	1.173	0.921	1.364	1.488	-0.109	1.226	0.912	1.936	1.864	-0.095
Non-Revolving Loan (% Asset)	15.411	4.919	9.915	6.628	0.666	15.588	4.639	14.387	7.409	0.137
Control Variables										
Size	14.680	0.905	13.220	1.202	0.970	14.637	0.921	14.684	1.026	-0.034
Capital Ratio	5.273	1.249	6.027	2.730	-0.251	5.385	1.188	5.141	1.505	0.127
Deposit Ratio	86.715	2.216	87.116	3.727	-0.092	86.660	2.238	86.885	4.388	-0.046
Liquid Asset Ratio	6.883	2.120	2.854	2.257	1.301	6.603	1.978	6.148	2.229	0.153
N	754		1664			594		588		
Panel B: VJKRE Data										
Dependent Variables										
Total Loan (% Asset)	1.269	1.524	1.080	1.532	0.087	1.310	1.553	1.102	1.592	0.094
Short-term Loan (% Asset)	0.189	0.290	0.201	0.371	-0.025	0.198	0.297	0.218	0.388	-0.041
Long-term Loan (% Asset)	1.080	1.351	0.878	1.275	0.109	1.112	1.374	0.883	1.322	0.120
N	16558		36344			13062		12664		

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BISTA and VJKRE, 2019M10-2020M12, own calculations.
Note: For the number of observations (N), there is one observation of the average in the pre-period and one in the post-period for each bank.

Later, we also use data on coronavirus infection cases, mobility changes, work-from-home capacity, and employment to measure the heterogeneous exposure to COVID-19 by geographic location and sector. Detailed descriptions of these datasets are provided in the sections in which they are used. Finally, in the main analysis using monthly data, we set March 2020 as the start of the COVID shock in Germany since this is when the first death was reported and considering that the containment policies of mobility constraints were low before March.[7] In the analysis using quarterly data, we set the event time to 2020Q1.

3 Identification Strategy

3.1 Baseline Specifications

The main test in this paper is to compare the lending behavior between state-owned savings banks and credit cooperatives before and after the COVID-19 shock. We adopt the following difference-in-differences (DID) specification:

$$Lending_{bt} = \alpha + \beta After_t \times Savings\ Bank_b + \Gamma X_{bt-1} + \eta_{st} + \delta_b + \epsilon_{bt} \tag{1}$$

where b, s, and t indicate the bank, the state where the bank is located, and time, respectively. The dependent variable $Lending_{bt}$ is bank b's lending-to-asset ratio at time t; we use total corporate lending as well as its subcategories: short- and long-term loans and revolving and nonrevolving loans. $After_t$ is a dummy variable that indicates the months after the COVID-19 shock, i.e., $After_t = 1$ if $t \geq 2020M3$ and $After_t = 0$ if $t < 2020M3$. The main sample starts in 2019M10 and ends in 2020M12, i.e., five months before the shock and nine months after the shock;[8] later, we also show results using a shorter window of 2019M12-2020M6. $Savings\ Bank_b$ is a dummy variable that equals one when the bank is a state-owned savings bank and zero when it is a credit cooperative. X_{bt-1} is an array of control variables, including bank size, capital-to-asset ratio, deposit-to-asset

[7] The first confirmed case was reported on January 27, 2020 and the first death was reported on March 09, 2020. We report the COVID-19 situation and policy responses in Germany Figure A1 in the appendix.

[8] The start and end of the horizon is chosen to also fit the quarterly data in the later analysis, i.e., 2019Q4-2020Q4.

ratio, and liquidity-to-asset ratio. η_{st} and δ_b denote state-time and bank fixed effects, respectively. They eliminate confounding factors that are bank-specific while time-invariant and state-time-varying shocks that are common to all banks. In particular, the inclusion of state-time fixed effects allows the comparison of bank lending in the same state at the same time, thus partially mitigating concerns relating to credit demand, which we will formally address later. The coefficient of most interest is β, which captures the relative changes in lending performance between savings bank and credit cooperatives before and after the COVID-19 shock. A significant and positive (negative) β indicates that savings banks' lending during the COVID-19 crisis is stronger (weaker) than that of credit cooperatives.

To address the concerns relating to inconsistent standard errors due to autocorrelation, we follow the correction method in Bertrand et al. (2004) and collapse the monthly data into a "pre-" and "post-" period for each bank by taking the average of each variable over the months before and after the shock. We also show the results using a shorter time window, i.e., three months before and three months after, to collapse the data.

As a classical difference-in-differences setting, the identification strategy is based on a comparison between the behavior of savings banks (the treatment group) and credit cooperatives (the control group) around a shock that is common to both banks. There are several assumptions that are critical to the identification strategy. First, the exogeneity of the COVID-19 with respect to bank lending and the parallel trends between the treated and control groups before the shock. Second, the cooperatives are a valid comparison to savings banks; that is, the treatment and control groups are similar to each other with the exception of the savings banks being state-owned. Third, the isolation of the credit supply from credit demand is crucial since the investigation is on the change in the credit supply between two groups of banks. We tackle these challenges one by one through the following methods.

3.2 Test of Parallel Trend

For the parallel trend assumption, the exogeneity of COVID-19 is very plausible since this is an unexpected health crisis that is not rooted in the banking sector. In addition, we formally show

the parallel trend and the dynamic effects in each month by estimating the following specification:

$$Lending_{bt} = \alpha' + (\Sigma_{-5}^{-2}\beta'_k Month\ to\ COVID_k + \Sigma_{0}^{+9}\beta'_k Month\ to\ COVID_k) \times Savings\ Bank_b + \Gamma' X_{bt-1} + \eta'_{st} + \delta'_b + \epsilon_{bt} \quad (2)$$

where $Month\ to\ COVID_k$ is a dummy variable indicating k months to the COVID-19 shock. The specification does not include the dummy of the month before the shock (i.e., $k = -1$); therefore, the estimates of β'_k are the relative lending by savings banks in each month relative to month -1. When the estimates of $\beta'_k, k \in [-5, -2]$ are insignificant, we argue that the lending behaviors between savings banks and other banks are similar before the COVID-19 shock and that there is no pre-trend. Similarly, the significant estimates of $\beta'_k, k \in [0, +9]$ indicate that savings banks perform differently from credit cooperatives after the shock. Moreover, by observing the coefficients β'_k month-by-month, we can display the dynamic impact and detect whether the effect is temporary or persistent.

3.3 Propensity Score Matching

As described in Section 2, there are many similarities between savings banks and credit cooperatives. However, they still differ from each other along various dimensions of bank characteristics. In the left panel of Table 1, we report the normalized difference (Imbens and Wooldridge, 2009) between the two types of banks in the raw data. Using the threshold of 0.25, the results show that savings banks are significantly larger in size, have a lower capital ratio, and have more liquid assets than credit cooperatives, while their deposit-to-asset ratios are not significantly different. These differences threaten the assumption that the two groups of banks are similar in most characteristics except for state ownership.

To address this issue, we follow Koetter and Popov (2021) and conduct a propensity score matching (PSM) procedure in the style of Abadie and Imbens (2006, 2016) to match the treated and control banks. Specifically, we match banks based on the average of their observable traits five months prior to the COVID-19 shock (i.e., $After = 0$) and use a probit model to estimate propensity scores of being a savings bank conditional on the following control variables: bank size,

capital-to-asset ratio, deposit-to-asset ratio, and liquidity-to-asset ratio. We then use the nearest neighbor method to identify one credit cooperative for each savings bank, which is required to be in the same state and have an absolute difference in its predicted propensity score not higher than 0.05.

The right panel of Table 1 shows the normalized differences after matching, which all become insignificant. Figure 1 visualizes the standardized bias across covariates and the distribution of propensity scores of the treated and control banks before and after matching. It clearly shows that the matching process largely reduces the differences in the banks' characteristics and distributions of propensity scores. Therefore, it is plausible to argue that the matched savings banks and credit cooperatives are similar to each other.

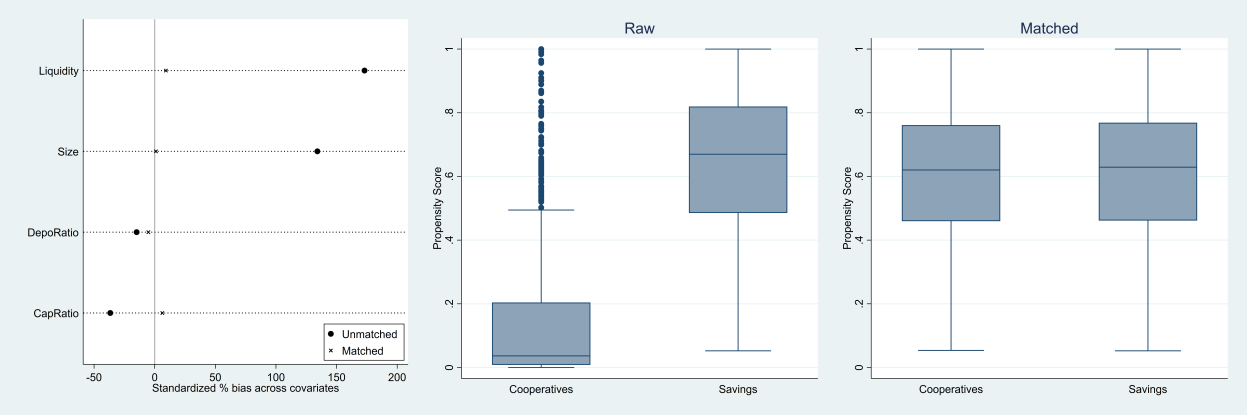

Figure 1: Propensity Score Matching

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BISTA, 2019M10-2020M12, own calculations.

3.4 Credit Demand vs. Credit Supply

Lastly, to mitigate the concern that credit demand drives the results and to better take into account the heterogeneous exposures to lockdowns and other policies to combat the coronavirus, we utilize the fact that different sectors have been affected by the COVID-19 shock to different extents and then examine whether the different lending performance of savings bank has been stronger in the sectors that are more exposed.

To begin with, we adopt two measures of sector exposure to the COVID-19 crisis. First, we measure the abnormal decline in sector employment following Chodorow-Reich et al. (2021). Specifically, we subtract the average Q2-to-Q2 growth rates of employment in 2015-2019 by the growth rate of 2019Q2-2020Q2. Chodorow-Reich et al. (2021) have shown that this measurement is positively correlated with firms' credit line drawdowns. A higher value indicates that the sector shows a more abnormal decline in employment and is thus more exposed to the COVID-19 shock. The disadvantage of this measurement is that it does not allow for granularity within the broad manufacturing sector. There are nine subsectors within manufacturing in the VJKRE dataset, but the abnormal decline in employment only allows one value for the sector in aggregate. Second, we use the measurement of the work-from-home (WFH) capacity from Alipour et al. (2020). This measurement is based on a large representative employment survey in 2018[9] that includes the question, "If your company would allow you to work at home temporarily, would you accept this offer?" with answer choices, "Yes; No; Is not possible with my work." The authors first construct the measure at the occupation level and then aggregate it to the sector level using employment as weight. We reformat the WFH capacity index to show the fraction of employees who *cannot* work from home by subtracting 100 from the original percentage that *can* work from home; thus, a higher value indicates a higher exposure to COVID-19 shock.

Figure 2 shows the exposure of each sector using the two measurements in ascending order of abnormal decline in employment. Unsurprisingly, the hotel and restaurant, wholesale and retail trade, and transportation sectors, which require close social interactions and thus are the most heavily affected by the lockdown and other mitigating policies, are the top three sectors in terms of abnormal reduction in employment, and they also show a high unavailability for WFH. In contrast, financial intermediation and insurance companies even display an employment growth rate above the historical trend, and they have a high fraction of work-from-home employees. In the bank-sector-quarter dataset, we exclude financial companies and focus on bank credits to the real economy. In later regressions, we standardize the two exposure measurements to facilitate

[9]The BIBB/BAuA6 Employment Survey. BIBB: Federal Institute for Vocational Education and Training (*Bundesinstitut fur Berufsbildung*); BAuA: Federal Institute for Occupational Safety and Health (*Bundesanstalt fur Arbeitsschutz und Arbeitsmedizin*).

interpretations, i.e., a change by one indicates an increase by one standard deviation of the sectoral exposure.

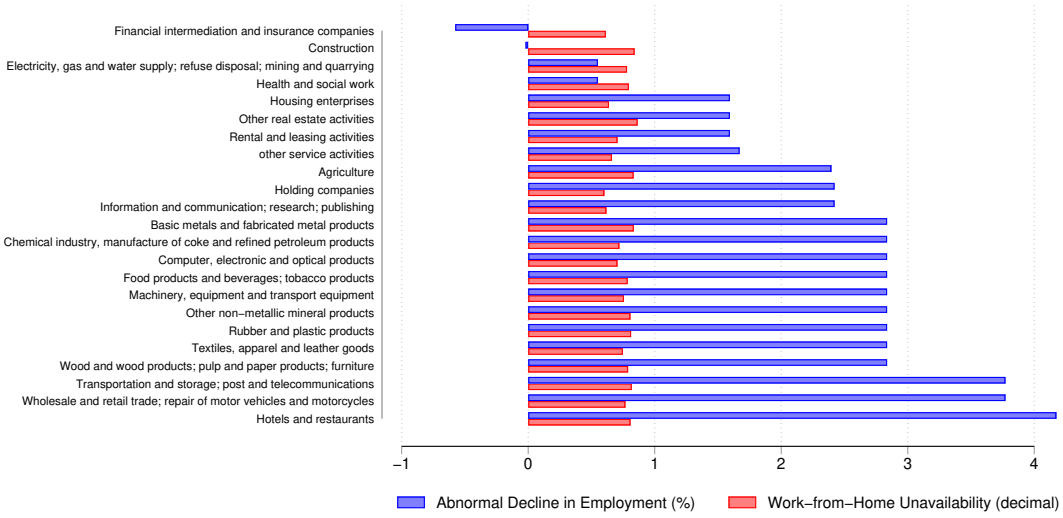

Figure 2: Exposure to COVID-19 Shock by Sector

Source: Federal Statistical Office of Germany and Alipour et al. (2020), own calculations.

Armed with the sectoral exposure measurements, we then estimate the following specifications:

$$Lending_{bjt} = \alpha + \beta_1 After_t \times Savings\ Bank_b \times Sector\ Exposure_j + \beta_2 After_t \times Savings\ Bank_b + \Gamma X_{bt-1} + \eta_{jt} + \delta_{bj} + \epsilon_{bjt} \tag{3}$$

$$Lending_{bjt} = \alpha' + \beta' After_t \times Savings\ Bank_b \times Sector\ Exposure_j + \eta_{jt} + \delta_{bj} + \gamma_{bt} + \epsilon_{bjt} \tag{4}$$

where b, j, and t indicate bank, sector, and time, respectively. We use the matched sample and the collapsed dataset in the estimation. The dependent variable $Lending_{bst}$ is bank b's average ratio of lending to sector j to its total assets before and after the COVID-19 shock. Corresponding to the sample period using the monthly dataset, the main sample period here is 2019Q4-2020Q4. We also show the results when the sample is limited to a shorter window of 2019Q4-2020Q2. $Savings\ Bank_b$ and $After_t$ are defined in the same way as above. $Sector\ Exposure_j$ is one of the measurements of

the degree to which the sector is affected by COVID-19, as described above. In Equation (3), we include the sector-time fixed effect η_{jt}; thus, credit demand is fully captured and we estimate the effect of different banks lending to the same sector at the same time. Additionally, we include the bank-sector fixed effect δ_{bj}, which captures the relationship lending between each bank and sector and mitigates the concern that some banks specialize in lending to certain sectors in the region. In Equation (4), we additionally control the bank-time fixed effect γ_{bt}; thus, the estimates arise from the lending to different sectors, and the bank-level characteristics are absorbed.

4 Empirical Results

4.1 Baseline Results

Table 2 shows the baseline results of the collapsed DID specification using both the raw and matched samples, and both the full and short windows. The main findings are threefold. First, savings banks have lent less than credit cooperatives to firms after COVID-19 hit. Specifically, columns (1)-(2) show that corporate lending by savings banks is smaller than that by credit cooperatives in the post-COVID period by a magnitude of 0.22 to 0.25 percentage points. Based on column (2), a change of 0.25 percentage points amounts to more than half of the overall difference in total lending between savings banks and credit cooperatives in the matched sample. Moreover, considering that the total assets of savings banks in the German banking system in 2020M3 is 1.36 trillion euros, a weaker lending by 0.25 percentage points amounts to 3.4 billion euros, implying important economic significance. This effect is smaller in the short window, where the gap is 0.15 to 0.19 percentage points, thus implying that the weaker role of savings banks has become more pronounced over time after the COVID-19 shock.

Second, when classifying total corporate lending by maturity, the difference in lending performance between savings banks and credit cooperatives is milder in short-term loans and more severe in long-term loans. In the full window, short-term lending by savings banks is weaker than that by credit cooperatives after the shock by 0.07 to 0.09 percentage points; meanwhile, in the near-term comparison, the difference in short-term lending is insignificant. In contrast, the long-

term loans display a larger and more significant gap between the two types of banks after the COVID-19 shock. Based on the estimates using the matched sample in column (6), savings banks issue fewer long-term loans than credit cooperatives by magnitudes of 0.16 and 0.12 percentage points in the full and limited observation windows, respectively.

Third, recent studies have shown that there has been a "dash for cash" phenomenon of massively drawing down existing credit lines during the COVID-19 crisis (Acharya and Steffen, 2020; Chodorow-Reich et al., 2021; Li et al., 2020), so we distinguish between revolving loans that are issued in the form of predetermined credit lines and other nonrevolving loans. The results in columns (7)-(10) show that the impact of COVID-19 on the different lending behaviors between savings banks and credit cooperatives is only present for nonrevolving loans, as the coefficients for revolving loans are insignificant, while those for nonrevolving loans are significantly negative. Specifically, based on column (10), savings banks are associated with lower non-revolving loan lending than credit cooperatives after the shock by 0.20 to 0.27 percentage points. Since revolving loans are the credit lines that firms can withdraw without additionally applying to lenders, they capture the demand from firms rather than the supply from lenders. Therefore, this finding suggests that the weaker lending from savings banks is not driven by credit demand but rather originates on the supply side. More discussion on the credit demand and supply can be found in Section 4.3.

4.2 Parallel Trend and Dynamic Effects

We show the results of the dynamic effects and parallel trend test in Figure 3, which reinforces the baseline findings and additionally highlights the comparison between treated and control groups month by month.

First, across all dependent variables, this figure shows that there are no significant differences in the lending behaviors between savings banks and credit cooperatives in the pre-COVID months. That is, the parallel trend assumption is likely to hold, as the two types of lenders perform similarly and form comparable treatment and control groups before the shock hits.

Second, savings banks show statistically lower total corporate lending relative to credit co-

Table 2: Baseline Results

	Total		Short		Long		Revolving		Non-Revolving	
	(1) All	(2) Matched	(3) All	(4) Matched	(5) All	(6) Matched	(7) All	(8) Matched	(9) All	(10) Matched
Panel A: Longer Window [-5,+9]										
After × Savings Banks	-0.224***	-0.254***	-0.067*	-0.091**	-0.156***	-0.152***	-0.006	0.017	-0.218***	-0.270***
	(0.055)	(0.064)	(0.035)	(0.039)	(0.041)	(0.047)	(0.022)	(0.024)	(0.051)	(0.059)
Observations	2418	1182	2418	1182	2418	1182	2418	1182	2418	1182
Adjusted R-Square	0.993	0.994	0.979	0.985	0.994	0.996	0.968	0.984	0.993	0.994
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Panel B: Shorter Window [-3,+3]										
After × Savings Banks	-0.149***	-0.191**	-0.029	-0.064	-0.119***	-0.120**	0.004	0.009	-0.154***	-0.200***
	(0.032)	(0.077)	(0.021)	(0.051)	(0.023)	(0.049)	(0.014)	(0.029)	(0.029)	(0.071)
Observations	2418	1182	2418	1182	2418	1182	2418	1182	2418	1182
Adjusted R-Square	0.997	0.997	0.991	0.993	0.998	0.998	0.983	0.992	0.997	0.997
Bank FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BISTA, 2019M10-2020M12, own calculations.

operatives since the first month after the COVID shock. The weaker lending effect is persistent and becomes increasingly pronounced in the initial post-COVID period and then stabilizes five months later. Specifically, in the first month after the shock (2020M4), the savings banks lend less by 0.16 percentage points, and the magnitude is enlarged to 0.71 percentage points five months after the shock (2020M8). After that, the effect is mitigated, but savings banks stay a tighter lender than credit cooperatives by 0.41 percentage points by the end of 2020.

Third, by categories of lending, savings banks do not show a weaker role in revolving loans in any month in the sample but present a much more disadvantaged position in nonrevolving loans starting from one month after the shock. Moreover, the gap in short-term lending between savings banks and credit cooperatives is small and only significant four months after the shock; meanwhile, the gap in long-term lending is realized faster and is more persistent and pronounced. Taken together, the weak lending effect of savings banks is dominated by long-term and nonrevolving loans.

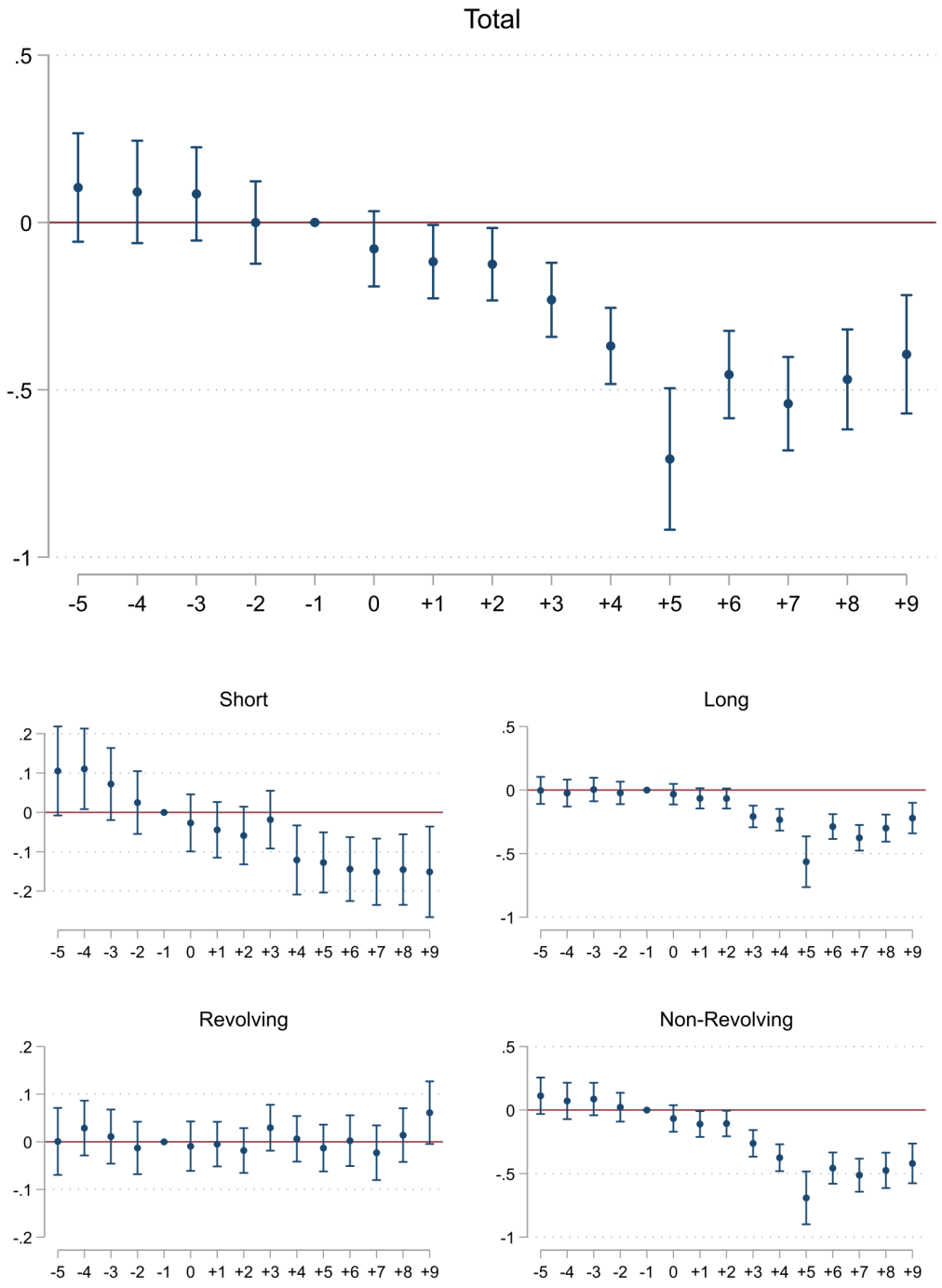

Figure 3: Dynamic Effects

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BISTA, 2019M10-2020M12, own calculations.

4.3 Heterogeneous Exposure to COVID and Credit Demand

Estimates of the specifications in equations (3) and (4) are shown in Table 3. Columns (1)-(6) and (7)-(12) are based on WFH unavailability and an abnormal reduction in employment as sector-level exposure to COVID, respectively. As described in Section 3, these two measurements are standardized to have a mean of zero and a standard deviation of one. Note that the sector-time fixed effect here can fully saturate the change in credit demand during the crisis period, and the result originates from the banks.

The coefficients of the triple interaction term are significantly negative when the dependent variable is total lending, and this finding is consistent using both WFH and EMP measurements. Specifically, based on columns (1)-(2), for sectors that are more unable to provide WFH capacity by one standard deviation, savings banks lend less to these sectors compared to credit cooperatives after the shock by 0.020 to 0.028 percentage points, which are equivalent to more than 20% of the normalized difference. Moreover, column (1) indicates that weaker lending by savings banks is only present in sectors that are more exposed by at least 0.6 standard deviations. A similar conclusion can be found in columns (7)-(8) when the abnormal employment reduction is used as a heterogeneous exposure, although with a smaller magnitude, which could arise from the *Kurzarbeite* policy that motivates firms to maintain employment by cutting working time; thus, the reduction in employment in Germany might underestimate the shock of COVID in each sector. These results show that savings banks not only have smaller overall lending but that the lower credit supply is particularly targeted at those sectors that are more negatively affected by the COVID-19 crisis.

Moreover, when we separate the short-term and long-term lending, the role of sector-level exposure is very small or insignificant for short-term lending but more pronounced for long-term lending, which is consistent with the baseline finding of a stronger effect on long-term loans. Specifically, a one standard deviation increase in sectoral exposure is associated with savings banks issuing fewer long-term loans to this sector by 0.025 to 0.028 percentage points relative to credit cooperatives in the post-COVID period, and this effect is larger than that on overall lending.

Table 3: Sectoral Exposure to COVID

	WFH						EMP					
	Total		Short		Long		Total		Short		Long	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Longer Window: [-2,+3] quarters												
After × Sector Exposure × Savings Bank	-0.020**	-0.021***	0.004*	0.004*	-0.024***	-0.025***	-0.010**	-0.011**	0.006**	0.006***	-0.016***	-0.017***
	(0.008)	(0.008)	(0.002)	(0.002)	(0.007)	(0.007)	(0.004)	(0.004)	(0.002)	(0.002)	(0.004)	(0.004)
After × Savings Bank	0.012**		-0.002		0.015***		0.012**		-0.002		0.015***	
	(0.006)		(0.002)		(0.005)		(0.006)		(0.002)		(0.005)	
Observations	25726	25726	25726	25726	25726	25726	25726	25726	25726	25726	25726	25726
Adjusted R-Square	0.981	0.981	0.963	0.964	0.979	0.979	0.981	0.981	0.963	0.964	0.979	0.979
Bank-Sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector-Time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bank-Time FE	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Shorter Window: [-1,+1] quarters												
After × Sector Exposure × Savings Bank	-0.027***	-0.028***	-0.000	-0.001	-0.027***	-0.028***	-0.016**	-0.017**	0.005	0.005	-0.021***	-0.022***
	(0.007)	(0.007)	(0.002)	(0.002)	(0.007)	(0.007)	(0.008)	(0.008)	(0.004)	(0.003)	(0.007)	(0.007)
After × Savings Bank	0.018***		-0.003		0.020***		0.018		-0.003		0.020*	
	(0.005)		(0.002)		(0.005)		(0.012)		(0.003)		(0.011)	
Observations	25710	25710	25710	25710	25710	25710	25710	25710	25710	25710	25710	25710
Adjusted R-Square	0.984	0.984	0.970	0.971	0.982	0.982	0.984	0.983	0.970	0.970	0.982	0.981
Bank-Sector FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector-Time FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bank-Time FE	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BISTA and VJKRE, 2019Q4-2020Q4, own calculations.

5 Discussion

In this section, we extend the investigation by utilizing the different degrees of lockdown and other mitigation policies across states and examining the political role of state-owned savings banks to understand their weaker lending during the crisis.

5.1 Banks' Exposure to COVID-19

Banks' lending adjustment to the COVID-19 shock could depend on their exposure to the outbreak and containment policies to combat the health crisis (Beck and Keil, 2021; Dursun-de Neef and Schandlbauer, 2021). Now, we test whether the differences in lending behavior between savings banks and credit cooperatives are also dependent on the severity of the shock.

We use two types of variables to measure the exposure to COVID-19 in each state. The first is based on the COVID-19 Community Mobility Report by Google, which measures visitor numbers

to specific locations relative to baseline before the outbreak of coronavirus.[10] We use the mobility of visiting grocery stores and transit stations to capture the impact of lockdowns on essential living and transportation. The second is the infection rates (per 100,000), which is calculated based on the JHU CSSE COVID-19 Dataset that documents the number of confirmed cases in each region.[11] Both mobility change and infection rate data are available for each state of Germany at a daily frequency. The greater the decline in mobility and the larger the infection rates are, the higher the exposure of the state. We first calculate the average in the first three months since the pandemic (2020M3-20205) for each state, then use the median value to divide the 16 federal states into high and low exposed locations, and finally match banks with states in which they are located.

We repeat the DID estimation for each subsample of low- and high-exposed banks using total corporate lending as the dependent variable and present the results in Table 4. In places where the mobility restriction and infection rates are low, the treated and control banks do not display significant differences in total lending after the COVID-19 shock. The weaker lending by savings banks only appears in places that are highly exposed. In addition, across the three measurements of exposure, the results are more pronounced when the infection rates are used to classify low- and high-exposed states than when the mobility declines in grocery stores and transit stations. This finding could imply that the fear of the spread of the virus plays an even larger role than containment policies on the economic impact.

5.2 Political Role of State-Owned Banks

The weaker lending during the COVID-19 crisis by savings banks relative to credit cooperatives seems to suggest that the political role prevails over the social role of government ownership (Iannotta et al., 2013; Englmaier and Stowasser, 2017; Koetter and Popov, 2021). To further study the political role, we focus on the time-in-office and political ideology of the party or party coalition

[10]Baseline days represent a normal value for that day of the week, given as median value over the five-week period from January 3rd to February 6th 2020. For more details, see https://www.google.com/covid19/mobility/

[11]The JHU CSSE COVID-19 Dataset is the COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. https://github.com/CSSEGISandData/COVID-19

Table 4: Geographic Exposure to Pandemic

	Mobility-Grocery		Mobility-Transit		Infection Rates	
	(1)	(2)	(3)	(4)	(5)	(6)
	Low	High	Low	High	Low	High
	Panel A: Longer Window [-5,+9]					
After × Savings Banks	-0.217	-0.258*	-0.241	-0.229*	-0.107	-0.318**
	(0.201)	(0.142)	(0.219)	(0.137)	(0.184)	(0.154)
Observations	454	728	402	780	422	760
Adjusted R-Square	0.995	0.994	0.995	0.994	0.995	0.993
Bank FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES
	Panel B: Shorter Window [-3,+3]					
After × Savings Banks	-0.117	-0.207**	-0.142	-0.178**	-0.020	-0.212**
	(0.100)	(0.089)	(0.105)	(0.086)	(0.101)	(0.099)
Observations	454	728	402	780	422	760
Adjusted R-Square	0.998	0.997	0.998	0.997	0.998	0.997
Bank FE	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BISTA, 2019M10-2020M12, own calculations.

in power before the pandemic.

First, the state election in Germany takes place every four to five years, and the dates of elections vary from state to state. We define a short time-in-office when the ruling parties were elected within 12 months of the COVID-19 breakout in Germany (2020M3) and a long time-in-office when they were elected more than 12 months before. We also use 24 months as an alternative criterion. Next, we look at the ideology of the leading party in each state during the sample period and classify them into subsamples with left and right political positions.[12] Generally, the left parties tend to pursue social justice while the right parties are more influenced by economic liberalism.

We estimate the baseline DID specification using each subsample and present the results in

[12]Specifically, for the parties that are relevant in this process, the following parties are on the left in terms of political position: Grüne (the Green), SPD (Social Democratic Party of Germany), Die Linke (the Left), and these are on the right: CDU (Christian Democratic Union of Germany)/CSU (Christian Social Union in Bavaria), FW (Free Voters), FDP (Free Democratic Party).

Table 5. It shows that the difference between savings banks and credit cooperatives is only observable in the states in which the current ruling parties have been in office for a relatively long time and hold a pro-right political position. In other words, if banks are in states in which the government is newly elected or lies on the left side of the political spectrum, then savings banks and credit cooperatives perform similarly during the crisis period. Moreover, the contrast between subsamples of different political environments is larger in the longer window, thus implying that the existence of political roles of state-owned banks becomes stronger with the development of the COVID-19 crisis.

Table 5: Political Environment

	Time in Office		Time in Office		Party Ideology	
	(1)	(2)	(3)	(4)	(5)	(6)
	Short (<12M)	Long (>=12M)	Short (<24M)	Long (>=24M)	Left	Right
Panel A: Longer Window [-5,+9]						
After × Savings Banks	-0.257	-0.230*	-0.077	-0.353**	-0.244	-0.263*
	(0.603)	(0.124)	(0.155)	(0.175)	(0.270)	(0.136)
Observations	52	1130	440	742	262	920
Adjusted R-Square	0.999	0.994	0.995	0.994	0.996	0.993
Bank FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES
Panel B: Shorter Window [-3,+3]						
After × Savings Banks	-0.318	-0.160**	-0.096	-0.232**	-0.144	-0.184**
	(0.249)	(0.074)	(0.104)	(0.096)	(0.124)	(0.084)
Observations	52	1130	440	742	262	920
Adjusted R-Square	0.999	0.997	0.997	0.998	0.999	0.997
Bank FE	YES	YES	YES	YES	YES	YES
Month FE	YES	YES	YES	YES	YES	YES

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank, BISTA and VJKRE, 2019M10-2020M12, own calculations.

6 Conclusion

By adopting a difference-in-differences specification combined with propensity score matching, this paper uses the microdata of German banks to examine the role of government-owned banks

in corporate lending during the COVID-19 crisis. Overall, we find a significantly weaker role of government-owned savings banks compared to matched credit cooperatives. Specifically, the lower lending effects of state-owned banks are particularly pronounced for long-term and non-revolving loans and are insignificant for short-term and revolving loans. Moreover, the negative impact of government ownership is larger for sectors and regions that are more exposed to the COVID-19 shock, which implies that savings banks misallocate credit since they do not issue it to borrowers who are more desperate. Last, the political environment, including time-in-office and party ideology, plays a role in the performance gap between savings banks and credit cooperatives.

These findings add evidence to the political roles of government-owned banks and have important implications for policymakers who attempt to rescue the economy during crisis times. Incentives of state-owned banks should therefore be taken into account when allocating public funding and channeling credit to borrowers in need.

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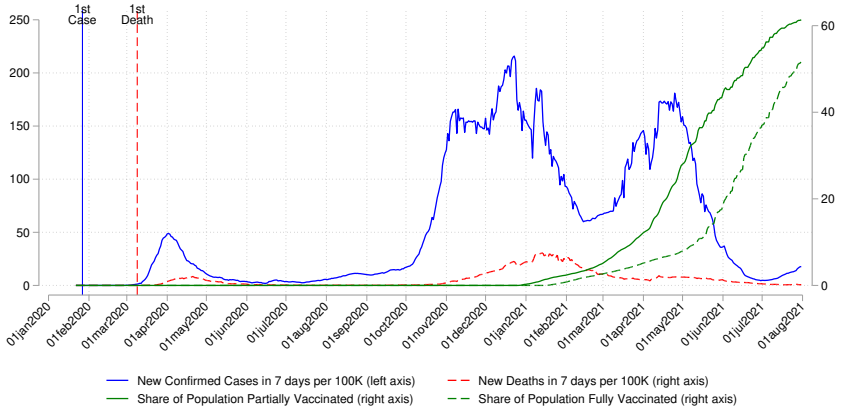
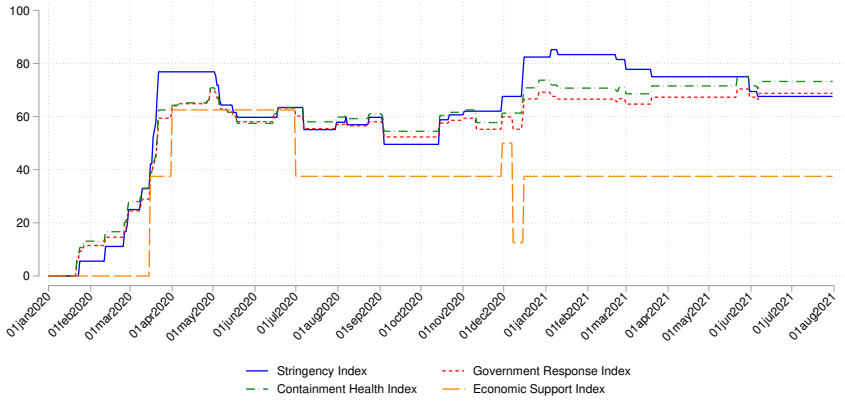
Internet Appendix

((A)) COVID-19 Situation



((B)) Overall Policy Responses (Oxford)



((C)) Banking Sector Policy Responses (World Bank)

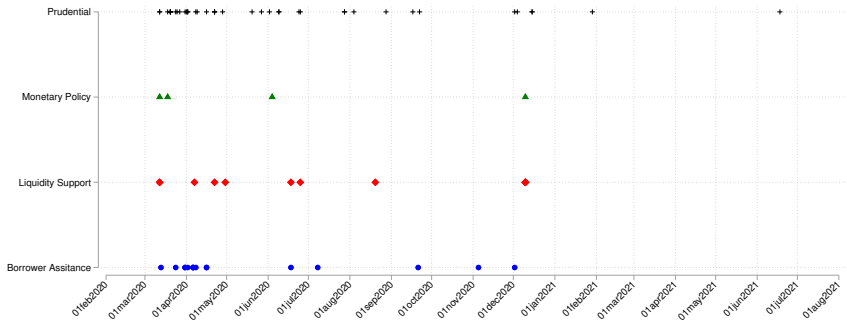


Figure A1: COVID-19 in Germany

Note: The COVID-19 cases and deaths data in panel A is from the JHU CSSE COVID-19 Dataset; the data of government policy measures to combat COVID-19 in Panel B is from the Oxford Covid-19 Government Response Tracker (OxCGRT); the announcements of measures targeting at banking sector from the World Bank. The JHU CSSE COVID-19 Dataset is the COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. https://github.com/CSSEGISandData/COVID-19 Detailed descriptions of the OxCGRT data can be found in Hale et al. (2021). https://github.com/OxCGRT/covid-policy-tracker Detailed descriptions of the World Bank Covid-19 Financial Sector Responses data can be found in Feyen et al. (2020). https://datacatalog.worldbank.org/search/dataset/0037999

Table A1: Number of Banks in German Banking System

Month	Total	Landesbank	Savings Bank	Credit Cooperative	Commercial Bank
			Number of Banks		
2019-10	1543	6	380	850	260
2019-11	1535	6	380	842	260
2019-12	1534	6	380	842	259
2020-01	1532	6	379	842	258
2020-02	1533	6	379	842	259
2020-03	1533	6	379	842	259
2020-04	1531	6	378	842	258
2020-05	1530	6	378	841	258
2020-06	1530	6	378	841	259
2020-07	1527	6	377	840	258
2020-08	1526	6	377	839	258
2020-09	1518	6	377	829	260
2020-10	1511	6	377	822	260
2020-11	1501	6	377	815	257
2020-12	1501	6	377	815	257
			Total Assets (billion Euro)		
2019-10	8494.309	845.973	1340.787	974.912	3533.967
2019-11	8558.136	843.529	1354.479	985.491	3567.044
2019-12	8358.519	807.215	1341.727	982.932	3444.678
2020-01	8529.401	840.005	1351.235	985.927	3559.583
2020-02	8714.677	858.824	1357.567	989.946	3694.884
2020-03	8963.386	871.39	1362.444	993.37	3863.577
2020-04	9064.172	879.085	1379.456	1006.33	3910.337
2020-05	8968.275	880.969	1394.158	1018.526	3790.937
2020-06	9082.205	879.346	1402.45	1029.232	3864.893
2020-07	9126.176	879.643	1416.051	1037.345	3907.496
2020-08	9043.261	864.546	1420.594	1042.294	3832.21
2020-09	9155.218	866.963	1431.547	1048.465	3871.076
2020-10	9183.37	879.831	1446.408	1058.583	3870.941
2020-11	9154.47	856.315	1455.839	1065.802	3845.014
2020-12	9002.095	807.438	1463.723	1072.68	3753.218

Table A2: Sector Classification in VJKRE

Industry Group	Main Activity	Sector Codes in WZ2008
1	Agriculture, forestry, fishing, and aquaculture	010, 020, 030
2	Electricity, gas and water supply; refuse disposal, mining and quarrying	050, 060, 070, 080, 090, 350, 360, 370, 380, 390
3	Chemical industry, manufacture of coke and refined petroleum products	190, 200, 210
4	Manufacture of rubber and plastic products	220
5	Manufacture of other non-metallic mineral products	230
6	Manufacture of basic metals and fabricated metal products	240, 250
7	Manufacture of machinery and equipment; manufacture of transport equipment; repair and installation of machinery and equipment	280, 290, 300, 330
8	Manufacture of computer, electronic and optical products	260, 270, 950
9	Manufacture of wood and wood products; manufacture of pulp, paper and paper products, printing; manufacture of furniture; manufacturing nec	160, 170, 180, 310, 320
10	Manufacture of textiles, apparel and leather goods	130, 140, 150
11	Manufacture of food products and beverages; manufacture of tobacco products	100, 110, 120
12	Construction	410, 420, 430
13	Wholesale and retail trade; repair of motor vehicles and motorcycles	450, 460, 470
14	Transportation and storage; post and telecommunications	490, 500, 510, 520, 530, 790
15	Financial intermediation (excluding MFIs) and insurance companies	64D, 64E, 64F, 64G, 64H, 64J, 64K, 64L, 64M, 64N, 65A, 65B, 65C, 660
16	Housing enterprises	68A
17	Holding companies	70A
18	Other real estate activities	68B, 810
19	Hotels and restaurants	550, 560
20	Information and communication; research and development; membership organisations; publishing activities; other business activities	580, 590, 600, 610,620, 630, 690, 70B, 710, 720, 730, 740, 780, 800, 820, 830, 940
21	Health and social work (enterprises and self-employment)	750, 860, 870, 880
22	Rental and leasing activities	77
23	Other service activities	940, 950, 960