# Rent-Seeking in Elite Networks

Rainer Haselmann* David Schoenherr† Vikrant Vig ‡

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**Abstract**

We employ a unique dataset on members of an elite service club in Germany to investigate how elite networks affect the allocation of resources. Specifically, we investigate credit allocation decisions of banks to firms inside the network. Using a quasi-experimental research design, we document misallocation of bank credit inside the network, with state-owned banks engaging most actively in crony lending. The aggregate cost of credit misallocation amounts to 0.13 percent of annual GDP. Our findings, thus, resonate with existing theories of elite networks as rent extractive coalitions that stifle economic prosperity.

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*Goethe University Frankfurt. Email: haselmann@safe.uni-frankfurt.de

†London Business School. Email: dschoenherr@london.edu

‡London Business School and CEPR. Email: vvig@london.edu

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"*People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices.*"
Adam Smith, Wealth of Nations, 1776.

# 1 Introduction

In an insightful and thought-provoking book, entitled "*Bowling Alone: The Collapse and the Revival of American Economy*", Putnam (2000) made an important revelation about the declining trend of social engagement in the American society. Using an enormous database, Putnam documents that Americans today are less social and more disconnected from each other than they were in the past. The advent of IT, the proliferation of mass media, changes in family structures, increased mobility, and increased pressures on time and money have all contributed to the changes in patterns of social engagement across the globe. Putnam (2000) argues that this decline in social capital is detrimental for the well-being of the society, a view that is supported by some influential recent research that documents the important role of social capital in alleviating market frictions and thereby fostering economic development (Knack and Keefer 1997; Guiso, Sapienza, and Zingales 2004; Karlan, Mobius, Rosenblat, and Szeidl 2009).

However, social capital may not be unambiguously benign. In seminal work Olson (1982) identifies the emergence of self-serving interest groups, collusive networks and lobbies that are created to further their interests largely at the expense of broader economic prosperity. Olson (1982) argues that, after a period of stable growth, countries have a tendency to accumulate rent-extracting institutions that ultimately lead to the decline of nations. Compared to more direct and visible forms of corruption in developing countries, those distributional institutions provide a means of a more subtle and disguised way of rent-extraction in developed economies.[1]

Interestingly, during the same time period that is studied by Putnam, elite service club organizations have bucked this declining trend and have continued to flourish (see Figure 1, which plots the growth in membership to the largest two clubs in Germany). Membership to those service clubs is considered prestigious and these clubs ensure exclusivity through stringent member selection criteria. Typically, club members comprise local politicians, and professional and business leaders. While the primary objective of these clubs is to raise money to fight diseases, reduce poverty and educate people, there is a general perception

[1] This, according to Olson 1982, was the reason why Germany and Japan grew at a much faster rate than Britain after the Second World War, which was saddled by these growth inhibiting collusive organizations.

that social connections established in the club are highly valuable to its members. Under Putnam's view the persistence and growth of these service clubs, despite a secular decline in other forms of social engagement, would be a positive development. However, the service clubs with their exclusive nature also bear resemblance with the 'distributional' institutions described in Olson (1982).

In this paper, we examine the role of those elite networks in the allocation of resources in the economy.[2] Given their wide prevalence and their representation of a large share of local political and business leaders a large fraction of resources is under the control of service club members.[3] Our focus here is on the allocation of credit between banks and firms whose officials are members of this club. Specifically, we hand-collect data on members – both firms' CEOs and bank directors – for 211 service club branches, from 1993 to 2011, to capture both cross-sectional and time series variation in social proximity, and we obtain very detailed contract-level financial data on these members from the Deutsche Bundesbank. We are thus able to create a unique dataset on social networks that provides very granular information on social networks combined with detailed accounting information.

We focus on credit allocation for several reasons. First, efficient allocation of credit is an important engine of economic growth (King and Levine 1993; Rajan and Zingales 1998). The sheer magnitude of credit being allocated in these clubs makes it an important laboratory to study. Second, data on bank lending is available at the very micro-level, allowing us to exploit time-series and cross-sectional variation in detail. Finally, examining credit allocation allows us to understand the mechanism that is at work. Asymmetric information and moral hazard pose major impediments to financial contracting. Social capital between lenders and borrowers is understood to relax informational constraints that adversely affect lending (Guiso, Sapienza, and Zingales 2004), and improve enforcement by providing social collateral (Karlan et al. 2009).[4] On the other hand, consistent with the dark side view of social capital, expressed by Olson (1982) and Adam Smith, social connections between borrowers and lenders may generate new frictions from rent-seeking and favoritism that distort the allocation of credit in the economy.

We find that banks misallocate credit inside the network, consistent with the dark side view of social capital propagated by Olson (1982). The preferential allocation of credit takes a rather subtle form. It does not come explicitly from observably lower interest rates, but rather from excessive continuation of underperforming firms. Rough estimates of the overall

[2]Due to confidentiality reasons we are not able to disclose the name of the service club organization.

[3]About five percent of all bank loans are extended within one such service club organization alone and are therefore subject to the effects of social capital, generated through social interactions between bank directors and firms' CEOs in those club. Taking into account the total number of service club members in Germany, the share of bank loans contracted between club members is about 12.5 percent.

[4]Engelberg, Gao, and Parsons (2012) provide additional evidence in support of this view.

costs generated by preferential credit allocation inside the network suggest that the total costs of capital misallocation amount to 0.13 to 0.19 percent of annual German GDP.

Despite the abundance of anecdotes on rent-seeking and collusion in social networks, there is scant empirical evidence on this topic, especially when it comes to the allocation of credit.[5] This is certainly not because of its lack of importance; there is a growing recognition that rent-seeking and collusion is ubiquitous and imposes substantial costs on the society. However, empirically identifying such behavior has proven to be very difficult, as both the bright-side (information and enforcement channels) and the dark-side views (collusion and favoritism) generate observationally equivalent outcomes.

Economists have long struggled to distinguish empirically between taste-based (favoritism) and statistical discrimination (Becker 1957; Arrow 1973; Phelps 1972). The challenge faced by scholars in identifying rent-seeking behavior is very similar in spirit to the challenge researchers face when trying to identify the presence of taste-based discrimination. To add to this, researchers have to grapple with serious selection issues – formation of social networks is not random and people often self-select into social groups that have interests aligned with their own (Lazarsfeld and Merton 1954). In our context, firms whose CEO is part of a social network might share characteristics that distinguish them from firms whose CEO is not part of the same network. The main identification challenge is to isolate the impact of social proximity from spurious effects caused by selection.

We tackle the endogenous selection issue in several ways. From the outset, it should be noted that our analysis focuses on firms that are members of the same service club organization. In other words, our analysis does not compare firms that are members of the club with firms that are not members of the club. Instead, we compare firms whose CEOs are members of the same club branch as the banker (referred to as in-group) with firms whose CEOs are members of a different branch of the same service club in the same city (referred to as out-group). Since members of this service club are selected with the same ideological criteria, this should alleviate most selection concerns to a large extent. Moreover, the same bank that is an in-group bank for one club branch, is an out-group bank for another club branch. By comparing the same bank's lending to firms whose CEOs are members of its club branch with firms whose CEOs are not connected to the bank, we are able to control for the time-invariant sources of unobserved bank heterogeneity.

To quantify the effect of social proximity on lending, our empirical strategy, which is essentially a difference-in-differences methodology, compares for the same firm, quarter-by-

[5] Two notable exceptions are La Porta, Lopez-de Silanes, and Zamarripa (2003) who investigate the negative consequences of *related lending* in Mexico and Khwaja and Mian (2005) who document the negative effects of *political connections* on lending in Pakistan.

quarter, the financing provided by in-group banks to that provided by out-group banks. This empirical strategy thus controls for demand-side effects, such as changes in investment opportunities. We begin our analysis by investigating two events that generate perturbation in social proximity: 1) entry of new members to a club branch, and 2) formation of a new club branch within a city.[6] Entry of firms is driven by rules, such as the 'one member per industry' rule. Thus, the entry of new members only takes place once their industry sector slot becomes vacant (i.e., existing members retire). Similarly, the formation of a new club branch, follows a highly regulated process that involves the agreements of a district extension committee and the district governor. Since these events are driven by pre-defined rules, it lends credibility to our research design. As will become evident, our analysis goes into great depth in ensuring that the exclusion restrictions are not violated.

The main identification strategy exploits mayoral elections. In Germany, the mayor of a district often directly becomes the local state bank's supervisory board chairman.[7] In his capacity as a chairman of the supervisory board, the mayor commands a large influence on the loan-granting activity of the bank, especially for corporate loans.[8] So, while the elected candidate is always a member of the club branch, the degree of influence changes with the election. Importantly, the mayoral election is independent of time series changes in firm characteristics. It is further independent of changes in bank quality that would be of concern in case of bank entry. The mayoral election thus provides exogenous time series variation in the members' ability to access and approve funds, free from other influences.

The following facts emerge from our analysis. In-group banks have an 18.35 percent higher market share among members of their own club branch, compared with members of other branches in the same city. On average, entry to branches leads to an increase in the fraction of total firm loans borrowed from the in-group bank by 10.03 percentage points. On examining mayoral elections, we find that when a club member is elected as a mayor and becomes the head of the local state bank, the share of loans from the state bank increases by 5.63 percentage points. The evidence on mayoral elections is reinforced by comparing firm lending around mayoral elections for which the mayor is not appointed as the chairman of the supervisory board of the local savings bank. Using this event as a placebo test, we can isolate the effect of state bank proximity from the proximity to the mayor. If a club member is elected as a mayor, but is not appointed as the head of the local state bank, there is no effect on in-group financing. We further explore the dynamics of lending around these events

[6]Membership is offered to individuals. So when we state that a firm joins a club branch, it implies that the firm's CEO joins a club branch.

[7]Whether the mayor is the chairman depends on the size of the city relative to the county. We discuss this issue in detail later in the paper.

[8]As a rule, decisions on large loans require approval by the credit committee (*Kreditausschuss*) which is often chaired by the mayor.

and find that our results cannot be explained by pre-treatment trends.

We find that social proximity also significantly increases firms' total debt by 32.22 percent. This finding is confirmed when we examine branch formations and mayoral elections. On examining the *intensive* and the *extensive* margins, we find that an increase in the degree of social connectedness leads not only to more lending to firms that already have an existing relationship with the in-group bank, but it also increases the probability of forming a new relationship with this bank by 11.44 percent relative to out-group banks.

To evaluate the efficacy of resource allocation in elite networks, we calculate the return on loans (ROL) that banks generate from in-group vis-à-vis out-group transactions. A simple informational or enforcement theory should lead to a better allocation of credit, thereby improving the ROL of the bank. A favoritism or a rent-seeking theory, on the other hand, predicts that the ROL is lower for in-group compared to out-group loans originated by the same bank. Since we are able to measure ex-post loan performance, all contract features that affect the banks' returns, e.g. differences in collateral, are accounted for. Thus, our analysis is robust to differences in contract features.

We find that a given bank generates a 3.23 percentage points lower ROL on in-group loans compared to out-group loans. In addition, the ROL of in-group banks is significantly lower when compared to out-group banks for the *same* firm. Investigating the drivers of the difference in ROL, we find that it mostly comes from the difference in returns generated from lending to firms in financial distress. While interest rates and recovery rates on loans are not much different for in-group loans compared to out-group loans, banks lend disproportionately more to in-group firms that are closer to distress, and thus the banks lose a lot more when these firms default. It should be noted that banks not only generate lower returns on connected loans compared to other loans, but these loans earn returns well below the risk-free rate and often the connected loan portfolio generates a negative ROL for the bank. Furthermore, connected loans also exhibit higher return volatility. Clearly, such a pattern cannot be rationalized by the action taken by a risk-averse lender who trades off ROL for lower risk.

In addition to lower ROL for banks, the misallocation of credit in the economy induces inefficiencies in the deployment of capital. An important role of banks is to screen firms with profitable investment opportunities and allocate capital to its most profitable usage. This link, however, breaks down when we look at in-group lending. Banks' in-group financing is less sensitive to firms' investment opportunities compared to their out-group lending. This distortion in banks' capital allocation hinders credit to flow to the most profitable investment projects, which in turn reduces the productivity of the economy. Examining how firms deploy the extra financing they receive through their membership to the network, we find that firms do not use the extra financing to make new investments, something one would expect if social proximity to the lender relaxed financing constraints. Instead, firms use these funds to increase payments to the shareholders, which in most cases means paying out to the CEO, as most of these are relatively small, family-owned firms. Furthermore, the increase in bank credit leads to a significant increase in leverage. The total loans to assets ratio increases by 6.17 percentage points after firms join the club.

We next investigate how the effects vary with bank ownership. Such a comparison across different bank groups (private banks, state banks, cooperatives) allows us to examine the effect of incentives and governance structures on the social proximity effect.[9] We find that entry of firms to a club branch increases their share of financing by 6.45 percentage points more if the in-group bank is state-owned, compared to when this bank is privately-owned or a cooperative. On examining the ROL, we find that, while the effects are present for both state and private banks, the ROL effect is significantly stronger for state banks. More specifically, the wedge in ROL obtained by the state banks for their in-group loans compared with their out-group loans is significantly larger for state banks.[10] Thus, state banks not only grant more loans to firms in their network, but they also generate much lower ROL within the branch. For cooperatives that present closest counterparts to state-owned savings banks, we find a significantly weaker effect suggesting that better governance can mitigate some of the ill effects of social proximity on lending (Bandiera, Barankay, and Rasul 2009). These results are consistent with the view that state banks, due to blunt incentives, are more likely to engage in crony lending.

This paper shows a dark side of social capital. By distorting the allocation of resources, the presence of rent-seeking in elite social networks has the potential to cause significant damage to the economy. The results in the paper are consistent with investment in rent-extracting institutions by elite members of society (Acemoglu and Robinson 2008, 2012). While there is abundant empirical evidence on the virtues of social capital in fostering economic development (e.g., Knack and Keefer 1997; Guiso, Sapienza, and Zingales 2004), clear-cut empirical evidence on a detrimental role of social capital in stifling economic efficiency is scarce, in particular for developed economies with well-functioning institutions.[11]

[9] The key differences between state, private, and cooperative banks are detailed in Appendix B. In Germany, cooperative banks are organized similarly to state-owned banks sharing the same regional focus. The ownership structure, however, is quite different. Cooperatives are owned by their members, whereas savings banks are owned by the local government. The difference in ownership structure creates different incentives (Jensen and Meckling 1976), with cooperatives having a similar governance structure as private banks, whereas the governance in state-owned banks tends to be of lower quality (Engelmaier and Stowasser 2013).

[10] This test controls for differences in objective functions that might exist between state-owned and privately-owned banks. Since we are looking at the wedge in ROL between in-group and out-group loans, for the *same* bank, we control for inherent differences in these different organizational forms.

[11] Satyanath, Voigtländer, and Voth (2013) show that dense networks of civic associations facilitated the rise of the NS party in Germany.

The paper also contributes to a broader literature on social connections and economic outcomes,[12] as well as the literature on social proximity and bank lending. It is often argued that proximity between banks and firms mitigates informational problems (Petersen and Rajan 2002).[13] Our results suggest that proximity can be a double-edged sword, and that too much proximity may not always be desirable. La Porta, Lopez-de Silanes, and Zamarripa (2003) investigate the negative consequences of *related lending* in Mexico, where related lending is defined as loans to firms that are controlled and owned by the bank's owners. Similarly, Khwaja and Mian (2005) document the negative effects of *political connections* on lending in Pakistan. There are two important differences between the findings in those papers and our findings. First, the nature of connections is very different. In this paper, we examine the effect of *social connections*, as opposed to *ownership* or *political* linkages. Second, as La Porta, Lopez-de Silanes, and Zamarripa (2003) argue, it is not clear whether the negative forces of related lending can be extrapolated to a developed economy, where corruption and other institutional ills are perceived to be low. Our findings highlight that even in an economy with developed institutions, social proximity generates sizeable distortions in credit allocation.

Finally, our paper contributes to the understanding of the difference between state and private financing (La Porta, Lopez-de Silanes, and Shleifer 2002). Governments around the world are taking ownership of large parts of the banking system and, potentially, this public-sector involvement in the banking sector may have considerable long-term effects on all major industrialized countries.[14]

# 2 Institutional Background and Data

## 2.1 Service Clubs in Germany

To identify social capital, we focus on membership information of an important service club organization in Germany. While the service club organization is organized through a global headquarter in the United States, the individual service club branches operate locally in

[12]Granovetter (2005) describes the relationship between social connections and economic outcomes in the sociology literature; Shue (2013) discusses how executive peer networks affect managerial decision-making and firm policies; Lerner and Malmendier (2011) examines social networks and entrepreneurship; Jackson and Schneider (2010) document how social connections reduce moral hazard, Gompers, Mukharlyamov, and Xuan (2012) find that venture capitalists make worse investment decisions when they share social traits; Burchardi and Hassan (2013) show that social connections influence economic growth.

[13]See also Mian (2006) and Fisman, Paravisini, and Vig (2012).

[14]Several papers have documented distortions in lending by state-owned banks and state-regulated banking sectors (Sapienza 2004). For theoretical evidence on this topic, see Krueger (1974) and Shleifer and Vishny (1993, 1994).

almost every city or county in Germany. The clubs bring together members, all of whom are local business and professional leaders, to meet within their club branch once a week over lunch or dinner to socialize. It is mandatory for each club member to attend the weekly meetings on a regular basis to sustain membership.[15] By frequently interacting during those meetings, members built up social capital. While the stated objective of the service club is to raise funds for charitable work, having personal connections to other business leaders is often cited as an important membership perquisite.

A local club branch has about 50 members on average. Typically, there is one branch in each city of about 20,000 inhabitants. In larger cities, formation of additional club branches is common. There are about 1,000 club branches with about 50,000 members in Germany. There are strict membership criteria new members have to fulfill that tend to be based on business or professional leadership. Our sample area comprises all branches of the service club organization in southern Germany (the northern boundary is Saarbruecken, Frankfurt, Erfurt and Hof) during the period from 1993 to 2011.[16] Further details on the data collection are described in Appendix A. We gather membership information on all corporate CEOs and directors of bank branches for 211 clubs in this area (Table 1, Panel A).[17] This provides data for 1,091 corporate CEOs whose firms are listed in the German credit register. Throughout the paper we refer to member firms whenever a CEO of the firm is member of a service club branch. Out of these sample firms, 141 firms defaulted on a loan during our sample period. We exclude firms (five in total) which are listed on the German stock market index (DAX), since these are very large firms with many lending relationships.

The process for a new member to join a specific club branch is as follows: an existing member suggests a new candidate to the other members of a specific branch, who then decide by vote if the candidate may join the branch. Since membership of the service club organization is considered very prestigious, most CEOs and bank directors accept membership invitations to a particular branch. Each profession or business can only be represented once in each club branch, according to the 'one member per industry' rule. A candidate whose industry sector is already represented by an existing member may join once the existing member has been in the club for 15 years.[18] Therefore, in many cases the timing of the entry

[15]Specifically, membership is taken away if a member misses four consecutive meetings or attends less than 50% of the meetings over a period of six months.

[16]The German credit register starts in the second quarter of 1993. Therefore this date marks the beginning of our sample period.

[17]A particular service club branch is included in our sample if there is at least one CEO whose firm has taken out a bank loan that is recorded in the credit register of the Deutsche Bundesbank. Our sample firms have the following legal structure: 944 are head of a limited liability firm (GmbH), 57 members are heads of a private firm (KG and OHG), and 90 are CEOs of publicly listed firms (AG).

[18]If a member reaches the age of 60 and has been a member of the club for at least 10 years, or reaches the age of 65 and has been a member for at least five years, a new member of his industry may join.

of new members depends on the date when the industry slot becomes available. During our sample period, 474 CEOs enter a club branch.

There are distinct rules that govern the formation of new club branches. The district governor, who is the local head of a district of the service club organization, appoints a district extension committee, tasked mainly with identifying communities that are currently without club branches or communities that have existing branches, but where an additional branch is beneficial. The communities must meet the population criteria requirement for chartering a new branch. For instance, it is required that each branch must have at least 25 businessmen or professionals from the local community. In addition, for communities that have existing branches, it is the job of the extension committee to ensure that the establishment of the additional branch does not negatively affect existing branches.

The 1,091 firms whose CEOs are club members take out loans from 542 distinct banks. We define a bank as a club bank if the director of the bank or local bank branch is a member of a club branch. In Germany, private banks have different organizational characteristics compared with state-owned and cooperative banks. Private banks, are generally larger in size, and provide a wide array of transaction services to the customers. Compared to state-owned savings banks and cooperatives that have more of a local presence, private banks operate in different geographical areas through their local branches. Cooperative and state-owned banks have a very similar business model, but different control structures; state-owned banks are controlled by local politicians, while cooperative banks are owned by their customers.[19] Given the differences in organizational structure, private bankers in our sample are directors (heads) of a local bank branch, while directors of public and cooperative banks are heads (CEOs) of local banks. We identify 352 club bankers,[20] 173 of which are from a private bank, 138 from a state bank, and 41 from a cooperative bank.

Finally, there is an interesting feature of German saving banks that we exploit for identification in this paper. Since German savings banks are owned by local cities, the respective mayor is often also the chairman of their supervisory board. While he is not explicitly involved in managing the bank, he has a large influence on the banks' loan-granting activity.[21] The election of a member of a specific club branch member as a mayor thus generates a time series variation in the member's ability to approve state bank funds. In our sample, we identify 20 cases in which an existing branch member was elected as a mayor for the first time and subsequently became chairman of the state bank's supervisory board, in 16

[19]See Appendix B for a detailed overview of the German banking sector.

[20]Some clubs have two bankers among their members because some bankers have been connected to a club branch for more than 15 years and, thus, do not block the industry sector slot anymore.

[21]Since savings banks are, on average, small institutions, large loans bear a particular risk for these banks. Therefore, these banks have a credit committee in place to approve loans. The chairmen of the bank's supervisory board also chair these credit committees.

cases an existing member is elected as a mayor and does not become head of the local state bank.[22]

## 2.2 Loan and Financial Statement Data

We collect information on all individual lending relationships of our sample firms from the credit register at Deutsche Bundesbank. The credit register provides contract-level information on all German firms, whose total outstanding loans in a given quarter exceed 1.5 million euros. We define a loan as an in-group loan if both the CEO of the firm and the bank director of the specific bank or branch are part of the same club branch. As shown in Table 1, Panel B, our sample contains 54,123 firm-quarter loan observations. The average loan amount per lending relationship is 6.4 million euros and the average outstanding loan amount per firm is 13.4 million euros. The firms have, on average, 3.72 different lending relationships over the entire sample period.

We match loan-level data from the credit register with accounting information from the Deutsche Bundesbank's USTAN database.[23] This match yields a sample of 686 firms (5,474 firm year observations).[24] Panel B provides summary statistics on total assets, debt to assets, return on assets (ROA), cash to assets, and borrowing costs for this sample. We also report the corresponding summary statistics for the population of firms contained in the USTAN database to compare them with our sample firms. As can be seen below the reported sample statistics, the variables are fairly similar.

# 3 Empirical Strategy

In our basic identification strategy, we examine whether the accumulation of social capital between firms and banks affects the quantity of financing a firm receives. This implies the estimation of the following specification:

$$q_{jt} \quad = \quad \alpha_j + \alpha_t + \varphi \cdot AFTER_{jt} + \epsilon_{jt} \tag{1}$$

where $q_{jt}$ is the total financing that firm $j$ receives at time $t$; $\alpha_j$ and $\alpha_t$ denote firm and quarter fixed effects; the indicator variable $AFTER_{jt}$ takes on a value of one from the year when firm $j$ enters a club branch, and zero otherwise. In our empirical strategy we also exploit

[22]Whether an elected mayor becomes the head of the local state bank's supervisory board depends on the relative size of the city to its surrounding county. If the county is relatively large, the county administrator generally becomes chairman of the supervisory board of the regional state bank.

[23]Even though the credit register and the accounting information all come from the Deutsche Bundesbank, the two datasets need to be hand matched by company name and location of incorporation.

[24]Note that the loan-level information is available quarterly, while the balance sheet information is annual.

the formation of a new club branch and mayoral election as an event. In the latter case, the $AFTER_{jt}$ dummy takes on a value of one for all member firms that share membership with the elected mayor, and zero otherwise. The parameter $\varphi$ measures how social connections affect firms' ability to access external finance and $\epsilon_{jt}$ captures firm-level demand shocks. It is, however, important to note that changes in the degree of social connectedness, captured by the $AFTER_{jt}$ variable, can also generate demand effects, such as increases in investment opportunities. Then, a potential bias in the estimate $\hat{\varphi} = \varphi + \frac{Cov(AFTER_{jt},\epsilon_{jt})}{Var(AFTER_{jt})}$ is captured by the term: $\frac{Cov(AFTER_{jt},\epsilon_{jt})}{Var(AFTER_{jt})}$.

To identify the supply side effect separately, we employ our contract-level data and compare, for the same firm, quarter by quarter, the quantity of loans granted by in-group banks with the quantity of loans granted by out-group banks. This allows us to control for firm-specific shocks, such as demand shocks, that may coincide with enhanced social proximity. In a regression framework, we estimate the following specification:

$$q_{ijt} \quad = \quad \gamma_{jt} + \gamma_{it} + \gamma_{ij} + \Delta \cdot AFTER_{jt} + \epsilon_{ijt}, \tag{2}$$

where $q_{ijt}$ is the quantity loan from bank $i$ to firm $j$, $\gamma_{ij}$ are relationship-level fixed effects that control for any time-invariant effects between firm $j$ and bank $i$; $\gamma_{jt}$ and $\gamma_{it}$ are non-parametric controls for firm and bank-specific shocks. In this specification, $\Delta$ is the variable of interest - it measures how social connections affect firms' ability to access external finance. For firms that have a single lending relationship, the coefficient $\Delta$ cannot be identified since $AFTER_{jt}$ is absorbed by $\gamma_{jt}$. Our identification thus compares for the *same* firm the quantity of loans granted by in-group banks relative to out-group banks around the event.

While the empirical strategy controls for firm-level demand effects, it generates an upward bias if firms substitute lending from the out-group bank to the in-group bank. To see this, consider two banks, $i$ and $i'$, where $i$ is the in-group bank and $i'$ is the out-group bank, both providing external financing to firm $j$. Assume that the perturbation in the degree of social connectedness, say by the entry event, generates a positive supply-side effect ($\Delta_1$) from the in-group bank. This supply-side effect could come, for example, from a lower cost of financing that results from lower asymmetric information. A lower cost of financing would lead to more club financing, but also to less outside financing (outside financing is now relatively more expensive). Such a substitution effect, if present, is denoted by ($\Delta_2$). This gives us the following system of equations:

$$\begin{aligned} q_{ijt} = & \quad \gamma_{it} + \gamma_{jt} + \gamma_{ij} + \Delta_1 \cdot AFTER_{jt} + \epsilon_{ijt} \\ q_{i'jt} = & \quad \gamma_{i't} + \gamma_{jt} + \gamma_{i'j} - \Delta_2 \cdot AFTER_{jt} + \epsilon_{i'jt}. \end{aligned} \tag{3}$$

Differencing the equations in (3) leads to: $q_{ijt} - q_{i'jt} = \gamma_{it} - \gamma_{i't} + \gamma_{ij} - \gamma_{i'j} + [\Delta_1 + \Delta_2] \cdot AFTER_{jt} + \epsilon_{ijt} - \epsilon_{i'jt}$, which can be empirically estimated in the regression framework:

$$\Delta q_{jt} = \gamma_{it} - \gamma_{i't} + \gamma_{ij} - \gamma_{i'j} + [\Delta_1 + \Delta_2] \cdot AFTER_{jt} + \epsilon_{ijt} - \epsilon_{i'jt} \quad (4)$$

It can be seen from equation (4) that estimation in differences may generate an upward bias in the coefficient of interest. Substitution of loans by firms from out-group to in-group banks would bias the estimated coefficient $\Delta$ upwards – the network effect is $\Delta_1 + \Delta_2$ instead of $\Delta_1$. To deal with this bias, we transform the left-hand side variable to a firm's share of loans from its in-group bank to its total loans (henceforth, in-group bank share).

Shares of inside ($i$) and outside ($i'$) banks are given by:

$$\begin{aligned} \frac{q_{ijt}}{\sum_i q_{ijt}} &= \alpha_{jt} + \alpha_{it} + \alpha_{ij} + \delta \cdot AFTER_{jt} + \epsilon_{ijt} \\ \frac{q_{i'jt}}{\sum_i q_{ijt}} &= \alpha_{jt} + \alpha_{i't} + \alpha_{i'j} - \delta \cdot AFTER_{jt} + \epsilon_{i'jt} \end{aligned} \quad (5)$$

Differencing equations in (5) we get:

$$\frac{q_{ijt}}{\sum_i q_{ijt}} = \frac{1}{2} + \underbrace{\frac{\alpha_{it} - \alpha_{i't}}{2}}_{\approx 0 \text{ on average}} + \underbrace{\frac{\alpha_{ij} - \alpha_{i'j}}{2}}_{\beta_j} + \delta \cdot AFTER_{jt} + \underbrace{\frac{\epsilon_{ijt} - \epsilon_{i'jt}}{2}}_{\epsilon_{jt}} \quad (6)$$

Since computing in-group banks' shares collapses the relationship-specific information from the two equations in (5) into one firm-level observation, this simplifies to:

$$\frac{q_{ijt}}{\sum_i q_{ijt}} = \beta + \beta_j + \delta \cdot AFTER_{jt} + \epsilon_{jt} \quad (7)$$

where the dependent variable is the share of the financing provided by the in-group bank. It should be noted that the specification is quite stringent and already controls in a non-parametric way for firm-specific shocks ($\alpha_{jt}$), such as an increases in investment opportunities etc. that may coincide with increased social proximity. Importantly, our set-up also takes care of bank-specific shocks. In-group banks and out-group banks are not two distinct groups of banks; the same bank is an in-group bank to some and an out-group bank to other firms. Thus, on average, $\alpha_{it} - \alpha_{i't}$ is approximately zero.[25] The variable $\delta$ thus captures a supply

[25] We can further saturate the specification by adding quarter-fixed effects $\beta_t$ in equation (7). We can

effect that results from an increase in proximity to the in-group bank, provided that the covariance between $AFTER_{jt}$ and $\epsilon_{jt}$ is zero. Equation (6) highlights that the nature of a shock that may lead to a bias in $\delta$ would need to be a shock that is correlated with $AFTER_{jt}$ and that affects the borrowing of firm $j$ from in-group bank $i$ differently than its borrowing from out-group bank $i'$. Our empirical strategy tries to ensure that the $AFTER_{jt}$ variable is exogenous from such shocks. Specifically, we look at the entry of firms to branches, the formation of new club branches and mayoral elections. As described in detail below, the election of a member as a mayor changes the proximity between firms and the in-group bank in a manner that is orthogonal to firm-specific shocks, allowing us to identify changes in borrowing free of spurious effects.

# 4 Social Connections and Lending Patterns

## 4.1 Structure of Financing

We start this section by examing the effect of social capital on the allocation of credit by reporting the average share of credit in a club branch that is provided by the in-group bank. This is measured as the ratio of financing provided to firms whose CEOs are members of a club branch by in-group banks to the total financing provided to these firms by all banks. As can be seen from Panel C of Table 1, these firms borrow 25.08 percent of their total loans from in-group banks.

To understand this number better, we exploit a distinct feature of our framework: our sample cities have multiple club branches. This allows us to examine the share of credit provided by in-group banks to firms that are members of other club branches in the same city. The mean share these banks have within the other service club(s) within the same city is only 6.73 percent. The difference between these two shares is large and statistically significant. This difference uncovers an interesting pattern: firms borrow substantially more from their in-group bank than they do from out-group banks. Since the same bank is an in-group bank for one branch, but an out-group bank for another branch, this suggests that these correlations are not driven by differences in bank quality. Moreover, the fact that firms are selected under the same ideological criteria mitigates selection concerns related to the endogenous matching of banks to firms.

even control for shocks to the local bank branch by adding quarter-county fixed effects. Our results remain unaffected by this alternation.

## 4.2 Entry of Firms to Clubs and New Club Formations

We exploit firms' entry to a service club branch to generate variation in social proximity. As outlined in Section 2, a new candidate can only join if her industry sector is not already represented by an existing member. This pre-specified rule gives us an arguably exogenous source of variation in the timing of firms' entry to the network.

A graphical depiction of the average share of credit in a club that is given by the in-group bank is provided in Figure 2. As can be seen, we observe a sharp rise in the share of connected lending subsequent to entry; an increase from 14 percent to 24 percent. In addition, we find no evidence of pre-event trends. The results from running specification (7) are summarized in Table 2. Column I displays the results for the entire sample of firms which joined a club branch, while Column II displays findings only for those firms joining the club through new branch formation. Considering entries, the lending share of in-group banks increases by 10.03 percentage points. Firms that join a club branch during club formation show an increase in borrowing share from in-group banks by 12.53 percentage points.

We further explore the effects of social proximity on total financing and leverage. Since the documented effects are consistent with a *supply-side* effect, it is thus natural to expect that proximity should lead to an increase in total firm borrowing. We replace the dependent variable in equation (7) by the log of aggregate firm borrowing per quarter. The results are gathered in Table 2, Columns III and IV. Total borrowing is, on average, 32.22 percent higher after firms enter the network, relative to the pre-entry period. The magnitude is almost identical for firms participating in branch formation (38.06 percent). On examining leverage, we find that entry to a club branch, increases the leverage ratio by 6.17 percentage points (Column V).[26] For firms that participate in the formation of a new branch, the leverage increases by 6.73 percentage points (Column VI). Thus, the documented increase in total bank loans after entry is not explained by firms' asset growth after joining the club but rather depicts a change in debt usage. To sharpen our analysis further, in the next section we exploit mayoral elections as an additional source of identification.

## 4.3 Mayoral Elections: A Sharper Test

In Germany, the mayor is generally also the chairman of the supervisory board of the local state bank (savings bank). This position gives her substantial executive powers to affect the banks' strategies going forward. The mayor not only has significant influence in the

[26]We include the log of sales and the log of earnings before interest and taxes (EBIT) in the loans to assets regression. While the estimates for the coefficients of both control variables are significant, the coefficient of the loans to assets ratio is almost identical to the estimation without control variables.

management board, but she also has a big say in the appointment of bank managers, in the distribution of banks' earnings and, in the case of large loans, she has to approve the disbursement of credit. In our sample, we identify 20 clubs in which an existing member is elected as a mayor and at the same time is appointed the chairman of the supervisory board. We use this mayoral election to generate exogenous variation in the degree of firms' connectedness with the state bank.

The dynamics of the average share of credit to in-group firms provided by the state bank is depicted in Figure 3. As can be seen, we observe a sharp rise in the share of 'connected lending' subsequent to the mayoral election from 17 percent to 28 percent. In addition, we find no evidence of pre-event trends. In Table 3, we define the $AFTER_{jt}$ dummy to be one from the year of the mayoral election for the firms in the 20 branches that experience a mayoral election. We observe that the share of state bank loans in total firm loans for affected firms increases by 5.63 percentage points following the election (Column I). We further examine whether the mayoral election has an impact on firms' total debt and their leverage ratio. The election of a member as mayor in branches with a state bank leads to an increase in total debt for in-group firms by 23.30 percent (Column II), and an increase in leverage by 4.97 percentage points (Column III).

It is worth highlighting that mayoral elections provide us with exogenous time-series variation in member's ability to access and approve funds. It thus allows us to identify changes in firms' borrowing structures in a setting that is free from other influences, such as time series changes in firm characteristics. A remaining concern might be that change in the proximity with the mayor also affects firms' demand for loans. We therefore provide a placebo test by exploiting 16 elections of an existing club member as a mayor where the newly elected mayor does not become head of the state bank (Columns IV to VI). Whether an elected mayor becomes the head of the local state bank's supervisory board depends on the relative size of the city to its surrounding county. If the county is relatively large, the county administrator generally becomes chairman of the supervisory board of the regional state bank.[27] There is effectively no change in the share of state bank loans in total firm loans (Column IV), firms' total loans (Column V) and their loans to assets ratio (Column VII) around mayoral elections that are not associated with the state bank chairman position. Thus, it is the change in proximity between the state bank and the other club members induced by mayoral elections that drives the previous findings.

[27] The *absolute* difference in the size of cities whose mayor becomes head of the state bank and cities whose mayor does not become head of the state bank is small (mean inhabitants is 60,000 for cities where the mayor becomes chairman of the savings bank and 50,000 for cities where the mayor does not become chairman).

## 4.4 Dynamics of Network Borrowing

We further investigate the issue of reverse causality and CEO entry into clubs by focusing on the dynamics of CEO entry and the share of lending within the club branch. To do so, we replace the $AFTER_{jt}$ dummy variable with five dummy variables – the event dummy, two leads and two lags – that capture the dynamics of network borrowing before and after the point of entrance (Table 4). Importantly, there is no significant pre-treatment trend for firms before entry (Column I), which can be inferred from the small coefficient on the dummy variable that capture the dynamics of network borrowing before entry (0.90 percent), in contrast to the much stronger and statistically significant value on the dummy variable in the year of entry (3.88 percent). The other dummy variables that capture *changes* in in-group bank shares after firms' entry to the club branch show that the increase in the share of loans that firms take out from socially connected banks remains consistently higher following an increase in social proximity. As can be seen in Columns II and III, the dynamics of network borrowing before the formation of new branches and mayoral elections show similar patterns. Examining the corresponding dynamics for firms' total lending and leverage around firms' entry, formation of new branches, and mayoral elections (Columns IV to IX) indicates that there are no pre-treatment trends. Joining a network not only affects the composition of financing, but it also increases the amount of financing that a firm receives.

## 4.5 Intensive Margin and Extensive Margin

The documented increase in the share of in-group banks' lending could occur through existing relationships (intensive margin) and/or new relationships (extensive margin). In order to provide insights into this, we shift our analysis from the firm to the loan (relationship) level and estimate the following equation:

$$log\,(loans_{ijt}) \quad = \quad \alpha_t + \alpha_i \cdot \alpha_j + \omega \cdot AFTER_{jt} + \delta \cdot INGROUP_{ij} \cdot AFTER_{jt} + \epsilon_{ijt}. \quad (8)$$

The dependent variable is the log of loans from bank $i$ to firm $j$. We include quarter ($\alpha_t$) and relationship ($\alpha_i \cdot \alpha_j$) fixed effects. By including relationship fixed effects, we capture the change in lending following entry for the same lending relationship over time. Note that this implies that the identification of changes in loans only comes through relationships that exist before and after the event (intensive margin). The parameter $\omega$ captures the effect of the event on out-group banks and $\delta$ quantifies the additional effect if the bank is an in-group bank. While we find no effect on the quantity of out-group loans, in-group loans go up by 26.31 percent more (Table 5, Column I). In Column II, we saturate the specification by adding firm-event fixed effects.[28] This allows us to compare changes in loans from in-group and out-group banks for the *same* firm. Thus the interaction term $INGROUP_{ij} \cdot AFTER_{jt}$ captures the difference in borrowing of the in-group bank relative to out-group banks as a response to the entry event for the *same* firm. The *same* firm borrowing from in-group and out-group banks experiences a 30.37 percent increase in lending from the in-group bank relative to lending by the out-group banks.

In Columns III to IV, we replicate this analysis for firms that enter a club through the formation of a new branch. As can be seen, the magnitudes for this event are slightly higher. The basic specification shows an increase in lending of 37.73 percent, which increases to 56.93 percent when we saturate the specification by adding firm-event ($\alpha_j \cdot AFTER_{jt}$) fixed effects. We also replicate our analysis for the intensive margin using mayoral elections as the event (Columns V and VI). Regarding the intensive margin we find that lending by state banks increases significantly (41.47 percent) after the election as compared to outside banks. As before, we saturate this specification by adding firm-event ($\alpha_j \cdot AFTER_{jt}$) fixed effects, as this allows us to compare changes in loans from state banks and out-group banks for the *same* firm. We find that *same* firm borrowing from state and out-group banks experiences a 47.70 percent increase in lending from the state bank relative to the lending by outside banks.

Columns VII to XII investigate the extensive margin. Specifically, we examine whether entry of firms to club branches results in formation of a new lending relationship with an in-group compared to an out-group bank. We define a dummy variable that takes the value of one if a relationship is formed between a firm and a bank, and zero otherwise. For this test we treat every connection between a particular firm and each bank lending to at least one firm in the county as a potential relationship. We regress this new relationship dummy variable on the interaction of the $AFTER_{jt}$ dummy and the $INGROUP_{ij}$ dummy variable using ordinary least squares.[29] We find that the probability of forming a relationship with an in-group bank is 11.44 percentage points higher after a firm joins a branch relative to an out-group bank, when compared with the period before entry (Column VII).[30] The effect is even stronger for firms joining by club branch formation (14.72 percentage points, Column IX). The increase in the likelihood of forming a new relationship after the mayoral election is about 10 percentage points higher for state banks relative to out-group banks (Column XI).

[28] This specification bears close resemblance to the lending channel specification employed in Khwaja and Mian (2008). The main exception is that the staggered nature of our events allows us an additional level of differencing.

[29] The results are qualitatively and also quantitatively almost identical to running a probit model.

[30] Since the time window before and after a firm's entry to a branch or participation in branch formation is not the same, only the interaction term can be meaningfully interpreted. The cross-sectional results are not affected when we focus on windows of similar durations both before and after the event.

Adding firm-event fixed effects to compare the probability of establishing a new relationship for the *same* firm does not alter the results (Columns VIII, X and XII).

# 5 Mechanism: Return on Loans

In the previous section we document that membership to the network increases the equilibrium amount of financing that a firm receives. This increase in financing is consistent with a benign view of social capital in reducing market frictions such as information asymmetry, but also with a malign view of social capital in facilitating rent-seeking. In this section, we try to disentangle these opposing views, by comparing the return on loan (ROL) that banks generate on loans given to in-group firms vis-à-vis out-group loans. Since the realized ROL takes into account both the interest payments that are collected on the loans and the losses, it offers an ideal metric to identify the mechanism at work.

## 5.1 Methodology

To calculate the return on a loan we follow a procedure that is very similar in spirit to Khwaja and Mian (2005). Specifically, we calculate the return per euro invested on a loan made by bank $i$ to firm $j$ as follows:

$$ROL_{ij} = \sum_{t=1}^{T} \frac{\theta_t \cdot loan_{ijt}}{\sum_{t=1}^{T} \theta_t \cdot loan_{ijt}} \cdot \left[(1 - \mathbb{1}_{\{def=1\}}) \cdot r_{ijt} + \mathbb{1}_{\{def=1\}} \cdot (\kappa_{ijt} - 1)\right], \qquad (9)$$

where $\theta_t \cdot loan_{ijt}$ is the outstanding loan from bank $i$ to firm $j$ at the beginning of period $t$ discounted at the risk-free rate.[31] Accordingly, $\frac{\theta_t \cdot loan_{ijt}}{\sum_{t=1}^{T} \theta_t \cdot loan_{ijt}}$ is the fraction of the discounted loan outstanding in the current period and the total volume of outstanding loans over the lending relationship from $t = 1$ to $t = T$. The indicator function $\mathbb{1}_{\{def=1\}}$ is one, if the firm defaults in the period between t and t+1, and zero otherwise. The interest rate charged by bank $i$ for firm $j$ is denoted by $r_{ijt}$; the recovery rate is denoted by $\kappa_{ijt}$.[32] Consequently, $(\kappa_{ijt} - 1)$ is the fraction of the loan forgone by the bank in the default period. The weighting is important since loans tend to have higher outstanding amounts in the beginning, and often, if a loan defaults, a considerable fraction of the loans is already repaid.

[31] The discounting is simply done to account for the time value of money. Since most of our analysis is cross-sectional, the discounting has no significant effect on our results.

[32] Interest rates can be obtained by matching the credit register with the financial statements (see Appendix C for more details). The credit register reports the amount of quarterly write-downs in case of default at the firm-bank relationship level. These write-downs allow us to compute the recovery rate of the loan. Where the recovery rates are missing, we use the industry average recovery rates.

The calculation can be understood using a simple example. Consider a scenario where a bank lends 3 million euro to a firm in period t=0. The outstanding balance at t=1 is 2 million euros, and 1 million euros at t=2. Assume that the bank charges interest rates of 5 percent in all periods. Further assume that the firm defaults in period t=2 and the recovery rate is 50 percent of the outstanding balance. In such a scenario, the bank earns 5 percent on the 3 million euro in the first period and the 2 million euro in the second period, and -50 percent on the 1 million euro in the third period. The resulting ROL is calculated as $\frac{5}{6} * 0.05 + \frac{1}{6} * (-0.50) = -0.0417$. While omitted here for simplicity, for the tests we discount outstanding loans with the risk-free rate to capture the time value of money. Importantly, if a low ROL is generated on small loans and a high ROL on large loans, results could be biased by relying on the estimation of individual ROL, which weights all loans equally. To account for this, we also calculate the value-weighted ROL on the portfolio of loans granted to firms inside the bank's own club and compare this with the value-weighted ROL on the portfolio of loans granted to firms in other clubs.[33]

## 5.2 Results

To begin with, we conduct our analysis at the relationship level and investigate how social connections affect ROL. Table 6 reports descriptive statistics of ROL and components thereof. Overall, banks earn a 6.37 percent return on loans provided to our sample firms (median: 6.32 percent). ROL is considerably higher for out-group loans (7.30 percent), compared with loans granted to in-group firms (4.23 percent). For the value-weighted portfolios, the average return is slightly higher, at 6.83 percent (median: 6.42 percent). Again, a bank's return is higher on the portfolio of out-group loans (7.49 percent), compared with the portfolio of in-group loans (5.00 percent). The average recovery rate once a loan defaults is 41.81 percent, and this remains relatively similar for in-group loans (38.24 percent) and out-group loans (43.69 percent). The annual default rate of loans is 1.81 percent, with a significant difference between loans made inside the branch (4.04 percent) and those made outside the branch (0.84 percent). The average interest rate on loans is 7.47 percent and is very similar for in-group loans (7.03 percent) and out-group loans (7.71 percent). While these descriptive results suggest that banks tend to make poor lending decisions with in-group loans compared with out-group loans, we examine differences in ROL in a more systematic manner to ensure that these differences are not driven by selection concerns or other factors, such as the risk-aversion of lenders.

[33] The calculation is similar to equation (9). The only difference is that, before weighting a bank's earnings over time, the quarterly earnings are calculated from the bank's entire portfolio of loans. This provides us with one or two observations per bank (one observation if the bank either only lends to firms in its own club or outside its own club; two if it lends to both groups of firms).

We statistically examine the effect of social connections on banks' ROL by estimating:

$$ROL_{ij} = \alpha_j + \beta \cdot INGROUP_{ij} + \epsilon_{ij}, \tag{10}$$

where subscript $i$ indexes banks and $j$ indexes firms, $\alpha_j$ represents firm fixed effects. The variable $ROL_{ij}$ measures the return on a loan given to firm $j$ by bank $i$ according to equation (9). The indicator variable $INGROUP_{ij}$ takes the value of one if the loan was originated by an in-group bank and zero if the loan was originated by an out-group bank. The coefficient of interest $\beta$ allows us to identify the mechanism that generates the increased financing for firms that are members of the club branch. A positive view of social networks should generate higher ROL on in-group loans, whereas a favoritism story would predict lower ROL on these loans.

Results are reported in Table 7. In Columns I to III, we focus on a subset of loans for which we are able to estimate the interest rate charged on the loan. The observation that the interest rate charged to a given firm by in-group banks is not substantially different from the interest rate charged by banks outside the branch, allows us to estimate our regressions using the full sample, assuming identical interest rates on in-group and out-group loans in a given year in Columns IV to VI. In Column I, we look at differences in ROL from a firm's perspective. We compare the ROL generated by in-group and out-group banks for the same firm. In-group banks generate a 2.02 percentage points lower ROL to the *same* firm compared with outside banks. In Column II, we re-estimate our regression specification with bank fixed effects. This allows us to compare the ROL generated by the same bank on loans given to firms that are members of the same branch with those given to firms that are members of other club branches in the same city. The ROL on inside loans is significantly lower, by 3.03 percentage points, relative to loans granted outside the club branch. In Column III, we calculate the return at the portfolio level. Specifically, for each bank we compute the return on a value weighted portfolio on all in-group loans as well as out-group loans. The in-group portfolio generates a 3.23 percent lower return than its out-group portfolio. The results are qualitatively similar when we redo this analysis for the entire sample. We find that for the same firm the ROL generated by in-group banks is 0.85 percentage points lower than the ROL generated by out-group banks (Column IV). The same bank generates a 1.75 percentage points lower ROL on in-group loans when compared with out-group loans (Column V). Finally, for value-weighted portfolios, the difference in ROL between in-group and out-group loans is 1.40 percent (Column VI).

The results in Table 7 document that loans provided to socially connected firms relative to non-connected firms generate a lower ROL. We next examine how perturbation in social proximity between firms and banks affects ROL. Formally, we estimate:

$$ROL_{ijt} = \alpha_j + \beta_1 \cdot INGROUP_{ij} + \beta_2 \cdot AFTER_{jt} + \beta_3 \cdot INGROUP_{ij} \cdot AFTER_{jt} + \epsilon_{ijt}. \quad (11)$$

To analyze changes in ROL, we split all loans for each firm-bank pair into the loans originated before and after the event. We use the same three events ($AFTER_{jt}$) (i.e., firm entry to a club branch, branch formations, mayoral elections), as discussed in the previous section.[34] We compute the ROL for the set of loans issued before and after the event separately. A negative estimate of $\beta_3$ provides evidence of a deterioration in loan performance for socially connected loans after the event, compared to the pre-event period (diff-in-diff estimate).

Results of estimating equation (11) are gathered in Table 8. After firm CEOs enter a branch, socially connected banks earn a 3.29 percentage points lower return when lending to the same firm, as compared to a non-connected bank, relative to the pre-event period (Column I). The estimate is similar (3.53 percentage points lower) once we control for bank fixed effects (Column II). When comparing the performance of value weighted loan portfolios, the effect is 4.96 percentage points lower (Column III). The effects are very similar with slightly higher magnitudes recorded for new branch formations (Columns IV to VI). The effects are much larger when we examine mayoral elections where the in-group loans generate a 9.56 percentage points lower return than out-group loans after controlling for firm fixed effects (Column VII) and 9.21 percentage points lower returns when controlling for bank fixed effects (Column VIII). On evaluating the value weighted portfolio of in-group loans, we find that the in-group loan portfolio generates a 6.72 percentage points lower returns (Column IX).

All in all, across all the specifications, we find a fairly robust result that in-group ROL is significantly lower than out-group ROL. While such a behavior is suggestive of a rent-seeking behavior, a few comments are in order. First, the information channel would predict that banks face higher informational constraints when they lend to firms outside their club branch than when they lend to firms within the network. Given this difference in the degree of asymmetric information, which is larger for out-group firms, it is natural to expect that out-group firms will on average have higher credit quality than in-group firms. This argument is similar to the argument in the *statistical* discrimination literature, as pioneered by Gary Becker (Becker 1957). The ROL measure is free from this critique – lending to a borrower that is known to have higher observable credit quality does not imply a higher ROL for the lender. If anything, because credit worthiness of this borrower is public information, higher competition would reduce ROL. On the contrary, the in-group banks have an informational

[34] When using mayoral elections as our event, $INGROUP_{ij}$ takes the value of one if the loan was originated by the local state bank in which the mayor becomes head of the supervisory board.

monopoly when they lend to in-group firms, which should generate a higher ROL on loans. This is not what we find. Second, our analysis spans the years 1993 to 2011 and this period includes the recent financial crisis. It is important to note that the German real sector has been mostly insulated from the financial crisis. Accordingly, our results remain qualitatively unaffected for restricting the analysis on the pre-crisis period. Finally, it can be argued that such a pattern (lower in-group ROL) can be explained by lenders' risk-aversion. A risk-averse lender may trade-off lower ROL for lower risk. We find that the ROL volatility is significantly higher is for in-group loans than out-group loans (see Table 5). Furthermore, the return on these *connected* portfolio of loans in most scenarios is lower than the risk-free rate, and often the connected portfolio generates a negative ROL (Column VII and Column VIII). Clearly, such a pattern is inconsistent with the actions taken by a risk-averse lender.[35]

## 5.3 Unpacking ROL

What generates a lower ROL on loans made within social networks? As documented, the interest rates charged by in-group banks to in-group firms are similar to those charged by banks outside the club branch. Furthermore, the financial contracts offered by in-group banks are very similar to the ones offered by out-group banks, leading to fairly similar recovery rates. We find that the difference in ROL comes from excess continuation of distressed firms by in-group banks. In other words, the lower ROL is an outcome of the *soft budget constraint* problem (Kornai 1986). This effect can be seen from Panel A of Figure 4, which plots the share of loans from in-group banks in total firm loans as firms approach bankruptcy. The share of in-group bank loans rises as firms move closer to bankruptcy. This is particularly dramatic if the in-group bank also happens to be the firm's main lender. This pattern is peculiar to loans given to in-group firms. In the population of firms in the sample region, one does not find this pattern for the firms' main lenders. Thus, in-group banks continue to finance firms which are members of the club branch much longer, or are reluctant to liquidate inefficient firms which are members of the club. This points to a rent-seeking story rather than an informational or enforcement story, since continuation on better information should generate higher returns. It should be noted that this excess continuation constitutes a more disguised, harder to detect, form of preferential treatment, compared with changes in the price of credit.

[35] Such a pattern also cannot be rationalized from the perspective of an ambiguity-averse lender characterized by a set of preferences employed to explain departures from the expected utility framework, such as the Ellsberg paradox.

# 6 Exploring Heterogeneity Across Banks

It is often argued that private bankers have stronger incentives compared with state bankers. It is possible that these incentives may keep favoritism and rent-seeking in check, thereby mitigating the malign effects of social capital in elite networks. By comparing the behavior of state and private banks when operating in the same environment (service clubs), we are also able to shed some light on the efficacy of these organizational forms.

## 6.1 Structure of Financing

To examine if the degree of preferential treatment varies across these two bank groups, we modify specification (7) to compare the differential effect of firm entry on state and private banks in the same club branch. As well as classifying banks as being either inside or outside the branch, we now also classify them by their ownership, that is, whether they are state- or privately-owned banks. In a regression framework, this is achieved by estimating:

$$\frac{q_{ijt}}{\sum_i q_{ijt}} = \alpha_t + \alpha_j + \delta_1 \cdot AFTER_{jt} + \delta_2 \cdot AFTER_{jt} \cdot STATE_k + \epsilon_{ijt}. \tag{12}$$

As before, $i$ indexes banks, $j$ indexes firms, $k$ indexes club branches, and $t$ indexes time in quarters. The dummy variable $STATE_k$ is one for branches with a state bank and zero for branches with a private banks.

In Table 9, we investigate the differential effect across different groups of banks. The results in Columns I to III indicate that the increase in borrowing from in-group banks is higher for firms entering club branches with only a state bank as a member (10.82 percentage points), relative to firms entering a branch with only a private bank (7.63 percentage points, shown in Column II) or a cooperative bank (4.72 percentage points, shown in Column III) as a member. The differential effect is statistically significant; 6.45 percentage points higher for state banks (Column IV). Cooperatives are organized in a very similar manner as the local state banks sharing the same regional structure. While local savings banks are state-owned, cooperatives are owned by their shareholders. Thus, differences between those two groups of banks originate from differences in the banks' incentive and governance structure.

To alleviate concerns that the differences in the increase in in-group bank lending shares could be driven by differences in firm quality across club branches, we examine differences in state and private/cooperative banks for the *same* firm. This is possible since some branches have a state and a private banker among its members. For firms in those branches we can compare changes, quarter by quarter, in in-group loans for private and state banks. To avoid double counting (an increase in the share of lending from the state in-group bank leads to a decrease of the private in-group bank) we replace the dependent variable by the share of the state in-group bank in total loans of both in-group banks (state plus private bank loans). Even with this stringent specification, one observes that the lending shares of the state banks, relative to all bank loans within club branches, increase by 14.26 percentage points (Column V). Finally, we exploit the fact that, in some branches, one of the members is the mayor of the respective city in which the branch is located, and simultaneously heads the board of the local state bank. We expect that, in branches in which those mayors are members and additionally have a state banker among its members, the incentives to provide additional loans to in-group members are even stronger. Indeed, branches with a state banker see a 6.26 percentage points increase in the share of loans made within the branch after firms enter, whereas there is an additional increase of 12.83 percentage points for branches with a mayor among members (Column VI).

## 6.2 Return on Loans

In the previous section, we document a large increase in financing provided by state banks. While the increase in supply by state banks is consistent with state bankers being more vulnerable to collusion due to blunter incentives (particularly when the main supervisor of the state bank, the mayor, is also involved in the branch), it is also consistent with an informational or enforcement story. One could argue that state banks have poor screening and/or monitoring technologies, so the marginal benefit of proximity is higher for them. Notably, however, this would not explain why the effect is stronger when the head of the state bank board is also among the club members. To investigate the underlying mechanism further, we classify banks into three different categories: state banks, private banks, and cooperatives, and compare the ROL generated by different lenders.

We find that, while both private banks and cooperatives generate an only slightly lower ROL on in-group loans relative to out-group loans (1.87 and 0.26 percentage points, respectively, shown in Table 10, Columns II and III), the state banks' performance turns out to be quite dismal with a difference between ROL on in-group and out-group loans of 5.64 percent (Column I). The state banks generate an almost 4 percentage points lower ROL on in-group loans, compared with out-group loans, relative to private banks (Column IV). The difference in ROL between state-owned savings banks and private banks suggests that incentives play an important role in mitigating ill effects of social proximity on lending. Comparing cooperatives and savings banks is particularly striking as both banks are comparable in size, reach and have a similar organizational structure. What sets them apart is their ownership and governance structure. While savings banks are owned by the local government, cooperatives are owned by their members. The joint ownership structure of cooperatives keeps a check on the behavior of bankers.[36]

We interpret the results as suggesting that state banks engage more in crony lending than private banks or cooperatives. Since the cooperatives present a good control group, these results highlight the important role that incentives play in mitigating this effect. Our results on state vs. private are not driven by differences in objective functions between state and private banks. While it is true in the data that state banks generate a lower ROL on the loans that they originate, compared to private banks, in our tests we compare the ROL generated by a state bank inside the network to the ROL generated by the same state bank in other club branches in the same city. This within-comparison controls for any differences in objective functions between state and private banks.

# 7 Additional Results

The broad array of results provides support for the view that banks engage in preferential lending to in-group firms. In this section, we provide additional results to strengthen this claim.

## 7.1 Cross-selling by Banks and Transaction Costs

In addition to granting loans, banks also provide a significant amount of transaction-related services. While banks may earn a lower ROL made within branches, they might make up for it by earning higher returns from other services they provide to firms in the network. Furthermore, the firms, through referrals, may generate other business for the bank, which more than makes up for the lower ROL on a loan made within the club branch (Santikian 2011). While this proposition may appear plausible at first, it is unlikely for a number of reasons. First, as has been noted earlier, most of the drop in ROL for loans made within networks comes from state banks. State banks, however, offer a very limited set of services to borrowers; most transaction-related services are offered by the *Landesbanken*.

Second, we can directly test whether banks that earn lower ROL on in-group loans as compared to out-group loans make higher overall profits. Since in-group loans represent only a fraction of the total loans granted by the banks, it might be the case that, while banks

[36]The lower ROL of state banks comes from the soft budget constraint problem it faces. The soft budget constraint issue is visually apparent from Panel B of Figure 4. While for private banks in branches the increase in their share in total firm loans, before firms default where they are a main lender, is a relatively mild 4 percentage points within the last four years before the default quarter (gray line), the increase is significant for state banks at 16 percentage points (black line).

lose money on in-group loans, club membership generates more business for the bank and overall this increases the banks' profitability.

We test whether banks that earn lower ROL on in-group loans, compared out-group loans, make up for this shortfall elsewhere. To examine this, we investigate how this difference between the inside ROL vs. outside ROL for the same bank correlates with the overall returns for this bank. We find that banks that engage in more preferential lending in their club branches, also earn significantly lower returns for their shareholders.[37] Specifically, going from the lowest decile of wedge to the highest decile results in approximately a one percentage point lower ROE for the bank. This is substantial, since this represents roughly 19 percent of their returns as the average ROE of state banks is about 5.4 percent. Thus, banks that have a bigger drop in-group ROL, also generate lower returns in general.

These findings also rule out potential explanations based on lower transaction costs of in-group loans. It can be argued that the lenders have to expend less effort in screening and monitoring borrowers lowering the cost of providing loans inside the club branch. Since the ROL calculation does not take this into account, it is likely to understate the ROL generated on in-group loans. As we have shown, banks that have a higher wedge between the in-group ROL and the out-group ROL also generate lower returns on their loan portfolios. More importantly, banks often generate negative ROL on connected portfolios. This would not be the case if they were actually saving on the transaction costs.

## 7.2 Deployment of Funds

Our results show that social capital increases the total amount of funds that a firm receives from the banks. In this section, we examine whether connected firms use the additional financing they receive to make profitable investment. To investigate the deployment of funds, we substitute the dependent variable of specification (7) with investment to assets, where investment is measured by capital expenditure.[38] We find that, while entry to a club branch leads to increased financing, it does not result in an increase in firms' investment. The effect of club membership on capital expenditure is statistically indistinguishable from zero (Table 11, Column I). When we investigate where the additional funds are channeled to, we find that firms use the extra money from the in-group banks to increase their liquidity position and pay out more funds to the owners. Results in Columns II and III show that firms increase cash holdings to assets by 2.71 percentage points and increase the fraction of

[37]This analysis already controls for bankers' ability since the independent variable is the difference between the ROL that the bank earns on their in-group loans vis-à-vis ROL they earn on out-group loans.

[38]Since we can only obtain balance sheet information for a subset of firms from the USTAN database, the sample is limited to 686 firms, compared with the 1,091 firms in the full sample.

profits that they pay out to shareholders by 2.89 percentage points per year. Since most of the sample firms are SMEs, the CEO is often the owner of the firm. Thus, paying out dividends to shareholders typically means that CEOs pay out funds into their own pockets.

The increase in the payout ratio, rather than using the funds for additional investment, leads to a change in firms' leverage. After entry to a club branch, firms' total loans to assets ratio increases by 6.17 percentage points (Column IV). This also confirms that the increase in bank loans that we observe is not explained by asset growth of firms after joining the club, but rather depicts a change in firms' financial structure. Moreover, we find that firms' profitability is virtually unaffected by entry to a club branch, further reducing concerns about club membership being related to changes in firm quality (Column V). Finally, we examine whether firms' costs of capital are significantly different after entering the network. We find that the average fraction of interest expenditures by debt decreases by 0.40 percentage points; however, this decrease is statistically insignificant (Column VI). The results in this section suggest that bankers transfer funds to fellow club members who pocket the money rather than using it for profitable investment. This diversion of capital from the banking sector may reduce the available capital for profitable investment projects in the economy.

# 8 Effects of in-group lending on the real sector

In this section we provide estimates of the aggregate costs of distortions in credit allocation caused by social capital in elite networks for the German economy. While we take great care in calculating these costs, the estimates are based on assumptions and should be considered as a rough estimate of the true costs. We only measure direct efficiency losses from poorly employed capital, which ignores additional costs that are difficult to measure, for example higher barriers to entry (distortion in competition) or personal costs from establishing social connections. Our analysis also does not cover changes in employees' utility from continued employment, or other potentially positive welfare effects. Thus, the analysis should not be interpreted as an attempt to evaluate total welfare effects, but as a measurement of the productivity loss to the economy from the misallocation of credit in elite social clubs.

## 8.1 In-group lending and firm performance

To evaluate the effect of social connections on distortions in capital allocation we follow the framework developed by Bertrand, Schoar, and Thesmar (2007) to estimate the profitability of bank lending. The intuition of the test is simple: Banks grant loans to firms that allow firms to undertake investment projects. This investment generates profits in the future that determine firms' future profitability. If banks are successful in screening profitable investment projects, firms' future profitability should be positively correlated to a contemporaneous increase in bank loans. Future return on assets of a firm can be thought of as a weighted average of the return generated by the assets in place and the returns generated from new financing: $\overline{ROA}_{t+k} = \frac{assets_{t-1}}{assets_{t-1}+\Delta loans_{t,t-1}} \cdot ROA_t + \frac{\Delta loans_{t,t-1}}{assets_{t-1}+\Delta loans_{t,t-1}} \cdot \overline{ROA}_{loans}$, where $ROA_t$ is current period return on assets, $\overline{ROA}_{t+k}$ is the average return on assets from $t+2$ to $t+k$, $\overline{ROA}_{loans}$ is the average return generated on new lending, $\Delta loans_{t,t-1}$ is increase in loans from period $t-1$ to $t$, and $assets_{t-1}$ is last period's total assets. Abstracting from changes in equity, $assets_{t-1} + \Delta loans_{t,t-1} = assets_t$. Then, rearranging the formula yields: $\overline{ROA}_{t+k} - ROA_t = (\overline{ROA}_{loans} - ROA_t) \cdot \frac{\Delta loans_{t,t-1}}{assets_t}$. The estimate of $(\overline{ROA}_{loans} - ROA_t)$ is informative about the profitability of investment undertaken with new financing. Since we have loan level data, we extend the Bertrand, Schoar, and Thesmar (2007) framework to the loan level. This allows us to compare the profitability of new lending by in-group and out-group banks. This controls for average profitability of new lending across all banks:

$$\begin{aligned}\overline{ROA}_{jt+k} - ROA_{jt} &= \alpha_t + \alpha_j + \alpha_i + \gamma \cdot controls_{jt} + \beta_1 \cdot \frac{\Delta loans_{ijt,t-1}}{assets_t} \\ &\quad + \beta_2 \cdot INGROUP_{ij} + \beta_3 \cdot \frac{\Delta loans_{ijt,t-1}}{assets_t} * INGROUP_{ij} + \epsilon_{ijt}\end{aligned}$$

where the dependent variable $\overline{ROA}_{jt+k} - ROA_{jt}$ captures the change in firm performance (EBIT scaled by assets). The dummy variable $INGROUP_{ij}$ takes the value of one if the bank and firm belong to the same club, and zero otherwise. Year, bank, and firm fixed effects are denoted by $\alpha_t$, $\alpha_i$ and $\alpha_j$, respectively.[39] Lending decisions by banks are captured by $\frac{\Delta loans_{ijt,t-1}}{assets_t}$ which is defined as the change in bank $i$'s lending to firm $j$ from $t-1$ to $t$ scaled by firm $j$'s total assets in $t$. As in Bertrand, Schoar, and Thesmar (2007), we include lagged firm assets and industry trends as control variables and correct for clustering of standard errors at the firm level. The coefficient $\beta_3$ corresponds to the wedge in the return generated on the new loans compared to the assets in place $(\overline{ROA}_{loans} - ROA_t)$ for in-group relative to out-group loans.

Consistent with the screening role of banks it seems that banks are able to provide funds to firms with higher future profitability. In Table 12, Panel A, column I, we look at loans that our sample banks provide to the entire population of firms in our sample region (firms not associated to the social clubs). On average there is a positive wedge between the return on investment from new loans and current return on assets of 2.55 percentage points two years

[39] Quarterly loan data is aggregated by taking the average of the outstanding amount of the loan over the four quarters.

after the loans are granted. Bank lending also predicts firm profitability in the long-run. When we look at the average ROA in periods $t+2$ to $t+5$ minus current return, the positive wedge persists with similar magnitudes (column II).[40] Columns III and IV show that new in-group loans generate a lower return than loans made by out-group banks. The return on the new loans form in-group banks is 5.88 percentage points lower than for out-group banks. In the long-run the effect is still highly significant with 4.10 percentage points. For in-group banks, new lending predicts a *negative* trend in firm performance (columns V and VI), whereas for outside banks the relationship is positive in the short-run and the long-run (columns VII and VIII).[41]

One explanation for the reduction in firm profitability could be that club banks trade off risk and return and screen firms that invest in safer projects. In Panel B, we examine changes in firm risk after a net increase in lending from in-group banks compared to out-group banks by replacing the dependent variable in specification 13 with the future change in the logarithm of the probability of default (PD).[42] For loans issued by to firms in the population (firms not associated with the social club organization), the relationship between future changes in PD and new loans is negative and highly significant, even in the long-run (columns I and II). While we find the same negative relationship for outside banks (columns VII and VIII), new club bank lending does not predict a reduction in firm risk (columns V and VI). Thus, lower future profitability of firms after receiving new loans from clubs banks is not explained by a reduction in default risk. Next, we use the estimates from Table 12 to aggregate losses from the misallocation of capital to less profitable projects.

## 8.2 Aggregating the costs of loan misallocation

Our sample firms obtain on average 2.8 million euros of new loans from in-group banks per year. The service club organization considered in this paper comprises about 10,000 CEOs in Germany.[43] Thus, the total volume of in-club lending in Germany is about 28 billion euros per year. The estimate of $\beta_3$ in column III of Table 12 means that the profitability generated from in-group loans is 5.88 percentage points lower than for out-group loans. Assuming that the funds misallocated in the club would otherwise generate the same ROA as out-club loans, we aggregate the total loss in firms' returns from this misallocation. Multiplying the total

[40] The results are qualitatively identical if we look at average ROA from $t+2$ to $t+3$ or from $t+2$ to $t+4$.

[41] Before a bank and a firm are connected through common club membership the new lending/future profitability relationship is positive for the same lending relationship. The negative relationship only emerges after the bank and firm become socially connected through common club membership.

[42] We compute the probability of default from a model based on Moody's RiskCalc for Germany and optimized for Bundesbank data by Foerstemann (2011).

[43] In Germany the service club organization comprises more than 50,000 members and about each fifth member is a CEO of a non-financial firm.

club lending with the profitability wedge: 28 billion * 0.0588, we obtain a total loss of about 1.65 billion euro per year, which is equivalent to about 0.0761 percent of the average annual nominal GDP during the sample period. When we use the ROA wedge from the long-run estimate (0.0410) the total costs constitute 0.0531 percent of nominal GDP.[44]

It should be noted that we only consider one service club organization. The culture of service clubs is pervasive in Germany. There are additional service club organizations and other networks (e.g., golf clubs, cultural clubs) that provide a breeding ground for preferential lending. In particular, there is one service club of almost identical size and together with other larger service club organizations the total number of members of German service clubs is above 125,000. Thus, the aggregate economic effects of lending in social networks are likely to be significantly larger than in our estimation that is restricted to one service club organization. Scaling the effects from the service club in the sample (50,000 members) to the number of service club members for all larger service clubs in Germany alone increases the effect to 0.13 to 0.19% of annual German GDP. Khwaja and Mian (2005), who examine distortions in state bank lending to politically connected firms in Pakistan estimate the total costs to be between 0.3 and 1.9% of annual GDP. While Khwaja and Mian (2005) examine economy-wide distortions in state bank lending our analysis focuses only on social clubs, which makes it difficult to compare the results. With this in mind, our results suggest that even in a developed economy with sophisticated institutions, economic costs from rent-seeking are sizeable even relative to the effects in developping countries.

# 9 Conclusion

In this paper we uncover a dark side of social capital. Using a unique micro-level dataset on an elite network, we observe a misallocation of credit within the network. Our results paint a picture of preferential treatment accorded to firms by in-group banks, with stronger results observed for state-owned banks. Interestingly, the form of rent-seeking we document resonates with the work by Olson (1982) and Acemoglu and Robinson (2012) that describe the emergence of distributional or extractive institutions as a barrier to economic prosperity.

It should be noted that, while we are cautious in not making claims on total welfare, our

[44] Some of the reduction in firm profitability is absorbed by the banking sector. In Section 5 we estimated a 3.23 percent lower ROL on club loans compared to outside loans. Assuming that banks would have earned a 3.23 higher ROL in absence of lending distortions through connected lending their total annual cash flows are reduced by 904.4 million euro per year (28 billion euros * 0.0323). This comprises about 54.8% of total losses to the economy. This loss additionally generates a multiplier effect by reducing the banks' available funds to provide loans to the economy by about 900 million Euro. Considering that the average firm in the sample generates a return on assets of 6.21%, this implies an additional loss of 56 million Euros (904.4 million * 0.0621). The total loss due to a reduction in profitability amounts to about 1.7 billion Euros per year, which equals 0.0785% of average annual nominal GDP during the sample period.

analysis provides evidence that is consistent with the inefficient allocation of resources. From the perspective of the bank, the allocation of funds does not seem efficient. Furthermore, we find that firms do not use the extra financing that they receive to make new investments, but rather to pay out funds to the owners. Accordingly, we find that loans made by in-group banks to socially connected firms predict significantly lower future profits than loans from the same bank to non-connected firms. We estimate the productivity loss due to the misallocation of loans in service clubs alone to account for 0.13 to 0.19% of annual German GDP.

Overall our results suggest that rent-seeking and corruption are not just a developing world phenomenon, but is also present in a developed economy, with strong institutions and a well-developed banking sector such as Germany. The channel through which rent-seeking occurs is subtle and sophisticated (rather that outright bribes) and thus difficult to detect. In our setting, banks do not charge different prices on loans to connected firms, but transfer funds to connected firms through excessive continuation.

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Table 1: Descriptive Statistics

| | | | | |
|---|---|---|---|---|
| Panel A: Network Data | | | | |
| No. of club branches | 211 | | | |
| No. of CEOs within club branches | 1,091 | | | |
| No. of bankruptcies by CEOs | 141 | | | |
| No. of club branch entries by CEOs | 474 | | | |
| No. of club branch formations | 43 | | | |
| No. of banks | 542 | | | |
| No. of in-group banks | 352 | | | |
| No. of private in-group banks | 173 | | | |
| No. of public in-group banks | 138 | | | |
| No. of cooperative in-group banks | 41 | | | |
| No. of club members being elected mayor and becoming chairman of local state bank | 20 | | | |
| No. of club members being elected mayor not becoming chairman of local state bank | 16 | | | |
| Panel B: Loan & Firm Level Data | | | | |
| | Mean | Median | Std. | Obs. |
| *Loan Data (based on 1,091 firms):* | | | | |
| Loan amount - loan level (thousand euro) | 6,433 | 4,000 | 6,100 | 54,123 |
| Loan amount - firm level (thousand euro) | 13,440 | 5,555 | 24,247 | 25,908 |
| Lending relationships per firm (sample period) | 3.72 | 2.00 | 4.50 | 1,091 |
| *Firm Data (based on 686 firms):* | | | | |
| Total assets (thousand euro) | | | | |
| Sample | 92,102 | 14,165 | 249,376 | 5,474 |
| Population | 93,367 | 9,677 | 1,261,264 | 200,531 |
| Debt/assets | | | | |
| Sample | 0.2525 | 0.2235 | 0.1944 | 5,474 |
| Population | 0.2464 | 0.2038 | 0.2104 | 200531 |
| ROA | | | | |
| Sample | 0.0621 | 0.0509 | 0.0952 | 5,474 |
| Population | 0.0691 | 0.0550 | 0.0985 | 200,531 |
| Cash/assets | | | | |
| Sample | 0.0629 | 0.0241 | 0.0891 | 5,474 |
| Population | 0.0662 | 0.0206 | 0.1228 | 200,531 |
| Borrowing costs | | | | |
| Sample | 0.0811 | 0.0707 | 0.0504 | 5,474 |
| Population | 0.0911 | 0.0560 | 0.1084 | 200,531 |
| Panel C: Bank Lending Shares | | | | |
| Lending share in bank's club branch | 0.2508 | | | |
| Lending share in other club branches (same city) | 0.0673 | | | |
| Difference | 0.1835 | | | |
| t-statistic | [10.56] | | | |

Panel A depicts the data on social club branches: the number of club branches and CEOs in those branches, number of firms defaulting on a loan or filing for bankruptcy, number of firms joining a club branch during the sample period and number of branch formations, the total number of banks in the sample, number of bankers whose director is a club member and ownership of those banks, and the number of club members elected as mayors. The top part of Panel B provides information on loan data from the Bundesbank credit register, the bottom part shows balance sheet data for sample firms and the population of non-sample firms from the same geographic area from the Bundesbank USTAN database. Panel C depicts banks' lending share in club branches where they are members (a bank's loans to all firms in a club branch divided by all loans to those firms), in club branches where the bank director is not a member but are located in the same city, and the difference between both numbers including the significance level.

Table 2: Club Branch Entry by Firms and Branch Formations

| | I | II | III | IV | V | VI |
|---|---|---|---|---|---|---|
| Dep. Var.: | $\left(\frac{In-group\ bank\ loans}{Total\ firm\ loans}\right)_{jt}$ | | $log\,(Debt)_{jt}$ | | $\left(\frac{Debt}{Assets}\right)_{jt}$ | |
| | Entry | Formation | Entry | Formation | Entry | Formation |
| $AFTER_{jt}$ | 0.1003*** | 0.1253*** | 0.3222*** | 0.3806** | 0.0617*** | 0.0673*** |
| | [7.12] | [5.22] | [3.40] | [2.18] | [2.67] | [2.64] |
| Quarter FE | yes | yes | yes | yes | no | no |
| Year FE | no | no | no | no | yes | yes |
| Firm FE | yes | yes | yes | yes | yes | yes |
| Clustered SE | club branch | club branch | club branch | club branch | club branch | club branch |
| Observations | 25908 | 19320 | 25908 | 19320 | 4364 | 3017 |
| R-squared | 0.538 | 0.525 | 0.734 | 0.727 | 0.762 | 0.749 |

The sample for this table comprises all 1091 firms from our sample. The dependent variable in columns I and II is firm $j$'s loans from its in-group bank divided by firm $j$'s total loans. In columns III and IV it is the log of firm $j$'s total loans, in columns V and VI it is firm $j$'s loans to assets ratio. The variable $AFTER_{jt}$ is a dummy variable taking the value of one from the year when firm $j$ enters a club branch, and zero otherwise in columns labeled 'Entry'. It takes the value of one from the year when firm $j$ joins a club branch through formation and zero otherwise in columns labeled 'Formation'. For columns V and VI the sample comprises the firms for which balance sheet data is available and data is annual. Information on fixed effect is provided at the bottom of the table. Standard errors correct for clustering at the club branch level. We report $t$-statistics in parentheses.

Table 3: Mayoral Elections

| | I | II | III | IV | V | VI |
|---|---|---|---|---|---|---|
| | Mayoral Elections + Supervisory Board | | | Mayoral Elections + No Supervisory Board | | |
| Dep. Var.: | $\left(\frac{State\ bank\ loans}{Total\ firm\ loans}\right)_{jt}$ | $log(Debt)_{jt}$ | $\left(\frac{Debt}{Assets}\right)_{jt}$ | $\left(\frac{State\ bank\ loans}{Total\ firm\ loans}\right)_{jt}$ | $log(Debt)_{jt}$ | $\left(\frac{Debt}{Assets}\right)_{jt}$ |
| $AFTER_{jt}$ | 0.0563** | 0.2330** | 0.0497* | -0.0443 | -0.0131 | -0.0135 |
| | [2.45] | [2.20] | [1.86] | [1.28] | [0.09] | [0.94] |
| Quarter FE | yes | yes | no | yes | yes | no |
| Year FE | no | no | yes | no | no | yes |
| Firm FE | yes | yes | yes | yes | yes | yes |
| Clustered SE | club branch | club branch | club branch | club branch | club branch | club branch |
| Observations | 25908 | 25908 | 4364 | 25908 | 25908 | 4364 |
| R-squared | 0.532 | 0.732 | 0.760 | 0.532 | 0.732 | 0.759 |

The sample in this table comprises all 1091 sample firms. The $AFTER_{jt}$ dummy takes the value of one from the year when an existing member is newly elected as a mayor and zero otherwise. In columns I to III only elections after which the mayor also automatically becomes the head of the local state bank's supervisory board are considered, in columns IV to VI only elections after which the mayor does not become head of the local state bank's board are considered. The dependent variable in columns I and IV is firm $j$'s loans from the state bank divided by firm $j$'s total loans, in columns II, and V it is the log of firm $j$'s total loans, in columns III and VI it is firm $j$'s total loans scaled by assets. In columns III and VI the sample is reduced to the 686 firms for which balance sheet data is available and the data is annual. The bottom of the table provides information on the fixed effects included. Standard errors are corrected for clustering at the club branch level. We report $t$-statistics in parentheses.

Table 4: Perturbation in Social Connectedness - Dynamics

| | I | II | III | IV | V | VI | VII | VIII | IX |
|---|---|---|---|---|---|---|---|---|---|
| Dep. Var.: | $\left(\frac{In-group\ bank\ loans}{Total\ firm\ loans}\right)_{jt}$ | | | $log(Debt)_{jt}$ | | | $\left(\frac{Debt}{Assets}\right)_{jt}$ | | |
| | Entry | Formation | Mayoral Election | Entry | Formation | Mayoral Election | Entry | Formation | Mayoral Election |
| $Before_2$ | 0.0185 | 0.0262 | 0.0155 | 0.0680 | 0.0910 | -0.1116 | 0.0114 | -0.0296* | 0.0218 |
| | [1.46] | [1.12] | [0.50] | [0.90] | [0.49] | [1.26] | [0.42] | [1.74] | [0.51] |
| $Before_1$ | 0.0090 | -0.0168 | 0.0169 | 0.0633 | 0.1246 | 0.0823 | -0.0065 | -0.0407 | -0.0111 |
| | [1.25] | [1.02] | [0.80] | [1.13] | [1.41] | [0.65] | [0.31] | [1.18] | [1.48] |
| $Before_0$ | 0.0388*** | 0.0503*** | -0.0060 | 0.1412** | 0.1823* | 0.0409 | 0.0443*** | 0.0759* | -0.0055 |
| | [4.73] | [2.97] | [1.34] | [2.49] | [1.95] | [0.31] | [2.58] | [1.90] | [0.32] |
| $After_1$ | 0.0104 | 0.0313** | 0.0645* | 0.0819** | 0.0586 | 0.1941** | 0.0015 | 0.0269 | 0.0568* |
| | [1.49] | [1.99] | [1.80] | [2.40] | [0.74] | [1.98] | [0.11] | [1.23] | [1.83] |
| $After_2$ | 0.0487*** | 0.0571** | 0.0114 | 0.0457 | 0.0441 | 0.0323 | 0.0207 | 0.0075 | -0.0065 |
| | [3.87] | [2.48] | [0.76] | [0.89] | [0.52] | [0.29] | [1.42] | [0.44] | [0.92] |
| Quarter FE | yes | yes | yes | yes | yes | yes | no | no | no |
| Year FE | no | no | no | no | no | no | yes | yes | yes |
| Firm FE | yes | yes | yes | yes | yes | yes | yes | yes | yes |
| Clustered SE | club branch | club branch | club branch | club branch | club branch | club branch | club branch | club branch | club branch |
| Observations | 25908 | 19320 | 25908 | 25908 | 19320 | 25908 | 4364 | 3017 | 4364 |
| R-squared | 0.539 | 0.526 | 0.532 | 0.735 | 0.728 | 0.732 | 0.762 | 0.750 | 0.760 |

The sample for this table comprises all 1091 firms from our sample. The dependent variable in columns I to III is firm $j$'s loans from its in-group bank(s) divided by firm $j$'s total loans. In column III the in-group bank is the state bank in which the mayor becomes head of the supervisory board through her election. In columns IV to VI the dependent variable is the log of firm $j$'s total loans, in columns VII to IX it is the ratio of firm $j$'s loans to assets. Data is quarterly in columns I to VI an annual in columns VII and IX. In columns labeled "Entry" the dummy variables are defined as follows: The dummy variable $Before_2$ ($Before_1$) takes the value of one from two years (one year) before the firm enters a club branch and zero otherwise, $Before_0$ takes the value of one from the year when the firm enter a branch, $After_1$ ($After_2$) takes the value of one from the year (two years) after the firm enters a branch. In columns labeled "Formation" and "Mayoral Election" the five dummy variables are defined the same way with respect to the year when firm $j$ participates in a new club branch formation or an existing member is elected as a mayor and becomes head of the supervisory board of the local state bank. For columns VII to IX the sample comprises the firms for which balance sheet data is available. Each regression includes time and firm fixed effects. Standard errors are corrected for clustering at the club branch level. We report $t$-statistics in parentheses.

## Table 5: Bank Lending and Firm Borrowing Channel

| | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Intensive Margin | | | | | | Extensive Margin | | | | | |
| Dep. var.: | $log(Loans)_{ijt}$ | | | | | | $New\ relationship_{ijt}$ | | | | | |
| | Entry | | Formation | | Mayoral Election | | Entry | | Formation | | Mayoral Election | |
| $AFTER_{jt}$ | 0.0612 | | -0.0151 | | 0.0349 | | 0.0124*** | | 0.0083*** | | -0.0115** | |
| | [0.83] | | [0.15] | | [0.26] | | [3.46] | | [3.08] | | [2.42] | |
| $INGROUP_{ij}$ | | | | | | | 0.0709*** | 0.0709*** | 0.0691*** | 0.0713*** | 0.0151 | 0.159 |
| | | | | | | | [5.94] | [5.90] | [3.42] | [3.49] | [0.57] | [0.59] |
| $AFTER_{jt} * INGROUP_{ij}$ | 0.2631** | 0.3037* | 0.3773** | 0.5693* | 0.4147*** | 0.4770*** | 0.1144*** | 0.1143*** | 0.1472*** | 0.1428*** | 0.1076* | 0.1059* |
| | [2.26] | [1.85] | [2.20] | [1.94] | [2.93] | [3.10] | [4.99] | [4.88] | [3.86] | [3.69] | [1.92] | [1.91] |
| Quarter FE | yes | yes | yes | yes | yes | yes | no | no | no | no | no | no |
| Firm FE | no | no | no | no | no | no | yes | yes | yes | yes | yes | yes |
| Firm-Bank FE | yes | yes | yes | yes | yes | yes | no | no | no | no | no | no |
| Firm-Event FE | no | yes | no | yes | no | yes | no | yes | no | yes | no | yes |
| Clustered SE | club branch | club branch | club branch | club branch | club branch | club branch | club branch | club branch | club branch | club branch | club branch | club branch |
| Observations | 54123 | 54123 | 39145 | 39145 | 54123 | 54123 | 60334 | 60334 | 21176 | 21176 | 11796 | 11796 |
| R-squared | 0.737 | 0.744 | 0.716 | 0.761 | 0.735 | 0.736 | 0.098 | 0.151 | 0.081 | 0.118 | 0.051 | 0.080 |

The sample for this table comprises all 1091 firms from our sample. The dependent variable in columns I to VI is the log of bank $i$'s loans to firm $j$. In columns VII to XII the dependent variable is replaced by a dummy variable that is one if bank $i$ and firm $j$ start a new lending relationship and zero otherwise. In columns VII to XII, there are two observations per firm-bank relationship, one for the period before the event and for the period after the event. Accordingly, the samples for this test are restricted to firms that are subject to the respective event during the sample period. In this test for each firm $j$ every bank that provides a loan to at least one firm in the city in which firm $j$'s club is located is considered as a potential lending relationship for firm $j$. The dummy variable $AFTER_{jt}$ takes the value of one from the year when firm $j$ joins a club branch and zero otherwise in columns labeled "Entry", it takes the value of one from the year when firm $j$ joins a branch through formation in columns labeled "Formation", and it takes the value of one after an existing club branch member is elected as mayor zero otherwise in columns labeled "Mayoral Election". The dummy variable $In\ group\ bank_{ij}$ takes the value of one if bank $i$ is in-group bank to firm $j$, and zero otherwise. In columns labeled "Mayoral Election" the in-group bank is the local state bank in which the mayor becomes the head of the supervisory board through her election. The bottom of the table depicts information on the fixed effects included. Standard errors are corrected for clustering at the club branch level. We report $t$-statistics in parentheses.

Table 6: Returns on Loans - Data

| | Mean | Median | Std. | Obs. |
|---|---|---|---|---|
| *Return on loan (equal weighted) :* | | | | |
| All loans | 0.0637 | 0.0632 | 0.0714 | 681 |
| in-group loans | 0.0423 | 0.0585 | 0.0995 | 206 |
| out-group loans | 0.0730 | 0.0657 | 0.0524 | 475 |
| *Return on loan portfolio (value weighted) :* | | | | |
| All loans | 0.0683 | 0.0642 | 0.0563 | 339 |
| in-group loans | 0.0500 | 0.0594 | 0.0671 | 89 |
| out-group loans | 0.0749 | 0.0695 | 0.0505 | 250 |
| *Recovery rates :* | | | | |
| All loans | 0.4181 | 0.3612 | 0.2826 | 126 |
| in-group loans | 0.3824 | 0.3494 | 0.2795 | 51 |
| out-group loans | 0.4369 | 0.4040 | 0.2846 | 75 |
| *Default rates :* | | | | |
| All loans | 0.0181 | 0.0000 | 0.0911 | 681 |
| in-group loans | 0.0404 | 0.0000 | 0.1511 | 206 |
| out-group loans | 0.0084 | 0.0000 | 0.0414 | 475 |
| *Interest rates (contract level) :* | | | | |
| All loans | 0.0747 | 0.0679 | 0.0474 | 6197 |
| in-group loans | 0.0703 | 0.0657 | 0.0445 | 2191 |
| out-group loans | 0.0771 | 0.0693 | 0.0487 | 4006 |

This table reports descriptive statistics relevant for the computation of banks' returns on loans. This comprises banks' return on individual lending relationships, recovery rates in case of loan defaults (available from 2008-2011), loan default rates, contract-level interest rates, and the return on value-weighted loan portfolios.

Table 7: Returns on Loans - Results

| | I | II | III | IV | V | VI |
|---|---|---|---|---|---|---|
| | Contract-Level Interest Rates | | | Firm-Level Interest Rates | | |
| Dep. Var.: $ROL_{ij}$ | Relationship | | Portfolio | Relationship | | Portfolio |
| $INGROUP_{ij}$ | -0.0202** | -0.0303*** | -0.0323*** | -0.0085** | -0.0175** | -0.0140** |
| | [2.24] | [3.24] | [3.44] | [2.37] | [2.02] | [2.28] |
| *Constant* | 1.0687*** | 1.0718*** | 1.0745*** | 1.0729*** | 1.0751*** | 1.0755*** |
| | [391.27] | [315.03] | [266.57] | [1302.85] | [648.54] | [522.38] |
| Firm FE | yes | no | no | yes | no | no |
| Bank FE | no | yes | yes | no | yes | yes |
| Clustered SE | club branch | club branch | club branch | club branch | club branch | club branch |
| Observations | 681 | 681 | 339 | 2082 | 2082 | 755 |
| R-squared | 0.731 | 0.376 | 0.749 | 0.789 | 0.183 | 0.802 |

This table summarizes the results for banks' returns on loans. In columns I to III the sample is limited to the 681 lending relationships with contract-level interest rates, the sample in columns IV to VI consists of the 2082 bank-firm relationships for which loan and balance sheet data is available assuming interest rates to be the equal for the same firm in the same year for all contracts. Columns I, II, IV, and V display results for individual lending relationships, columns III and VI for value weighted loan portfolios. For each bank we compute the return on a value weighted portfolio of all loans within their club branch and loans to firms outside their club branch separately. Thus, there are at most two observations per bank. The dependent variable $ROL_{ij}$ is bank $i$'s payoff per one dollar investment over the life time of the lending relationship with firm $j$ (or loan portfolio in columns III and VI). Details on the computation of banks' returns on individual loans and loan portfolios can be found in the text. The dummy variable $INGROUP_{ij}$ is one if bank $i$ and firm $j$ are connected through membership in the same club branch, and zero otherwise. The bottom of the table provides information about fixed effects and level of clustering. We report $t$-statistics in parentheses.

Table 8: Returns on Loans around Events

| | I | II | III | IV | V | VI | VII | VIII | IX |
|---|---|---|---|---|---|---|---|---|---|
| | | Entry | | | Formation | | | Mayoral Election | |
| Dep. var.: $ROL_{ij}$ | Relationship | | Portfolio | Relationship | | Portfolio | Relationship | | Portfolio |
| $AFTER_{jt}$ | -0.0068 | -0.0123 | -0.0187* | 0.0086 | 0.0004 | -0.0107 | -0.0047 | -0.0049 | 0.0001 |
| | [1.08] | [1.52] | [1.97] | [0.77] | [0.03] | [0.69] | [0.63] | [0.46] | [0.00] |
| $INGROUP_{ij}$ | -0.0006 | -0.0159 | -0.006 | -0.0045 | 0.0147 | 0.0053 | 0.0127 | 0.0129 | -0.0162 |
| | [0.06] | [1.23] | [0.41] | [0.29] | [0.85] | [0.23] | [0.63] | [0.49] | [0.55] |
| $AFTER_{jt} * INGROUP_{ij}$ | -0.0329*** | -0.0353** | -0.0496*** | -0.0393*** | -0.0475** | -0.0613** | -0.0956*** | -0.0921*** | -0.0672** |
| | [2.88] | [2.46] | [2.95] | [2.27] | [2.62] | [2.45] | [4.63] | [3.10] | [2.25] |
| $Constant$ | 1.0725*** | 1.0810*** | 1.0892*** | 1.0784*** | 1.0673*** | 1.0814*** | 1.0678*** | 1.0674*** | 1.0689*** |
| | 195.12 | 154.36 | 137.69 | 108.77 | 98.97 | 78.82 | 216.24 | 156.80 | 144.56 |
| Fixed Effects | firm | bank | bank | firm | bank | bank | firm | bank | bank |
| Clustered SE | club branch | club branch | club branch | club branch | club branch | club branch | club branch | club branch | club branch |
| Observations | 411 | 411 | 304 | 174 | 174 | 141 | 232 | 232 | 130 |
| R-squared | 0.736 | 0.623 | 0.672 | 0.668 | 0.708 | 0.710 | 0.722 | 0.542 | 0.717 |

This table summarizes the results for banks' returns on loans for which it is possible to extract contract-level interest rates (see Appendix C) for firms that are affected by the respective event specified at the top of the table (entry, formations, mayoral elections). For each firm-bank pair we split the loans in two groups: those originated before the event and those originated after the event and compute the return per one dollar investment separately for both groups. Columns I, II, IV, V, VII, and VIII display the results for individual lending relationships, columns III, VI, and IX for value weighted loan portfolios. For the portfolio tests we compute the return on a value weighted portfolio of all loans within their club branch and loans to firms from outside their club branch separately for each bank. Thus, there are at most two observations per bank. The dependent variable $ROL_{ij}$ is bank $i$'s payoff per one dollar investment over the life time of the lending relationship with firm $j$ (or the loan portfolio in columns III and VI). Detailed explanation of the computation of banks' returns on individual loans and loan portfolios can be found in the text. The dummy variable $INGROUP_{ij}$ is one if bank $i$ and firm $j$ are connected through membership in the same club, and zero otherwise. In columns VII to IX the 'in-group' bank is the local state bank in which the newly elected mayor becomes head of the supervisory board through her election. The bottom of the table provides information about fixed effects and level of clustering. We report $t$-statistics in parentheses.

Table 9: Lending Shares of In-group Banks - By Bank Ownership

| | I | II | III | IV | V | VI |
|---|---|---|---|---|---|---|
| Dep. Var.: | | $\left(\frac{In-group\ bank\ loans}{Total\ firm\ loans}\right)_{jt}$ | | | $\left(\frac{State\ in-group\ bank\ loans}{Total\ in-group\ bank\ loans}\right)_{jt}$ | $\left(\frac{In-group\ bank\ loans}{Total\ firm\ loans}\right)_{jt}$ |
| | State | Private | Cooperatives | One bank | Multiple banks | State |
| $AFTER_{jt}$ | 0.1082*** | 0.0763*** | 0.0472 | 0.0592*** | 0.1426* | 0.0626** |
| | [3.63] | [4.66] | [1.28] | [4.56] | [1.94] | [2.20] |
| $AFTER_{jt} * STATE_k$ | | | | 0.0645** | | |
| | | | | [2.34] | | |
| $AFTER_{jt} * MAYOR_k$ | | | | | | 0.1283*** |
| | | | | | | [2.89] |
| Quarter FE | yes | yes | yes | yes | yes | yes |
| Firm FE | yes | yes | yes | yes | yes | yes |
| Clustered SE | club branch | club branch | club branch | club branch | club branch | club branch |
| Observations | 4214 | 6936 | 866 | 12016 | 12696 | 4214 |
| R-squared | 0.511 | 0.445 | 0.363 | 0.473 | 0.662 | 0.554 |

For the dependent variable in this table we divide firm $j$'s loans from its in-group bank by firm $j$'s total loans in columns I to IV and VI. The sample in columns I to IV is limited to club branches with only one in-group bank, which is either a state bank (column I), a private bank (column II) or a cooperative bank (column III). The sample in column V comprises all club branches that have two in-group banks one of which is a state in-group bank and one of which is a private or cooperative in-group bank. The dependent variable is replaced by firm $j$'s state in-group bank loans divided by firm $j$'s total loans from all in-group banks. The variable $AFTER_{jt}$ is a dummy variable taking the value of one from the year when firm $j$ enters a club branch, and zero otherwise. The $STATE_k$ dummy takes the value of one for firms associated to a club branch with a state banker and zero for firms associated with branch that have no state banker among its members. For a subsample of branches the mayor of the respective city is member of the branch (and simultaneously heading the board of the state bank). For those branches the $MAYOR_k$ variable takes the value of one, whereas for branches with no mayor it takes the value of zero. The sample in column VI is restricted to branches in which the in-group bank is a state bank. Each regression includes quarter and firm fixed effects. Standard errors are corrected for clustering at the club branch level. We report $t$-statistics in parentheses.

Table 10: Returns on Loans - By Bank Ownership

| Dep. Var.: $ROL_{ip}$ | I<br>State | II<br>Private | III<br>Cooperatives | IV<br>All |
|---|---|---|---|---|
| $INGROUP_{ij}$ | -0.0564*** | -0.0187** | -0.0026 | -0.0166 |
| | [2.88] | [2.02] | [0.16] | [1.40] |
| $INGROUP_{ij} * STATE_i$ | | | | -0.0398** |
| | | | | [2.11] |
| $Constant$ | 1.0680*** | 1.0744*** | 1.0866*** | 1.0745*** |
| | [111.21] | [267.68] | [237.13] | [271.62] |
| Bank FE | yes | yes | yes | yes |
| Clustered SE | club branch | club branch | club branch | club branch |
| Observations | 105 | 175 | 59 | 339 |
| R-squared | 0.671 | 0.744 | 0.982 | 0.761 |

This table summarizes the estimation results for portfolio-level returns on loans for different bank groups. The sample comprises the firms for which contract-level interest rates can be computed (see Appendix C). We compute the return on a value-weighted portfolio separately for loans to firms within the club branch and firms in other branches. Thus for each bank there are at most two observations. The dependent variable $ROL_{ip}$ is bank $i$'s payoff per one dollar investment over the life time of portfolio $p$. A detailed explanation of the computation of portfolio-level returns on loans can be found in the text. The dummy variable $INGROUP_{ij}$ is one if bank $i$ and the firms in portfolio $p$ are connected through membership in the same club branch, and zero otherwise. The $STATE_i$ dummy takes the value of one if bank $i$ is a state bank, and zero otherwise. All regressions include bank fixed effects. Standard errors are corrected for clustering at the club branch level. We report $t$-statistics in parentheses.

Table 11: Firms' Usage of Capital

| Dep. Var.: | I<br>$\left(\frac{Investments}{Assets}\right)_{jt}$ | II<br>$\left(\frac{Cash}{Assets}\right)_{jt}$ | III<br>$\left(\frac{Payouts}{Assets}\right)_{jt}$ | IV<br>$\left(\frac{Debt}{Assets}\right)_{jt}$ | V<br>$\left(\frac{EBIT}{Assets}\right)_{jt}$ | VI<br>$\left(\frac{Interest\ exp.}{Debt}\right)_{jt}$ |
|---|---|---|---|---|---|---|
| $AFTER_{jt}$ | -0.0063 | 0.0271*** | 0.0289*** | 0.0617*** | 0.0018 | -0.0040 |
| | [0.65] | [2.71] | [2.83] | [2.67] | [0.28] | [1.33] |
| Year FE | yes | yes | yes | yes | yes | yes |
| Firm FE | yes | yes | yes | yes | yes | yes |
| Clustered SE | club branch | club branch | club branch | club branch | club branch | club branch |
| Observations | 4751 | 5474 | 4751 | 4364 | 5474 | 5094 |
| R-squared | 0.402 | 0.698 | 0.379 | 0.762 | 0.558 | 0.404 |

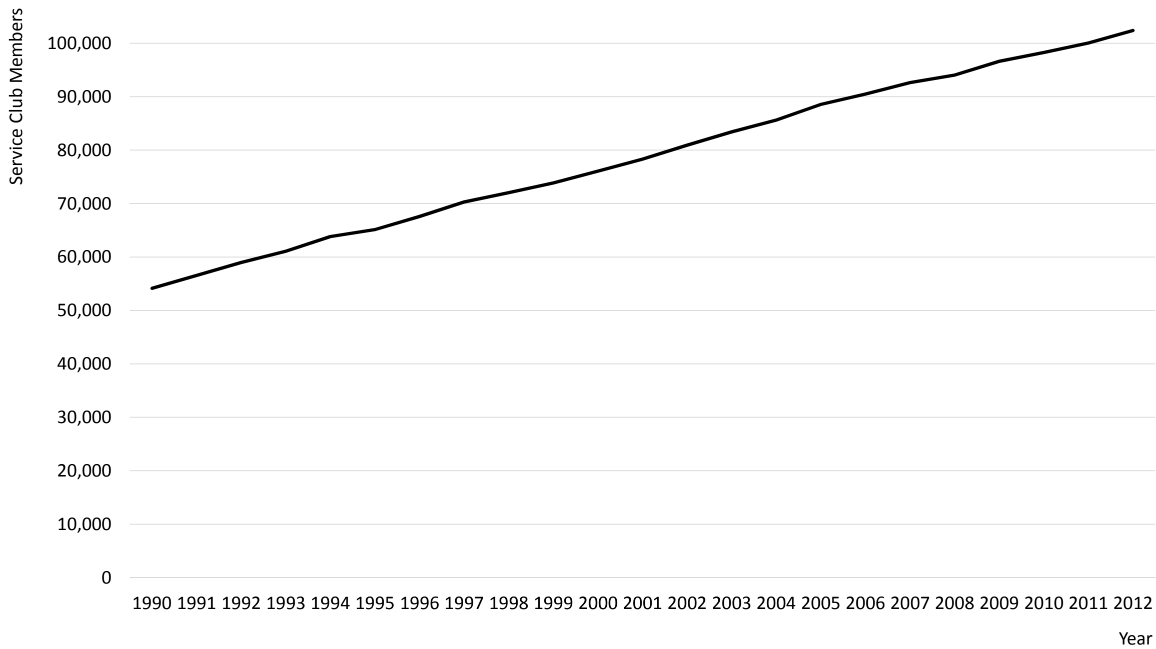
This table depicts changes in firm-level variables for the subsample of 686 firms for which balance sheet data from the USTAN database is available. Information on the dependent variable of each regression is provided at the top of the table. The dummy variable $AFTER_{jt}$ takes the value of one from the year when firm $j$ joins a club branch and zero otherwise. All regressions include year and firm fixed effects. Standard errors are corrected for clustering at the club branch level. We report $t$-statistics in parentheses.

Table 12: Lending Decisions and Future Changes in Firm Performances

| Panel A: Profitability | I | II | III | IV | V | VI | VII | VIII |
|---|---|---|---|---|---|---|---|---|
| | Population | | Sample | | Club Loans | | Outside Loans | |
| Dep. Variable: $\overline{ROA_{t+k}} - ROA_t$ | k=2 | k=5 | k=2 | k=5 | k=2 | k=5 | k=2 | k=5 |
| $\frac{\Delta\ loans_{ijt}}{assets_j t}$ | 0.0255*** | 0.0273*** | 0.0037 | 0.0151*** | -0.0552** | -0.0323* | 0.0045 | 0.0156*** |
| | [4.69] | [3.74] | [0.47] | [4.51] | [2.60] | [1.97] | [0.54] | [3.54] |
| $club\ bank_{ij}$ | | | -0.0029* | -0.0005 | | | | |
| | | | [1.88] | [0.47] | | | | |
| $\frac{\Delta\ loans_{ijt}}{assets_j t} * club\ bank_{ij}$ | | | -0.0588*** | -0.0410*** | | | | |
| | | | [3.02] | [2.65] | | | | |
| Year FE | yes | yes | yes | yes | yes | yes | yes | yes |
| Firm FE | yes | yes | yes | yes | yes | yes | yes | yes |
| Bank FE | yes | yes | yes | yes | yes | yes | yes | yes |
| Firm Controls | yes | yes | yes | yes | yes | yes | yes | yes |
| Clustered SE | firm | firm | firm | firm | firm | firm | firm | firm |
| Observations | 71737 | 36848 | 6806 | 4206 | 2132 | 1305 | 4674 | 2901 |
| R-squared | 0.260 | 0.399 | 0.661 | 0.870 | 0.706 | 0.892 | 0.656 | 0.869 |
| Panel B: Firm Risk | I | II | III | IV | V | VI | VII | VIII |
| | Population | | Sample | | Club Loans | | Outside Loans | |
| Dep. Variable: $PD_{t+k} - PD_t$ | k=2 | k=5 | k=2 | k=5 | k=2 | k=5 | k=2 | k=5 |
| $\frac{\Delta\ loans_{ijt}}{assets_j t}$ | -0.1841** | -0.1718* | -0.1572* | -0.2717** | 0.1327 | 0.0666 | -0.2121** | -0.3583*** |
| | [2.41] | [1.82] | [1.85] | [2.54] | [0.20] | [0.08] | [2.21] | [2.87] |
| $club\ bank_{ij}$ | | | -0.0126 | -0.0598 | | | | |
| | | | [0.57] | [1.63] | | | | |
| $\frac{\Delta\ loans_{ijt}}{assets_j t} * club\ bank_{ij}$ | | | 0.0779 | 0.0721 | | | | |
| | | | [0.12] | [0.08] | | | | |
| Year FE | yes | yes | yes | yes | yes | yes | yes | yes |
| Firm FE | yes | yes | yes | yes | yes | yes | yes | yes |
| Bank FE | yes | yes | yes | yes | yes | yes | yes | yes |
| Firm Controls | yes | yes | yes | yes | yes | yes | yes | yes |
| Clustered SE | firm | firm | firm | firm | firm | firm | firm | firm |
| Observations | 69316 | 35551 | 5393 | 3152 | 1717 | 1001 | 3676 | 2151 |
| R-squared | 0.335 | 0.566 | 0.443 | 0.642 | 0.493 | 0.656 | 0.446 | 0.659 |

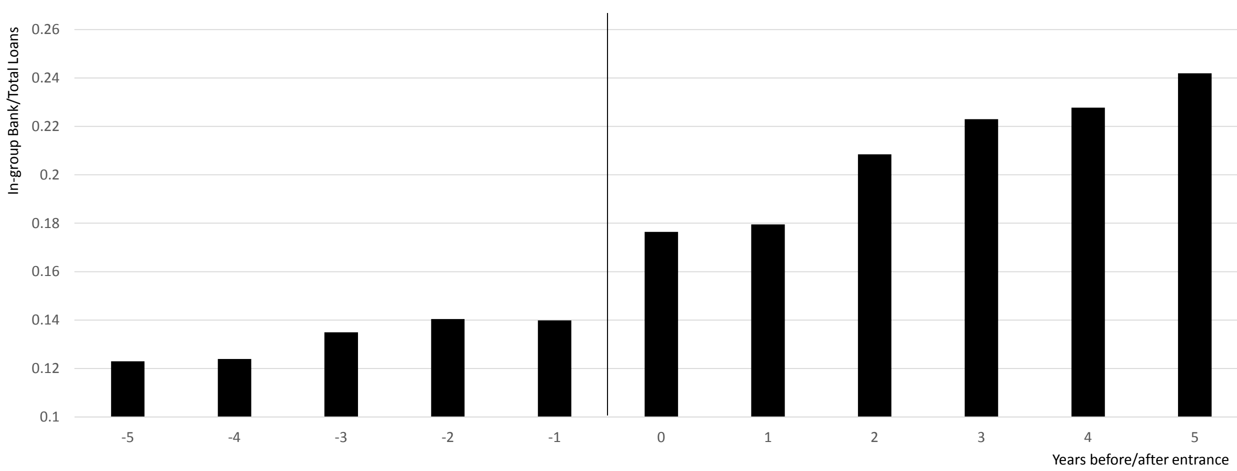
The dependent variable in this table $\overline{ROA}_{jt+k} - ROA_{jt}$ is firm $j$'s average return on assets from $t+2$ to $t+k$ minus its current return on assets. The variable $\frac{\Delta\ loans_{ijt}}{assets_j t}$ is the change in loans from bank $i$ to firm $j$ from $t-1$ to $t$ scaled by firm $j$'s assets. The dummy variable $club\ bank_{ij}$ takes the value of one if bank $i$ is club bank in firm $j$'s club and zero otherwise. We only consider loans to firms when they are a member of the club, except in columns I and II, where the sample comprises all firms in the sample region not associated to the social club organization. In columns V and VI the sample comprises only within club loans, in columns VII and VIII the sample is limited to loans from banks that are member of a different club branch than the firm. We include year, firm and bank fixed effects in every regression. As firm controls we add the logarithm of lagged firm assets, and industry trends*. T-statistics are reported in parantheses. Standard errors are corrected for clustering at the firm level.

Figure 1: **Service Club Membership in Germany**



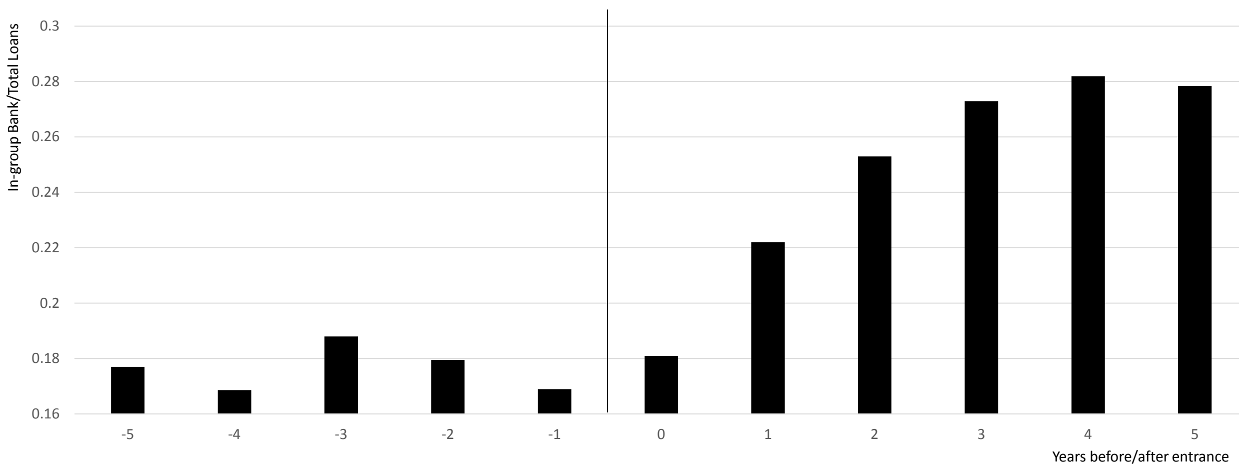

This figure depicts the time-series evolution of aggregate membership to the two largest service clubs in Germany.

Figure 2: **In-group Bank Share in Total Firm Lending Around Entry to a Branch**



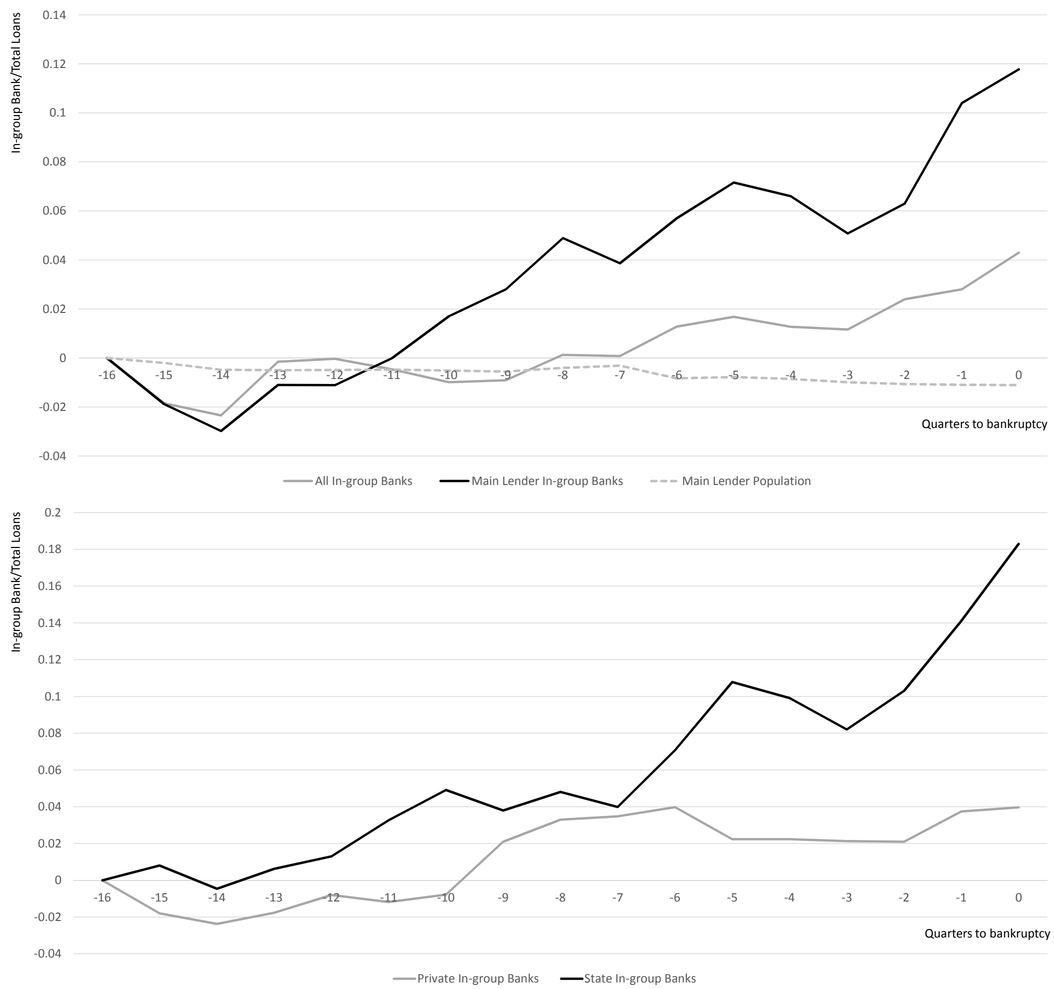

This figure depicts the share of loans from a firm's in-group bank divided by the firm's total loans for the sample of 474 firms that enter a branch during the sample period. To compute the in-group bank shares on the y-axis we align firms around the year they enter a branch and calculate the average in-group bank share for all firms with the same distance to entry. The x-axis displays the distance to firms' entry to a branch in years. The value zero indicates the year in which the firm officially obtains member status in the branch.

Figure 3: **State Bank Share in Total Firm Lending Around Mayoral Elections**




This figure depicts the share of loans a firm borrows from the state bank divided by its total loans for the sample of 109 firms that are members of a club branch in which an existing member in elected as a mayor for the first time during the sample period and thereby becomes head of the local state bank's supervisory board. To compute the state bank shares on the y-axis we align firms around the year of the mayoral election and calculate the average state bank share for all firms with the same distance to the mayoral election.

Figure 4: **Bank Lending Shares before Bankruptcy**




Panel A of this figure plots the share of in-group bank in total firm loans in the sixteen quarters before firms' default on the y-axis (solid lines). We plot in-group bank shares relative to the share sixteen quarters before bankruptcy which we set to zero. The x-axis lists the distance to the official bankruptcy date in quarters. The gray solid line comprises all firms with a default event in the sample, whereas the black solid line only includes those firms for which additionally the in-group bank is their main lender. The gray dashed line depicts the share of loans from firms' main lender in total firm loans for the population of all firms in the sample region that are not club members (and therefore not part of our sample). Panel B plots the share of in-group bank in total firm loans for the firms with a default event whose in-group bank is the main lender separately for firms for which the in-group bank is a state bank (black line) and for firms for which the in-group bank is a private bank (gray line).

# Appendix A. Data collection of service club members

This appendix describes the construction of the dataset on service club members. Many of these service club branches provide their entire membership section through their website. Other service club branches only provide the names of current members and the official function within the branch (e.g. president, vice-president, treasury), as well as the names of members that had an official function in the past. Since the branches tend to be small (on average 50 members) and we are only interested in members that are either a firm's CEO or a bank director, we obtain most member names by this search strategy. We complete our sample by interviewing club members from our sample region.

Membership information includes an entrance date, as well as information on the member's profession. If the information regarding a member's profession is incomplete, we update our sample by internet research. Names of CEOs of limited liability and public firms can be obtained through the federal German corporate register (*elektronischer Bundesanzeiger*).[45] We also use the latter source to identify whether the firms in the service clubs filed for bankruptcy during our sample period. All sample banks list their regional directors on each bank's website.

# Appendix B. The German banking sector

The German financial sector is bank-based with a universal banking system. The German banking sector consists of 2,277 banks and nearly 40,000 bank branches.[46] One of the distinct features of the German banking sector is the so-called three-pillar structure which refers to the three different types of legal ownership of German banks - state owned banks (*Landesbanken* and *Sparkassen*), private banks, and credit cooperatives. The market shares of these different types of banks according to banking assets are distributed as follows: 39 percent are held by private banks, 45.5 percent by state banks (that break down in 25 percent by savings banks (*Sparkassen*), and 20.5 by Landesbanken), and 15.5 percent by cooperative banks. While savings banks and cooperative banks share a regional structure, private banks tend to have one headquarter (mostly in Frankfurt) and operate bank branches throughout Germany. An illustration of the most important institutional features of these three different types of banks is provided in Table A.1.

[45] https://www.ebundesanzeiger.de

[46] Within Europe, Germany is among the countries with the highest number of credit institutions, branches, and bank employees; see ECB (2007) for details.

Table A.1: Banks in Germany

| | Private Banks | State-Owned Banks (excl. Landesbanken) | Cooperative Banks |
|---|---|---|---|
| Ownership | shareholders | local government | customers are shareholders (members) |
| Geographic Outreach | national | regional (local) | regional (local) |
| Liability | limited liability of shareholders | public guarantee obligation until 2005; implicit public guarantee through state ownership | liability of members (if losses exceed equity, members have to inject new capital) |
| Deposit Insurance | private fund to secured the deposits of customer up to a ceiling of 30 percent of the liable capital of each bank | federal association of state owned banks to support entire bank (not just deposits); capital injections from regional government | federal association provides an insurance fund to provide deposit guarantees |
| Market Share | 39 percent | 25 percent | 15.5 percent |

This table provides information about the organizational structure of the three groups of German banks: private banks, state-owned banks (savings banks, excl. Landesbanken), and cooperatives. It depicts information on ownership of the banks, their geographic outreach, owners' liability, deposit insurance, and their respective market share according to banking assets.

The structure of the state banking sector is the result of laws (*Sparkassengesetz*) implemented at the beginning of the twentieth century and after the Second World War, which gave rise to a country-wide community savings banking sector. Savings banks are owned and controlled by the local politicians exercise governance through the supervisory board of the savings banks. Furthermore, local politicians are members of a so called credit committee (*Kreditausschuss*) that has to approve lending decisions on large loans of the savings banks. Thus, local politicians have a direct influence on the state banks management decisions. The regional principle requires savings banks to foster credit supply in the city/county of their location. The objectives of state banks, as laid down in the respective laws (e.g., *SpGNRW* and *SpGBW*), are besides generating income to the local government manifold: e.g., ensuring the availability of credit to enterprises and communities, as well as facilitating individual savings.[47] Since regional state-owned banks are owned and controlled by the local politicians, these politicians may use taxpayers money to support these banks in case of distress.

German cooperative banks are organized in a very similar way as state-owned banks. They have the same regional organization but operate independent of the local government. Thus, the main difference between these two types of banks is their ownership structure.

[47]Commonly this legal framework includes a statement that profit maximization is not the only objective of state owned banks. Other objectives are to provide a checking account to every private person independent of her income and the economic education of the youth (see the *Sparkassengesetze*, *Sparkassenordnung* and *Landesbankgesetz of the Länder in German*.

While savings banks are owned by the government, cooperative banks are owned by private shareholders (i.e., referred to as members). According to the institutional set-up of cooperatives, only customers of the bank may become shareholders of the banks. Furthermore, in case a bank encounters losses that are higher than its equity, shareholders are required to inject further capital (no limited liability). Thus, the governance of cooperative and private banks is basically very similar since both types of banks are controlled for by shareholders that benefit from higher bank profits. Savings banks, however, are controlled by the local politicians. In this case, the budget of the city/county would benefit from high profits by the savings bank, while there is no direct benefit for the politician. We exploit this difference in governance that is very likely to be stricter for private and cooperatives as opposed to state-owned banks. For further details see Engelmaier and Stowasser (2013).

# Appendix C. Computation of Interest Rates

Combining the quarterly Bundesbank credit register with annual firm-level accounting information from USTAN allows us to back out effective annual interest rates on the loan contract level.

Step 1: As a first step, we use quarterly information from the credit register on the bank-firm relationship level to identify individual loan contracts. From the repayment structure of the initial loan amount, we can infer the maturity of the loan contract (e.g., whether it is repaid at the end of the contract period; linearly or de/progressively). If the outstanding loan of a lending relationship increases, we identify a new loan contract. Some lending relationships include a current account for the client with a loan amount that fluctuates around a fairly stable mean. Therefore, we only identify a new loan contract if the increase in total loans per firm-bank relationship exceeds 33.33 percentage points. Following this procedure, we extract all individual loan contracts per firm from the credit register (see Table A.2, Panel A).[48]

[48] The tables in this section help to guide the reader through the computation of interest rates by illustrating one hypothetical example.

Table A.2: Contract Extraction

| A - Quarterly Data | I | II | III | IV | V |
|---|---|---|---|---|---|
| Quarter | Bank A | Bank B | Contract 1 (A) | Contract 2 (A) | Contract 3 (B) |
| 1998 Q4 | 12000 | - | 12000 | - | - |
| 1999 Q1 | 10000 | - | 10000 | - | - |
| 1999 Q2 | 8000 | - | 8000 | - | - |
| 1999 Q3 | 6000 | - | 6000 | - | - |
| 1999 Q4 | 11000 | - | 4000 | 7000 | - |
| 2000 Q1 | 9000 | - | 2000 | 7000 | - |
| 2000 Q2 | 7000 | - | - | 7000 | - |
| 2000 Q3 | 7000 | - | - | 7000 | - |
| 2000 Q4 | 7000 | - | - | 7000 | - |
| 2001 Q1 | 7000 | - | - | 7000 | - |
| 2001 Q2 | 7000 | - | - | 7000 | - |
| 2001 Q3 | 7000 | 5000 | - | 7000 | 5000 |
| 2001 Q4 | - | 4000 | - | - | 4000 |
| 2002 Q1 | - | 3000 | - | - | 3000 |
| 2002 Q2 | - | 2000 | - | - | 2000 |
| 2002 Q3 | - | 1000 | - | - | 1000 |
| B - Annualized Data | I | II | III | IV | V |
| Year | IR | Spread | Contract 1 (A) | Contract 2 (A) | Contract 3 (B) |
| 1999 | 0.0700 | 0.0381 | 9000 | - | - |
| 2000 | 0.0853 | 0.0367 | 1500 | 7000 | - |
| 2001 | 0.0803 | 0.0399 | - | 7000 | 1250 |
| 2002 | 0.0800 | 0.0451 | - | - | 2500 |

Panel A of this table lists a firm's total loans from Bank A in column I and Bank B in column II derived from the credit register. Columns III to V display the contracts extracted from the quarterly loan information. Panel B depicts the annualized data. Column I shows the annual firm-level interest rate from balance sheet data, column II the spread of the interest rate over the EURIBOR. Columns III to V lists the average annual loan for Contracts 1 to 3. Details on the identification of loan contracts can be found in the text.

To match loan and balance sheet data, we annualize the loan data by averaging the loan amount over four quarters (December$_{t-1}$, March$_t$, June$_t$, September$_t$). We match contract-level information with interest payments derived from balance sheet information[49] (see Table A.2, Panel B). In rare cases, firms have interest-relevant debt in excess of bank loans. In this case, the sum of all bank loans from the credit register does not sum up to the amount of loans reported in a firm's balance sheet. We deal with this discrepancy by treating the difference as an additional lending relationship.

Step 2: The combination of both datasets allows us to compute contract-level interest rates by solving the equation system:

$$r_{jt} = \sum_{d=1}^{D} \frac{x_{djt}}{\sum_{d=1}^{D} x_{djt}} \cdot r_{dj}, \tag{C.1}$$

$$for\ t = t - int(D/2), ..., t, ..., t + int((D-1)/2)$$

[49]Annual firm-level interest rates are defined as interest expenses minus interest expenses to related firms (ap174-ap175) divided by the average loan amount in the same year.

where $D$ is the number of relationships. The variable $r_{jt}$ is the average interest rate paid by firm $j$ in year $t$. We winsorize firm-level interest rates at the 5/95 percent quintile to account for unduly extreme outliers. The individual contract volume for firm $j$'s contracts is denoted by $x_{djt}$, and thus, $\frac{x_{djt}}{\sum_{d=1}^{D} x_{djt}}$ is contract $d$'s share in firm $j$'s total borrowing. The variable of interest is $r_{dj}$, the interest rate on the individual loan contract.[50]

Each contract can either be a fixed or floating rate contract.[51] Equation system (C.1) can also be solved for floating rate contracts by replacing $r_{dj}$ by $(s_{dj} + EURIBOR_t)$, where $s_{dj}$ is the spread over the EURIBOR for contract $d$. As we do not have information about the type of contract, we allow all possible combinations for each firm at every point in time. For a firm with $D$ contracts at a given point in time, we solve $2^{\mathrm{D}}$ different equation systems. Additionally, for $D$ contracts to solve the equation system for $r_{dj}$, $D$ independent equations are required. Solving the equation system provides us with contract-specific interest rates/spreads (see Table A.3).

Step 3: To identify the correct combination of contract types, we first calculate the average absolute deviation from the mean interest rate/spread for each contract:

$$\sigma_{djt} = \frac{1}{T} \cdot \sum_{t=1}^{T} \left| r_{djt} - \sum\nolimits_{t=1}^{T} \frac{r_{djt}}{T} \right| \tag{C.2}$$

where T is the maturity of contract $d$ in years. Next, we compute the average deviation for each of the $2^{\mathrm{D}}$ equation systems as the average deviation over all contracts as $\varsigma_j$. For each firm, we pick the combination of fixed and floating rate contracts that leads to the lowest value of $\varsigma_j$ (see Table A.3). Finally, we calculate the annual firm-bank relationship level interest rate as the value-weighted interest rate of all contracts of a firm-bank relationship for a given year. This approach allows us to compute firm-bank level interest rates for a subsample of lending relationships for which equation system (C.1) is solvable.

Step 4: To verify the validity of the computed interest rates we run within sample plausibility tests and apply the algororith to a sample of contracts for which we collect information on actual interest rates. From 2008, for every loan the credit register provides information about whether a loan is secured or unsecured, and the lender's reported probability of default. Within sample tests allow us comparing interest rates of the *same* firm in the same year, which is insightful as differences in interest rates for the same firm in the same year

[50] In the example from Table A.2, the equation system for the year 2000 with fixed interest rates is: $\begin{bmatrix} 0.0853 \\ 0.0803 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0.1765 & 0.8235 \end{bmatrix} \times \begin{bmatrix} r_1 \\ r_2 \end{bmatrix}$.

[51] In Germany, floating rate contracts use the FIBOR as base rate until 1998 and the EURIBOR as of 1999.

Table A.3: Solutions

| | (r,r,r) | (s,s,s) | (r,s,s) | (r,r,s) | (r,s,r) | (s,r,r) | (s,r,s) | (s,s,r) |
|---|---|---|---|---|---|---|---|---|
| 1999 | | | | | | | | |
| Contract 1 (A) | 0.0700 | 0.0381 | 0.0700 | 0.0700 | 0.0700 | 0.0381 | 0.0381 | 0.0381 |
| Contract 2 (A) | - | - | - | - | - | - | - | - |
| Contract 3 (B) | - | - | - | - | - | - | - | - |
| 2000 | | | | | | | | |
| Contract 1 (A) | 0.0700 | 0.0381 | 0.0700 | 0.0700 | 0.0700 | 0.0381 | 0.0381 | 0.0381 |
| Contract 2 (A) | 0.0886 | 0.0364 | 0.0400 | 0.0886 | 0.0400 | 0.0850 | 0.0850 | 0.0364 |
| Contract 3 (B) | - | - | - | - | - | - | - | - |
| 2001 | | | | | | | | |
| Contract 1 (A) | 0.0700 | 0.0381 | 0.0700 | 0.0700 | 0.0700 | 0.0381 | 0.0381 | 0.0381 |
| Contract 2 (A) | 0.0886 | 0.0364 | 0.0400 | 0.0886 | 0.0400 | 0.0850 | 0.0850 | 0.0364 |
| Contract 3 (B) | 0.0339 | 0.0595 | 0.0395 | -0.0065 | 0.0799 | 0.0540 | 0.0136 | 0.0999 |
| 2002 | | | | | | | | |
| Contract 1 (A) | - | - | - | - | - | - | - | - |
| Contract 2 (A) | 0.0804 | 0.0390 | 0.0390 | 0.0794 | 0.0400 | 0.0804 | 0.0794 | 0.0462 |
| Contract 3 (B) | 0.0800 | 0.0451 | 0.0451 | 0.0451 | 0.0800 | 0.0800 | 0.0451 | 0.0451 |
| $\sigma$(Contract 1 (A)) | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| $\sigma$(Contract 2 (A)) | 0.0101 | 0.0031 | 0.0012 | 0.0113 | 0.0000 | 0.0057 | 0.0069 | 0.0120 |
| $\sigma$(Contract 3 (B)) | 0.0345 | 0.0108 | 0.0042 | 0.0387 | 0.0001 | 0.0195 | 0.0236 | 0.0411 |
| $\varsigma$ | 0.0149 | 0.0046 | 0.0018 | 0.0166 | 0.0000 | 0.0084 | 0.0102 | 0.0177 |

The first line of the table indicates the combination of fixed rate contracts (r) and floating rate contracts (s). The optimal combination of contracts to solve the equation system is (r,s,r). The interest rate for Contract 1 is 0.08, the spread for Contract 2 is 0.04, and the interest rate for Contract 3 is 0.07. This leads to annual interest rates of 0.0700 in 1999, 0.0853 in 2000, and 0.0804 in 2001 for Bank A, and 0.0800 in 2001 and 2002 for Bank B.

Table A.4: Within-Sample Plausibility Tests

| | Secured vs. unsecured | | | Firm risk | | |
|---|---|---|---|---|---|---|
| Dep. Var.: $IR_{ijt}$ | I | II | III | IV | V | VI |
| $secured_{ijt}$ | -0.0052* | -0.0104*** | -0.0175*** | | | |
| | [1.88] | [3.33] | [3.56] | | | |
| $log(PD)_{ijt}$ | | | | 0.0020* | 0.0049*** | 0.0075** |
| | | | | [1.77] | [2.74] | [2.23] |
| Year FE | yes | yes | - | yes | yes | - |
| Firm FE | no | yes | - | no | yes | - |
| Firm-Year FE | no | no | yes | no | no | yes |
| Observations | 1093 | 1093 | 1093 | 636 | 636 | 636 |
| R-squared | 0.052 | 0.571 | 0.652 | 0.063 | 0.621 | 0.731 |

This table shows the results from the regression: $IR_{ijt} = \alpha + \beta \cdot secured_{ijt} + \epsilon_{ijt}$ in columns I to III, where $IR_{ijt}$ is the relationship-level interest rate charged by bank $i$ for firm $j$ at time $t$ and $secured_{ijt}$ is a dummy variable taking the value of one if the loan is secured and zero otherwise. In columns IV to VI the $secured_{ijt}$ dummy is replaced by $log(PD)_{ijt}$, the log of the probability of default assigned from bank $i$ to firm $j$ at time $t$. The bottom part of the table lists the fixed effects included. We report $t$-statistics in parentheses.

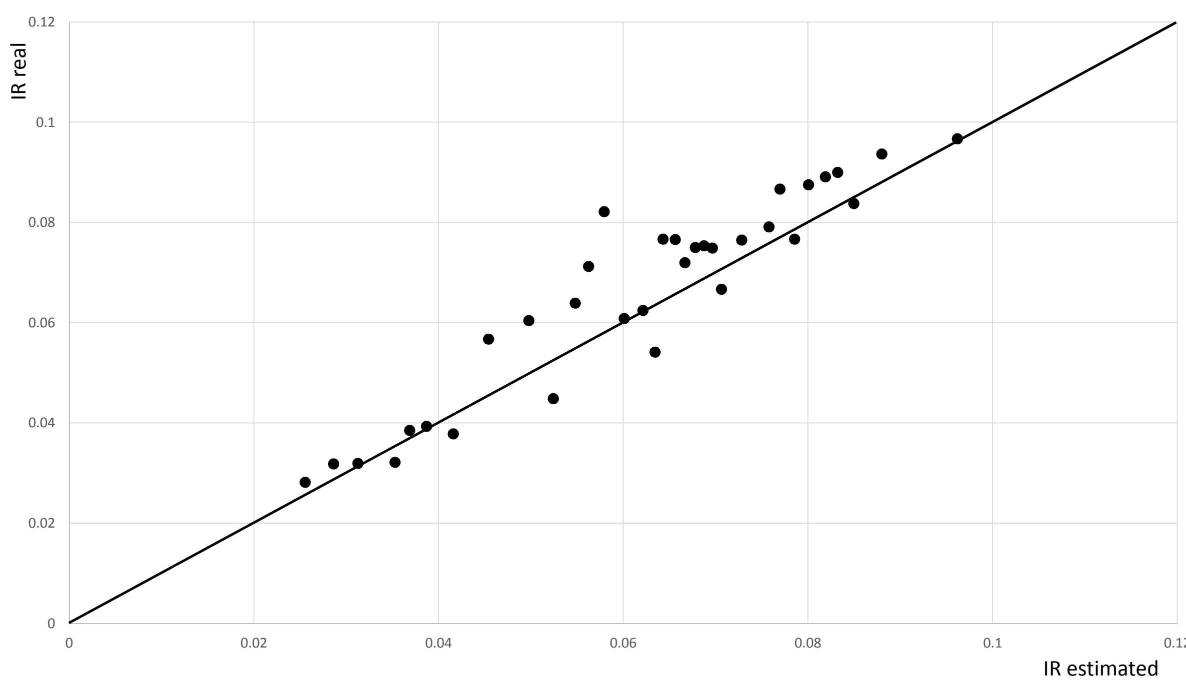
emerge solely from the algorithm to computate *relationship-level* interest rates. In the cross-section, interest rates on secured loans are 0.52 percentage points lower than for unsecured loans (Table A.4, column I). After adding firm fixed effects, the difference is even larger, with 1.04 percentage points (column II). With firm-year fixed effects, interest rates on secured loans are are 1.75 percent lower than for unsecured loans (column III). Additionally, interest rates are higher for riskier firms (column IV). After adding firm fixed effects, the difference is even stronger (column V). Adding firm-year fixed effects reveals that banks that consider the same firm to be riskier (that is, report a higher probability of default) charge higher interest rates (column VI). The results from the plausibility checks verify that the computed interest rates capture differences in interest rates across loan contracts correctly. In particular, the algorithm to compute relationship level interest rates improves the cross-sectional distribution of interest rates suggesting that it captures differences in interest rates well.

We obtain actual interest rates from the Center for Financial Studies (CFS) Loan Data Set used in Brunner and Krahnen (2008, 2013).[52] The dataset comprises, for a randomly drawn set of medium-sized firms, bank-borrower relationship level interest rates collected from five major banks (three private banks, one public sector bank, and one cooperative bank) from 1992 to 1996. We additionally update the data for the 2011-2012 period for one bank. In total we can match 93 of the firms with balance sheet and loan data at Bundesbank. For 87 out of the 93 firms balance sheet and loan data overlaps (is available for the same

[52] We thank Jan-Pieter Krahnen for providing us with the data.

year), allowing us to estimate interest rates. For 72 of the firms such information is available in at least one year for which we obtained actual interest rates. We start with 164 firm-year observations for which real and balance sheet level interest rates are available. For 167 of the 725 annual firm-bank relationships that exist for those 164 firm-year observations, we know the actual interest rate. After applying the algorithm we obtain 100 estimated relationship-level interest rates for 50 firms. Since Bundesbank rules require each reported data point to comprise at least three individual observations, we summarize three adjacent estimated interest rates into 33 buckets (the last bucket contains four observations) for the graphical analysis. Figure A.1 plots the average actual interest rates against the average estimated interest rates for those 33 buckets including a 45 degree line. The correlation between the actual and estimated interest rates is 0.9429. When we regress the actual interest rate on estimated interest rates, the slope is close to one with 1.0574 (Table A.5, column I). When we add a constant to the regression the constant term is insignificant with 0.44 percentage points, the slope coefficient is 0.9929 (column II). The comparison with actual interest rates shows that the algoritmn to compute relationship-level interest rates provides a reasonable proxy for actual interest rates.

Figure A.1: **Actual and Estimated Interest Rate**




This figure plots actual interest rates (y-axis) against estimated interest rates (x-axis) around a 45 degree line. Individual firm-bank relationship observations are aggregated into buckets comprising three individual observations to comply with Bundesbank reporting regulations. The plot shows the average actual interest rates and average estimated interest rates for the 33 buckets.

Table A.5: Actual and Estimated Interest Rate

| Dep. Var.: $IR\ real_{ijt}$ | I | II |
|---|---|---|
| $IR\ estimated_{ijt}$ | 1.0574*** | 0.9929*** |
| | [56.38] | [15.19] |
| $Constant$ | | 0.0044 |
| | | [1.03] |
| Observations | 100 | 100 |
| R-squared | 0.970 | 0.702 |

This table shows the results from regressing actual firm-bank relationship interest rates ($IR\ real_{ijt}$) on estimated interest rates ($IR\ estimated_{ijt}$) without a constant in column I and with a constant in column II. We report $t$-statistics in parentheses.