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Social Capital and the Viability of Stakeholder-Oriented Firms: Evidence from Norwegian Savings Banks*

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Abstract

Stakeholder oriented governance systems are often thought to hamper efficiency. We show that social capital improves the viability of stakeholder-oriented firms in competitive markets. Studying exits from the population of Norwegian savings banks after deregulations, we find that banks located in communities with high social capital have a higher probability of survival. We propose that social capital facilitates collective decision-making, ensuring that banks internalize the preferences of the community in return for continued community patronage. Consistently, we find that in high social capital areas banks operate with lower interest rate margins, lower returns on assets, and lower loan losses.

Keywords: Stakeholder Governance, Social Capital, Nonprofit firms, Corporate Governance, Financial Intermediation

JEL: Z13, P13, G34, G21

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1 Introduction

Economists are often sceptical about the accomplishment of value creation and good governance practices in stakeholder-oriented firms. In principle, the objectives of management in stakeholder-oriented firms should incorporate the welfare of stakeholders other than investors, encompassing, for example, employees, customers, suppliers, or the community at-large. Tirole (2001), however, points out that the provision of adequate incentives for management to maximize the welfare of stakeholders is fraught with difficulties and that heterogeneous and conflicting preferences among stakeholders represent a major hindrance to the implementation of the stakeholder ideal. Jensen (2001) argues that firms that attempt to follow the stakeholder ideal will not survive in competition with value-maximizing firms.

In this paper, we offer a perspective on the continued existence of stakeholder-oriented firms in competitive industries. We suggest that social capital is a key determinant of the viability of firms with focus on stakeholders' objectives. We study survival to the present day of nonprofit savings banks in the Norwegian banking industry after deregulations in the mid-1980s subjected savings banks to the full force of competition from for-profit banks.[1] Communities with high social capital are characterized by interpersonal trust, civic engagement, and the norm that one should forgo self-interest and act in the interests of the collectivity (Putnam (1993,1995) and Coleman (1988)).[2] We find that savings banks survive longer as independent nonprofit organizations if they are located in communities with high social capital, and that social capital increases the probability of survival by up to 10 percentage points. This result obtains after controlling for bank characteristics, such as equity and competing banks' market share, and several population characteristics of the communities in which the banks operate, such as age, education, and the distribution of

[1] The nonprofit organizational form implies that the banks operate subject to a "non-distribution constraint" that bars the distribution of earnings to their capital suppliers or any other group of stakeholders. Unlike many other nonprofit organizations that sustain themselves by governmental funding and charitable donations, savings banks are *commercial* nonprofits—they sell private goods for a price and generate income.

[2] Social capital may be defined as relations between people "that enable participants to act together more effectively to pursue shared objectives for mutual benefit" (Putnam (1993, 1995)) and "the ability of people to work together for common purposes in groups and organizations" (Fukuyama (1995)). In this paper, we follow Putnam's sociocentric definition of social capital as a characteristic of a community and the interactions between members of that community (Adam and Rončević (2003) discuss alternative egocentric and network-based definitions of social capital).

income.

By regulation, Norwegian savings banks are governed by depositors, employees, and representatives of the local government councils. Borrowers may sit on the governing bodies too, as borrowers often also hold deposits. Therefore, the banks are governed by stakeholders from the local communities in which they have branches. The banks' nonprofit form implies that no stakeholders hold residual cash flow rights and that the banks have no explicit motive for maximizing profits. In this sense, the organizational form of the banks is *designed* to internalize the preferences of its stakeholders.

We propose that the positive effect of social capital on savings bank viability occurs because social capital facilitates the alignment of stakeholder preferences and collective decision-making, and helps ensure that management, in the conduct of the banks, internalize the preferences of the local community. In return for "community-based banking", an engaged community with focus on the common good will patronize the banks, ensuring their continued survival.

The absence of a profit-maximizing objective naturally raises the question of what business model successful savings banks pursue. We attempt to uncover how social capital affects individual banks' operations by examining whether social capital has an independent impact on savings banks' operating performance. Our results show that high social capital banks tend to earn lower returns on assets and allocate more of their annual surplus to charitable causes. They also operate with a lower interest rate margin resulting from higher deposit and lower loan rates. These results corroborate our conjecture that social capital facilitates community-based banking. We further find that high social capital banks sustain a lower proportion of past due loans, and that, given delinquencies, loan loss provisions are lower and the rate of recovery on past due loans is higher. These findings suggest that mechanisms in communities with high social capital generate incentives for borrowers to avoid delinquent repayment through norms that proscribe opportunistic behavior, whether internalized or working through social disapproval or rewards.[3]

Norwegian savings banks compete in the same product markets as for-profit banks and have, since a comprehensive deregulation of branching and quantitative credit restrictions

[3]Similar effects of social penalties are modelled for group lending by Besley and Coate (1995).

in the mid-1980s, faced severe competition from the branch networks of for-profit banks. The location of the savings banks at the time of deregulation is pre-determined, for many in the 19th century. Consequently, the Norwegian scenario of banking deregulation sets up a quasi-experiment: We observe the disappearance ("exits") of independent banks from the population of savings banks from around the time of deregulation, 1987, until 2005, and explore which bank and community characteristics determine whether a bank in a given location succumbs to competition after deregulation. During this period, about 50 percent of the savings banks exit the sample as targets in acquisitions by other savings banks or through conversions from the nonprofit organizational form. Conversions have been permitted since 1987 through the issue of a form of equity that introduces owners with residual cash flow rights into the banks' governing bodies (see Section 3).

Our key hypothesis is that social capital improves the viability of savings banks as independent nonprofit organizations. That is, under the null, savings banks operating in areas with high social capital should resist take-over attempts and convert their organizational form less frequently. The nonprofit organizational form shields independent savings banks from acquisitions. A proposal to merge must be approved by the stakeholders in the banks' governing bodies. But an acquisition implies that the target community's interests are traded off against acquiring communities' interests and that it loses influence in the decision-making process because the headquarter is moved further away.[4] A bank's special consideration of its community's interests is therefore likely to disappear when the bank is acquired. Furthermore, mergers are likely to generate changes in acquired banks' credit allocation policies. Knowledge of effort and the personal character of borrowers, obtained through repeated personal contact, may reduce problems of moral hazard and is likely to be important for banks whose business strategies weigh community interests. In larger banking organizations with hierarchial structures, however, local loan officers have fewer incentives to produce such non-verifiable ("soft") information (Stein (2002) and Berger et al. (2005)).[5] For these reasons, we conjecture that acquisitions of independent savings

[4]When banks merge, representatives from a larger number of communities must share the seats on the governing bodies (see Section 2, footnote 8).

[5]Alessandrini, Presbitero and Zazzaro (2007) study consolidation in the Italian banking industry and show that when mergers result in increased "functional" distance, defined as difference in social capital between banks' head-quarters and borrowers' location, consolidation lowers the availability of finance to

banks that are perceived by the community to serve its interests well should occur less frequently. A similar argument applies to banks that convert their organizational form. A conversion must be approved by the governing stakeholders because it entails a loss of control rights to a new group of investors. In contrast to incumbent stakeholders, entrant investors hold cash flow rights and have a preference for profits. Their presence in governance weakens the bank's incentives for community-banking. We therefore conjecture that conversions of savings banks that operate in high social capital areas with the purpose of maximizing community welfare occur less frequently. We discuss the link between social capital and savings bank longevity in more detail in section 2.

Due to its mountainous geography, Norway has a distinct regional character with many small communities and strong regional identities. We therefore, for every year, map out the location of all banks' branches, placing each branch in one of the 433 municipalities and match this data with measures of the level of, among others, social capital in each municipality. We then set up a discrete time survival model and estimate the probability of exit as a function of the level of social capital in the municipalities where they operate, controlling for other bank and municipality characteristics. The analysis is conducted with three different measures of social capital chosen to reflect three of the most commonly mentioned forms of social capital: interpersonal trust, civic engagement, and generalized reciprocity. The measures are, respectively, a score of trust based on the World Values Survey, households' newspaper subscriptions, and donations to charity, and are described in detail in Section 4. Since we have no a priori criterion for choosing among these three measures, we also use the first principal component for the measures throughout our analysis as a way of capturing the information that is common among them.

Our paper is related to the literature on firms with stakeholder-oriented governance structures. Fauver and Fuerst (2006) find that employee representation on German corporate boards improves the monitoring of management, reduces agency costs, and increase firms' market value. Allen, Carletti and Marquez (2007) argue that stakeholder oriented firms' overriding objective is survival in the long term. This is in line with our approach, i.e. survival is the relevant outcome variable to focus on in an analysis of commercial nonprofit

small local borrowers.

firms. In their model a concern for stakeholders induces a wealth transfer from the firm's customers to its other stakeholders. Bøhren and Josefsen (2007) study the performance of Norwegian banks and find that savings banks generate returns that are comparable to those for-profit banks. While they compare the performance of banks of different organizational forms, we study only the nonprofit form and propose a link between that form and social capital.[6]

Our work is also related to a recent literature that documents the effect of social capital on economic outcomes. Knack and Keefer (1997) and LaPorta et al. (1997) show that countries with more trust have higher economic growth and more efficient judicial systems. Guiso, Sapienza, and Zingales (2004, 2007) document that more trusting individuals are more likely to invest in the stock market and make less use of informal credit.[7] Bottazzi, Da Rin, and Hellmann (2007) find that trust enhances cross-border venture capital flows. The theme in these papers is how trust between counter parties facilitates financial contracting and economic development. Our mechanism is quite similar as interpersonal trust generally arises from norms proscribing selfish and opportunistic behavior. Such norms further the implementation of the common good, just as they ensure that repayment obligations are less likely to be breached. In addition, our paper is related to the literature on property rights that has addressed the question of outside versus inside (cooperative) ownership, aiming to understand the features that make one or the other polar organizational form efficient, e.g. Hansmann (1996), Hart and Moore (1998), and Rey and Tirole (2007). Our analysis suggests that social capital is a driving force behind the continued existence of nonprofit firms in developed economies.

The paper proceeds as follows. In Section 2 we discuss the link between community social capital and the savings banks' nonprofit organizational form. Section 3 provides a brief overview of the Norwegian banking industry and its development since deregulation. Section 4 describes our data, and Section 5 the methodology. Section 6 discusses the

[6]Several papers discuss the differences between shareholder-oriented Anglo-Saxon economies and the stakeholder-oriented systems of Germany and Japan. E.g., Yoshimori (1995) argues that the higher degree of stakeholder cohesion in Japanese firms furthers collaboration for companies' survival and prosperity. See also Aoki (1990).

[7]Guiso, Sapienza and Zingales (2006) find evidence that individuals' display of trust towards others are influenced by their cultural background and changes only slowly over time.

empirical results and Section 7 concludes.

2 Social capital, stakeholders, and the nonprofit bank

The governing bodies of Norwegian savings banks are fundamentally different from those of commercial banks because they have no owners. Savings banks have a Committee of Representatives that set out general lines of direction and elect the Board of Directors responsible for the day-to-day management of the bank. Committee members are elected by depositors and the municipality councils in the areas where the bank has offices.[8] That is, savings banks are governed by stakeholders who have no equity investment and no formal cash flow rights, but may, nevertheless, have an interest in exerting control over the bank's management.[9] The absence of residual cash flow rights and the representation of various stakeholder groups on banks' governing bodies imply that savings banks have no explicit incentive to maximize profits. The lack of a profit motive is reinforced by the non-distribution constraint: savings banks are, by regulation, prohibited from distributing net profits and are required to use residual earnings to replenish their capital or to channel resources for charitable purposes. A maximum of 25 percent of the annual earnings can be set aside in a separate gift fund and distributed for charitable purposes in the current or a future year.[10]

By the non-distribution constraint and the allocation of control rights to stakeholders based in the local community, nonprofit savings banks are essentially designed to internalize the effect of their actions on the welfare of stakeholders. This generates a link between the viability of savings banks and the level of social capital in the communities where the banks operate. An engaged community will patronize a bank in return for the bank conducting its business with an eye on community interests, securing the long-run survival of the bank.

[8] The relative proportion of depositors and public appointees is determined in the bylaws of the individual savings bank. For most banks, the articles set out a distribution key for the number of depositors and public appointees to be elected from the different municipalities such that larger municipalities and the municipality of a bank's headquarter often carry a higher weight.

[9] In contrast, in commercial banks, shareholders with residual cash flow rights constitute an absolute majority (72 percent) on the Committee of Representatives.

[10] The rest of the profits is to be retained and reinvested in the bank. In the case of a dissolution, any remaining equity capital must, be used to further savings banks business in the "home" area of the bank. In the case of an acquisition by another savings bank, retained equity is transferred to the merged bank.

Such community-based banking may take several forms. The bank may internalize community interests by acting as a vehicle for the provision of collective goods, It may lend to local firms on favorable terms or it may display high willingness to share risk with local borrowers through implicit long term contracting as suggested by Boot (2000).[11] For example, a bank may be more willing to renegotiate loan contracts with local entrepreneurs or enterprizes that are important employers in the community, with beneficial consequences for community members' economic and non-economic welfare.[12]

When social capital is high, a non-profit bank is more likely to internalize the community's interests and earn the community's support. We propose four channels through which social norms and civic engagement may foster community-based banking.

First, in nonprofit firms, control rights are shared between groups of stakeholders with potentially divergent interests The incentive for maximizing profits is replaced by preferences over the allocation of surplus towards different stakeholder groups. As a result, stakeholders may find it difficult to exert effective control even if they sit on the firms' governing bodies (Hansmann (1996)). Stakeholders in communities with high social capital are likely to cooperate more easily and have a shared preference for the general wellbeing of the community. Consequently, the costs of collective decision making are likely to be lower in the savings banks located in such communities and banks' actions are likely to come closer to maximizing the aggregate welfare of their stakeholders.

Second, civic participation may mitigate managerial agency problems though more active monitoring of savings banks' policies and practices, ensuring that these are consistent with local community objectives.

Third, social norms may directly affect the return on local lending to the extent that norms proscribing opportunistic behavior mitigate incentive problems in lending. Coleman (1988) argues that norms that emphasize the common good may be internalized or supported through external rewards or sanctions. More efficient lending arrangements may be attained when the relationship between banker and borrower are characterized by trust that

[11] See Demyanyk, Ostergaard and Sørensen (2007) for empirical evidence on risk sharing in banking relationships.

[12] Angelini, Di Salvo and Ferri (1998) find evidence that Italian credit cooperatives favor member firms by offering easier access to credit in the form of larger amounts and lower interest rates.

neither party will act opportunistically. The non-distribution constraint lessens the bank's incentives to use proprietary information to hold up the borrower and the borrower will have fewer incentives to exploit a bank's willingness to renegotiate, thus mitigating problems of moral hazard. Community-based monitoring and social sanctions have been pointed out as core elements of non-conventional lending arrangements such as credit cooperatives in developing countries.[13]

Fourth, the viability may be enhanced by trust among community members. Depositors may patronize the local savings bank rather than the local branch of a nationwide commercial bank because the former have members of the community on its governing bodies, whereas the latter have owners whose preferences do not internalize the community's costs and benefits of bank policies.[14]

3 Norwegian savings banks and the impact of deregulation

Since their establishment in the early nineteenth century, savings banks in Norway have had a strong local focus and served as an important source of finance for local firms and households. In 1960, 600 savings banks were operating in the country. Economic structural developments after 1960 prompted a rapid consolidation of the banking sector though mergers between savings banks, decreasing the number of savings banks by 55 percent by the mid-1980s.

Free competition in the Norwegian banking industry was introduced with the credit market reforms of the 1980s. Until 1984, bank lending was subject to quantitative regulations and bank branching was severely restricted. To establish new branches, banks were required to obtain approval from the Ministry of Finance, which, through a lengthy process, would consult with the respective local authorities. These policies effectively provided protection for local savings banks against entry from outside banks.[15] The suspension of restrictions enhanced competition and prompted further consolidation of the banking in-

[13] E.g. Besley and Coate (1995), and Banerjee, Besley and Guinnane (1994).

[14] Rose-Ackerman (1996) suggests that customers prefer nonprofit firms if organizational form signals an ideological commitment from the firms' managers. This hypothesis, however, assumes trust arises from "shared ideology" rather than "shared community".

[15] See Norwegian Official Reports (1992, pp. 66–67) for a description of such protection.

dustry: From the time of deregulation till present, another 50 percent of the independent savings bank agreed to acquisitions or conversions.

Since 1987 savings banks have been able to convert their organizational form. In particular, savings banks were allowed to increase their equity capital through the issue of so-called Primary Capital Certificates (PCCs). PCCs are residual claims on the banks' surplus and are typically traded on the Oslo Stock Exchange. A PCC-bank is a hybrid between a commercial bank and a nonprofit savings bank—it has outside owners with voting rights and residual cash flow rights but the other stakeholder groups continue to to be represented on the governing bodies.[16]

Aquisitions and issues of PCCs have been used by several banks to accelerate growth, resulting in large regional banks capable of competing with the largest commercial banks in the loan market for domestic businesses. Furthermore, three strategic alliances between independent savings banks were set up during the 1990s coordinating activities in areas such as IT-solutions, insurance and real estate.[17] Banks within an alliance do typically not operate branches on each others' home turfs. They do, however, compete with branches of savings banks from the other alliances, or savings banks outside the alliances. Hence, savings banks compete not just with commercial banks but also with each other.

In contrast to savings banks in many other countries, Norwegian savings banks are strongly engaged in business lending. Hence, at the beginning of our sample, in 1987, loans to businesses made up 31 percent of saving banks' portfolios, which 24 percent was commercial and industrial loans. Today (2005), the fraction is 26 percent, of which 23 percent represent commercial and industrial loans.[18]

The banking crisis that took place in 1988-1993 also contributed to the transformation of Norway's banking industry. The commercial banks were hit hardest by the crisis, but also some savings banks got into trouble.[19] From 1988 to 1990, 14 small and some regional banks failed, mostly savings banks. These banks, however, were of relatively small size.

[16]PCC-holders constitute the largest stakeholder block occupying 40 percent of the seats on the Committee of Representatives.

[17]See the Norwegian Savings Bank Association (www.sparebankforeningen.no).

[18]Loans to households and municipalities (or municipality-owned firms) constituted 57 and 5 percent, respectively in 1987. The numbers in 2005 are 70 and 0.2 percent, respectively.

[19]Aggregate loan loss provisions in commercial banks constituted more than 4% of total assets at the peak of the crisis in 1991. The equivalent number for the savings banks was about 2%.

Towards the end of 1990, the crisis became systemic, forcing the government to establish a governmentally-financed insurance fund. None of the failed savings banks were forced to close. Instead, they were either acquired by larger solvent savings banks, or forced to sell their devalued equity capital to the Savings Bank Guarantee Fund through the issue of PCCs. 15 acquisitions of savings banks and 3 PCC-conversions were the results of these rescue operations. The pattern of failures contains information and it is likely that a kind of self-selection is present: Stakeholder oriented banks in high social capital communities are less likely to take high risks for future gains, whereas banks with low community patronage have had a larger incentive to shift risk.[20]

Overall, regulatory changes and the consequent transformation of the banking industry in Norway resulted in a decrease in the number of nonprofit savings banks from 191 in 1987 to 103 in 2005. Of these banks, 23 banks converted to the PCC-form and the remaining banks were acquired in mergers with larger banks.

4 Measuring social capital

Building on work by, among others, Coleman (1988), Putnam (1993,1995) describes the key dimensions of social capital as the active involvement in civil society, interpersonal trust, and norms of generalized reciprocity. We proxy the level of social capital within a community with three different measures that reflect these dimensions: (1) a measure of trust from the 1990 World Values Survey, (2) household subscriptions to newspapers, and (3) charity donations. By nature, the measurement of, unobservable, social capital is not straightforward. For our purposes, proxies for social capital must be available at the municipality or county level, display cross-sectional variation, and not be causally affected by savings banks' probability of survival. We discuss each measure in turn, and refer to the data appendix for the remaining variables used in the regressions.

Interpersonal trust facilitates cooperation towards the implementation of common goals. Our measure of trust comes from the World Values Survey and indicates, on a score of 1–5, the level of trust towards other Norwegians where the score of 5 indicates high trust and

[20]See Moe, Solheim and Vale (2004) for an account of the Norwegian banking crisis.

the score of 1 high distrust. The variable is available at the county-level.[21]

Interest and knowledge about public issues are necessary conditions for civic engagement in community affairs. Being informed, fosters discussion and connectedness among community members. Social connections may in turn enable participants of the community to act together in the pursuit of common objectives or collective goods. Newspaper readership has been suggested as a measure of civic engagement by Putnam (1993). We use a measure of the average number of newspapers subscribed to by households in each municipality.[22]

Altruism and volunteering are strongly related to generalized reciprocity, and indicate peoples' willingness to contribute towards a general goal at the price of reduced individual consumption.[23] Our charity donation measure comes from the annual Norwegian TV charity show—a large prime time media event broadcasted nationally with the purpose of raising donations for a particular charity organization. On the day of the charity show, door-to-door collections are carried out by volunteers from municipalities all over the country. The national character of the broadcast makes it an attractive event to base an altruistic measure of social capital on, because the event occurs simultaneously in all municipalities, that is, the "demand" for donations is nationwide. We construct a municipality-level donation ratio based on the amount raised in day-time door-to-door collections defined as the average donation per unit of income Altruistic measures of social capital (blood-donation) have been innovatively employed in related work by Guiso et al. (2004).[24]

Figure 1 displays the distribution of the three social capital measures across municipalities. Each map indicates high levels of social capital along the bottom half of the West coast, but otherwise the distributions appear quite dissimilar. This is confirmed by the

[21]The same measure of trust is employed at the province level by Guiso, Sapienza and Zingales (2004).

[22]Norwegian households' newspaper consumption per capita is among the the highest in the world and the newspaper distribution pattern has a distinct local character (Høst (2005)).

[23]Putnam (2000) argues that "[s]ocial capital refers to networks of social connection, doing *with*. Doing good *for* other people, is not part of the definition of social capital. But volunteering and philanthropy and even spontaneously helping are all strongly predicted by civic engagement. Those of us who belong to formal and informal social networks are more likely to give out time and money to good causes then those of us who are isolated socially. For this reason, altruism is an important diagnostic sign of social capital" (*ibid.*, p. 117).

[24]Voter turnout in referenda has also been suggested as a measure of social capital. We collected data on voter turnout in municipality elections, but the variable is far from significant in our regressions. We believe a reason may be that elections turnout measures trust in political institutions rather than interpersonal trust, and that the confidence in the political system is generally very high in Norway.

low cross-correlations between the three measures. Newspaper Subscriptions and Donation Ratio have the highest correlation of 0.31. Trust and Subscriptions, respectively Trust and Donations, have correlations 0.20 and 0.14. By nature, it is not possible to know which proxy comes closest to capturing the true variation in social capital. Therefore, we also run regressions using the first principal component of the three social capital measures. The first principal component accounts for about half of the total variation in the three measures.

5 Methodology

We use a discrete-time duration model to estimate the relationship between the survival of non-profit savings banks and the level of social capital in the municipalities where the banks operate. The event in focus of our analysis is the disappearance of the savings bank as an independent non-profit organization. As discussed in Section 3, the event of exit from the population of savings banks may occur in the form of an acquisition or a change in organizational form.

To record event occurrence, we divide the time from branching deregulation into equal-sized intervals of length one year, with interval j defined as $(\, j-1, j\,]$. Interval $j = 1$ is thus the first year following the date of branching deregulation, 1 January 1984.[25]

Let T denote the time (years) elapsed from branching deregulation to the observed exit of savings bank i, i.e. we have observations on n independent and identically distributed random variables, where n is the number of banks observed at the beginning of interval 1. The failure function, $P(j) = prob(\mathrm{T} \leq j)$, is the cumulative distribution function of T with probability mass function $p(j)$. It defines, in turn, the survival function $S(j) = 1 - P(j) = prob(\mathrm{T} > j)$ which is simply the probability that the duration of the lifetime of a randomly chosen bank exceeds j periods. Since each bank does not survive for the same number of periods after deregulation, we denote the last period of the lifetime of bank i, j_i.

The modelling of the economic relationship between the probability of survival and the

[25] Although it is possible to uncover the exact day of a bank's exit, we prefer to model the process in discrete rather than continuous time to match the frequency of the explanatory variables, most of which are available only annually.

explanatory variables focuses on the "hazard rate" rather than the survival function. The hazard rate is defined as the probability of the event of exit during interval j, conditional on survival up to that point in time. In this and the next section, we outline our estimation approach which follows Allison (1982) and Jenkins (2005).[26]

Let the hazard rate for bank i in year j be defined as

$$h_{ij} = prob(\mathrm{T}_i = j | \, \mathrm{T}_i \geq j, x_{ij}) \,, \tag{1}$$

where x_{ij} is a $(k \times 1)$ vector of bank-specific (constant or time-varying) explanatory variables. We explain how we construct the explanatory variables, $\mathbf{x_i}$, in detail below but the general point is that $\mathbf{x_i}$ measures the characteristics of bank i and the markets in which it operates, among others, the level of social capital.

We specify a proportional odds logistic model for the hazard rate:

$$\log\left[\frac{h_{ij}}{1-h_{ij}}\right] = \log\left[\frac{h_{0j}}{1-h_{0j}}\right] + \beta' x_{ij} \tag{2}$$

$$\Leftrightarrow \; h_{ij} = \frac{1}{1+e^{-[\theta_{0j}+\beta' x_{ij}]}} \quad . \tag{3}$$

In (2), the log-odds of the hazard rate for each bank depends linearly on x_{ij} and a "baseline" hazard of risk over time, $logit(h_{0j}) = \theta_{0j}$. Since the hazard rate is a (conditional) probability, it lies between zero and one, while the log of the odds ratio accordingly lies between minus and plus infinity. The baseline hazard is common to all banks and a function of observation time only. It is the underlying process driving the event of exit when the individual bank characteristics equal zero. In our setting, the baseline hazard captures the underlying process of consolidation in the Norwegian banking sector following deregulation.

We specify a functional form for θ_{0j},

$$\theta_{0j} = \alpha_0 + \alpha_1 \log(j) + \alpha_2 [\log(j)]^2 \,. \tag{4}$$

Ignoring first the quadratic term in (4), the sign of α_1 controls the pattern of duration

[26] Jenkins (2005) is a valuable exposition of duration analysis and its implementation. For discrete-time methods, see also Singer and Willett (1993).

dependence for the population of savings banks. When α_1 is negative the hazard rate is monotonically decreasing over time for all banks, and the effect is the opposite when α_1 is positive. When α_1 is zero, the baseline probability of exit is constant for all observation intervals. We include a quadratic term to capture the fact that the hazard rate cannot continuously decrease or increase forever, given that the population of banks at the beginning of the sample is fixed.[27] In practice, the form in (4) was chosen based on a preliminary non-parametric estimation of the baseline hazard, see Section 5.2, with the aim of capturing the "shape" of the process of consolidation in a parsimonious manner, preserving degrees of freedom. As a robustness check, we estimate our main survival regression using time dummy variables in place of (4).

5.1 Estimation and likelihood function

Our sample is right-censored as we do not observe the life duration of banks that survive from the time of deregulation until the end of our sample. We only know that these banks did not exit prior to 2005, the end of our sample period, as, by nature, banks can only exit once.[28]

Define an indicator variable, δ_i equal to one if bank i exits during the sample and zero otherwise (censoring). The general form of the likelihood function corresponding to the observations of T_i is

$$\begin{aligned} L &= \prod_{i,\text{uncensored}} p(j_i) \prod_{i,\text{censored}} [1 - P(j_i)] \\ &= \prod_{i=1}^{n} p(j_i)^{\delta_i} [1 - P(j_i)]^{(1-\delta_i)} \end{aligned} \tag{5}$$

There is a one-to-one relationship between the survival function and the hazard rate and (5) can therefore be rewritten in terms of the latter, $S(j) = \Pi_{k=1}^{j}(1 - h_k)$. In our

[27] We do not include (de novo) banks formed during the sample period in the analysis, see Section 5.3 below.

[28] Censoring is indeed one reason why an OLS regression of life duration on bank and municipality-characteristics would be an inappropriate estimation approach for the issue at hand. The alternative approach of defining a binary dependent variable that equals one if a bank exits during the sample period ignores important information regarding the timing of exit, see Allison (1982) for a discussion of such issues and the analysis of event histories.

setting, the probability functions must be further modified for left-truncation—the relevant starting date for our "experiment" is the year of deregulation, 1984, but we observe the population of banks only three years later, from 1987.

Let j_τ denote the point of truncation (the year of 1987, common to all banks). The truncated conditional probability functions can be written in terms of the hazard rate as

$$p(j_i|j_i > j_\tau) = \frac{h_{ij_i}\prod_{k=1}^{j_i-1}(1-h_{ik})}{\prod_{k=1}^{j_\tau}(1-h_{ik})} = h_{ij_i}\prod_{k=j_\tau}^{j_i-1}(1-h_{ik}) \tag{6}$$

for censored observations and

$$1 - P(j_i|j_i > j_\tau) = \frac{\prod_{k=1}^{j_i}(1-h_{ik})}{\prod_{k=1}^{j_\tau}(1-h_{ik})} = \prod_{k=j_\tau}^{j_i}(1-h_{ik}) \tag{7}$$

for uncensored observations respectively.[29]

Substituting into the likelihood function we obtain

$$L = \prod_{i=1}^{n}\Big[h_{ij_i}\prod_{k=j_\tau}^{j_i-1}(1-h_{ik})\Big]^{\delta_i}\Big[\prod_{k=j_\tau}^{j_i}(1-h_{ik})\Big]^{1-\delta_i}. \tag{10}$$

Brown (1975) and Allison (1982) demonstrate that (10) can be reformulated as the likelihood function for a binary dependent variable, y_{ij}, where

$$y_{ij} = \begin{cases} 1, & \text{if bank } i \text{ exits during interval } j \\ 0, & \text{if bank } i \text{ does not exit during interval } j \end{cases}. \tag{11}$$

Hence, if the event of exit occurs for bank i during, say, the fifth year of observation, y_{ij} equals zero in years one to four, and one in year five. For banks that are not observed to exit during our sample, y_{ij} equals zero in all periods. Essentially, this formulation

[29]The corresponding unconditional expressions are respectively

$$prob(\mathrm{T}_i > j_i) = S(j_i) = (1-h_{i1})(1-h_{i2})...(1-h_{ij_i}) = \prod_{k=1}^{j_i}(1-h_{ik}) \tag{8}$$

and

$$prob(\mathrm{T}_i = j_i) = h_{ij_i}S(j_i-1) = h_{ij_i}\prod_{k=1}^{j_i-1}(1-h_{ik}). \tag{9}$$

converts the problem into a panel with a binary bank-specific dependent variable where the time dimension refers to the number of observation periods for each bank. The panel is unbalanced because not all banks survive for the same number of years. The reformulated likelihood function becomes

$$L = \prod_{i=1}^{n} \Big[\prod_{k=j_\tau}^{j_i} h_{ik}^{y_{ik}} \left(1 - h_{ik}\right)^{(1-y_{ik})} \Big]. \tag{12}$$

The likelihood in (12) has the standard form for a logistic binary dependent variable, y_{ik}, with probabilities h_{ik} and $(1 - h_{ik})$ respectively (given that h_{ik} is logistic by assumption). Hence, (2) may be estimated as a logit regression with y_{it} as the dependent variable and α_0, $\log(j)$, $(\log(j))^2$, and x_{ij} as explanatory variables. The total number of observations equals $\sum_{i=1}^{n} (j_i - j_\tau)$ and bank i is observed for j_i periods.

5.2 Non-parametric estimation of hazard and survival probabilities

We also provide non-parametric estimates of the interval hazard rate and the sample survival function, using the Kaplan-Meier estimator, that is, under the assumption that the hazard and survival function is period-specific and the same for all banks.

Let n_j be the number of banks at risk of experiencing an exit event in the beginning of period j and d_j be the number of observed exits in period j. The non-parametric estimate of the hazard for period j, the "interval hazard rate", is

$$\widehat{h_j} = \frac{d_j}{n_j}, \tag{13}$$

and the estimate of the survival function for period j is

$$\widehat{S(j)} = \prod_{k=1}^{j} \left(1 - \frac{d_k}{n_k}\right). \tag{14}$$

The survival probability in period j is thus equal to one minus the exit rate at each of the exit times preceding j. It is a step function but for illustration, we display smoothed estimates. Notice that the interval hazard cannot be estimated for periods in which no exit occurs.

5.3 Duration and explanatory variables

We measure duration of banks' lifetimes as follows. We collect information on the timing of all acquisitions involving savings banks, on all issues of PCCs, and define the event of exit to take place during the year in which either of these two events occur.[30] In the case of acquisitions, target banks are treated as exiting. Essentially all of the mergers that occur during our sample period have clearly defined target and acquiring banks. Except, in *one* case a new bank was formed by a merger of eight smaller banks.[31] In this case, however, one bank comprised 60 percent of all bank assets in the merger, and we define that bank to be the de-facto acquiring bank. It is almost always the case that the bank known to be the acquiring bank is also the largest. New (de novo) savings banks are established during the sample period. We exclude such banks entirely from the analysis as such banks choose location after deregulation has occurred. They do not, therefore, fit the premises of our "experiment" well.

To construct the explanatory variables in (1) we need to transform measures of community characteristics into bank-level variables. We map municipality-level data into bank-specific variables using information on the branch structure of each bank. In each year of the sample, we know the exact location of the banks' branches. For every bank we can therefore construct a weighted average of the municipality-level variables, where the weights are the fractions of the bank's branches located in the municipalities.[32]

For illustration, let $\log(\text{POP}_m)$ denote the log of the population in municipality m and let BRANCHES_{im} denote the number of branches of bank i in municipality m. We then construct the bank-level population variable, "log(Population)$_i$", as the weighted average of (logged) population size.

$$\log(Population)_i = \sum_m \left[\frac{\text{BRANCHES}_{im}}{\sum_m \text{BRANCHES}_{im}} \cdot \log(\text{POP}_m) \right] . \tag{15}$$

The branch structure employed in (15) is the structure that applies at the beginning

[30] When exit occurs right at the beginning of a year, i.e. a bank is, say, acquired on 1 January, the event is defined as having taken place during the preceding year.

[31] Sparebanken Sogn og Fjordane.

[32] This calculation implicitly assumes that a bank's branches are all of equal size. The assumption is necessary because data on the distribution of bank assets on municipalities do not exist.

of each interval (year). Other bank-level explanatory variables, including our measures of social capital, are constructed in a similar manner.

In the estimated hazard rate model, equation, the explanatory variable of interest is the measure of the level of social capital in the municipalities in which a given bank operates. In addition, we include several other variables in the regression to control for the characteristics of the municipalities, in particular municipality size, the proportion of residents in retirement (proxied by the fraction of the population over 67 years of age), and the education level of the residents in the municipality. Our measures of social capital, are likely to be correlated with these population characteristics—omitting such characteristics might bias our results. Also, donations to charity may be affected by the level and distribution of income in a municipality. We therefore scale the charity donation measure by average (gross) personal income in the municipality.

A factor that is likely to affect the survival probability of savings banks is competition from other banks. We include in our regressions a bank-specific measure of the degree of competition a given bank faces from other banks, which we measure in alternative ways. Our preferred measure, "bank asset competition", captures the average weighted market share of competing banks in municipalities in which a given bank has branches. We proxy market share by total assets assuming that all branches of a given bank are of similar size by simply dividing total assets of the bank by the number of its branches. For a given bank, we compute the asset competition it faces as the weighted sum of assets held by competing banks in each municipality, where the weights are $[\text{BRANCHES}_{im}/\sum_m \text{BRANCHES}_{im}]$ similar to (15). The alternative competition measures; the number of competing banks, the number of competing banks' branches, the number of competing large banks (size above the 90th percentile), and the number of competing commercial banks respectively, are computed in a similar manner. Importantly, we *always* compute the bank market competition measures from information on all municipalities and all banks in the Norwegian banking industry. Our competition measures therefore reflect the actual competition a bank is exposed to from *all* other banks, including commercial banks that are not otherwise in the sample.

We also include two measures of bank characteristics at the beginning of the sample; the equity capital ratio and bank assets in 1987. The suggestion of Hansmann (1996) that

savings banks die only slowly because they are not under pressure to generate economic profits, would suggest that a bank can survive in a competitive regime for a longer period of time if it starts out with a considerable level of capital. It is also possible that bank size matters for the probability of survival. Large banks typically have more diversified portfolios, which may improve their risk-return tradeoff, and make them less susceptible to local economic shocks. Bank size and capitalization are, through accounting identities, causally affected by a bank's continued survival and therefore we use only the 1987-values of these two variables.

Finally, we include control variables for the level of economic activity measured by average personal income and the rate of unemployment, lagged one period. Bank lending may lower local unemployment, and we control for this by including the lagging the rate of unemployment. In general we collect municipality level data for as many years of the sample period as possible but statistics are not always available for every year. In such cases, we construct a step-wise variable in accordance with the years of information that are available. The data appendix, Appendix A, contains a detailed description of the construction of all variables.

As a further test of robustness, we run our main regressions taking into account the pattern of failed banks during the banking crisis. In particular, for a failed bank, we determine the year of exit as the first year in which it receives capital from the savings banks guarantee fund. The guarantee fund is a private risk-sharing arrangement among the savings banks and in this sense a draw on the fund is not strictly speaking an exit but a private capital infusion. This redefinition effectively shifts the distribution of exit dates towards the beginning of the sample and causes more tied observations and less variation in the data, which may potentially reduce identification.

6 Results and discussion

6.1 Descriptive statistics

Table 1 summarizes the structure of the Norwegian banking sector in 1987 and 2005. It shows that the number of nonprofit savings banks drops from 191 in 1987 to 103 in 2005

compared to a decrease in the population of commercial banks from 24 to 7 and an increase in the population of PCC-banks from 0 to 23. The number of savings bank branches have been reduced from 1445 to 350 while total branches of for-profit banks have increased from 720 to 873. The number of single-office savings banks (unit banks) is 60 and 34 respectively. The average number of branches in the group of savings banks is 7.6 in 1987 and 3.4 in 2005. Commercial and PCC-banks are typically larger. In 1987, 73 percent of the nonprofit savings banks have less than 5 branches and 7 percent have more than 25 branches.[33] In contrast, only 33 percent of the commercial banks have less than 5 branches in 1987, but 25 percent have more than 25 branches.[34] In 1987, 28 percent of savings bank branches and 6 percent of for-profit bank branches are located in municipalities with below-median population. In 2005, the figures are 33 and 18 percent respectively. Hence, it is not the case that the savings banks survive because they are predominantly located in municipalities with few inhabitants. Overall, the figures illustrate that competition in the banking market has sharpened considerably since deregulation, also in the smaller municipalities.

Figure 2 contrasts the geographical distribution of savings bank branches in 1987 and 2005 with the corresponding distribution of commercial and PCC-banks. The plots suggest that the competition from for-profit banks intensified over the sample period with commercial banks and PCC-banks moving into new municipalities. The dilution of savings banks has occurred all over the country but has been especially strong in the northern part.

Table 2 provides a summary of the annual number of exits from our sample of savings banks from 1987 and onwards. The first column indicates the year of exit. The second column shows the number of savings banks present in the beginning of a given year and the third column gives the number of banks that exit during each year. Out of the 191 savings banks at the beginning of the sample period, 102 savings banks survive until the end of the sample.

The last two columns in the table state the estimated survival probabilities and interval hazard rates computed by the Kaplan-Meier method (cf. Section 5.2). The survival probabilities equal the proportion of the initial population of savings banks that survive several consecutive years. The table shows that 90 percent of the banks survive for more than one

[33]The corresponding statistics for 2005 are 86 percent and 0.03 percent.
[34]The corresponding statistics for 2005 are 47 percent and 27 percent.

year, 83 percent survive for more than two, while 77 percent survive for more than three years etc. The median survival time or duration in our sample exceeds 19 years: Just above half the savings banks, 53 percent, remain alive for 20 years after deregulation.

The interval hazard rate equals the ratio of the number of banks that exit the sample in a given year relative to the number of banks present in the beginning of that year. Thus, for a given year, the hazard rate thus represents the probability of a bank's exit in the year conditional on the bank's survival up to the beginning of the year. The results clearly show that the hazard probability is highest in the earliest years of the sample, around 7 percent, and subsequently falls to a lower level of a few percent. The hazard rate is not monotonically decreasing over time, and there appears to be a clustering of consolidation/conversions, the first in the years right after deregulation, the second at the end of the 1990s, resulting in several tied observations.

In Table 3, we display statistics for the regression variables measured at the municipality level (county-level in the case of Trust-WVS). The municipalities vary considerably in size. The, by far, largest municipality is Oslo, the Norwegian capital, with more than half a million inhabitants, whereas the smallest municipality has less than 300. Importantly, there are no bank branches in these small municipalities which therefore do not influence the regressions.[35]

Table 4 displays descriptive statistics for the banks with low, medium, and high social capital. The three groups are based on each bank's average level of social capital over its lifetime and subsequently split into groups using the 33 and 67 percentiles. The column values are the average level over banks and years in the respective subgroup.

On average, a larger fraction of banks survive in the high social capital group according to the Trust and Subscriptions measures, but the Donation measure actually has a lower fraction of banks survive. Otherwise, Panel A shows that high social capital banks are characterized by being smaller and having marginally higher equity ratios.[36] Around 15 percent of the high social capital banks are the only bank in the municipalities in which it is present in *all* years of its lifetime, whereas the same is true for around 8 percent of

[35]Municipalities without branches receive a zero weight in the construction of bank-level variables.

[36]The figures show that average bank size has decreased over time. While the larger banks have grown in size, the size of the many smaller banks have decreased.

the remaining banks ("all" years because the table displays time-averaged values). This figure reflects that the Norwegian banking industry has many small banks with a distinct local orientation where many banks have offices in only one municipality and are "alone" in that municipality if no other bank opens offices.[37] This fact may at first appear surprising given that regulatory barriers to entry have been absent for two decades at the end of the sample, but it is partly an artifact of the small size of many municipalities. It is also possible that non-legal barriers, such as high social capital, effectively deter entry.[38] The Donation measure appears to pick up many such single banks, but fewer of them survive, suggesting that being the only bank in a local area does not automatically cause survival. In any case, as a precaution, we control explicitly for such single banks in our regressions. The four competition measures at the bottom of the table, however, reveal that it is not the case that high social capital banks operate without competition. They face on average 1.9 other competing banks, whereas low and medium social capital banks face less than 1.5 competing banks on average, but more of these banks are large banks. The three bottom competition measures, Bank Asset Competition, Branch Competition, and Commercial Bank Competition, capture the market share of competing banks in terms of assets, branches, and commercial bank branches respectively. Measured in terms of assets, competing banks have a market share of around 0.6, 0.5, and 0.4 for low, medium, and high social capital banks respectively. Measured in terms of branches, however, competing banks have a market share of around 0.4, 0.5, and 0.7 respectively. The third competition measure shows that more of the competing branches faced by high social capital banks belong to other savings banks.

Overall, a picture emerges of an industry where the average small and medium-sized savings banks compete against each other's branch networks in the local markets, and, in addition, around 10 percent of the banks operate in areas with no other bank. High social capital banks are well represented in both groups.

As for the remaining variables used in the regressions, it can be seen that high social

[37] In 1987, 67 percent of the banks had offices in only one municipality and the same is still true for 59 percent of the banks in 2005.

[38] It is a well-known anecdote in the Norwegian banking community that large banks abstain from establishing branches in tight-knit communities due to the belief that they would not be able to capture a large enough share of the market to make their presence profitable.

capital banks tend to be located in areas with smaller, but not markedly lower, populations of marginally higher age and shorter educations. The level of income is also lower, whereas the unemployment rate is about the same. This suggests that average income, may in fact be a better predictor of regional economic differences than unemployment, possibly due to differences in levels of salary. Considering the bank accounting variables, there is little difference across the social capital groups. Return on assets, allocation to the banks' gift fund, interest rate margins, and loan loss provisions show little variation across groups. The average proportion of the loan portfolio that are past due is marginally lower for high social capital banks, and the proportion of past due loans that eventually recover, is higher. That loan growth is higher for low social capital banks suggests that it is especially this group of banks that have expanded during the sample. The fraction of commercial and industrial loans in the banks' portfolios is around 30 percent for all groups.

6.2 Logit regressions of the probability of exit

Table 5 shows the results from logit regressions of the hazard rate on a baseline hazard and explanatory variables. Models (1)–(4) assume a parametric log-baseline hazard function, which in Models (5)–(8) is replaced with a dummy variable for each period j in which at least one bank exit occurs.[39] The latter specification may capture time-varying macroeconomic developments better than the models with the log-baseline hazard, The results show that all three measures of social capital have a significant and negative effect on the hazard rate, that is, savings banks' probability of exit in a given period is lower when banks have branches in municipalities with a high level of social capital. The effects are significant at the 5 percent level for Trust and Subscriptions, and the 10 percent level for Donation in Model (1)–(3). The first principal component, Model (4), is also highly significant at the 1 percent level. In the nonparametric baseline case, Subscriptions and Donations are significant at the 5 percent level, while the p-value of the Trust estimate increases to 12 percent. This is likely caused by a loss of degrees of freedom—the time dummy variables increases the number of parameters to be estimated considerably—coupled with the fact that Trust has less cross-sectional variation because it is measured at the country-level.

[39]The time effect is not identified in years with no exit and these years are omitted from the regressions.

The principal component remains highly significant and the coefficient estimate is stable across model specification (compare Models (4) and (7)).

To interpret the sign of the estimated coefficients, consider first the estimated baseline hazard function, $\alpha_0 + ln(j) + ln(j)^2$. In period one, i.e. the year of 1987, j equals 1. That is, the baseline hazard reduces to α_0. The estimated value of α_0 is positive which implies that the odds, $(\frac{h}{1-h})$, in period one exceeds 1—the baseline probability of exit is higher than the probability of survival. In Model (2), for example, one can compute that the baseline probability of exit in period one equals 0.6857.[40] The negative sign of the estimated coefficient on Subscriptions then implies that a bank with a value of Subscriptions equal to 1, has a 42.3 percent probability of exit in period one assuming for simplicity that the value of all other variables is zero.[41] That is, depending on their signs, the coefficient of the explanatory variables shift the baseline hazard up or down, in the scale of logit-hazard. The estimated signs of the coefficients of the second and third term in the baseline hazard function imply that the probability of exiting over time is bell shaped, increasing at first but then falling over time. The estimated joint effect of these two terms is statistically significant at the 1 percent level (LR-Test 2).

The estimated effect of banks' equity ratio at the onset of the deregulated regime is also negative and statistically significant at a level below 1 percent—capitalization is clearly a very important determinant of the viability of nonprofit banks.

Of the other explanatory variables included in the regression, several are significant at conventional levels. More intense competition increases the probability of exit, Bank Asset Competition is significant at the 10 percent level, higher municipality size (population) lowers the probability of exit. This may reflects the existence of underlying business opportunities or that many of the savings banks that have pursued a growth strategy after deregulation are headquartered in the more densely populated regional centers and have been acquiring other banks in mergers. Only Bank in Home Municipality has a positive sign, suggesting that being a single bank in an area *lowers* lifetime. Even if the variable is significant at the 30 percent level, its sign reflects that being a single bank does not

[40] $h = 0.6857$ solves $\ln(\frac{h}{1-h}) = 0.78$.
[41] From $\ln(\frac{h}{1-h}) = 0.78$-1.09.

automatically increase lifetime duration. Population over 67 Years is significant at the 5 percent level with a positive sign, that is, we do not find evidence that nonprofit banks located in communities with an aging population are able to survive longer. In fact, we find clear evidence of the opposite. The average income level is also a significant predictor of exit, higher income is associated with a higher probability of exit. The estimates do not change much when we use time dummy variables instead of a parametric baseline hazard.

To get a sense of the economic importance of our results, we use Model (1) to estimate the marginal effect of a discrete change in the value of Trust in the year of 1987, assuming that all other explanatory variables are held at their mean values. When the average level of Trust increases from its minimum value of 3.92 to its maximum of 4.33, the estimated probability of exit decreases by 6.3 percentage points for the average bank. In the middle of the sample period, 1997, the probability falls by 1.7 percentage points, reflecting that the probability of exit is estimated to be highest in the beginning of the period (most mergers occur in the first half of the sample).[42] If one instead considers a discrete increase in Trust of one standard deviation around the mean (from 1/2 standard deviation below to 1/2 above), the corresponding falls in the probability of exit figures 0.01 in 1987 and 0.04 in 1997. [43] Clearly the economic importance of social capital is considerable when we compare the minimum and maximal values of social capital observed in the sample, but much smaller if we look at variation around the average. This suggests that banks that operate in markets with an average level of civic engagement experience a relatively modest effect of social capital. However, banks that operate in communities with above-average social capital experience a markedly improved probability of survival.

The estimated marginal effect of changes in the ratio of equity capital in Models (1)–(3) is considerable. In 1987, a discrete change in Equity Ratio from its minimum to its maximum level, decreases the probability of exit by 42.5, 40.2, and 47.2 percentage points according to Models (1), respectively (2) and (3), holding all other explanatory variables at their means. A bank's level of capitalization, therefore, appears to be the most important

[42]For Subscriptions and Donation, Models (2) and (3), the estimated marginal effects are 9.0 and 15.4 percent in 1987, and 2.3 and 3.0 percent in 1997.

[43]For Subscriptions the decrease in probabilities are 1.7 and 0.4, and for Donation 2.7 and 0.5 percentage points respectively.

factor for survival, consistent with the proposition that well-capitalized nonprofit firms may continue to survive for long periods of time even if they operate with losses. Such interpretations must, however, be made with care as Table 5 says nothing about the economic profits generated by the high-equity banks in our sample.

In Figure 4, we illustrate the economic interpretation of our results further. We depict the estimated effect of social capital on the probability of exit for different values of Equity Ratio in 1987 and 1997, using the estimates of Models (1)–(3). All other explanatory variables are held at their mean values. The plots show that a (hypothetical) average bank with Equity Ratio equal to the minimum ratio observed in our sample, has a markedly higher exit probability than the average bank. The effect is largest at the beginning of the sample in 1987, but the difference is considerable also in 1997. On the other hand, social capital has almost no effect on the survival probability of a bank with the maximum observed equity ratio. This result implies that social capital is especially important for the survival of savings banks with a low level of equity capital and suggests that social capital may serve as a substitute for equity capital.

6.3 Robustness of survival regressions

Table 6 shows regression results with alternative measures of bank market competition. The regression specification is similar to Models (1)–(4) in Table 5. The estimated coefficients on Trust, Subscriptions, Donation, and Principal Component are robust to different measures of competition. The estimated coefficients on the competition measures themselves are all insignificant at conventional levels and less significant than our preferred measure of competing, Bank Asset Competition, employed in Table 5. It is interesting, however, that the sign of the competition measures in Models (9)–(12), CB Branch Competition which measures competing branches of commercial banks, changes to negative and is close to being significant, indicating that stronger competition from commercial banks *lowers* the probability of exit. This may indicate that the customers of savings banks have a particular preference for the nonprofit organizational form. The insignificance of the results, however, provides only suggestive evidence for such an effect.

As a further test of robustness, we run our main regressions taking into account the

pattern of failed banks during the banking crisis. In particular, for a failed bank, we determine the year of exit as the first year in which it receives capital from the savings banks guarantee fund. This redefinition effectively shifts the distribution of exit dates towards the beginning of the sample and causes more tied observations and less variation in the data, which may potentially reduce identification.[44] Table 7 displays the results of the regressions. Overall, the effect of social capital is robust to this specification but the p-level of Trust in Model (4) is larger than in Table 5 and Trust is only significant at the 20 percent level in this specification.

6.4 Regressions on bank-level financial ratios

Individual banks' business strategies may differ substantially. We attempt to uncover whether social capital has an independent effect on banks' choice of strategy by examining the impact of social capital on several key financial ratios. The results of such regressions should give us some indication of how the objective functions of banks in high social capital areas differ from other banks. For this purpose, we run GLS regressions of financial ratios on the right hand side variables from the survival analysis, with two adjustments: (1) we allow the equity ratio and total assets to vary over time instead of using the 1987-values since the two ratios will change as banks grow in size, and (2) we include in the regressions lagged loan growth and the fraction of commercial and industrial loans in the loan portfolio as controls for differences in banks' lending policies. We include time fixed effects in all regressions to control for macroeconomic developments.

Table 8 displays the results from these regressions using the first principal component as the regressor. The main conclusion is that social capital does appear to have an independent effect on key financial ratios: High social capital banks appear to operate with lower returns on assets and to allocate a larger fraction of their annual surplus to charity. When we consider the banks' average interest rate margins (including fees and provisions) they are lower on both the deposit and loan side, i.e. high social capital banks offer higher deposit rates and lower loan rates on average.

[44] Information on capital infusions from the savings bank guarantee fund may be found in Moe et al. (2004), ch. 6.

On the loan side, we see that the proportion of past due loans, leases, and guarantees in banks' loan portfolios is lower for banks with high social capital. According to Norwegian regulation, a loan, lease, or guarantee is to be considered past due when repayments are 90 days or more behind schedule. So-called "specified" loan loss provisions must be made no later than 90 days after the contractual repayment date. The size of the provisions must be assessed for the individual loan engagement based on expected loss given default.[45] Our regressions show that specified loss provisions are lower for high social capital banks. When we consider the rate of recovery on past due loans, that is, the fraction of past due loans at the beginning of each year that move from past due-status to non-delinquent status during the course of that year, that ratio is also higher for high social capital banks.

Most of the above estimates are significant at the 10 percent level or lower, except for the fraction of past due loans which is significant at the 15 percent level. Historical data on past due loans and recoveries on past due loans does not go back as far in time as the data on the other variables, simply because the information was not collected in the beginning of our sample. The shorter time series may explain the lower precision of the estimates. Accounting variables are only rough indicators of business strategies and banks' objective functions. Nevertheless, our results suggest interesting implications. Nonprofit banks, by nature, have little incentive to maximize profits. The fact that high social capital banks earn a lower return on assets may indicate that other objectives are indeed prioritized in those banks. At the same time the high social capital banks are the banks that survive the longest (Tables 5–7), and the lower returns do not seem to be a product of higher loan losses (Table 8). Rather the lower returns appear to be caused by lower interest rate margins. The community-banking/stakeholder ideal is consistent with the banks earning less rent.

Important aspects concerning the role of norms, trust and soft information in lending are difficult to observe, for example, we cannot observe how often the local loan officer pays a personal visit to the businesses that are borrowing from the bank. Nevertheless, we find that the business strategies of banks located in areas with high social capital tend to generate fewer loans that are past due, and that, given delinquency, the banks estimate that associated losses will be lower. Consistent with that, the observed rate of recovery of past

[45] 'Specified" provisions differ from general loan loss provisions in that they represent an explicit loss given default-evaluation on individual loans/leases/guarantees that are past due.

due loans is higher. These findings point to mechanisms that are similar in nature to peer-monitoring effects from group-lending—norms that sanction opportunistic behavior may help mitigate moral hazard in lending. The results are also consistent with the literature arguing that smaller banks have a larger incentive to employ soft information in lending, since we know that, on average, high social capital banks tend to be smaller in size (Table 4).

It is, of course, possible that banks in high social capital areas make less risky loans and therefore earn lower returns and experience lower losses. To take this into account, we control in the regressions for the risk of individual banks' lending strategies by including lagged loan growth and the fraction of business loans in the banks' portfolios. Importantly, our finding that high social capital banks experience a higher recovery rate on past due loans (Table 8) and the fact that low, median, and high social capital banks carry a similar fraction of business loans in their portfolios (Table 4), are at odds with the suggestion that our results are entirely due to less risky lending by these banks.

7 Conclusion

Using data on Norwegian savings banks we provide evidence that social capital contributes to the continued existence of stakeholder-oriented firms in competitive industries. The presence of a large number of savings banks makes the Norwegian banking sector well-suited to explore this hypothesis because the organizational form of nonprofit savings banks is designed to internalize the preferences of stakeholders and removes incentives to maximize profits.

Our main finding is that savings banks operating in communities with high social capital survive longer as independent organizations. Social capital decreases the probability of a bank's disappearance by up to 10 percentage points on average and the effect is especially strong for banks with a low level of equity capital.

We propose that social capital affects the governance of the savings banks by facilitating cooperation and alignment of preferences among, otherwise heterogenous, stakeholders. The alignment of stakeholders' interests ensures that banks' objective functions incorporate the preferences of the local community. High social capital communities, in turn, patronize

savings banks to ensure their continued survival.

We substantiate our hypothesis by showing that social capital affects savings banks' operating performance. Savings banks located in high social capital areas earn a lower return on assets, offer higher deposit rates and lower loan rates, and set aside a higher proportion of their annual surplus for charitable purposes. These results support our conjecture that high social capital banks operate with an eye on the interests of their local communities. We further find that savings banks located in high social capital areas sustain a lower proportion of past due loans, and that, given delinquencies, loan loss provisions are lower, and the rate of recovery of past due loans is higher. These results are consistent with the view that in high social capital communities borrowers are less likely to succumb to opportunistic behavior, thereby supporting the survival of local savings banks.

In summary, our results provide evidence that social capital matters for the continued existence of stakeholder-oriented firms in the banking industry. By suggesting a link between social capital and governance, we offer a new perspective on the survival of stakeholder-oriented firms in competitive markets.

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Table 1:

The Norwegian Banking Sector
Characteristics by Organizational Form in 1987 and 2005

	1987			2005		
	Savings Banks	Comm. Banks	PCC Banks	Savings Banks	Comm. Banks	PCC Banks
No. of banks	191	24	0	103	15	23
No. of branches	1,445	720	0	350	476	397
Average no. of bank branches	7.6	30.0	0	3.4	31.7	17.3
No. of single office banks	60	8	0	34	6	2
No. of small banks (< 5 branches)	140	8	0	89	7	7
No. of large banks (> 25 branches)	14	6	0	3	4	5
No. of branches in below median population municipalities	416	42	0	117	31	125
No. of branches in above median population municipalities	1,029	678	0	233	445	272

Note: The table displays the number of banks and bank branches by organizational form in the Norwegian banking sector, for 1987 and 2005. No. of banks, No. of branches (Average no. of bank branches) refer to the total (average) number of banks and bank branches in the population of banks, respectively. No. of single office banks is the number of banks with a single branch office. No. of small banks (No. of large banks) refer to the number of banks with less than 5 (more than 25) branches. Further, the bottom two rows display the number of bank branches in municipalities with population below and above the median.

Table 2:
Empirical Survival and Hazard Functions, 1987-2005

Year	Number of savings banks present beg. of year	Number of savings banks that exit during year	Survival function	Interval hazard function
1987	191	19	0.90	0.10
1988	172	14	0.83	0.08
1989	158	11	0.77	0.07
1990	147	11	0.71	0.07
1991	136	7	0.68	0.05
1992	129	4	0.65	0.03
1993	125	0	0.65	0.00
1994	125	1	0.65	0.01
1995	124	2	0.64	0.02
1996	122	3	0.62	0.02
1997	119	2	0.61	0.02
1998	117	0	0.61	0.00
1999	117	8	0.57	0.07
2000	109	2	0.56	0.02
2001	107	3	0.54	0.03
2002	104	0	0.54	0.00
2003	104	0	0.54	0.00
2004	104	2	0.53	0.02
2005	102	0	0.53	0.00

Note: The table shows bank survival summary statistics estimated with the Kaplan-Meier product-limit method. The first column indicates each year (interval) in the sample. The second column gives the number of savings banks in the sample at the beginning of each year. The third column shows the number of exits during the year. The estimate for the survival function for year j, column four, is the proportion of savings banks that survive until the end of year j. The estimated interval hazard function for year j, column five, equals the number of banks that exit in year j, divided by the number of banks in the sample at the beginning of year j.

Table 3:
Descriptive Statistics of Municipality-Level Variables

	Median	**Mean**	**Std.dev.**	**Min.**	**Max.**
Trust–WVS (1990)	4.07	4.06	0.09	3.92	4.33
Newspaper Subscriptions	1.10	1.13	0.28	0.39	2.17
Donation Ratio	0.15	0.17	0.09	0.00	1.14
Population	4,364	10,112	28,522	212	529,846
Pop. w. Higher Education (percent)	1.27	1.57	1.16	0	11.27
Pop. over 67 Years (percent)	15.8	15.6	3.67	5.68	31.3
Mean Income (thousand kroner)	169.9	176.0	30.5	119.0	431.4
Lagged Unemployment (percent)	2.59	2.79	1.32	0	12.0

Note: The table displays descriptive statistics for the main variables used in the regressions. The statistics are computed at the municipality-level of the variables. Notice that the table includes all 433 municipalities, including municipalities that do not have any bank branches. Please see appendix for variable definitions. The sample period is 1987–2005.

Table 4:

Descriptive Statistics of Bank-Level Variables Split by Social Capital
Panel A

	Low Social Capital			Medium Social Capital			High Social Capital		
	Trust	Subscriptions	Donation	Trust	Subscriptions	Donation	Trust	Subscriptions	Donation
Mean:	3.97	0.93	0.11	4.07	1.17	0.16	4.14	1.47	0.22
Fraction of Surviving Banks	0.51	0.46	0.67	0.48	0.50	0.59	0.69	0.71	0.42
Equity Ratio	0.100	0.089	0.087	0.100	0.099	0.099	0.098	0.114	0.109
	(0.034)	(0.032)	(0.025)	(0.046)	(0.040)	(0.032)	(0.035)	(0.040)	(0.048)
Equity Ratio (1987)	0.106	0.097	0.100	0.092	0.096	0.101	0.097	0.105	0.096
	(0.045)	(0.042)	(0.048)	(0.022)	(0.026)	(0.028)	(0.026)	(0.029)	(0.026)
Total Assets	2,952	10,265	10,090	10,331	3,463	4,459	1,927	612	2,159
	(8,262)	(35,780)	(38,408)	(36,933)	(6,443)	(14,355)	(3,441)	(414)	(4,358)
Total Assets (1987)	4,359	12,612	11,062	12,117	5,310	6,338	3,353	745	3,840
	(14,216)	(38,796)	(38,711)	(38,602)	(9,412)	(21,636)	(7,345)	(545)	(8,172)
Only Bank in Home Municip.	0.08	0.08	0.04	0.11	0.11	0.05	0.15	0.15	0.21
No. Competing Banks	1.482	1.302	1.062	1.266	1.567	1.549	1.981	1.848	1.902
	(1.767)	(1.677)	(0.625)	(0.827)	(1.210)	(0.847)	(1.564)	(1.443)	(2.089)
Bank Asset Competition	0.573	0.616	0.692	0.483	0.461	0.531	0.483	0.458	0.380
	(0.297)	(0.291)	(0.274)	(0.288)	(0.272)	(0.249)	(0.287)	(0.291)	(0.271)
Branch Competition	0.515	0.419	0.253	0.411	0.545	0.531	0.753	0.714	0.772
	(0.913)	(0.858)	(0.208)	(0.354)	(0.523)	(0.389)	(0.688)	(0.677)	(1.012)
CB Branch Competition	0.249	0.280	0.333	0.188	0.153	0.208	0.173	0.177	0.115
	(0.215)	(0.210)	(0.207)	(0.153)	(0.116)	(0.152)	(0.159)	(0.181)	(0.124)
Log(Population)	9.510	9.880	10.333	9.031	8.780	9.073	8.702	8.549	8.281
	(1.564)	(1.555)	(1.379)	(0.945)	(0.788)	(0.736)	(0.984)	(0.739)	(0.692)
Pop. over 67 years	15.7	15.0	14.1	15.7	16.3	15.6	16.1	16.3	17.2
	(2.9)	(2.9)	(2.5)	(2.9)	(2.4)	(2.6)	(3.1)	(3.3)	(2.7)
Pop. w. Higher Education	2.13	2.35	2.74	1.68	1.40	1.65	1.56	1.63	1.29
	(1.42)	(1.51)	(1.50)	(0.83)	(0.47)	(0.55)	(0.77)	(0.66)	(0.56)

(continued on next page)

Panel B

(continued from previous page)

	Low Social Capital			Medium Social Capital			High Social Capital		
	Trust	Subscriptions	Donation	Trust	Subscriptions	Donation	Trust	Subscriptions	Donation
Mean Income	180.2	181.9	192.1	173.6	170.5	171.3	166.7	168.6	163.5
	(19.7)	(21.0)	(16.3)	(16.3)	(11.9)	(11.5)	(12.2)	(14.7)	(11.1)
Lagged Unemployment	2.30	2.58	2.54	2.36	2.41	2.57	2.79	2.36	2.31
	(0.82)	(0.85)	(0.82))	(0.88)	(0.83)	(0.72)	(0.69)	(0.79)	(0.90)
Return on Assets	0.048	0.049	0.048	0.049	0.048	0.048	0.048	0.047	0.049
	(0.007)	(0.005)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
Allocation to Gift Fund	0.005	0.005	0.005	0.006	0.006	0.005	0.005	0.007	0.007
	(0.004)	(0.008)	(0.005)	(0.009)	(0.006)	(0.004)	(0.006)	(0.004)	(0.009)
Deposit Interest Rate Margin	0.039	0.040	0.037	0.042	0.040	0.040	0.038	0.038	0.042
	(0.009)	(0.010)	(0.009)	(0.010)	(0.009)	(0.009)	(0.006)	(0.008)	(0.008)
Loan Interest Rate Margin	0.019	0.019	0.021	0.017	0.019	0.019	0.021	0.018	0.017
	(0.007)	(0.006)	(0.005)	(0.011)	(0.009)	(0.006)	(0.007)	(0.010)	(0.011)
Past due Loans	0.034	0.046	0.034	0.040	0.035	0.029	0.033	0.025	0.043
	(0.023)	(0.075)	(0.034)	(0.037)	(0.025)	(0.017)	(0.075)	(0.025)	(0.074)
Recovered Loans	0.609	0.601	0.609	0.614	0.615	0.689	0.766	0.773	0.695
	(0.324)	(0.295)	(0.331)	(0.299)	(0.276)	(0.320)	(0.348)	(0.391)	(0.341)
Specific Loan Loss Provisions	0.008	0.011	0.007	0.011	0.014	0.008	0.011	0.005	0.015
	(0.017)	(0.014)	(0.011)	(0.014)	(0.027)	(0.009)	(0.025)	(0.010)	(0.028)
Lagged Loan Growth (percent)	11.48	10.57	12.39	9.08	8.88	9.71	8.91	10.45	8.05
	(15.38)	(15.79)	(16.77)	(4.84)	(5.83)	(5.43)	(6.41)	(4.41)	(5.80)
Fraction of C&I Loans (percent)	29.83	29.87	29.51	31.07	33.15	29.80	30.39	27.79	31.54
	(13.23)	(14.40)	(14.98)	(11.51)	(12.69)	(10.34)	(13.86)	(10.02)	(12.97)
No. Obs	923	842	842	762	848	837	827	822	833
No. Banks	73	71	55	65	66	61	54	55	76

Note: The table displays mean values and standard deviations (in parentheses) of key bank level variables split into social capital groups. Bank level variables are constructed from municipality level variables as a weighted average of the municipalities in which a given bank has branches, where the weights equal the fraction of the bank's branches in each municipality, cf. equation (15). Trust, Subscriptions and Donation have been time-averaged for each bank and subsequently split into three groups according to the 0.333 and 0.667 percentiles. All other variables are averaged over time and banks in the respective subgroup. Nominal value variables are measured in real terms (1998-kroner). The sample period is 1987–2005. Please refer to the appendix for variable definitions.

Table 5:

Effect of Social Capital on Savings Banks' Probability of Exit

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trust–WVS (1990)	-3.48	–	–	–	-5.17	–	–	–
	(0.03)	–	–	–	(0.12)	–	–	–
Newspaper Subscriptions	–	-1.09	–	–	–	-1.08	–	–
	–	(0.04)	–	–	–	(0.04)	–	–
Donation Ratio	–	–	-5.63	–	–	–	-3.58	–
	–	–	(0.07)	–	–	–	(0.02)	–
Principal Component	–	–	–	-2.04	–	–	–	-2.01
	–	–	–	(0.01)	–	–	–	(0.01)
Equity Ratio (1987)	-0.35	-0.33	-0.34	-0.34	-0.33	-0.33	-0.35	-0.33
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log(Total Assets) (1987)	0.13	0.09	0.15	0.09	0.13	0.08	0.11	0.08
	(0.31)	(0.45)	(0.23)	(0.45)	(0.28)	(0.50)	(0.36)	(0.49)
Bank Asset Competition	1.57	1.42	1.61	1.44	1.50	1.34	1.46	1.35
	(0.08)	(0.11)	(0.07)	(0.10)	(0.09)	(0.13)	(0.10)	(0.13)
Only Bank in Home Municipality	0.66	0.58	0.67	0.57	0.66	0.57	0.65	0.56
	(0.26)	(0.32)	(0.25)	(0.33)	(0.26)	(0.33)	(0.27)	(0.34)
Log(Population)	-0.42	-0.43	-0.59	-0.53	-0.59	-0.45	-0.44	-0.54
	(0.06)	(0.06)	(0.03)	(0.03)	(0.03)	(0.05)	(0.05)	(0.02)
Pop. w. Higher Education	-0.02	0.01	0.04	0.04	0.06	0.04	0.01	0.07
	(0.92)	(0.95)	(0.87)	(0.84)	(0.79)	(0.86)	(0.97)	(0.76)
Pop. over 67 Years	0.09	0.09	0.13	0.09	0.13	0.10	0.10	0.10
	(0.05)	(0.04)	(0.01)	(0.04)	(0.01)	(0.03)	(0.05)	(0.03)
Mean Income	0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.02
	(0.06)	(0.07)	(0.04)	(0.10)	(0.04)	(0.05)	(0.05)	(0.07)
Lagged Unemployment	-0.12	-0.13	-0.09	-0.12	0.06	0.03	0.07	0.04
	(0.32)	(0.27)	(0.45)	(0.32)	(0.68)	(0.86)	(0.64)	(0.81)
$\log(j)$	0.32	0.37	0.52	0.40	–	–	–	–
	(0.47)	(0.41)	(0.26)	(0.38)	–	–	–	–
$\log(j)$ squared	-0.38	-0.41	-0.53	-0.43	–	–	–	–
	(0.02)	(0.01)	(0.00)	(0.01)	–	–	–	–
α_0	13.36	0.78	0.61	6.20	-0.37	-0.09	12.95	5.30
	(0.06)	(0.77)	(0.83)	(0.11)	(0.90)	(0.97)	(0.08)	(0.18)
No. Obs	2412	2412	2412	2412	1860	1860	1860	1860
Pseudo-R^2	.14	.14	.13	.14	.13	.13	.13	.13
p-value LR-Test 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
p-value LR-Test 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Results are coefficient estimates from bank level logit regressions of y_{ij} on H_{0j} and x_{ij}, where y_{ij} equals one if bank i exists in year j and zero otherwise, and H_{0j} is a baseline hazard function. Models (1)–(4) assume a baseline hazard function of the form $\mathrm{H}_{0j} = \alpha_0 + \alpha_1 \log(\mathrm{J}) + \alpha_2 \big[\log(\mathrm{J})\big]^2$. Models (5)–(8) assume a baseline hazard function of the form $\mathrm{H}_{0j} = \alpha_0 + \sum_j^{\mathrm{J}-1} \delta_j \mathrm{D}_j$, where D_j is a dummy for interval j and J is the overall number of intervals of the sample (estimated interval dummies are not reported). D_j is omitted from the regression if no bank exit occurs in interval j. Trust is an index of the level of trust based on the World Values Survey in 1990, measured at the county-level. Newspaper Subscriptions is the average number of subscriptions per household measured at the municipality level. Donation Ratio is the door-collected contribution per capita, divided by average municipality income and multiplied by 1000 for scaling, measured at the municipality level. Principal Component is the first principal component for the variables Trust, Newspaper Subscriptions, and Donation. Please refer to the Data Appendix for remaining variable definitions. LR-test 1 is a Likelihood Ratio test of the joint significance of $\mathbf{x_{ij}}$. LR-test 2 is a Likelihood Ratio test of the joint significance of $\log(j)$ and $\log(j)^2$ and $\{\mathrm{D}_j\}_{j=2}^{\mathrm{J}}$ in Models (1)–(3) and (4)–(6) respectively. The sample is 1987–2005. Standard errors are corrected for clustering at the bank level, and p-values are reported in parentheses.

Table 6:

Effect of Social Capital on Savings Banks' Probability of Exit:
Robustness to Alternative Measures of Bank Competition

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Trust–WVS (1990)	-3.33	–	–	–	-3.37	–	–	–	-3.24	–	–	–
	(0.03)	–	–	–	(0.03)	–	–	–	(0.04)	–	–	–
Newspaper Subscriptions	–	-1.13	–	–	–	-1.12	–	–	–	-1.10	–	–
	–	(0.03)	–	–	–	(0.03)	–	–	–	(0.03)	–	–
Donation Ratio	–	–	-5.58	–	–	–	-5.40	–	–	–	-5.26	–
	–	–	(0.08)	–	–	–	(0.08)	–	–	–	(0.09)	–
Principal Component	–	–	–	-2.06	–	–	–	-2.06	–	–	–	-2.01
	–	–	–	(0.01)	–	–	–	(0.01)	–	–	–	(0.01)
Equity Ratio (1987)	-0.36	-0.34	-0.34	-0.34	-0.36	-0.34	-0.35	-0.34	-0.36	-0.34	-0.34	-0.34
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log(Total Assets) (1987)	0.02	0.00	0.05	0.00	0.05	0.04	0.14	0.02	-0.02	-0.04	0.00	-0.04
	(0.85)	(0.97)	(0.64)	(0.97)	(0.83)	(0.85)	(0.55)	(0.91)	(0.86)	(0.70)	(1.00)	(0.71)
No. Competing Banks	0.07	0.08	0.11	0.08	–	–	–	–	–	–	–	–
	(0.44)	(0.37)	(0.29)	(0.38)	–	–	–	–	–	–	–	–
Branch Competition	–	–	–	–	0.05	0.04	0.14	0.14	–	–	–	–
	–	–	–	–	(0.83)	(0.85)	(0.55)	(0.55)	–	–	–	–
CB Branch Competition	–	–	–	–	–	–	–	–	-1.15	-1.23	-1.33	-1.15
	–	–	–	–	–	–	–	–	(0.23)	(0.20)	(0.16)	(0.23)
Only Bank in Home Municipality	0.12	0.15	0.22	0.12	-0.06	-0.07	0.07	-0.12	-0.25	-0.26	-0.27	-0.27
	(0.81)	(0.76)	(0.65)	(0.80)	(0.91)	(0.89)	(0.89)	(0.81)	(0.52)	(0.49)	(0.48)	(0.48)
Log(Population)	-0.13	-0.16	-0.27	-0.25	-0.17	-0.20	-0.28	-0.30	-0.10	-0.13	-0.23	-0.22
	(0.50)	(0.42)	(0.24)	(0.23)	(0.42)	(0.33)	(0.24)	(0.17)	(0.60)	(0.52)	(0.32)	(0.30)
Pop. w. Higher Education	-0.07	-0.04	-0.02	-0.01	-0.06	-0.03	-0.03	0.00	0.00	0.03	0.05	0.05
	(0.75)	(0.87)	(0.92)	(0.96)	(0.77)	(0.89)	(0.90)	(1.00)	(0.99)	(0.89)	(0.81)	(0.81)
Pop. over 67 Years	0.08	0.09	0.12	0.09	0.09	0.09	0.12	0.09	0.08	0.09	0.12	0.09
	(0.07)	(0.05)	(0.01)	(0.05)	(0.06)	(0.05)	(0.01)	(0.04)	(0.07)	(0.05)	(0.01)	(0.05)
Mean Income	0.02	0.01	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.01
	(0.04)	(0.05)	(0.03)	(0.08)	(0.04)	(0.05)	(0.03)	(0.08)	(0.05)	(0.06)	(0.04)	(0.09)
Lagged Unemployment	-0.11	-0.12	-0.08	-0.11	-0.11	-0.12	-0.08	-0.11	-0.10	-0.11	-0.07	-0.10
	(0.36)	(0.30)	(0.49)	(0.34)	(0.37)	(0.31)	(0.49)	(0.36)	(0.42)	(0.33)	(0.53)	(0.38)

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
log(j)	0.35	0.40	0.54	0.43	0.34	0.39	0.53	0.41	0.33	0.39	0.51	0.41
	(0.44)	(0.37)	(0.24)	(0.35)	(0.45)	(0.38)	(0.25)	(0.36)	(0.47)	(0.39)	(0.27)	(0.37)
log(j) squared	-0.39	-0.42	-0.54	-0.45	-0.39	-0.43	-0.53	-0.45	-0.40	-0.43	-0.54	-0.46
	(0.02)	(0.01)	(0.00)	(0.01)	(0.02)	(0.01)	(0.00)	(0.01)	(0.02)	(0.01)	(0.00)	(0.01)
α_0	11.71	-0.32	-0.84	5.10	12.42	0.32	-0.50	5.83	11.73	0.03	-0.40	5.32
	(0.11)	(0.91)	(0.77)	(0.20)	(0.10)	(0.91)	(0.86)	(0.15)	(0.11)	(0.99)	(0.89)	(0.17)
No. Obs	2412	2412	2412	2412	2412	2412	2412	2412	2412	2412	2412	2412
Pseudo-R^2	.13	.13	.13	.14	.13	.13	.13	.14	.13	.13	.13	.14
p-value LR-Test 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
p-value LR-Test 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Results are coefficient estimates from bank level logit regressions of y_{ij} on H_{0j} and x_{ij}, where y_{ij} equals one if bank i exists in year j and zero otherwise, and H_{0j} is a baseline hazard function. Models (1)–(6) assume a baseline hazard function of the form $\mathrm{H}_{0j} = \alpha_0 + \alpha_1 \log(\mathrm{J}) + \alpha_2 \big[\log(\mathrm{J})\big]^2$. Models (7)–(12) assume a baseline hazard function of the form $\mathrm{H}_{0j} = \alpha_0 + \sum_j^{\mathrm{J}-1} \delta_j \mathrm{D}_j$, where D_j is a dummy for interval j and J is the overall number of intervals of the sample (estimated interval dummies are not reported). D_j is omitted from the regression if no bank exit occurs in interval j. Trust is an index of the level of trust based on the World Values Survey in 1990, measured at the county-level. Newspaper Subscriptions is the average number of subscriptions per household measured at the municipality level. Donation Ratio is the door-collected contribution per capita, divided by average municipality income and multiplied by 1000 for scaling, measured at the municipality level. Principal Component is the first principal component for the variables Trust, Newspaper Subscriptions, and Donation. Bank Asset Competition is the weighted average market share of competing banks, measured in terms of total assets. No. Competing Banks is the weighted average number of competing banks per 10,000 inhabitants. Branch Competition is the weighted average number of competing banks' branches per 10,000 inhabitants. CB Branch Competition is the weighted average number of commercial banks per 10,000 inhabitants. Please refer to the Data Appendix for remaining variable definitions. LR-test 1 is a Likelihood Ratio test of the joint significance of $\mathbf{x_{ij}}$. LR-test 2 is a Likelihood Ratio test of the joint significance of log(j) and log(j)^2 and $\{\mathrm{D}_j\}_{j=2}^{\mathrm{J}}$ in Models (1)–(6) and (7)–(12) respectively. The sample is 1987–2005. Standard errors are corrected for clustering at the bank level, and p-values are reported in parentheses.

Table 7:

Effect of Social Capital on Savings Banks' Probability of Exit:
Robustness to Timing of Capital Injections During Norwegian Banking Crisis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Trust–WVS (1990)	-3.47	–	–	–	-4.48	–	–	–
	(0.03)	–	–	–	(0.18)	–	–	–
Newspaper Subscriptions	–	-1.14	–	–	–	-1.10	–	–
	–	(0.03)	–	–	–	(0.03)	–	–
Donation Ratio	–	–	-5.37	–	–	–	-3.63	–
	–	–	(0.09)	–	–	–	(0.02)	–
Principal Component	–	–	–	-2.09	–	–	–	-2.03
	–	–	–	(0.01)	–	–	–	(0.01)
Equity Ratio (1987)	-0.35	-0.33	-0.34	-0.34	-0.33	-0.33	-0.35	-0.33
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log(Total Assets) (1987)	0.14	0.10	0.16	0.11	0.14	0.09	0.12	0.09
	(0.27)	(0.40)	(0.20)	(0.39)	(0.26)	(0.46)	(0.34)	(0.45)
Bank Asset Competition	1.65	1.50	1.69	1.52	1.54	1.38	1.50	1.40
	(0.06)	(0.09)	(0.06)	(0.08)	(0.09)	(0.12)	(0.09)	(0.11)
Only Bank in Home Municipality	0.72	0.64	0.74	0.64	0.73	0.64	0.72	0.63
	(0.22)	(0.27)	(0.21)	(0.28)	(0.22)	(0.28)	(0.22)	(0.29)
Log(Population)	-0.41	-0.44	-0.57	-0.53	-0.55	-0.45	-0.43	-0.54
	(0.07)	(0.06)	(0.03)	(0.02)	(0.04)	(0.05)	(0.06)	(0.02)
Pop. w. Higher Education	0.00	0.04	0.06	0.07	0.08	0.07	0.04	0.10
	(0.98)	(0.85)	(0.79)	(0.74)	(0.71)	(0.75)	(0.85)	(0.65)
Pop. over 67 Years	0.08	0.08	0.12	0.08	0.12	0.09	0.09	0.09
	(0.08)	(0.07)	(0.01)	(0.07)	(0.01)	(0.05)	(0.07)	(0.05)
Mean Income	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01
	(0.10)	(0.11)	(0.06)	(0.15)	(0.05)	(0.06)	(0.06)	(0.09)
Lagged Unemployment	-0.14	-0.15	-0.11	-0.14	0.08	0.05	0.09	0.06
	(0.24)	(0.20)	(0.35)	(0.24)	(0.57)	(0.74)	(0.52)	(0.69)
$\log(j)$	0.37	0.43	0.55	0.45	–	–	–	–
	(0.40)	(0.34)	(0.22)	(0.32)	–	–	–	–
$\log(j)$ squared	-0.40	-0.43	-0.54	-0.46	–	–	–	–
	(0.01)	(0.01)	(0.00)	(0.01)	–	–	–	–
α_0	13.57	1.22	0.80	6.69	-0.57	0.15	13.25	5.53
	(0.06)	(0.65)	(0.78)	(0.08)	(0.85)	(0.96)	(0.07)	(0.16)
No. Obs	2389	2389	2389	2389	1842	1842	1842	1842
Pseudo-R^2	.14	.14	.14	.14	.13	.14	.14	.14
p-value LR-Test 1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
p-value LR-Test 2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

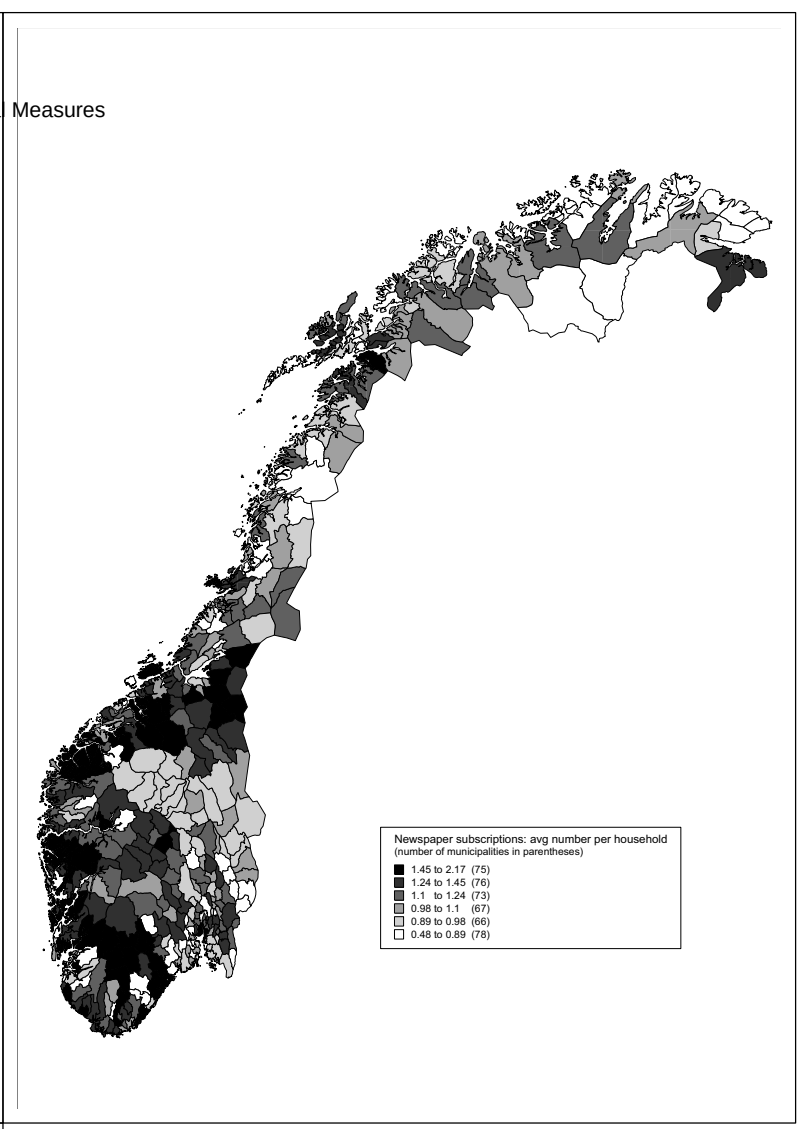
Note: Results are coefficient estimates from bank level logit regressions of y_{ij} on H_{0j} and x_{ij}, where y_{ij} equals one if bank i exists in year j and zero otherwise, and H_{0j} is a baseline hazard function. Models (1)–(4) assume a baseline hazard function of the form $\text{H}_{0j} = \alpha_0 + \alpha_1 \log(\text{J}) + \alpha_2 \big[\log(\text{J})\big]^2$. Models (5)–(8) assume a baseline hazard function of the form $\text{H}_{0j} = \alpha_0 + \sum_j^{\text{J}-1} \delta_j \text{D}_j$, where D_j is a dummy for interval j and J is the overall number of intervals of the sample (estimated interval dummies are not reported). D_j is omitted from the regression if no bank exit occurs in interval j. Trust is an index of the level of trust based on the World Values Survey in 1990, measured at the county-level. Newspaper Subscriptions is the average number of subscriptions per household measured at the municipality level. Donation Ratio is the door-collected contribution per capita, divided by average municipality income and multiplied by 1000 for scaling, measured at the municipality level. Principal Component is the first principal component for the variables Trust, Newspaper Subscriptions, and Donation. Please refer to the Data Appendix for remaining variable definitions. LR-test 1 is a Likelihood Ratio test of the joint significance of $\mathbf{x_{ij}}$. LR-test 2 is a Likelihood Ratio test of the joint significance of $\log(j)$ and $\log(j)^2$ and $\{\text{D}_j\}_{j=2}^{\text{J}}$ in Models (1)–(3) and (4)–(6) respectively. The sample is 1987–2005. Standard errors are corrected for clustering at the bank level, and p-values are reported in parentheses.

Table 8:
Effect of Social Capital on Bank Financial Accounting Ratios

	Return on Assets	Gift Payments Out of Surplus	Deposit Rate Margin	Loan Rate Margin	Past Due Loans	Specified Loss Provisions	Recovered Loans
Social Capital (PC)	-0.651	0.288	-0.606	-0.294	-0.444	-0.151	0.293
	(0.00)	(0.07)	(0.00)	(0.02)	(0.15)	(0.01)	(0.09)
Equity Ratio (current)	0.030	0.071	-0.028	-0.049	-0.064	-0.023	0.020
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)
Log(Total Assets) (current)	-0.054	-0.078	0.050	-0.041	0.032	0.035	-0.067
	(0.05)	(0.00)	(0.24)	(0.10)	(0.68)	(0.09)	(0.00)
Bank Asset Competition	-0.335	-0.030	0.550	-0.123	-0.040	0.058	0.009
	(0.02)	(0.86)	(0.03)	(0.36)	(0.89)	(0.40)	(0.94)
Only Bank in Home Municipality	-0.319	0.050	0.260	-0.119	0.530	-0.009	-0.114
	(0.00)	(0.60)	(0.09)	(0.16)	(0.01)	(0.84)	(0.13)
Log(Population)	0.009	0.014	-0.111	-0.006	-0.008	-0.037	0.084
	(0.82)	(0.79)	(0.12)	(0.89)	(0.93)	(0.10)	(0.04)
Pop. w. Higher Education	0.080	-0.010	0.190	0.126	0.136	0.025	-0.008
	(0.04)	(0.86)	(0.01)	(0.01)	(0.18)	(0.20)	(0.79)
Pop. over 67 Years	-0.040	0.001	-0.036	-0.028	0.034	-0.010	0.015
	(0.00)	(0.96)	(0.01)	(0.00)	(0.18)	(0.04)	(0.19)
Mean Income	-0.015	0.001	-0.017	-0.012	-0.009	-0.005	0.001
	(0.00)	(0.77)	(0.00)	(0.00)	(0.05)	(0.00)	(0.69)
Lagged Unemployment	0.048	0.009	0.065	0.028	0.062	-0.001	-0.006
	(0.08)	(0.76)	(0.11)	(0.36)	(0.32)	(0.94)	(0.87)
Lagged Loan Growth	-0.001	0.006	-0.007	-0.004	-0.032	-0.016	0.010
	(0.50)	(0.00)	(0.01)	(0.03)	(0.00)	(0.00)	(0.00)
Fraction of C&I Loans	-0.001	0.003	-0.002	0.001	0.039	0.006	-0.003
	(0.75)	(0.41)	(0.36)	(0.64)	(0.00)	(0.00)	(0.13)
No. Obs	2146	2141	2031	2037	1755	1903	1061
No. Banks	157	156	149	149	131	146	118
R-squared	0.98	0.54	0.95	0.94	0.57	0.45	0.47

Note: Results are coefficient estimates from GLS bank level regression of the form: $y_{it} = \mathrm{D}_t + x_{it}\beta + \epsilon_{it}$ (estimated time dummies, D_t, are not reported). Social Capital (PC) is the first principal component for the three social capital proxies Trust, Newspaper Subscriptions, and Donation Ratio. Please refer to the Data Appendix for remaining variable definitions. All coefficient estimates, except Equity Ratio and Lagged Loan Growth, have been multiplied by 100. The sample is 1990–2005 for past due loans, 1995–2005 for recovered loans, and 1987–2005 otherwise. GLS standard errors are corrected for clustering at the bank level, and p-values are in parentheses.

Figure 1: Social Capital Measures



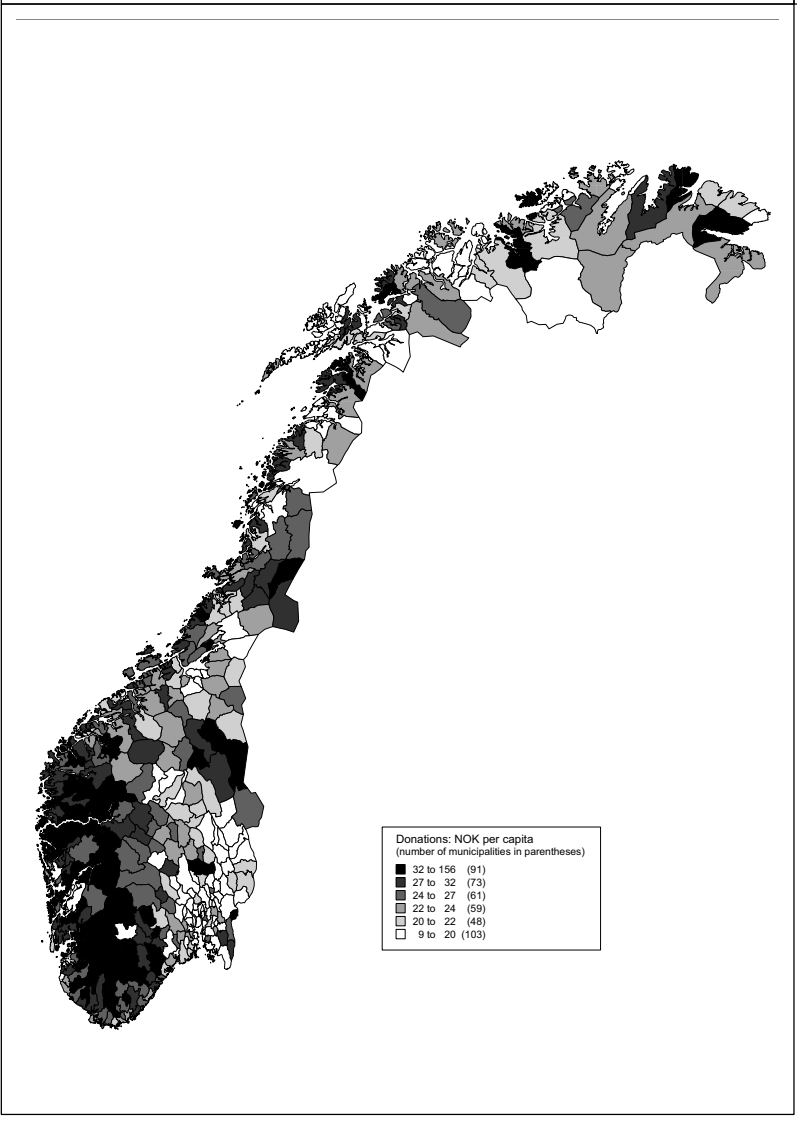
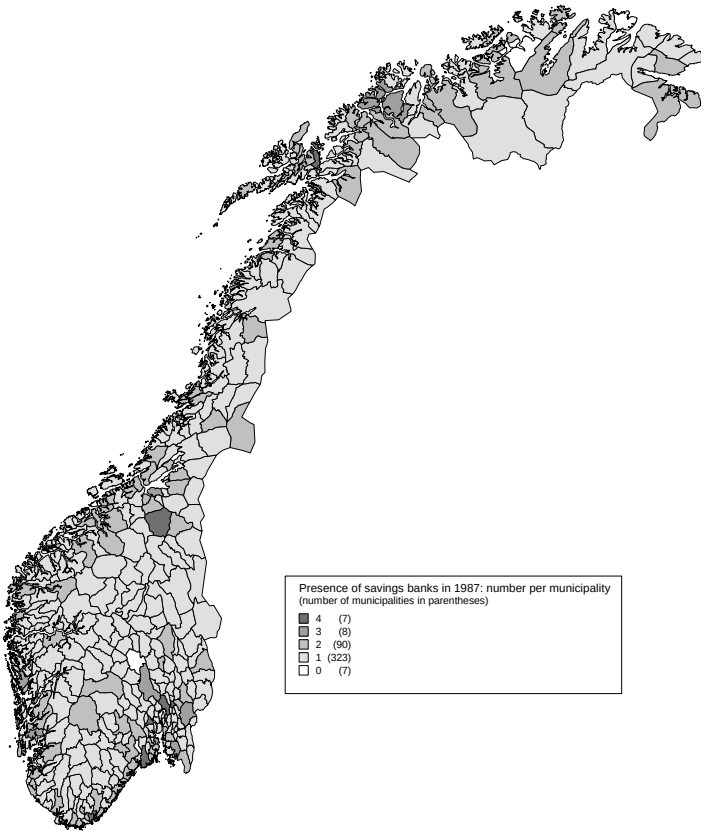
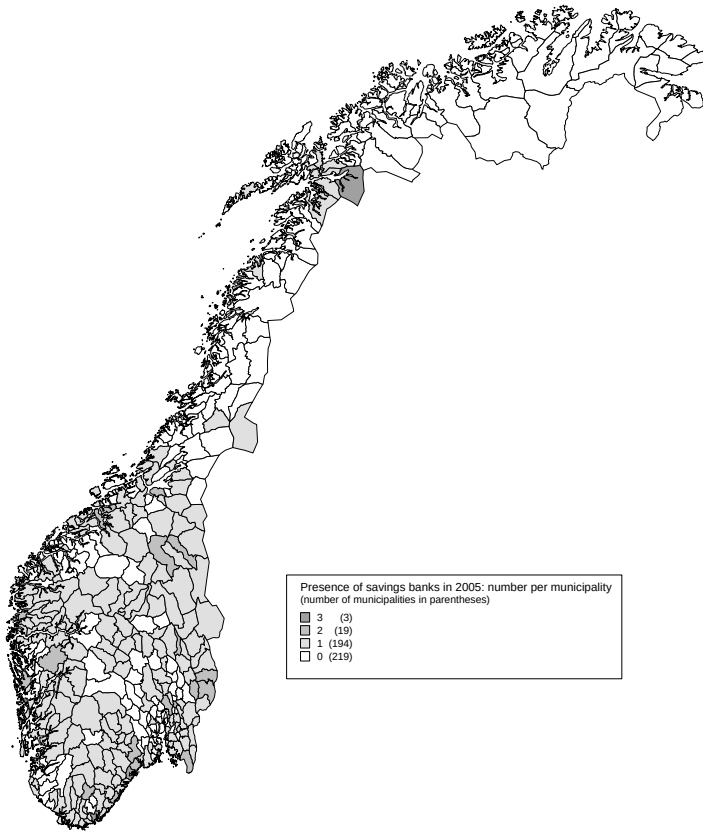
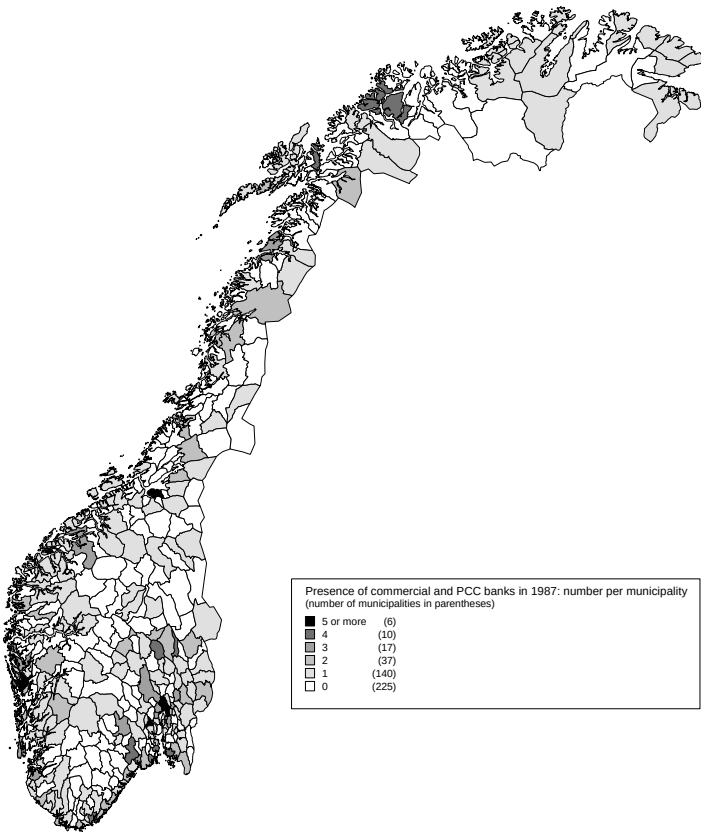


Figure 2: Geographical Presence of Bank Organizational Forms: 1987-2005







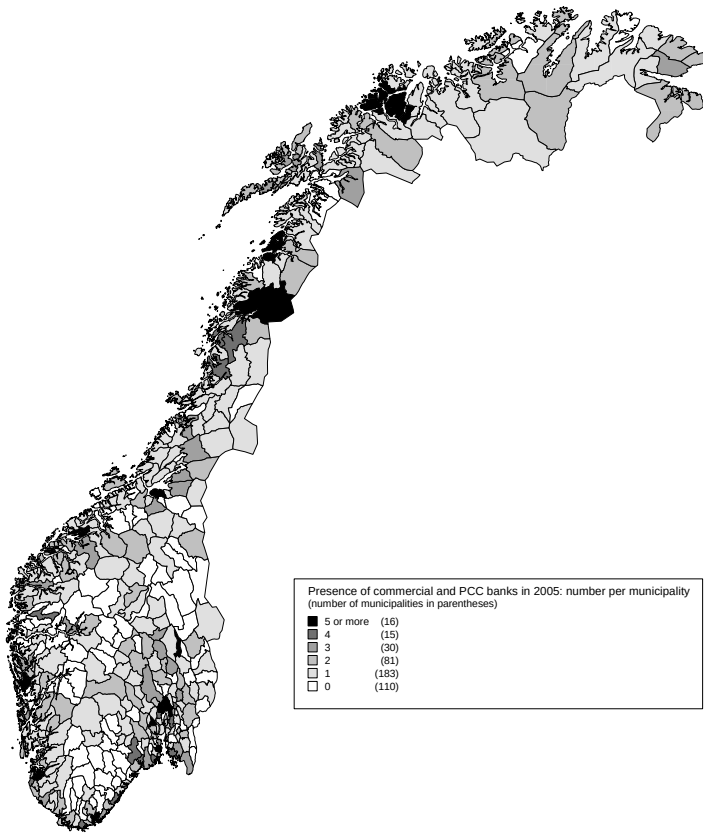
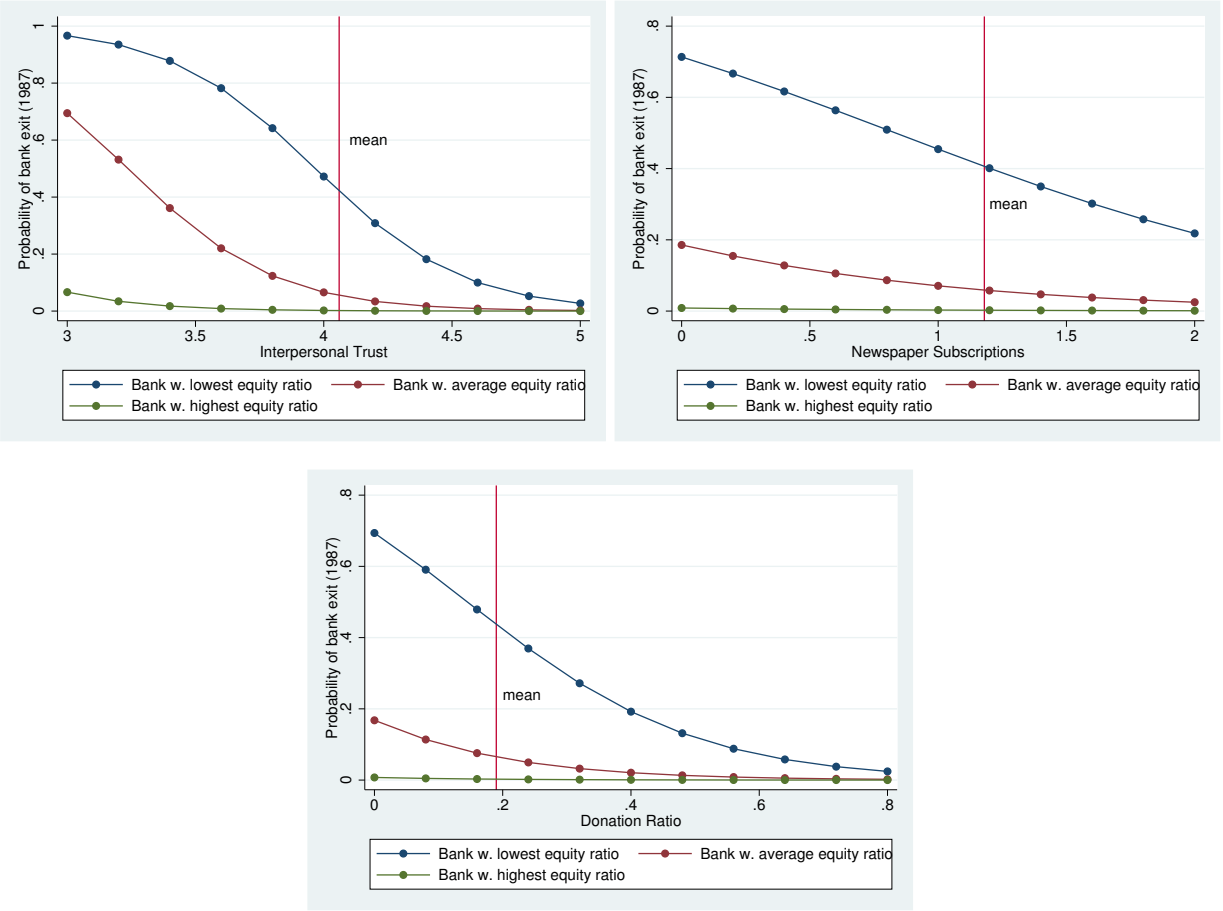


Figure 3: Effect of Social Capital on Banks' Probability of Exit for Different Equity Ratios



Notes: The figures show the effect of the social capital measures Trust, Subscriptions, and Donation on the probability of bank exit in 1987 for different bank equity ratios (minimum, median, and maximum), according to the estimates in Table 6, Models (1)–(3). The minimum, median, and maximum equity ratios equal 3.2, 9.7, and 20.1 respectively. All other variables are held at their mean values.

A Data appendix

For municipality-level variables we use 2005-municipality borders throughout the analysis (mergers between municipalities occur during our sample period). Norway has 433 municipalities and 20 counties in 2005. In general we collect municipality level data for as many years of the sample period as possible but statistics are not always available for every year. In such cases, we construct a step-wise variable in accordance with the years of information that are available. Municipality level data are from Statistics Norway (www.ssb.no), unless otherwise indicated. Detailed data on banks' balance sheet, income, and cost statements are from the banking statistics database (ORBOF) at Norges Bank (the central bank of Norway). Lagged bank accounting variables are corrected for bank mergers and acquisitions by constructing a synthetic bank in year $t-1$ comprised of the banks involved in the merger. All variables are measured annually from 1987 to 2005 unless otherwise mentioned. Nominal value variables used in the regressions are deflated with the consumer price index.

Trust: The variable comes from the 1990 World Values Survey (WVS) and measures the level of trust among Norwegians on a scale from 1 to 5 using answers to the following question: "Regarding trust of other Norwegians, would you say that you generally have (5) high trust in them, (4) have some trust in them, (3) neither trust or distrust them, (2) distrust them, or (1) highly distrust them?" There were 1239 respondents to the questionnaire and we know the county of residence of each respondent. We have inverted the ranking of the responses similarly to Guiso et al. (2004).

Newspaper subscriptions: The variable is the average number of newspaper subscriptions per household, not including freely distributed newspapers or tabloid papers. Figures of subscription levels are kindly provided by Sigurd Høst, cf. Høst (2005), for the years 1984, 1996, and 2002. We construct a step-wise variable that equals respectively the 1984-level subscriptions in the years of 1987-1995, the 1996-level subscriptions in the years 1996-2001, and the 2002-level subscriptions in the years 2002-2005.

Donation ratio: The variable is defined as the amount raised from door-to-door-collections per capita divided by average income, multiplied by 1,000, that is, a ratio of, say, 0.20

implies that, on average, people donate 0.02 percent of (average) gross personal income in a particular municipality. Donation amounts are available from the national annual TV-charity shows *TV-aksjonen* in the years of 1990, and 2000-2005. We have been unable to recover municipality-level data for the other years of the sample. We construct a step-wise variable that equals respectively the 1990-donation ratio in the years 1987-1995, the 2000-donation ratio in the years 1996-2000, and the annual donated ratio in the years 2001-2005. Data for 1990 is kindly provided by Redd Barna. Data for 2000-2005 is kindly provided by DnB NOR (the bank in charge of the administration of donated amounts).

Bank branches: For every year 1987–2005, we construct a data set of the municipality-location of each bank's branches. Information on the location of bank branches is from the annual publication *Bankplassregisteret* by the Norwegian Financial Services Association.

Bank asset competition: The variable measures the market share of competing banks in terms of bank assets. It equals $\sum_m [w_{im} \cdot (\text{market share of competing banks}_m)]$ and measures, for each bank i, the (weighted) share of total bank assets in municipality m that are held by competing banks, where a given bank's assets in municipality m is computed as the bank's total assets multiplied by the fraction of its branches located in m.[46]

No. competing banks: The variable equals $\sum_m [w_{im} \cdot (\text{no. competing banks}_m)]$ and measures, for each bank i, the (weighted) average of the number of competing banks per 10,000 inhabitants across the municipalities in which it operates.

Branch competition: The variable equals $\sum_m [w_{im} \cdot (\text{branch-share of competing banks}_m)]$ and measures, for each bank i, the (weighted) share of the total number of branches in municipality m that are owned by competing banks.

Commercial bank (CB) branch competition: The variable equals $\sum_m [w_{im} \cdot (\text{branch-share of CB banks}_m)]$ and measures, for each bank i, the (weighted) share of the number of branches in municipality m that are owned by commercial banks.

Only Bank in Home Municipality: A dummy variable equal to one in years where Asset Competition equals zero, that is, when bank i faces no competition from other banks in

[46]The variable, as well as the other competition measures, measure competition from *all* existing banks, including the banks that are not in our sample (i.e. acquired, PCC, and commercial banks).

the municipalities in which it is present.

Average gross personal income: Data on gross personal income are available starting in 1993. In the regressions we set the value in years prior to 1993 equal to the 1993-value. The variable is adjusted for changes in the consumer price index (base year is 1998) and measured in thousand Norwegian kroner.

Population: Population indicates the number of inhabitants in each municipality. The variable is logged in the estimations.

Population over 67 years: The variable is defined as the fraction of inhabitants in each municipality of at least 67 years of age, multiplied by 100.

Population with higher education: The variable measures the fraction of municipality population who holds a university-level (or equivalent) degree obtained in a program of at least four years of education, multiplied by 100.

Unemployment: The variable is the fraction of municipality population that are unemployed in a given year, aggregated across municipalities to the county level. The earliest year when data are available is 1988, hence 1987 employment values are set equal to the 1988 values.

Total assets and equity ratio (bank level): The equity ratio is defined as the level of total equity divided by total assets, multiplied by 100.

Return on Assets (bank level): Return on Assets (ROA) is computed as interest and non-interest income minus interest and non-interest expenses, divided by the mean value of total assets measured at the end of the current and the previous year.

Gift Payments Out of Surplus (bank level): The variable is the fraction of annual surplus that is paid out as gifts or set aside for future gifts payments in the bank's gift fund.

Past due loans (bank level): Past due loans and guarantees are measured as the outstanding gross value of delinquent engagements scaled by net loans (net of specified loan loss reserves). If a loan or a guarantee of a particular customer is in delinquency the value of all engagements of the customer are reported under this item. Delinquencies must be reported within 3 months. Data on delinquent engagements are available from 1990.

Specified loan loss provisions (bank level): The item measures changes in specified reserves

on loans, leases, and guarantees during the period, scaled by the mean value of total assets measured at the end of the current and the previous year. If a loan or a guarantee has been in delinquency for more than 3 months, specific loss provisions based on expected losses on the particular loan/guarantee must be made.

Recovered loans (bank level): Recovered loans and guarantees are measured as the gross value of reported delinquent engagements, at the beginning of the year, that are no longer in delinquency at the end of the year, scaled by the gross value of delinquent engagements at the beginning of the year. The item is reported as the book value of the previously delinquent engagement. Loans with renegotiated terms are not to be reported under this item. Data on recovered loans are available from 1995.

Deposit Interest Rate Margin (bank level): Banks' deposit rate margin is defined as the money market rate minus the individual bank's average deposit rate, Banks report their interest rates as by year-end on various types of deposits. For each bank we calculate the weighted average of the reported interest rates, where the weights are the relative amounts of each deposit type. From 1987 till 2000 we use the ordinary deposits rate, i.e., deposits received from the non-bank public, excluding deposits on negotiated terms. From 2001 on, the definitions of deposit categories in the official statistics changes and from this date we use transaction deposits which is the category most similar to ordinary deposits. As the money market rate we use the effective 3 months NIBOR (Norwegian Interbank Offered Rate). Since the mid to late 1980s banks in Norway have charged depositors fees in connection with retail payments. In order to be able to take this into account in our analysis we calculate the payment fee rate as the payment fees received by a bank during a year relative to the average size of its ordinary deposits (transactions deposits) at the beginning of the year. This payment-fee rate is then added to the deposit margin.

Loan Interest Rate Margin (bank level): A bank's lending margin is defined as the interest rate on loans to non-bank-borrowers minus the money market rate, i.e., it measures how much the bank charges its non-bank borrowers over the interest rate charged between banks in the interbank market. Banks report their interest rates as by year-end on various types of loans. For each bank we calculate the weighted average of the reported interest rates,

where the weights are the relative amounts of each loan type. As the money market rate we use the effective 3 months NIBOR (Norwegian Interbank Offered Rate). To the lending rates we add up-front fees converted to an annualized rate. These are fees that banks charge on some loans to cover administrative costs etc.[47]

Loan growth (bank level): The variable is computed from net loans measured in real values.

Fraction of C&I Loans (bank level): Commercial and industrial loans are loans made to businesses in all industries. Businesses that are fully or partly owned by municipalities are excluded. The amount of loans is scaled by the total outstanding amount of loans.

[47] Almost all loan rates offered by Norwegian banks as well as most of the deposit rates are floating, although for practical reasons they do not vary at a daily basis. The use of a money market interest rate of three months duration will thus match the effective duration of the lending and deposit rates reasonably well.