

Microenterprises and multiple bank relationships: The case of professionals

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Abstract The present paper focuses on professionals as a special group of microenterprises. It explains their characteristics and financial relationships, using data from a survey conducted in Germany in 2002. Consistent with the theory of asymmetric information and relationship lending, we find that these firms maintain a small number of bank relationships, which increases in firm size and age. They tend to choose multiple banking relationships to overcome credit rationing and finance larger loans. Credit risk and the structure of the banking market do not seem to matter.

Keywords Bank–customer relationships · Multiple bank relationships · Relationship banking · Small firm finance

JEL Classifications G21 · G32 · L14 · L26

1 Introduction

The number of bank relationships held by small and medium-sized enterprises (SMEs) is one of the key

variables in the literature on relationship lending.¹ A low number of lending banks is usually considered an indicator of a close bank–customer relationship, which helps to overcome credit rationing due to asymmetric information. The information-based theory of financial intermediation predicts that an information-opaque small or young firm borrows from only one to few banks. This ‘one-to-few’ hypothesis has been confirmed for SME loans in several countries, but not for the majority of countries in cross-section studies (Ongena and Smith 2000b, Qian and Strahan 2005). The evidence of a large cross-country variation in the number of bank relationships with multiple banking relationships prevailing even at small firms has induced research on the determinants of this variable. While in empirical studies on relationship lending the number of bank relationships has been often treated as an exogenous variable, recent research focuses on explaining this number or the probability of multiple banking relationships.² The number of lending

¹ For surveys, see Boot (2000), Ongena and Smith (2000a) and Elyasiani and Goldberg (2004).

² See Ongena and Smith (2000b) and Qian and Strahan (2005) for cross sections of countries, Guiso and Minetti (2004) for the US, Cosci and Meliciani (2002) and Detragiache et al. (2000) for Italy, Machauer and Weber (2000) and Harhoff and Körting (1998b) for Germany, Ziane (2003) for France, Neuberger et al. (2006) for Switzerland, Degryse and Ongena (2001) for Norway, Berger et al. (2001b) for Argentina, Berger et al. (2005) for India, Yu and Hsieh (2003) and Fok et al. (2004) for Taiwan, and Ogawa et al. (2005) for Japan.

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relationships may not only be an indicator of the incidence of a housebank relationship (Elsas 2005), but also of borrower quality and size (Machauer and Weber 2000). Moreover, it may be affected by the stability of the banking sector, with a higher incidence of multiple banking relationships in more fragile environments (Detragiache et al. 2000).

So far, the empirical studies on relationship lending refer to small and medium-sized firms, neglecting micro firms. According to the European Union, the category of SMEs is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million. Within this category, a microenterprise, respectively small enterprise is defined as an enterprise which employs fewer than 10 persons, respectively 50 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million, respectively EUR 10 million (Commission of the European Communities 2003, p. 39). The present paper focuses on professionals, which fall mostly into the category of microenterprises. They differ from other enterprises by being self-employed persons acting in the services sector with special professional qualifications. Our motive for investigating the number of bank relationships of professionals is both to close a gap in the empirical literature, and to test the theory of asymmetric information: since professionals are microenterprises with mostly intangible assets in the services sector, we expect that they are especially prone to adverse selection and moral hazard and hence to credit rationing. Beyond our academic interest, it may be valuable for banks to understand the demand of professionals for bank relationships. Professionals represent a customer segment in the profitable retail banking business, whose importance is growing with the expansion of the services sector. From 1992 to 2006, the number of professionals in Germany increased by about two third from 514,000 to 906,000 (BMW 2006, p. 2).

We use data from a survey conducted among professionals in Germany in 2002 to explain the number of bank relationships held by these firms. As possible determinants, we investigate characteristics of the firm and its loan demand, characteristics of the housebank and its relationship to the borrower, and

variables of bank market structure and regulation. Consistent with previous studies for small and medium-sized firms, we find that the number of bank relationships increases with firm size and age. Our results do not support the hypothesis that firms develop multiple banking relationships to reduce hold-up costs. Rather, they indicate that multiple banking relationships serve to increase credit availability and finance larger loans.

The rest of the paper is organized as follows. Section 2 provides an overview of the theoretical and empirical literature and the hypotheses to be tested. Section 3 discusses the special characteristics of professionals and the expected relevance of the hypotheses. Section 4 describes the data set and descriptive statistics. The econometric results are presented in Sect. 5. Section 6 concludes.

2 Literature review and hypotheses

Theoretical literature yields hypotheses about the influence of characteristics of the firm and its loans, of the bank–customer relationship, and also of the bank and banking market on the number of bank relationships.

First of all, the number of banking relationships is expected to depend on the firm's size, credit risk and demand for financial services. Multiple banking relationships may result from a large demand for financial services, which cannot be satisfied by a single bank (Berger et al. 2005, p. 8), or by a risk sharing or cross selling by the bank (Cosci and Meliciani 2002, p. 39). Carletti et al. (2004) show that banks may prefer to share lending to SMEs even if this implies free-riding and duplication of monitoring efforts. They predict a greater use of multiple-bank lending not only when banks are small relative to investment projects, but also when firms are less profitable and monitoring costs are high. The latter is likely to be relevant for young and small enterprises.

Another explanation for an effect of firm size and quality is that smaller firms tend to be characterized by higher information opacity and credit risk. According to the theory of asymmetric information, this increases their likelihood of being credit rationed. One way to overcome this problem is the concentration

of borrowing at a housebank,³ which gathers information about the firm's quality. A single bank relationship is most efficient when a firm borrows once, because it minimizes monitoring costs (Diamond 1984). In the case of repeated lending by the same bank, the terms of lending may improve after a successful completion of the project (Boot and Thakor 1994).⁴ A housebank relationship may also insure the borrower against the risk that in the case of financial distress distributional conflicts between multiple lenders cause a premature liquidation of the firm (Hellwig 1991, p. 54; Koziol 2006).⁵ However, a lending relationship to a single bank is likely to ease the financing of inefficient projects due to a soft budget constraint (Dewatripont and Maskin 1995) or to induce a strategic default of the project (Bolton and Scharfstein 1996). These problems may be reduced by multiple lending relationships, which implies that a larger number of banking relationships signals higher borrower quality (Bolton and Scharfstein 1996). However, financially distressed borrowers may benefit from a heterogeneous multiple bank relationship, where a housebank is combined with several arm's length lenders (Banner 2005). Also Carletti (2004) predicts a negative relation between the number of bank relationships and firm quality, analyzing how banks' monitoring incentives change with the number of banking relationships and how this affects firms' optimal borrowing choice. She shows that the attractiveness of two-bank lending is increasing in the cost of monitoring and the firm's expected profitability.

³ We use 'housebank' and 'relationship bank' as synonymous terms. A housebank is usually defined as the major lender of a firm and does not preclude that the firm holds also other bank relationships. For German universal banks, the incidence of a housebank status has been shown to be positively related to the bank's share of borrower debt financing, but negatively related to the firm's number of bank relationships (Elsas 2005).

⁴ See, however, Baas and Schrooten (2006), who show that the lack of reliable information leads to comparative high interest rates even if a long-term bank-borrower relationship exists.

⁵ For empirical evidence, see Brunner and Krahen (2002), who show that the success probability of a workout of financially distressed firms depends negatively on the number of lending banks. Gilson et al. (1990) and Petersen and Rajan (1994) find that a larger number of creditors worsens the terms of credit and increases the cost of financial distress to small firms.

Information opacity may also result from high cost of information disclosure. Bhattacharya and Chiesa (1995) suggest that firms with valuable proprietary information prefer fewer creditors to prevent information leakage. Yosha (1995) shows that a highly innovative, high quality firm with large investments in R&D will not be willing to give all the information to multiple banks. Von Rheinbaben and Ruckes (2004) determine the optimal number of creditors that balances the costs of information disclosure against the costs of higher interest rates due to the banks's monopoly power. Accordingly, the relationship between the innovativeness of a firm and the number of its lenders would be negative (Yosha 1995) or U-shaped (Von Rheinbaben and Ruckes 2004).

Models of repeated lending predict that informationally opaque firms have an incentive to develop multiple banking relationships, because this may help them to save hold-up costs which arise from their lock-in by the housebank's superior information (Sharpe 1990; Rajan 1992; Jean-Baptiste 2005). Since the hold-up costs increase with loan demand, we expect a positive influence of loan demand on the number of lenders. However, Elsas et al. (2004) show that the co-existence of a relationship bank and arm's length financiers may optimally balance the hold-up cost of relationship banking and the coordination failure of multiple creditors for risky firms or firms with low expected cash-flow. This implies that firms should maintain, at most, only a few bank relationships.

Summarizing, we formulate hypotheses on the influence of firm-specific and loan-specific variables on the number of banking relationships:

H1: Informationally opaque firms hold only one to few banking relationships.

H2: The number of banking relationships increases with firm size, demand for financial services and credit risk.

In the empirical literature, information opacity is measured by firm size, age, and R&D expenditure. Small, young and innovative firms tend to be opaque, because most potential lenders have little information on the managerial capabilities or investment opportunities of such firms (Audretsch and Elston 2002, pp.3). Larger and older firms usually have better instruments to signal their quality to creditors (Harhoff and Körting 1998b). In line with H1, SMEs in Germany (Harhoff and Körting 1998a, b, Hommel

and Schneider 2003), Switzerland (Neuberger et al. 2006), the US (Petersen and Rajan 1994, Berger and Udell 1995), Norway (Ongena and Smith 2001) and France (Ziane 2003) hold on average less than three bank relationships. This is not the case for SMEs in Italy (Detragiache et al. 2000; Guiso 2003; Cosci and Meliciani 2004) and for medium and larger firms in most countries.⁶

A unanimous finding is that the number of banking relationships increases with firm size (see Table 1).⁷ This supports H1 and H2, because firm size may be a proxy for both information opacity and the demand for financial services. The evidence about the influence of firm age is mixed. Older firms may have a higher number of bank relationships, because they are less opaque (H1), or a lower number of bank relationships, because they are less risky or have a lower demand for bank loans due to internal funds accumulated through time (H2). In line with H2, several risk proxies (financial distress, innovative activity, leverage, and delinquencies) exert a positive influence on the number of banking relationships (see Table 1).

Moreover, the number of banking relationships is expected to depend on the bank–customer relationship and bank-specific variables. The bank–customer relationship is affected by the lending technology, which may be characterized by relationship lending or transaction lending. Under relationship lending, the bank relies primarily on soft information gathered through direct contact of the loan officer with the firm and its local community, observing the borrower’s performance on all dimensions of its banking relationships over time (Berger and Udell 2005, p. 7). This lending technology addresses the problem of SMEs’ information opacity. In contrast, transaction

lending is based primarily on “hard” quantitative data.⁸

Small, regional banks may have a comparative advantage in gathering and verifying soft information, because they are closer to their customers in local markets (Agarwal and Hauswald 2006). Soft information is difficult to quantify and transmit through the communication channels of large organizations (Berger and Udell 2002, 2003), which in turn may have an advantage in transaction lending, because they can reap economies of scale in the processing of hard information.⁹ An implication is that the concentration of banking relationships is higher if the housebank is a small, regional bank. Moreover, firms that borrow from small, regional banks have less incentives to develop multiple banking relationships, since bank size may serve as a commitment device that prevents the bank from holding up borrowers in the future (Jean-Baptiste 2005).

Thus, we expect

H3: The number of banking relationships is lower if the customer’s housebank is small or specializes on relationship lending.

There is ample evidence of a specialization of small banks on small business lending.¹⁰ In Germany, most of the SMEs are financed by public savings banks and mutual banks, which are small regional banks specializing on relationship lending with the provision of long-term fixed-rate loans to small firms.¹¹ A positive influence of the size of the lending bank on the number of banking relationships in line with H3 has been found by Harhoff and Körting (1998b), Berger et al. (2001b)

⁶ For an overview, see Ongena and Smith (2000a, pp.243). Medium and larger firms typically hold more than three bank relationships in Germany (Elsas and Krahen 1998, Machauer and Weber 2000), Argentina (Berger et al. 2001b), Taiwan (Yu and Hsieh 2003, Fok et al. 2004), India (Berger et al. 2005), and the majority of 20 European countries (Ongena and Smith 2000b). While firms in the UK, Norway and Sweden maintain fewer than three bank relationships on average, firms in Italy, Portugal, Belgium and Spain maintain on average 10 or more bank relationships (Ongena and Smith 2000a).

⁷ See also Petersen and Rajan (1994), Harhoff and Körting (1998a), Farinha and Santos (2002) and Ongena and Smith (2000b).

⁸ Transaction lending is generally viewed as being focused on informationally transparent borrowers. However, this view is oversimplified, because only one transaction technology (financial statement lending) is focused on transparent borrowers, while other transaction technologies (small business credit scoring, asset-based lending, factoring, fixed-asset lending and leasing) are targeted to opaque borrowers (Berger and Udell 2005).

⁹ For empirical evidence, see Carter et al. (2004).

¹⁰ See among others Akhavein et al. (2004), Berger et al. (2001a), Jayaratne and Wolken (1999) and Strahan and Weston (1998). For an overview see Akhavein et al. (2004) and Carter et al. (2004).

¹¹ The long-term relationship between banks and small firms in Germany has been strengthened by the increasing bank competition, which induced banks to provide more long-term funds and information to small firms (Audretsch and Elston 2002, p. 6).

Table 1 Determinants of the number of bank relationships: previous evidence. *Dependent variable:* number of banking relationships or probability of multiple banking relationships

Sample	Guiso and Minetti (2004)	Detragiache et al. (2000)	Cosci and Meliciani (2002)	Harhoff and Körting (1998b)	Machauer and Weber (2000)	Degryse and Ongena (2001)	Neuberger et al. (2006)	Ziane (2003)	Berger et al. (2001b)	Fok et al. (2004)	Yu and Hsieh (2003)	Berger et al. (2005)
Country	USA	Italy	Italy	Germany (ordered)	Germany	Norway	Switzerland	France	Argentina	Taiwan	Taiwan	India
Method	Probit	OLS	Neg. binomial	Logit	Poisson	Logit	OLS, Poisson	Poisson	Logit	2SLS	Logit	Probit/Poisson
Independent variables												
<i>Firm characteristics</i>												
Size	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +
Total assets (or loans)	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +
Number of employees	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +
Age	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +
Credit risk/fin. distress	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.
Innovation	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +
Leverage	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +
Delinquencies	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +
Credit rationing	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +
<i>Relationship characteristics</i>												
Duration	**** -	**** -	**** -	**** -	**** -	**** -	**** -	**** -	**** -	**** -	**** -	**** -
Housebank	**** -	**** -	**** -	**** -	**** -	**** -	**** -	**** -	**** -	**** -	**** -	**** -
Ownership share	* +	* +	* +	* +	* +	* +	* +	* +	* +	* +	* +	* +
<i>Banking market characteristics</i>												
Bank size	* -	* -	* -	* -	* -	* -	* -	* -	* -	* -	* -	* -
Bank type	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +
Bank fragility	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +	**** +
Market concentration	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.	n. sig.

* Significant at the 10% level. ** Significant at the 5% level; *** Significant at the 1% level; n. sig.: tested, but not significant

and Neuberger et al. (2006). Relationship lending is usually measured by the incidence of a close housebank relationship or by a long duration of the bank–customer relationship. However, a longer duration may also be a proxy for lock-in or hold-up, inducing the firm to increase the number of banking relationships. Accordingly, a positive influence of duration, but a negative influence of the closeness of the housebank relationship has been found for SMEs in Germany (Machauer and Weber 2000). In the US and France, where close housebank relationships are less important for the financing of SMEs, the duration of the bank–customer relationship seems to be a more suitable measure for relationship lending (Guiso and Minetti 2004; Ziane 2003; see Table 1). Moreover, duration analyses for SMEs in Portugal and Norway support the hold-up theory.¹²

A further motive for SMEs to maintain multiple banking relationships is to overcome actual or expected restrictions in credit availability. Multiple banking relationships may be advantageous, if banks are subject to exogenous shocks that may cause premature termination of the relationships with their customers (Detragiache et al. 2000). Such shocks may result from liquidity problems and bank failures in a fragile environment, or by changes in bank regulation that cause portfolio restructurings of banks. If a firm must fear that its relationship bank is hit by a shock and that adverse selection will prevent refinancing from uninformed banks, it should choose multiple banking relationships as an insurance against future credit rationing. Thus, we expect

H4: The number of banking relationships increases with actual or expected credit restrictions at the housebank.

The impact of actual credit restrictions has not been tested so far. The previous studies do not include measures for loan demand or credit availability as independent variables. The only exception is Ziane (2003), who found that credit rationing (as perceived by financial managers) had a significant

positive influence on the number of bank relationships held by small firms in France. The influence of expected credit restrictions due to liquidity shocks has been tested by using several variables characterizing the lending bank (see ‘bank type’ and ‘bank fragility’ in Table 1). Evidence consistent with H4 has been found for Taiwan, India, Italy and Argentina. Yu and Hsieh (2003) and Berger et al. (2005, p. 24) find that firms in Taiwan and India, which use a state-owned or financially safe bank as main bank have less need for additional bank relationships. For Italy (Detragiache et al. 2000) and Argentina (Berger et al. 2001b), bank fragility (measured in terms of the bank’s size, volatility of liquidity, nonperforming loans, leverage or profitability) has a positive impact on the likelihood to borrow from multiple banks. However, the cross-country study of Ongena and Smith (2000b) finds mixed support for H4. On the one hand, the number of banking relationships tends to be higher in countries with inefficient judicial systems and poor enforcement of property rights, on the other hand, it tends to be higher in countries with higher banking stability (measured by bank credit ratings).

Finally, we expect that the number of banking relationships is affected by the structure of the banking market. According to the traditional structure–conduct–performance hypothesis, market concentration causes market power, which leads to supply restrictions and higher prices. The expected effects on the number of banking relationships held by a firm depend on the geographic extent of the relevant banking market and demand substitutability. Especially relationship lending markets are local in nature, because closeness to the customer tends to lower monitoring costs, thus increasing credit availability (Agarwal and Hauswald 2006). If distance between borrower and lender matters for the provision of relationship banking services to SMEs, the availability of banks that will serve these customers is the lower the higher is the local banking market concentration. If, however, relationship lending can be perfectly substituted by transaction lending techniques targeted to opaque firms by more remote banks,¹³ the structure of the local banking market should not matter. Theoretical

¹² Farinha and Santos (2002) find for young firms in Portugal that the chance of substituting a single banking relationship with multiple banking relationships increases with the duration of that relationship. Ongena and Smith (2001) show for Norwegian firms that the probability of ending a bank relationship increases in duration and that small, young and highly leveraged firms maintain the shortest relationships.

¹³ Since technological change has eased the ability to lend to small firms at a distance (Petersen and Rajan 2002), out-of-market lending to small firms in local markets increased substantially in recent years (Hannan 2003).

models of relationship lending yield conflicting hypotheses on effects of market structure on market conduct. While Sharpe (1990), Petersen and Rajan (1995) and Hauswald and Marquez (2006) predict a negative effect of higher competition on investments in relationship lending, Boot and Thakor (2000) predict the reverse.

For the whole range of banking services, we expect

H5: The number of banking relationships decreases with local banking market concentration.

The studies reported in Table 1 find no significant influence of banking market concentration on the number of banking relationships. However, consistent with H5, the cross-country study of Ongena and Smith (2000b) shows that firms maintain a higher number of banking relationships in countries with lower banking market concentration.

All previous studies refer to small, medium and large firms (see Table 1), with the exception of Harhoff and Körting (1998b) and Neuberger et al. (2006), who examine also microenterprises. None of the previous studies investigates the financing of professionals as microenterprises. To close this gap, we first have to examine their special characteristics and thus the expected relevance of the above hypotheses.

3 Characteristics of professionals

Professionals are self-employed persons acting in the services sector usually with a small number of employees. Like tradesmen, they are not bound by instructions, perform managerial functions and make capital investments, holding residual claims. They differ from tradesmen by providing services based on special professional qualifications or creative skill personally, on their own responsibility and professionally independent (BMW 2006, p. 1, Hübler 1991). Under the regulatory environment given in Germany, they have to prove their professional qualification, but are not obliged to register their business. There are four categories of professional activities: (1) medicative professions (e.g., doctors, dentists, veterinarians, alternative practitioners, physiotherapists, apothecaries), (2) legal counseling, tax and business consulting professions (e.g., lawyers, notaries, auditors, accountants, business consultants),

(3) scientific and technical professions (e.g., engineers, architects, chemists), and (4) cultural, information communication and linguistic professions (e.g., journalists, photo reporters, interpreters, translators) (BMW, 2006).

Like tradesmen, professionals need external finance for investments in technical and office equipment and for smoothing cash-flow. The success of their investments depends on their managerial know-how and professional expertise to provide high quality personal services. Since both kinds of know-how are difficult to assess by external financiers, the activities of professionals tend to be characterized by high asymmetric information ex ante ('hidden information') and ex post ('hidden action'; Arrow 1985). This information asymmetry and the opaqueness due to the small size of professional enterprises tend to increase credit risk. Since professional firms are mostly microenterprises, where a single person performs professional and managerial functions, it is unlikely that this person has high know-how in both. However, credit risk may be reduced by unlimited liability and collateral. The typical legal forms of professional activities are sole proprietorships and non-trading partnerships, where the entrepreneur is liable with his or her personal assets. Because the assets can be used for business as well as private purposes, a distinction between inside and outside collateral makes no sense here.

Within the bank-based financial system of Germany, the financing of SMEs is concentrated on bank loans, which are often, beneath trade credits, the only external financial source. Even if the equity capital ratio of German SMEs increased from 4.4% in 2002 to 7.5% in 2003, it is still low by international standards and lowest for micro firms (Sachverständigenrat 2005, p. 476). Low equity capital, going along with low collateral, implies higher credit risk, constraining credit availability. However, this disadvantage is often mitigated by a close housebank relationship, which still plays a large role for the financing of SMEs in Germany. On average, German SMEs receive 75% of their loans from their housebank, and 40% of them maintain only one banking relationship (Stark 2001). Professionals use their housebank relationship to obtain financial services, mainly deposits and loans, both for their business and private needs. The information gained from the customer's deposit behavior

may help the housebank to improve its lending decision. When there is *ex ante* information asymmetry, accepting checkable deposits can give banks information about the quality of future borrowers. Hence, demand deposits and loans are complementarities (Vale 1993).

Information about professional activities in Germany is scarce, since official statistics about self-employed persons do not differentiate between professionals and tradesmen. In the first quarter of 2004, the loan demand of self-employed persons was satisfied mostly by small, regional banks (34% by savings banks, 23% by cooperative banks) and only to a small extent (14%) by big private banks (Sachverständigenrat 2004, p.287). The financial behaviour of professionals has not been studied so far.

Given the above described characteristics, we expect that the one-to-few hypothesis (H1) is especially relevant for professionals. Because of their small size, low demand for financial services and low risk (H2), and their long-term relationship to their mostly small housebank, (H3), we expect that they hold only a small number of bank relationships. They may choose multiple bank relationships only if their loan demand is not adequately satisfied by their housebank due to hold-up or credit rationing, or if they fear future credit restrictions, which may be caused by the Basle II rules (H4). Since they depend on relationship lending by local banks, the number of their bank relationships is likely to be affected by local banking market concentration (H5).

4 Data set and descriptive statistics

Data is obtained from an online survey among 6,000 professionals in Germany, which was carried out in spring 2002. The addresses of the interviewees were randomly chosen from the yellow pages and from publicly available registers of chambers and industries. The interviewees were allocated to the industries proportionally to the actual industry structure of professionals in Germany. Data was collected about bank relationships, firm characteristics, characteristics of the banks with which relationships are held, the loans granted, features of the banking market and information gathering by banks. About

230 professionals answered the questionnaire, implying a response rate of 3.8%.¹⁴

About 36% of the respondents belong to the medicative sector, 33% to the consulting sector, 24% to the scientific–technical sector, and 7% to the cultural sector. This structure represents the actual industry structure of professionals in Germany well. About 88% of the professionals in our sample are microenterprises with less than 10 employees. Nearly half of them have even not more than three employees. In 84% of the cases, the turnover does not exceed EUR 500,000. Considering the distribution of firm size per industry, we find that professionals in the scientific–technical and cultural sector are all microenterprises with mostly not more than three employees, while the medicative and consulting sectors comprise also larger firms (see Table 5 in the Appendix). The majority of the respondents (89%) have a legal form with unlimited liability.

The variables of this study resemble standard variables from the literature on relationship lending. Their definition, measurements and main descriptive statistics are summarized in Table 2.

Our dependent variable is the number of bank relationships held. In the present sample, its average is 2.27. Beyond the housebank relationship, at least one additional bank relationship is held in 73% of the cases. In 70% of the cases only one or two bank relationships are maintained. This is consistent with the one-to-few hypothesis H1 and similar to previous observations about the number of banking relationships of micro and small enterprises in Germany.¹⁵

As independent variables, we first use firm-specific variables common in the literature of relation lending: firm size and age, industry, innovative activity, and financial squeeze. While firm size and age may be proxies for both the demand for financial services

¹⁴ The low response rate is likely to be due to the fact that the questionnaire contained some very personal questions and questions about financial matters, which are reluctantly answered online. In Germany, there is still much concern about the safety of the internet, and especially older persons are reluctant to use this medium. In our sample, the mean age of the self-employed persons acting as professionals is 49 years.

¹⁵ Harhoff and Körting (1998b) find a mean number of lending relationships of 1.8 for micro and small firms. Hommel and Schneider (2003, p.64) find a mean number of lending relationships of 1.9 for microenterprises with an annual turnover less than EUR 1 million in 2002.

Table 2 Definition, measurements and descriptive statistics of variables

Dependent variable		Mean	Median	Stand.Dev.	Obs.
Num_bank	Number of bank relationships	2.27	2.00	1.26	226
<i>Firm characteristics</i>					
Size	Number of employees	5.18	3.00	5.97	213
Age	Age of the firm in years	15.61	12.00	14.09	217
Industry	Set of dummies with value 1, if the professional firm belongs to (1) the medicative sector, (2) the business consultant sector, (3) the natural scientist sector or (4) the cultural sector, otherwise 0				
	Medicative	0.36	0.00	0.48	229
	Cultural	0.07	0.00	0.25	229
	Scientific–technical	0.24	0.00	0.43	229
Finance_bank	Dummy indicating whether the firm is dependent on bank finance	0.56	1.00	0.50	229
Innovation	Qualitative variable indicating the research and development effort (R&D) of the professional, ranging from 1 (= high R&D) to 5 (= low R&D).	2.24	2.00	0.86	212
No financial squeeze	Dummy indicating that the firm does not experience a financial squeeze.	0.46	0.00	0.50	228
<i>Relationship characteristics</i>					
Duration	Duration of the housebank relationship in years	16.99	15.00	11.56	223
Housebank	Qualitative variable, indicating the importance of the housebank perceived by the professional, ranging from 1 (= very important) to 5 (= very unimportant)	1.69	1.00	0.84	221
<i>Bank characteristics</i>					
Rating_hb	Qualitative variable, indicating the rating of the housebank (Moody's), ranging from 1 (= A+; best rating) to 15 (= E-; worst rating).	7.74	7.00	2.01	209
Bank_type	Set of dummies, indicating whether the housebank is (1) a private bank, (2) a cooperative bank or (3) a savings bank private bank	0.39	0.00	0.49	224
	Cooperative bank	0.28	0.00	0.45	224
<i>Loan characteristics</i>					
Maturity	Maturity of the loan in years	9.73	10.00	5.39	126
Credit volume	Set of dummies indicating whether the volume of the loan is (1) up to EUR 10,000, (2) EUR 10,000–50,000, (3) EUR 50,000–100,000, (4) EUR 100,000–250,000, (5) EUR 250,000–500,000 and (6) more than EUR 500,000				
	Up to EUR 10,000	0.04	0.00	0.20	142
	EUR 10,000–50,000	0.21	0.00	0.41	142
	EUR 50,000–100,000	0.25	0.00	0.44	142
	100,000–250,000	0.23	0.00	0.42	142
	250,000–500,000	0.21	0.00	0.41	142
Collateral	Dummy indicating whether the firm must pledge collateral	0.87	1.00	0.33	136
Investment credit	Dummy indicating whether the firm has an investment credit	0.44	0.00	0.50	229

Table 2 continued

Dependent variable		Mean	Median	Stand.Dev.	Obs.
Num_bank	Number of bank relationships	2.27	2.00	1.26	226
<i>Market structure and regulation</i>					
Basle II	Dummy indicating whether the professional is informed about the new Basle II regulation	0.43	0.00	0.50	225
Banks_vicinity	Number of banks not more than 5 km afar from the firm	5.13	4.00	5.10	218
Distance	Distance between firm and housebank in kilometres	6.80	2.00	14.75	221
<i>Control variables</i>					
Credit availability	Dummy indicating whether the professional expects an increase in credit availability from multiple bank relationships	0.56	1.00	0.50	199
Visit	Dummy indicating whether the bank visits the professional	0.04	0.00	0.21	228
Monitoring	Dummy indicating whether the bank monitors the professional's monetary transactions	0.11	0.00	0.32	228

and credit risk, the latter three variables seem to be clearly related to credit risk. However, we do not know whether the four different sectors of professional activities have different industry risks. As a further risk proxy, we include the variable *finance_bank*, which indicates whether the firm is dependent on being financed by the bank. We presume that a higher bank dependency implies a higher credit risk to the lending bank.

Second, we include the duration and importance of the housebank relationship as well as the variables 'visit' and 'monitoring' to measure relationship lending. Going beyond previous studies, the latter two variables measure efforts of information gathering on the side of the bank. They may also be a proxy for information asymmetry. In the present sample, housebank relationships have an average duration of 17 years and are considered as important or very important on average. This confirms our expectation that relationship banking plays a larger role for microenterprises than for the small and medium-sized firms considered in previous studies, where housebank relationships tend to be less important and shorter.¹⁶ As shown by Table 6 in the Appendix, the housebank relationship is mostly as old as the firm in all age

¹⁶ For comparison with the descriptive statistics of other studies, see Menkhoff et al. (2006, Table 2). While the previous studies usually measure the duration of all lending relationships, our duration variable refers only to housebank relationships, which are held in most cases.

classes (highest frequencies in the diagonal). Newly founded and young firms often have a housebank relationship, which already existed before their foundation (frequencies above the diagonal). This shows the simultaneous use of the housebank relationship for business and private financial needs and the high 'bank loyalty' of retail customers common in the financial system of Germany.

Third, as bank-specific variables we consider the housebank's type and rating. The bank type variable indicates to which of the three banking groups in the German banking market (private banks, cooperative banks, savings banks) the borrower's housebank belongs. In contrast to the nation-wide operating big private banks, the savings banks and cooperative banks are small, local banks. In the present sample, 61% of the professionals have a housebank relationship with a savings bank or a cooperative bank and 39% have a housebank relationship with a big private bank. This confirms our expectation that small, regional banks are important for the financing of professionals. The housebank's rating is included to test hypothesis H4. We assume that a bad rating involves a higher risk of premature termination of the bank–customer relationship.

Fourth, going beyond most previous studies (see Table 1),¹⁷ we include loan-specific variables

¹⁷ Table 1 only reports the independent variables used by most of the previous studies. Loan-specific variables are also included by Neuberger et al. (2006).

(maturity, credit volume, collateral, loan type, credit availability) as proxies for credit risk, loan demand or credit rationing. It is expected that credit risk increases with the duration and volume of the loan, and that it depends on the type of the loan granted and its collateralization. Investment credits tend to imply a higher credit risk than overdrafts and mortgage credits. They are typically larger and of longer duration than overdrafts, which are used temporarily to smooth cash-flow variability. In contrast to mortgage credits, investment credits are not necessarily collateralized by real estate. Since they are used to finance business investments, they are directly related to the risk resulting from a professional's activities. In the present sample, 75% of the respondents have an overdraft, 44% have an investment credit and 36% have a mortgage credit. The average maturity of investment credits is 10 years. We use their volume (measured in six size classes) as a measure of loan demand. About 73% of the investment credits have a volume below EUR 250,000, and 84% are collateralized, mostly to a high degree.¹⁸ This is consistent with previous studies that show a high incidence and volume of collateral especially for loans to smaller firms (Cowling 1999; Menkhoff et al. 2006). We also asked for the reasons why a loan was obtained without collateral. In most of these 16% of all cases, this was explained by the existence of a close personal contact with the housebank. This indicates that monitoring by the housebank and collateral are two important mechanisms to reduce credit risk of professionals. However, our question about the degree of collateral was not answered in a sufficient number of cases, so that we could not use the collateral volume as an explanatory variable. Rather, we use a dummy variable indicating whether the firm must pledge collateral for its investment credits. The variable 'credit availability' indicates whether the professional has chosen multiple bank relationships to overcome credit constraints.

Our fifth variable group 'market structure and regulation' includes a proxy for the change of the

¹⁸ In the present sample, investment credits are not only collateralized by real estate (63% of the cases), but also by transfer of property by way of security (25% of the cases), assignment of claims (20% of the cases) and personal guarantees (20% of the cases).

regulatory framework implied by the Basle II rules. At the time of our survey, especially small firms feared that the implementation of the new capital rules of the Basle II accord would cause credit restrictions by inducing banks to introduce risk adjusted pricing or to restructure their portfolios away from small business finance.¹⁹ The variable "Basle II" is a measure for the awareness of the professionals of this problem and thus their possible expectations about credit restrictions. We used it to test H4. Bank market structure is measured by the number of banks in the vicinity of the borrowing firm and by the distance to the housebank. Local banking market concentration is presumed to be the higher the lower the number of banks in the borrower's vicinity and the longer the distance the borrower must travel to his or her housebank.

Table 3 summarizes the hypotheses to be tested, the independent variables and the expected relationships.

5 Regression results and discussion

The hypotheses are tested by linear OLS estimations. The correlation matrix of regressors is shown in Table 7 (see Appendix). After conducting a *White*-test,²⁰ heteroscedasticity could be excluded for all estimations. The empirical results are reported in Table 4. The number of bank relationships, the size and the age of the firm are taken in logarithmic form. To find out the key determinants of the number of bank relationships, we perform six specifications. Sequentially, we include the firm-specific variables (models I and II), the duration of the relationship (model III), the housebank variable and bank rating variable (model IV), loan maturity, loan volume and collateral (model V) and all remaining variables (model VI).

Firm size and age show a positive influence on the number of bank relationships, which is significant in all, respectively the first four specifications. This

¹⁹ At the time of our survey, the possible advantage of the Basle II rules for small firms, given by lower bank capital requirements for the retail portfolio, had not been discussed yet. For recent research on the effects of the Basle II reform on retail credit markets, see Claessens et al. (2005) and the remaining papers in the respective special issue of the Journal of Financial Services Research.

²⁰ See Greene (2000, pp. 508) and Hackl (2004, pp. 174).

Table 3 Overview of hypotheses and expected signs

Hypothesis		Independent variables	Expected sign
H1	Informationally opaque firms hold only one to few banking relationships.	Size	Positive
		Age	Positive
		Innovation	Negative
		Monitoring	Negative
		Visit	Negative
H2	The number of banking relationships increases with firm size, demand for financial services and credit risk.	Size	Positive
		Age	Negative
		Credit volume	Positive
		Maturity	Positive
		Collateral	Negative
		Investment credit	Positive
		No financial squeeze	Negative
		Finance_bank	Positive
		Industry	Positive/negative
H3	The number of banking relationships is lower if the customer's housebank is small or specializes on relationship lending.	Bank_type	Positive/negative
		Housebank	Negative
		Duration	Negative
		Monitoring	Negative
		Visit	Negative
H4	The number of banking relationships increases with actual or likely credit restrictions at the housebank.	Credit availability	Positive
		Rating_hb	Positive
		Basle II	Positive
H5	The number of banking relationships decreases with local banking market concentration.	Banks_vicinity	Positive
		Distance	Negative

Dependent variable: number of bank relationships

supports hypothesis H1 under the presumption that small and young firms are more opaque than larger and older firms. Another explanation for the size effect is that, according to H2, larger firms need more financial services or larger loans which they may obtain at more competitive terms from several banks. Moreover, larger professionals may wish to offer a larger number of bank connections as a service to their larger customer base. The other firm-specific variables that are proxies for credit risk show no significant impact. This may be due to the low credit risk of these enterprises because of their small size, unlimited liability and the use of private assets as collateral. Since professionals belong to the services sector with low innovative activity, the insignificant influence of the innovation variable is not surprising.

Neither the duration nor the strength of the housebank relationship nor the variables visit and monitoring show a significant influence on the number of bank relationships. The influence of the housebank's type is as expected, but not significant. Thus, we find neither support for H3 nor for the hold-up hypothesis. This may be due to the prevalence of relationship lending with a high loyalty of the professionals to their housebank.

A worse rating of the housebank increases the number of bank relationships, but significantly only in model VI. Even if this finding is in line with the prediction of H4, it is unlikely to be due to the fear of bank insolvency in the highly stable banking market of Germany. A more plausible explanation is that a rating is also a measure for service quality, i.e.,

Table 4 Regression results (OLS). Dependent variable: LN (number of bank relationships)

	(I) N = 208	(II) N = 199	(III) N = 197	(IV) N = 178	(V) N = 102	(VI) N = 97
Constant	0.1968 (2.2277)**	0.2379 (1.7148)*	0.2532 (1.8285)*	0.1602 (0.7519)	0.5355 (1.2521)	0.1126 (0.2314)
<i>Firm characteristics</i>						
LN (size)	0.1424 (3.8796)***	0.1222 (2.8768)***	0.1422 (3.2226)***	0.1622 (3.4607)***	0.2368 (3.2556)***	0.2252 (2.8779)***
LN (age)	0.1384 (3.9281)***	0.1410 (3.8118)***	0.1290 (2.8613)***	0.1376 (2.9425)***	0.1189 (1.5871)	0.0772 (0.9724)
No financial squeeze		0.0353 (0.5037)	0.0401 (0.5732)	0.0220 (0.3052)	-0.0641 (-0.6650)	0.0253 (0.2256)
Finance_bank		0.1194 (1.6202)*	0.1035 (1.4013)	0.0921 (1.2167)	0.0931 (0.7481)	0.0970 (0.7029)
Innovation		-0.0292 (-0.7630)	-0.0296 (-0.7764)	-0.0222 (-0.5568)	-0.0167 (-0.3001)	-0.0132 (-0.2212)
<i>Relationship characteristics</i>						
Duration		0.0003 (0.0940)	0.0003 (0.0940)	0.0000 (0.0065)	-0.0046 (-0.8964)	-0.0021 (-0.3908)
Housebank				-0.0059 (-0.1518)	0.0761 (1.3175)	0.0721 (1.2077)
Visit						-0.0644 (-0.3006)
Monitoring						-0.0101 (-0.0683)
<i>Bank characteristics</i>						
Rating_hb				0.0073 (0.4353)	0.0320 (1.3397)	0.0647 (1.6254)*
<i>Bank_type</i>						
Private bank						0.0584 (0.3820)
Cooperative bank						-0.0750 (-0.3200)
<i>Loan characteristics</i>						
Maturity					0.0025 (0.2569)	0.0029 (0.2951)

Table 4 continued

	(I) N = 208	(II) N = 199	(III) N = 197	(IV) N = 178	(V) N = 102	(VI) N = 97
Constant	0.1968 (2.2277)**	0.2379 (1.7148)*	0.2532 (1.8285)*	0.1602 (0.7519)	0.5355 (1.2521)	0.1126 (0.2314)
<i>Credit volume</i>						
Up to EUR 10,000					-0.1245 (-0.2474)	-0.4275 (-0.8278)
EUR 10,000–50,000					-0.5220 (-2.4703)**	-0.4641 (-2.1639)**
EUR 50,000–100,000					-0.5012 (-2.4964)**	-0.5391 (-2.6283)**
EUR 100,000–250,000					-0.4664 (-2.3523)**	-0.4714 (-2.4124)**
EUR 250,000–500,000					-0.6053 (-2.9417)**	-0.6612 (-3.1530)**
Collateral					-0.1608 (-0.9898)	-0.1150 (-0.6684)
Investment credit						-0.0558 (-0.4993)
Credit availability						0.2540 (2.3241)**
<i>Market structure and regulation</i>						
Basle II						0.1231 (1.2244)
Banks_vicinity						0.0016 (0.1889)
Distance						-0.0005 (-0.1450)
Industry		n.sig.	n.sig.	n.sig.	n.sig.	n.sig.
R ²	0.1713	0.1879	0.1952	0.2215	0.3525	0.4525
Adjusted R ²	0.1633	0.1537	0.1564	0.1699	0.2121	0.2382
F-test	21.201***	5.4965***	5.0404***	4.2945***	2.5107***	2.1122***

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level

professionals choose additional bank relationships when their housebank provides low service quality.

The included loan volume classes all have negative, mostly significant regression coefficients relative to the reference class of the largest loans. This implies that borrowers with larger loans hold more bank relationships than those with smaller ones. This finding is in line with H2, a higher loan volume being a proxy for higher loan demand or credit risk. It may also be consistent with the hold-up hypothesis, if larger loans are more costly than smaller loans in the case of a lock-in by the relationship bank, inducing the borrower to choose multiple banking relationships to obtain loans at more competitive terms. However, this argument has not been supported by previous evidence, which showed a negative influence of loan size on loan rates (D'Auria et al. 1999, Elsas and Krahen 1998, Machauer and Weber 1998).

The credit availability variable shows a significant positive influence. Consistent with H4, professionals choose a higher number of bank relationships to overcome actual credit restrictions. This may reflect credit rationing due to high information opacity. Since the professionals' credit risk tends to be low and does not seem to be relevant for the number of banking relationships, we cannot conclude that it is the risky borrowers who hold more bank relationships to overcome credit rationing. Because of the information opacity and prevalence of close housebank relationships, it is likely that restrictions in credit availability go along with non-competitive interest rates or collateral claims because of hold-up. Previous studies on SME finance in Germany found a significant positive impact of the incidence of a housebank relationship on collateralization in line with the lock-in hypothesis (Elsas and Krahen 2002; Lehmann and Neuberger 2001; Machauer and Weber 1998).

The other loan-specific variables do not contribute significantly to the explanation of the number of banking relationships. This may again be explained by the low credit risk of professionals due to unlimited liability and provision of collateral. Also the variables of market structure and regulation have no significant impact. Thus, we cannot conclude that professionals who are informed about the Basle II rules choose significantly more bank relationships to insure themselves against a credit rationing after the

implementation of these rules. Neither the number of banks in the vicinity nor the distance to the housebank is relevant for a professional's decision to hold multiple banking relationships. Technological change in telecommunication has increased the ability of SMEs to hold relationships with remote banks. Also professionals in Germany use online banking, even still to a small extent. However, this does not imply that distance is irrelevant for the provision of relationship banking services to microenterprises.

To test the robustness of our OLS results, we also estimated a Poisson model, which measures the occurrence probability. This method should be applied to count data, if the count variable takes on the value zero for a nontrivial fraction of the population (Wooldridge 2002, p. 645). Since this does not apply to the count data in our sample, we preferred the OLS method. Moreover, a comparative study of models for analyzing count data showed that the Poisson regression yielded more Type I errors than the OLS regression, which is not overly sensitive to false positives (Sturman 1999). The results of the Poisson regression are given in Table 8 in the Appendix. They are qualitatively nearly identical to those of Table 4. The signs of the regression coefficients remain the same.

6 Summary and conclusion

The present paper tried to identify determinants of the number of bank relationships held by professionals as special microenterprises. It tested theoretically derived hypotheses on the number of bank relationships and aimed to investigate whether and why bank relationships of professionals differ from those of other firms. After a review on the theoretical and empirical literature about the number of bank relationships of SMEs, we discussed the particular characteristics of professional activities and conducted OLS and Poisson estimations using data from a recent survey among professionals in Germany. This is the first attempt to investigate the number of bank relationships of this group of enterprises. Going beyond previous studies for SMEs, we tested the influence of characteristics of the loans granted on the number of banking relationships.

Our main results are as follows. First, the firms in our sample hold on average about two banking relationships. This corresponds to the information-theoretic one-to-few hypothesis and previous evidence for micro and small enterprises. Because these firms tend to be characterized by high information opacity, they benefit most from being monitored in a close housebank relationship. The unanimous finding of previous studies indicate that the number of bank relationships is increasing in firm size and age also holds for our sample.

Second, direct proxies for credit risk do not matter significantly. This is contrary to the results of a previous study on micro and small firms in Germany (Harhoff and Körting 1998b). An explanation is that professionals tend to have low credit risk, because they are small, have a legal form with unlimited liability, and provide business and personal assets as collateral.

Third, professionals tend to hold a larger number of banking relationships if they need more or larger loans. This supports the hypothesis that the number of banking relationships is driven by the firm's loan demand and restrictions in credit availability. We expect that this holds in particular for professionals, which are prone to credit rationing due to their high information opacity. They have to provide professional expertise and managerial know-how, which are intangible assets, whose quality is difficult to assess by external financiers. However, we cannot compare these results with those for other microenterprises or larger firms, because the influence of the loan volume and credit restrictions has not been directly tested in previous studies. Thus, we cannot tell whether the results are special for the case of professionals.

Fourth, professionals rely on relationship lending with a long-term relationship to their housebank,

which is the dominant form of small business finance in Germany. The strength and duration of the housebank relationship do not influence their decision to hold additional bank relationships. Thus, we do not find support for the hold-up theory, upon which the previous evidence is mixed. Microenterprises do not seem to choose multiple banking relationships to obtain cheaper loans, but to obtain more or larger loans, because their credit availability is restricted at a single bank.

Fifth, we do not find evidence for a supply-side determination of the number of bank relationships. The number of bank relationships held by a professional enterprise does neither depend on the type of its housebank, nor on changes in bank regulation, nor on local banking market concentration. As an important regulatory change, we considered the introduction of the Basle II rules, which was expected to increase credit rationing of SMEs. However, these expectations did not induce a higher number of bank relationships in our sample.

In sum, these findings are consistent with credit rationing theory. Because of the scarcity of comparable studies for microenterprises, we cannot draw conclusions on whether our results are typical for this firm size or whether they are due to the particular characteristics of professional activities. Finally, the special features of the German financial system, with small firm finance through long-term fixed-rated loans provided by the housebank, call for caution in applying conclusions arising from this study to other countries. Obviously, more research has to be done to explain the financing of professionals and other microenterprises in distinct environments.

Acknowledgments We are grateful to Robert Hauswald and two referees for helpful suggestions and comments

Appendix

Table 5 Distribution of firm size per industry

Employees	Industry			
	Medicative	Consulting	Scientific-technical	Cultural
Up to 1 employee	9.1 (7)	23.7 (18)	34.0 (18)	77.8 (7)
2-3 employees	19.5 (15)	26.3 (20)	37.7 (20)	22.2 (2)
4-5 employees	35.1 (27)	6.6 (5)	15.1 (8)	0.0 (0)
6-9 employees	22.1 (17)	15.8 (12)	11.3 (6)	0.0 (0)
More than 10 employees	14.3 (11)	27.6 (21)	1.9 (1)	0.0 (0)
Sum	100.0 (77)	100.0 (76)	100.0 (53)	100.0 (9)

Percentages, number of observations in parantheses

Table 6 Relation between duration of housebank relationship and firm age

Firm age (in years)	Duration of housebank relationship (in years)			
	0-2	3-7	8-10	More than 10
0-2	58.3 (7)	8.7 (4)	3.7 (1)	3.0 (4)
3-7	25.0 (3)	63.0 (29)	11.1 (3)	9.1 (12)
8-10	0.0 (0)	10.9 (5)	63.0 (17)	8.3 (11)
More than 10	16.7 (2)	17.4 (8)	22.2 (6)	79.5 (105)
Sum	100.0 (12)	100.0 (46)	100.0 (27)	100.0 (132)

Percentages, number of observations in parantheses

Table 7 Correlation matrix of regressors

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1 Size	1.00																										
2 Age	0.31	1.00																									
3 Up to 10,000 €	-0.13	-0.14	1.00																								
4 10,000–50,000 €	-0.21	0.00	-0.11	1.00																							
5 50,000–100,000 €	0.15	-0.01	-0.12	-0.30	1.00																						
6 100,000–250,000 €	-0.02	-0.06	-0.12	-0.28	-0.32	1.00																					
7 250,000–500,000 €	0.12	0.05	-0.11	-0.27	-0.30	-0.28	1.00																				
8 Maturity	-0.10	-0.07	-0.11	-0.15	-0.13	0.07	0.25	1.00																			
9 Medicative	0.04	-0.06	-0.19	-0.30	-0.10	0.14	0.36	0.23	1.00																		
10 Cultural	-0.14	-0.04	-0.04	0.22	-0.10	0.01	-0.09	-0.05	-0.20	1.00																	
11 Science	-0.22	0.02	0.14	0.09	0.15	-0.10	-0.20	-0.01	-0.42	-0.15	1.00																
12 No financial squeeze	0.07	-0.06	-0.03	-0.18	0.08	0.09	0.00	0.05	0.04	-0.10	-0.01	1.00															
13 Innovation	0.02	0.06	0.05	-0.10	0.04	-0.05	0.09	0.11	0.05	0.04	-0.04	0.01	1.00														
14 Duration	0.06	0.46	-0.13	0.03	0.12	-0.08	-0.08	-0.01	-0.09	0.00	0.21	-0.01	0.08	1.00													
15 Rating_hib	-0.12	-0.06	0.12	0.03	-0.02	-0.11	0.13	-0.09	0.02	0.07	-0.05	-0.05	0.13	-0.13	1.00												
16 Private bank	-0.08	-0.03	0.07	-0.09	0.06	0.12	-0.12	-0.16	-0.14	0.01	0.01	0.10	-0.04	-0.17	-0.05	1.00											
17 Cooperative bank	-0.06	-0.07	0.01	-0.06	-0.08	-0.20	0.39	0.19	0.29	0.03	-0.18	-0.05	0.11	-0.11	0.71	-0.50	1.00										
18 Housebank	0.04	-0.04	0.01	-0.09	-0.04	0.14	-0.01	0.10	-0.10	0.00	0.04	0.17	0.02	-0.03	-0.15	0.17	-0.21	1.00									
19 Distance	-0.01	-0.04	-0.08	0.00	-0.14	-0.03	0.26	0.10	0.11	-0.08	-0.11	0.04	-0.03	-0.12	-0.01	0.10	0.13	0.17	1.00								
20 Vicinity	0.16	0.02	-0.05	-0.01	-0.04	-0.12	0.19	0.18	-0.04	-0.10	-0.04	0.03	0.09	-0.01	0.05	-0.02	0.11	-0.07	-0.03	1.00							
21 Basle II	0.21	0.09	-0.04	-0.12	-0.06	0.11	0.05	-0.05	-0.12	-0.07	-0.04	0.14	0.05	-0.07	0.05	0.08	-0.03	0.13	0.02	0.01	1.00						
22 Credit availability	0.05	0.09	0.13	0.05	-0.07	-0.14	0.09	-0.01	0.00	-0.14	-0.03	-0.36	-0.03	0.01	-0.13	-0.02	-0.10	-0.16	-0.06	0.06	-0.07	1.00					
23 Visit	0.06	0.02	-0.06	-0.14	0.22	-0.09	-0.01	-0.11	0.11	-0.06	-0.02	-0.03	-0.04	-0.07	0.13	0.10	0.01	-0.08	0.03	-0.03	0.03	0.02	1.00				
24 Monitoring	-0.07	-0.14	-0.09	0.08	-0.01	0.01	0.03	-0.03	0.13	-0.04	-0.01	-0.14	-0.11	-0.14	0.13	-0.06	0.11	-0.09	0.11	-0.04	-0.06	-0.07	0.33	1.00			
25 Finance_bank	0.14	0.06	-0.05	-0.05	-0.11	-0.06	0.20	0.02	0.22	-0.16	-0.07	-0.30	-0.07	-0.01	-0.04	-0.12	0.09	-0.17	0.05	0.04	-0.06	-0.06	0.36	0.10	0.18	1.00	
26 Investment credit	0.14	0.03	-0.22	-0.10	-0.05	0.05	0.19	0.01	0.35	-0.23	-0.17	-0.04	-0.06	-0.04	0.02	-0.08	0.17	-0.20	0.08	0.09	0.07	0.11	0.16	0.18	0.48	1.00	
27 Collateral	-0.17	0.14	-0.28	-0.29	0.06	0.11	0.20	0.23	0.30	-0.07	0.04	0.07	0.02	0.08	0.01	0.08	0.12	0.04	0.05	-0.02	0.09	-0.05	0.10	0.09	0.10	0.29	1.00

Table 8 Regression results (Poisson)

	(I) N = 208 0.2739 (1.9008)**	(II) N = 199 0.3951 (1.8458)*	(III) N = 197 0.4132 (1.9359)**	(IV) N = 178 0.3951 (1.2156)	(V) N = 102 0.7982 (1.3211)	(VI) N = 97 0.2457 (0.3373)
<i>Firm characteristics</i>						
LN (size)	0.1259 (2.3767)**	0.1063 (1.7282)*	0.1252 (1.9611)**	0.1451 (2.0944)**	0.2037 (1.8106)*	0.1874 (1.4783)
LN (age)	0.1573 (2.8729)****	0.1587 (2.7961)****	0.1297 (1.8769)*	0.1336 (1.8305)*	0.0866 (0.7460)	0.0516 (0.4215)
No financial squeeze	-0.0108 (-0.1041)	-0.0108 (-0.1041)	-0.0083 (-0.0810)	-0.0258 (-0.2392)	-0.0638 (-0.4420)	0.0069 (-0.0405)
Finance_bank	0.0780 (0.7131)	0.0780 (0.7131)	0.0643 (0.5848)	0.0434 (0.3757)	0.0542 (0.2846)	0.0047 (0.0214)
Innovation	-0.0420 (-0.7352)	-0.0420 (-0.7352)	-0.0433 (-0.7580)	-0.0390 (-0.6400)	-0.0202 (-0.2460)	-0.0043 (-0.0470)
<i>Relationship characteristics</i>						
Duration			0.0027 (0.5361)	0.0026 (0.5017)	0.0003 (0.0419)	0.0013 (0.1566)
Housebank				-0.0238 (-0.4034)	0.0525 (0.6135)	0.0531 (0.5641)
Visit						-0.0727 (-0.2147)
Monitoring						-0.0259 (-0.1037)
<i>Bank characteristics</i>						
Rating_hb				0.0033 (0.1324)	0.0291 (0.8132)	0.0808 (1.3085)
<i>Bank_type</i>						
Private bank						-0.0084 (-0.0359)
Cooperative bank						-0.1751 (-0.4799)
<i>Loan characteristics</i>						
Maturity					-0.0047 (-0.3192)	-0.0041 (-0.2578)

Table 8 continued

	(I)	(II)	(III)	(IV)	(V)	(VI)
Constant	N = 208 0.2739 (1.9008)**	N = 199 0.3951 (1.8458)*	N = 197 0.4132 (1.9359)**	N = 178 0.3951 (1.2156)	N = 102 0.7982 (1.3211)	N = 97 0.2457 (0.3373)
Credit volume						
Up to EUR 10,000					-0.2353 (-0.2915)	-0.5491 (-0.6461)
EUR 10,000–50,000					-0.5243 (-1.9216)**	-0.4930 (-1.7265)*
EUR 50,000–100,000					-0.5539 (-2.2009)**	-0.6051 (-2.2166)**
EUR 100,000–250,000					-0.4906 (-1.9513)**	-0.5256 (-2.0384)**
EUR 250,000–500,000					-0.5807 (-2.211)**	-0.6429 (-2.3394)**
Collateral					-0.1016 (-0.4248)	-0.0562 (-0.2153)
Investment credit						-0.0164 (-0.0967)
Credit availability						0.3246 (1.8278)*
<i>Market structure and regulation</i>						
Basle II						0.1162 (0.7202)
Banks_vicinity						-0.0007 (-0.0515)
Distance						0.0001 (0.0132)
Industry						n.sig.
R ²	0.1487	n.sig. 0.1657	n.sig. 0.1728	n.sig. 0.1910	n.sig. 0.3388	n.sig. 0.4811
Adjusted R ²	0.1404	0.1306	0.1330	0.1374	0.1955	0.2781
Log-likelihood	-321.743	-307.311	-304.016	-274.198	-158.057	-147.228

Dependent variable: number of bank relationships

*** Significance at 1% level. ** Significance at 5% level. * Significance at 10% level

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