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# Microenterprises and Multiple Bank Relationships:

# Evidence from a Survey among Professionals

by

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# Microenterprises and Multiple Bank Relationships:

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*Abstract*

An overview of previous evidence about relationship banking to SMEs shows that multiple banking relationships prevail even at small firms, but there is hardly evidence on the number of banking relationships held by micro firms. To close this gap, we use data from a survey conducted among professionals in Germany in 2002. Being self-employed persons acting in the services sector, professionals are mostly informationally opaque micro firms. To explain the number of their banking relationships, 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 the theory of asymmetric information, we find that these firms hold a small number of bank relationships, which increases in firm size and age. An increase in the duration or importance of the housebank relationship does not induce multiple banking relationships as predicted by the hold-up theory. Professionals rather tend to hold multiple banking relationships to increase their credit availability and finance larger loans. The type of the housebank and local banking market concentration do not seem to matter. All in all, the results indicate that multiple bank relationships help to overcome credit rationing.

JEL Code: G21, G32

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# 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/Smith, 2000b, Qian/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 relationships may not only be an indicator of the incidence of a housebank relationship (Elsas, 2005), but also of borrower quality and size (Machauer/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 micro, small and medium-sized enterprises (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 mainly in the services sector. Under the regulatory environment given in

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[1]  For surveys see Boot (2000), Ongena/Smith (2000a) and Elyasiani/Goldberg (2004).
[2]  See Ongena/Smith (2000b), Guiso/Minetti (2004), Cosci/Meliciani (2002), Detragiache et al. (2000), Machauer/Weber (2000), Harhoff/Körting (1998b), Ziane (2003), Degryse/Ongena (2001) Berger et al. (2001), Berger et al. (2005), Yu/Hsieh (2003), Fok et al. (2004), Ogawa et al. (2005).

Germany, they have to prove their professional qualification, but are not obliged to register their business. 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.

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 presents the hypotheses to be tested. Section 3 describes the data used and the measurements of the variables. The econometric results are presented in section 4. Section 5 concludes.

## 2. Theory and Empirical Evidence on the Number of Bank Relationships

### 2.1 Theory and Hypotheses

Theoretical explanations of the optimal number of bank relationships differ with respect to the motives for multiple banking relationships both on the side of the borrowing firms and the banks.[3] They yield hypotheses about the influence of characteristics of the firm and its loans, of the bank-borrower relationship and of the bank and the banking market on the number of bank relationships.

A first class of arguments is based on cost minimization within the theory of asymmetric information. According to Diamond's delegated monitoring model, a single bank relationship is most efficient when a firm borrows once, because it minimizes monitoring costs (Diamond, 1984). Especially risky, informationally opaque firms benefit from an exclusive banking relationship, because credit availability is improved through the housebank's[4] accumulation of information about borrower quality (Petersen/Rajan, 1995). In the case of repeated lending by the same bank, the terms of lending may improve after a successful completion of the project (Boot/Thakor, 1994). Moreover, a housebank relationship provides a kind of liquidity insurance, which eases financing constraints of SMEs. In a single banking relationship, there are no problems of free riding that are likely to impede an efficient renegotiation in the case of multiple lenders. The borrower is insured 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, 2005).[5] On the other hand, a lending relationship to a single bank is likely to ease the financing of inefficient projects due to a soft budget constraint (Dewatripont/Maskin, 1995) or may induce the manager to strategically default the project (Bolton/Scharfstein 1996). The resulting agency costs could be reduced by coordinating with multiple lenders. Bolton and Scharfstein (1996) determine the optimal number of lenders that balances the benefits of deterring strategic defaults against the costs of realizing a low liquidation value in a liquidity default. They predict that a larger number of banking

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[3]    For a recent overview see Ogawa et al. (2005).
[4]    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).
[5]    For empirical evidence see Brunner und Krahnen (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/Rajan (1994) find that a larger number of creditors worsens the terms of credit and increases the cost of financial distress to small firms.

relationships signals higher borrower quality. The reverse prediction follows from Bannier (2005) and Carletti (2004). Bannier (2005) shows that a heterogeneous multiple bank relationship, where a housebank is combined with several arm's length lenders, is advantageous for financially distressed borrowers. It combines the advantage of a housebank to reduce the likelihood of an inefficient liquidation with the improvement of credit availability by arm's length lenders. Carletti (2004) analyzes 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, the firm's private benefit and expected profitability.

Another aspect of cost minimization concerns the 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 that invests to a large extent 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/Ruckes, 2004).

The above arguments yield hypotheses about the influence of firm-specific variables on the number of bank relationships. The main prediction can be broadly formulated as follows:

> H1: The number of banking relationships decreases with the riskiness and information opaqueness of the firm and its loans.

The arguments about benefits of single bank relationships hold for the case that the borrower needs a one-shot finance. Models of repeated lending show that an inside bank may use its superior information to hold-up borrowers since outside investors face a winner's curse and would be reluctant to extend loans to the firm (Sharpe, 1990; Rajan, 1992). When commitment contracts cannot be written, firms have an incentive to develop multiple banking relationships to save hold-up costs arising from this lock-in in future loan contracts (Jean-Baptiste, 2005). 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 for firms with low expected

cash-flow. The implication is that firms should maintain, at most, only a few bank relationships ('one-to-few' hypothesis). Since the lock-in increases with the duration of the relationship, we expect that firms hold the more banking relationships the longer the relationship to their housebank is. Combined with the above discussed benefits of exclusive housebank relationships, our hypotheses concerning the role of the intensity of the bank relationship can be summarized as follows:

H2: The number of banking relationships decreases with the importance of the housebank relationship, and increases with its duration.

While informationally opaque firms thus seem to benefit from a low number of banking relationships, other firms may need multiple banking relationships because a single bank cannot provide all their financing needs. This restriction of credit availability may be expected to occur when the firm is large, complex, and geographically dispersed, while its housebank is too small to diversify the firm's risk, has not sufficient expertise to satisfy its demand or does not have offices in all the localities where the firm needs services (Berger et al. 2005, p. 8). Multiple banking relationships may also be motivated by a risk sharing or cross selling by the bank (Cosci/Meliciani 2002, p. 39). Carletti et al. (2004) explain why banks may prefer to share lending particularly to SMEs even if this implies free-riding and duplication of monitoring efforts. They predict a greater use of multiple-bank lending when banks are small relative to investment projects, firms are less profitable and monitoring costs are high. Thus, we hypothesize

H3: The number of banking relationships increases with the firm's loan demand and restrictions in credit availability.

Detragiache et al. (2000) show that multiple banking relationships are advantageous even for small and young firms, if banks are subject to exogenous shocks that may cause premature termination of the relationships with their customers. Such shocks may result from liquidity problems due to withdrawals of bank deposits, bank failures in a fragile environment, but also regulatory changes 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 the likelihood of future credit restrictions at the housebank.

The number of bank relationships may be affected by further supply-side variables of the banking market. Small banks in the local banking market have an advantage in gathering and verifying soft information about small and risky borrowers, compared to large banks.[6] Jean-Baptiste (2005) predicts that firms that borrow from small 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. Thus, we expect

> H5: The number of banking relationships is lower if the borrower's housebank is a small, local bank.

Consolidation of banks and technological change tend to reduce the importance of exclusive housebank relationships. Large banks are likely to reduce their small business lending after consolidation, because small, local banks have a comparative advantage in providing relationship lending services (Berger/Udell, 2003).[7] Since technological change has eased the ability to lend to small firms at a distance (Petersen/Rajan, 2002), out-of-market lending to small firms in local markets increased substantially in recent years (Hannan, 2003). If, however, distance between borrower and lender still 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. Thus, we expect

> H6: The number of banking relationships decreases with local banking market concentration.


## 2.2 Empirical Evidence

In the empirical literature on relationship lending, the number of bank relationships has been often treated as an exogenous variable to test the influence of a close bank-borrower relationship on credit availability and the terms of lending.[8] Studies about the impact of the banking arrangement on firm performance have recently begun to look at the two-way correspondance between the number of banking relationships and firm profitability, examining the determinants of both variables (Degryse/Ongena 2001, Fok et al. 2004). The

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[6]    For empirical evidence see Carter et al. (2004).

[7]    Evidence of a specialization of small banks on small business lending has been provided among others by Akhavein et al. (2004), Berger et al. (2001), Jayaratne/Wolken (1999) and  Strahan/Weston (1998). For an overview of the empirical literature on this and on consolidation effects see Akhavein et al. (2004) and Carter et al. (2004).

[8]    See Petersen/Rajan (1994), Cole (1998), Harhoff/Körting (1998a), Machauer/Weber (1998), Ongena/Smith (2000a), Elsas/Krahnen (2002), Shin/Kolari (2004).

first studies that regressed the number of bank relationships on a broader set of independent variables have been undertaken by Ongena and Smith (2000b) for a cross section of 20 European countries, by Detragiache et al. (2000) for SMEs in Italy and by Harhoff/Körting (1998b) and Machauer/Weber (2000) for SMEs in Germany. They have induced recent studies for the U.S. (Guiso/Minetti 2004), Italy (Cosci/Meliciani 2002), France (Ziane 2003), Argentina (Berger et al. 2001), Taiwan (Yu/Hsieh 2003, Fok et al. 2004), India (Berger et al. 2005), Japan (Ogawa et al. 2005) and a cross section of 60 countries (Qian/Strahan 2005).

The descriptive statistics of the various data sets show that small firms tend to maintain fewer banking relationships than large firms. However, there is a large variation in the average number of bank relationships which cannot only be explained by the size of firms within a country, but also by differences in legal protection of creditors and the enforcement of contracts (Qian/Strahan 2005, Ongena/Smith 2000a).[9] In line with the 'one-to-few' hypothesis, SMEs in Germany (Harhoff/Körting, 1998a, 1998b, Hommel/Schneider, 2003), the US (Petersen/Rajan, 1994, Berger/Udell 1995), Norway (Ongena/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/Melisciani 2004) and for medium and larger firms in most countries.[10]

An overview of the results of comparable regressions which seek to explain the number of bank relationships in single countries is given in table 1.

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[9] While firms in the U.K., Norway and Sweden maintain fewer than three bank relationships on average, firms in Italy, Portugal, Belgium and Spain maintain on average ten or more bank relationships (Ongena/Smith 2000a).

[10] For an overview see Ongena/Smith (2000a, pp.243). Medium and larger firms typically hold more than three bank relationships in Germany (Elsas/Krahnen 1998, Machauer/Weber 2000), Argentina (Berger et al. 2001), Taiwan (Yu/Hsieh 2003, Fok et al. 2004), India (Berger et al. 2005) and the majority of 20 European countries (Ongena/Smith, 2000b).

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

| | Guiso/ Minetti (2004) | Detragia-che et al. (2000) | Cosci/ Meliciani (2002) | Harhoff/ Körting (1998b) | Machauer/ Weber (2000) | Degryse/ Ongena (2001) | Ziane (2003) | Berger et al. (2001) | Fok et al (2004) | Yu/Hsieh (2003) | Berger et al. (2005) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sample** | medium firms | small and medium firms | small and medium firms | micro and small firms | medium and large firms | publicly listed firms | small and medium firms | all firms | publicly listed firms | publicly listed firms | medium and large firms |
| *Country* | US | Italy | Italy | Germany | Germany | Norway | France | Argentina | Taiwan | Taiwan | India |
| *Method* | Probit | OLS | Neg. Binomial | (ordered) Logit | Poisson | Logit | Poisson | Logit | 2SLS | Logit | Probit/ Poisson |
| *Independent variables:* | | | | | | | | | | | |
| *Firm characteristics* | | | | | | | | | | | |
| size | | | | | | | | | | | |
| total assets (or loans) | $+^{***}$ | | $+^{***}$ | | $+^{***}$ | | | $+^{***}$ | $+^{***}$ | | |
| number of employees | | $+^{***}$ | $+^{**}$ | $+^{***}$ | | | $+^{***}$ | | | | |
| age | | $+^{***}$ | $+^{***}$ | $+^{***}$ | | $-^{***}$ | n. sig. | | n. sig. | n. sig. | n. sig. |
| credit risk/ fin. distress | n. sig. | | | $+^{**}$ | n. sig. | | | | | | |
| innovation | | | | $+^{*}$ | | | | | | | |
| leverage | | $+^{***}$ | $+^{***}$ | | $+^{***}$ | | $+^{**}$ | | n. sig. | $+^{***}$ | $+^{**}$ |
| delinquencies | $+^{***}$ | | | | | | | n. sig. | | | |
| credit rationing | | | | | | | $+^{**}$ | | | | |
| *Relationship characteristics* | | | | | | | | | | | |
| duration | $-^{***}$ | | | | $+^{***}$ | | $-^{**}$ | | | | |
| housebank | | | | | $-^{***}$ | | | | | | |
| ownership share | $+^{*}$ | | | | | | | | | | |
| *Banking market characteristics* | | | | | | | | | | | |
| bank size | | $-^{*}$ | | $+^{***}$ | | | | $+^{***}$ | | | |
| bank type | | | | | n. sig./$-^{***}$ | n. sig. | $+/-^{**}$ | | | $+/-^{***}$ | $+/-^{***}$ |
| bank fragility | | $+^{**}$ | | | | | $+^{***}$ | | | | |
| market concentration | | | | 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

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A unanimous finding is that the number of banking relationships increases with firm size and age.[11] This supports hypothesis H1, presuming that credit risk and information opacity are lower for larger and older firms. Inconsistent with H1, however, several risk proxies (financial distress, delinquencies, leverage, innovative activity) exert a positive influence on the number of banking relationships.

The positive influence of firm size on the number of banking relationship is also consistent with H3, assuming that larger firms need larger loans or a wider range of bank services than smaller ones. Leverage always exerts a positive influence on the number of bank relationships. This also supports H3, given that high leverage is a proxy for high loan demand or high credit risk which causes credit rationing at a single bank. However, the impact of loan demand and credit rationing according to H3 has not been directly tested so far. The previous studies neither include the loan volume nor a measure for 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 evidence about the influence of characteristics of the bank-borrower relationship is also mixed. For medium-sized firms in Germany, where the housebank relationship traditionally plays a large role, the significant effects of the relationship duration and the importance of a housebank (Machauer/Weber 2000) are consistent with H2. Recent studies for the US (Guiso/Minetti 2004) and France (Ziane 2003) find reverse effects of comparable variables (see table 1). However, using duration analysis, Farinha and Santos (2002) find for young firms in Portugal that the chance of substituting a single banking relationships 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.

To test the influence of expected restrictions of credit availability due to liquidity shocks (H4), several measures of the characteristics of the lending bank have been used (variables 'bank type' and 'bank fragility' in table 1). Evidence consistent with H4 has been found for

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

the emerging economies of Taiwan and India as well as for Italy and Argentina. Yu/Hsieh (2003) observe for Taiwan that government owned banks are viewed as the safest source of credit and hence, firms with single banking relationships will borrow from them first. Berger et al. (2005, p. 24) find for India that firms with state-owned banks and financially safe banks as their main bank have less need for additional bank relationships. For Italy (Detragiache et al. 2000) and Argentina (Berger et al. 2001), 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).

Evidence consistent with the bank size hypothesis H5 has been found by Harhoff/Körting (1998b) and Berger et al. (2001). The country studies reported in table 1 find no significant influence of local banking market concentration on the number of banking relationship. However, 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. This is consistent with H6.

All previous studies refer to small, medium and large firms (see table 1), with the exception of that of Harhoff and Körting (1998b) who examine also microenterprises (with a median number of employees equal to 10). None of the previous studies investigates the financing of professionals as microenterprises. Due to their small size and high information opaqueness, we expect that they are especially prone to credit rationing and hold only one to few bank relationships.

## 3. Data and Measurements

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. 230 professionals answered the questionnaire, implying a response rate of 3.8%.[12] 37% of the respondents belong to the medicative sector, 34% are business consultants, 25% are natural scientists and 4% belong to the cultural sector. This structure represents the actual industry structure of professionals in Germany well. 88% of the professionals in our sample are microenterprises with less than 10 employees. Nearly half of them have even not more than 3 employees. For 84% of the sample the turnover does not exceed EUR 500,000 and for 98% it does not exceed EUR 2.5 million. 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. The definition, measurements and main descriptive statistics of the variables are summarized in table 2.

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[12] 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.

**Table 2:** Definition, measurements and descriptive statistics of variables

| Dependent Variable | | Mean | Median |
|---|---|---|---|
| num_bank | number of bank relationships | 2.27 | 2.00 |
| **Firm characteristics** | | | |
| size | number of employees | 6.45 | 4.00 |
| age | age of the firm in years | 16.73 | 12.00 |
| 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 |
| | Cultural | 0.07 | 0.00 |
| | Natural Scientist | 0.24 | 0.00 |
| | Business consultant | 0.33 | 0.00 |
| finance_bank | Dummy indicating whether the firm is dependent on bank finance | 0.56 | 0.00 |
| 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 |
| no financial distress | Dummy indicating that the firm is not in financial distress | 0.46 | 0.00 |
| **Relationship characteristics** | | | |
| duration | Duration of the housebank relationship in years | 16.99 | 15.00 |
| housebank | Qualitative variable, indicating the importance of the housebank perceived by the firm, ranging from 1 (= very important) to 5 (= very unimportant) | 1.69 | 1.00 |
| **Bank characteristics** | | | |
| 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 |
| 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 |
| | cooperative bank | 0.28 | 0.00 |

| *Loan characteristics* | | | | |
|---|---|---|---|---|
| maturity | Maturity of the loan in years | | 9.73 | 10.00 |
| credit volume | Set of dummies indicating whether the volume of the loan is (1) up to EUR 10,000, (2) EUR 10,000 to 50,000, (3) EUR 50,000 to 100,000, (4) EUR 100,000 to 250,000, (5) EUR 250,000 to 500,000 and (6) more than EUR 500,000 | | | |
| | Up to EUR 10,000 | | 0.04 | 0.00 |
| | EUR 10,000 to 50,000 | | 0.21 | 0.00 |
| | EUR 50,000 to 100,000 | | 0.25 | 0.00 |
| | EUR 100,000 to 250,000 | | 0.23 | 0.00 |
| | EUR 250,000 to 500,000 | | 0.21 | 0.00 |
| investment credit | Dummy indicating whether the firm has an investment credit | | 0.44 | 0.00 |
| *Market structure and regulation* | | | | |
| Basle II | Dummy indicating whether the professional is informed about the new Basle II regulation | | 0.43 | 0.00 |
| banks_vicinity | number of banks not more than 5 kilometres afar from the firm | | 5.13 | 4.00 |
| distance_housebank | distance between firm and housebank in kilometres | | 13.44 | 2.00 |
| *Control variables* | | | | |
| credit availability | Dummy indicating whether the professional expects an increase in credit availability from multiple bank relationships | | 0.55 | 1.00 |
| visit | Dummy indicating whether the bank visits the professional | | 0.04 | 0.00 |
| monitoring | Dummy indicating whether the bank monitors the professional's monetary transactions | | 0.11 | 0.00 |

The variables of this study resemble standard variables from the literature on relationship lending. Our dependent variable is the number of bank relationships held. In the present sample its average is 2.27. This is consistent with the one-to-few hypothesis and similar to previous observations about the number of banking relationships of micro and small enterprises in Germany.[13]

As independent variables we first use the common firm-specific measures of credit risk. It is generally assumed that credit risk is negatively related to firm size and age, but positively related to innovative activity, the incidence of financial distress and industry risk. 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.

Secondly, we include the duration and importance of the housebank relationship to measure relationship lending. 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.[14]

Thirdly, 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, 67% of the professionals have a housebank relationship with a savings bank or a cooperative bank and 33% have a housebank relationship with a big private bank. This confirms our expectation that small, local banks are important for the financing of microenterprises. 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.

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[13]   Harhoff and Körting (1998) 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.
[14]   For comparison with the descriptive statistics of other studies, see Menkhoff et al. (2006, table 2).

As a fourth variable group, we include loan-specific variables as proxies for credit risk or loan demand, thus going beyond previous studies (see table 1). 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. We presume that investment credits imply a higher credit risk than overdrafts and thus go along with fewer bank relationships.

Our fifth variable group 'market structure and regulation' includes a proxy for the change of the regulatory framework implied by the Basle II rules. Especially small firms fear that the implementation of the new capital rules of the Basle II accord will cause credit restrictions by inducing banks to introduce risk adjusted pricing or to restructure their portfolios away from small business finance. Thus, the variable "Basle II" is a further measure for an exogenous shock 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.

As control variables, we include variables measuring efforts to overcome credit constraints. The variable 'credit availability' indicates whether the professional has chosen multiple bank relationships to increase the availability of credits. The variables 'visit' and 'monitoring' measure efforts of information gathering on the side of the bank.

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

**Table 3 :** Overview of hypotheses and expected signs

*Dependent variable:* number of bank relationships

| Hypothesis | | Independent variables | Expected sign |
|:---:|:---|:---:|:---:|
| **H1** | The number of banking relationships decreases with the riskiness and information opaqueness of the firm and its loans. | *size* | positive |
| | | *age* | positive |
| | | *no financial distress* | positive |
| | | *innovation* | negative |
| | | *finance_bank* | negative |
| | | *industry* | positive/ negative |
| | | *duration of loan* | negative |
| | | *investment credit* | negative |
| | | *credit volume* | negative |
| **H2** | The number of banking relationships decreases with the importance of the housebank relationship, and increases with its duration. | *housebank* | negative |
| | | *duration* | positive |
| **H3** | The number of banking relationships increases with the firm's loan demand and restrictions in credit availability. | *credit volume* | negative |
| | | *credit availability* | positive |
| **H4** | The number of banking relationships increases with the likelihood of future credit restrictions at the housebank. | *rating_hb* | positive |
| | | *Basle II* | positive |
| **H5** | The number of banking relationships is lower if the borrower's housebank is a small, local bank. | *bank_type* | positive/negative |
| **H6** | The number of banking relationships decreases with local banking market concentration. | *banks_vicinity* | positive |
| | | *distance* | negative |

## 4. Regression Results and Discussion

The hypotheses are tested by linear OLS estimations. After conducting a *White*-test,[15] 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), the loan specific variables (model V) and all remaining variables (model VI).

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[15]  See Greene (2000, pp. 508) and Hackl (2004, pp. 174).

**Table 4:** Regression Results (OLS)

*Dependent variable:* LN(number of bank relationships)

| | (I) N=211 | (II) N=201 | (III) N=199 | (IV) N=180 | (V) N=108 | (VI) N=103 |
|---|---|---|---|---|---|---|
| Constant | 0.2022 (2.3626)** | 0.2742 (2.0616)** | 0.2906 (2.1394)** | 0.2187 (1.0395) | 0.5573 (1.3598) | 0.0875 (0.1905) |
| ***Firm characteristics*** | | | | | | |
| LN(size) | 0.1422 (4.0735)*** | 0.1131 (2.7710)*** | 0.1325 (3.1286)*** | 0.1489 (3.3212)*** | 0.1996 (2.8957)*** | 0.1922 (2.6098)*** |
| LN(age) | 0.1358 (3.9346)*** | 0.1333 (3.6628)*** | 0.1171 (2.6740)*** | 0.1231 (2.7101)*** | 0.0538 (0.7759) | 0.0420 (0.5824) |
| no financial distress | | 0.0329 (0.4720) | 0.0365 (0.5238) | 0.0174 (0.2423) | -0.0653 (-0.6712) | 0.0038 (0.0344) |
| finance_bank | | 0.1152 (1.5658) | 0.0989 (1.3404) | 0.0858 (1.1341) | 0.0957 (0.7681) | 0.0993 (0.7207) |
| innovation | | -0.0330 (-0.8657) | -0.0339 (-0.8921) | -0.0271 (-0.6812) | -0.0345 (-0.6306) | -0.0373 (-0.6581) |
| ***Relationship characteristics*** | | | | | | |
| duration | | | 0.0010 (0.2878) | 0.0007 (0.2209) | -0.0009 (-0.1957) | -0.0009 (-0.1667) |
| housebank | | | | -0.0057 (-0.1484) | 0.0646 (1.1242) | 0.0700 (1.1720) |
| ***Bank characteristics*** | | | | | | |
| rating_hb | | | | 0.0060 (0.3574) | 0.02477 (1.0530) | 0.0670 (1.7964)* |
| bank_type | | | | | | |
|    private bank | | | | | | 0.0108 (0.0737) |
|    cooperative bank | | | | | | -0.1223 (-0.5967) |
| ***Loan characteristicss*** | | | | | | |
| maturity | | | | | 0.0037 (0.4259) | 0.0054 (0.5507) |
| credit volume | | | | | | |
|    Up to EUR 10,000 | | | | | -0.0457 (-0.0902) | -0.2371 (-0.4612) |
|    EUR 10,000 to 50,000 | | | | | -0.3327 (-1.6247)* | -0.3168 (-1.5161) |
|    EUR 50,000 to 100,000 | | | | | -0.3308 (-1.7443)* | -0.3291 (-1.7142)* |
|    EUR 100,000 to 250,000 | | | | | -0.3166 (-1.6477)* | -0.3430 (-1.7742)* |
|    EUR 250,000 to 500,000 | | | | | -0.4386 (-2.237)*** | -0.4939 (-2.457)*** |
| Investment credit | | | | | -0.1001 (-0.9808) | -0.0776 (-0.7037) |
| ***Market structure and regulation*** | | | | | | |
| Basle II | | | | | | 0.0971 (0.9911) |

| | | | | | | |
|---|---|---|---|---|---|---|
| banks_vicinity | | | | | | -0.0004 (-0.0463) |
| distance_housebank | | | | | | 0.0013 (0.5630) |

| *Control variables* | | | | | | |
|---|---|---|---|---|---|---|
| credit availability | | | | | | 0.2126 (2.0003)** |
| visit | | | | | | -0.2459 (-1.2154) |
| monitoring | | | | | | -0.0140 (-0.0952) |

| | | | | | | |
|---|---|---|---|---|---|---|
| industry | | n.sig. | n.sig. | n.sig. | n.sig. | n.sig. |
| $R^2$ | 0.1872 | 0.1826 | 0.1894 | 0.2118 | 0.2953 | 0.3753 |
| F-Test | 23.95*** | 5.3616*** | 4.9090*** | 4.1050*** | 2.0722*** | 1.7561** |
| White Test[1] | 0.5284 | 0.8193 | 0.9019 | 0.9475 | 1.1760 | 0.7589 |

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

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 supports hypothesis H1 under the presumption that small and young firms are riskier and more opaque than larger and older firms. Another explanation for the size effect is that, according to H3, larger firms need more or larger loans which they may obtain at more competitive terms from several banks. Moreover, larger firms may wish to offer a larger number of bank connections as a service to their larger customer base. The other firm-specific variables show no significant impact. However, the positive influence of the absence of financial distress and the negative influence of innovativeness correspond to the prediction of H1. 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 importance of the housebank relationship show a significant influence on the number of bank relationships. Thus, we find no support for hypothesis H2. Also the influence of the housebank's type is insignificant. However, professionals whose housebank is a private bank hold more bank relationships and those whose housebank is a cooperative bank hold fewer bank relationships than those who have a housebank relationship with a savings bank. This is in line with hypothesis H5. In Germany, both cooperative banks and savings banks are active in geographically restricted local banking markets, and the former tend to be smaller than the latter.

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

The positive coefficient of the loan maturity variable is inconsistent with H1, but insignificant. 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. While this finding is in contrast to H1, it is in line with H3. It may may also be consistent with the hold-up hypothesis. Since larger loans tend to be more costly for the borrower than smaller loans due to higher interest rates and collateral claims, they imply higher hold-up costs in the case of a lock-in by the relationship bank. Thus, the borrower has a larger incentive to choose multiple banking relationships to obtain loans at more competitive terms or increase credit availability. Consistent with H1, investment credits go along with fewer bank relationships, but the influence is insignificant.

The variables of market structure and regulation do not contribute significantly to the explanation of the number of banking relationships. The positive influence of the Basle II variable corresponds to the prediction of H4, but 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. Both measures of local banking market concentration do not show the influence on the number of banking relationships predicted by H6. 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.

Among the control variables, the credit availability variable shows a significant influence. Consistent with H3, professionals choose a higher number of bank relationships to obtain more loans. Since our evidence concerning the influence of firm-specific credit risk is

ambiguous, we cannot determine whether it is the risky borrowers who hold more bank relationships to overcome credit rationing. To draw conclusions about the relationship between borrower quality and the number of bank relationships, further research is needed about the different proxies for credit risk.

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 5 in the appendix. They are qualitatively nearly identical to those of table 4. Only the variables firm size and age loose their significance when the variables loan duration and size are included in the Poisson regression. The signs of the regression coefficients remain the same.

## 5. Summary and Conclusion

The present paper tried to identify determinants of the number of bank relationships held by microenterprises. Its aim was to test theoretically derived hypotheses on the optimal number of bank relationships and to investigate whether and why bank relationships of microenterprises differ from those of larger firms. After a review on the theory, the hypotheses and previous empirical evidence, we 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.

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 that the number of bank relationships is increasing in firm size and age also holds for our sample.

Secondly, 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/Körting 1998b), but corresponds to findings of studies on medium-sized firms (Machauer/Weber 2000, Guiso/Minetti 2004). The signs of the regression coefficients indicate that risky firms tend to hold fewer banking relationships, consistent with credit rationing theory.

Third, firms 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 particularly for micro and small enterprises, which are most prone to credit rationing due to their high information opaqueness. However, we cannot compare these results with those for larger firms, because the influence of the loan volume and credit availability has not been directly tested in previous studies.

Fourth, the number of bank relationships does not depend on the intensity or the duration of the housebank relationship. Thus, we do not find support for the hold-up theory, upon which the previous evidence is mixed. Miroenterprises 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 special features of professional firms. Also, we still do not know whether the observed number of banking relationships is primarily determined by the demand-side or the supply side of the banking market. If the supply side does not matter, we do not need to be concerned about detrimental effects of bank consolidations on the financing of small firms. To find this out is a task for future research.

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# Appendix

**Table 5:** Regression results (Poisson)

*Dependent variable:* number of bank relationships

| | (I) N=211 | (II) N=201 | (III) N=199 | (IV) N=180 | (V) N=108 | (VI) N=103 |
|---|---|---|---|---|---|---|
| Constant | 0.2722 | 0.4549 | 0.4688 | 0.4752 | 0.9288 | 0.3795 |
| | (2.0062)*** | (2.2060)*** | (2.2796)*** | (1.4995) | (1.6340) | (0.5637) |
| ***Firm characteristics*** | | | | | | |
| LN(size) | 0.1280 | 0.0936 | 0.1129 | 0.1291 | 0.1269 | 0.1287 |
| | (2.6470)*** | (1.6149)* | (1.8766)* | (1.9956)** | (1.3017) | (1.1440) |
| LN(age) | 0.1567 | 0.1465 | 0.1129 | 0.1139 | 0.0392 | 0.0282 |
| | (2.9845)*** | (2.6542)*** | (1.7098)* | (1.6406)* | (0.3807) | (0.2527) |
| no financial distress | | -0.0149 | -0.0140 | -0.0330 | -0.1019 | 0.0274 |
| | | (-0.1447) | (-0.1365) | (-0.3072) | (-0.7277) | (-0.1654) |
| finance_bank | | 0.0718 | 0.0578 | 0.0356 | 0.0110 | -0.0010 |
| | | (0.6561) | (0.5256) | (0.3083) | (0.0590) | (-0.0050) |
| innovation | | -0.0477 | -0.0492 | -0.0459 | -0.0459 | -0.0485 |
| | | (-0.8393) | (-0.8645) | (-0.7555) | (-0.5716) | (-0.5708) |
| ***Relationship characteristics*** | | | | | | |
| duration | | | 0.0037 | 0.0037 | 0.0037 | 0.0023 |
| | | | (0.7401) | (0.7167) | (0.5149) | (0.2823) |
| housebank | | | | -0.0233 | 0.3874 | 0.0461 |
| | | | | (-0.3950) | (0.4637) | (0.5098) |
| ***Bank characteristics*** | | | | | | |
| rating_hb | | | | 0.0018 | 0.0195 | 0.0802 |
| | | | | (0.0731) | (0.5567) | (1.4020) |
| bank_type | | | | | | |
| private bank | | | | | | -0.0674 |
| | | | | | | (-0.3077) |
| cooperative bank | | | | | | -0.2184 |
| | | | | | | (-0.6933) |
| ***Loan characteristics*** | | | | | | |
| maturity | | | | | -0.0012 | 0.0005 |
| | | | | | (-0.0947) | (0.0334) |
| credit volume | | | | | | |
| Up to EUR 10,000 | | | | | -0.0715 | -0.3030 |
| | | | | | (-0.0889) | (-0.3654) |
| EUR 10,000 to 50,000 | | | | | -0.4030 | -0.3946 |
| | | | | | (-1.5038) | (-1.4106) |
| EUR 50,000 to 100,000 | | | | | -0.3807 | -0.3873) |
| | | | | | (-1.5840)* | (-1.5593)* |
| EUR 100,000 to 250,000 | | | | | -0.3488 | -0.4057 |
| | | | | | (-1.4034) | (-1.5950)* |
| EUR 250,000 to 500,000 | | | | | -0.4147 | -0.5008 |
| | | | | | (-1.6569) | (-1.8462)* |
| investment credit | | | | | | -0.0298 |
| | | | | | | (-0.1802) |

*Market structure and regulation*

| | | | | | | |
|---|---|---|---|---|---|---|
| Basle II | | | | | | 0.1115 |
| | | | | | | (0.7407) |
| banks_vicinity | | | | | | -0.0021 |
| | | | | | | (-0.1585) |
| distance_housebank | | | | | | 0.0020 |
| | | | | | | (0.5320) |

*Control variables*

| | | | | | | |
|---|---|---|---|---|---|---|
| credit availability | | | | | | 0.2648 |
| | | | | | | (1.5856)* |
| visit | | | | | | -0.3029 |
| | | | | | | (-0.9599) |
| monitoring | | | | | | -0.0486 |
| | | | | | | (-0.2054) |
| industry | | n.sig. | n.sig. | n.sig. | n.sig. | n.sig. |
| Log-Likelihood | -328.5251 | -310.8274 | -307.4307 | -277.7449 | -168.4962 | -158.0734 |
| $R^2$ | 0.1775 | 0.1513 | 0.1615 | 0.1755 | 0.2563 | 0.3848 |

[***] Significance at 1% level, [**] significance at 5% level, [*] significance at 10% level