

# Bank market structure, competition, and SME financing relationships in European Regions

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## Abstract

How do concentration and competition in the European banking sector affect lending relationships between small and medium sized enterprises (SMEs) and their banks? Recent empirical evidence suggests that concentration and competition capture different characteristics of banking systems. Using a unique dataset on SMEs for selected European regions, we empirically investigate the impact of increasing consolidation and competition on the number of lending relationships maintained by SMEs. We find that the negative effect on the number of lending relationships arising from more concentrated banking systems is offset by a positive impact from increased competition. Our results also suggest that characteristics of the local banking market considerably impact on the number of lending relationships.

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## 1 Introduction

An accelerating number of mergers and acquisitions (M&As) over the past decade, and changes in the regulatory and institutional environment financial institutions operate in have markedly affected the structure and competitive nature of banking markets. As the industry continues to shift and consolidate, relationships between banks and their customers may be altered, possibly impacting on the provision of banking services. This is of particular concern to small and medium size enterprises (SMEs) in Europe,<sup>1</sup> since they predominately depend on bank financing.

Numerous studies focus on the nature of relationships established by different types of banks (Berger et al., forthcoming), the determinants of the role of banks (Elsas, 2005; Harhoff and Körting, 1998; Elsas and Krahnen, 1998), the benefits of bank-borrower relationships (Berger and Udell, 2006; Elyasiani and Goldberg, 2004; Farinha and Santos, 2002; Ongena and Smith, 2001; Boot, 2000; Petersen and Rajan, 1995; Brick and Palia, 2007), the effect of competition on bank orientation (Degryse and Ongena, 2007), and the number of bank relationships maintained by large corporations (Ongena and Smith, 2000).

To the best of our knowledge, however, the extant literature has not yet investigated the determinants of the number of bank relationships maintained by SMEs. Moreover, how do observed changes in bank market structures affect the number of bank relationships maintained by SMEs? Further, how do characteristics of the local banking market impact on the number of bank financing relationships? This paper seeks to answer exactly these questions.<sup>2</sup>

In Europe, 23 million SMEs account for 99% of all companies, employ around 75 million people, and generate one in every two new jobs.<sup>3</sup> Given their important role, these institutional changes in banking systems give rise to major policy concerns. Our empirical enquiry focuses on SMEs since information-based intermediation theory (Diamond, 1984; Ramakrishnan and Thakor,

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<sup>1</sup> The EU defines SMEs as enterprises that employ fewer than 250 people, have an annual turnover not exceeding €50 million, and/or annual balance sheet total not exceeding €43 million.

<sup>2</sup> For the purpose of our research 'bank financing relationship' refers to SME financing for the following purposes: firm start-up; product development; purchases of fixed assets; cash flow; reduction/avoidance of overdraft facilities; trading and trading costs; other business/company acquisition; expansion/growth; share capital; working capital; retirement of co-director; management buy-in/buy-out; bridge financing; seasonal production/trading; research; general corporate purposes; staffing; debtors financing; bills payable; work in progress funding; stock purchase; tax payments; replacement machinery; acquisitions; and business development.

<sup>3</sup> Observatory for European SMEs, Enterprise Directorate-General of the European Commission, (2004), Brussels.

1984; Bhattacharya and Thakor, 1993; Stein, 2002) suggests that SMEs are less likely to have as many bank relationships as have large corporations.

First, SMEs and their lenders frequently belong to the same socio-economic setting, which reduces information asymmetries, eases monitoring, and reduces costly information acquisition information about borrowers. This implies that opaque firms like SMEs find it optimal to borrow from one bank. However, ‘hold up’ problems arise with repeated lending from only one bank if the relationship lender extracts rents from the firm (Sharpe, 1990; Rajan, 1992). Thus, a limited number of bank relationships is optimal for SMEs, this also reduces the probability of being denied credit (Thakor, 1996; von Thadden, 1995).

Second, empirical evidence indicates that the number of bank relationships is increasing, although not uniformly, in firm size (Petersen and Rajan, 1994; Berger and Udell, 1995; Houston and James, 1996; Ongena and Smith, 2000).

Third, another reason why SMEs are less likely to maintain many bank relationships relate to their typical rural locations where sophisticated intermediaries. Typically, large banks do not have a physical presence in these rural locations because SMEs do not demand diversified supplies of financial services (Ferri and Messori, 2000).

Finally, SMEs are less likely to maintain relationships with larger institutions as the lending technology required for processing ‘soft’ information is less well developed in larger banks (Williamson, 1988; Stein, 2002; Berger and Udell, 2002; Cole et al, 2004; Berger et al., 2005a).<sup>4</sup> These final two arguments indicate that SMEs have a reduced pool of banks to obtain financing from.

Our cross-country analysis is also related to the literature on financial system architecture. First, while Staikouras and Koutsomanoli-Fillipaki (2006) and Schaeck and Cihak (2007) report increasing degrees of competition in European banking systems, Goddard et al. (2007), de Guevara et al.

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<sup>4</sup> Relatedly, the literature on relationships maintained by local and regional banks proposes a ‘long term interaction hypothesis’ according to which banks taking part in community life share relationships of various kinds, not solely economic (Bannerjee et al., 1994; Besley and Coate, 1995). Through such relationships, they can acquire information that would be available to an outsider only at a cost. Consequently, banks operating in local and rural communities may take advantage of such information in their financing activities, placing them in a better position to deal with asymmetric information and agency problems.

(2005), and Amel et al. (2004) simultaneously observe a wave of consolidation across European banking systems resulting from an increasing number of M&As. This raises fears that consolidation decreases the number of banks specialising in relationship banking (e.g. community banks) with possibly detrimental welfare effects for local firms, especially SMEs, these firms' access to credit, and, ultimately, economic growth.<sup>5</sup> As a result, positive effects for the provision of banking services arising from increased competition in banking systems may be offset by higher degrees of concentration.

As part of our empirical investigation, we seek to answer this question because the extant literature on the effect of market structure and competition on SME financing offers two competing theories: Whereas proponents of the 'market power' notion (Elsas, 2005; Boot, 2000; Boot and Thakor, 2000, Ongena and Smith, 2000) contend that concentration decreases firms' access to credit, advocates of the 'information hypothesis' (Dell'Ariccia and Marquez, 2005; Petersen and Rajan, 1995) argue that less competition improves credit availability.

We propose that these contrasting findings may be due to the way competition is determined in empirical studies that frequently proxy competition with concentration measures. This assertion places our paper into a growing body of work by Beck et al. (2006), Claessens and Laeven (2004), Carbo et al. (2006), Schaeck et al. (2006), and de Guevara et al. (2005) indicating that concentration is a poor proxy for competition and that concentration and competition describe different characteristics of banking systems.

Second, following Ongena and Smith (2000), who report evidence that well developed financial systems with stronger protection of creditor rights help explain the number of bank relationships, we also test for the effect of differences in legal and financial system arrangements in the spirit of the studies motivated by La Porta et al. (1997), Levine (1999), Demirgüç-Kunt and Maksimovic (1998), and Beck et al. (2006). Our analysis helps evaluate whether the effects uncovered by Ongena and Smith (2000) are also valid for SMEs in Europe.

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<sup>5</sup> Such developments have been extensively studied for the US, see, for instance, Craig and Hardee (2007), Berger and Udell (2002), Cole et al. (2004) and Berger and Frame (2005).

Third, we focus on Europe since EU banking systems have been undergoing significant changes following the launch of the Single Market Programme, transition to the Euro, and recent EU enlargements. While these developments are aimed at creating a level playing field for competition in European banking, the EU banking landscape is still largely influenced by linguistic and cultural differences that thwart setting up banking relationships across national boundaries. Such impediments may be due to ‘exogenous economic borders’, i.e. legal origin and system, supervisory and corporate governance practices, political framework, language and culture, and ‘endogenous economic borders’. These are information-based, and arise from bank-firm relationships, adverse selection, and information sharing between intermediaries (Buch, 2001). Evidence for the conjecture that linguistic minorities and smaller non-financial firms prefer a more local character of the banks they do business with across EU regions is provided by Affinito and Piazza (2005). We therefore also explore whether differences across European regions help explain the number of bank relationships.

The purpose of our paper is to extend the literature on bank relationships in three distinct ways: First, this research is to the best of our knowledge the first empirical analysis of the determinants of the number of SME-bank financing relationships exclusively based on European data. Second, to disentangle effects from competition and concentration, we simultaneously consider independent effects arising from competition and concentration for SME-bank relationships. Third, we focus on selected European regions to investigate the importance of the socio-economic environment for SME-bank financing relationships. As Guiso et al. (2004, p. 937) point out ‘if local market conditions matter, they should matter the most for small firms, which have difficulty in raising funds at a distance, than for large firms’.

We obtain data from the Centre for Business Research of the University of Cambridge regarding scope and scale of the relationship between 552 SME borrowers and their banks from Emilia-Romagna in the north-east of Italy, Bavaria in the south of Germany, and the south-east region of the UK. These regions are traditionally characterised by areas rich in innovative SMEs as

well as local and regional banks, which are the main source of financing for SMEs.<sup>6</sup> This dataset, augmented with information on financial system architecture and local market conditions, provides an excellent setting to conduct our empirical investigation as the survey data can be matched with local bank market data. As detailed further below, this is particularly beneficial since we anticipate socio-economic factors to be paralleled by local financial systems. In addition, a regional focus permits better accounting for information asymmetries banks are exposed to when aiming to establish relationships with SMEs.

Four key findings emerge from our analysis: (1) Adverse effects of increasing consolidation for the number of bank relationships maintained by SMEs are fully offset by increased competition. To this extent, our results highlight that concentration measures do not serve as a proxy for competition in banking systems. (2) Factors such as regional GDP growth, regional population and an innovative environment are positively related to the number of bank relationships. (3) The number of bank relationships is increasing in the amount of bank finance used, and if the bank plays an active role in advising SMEs. (4) Regulatory restrictions on banking activities and financing and legal obstacles decrease the probability of maintaining multiple bank relationships.

The plan for the paper is as follows: Section 2 briefly explains the methodology and also describes the dataset. We present empirical results in Section 3. Section 4 contains sensitivity checks and Section 5 offers concluding remarks.

## 2 Data and Variables

We explain in Section 2.1 the information on SMEs obtained from survey data. Section 2.2 presents the motivation and description for the choice of the firm, bank, regional, and country-specific variables.

### 2.1 Survey Data

Our primary source for firm information is the *Survey of the Financing of Small and Medium-sized Enterprises in Western Europe*, conducted by the Centre for Business Research at the

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<sup>6</sup> Further details regarding composition of these three regions are provided in Martin et al. (2001). Ferri and Messori (2000) present additional details regarding socio-economic characteristics and regional financial sub-systems in Italy.

University of Cambridge in 2001.<sup>7</sup> This survey focuses on the financing of SMEs in three different regions of Europe: Emilia-Romagna in Italy, Bavaria in Southern Germany, and the south-east of England. The survey is based on a questionnaire containing 191 questions for Germany and the UK, and 188 questions for Italy.<sup>8</sup> The questionnaire was sent out to over 800 SMEs and yielded 247 responses for the UK, 161 for Italy and 114 for Germany. Questions from the survey cover a variety of topics including the main markets serviced, the type of finance used, whether firms have used bank finance, and the role that banks play. Moreover, the questionnaire also provides details about the nature of the SMEs' type of business, size, employment growth, and turnover.

Summary statistics for the survey (and the other explanatory variables) are presented in Table 1. The UK makes up 47% of the sample with Germany and Italy accounting for 22% and 31% respectively. Italy shows the highest incidence of multi-bank relationships with the UK exhibiting the lowest.<sup>9</sup> Our definition of bank financing includes financing that is intended for, *inter alia*, acquisition investment, cash-flow, tax, and for enabling the SME to remain a going concern. It excludes SMEs having a relationship solely through having a checking or savings account with a bank. 42% of the SMEs in the sample do not use banks for their financing activities. This implies that they either use other forms of financing such as borrowing from family and friends, or use their own reserves for financing purposes. Such notion of self-financing is consistent with Beck et al. (2005a) who show that small firms finance a lesser proportion of their investment with formal sources of external finance.

The survey does not provide actual figures for turnover. Rather, the SMEs are classified into five categories, whereby higher values indicate greater turnover. Both average turnover and average number of employees for all SMEs are greater for those that move from zero to one and from one to more than one bank financing relationships. This is in line with previous studies highlighting that size is positively correlated with the number of bank relationships, e.g. Petersen and Rajan (1994).

Descriptive statistics for the country-specific and regional variables are also presented in Table 1.

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<sup>7</sup> The survey data can be obtained from <http://www.data-archive.ac.uk/findingData/snDescription.asp?sn=4955>.

<sup>8</sup> The questionnaire is accessible on the University of Cambridge website (<http://www.data-archive.ac.uk/doc/4955%5Cmrdoc%5Cpdf%5C4955userguide.pdf>).

<sup>9</sup> These figures corroborate results obtained by other authors. For Italy, Pagano et al. (1998) report the mean number of bank credit relationships per firm to be 13.9 and Ongena and Smith (2000) report a mean of 15.2. For German firms, Elsas and Krahnen (1998), and Ongena and Smith (2000) report mean figures of 6.0 and 8.1 respectively. Ongena and Smith (2000) report mean figures of 2.9 relationships for UK firms.

[TABLE 1 about here]

## 2.2 Other Explanatory Variables<sup>10</sup>

### *Bank market structure variables*

In order to test our hypothesis that concentration and competition among banks have independent effects for the number of financing relationships maintained by SMEs, we include the *Herfindahl-Hirschman index* (HHI), calculated as the sum of the squared market shares. This index is widely used as a measure to describe concentration in banking markets (Cetorelli, 1999). In addition, we use the 3-bank concentration ratio for a sensitivity test provided in Section 4 below.

To disentangle the effects arising from concentration and competition, we include the Panzar and Rosse (1987) *H-Statistic* to gauge competition. Claessens and Laeven (2004) argue that H is a more appropriate measure for the degree of competition than previously used proxies of competition. Shaffer (2004) highlights the analytical strength and superiority of the H-Statistic over other measures of competition since it is formally derived from profit-maximising equilibrium conditions.<sup>11</sup> It overcomes criticism put forward against concentration ratios that are frequently used to infer competition as it does not require assumptions about the market.<sup>12</sup> The H-Statistic gauges market power by the extent to which changes in factor input prices translate into equilibrium revenues. Vesala (1995) has shown that higher values of H signify more competition. We anticipate that concentration is inversely related to the number of relationships maintained by SMEs whereas the H-Statistic is expected to be positively related. Appendix II presents the calculations for the H-Statistic.

### *Regional market structure variables*

Regional indicators for Emilia-Romagna, Bavaria, and the south-east of the UK are retrieved from REGIO, Eurostat's harmonised regional statistical database. We extract information on *Regional GDP*, *Regional Population*, and *Regional Patent Applications* to the European Patent

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<sup>10</sup> We present definitions for the explanatory variables in Appendix I.

<sup>11</sup> For a detailed overview on computation of the H-Statistic see Claessens and Laeven (2004).

<sup>12</sup> Shaffer (2004) stresses that the definition of a banking market is likely to affect inferences regarding competition, when competition is inferred from concentration ratios. This is due to the fact that banking markets in small countries are likely to extend beyond a single nation's borders and because large banks operate globally. Moreover, Cetorelli (1999) underscores that competition cannot be determined by simply looking at market structure, since bank behaviour can only be measured accurately through direct empirical analysis of individual bank data.



Office. We expect these variables to positively impact upon the number of bank financing relationships.

To control for the nexus between SMEs and the business environment, we obtain the variables *Time to start Business* and *Cost to start Business* from the World Bank Doing Business Survey (2005). These regressors capture important factors that enhance or constrain business investment, productivity and growth respectively. We expect them to be positively related to the number of bank relationships.

#### *Control variables*

We also adapt variables from the World Business Environment Survey (WBES)<sup>13</sup> survey that assesses whether financial and legal obstacles affect firm growth. The survey asks enterprise managers to rate the extent to which financing and legal problems present obstacles to the operation of businesses. The variables take values of 1-4, with 1 indicating no obstacle and 4 indicating a major obstacle. The variables *Financing* and *Legal obstacle* are incorporated into the model to examine the impact such obstacles have on SME financing relationships as Schiffer and Weder (2001) maintain that small firms are more likely to face obstacles in obtaining finance and accessing legal systems.

We include *Banking Freedom* (obtained from the Heritage Foundation) to assess the openness of the banking system. Higher values indicate fewer restrictions on banking freedom. It is a composite index of whether foreign banks are allowed to operate freely, the difficulties faced when setting up domestic banks, government influence over the allocation of credit, and whether banks are free to provide insurance products and securities to customers. The index is expected to be positively associated with the number of financing relationships.

Additionally, we use *Access to Financial Services* to capture the geographic penetration of the banking system measured by the number of bank branches relative to area, and *Stock Market Capitalization/GDP*, to gauge the influence of stock market development on the number of bank relationships given that well developed securities markets might function as a substitute for the

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<sup>13</sup> The World Business Environment Survey was conducted in 1999 and 2000 over 10,000 firms in 80 countries (World Bank database). Variables include financing constraints, GDP growth, private credit, domestic bank share, and foreign bank share. A detailed discussion of the survey is provided by Batra et al. (2003).

transaction services of banks. We assume that *Access to Finance* is positively correlated with the number of relationships as countries with better access to financial services providers offer more opportunities for SMEs to set up multiple lending relationships. By contrast, if SMEs can obtain funds from the stock market, we anticipate that a well developed equity market will be negatively related to the number of financing relationships.

We employ *Turnover* as a measure of firm size as we expect SMEs to maintain more financing relationships as they increase in size. Moreover, Detragiache et al. (2000) have shown that larger firms may have to rely on multiple banking to allow banks to diversify firm-specific credit risk. Additionally, firm complexity and growth opportunities are likely to increase with size, and larger borrowing requirements also induce SMEs to rely on multiple banking.

To determine the impact of entrepreneurial innovation on SME bank financing, we make use of a *Research and Development (R&D)* dummy variable that takes on the value one if the SME engages in R&D or zero otherwise. Von Thadden (1995) uses a measure of R&D to denote the amount of innovation intensity to capture entrepreneurial control rents. A negative correlation between entrepreneurial control rents and the probability of single banking also supports the hypothesis that multiple banking serves to reduce rent appropriation by banks. Conversely, Yosha (1995) shows that R&D intensity may be associated with single banking if information leakages to competitors are more likely with multiple lenders.

We use *Age* to assess whether the year of incorporation impacts the number of financing relationships. Older firms may face less severe adverse selection problems when seeking finance and should be more likely to have access to financial services as they have survived the critical start-up period and have generated reputational effects throughout the intervening years (Diamond, 1991).

To capture organisational form and distinguish between firm type, we include a dummy variable *Firm Type* that takes on the value one if the SME is private or zero otherwise. Public firms will have easier access to the capital markets and this might impact the number of bank relationships they maintain. As in Degryse and van Cayseele (2000), we include this variable as the degree of

informational asymmetry varies with organisational form due to agency conflicts between owners, managers, and creditors.

We also investigate *Ownership Change* on the number of bank relationships as changes in ownership structure tend to coincide with changes in financing relationships. The *Amount of Bank Finance Used* is employed to assess how much the SME depends on financing from banks.

To account for the banks' bargain power over the borrowers and the degree of monitoring exerted by the bank, we employ the variable *Bank Role* (Elsas, 2005). This regressor provides information on whether the bank has a seat on the SMEs board, and whether it offers sales, marketing, technical or management advice to the firm.

*Distance* determines whether proximity between borrower and lender has any impact on the number of relationships. Given that SMEs are considered opaque and given that the collection of 'soft' information is facilitated by geographic proximity, we anticipate that distance will be positively related to the number of bank relationships.<sup>14</sup> As a measure of relationship strengths, we utilize a dummy variable *Bank Terms*, that takes on the value one if the SME views the terms given by the bank as favourable or zero otherwise.

We also employ two dummy variables for bank type, which take on the value one if the bank is a regional or a national bank respectively, or zero otherwise. Since a particular SME can obtain bank financing from either *Regional* or *National banks*, or both, the two bank types are not mutually exclusive and are both included in the quantitative analysis. Banks with different organisational structures may use different lending technologies to produce soft information. Small regional banks may have a comparative advantage in producing soft information, while banks with multi-layered hierarchies may perceive this as a comparative disadvantage.

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<sup>14</sup> Several studies examine whether distance between lender and borrower has been changing over time and provide contrasting results. Petersen and Rajan (2002), Cymak and Hannan (2000), and, Wolken and Rohde (2000) all find that distance has increased, whilst Degryse and Ongena (2004), in contrast, find that distance has not increased.

### 3 Results

#### *Concentration and competition*

We use firm-level regressions of the number of bank relationships on firm, market structure, and regional and country-specific variables. The dependent variable is the multi-bank relationship variable. SMEs are classified as having no bank financing relationship, having one relationship, and having multiple bank financing relationships.<sup>15</sup> We employ a Tobit specification because the dependent variable is discrete-valued and truncated at the number of bank relationships below one.

[TABLE 2 about here]

Table 2 presents the main results. Column (1) is the canonical model. To examine the effects of concentration and competition, we include the HHI, the H-Statistic, and an interaction term between HHI and the H-Statistic in columns (2)-(5). The objective of these regression specifications is to establish whether concentration and competition capture the same characteristics of banking systems (and hence can be used interchangeably), or, if they independently affect the number of bank relationships. If so, this would suggest that it is inappropriate to proxy the degree of competition in banking systems with measures of market structure such as the HHI.

The HHI enters in column (2) positively and significantly, highlighting that SMEs in more concentrated markets are more likely to engage in more than one bank relationship. One reason may be that SMEs try to avoid hold-up problems in concentrated markets (Berger et al., forthcoming). This result however is reversed once the direct measure of competition, the Panzar and Rosse (1987) H-Statistic is included in the regression specification. In column (3), we only include the H-Statistic to gauge competition. This variable enters significantly with a positive sign, indicating that SMEs maintain more bank relationships in more competitive systems. Greater competition widens the spectrum of banks to choose from. Moreover, SMEs that might be experiencing difficulties could potentially find it easier to develop new bank relationships in a more competitive environment. Likewise, banks might also start providing better terms to clients in a bid to attract further business in a competitive environment. Our results contrast with Farinha and

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<sup>15</sup> The survey data do not provide the precise number of bank relationships beyond one. This hampers the use of a Poisson model that could otherwise be used to estimate the actual number of lending relationships.

Santos (2002) who do not find that bank competition in the region where the firm is located plays a role in its decision to switch from single to multiple relationships.

Importantly, when these two variables enter the regression simultaneously in column (4), the HHI changes the sign of the coefficient, and retains its significance. This key finding persists throughout the remainder of the paper. In line with previous work by Ongena and Smith (2000) and Dewatripont and Maskin (1995), concentration reduces the number of relationships.<sup>16</sup> Moreover, if the banking market is concentrated, and if an SME's existing relationship is experiencing difficulties for one reason or another, then it will be harder to obtain services when the number of players in the market is limited. This result is aligned with the Structure-Conduct-Performance (SCP) paradigm, which states that market power reduces access to credit.

By contrast, competition continues to positively affect the number of bank relationships. The results concerning HHI and the H-Statistic are intuitive: Firms operating in concentrated markets can only choose between a few providers of financing and therefore have fewer bank relationships, whereas competition increases the number of bank relationships. This result provides important evidence that independent effects arise from market structure and competition. Thus, our finding suggests that competition should not be proxied by the degree of concentration. In addition, this result is related to the results by Craig and Hardee (2007), who demonstrate that credit availability for small firms declines as a result of consolidation in banking. This adverse effect is however mitigated by the fact that small businesses substitute bank financing through alternative sources such as capital leasing firms, mortgage companies and financial brokers.

To shed more light on the effects attributable to competition and concentration, we include an interaction term between the H-Statistic and the HHI. The two variables are centered on the mean in this regression to mitigate collinearity problems arising from correlations between the interaction term and its components (Zou and Adams, 2006).<sup>17</sup> If centered, the individual

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<sup>16</sup> In a related study, Craig and Hardee (2007) show that small businesses operating in areas dominated by large banks tend to hold less debt than firms in areas with fewer large banks. They interpret this result as suggestive evidence for a negative effect of consolidation on access to credit.

<sup>17</sup> Centering variables involves subtracting from each observation of the component parts the mean of that variable before constructing the interaction term.

components reflect the effect of competition when concentration is held at the mean value (and vice versa). Thus, the total effect of *H* or the *HHI* on the number of bank relationships depends on the estimated coefficient of the interaction term. For instance, a negative coefficient for the interaction term indicates that the higher the degree of competition, the lower the effect of concentration on the number of bank relationships (and vice versa). Column (5) shows that both *H*-Statistic and *HHI* retain their respective signs and level of significance when the interaction term is included. The interaction term enters positively and significantly, implying that the effect of *H* on the number of relationships is greater in more concentrated markets.

Visual inspection of the magnitude of the coefficients for *H* and *HHI* in column (4) already indicates that their respective positive and negative effects cancel out. To further investigate this, we evaluate the independent effects arising from competition and concentration, using a logit model with marginal effects, and compute the impact of increasing these two variables by one percent on the probability of engaging in an additional relationship. The dependent variable is recoded for this test to take on the value zero if the *SME* only maintains one bank financing relationship or one if the *SME* makes use of more than one bank relationships. We report marginal effects, because the magnitude of the change in the probability of setting up an additional lending relationship depends on the initial values of all the independent variables and their coefficients. The results are provided in Appendix III, column (4).

While increasing the *HHI* by one percent ( $0.001 \times -0.3542$ ) decreases the probability of having an additional bank relationship by 0.04 percent, this effect is more than offset by increasing competition. In fact, increasing the *H*-Statistic by one percent ( $0.001 \times 0.4737$ ) increases the probability of having an additional bank relationship by 0.05 percent. This calculation illustrates that the adverse ramifications arising from increased consolidation in banking are totally offset by greater competition in banking.

Among the control variables in Table 2, we find that *Firm Age* increases the number of bank relationships, and so do *Turnover*, *Distance*, and the *Amount of Bank Finance Used*. The dummy variables for *Bank Role* and *Bank Terms* also enter significantly with a positive sign. The more

influential a bank, the more likely the SME seeks additional bank relationships. This could reflect the SMEs' awareness that the lender is trying to extract rents. Likewise, if firms perceive banks' terms to be favourable, they increasingly establish multiple lending relationships (Harhoff and Körting, 1998). The dummy variables for *National* and *Regional Bank* also enter positively and significantly. Doing business with a regional bank increases the number of bank relationships as the regional bank may not be able to provide as broad a range of services as required by the SME (Berger et al. forthcoming). On the other hand, doing business with a national bank may not be sufficient as the SME may want to retain a relationship with a local lender that is better able to process 'soft' information.

By contrast, *Firm Type*, *Ownership change*, and *R&D investment* enter negatively and significantly in Table 2. Private firms are less likely to have more than one bank relationship when compared to public firms, suggesting that more opaque firms tend to have less bank relationships as providers of funds that do not have access to 'soft' information will incur greater monitoring costs. The negative effect of ownership change may reflect banks' reluctance to provide services to firms that change ownership and require an assessment of whether the new SME management is able to provide them with the necessary creditworthiness requirements. The weakly inverse association of bank relationships with R&D investment could be driven by the SMEs' concern about possible information leakages.

It is important to acknowledge that including variables that capture competition and concentration considerably improve upon the fit of the model. While the regression in column (2) only explains about 40 percent of the variation in the number of bank relationships, the pseudo  $R^2$  increases to 46 percent when both *H* and *HHI* enter the regression equation simultaneously in column (4).

#### *Regional and financial system characteristics*

In Table 3, we investigate the effect of characteristics of the local banking market and of the wider financial system. As we are not specifically interested in the control variables, we constrain the subsequent discussion to regional and financial system characteristics and the effects of the *H*-Statistic and the *HHI*.

[TABLE 3 about here]

In terms of *Access to Financial Services*, measured by the ratio of bank branches per sq km, we find that a higher density of branch offices makes it easier to access providers of financial services.

The econometric tests corroborate our conjecture that regional factors affect the number of bank relationships. Higher *Regional GDP growth*, a larger *Regional Population*, and more *Regional Patents* are all significantly positively associated with our dependent variable. SMEs are likely to expand in scope and scale when the local economy prospers and innovates. This makes them diversify their financing relationships. Moreover, our result concerning regional population is aligned with Affinito and Piazza (2005) whose results indicate that an economically active local population requires wider access to banking services.

*Stock Market Capitalization/GDP* shows negative and significant association with multi-bank relationships. We attribute this result to the fact that SMEs operating in environments with better developed stock markets have a substantial part of their financial needs met through equity. A similar result, although not significant, is reported by Ongena and Smith (2000).

Both H-Statistic and HHI retain their respective sign and level of significance throughout all regressions in Table 3, suggesting that our inferences also hold when regional and financial system characteristics are accounted for.

#### *Institutional characteristics*

We examine the effects of the institutional environment and design features of the regulatory system in Table 4.

[TABLE 4 about here]

Both *Financing* and *Legal obstacles* are negatively related to the number of bank financing relationships. As financing obstacles increase, SMEs are less inclined to have more than one bank relationship since the environment makes it harder to develop new opportunities. Moreover, SMEs with one relationship are likely to be prone to maintain and nurture an existing bank relationship, anticipating that having one healthy banking relationship benefits the firm. Likewise, legal obstacles require greater knowledge of the legal environment (something which SMEs might not have or only



develop over time of being in business, given their local/community nature). As shown in Beck et al. (2005a), the extent to which financial and legal underdevelopment constrain a firm's growth depends very much on a firm's size. Smallest firms are consistently the most adversely affected by all obstacles. In fact, our results are aligned with the 'soft budget' constraint hypothesis (see also Ongena and Smith, 2000), proposing that inefficient judicial systems motivate firms to maintain more bank relationships.

With respect to the *Cost to start a business*, we find that higher costs induce firms to engage in multiple relationships. As anticipated, the more costs businesses incur towards their set-up, the more use of financial support they will need, particularly in instances where they do not have self-financing. The advice provided by banks that have assisted SMEs during their set-up may prove invaluable for SMEs. Similarly, *Time to start a business* also increases the number of financing relationship. This could be due to the fact that financing working capital is spread across a number of lenders in the early stages of a business as each lender individually may not be keen on committing large volume loans to the start-up company.

In line with our expectation, *Banking freedom* enters positively and significantly, suggesting that institutional factors conducive to a more open environment facilitate the establishment of multiple bank relationships.

The HHI retains its sign and level of significance throughout all regressions in Table 4. The H-Statistic also remains significant with the anticipated sign in all but one specification. It is only rendered insignificant when *Banking freedom* is controlled for. Thus, our inferences regarding concentration and competition are insensitive to controlling for the institutional setting.

#### 4 Sensitivity Tests

We embark on a set of robustness tests to investigate if our results are sensitive to the way competition and concentration are measured.<sup>18</sup>

[TABLE 5 about here]

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<sup>18</sup> We also ran the regressions for regional and financial system characteristics (Table 3), and for the institutional environment (Table 4) with the alternative measures of concentration and competition. We obtain virtually identical results with respect to the effects of competition and concentration. The results can be obtained from the authors on request.

Table 5 presents four regressions. In column (1) and (2) we employ an alternatively computed H-Statistic as a measure of competition. This H-Statistic is calculated using the ratio of interest revenue to total assets instead of the ratio of total revenue to total assets as dependent variable (see also Molyneux et al., 1994). The alternative H-Statistic enters significantly with a positive sign, suggesting that the way H is calculated does not affect the inferences.

Columns (3) and (4) replace the HHI with the 3-bank concentration ratio to gauge the degree of concentration in banking systems. This variable is frequently used in studies of bank concentration (e.g. Beck et al., 2006). The findings are not affected. We therefore conclude that measurement errors of concentration do not drive our findings.

Finally, we exploit the fact that our dataset only provides information on the number of bank relationships for zero, one, or multiple bank relationships and test the sensitivity of our results to the specification of the econometric model. As alluded to in Section 3, we employ a logit model and calculate marginal effects. Our findings regarding the effects of competition, concentration, and the regional, financial system, and institutional characteristics are corroborated. The results from this final sensitivity check are presented in Appendix III.

## 5 Concluding Remarks

Against a background of increasing concentration and competition in European banking systems and marked changes in the regulatory environment which financial institutions operate in, this paper seeks to establish the effect of such changes on the determinants of the number of SME bank financing relationships in three distinct European regions. To the best of our knowledge, this study provides the first insight of the determinants of financing relationship of SMEs in Europe.

Employing a new dataset from a cross-sectional survey of SMEs, we uncover independent effects arising from competition and concentration on the number of lending relationships maintained by SMEs. Small and medium sized firms maintain more relationships in more competitive banking systems. This result is consistent with the ‘market power’ hypothesis in the literature.

Importantly, our results substantiate the assertion in recent empirical work that competition and concentration describe different characteristics of banking systems. More precisely, the findings underscore that decreasing effects on the number of bank relationships arising from increased consolidation in banking are offset by increased competition. Furthermore, this conclusion is robust to alternative measures of competition and concentration.

Our study also analyses measures that capture information on the local economic environment and regarding design features of the institutional system on the country-level. In that respect, we find that regional GDP growth, regional population, and a stimulating local entrepreneurial environment foster the establishment of multiple lending relationships, whereas legal and financing obstacles are an impediment to multiple relationships.

These findings bear important policy implications: In particular, the results imply that measures of market structure such as the HHI and the 3-bank concentration ratio may be inappropriate proxies for the degree of competition in banking as we reveal that both structure and conduct affect SMEs' financing relationships in opposite directions. Moreover, the frequently raised concern among policymakers and in the media about the adverse ramifications from an increase of consolidation in banking concerning the provision of banking services to SMEs is not justified, given that these negative effects are fully offset by the increased competition in banking. In addition, the finding that legal obstacles are an impediment to diversifying lending relationships indicates that policies aimed at encouraging SMEs to expand in scope and scale (which often requires setting up additional bank relationships) are bound to be unsuccessful if legal institutions are not amended accordingly. Finally, removing barriers and obstacles that hamper setting up multiple bank relationships imposed on banks will enable SMEs to develop and mature by making use of more sophisticated financial services, thus ultimately promoting economic growth.

Data limitations concerning the comparatively small sample size suggest that our results have to be taken with a note of caution. Nonetheless, our findings complement a growing body of empirical work in the banking literature suggesting that concentration and competition describe different characteristics of banking systems.

This paper can be extended in other directions. Obviously, it would be interesting to examine our hypotheses with a larger cross-country sample, including less developed economies. Another intellectually appealing avenue for future work would be to analyse the effect of the availability of venture capital and private equity on SME financing and the way SMEs interact with their banks. Finally, an examination of how different lending technologies are affected by concentration and competition also seems worthwhile.

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## Appendix I: Definitions of explanatory variables

Variable	Description	Source
Multi-bank relationships	Whether SME has 0, 1, or more than 1 bank relationship	Cambridge SME Survey
Turnover	Turnover for year 2001. Variable takes value of 1 if < £499k; value of 2 if between £500k and £999k; value of 3 if between £1m - £9.9m; value of 4 if between £10m - over.	Cambridge SME Survey
Year	Ranges between 1700 and 2001 and is measured as the difference between 2001 and the year the SME began trading.	Cambridge SME Survey
Ownership	Takes value of 1 if the company is still under the same ownership, 0 otherwise.	Cambridge SME Survey
Employees	Employees for year 2001. Variable takes value of 1 if between 1 - 5; value of 2 if between 10 - 19; value of 3 if between 20 - 49; value of 4 if between 50 - 99; value of 5 if >=100.	Cambridge SME Survey
R&D Expenditure	Take value of 1 if SME invests in R& D, 0 otherwise.	Cambridge SME Survey
Type of Company	Whether the SME is public or private company (1=public, 0 otherwise).	Cambridge SME Survey
Bank Role	Takes value of 1 if bank plays a role for SME being either a seat on the firm's board; technical advice; management advice; marketing and sales advice; and other roles; 0 otherwise.	Cambridge SME Survey
Bank Terms	Takes value of 1 if bank's terms are reasonable, 0 otherwise.	Cambridge SME Survey
Regional Bank	1 if Regional Bank 1 if National bank or 0 otherwise. Italian regional banks are Cooperative, Local and Regional banks; with National and other banks considered as National Banks. Germany regional banks are Sparkassen, Raiffeisen, Volksbank, Regionale Privatbank; with Überregionale Privatbank, Postbank, Spardabank, Sonstige and other banks considered as National Banks. UK regional banks are Clearing banks; with Investment Banks considered as National Banks.	Cambridge SME Survey
Distance	Distance of bank from firm. Variable takes value of 1 if < 10 miles; value of 2 if between 10 - 49 miles; value of 3 if >= 50 miles.	Cambridge SME Survey
Time to start business	Time in days to set up a business	World Bank Survey (2005)
Cost to start business	Cost, measured in percent of income per capital, to set up a business	World Bank Survey (2005)
Banking freedom	An indicator of relative openness of banking and financial system, averaged over the period 1995-99: specifically whether the foreign banks and financial services firms are able to operate freely, how difficult it is to open domestic banks and other financial services firms, how heavily regulated the financial system is, the presence of state-owned banks, whether the government influences allocation of credit, and whether banks are free to provide customers with insurance and invest in securities (and vice-versa). The index ranges in value from 1 (very low) to 5 (very high), calculated as 6 minus the banking freedom index of the Heritage Foundation.	Barth et al. (2001)
Financing obstacle	Firms to rate on scale of 1-4, how problematic specific financing issues are for the operation and growth of their business. These are i) collateral requirements of banks and financial institutions; ii) bank paperwork and bureaucracy; iii) high interest rates; iv) need for special connections with banks and financial institutions; v) banks lacking money to lend; vi) access to foreign banks; vii) access to non-bank equity; viii) access to export finance; ix) access to financing for leasing equipment; x) inadequate credit and financial information on customers; and xi) access to long-term loans.	Beck et al. (2005a)
Legal Obstacle	Businesses asked whether i) information on laws and regulations was available; ii) if the interpretation of laws and regulations was consistent; and iii) if they were confident that the legal system upheld their contract and property rights in business disputes 3 years ago, and continues to do so now. Businesses asked whether their country's courts are i) fair and impartial; ii) quick; iii) affordable; iv) consistent; and v) enforced decisions.	Beck et al. (2005a)

Access to financial services	Measure of the outreach of the financial sector in terms of access to banks' physical outlets. Question asked: 'How many bank branches do deposit money banks have (combined for all banks) in your country?' (Italy, Germany, UK: Regulator Survey, 2002)	Beck et al. (2005b)
Stock Market Cap. / GDP	Value of listed shares divided by GDP. Indicator of Stock Market Size.	Beck et al. (2000)
Regional GDP	Gross domestic product (GDP) at current market prices	REGIO Database
Regional Population	Economically active population by sex and age	REGIO Database
Regional Patent applications	All Patent applications to the EPO by priority year at the regional level.	REGIO Database
3-bank concentration ratio	Sum of the market shares of the 3 largest banks in terms of total assets	Beck et al. (2006)
Herfindahl-Hirschman index	Sum of the squared market shares in terms of total assets	BankScope and authors' calculations
H-Statistic	Measure of the degree of competition	BankScope and authors' calculations

## Appendix II: Computation of the H-Statistic

We present in this appendix a brief overview of the Panzar and Rosse (1987) H-Statistic that we utilise to gauge competition. This statistic is widely used in empirical work to test for banking competition (e.g. Shaffer, 2004; Molyneux et al., 1994; Claessens and Laeven, 2004).

The H-Statistic is derived from reduced-form revenue equations and measures market power by the extent to which changes in factor input prices are reflected in revenue. Assuming long-run equilibrium, a proportional increase in factor prices will be mirrored by an equiproportional increase in revenue under perfect competition. Under monopolistic competition, however, revenues increase less than proportionally to changes in input prices. In the monopoly case, increases in factor input prices will be either not reflected in revenue, or will tend to decrease revenue.<sup>19</sup> The magnitude of H can be interpreted in the following way:

$H \leq 0$	indicates monopoly equilibrium
$0 < H < 1$	indicates monopolistic competition
$H = 1$	indicates perfect competition

We obtain data from BankScope and include all savings, co-operative, and commercial banks operating in Italy, Germany, and in the UK in 2001. To estimate H-Statistics, we follow the method in Schaeck and Cihak (2007) and split our sample into small and large banks since potential differences in the way these banks compete will bias H. Small banks often operate locally and tend to face stronger competition from other small banks in retail markets. By contrast, large institutions compete in different lines of business, e.g. corporate and investment banking, and compete globally. We use a cut-off point of 450 million EUR to distinguish between small and large banks<sup>20</sup> and estimate the following reduced-form revenue equation cross-sectionally for each one of the three countries in 2001

$$\ln(R) = \alpha + \beta_1 \ln(W_1) + \beta_2 \ln(W_2) + \beta_3 \ln(W_3) + \gamma_1 \ln(Y_1) + \gamma_2 \ln(Y_2) + \gamma_3 \ln(Y_3) + \gamma_4 \ln(Y_4) + \varepsilon. \quad (\text{A.1})$$

<sup>19</sup> Therefore, the magnitude of the H-Statistic can serve as a measure for the degree of competition, assuming that the bank faces a demand with constant elasticity and a Cobb-Douglas production technology (Vesala, 1995).

<sup>20</sup> This cut-off point is aligned with the literature on small banks in Europe (Mercieca et al., 2007).

$R$  is the ratio of total revenue to total assets (as a proxy for the output price of loans and other services). This dependent variable includes total interest revenue, fee income, commission income, and other operating income to reflect that banks compete in many different activities. The variable  $W_1$  is the ratio of interest expenses to total deposits and money market funding (as a proxy for input price of deposits),  $W_2$  is the ratio of personnel expenses to total assets (proxy for input price of labour), and  $W_3$  denotes the ratio of other operating and administrative expense to total assets (proxy for input price of equipment and fixed assets). To take account of risk-taking behaviour and size,  $Y_1$  captures the ratio of deposits to deposits and money market funding,  $Y_2$  is the ratio of net loans to total assets,  $Y_3$  is the ratio of equity to total assets, and  $Y_4$  captures bank size, measured as total balance sheet assets. All variables enter the equation in logs. The H-Statistic is calculated as the sum of the coefficients  $\beta_1 + \beta_2 + \beta_3$ .

It is well known that the H-Statistic assumes long-run equilibrium (Molyneux et al., 1994). Consequently, we perform the following analysis to investigate long-run equilibrium and estimate Equation (1) with the pre-tax return on assets as dependent variable.

$$\begin{aligned} \ln(ROA) = & \alpha + \beta_1 \ln(W_1) + \beta_2 \ln(W_2) + \beta_3 \ln(W_3) \\ & + \gamma_1 \ln(Y_1) + \gamma_2 \ln(Y_2) + \gamma_3 \ln(Y_3) + \gamma_4 \ln(Y_4) + \varepsilon \end{aligned} \quad (\text{A.2})$$

The modified H-Statistic is the equilibrium statistic and it is again calculated as  $\beta_1 + \beta_2 + \beta_3$ . We test if the equilibrium statistic  $E = 0$ , using an F-test. This test aims to establish whether input prices are uncorrelated with industry returns since a competitive system will equalise risk-adjusted rates of return across banks in equilibrium. If this hypothesis is rejected, the market is assumed to be in disequilibrium. The results from our equilibrium test indicate that the three markets under consideration are in long run equilibrium.

### Appendix III: Logit model with marginal effects

	(1)	(2)	(3)	(4)	(5)
Firm Age	0.3419 (0.3916)	0.2842* (0.4015)	0.1577 (0.4153)	0.2196 (0.4116)	0.2192 (0.4118)
Firm Type	2.1840*** (0.3521)	0.6639 (0.4317)	0.9274** (0.4019)	0.3444** (0.4430)	0.3630* (0.4415)
Ownership change	-1.3149*** (0.3131)	-0.2647*** (0.3762)	-0.5539 (0.3541)	-0.1538 (0.3837)	-0.1681 (0.3821)
R&D investment	-0.5234 (0.3305)	-0.4272 (0.3536)	-0.3190 (0.3584)	-0.3422 (0.3662)	-0.3203 (0.3649)
Turnover	0.6384** (0.1753)	0.4051 (0.1848)	0.2010* (0.1006)	0.3916 (0.1891)	0.6859 (0.0266)
Distance	0.4761 (0.3444)	0.2207* (0.3767)	0.1843* (0.4027)	0.0440*** (0.4112)	0.0558*** (0.4112)
Bank Role	0.2015** (0.3658)	1.0787* (0.4484)	0.6395*** (0.4054)	0.2040*** (0.5028)	0.1922*** (0.5021)
Bank Terms	0.7253* (0.4110)	1.1786*** (0.4919)	0.8404* (0.4942)	1.1305** (0.5341)	1.1129** (0.5346)
Amount of bank finance used	0.0248 (0.1360)	0.2266** (0.1496)	0.1096** (0.1404)	0.1793* (0.1524)	0.2102** (0.1481)
Regional bank	2.6376*** (0.7082)	2.8666*** (0.7426)	2.7788*** (0.7533)	2.8243*** (0.7427)	2.8171*** (0.7416)
National bank	2.1809*** (0.6108)	2.9124*** (0.6259)	1.6683** (0.6935)	2.2350*** (0.6879)	2.2420** (0.6878)
HHI		0.8680*** (0.5558)		-0.3542** (0.7479)	0.9709*** (0.4806)
H-Statistic			0.6129*** (0.8737)	0.4737*** (0.1486)	0.3427* (0.3634)
HHI*H-Statistic					0.9833 (0.5541)
Pseudo R <sup>2</sup>	0.44	0.53	0.54	0.57	0.56
Observations	305	305	305	305	305

Dependent variable: Multi-bank relationships with 0 being a firm with one bank relationship, 1 being a firm with more than one bank relationship. \*\*\*, \*\*, \* indicates statistical significance at the 1%, 5%, and 10% level respectively. Robust standard errors in parentheses.

**Table 1: Descriptive statistics**

	Italy				Germany				UK		
<b>Bank Relationships</b>	<b>0</b>	<b>1</b>	<b>&gt;1</b>		<b>0</b>	<b>1</b>	<b>&gt;1</b>		<b>0</b>	<b>1</b>	<b>&gt;1</b>
Total Observations	161			114				247			
% of Total Observations	12.4	16.1	71.4		55.3	20.2	24.6		54.3	42.9	2.8
Oldest Trading SMEs	1932	1927	1905		1900	1868	1602		1926	1926	1959
Youngest SMEs (year of incorporation)	1999	1999	2001		2001	2001	2001		2001	2001	1998
Changed ownership	8	8	39		46	15	15		119	95	6
Turnover -Average	2.8	2.5	3.2		2.11	2.57	2.75		1.49	2.02	2.14
Private Company	4	9	33		48	20	20		131	106	7
Public Company	16	17	82		15	3	8		3	0	0
Employees - Average	2	1.58	2.23		2.11	2.70	3.11		1.46	1.93	2.57
R&D Investment (1=yes)	20	12	65		41	12	13		50	49	3
Distance (miles) - Average	0	1.12	1.10		0	1.13	1.25		0	1.41	1.43
Favourable Terms (1=yes)	0	26	94		0	20	22		0	85	4
Regional Bank	0	23	105		0	9	24		0	101	6
National Bank	0	3	10		0	15	20		0	2	2
HHI	0.0483			0.0859				0.0828			
Concentration Ratio	0.3216			0.4551				0.3846			
H-Statistic (average)	0.4718			0.6694				0.6474			
Amount of Bank Finance Used (Average)	1.88			1.18				0.75			
Branches/sq. km	102.05			116.90				45.16			
Regional GDP	109.06			369.60				238.30			
Regional Population	1.865			6.177				4.156			
Regional Patent Applications (number)	754			5902				1930			
Stock market cap/gdp	0.6007			0.6356				1.6958			
Legal Obstacles	2.27			2.14				1.51			
Financing Obstacles	1.98			2.60				2.21			
Time to start business (days)	23			45				18			
Cost to start business (% of income/capita)	16.7			5.8				0.9			
Banking Freedom	2.14			2.71				1.00			

**Table 2: Tobit model**

	(1)	(2)	(3)	(4)	(5)
Firm Age	0.1575** (0.0610)	0.1571** (0.0605)	0.1277** (0.0566)	0.1048* (0.0551)	0.1078* (0.0648)
Firm Type	-0.3542*** (0.0582)	-0.3493*** (0.0580)	-0.1303** (0.0618)	0.0177 (0.0662)	0.0183 (0.0531)
Ownership Change	-0.3037*** (0.0527)	-0.3001*** (0.0525)	-0.1595** (0.0526)	-0.0674 (0.0535)	-0.0534 (0.0520)
R&D investment	-0.1183** (0.0527)	-0.1150** (0.0525)	-0.0936* (0.0491)	-0.0890* (0.0470)	-0.0639 (0.0521)
Turnover	0.0637** (0.0279)	0.0617** (0.0278)	0.0269 (0.0264)	0.0091 (0.0256)	0.0833 (0.0221)
Distance	0.1996*** (0.0506)	0.2037*** (0.0506)	0.2427*** (0.0478)	0.2464*** (0.0457)	0.2455*** (0.0415)
Bank Role	0.3084*** (0.0621)	0.3553*** (0.0694)	0.4010*** (0.0599)	0.2530*** (0.0628)	0.3012*** (0.0513)
Bank Terms	0.2165*** (0.0651)	0.2242*** (0.0652)	0.2085** (0.0605)	0.1618*** (0.0584)	0.2010*** (0.0602)
Amount of bank finance used	0.0450** (0.0225)	0.0427** (0.0225)	0.0507** (0.0210)	0.0652** (0.0203)	0.0783** (0.0304)
Regional bank	1.1774*** (0.0844)	1.1628*** (0.0845)	1.0929*** (0.0788)	1.0772*** (0.0756)	1.0885*** (0.0801)
National bank	0.9196*** (0.0852)	0.8535*** (0.0946)	0.7108*** (0.0827)	0.8399*** (0.0845)	0.8395*** (0.0851)
HHI		0.6357** (0.4152)		-2.818*** (0.5353)	-0.5148*** (0.0568)
H-Statistic			1.7312*** (0.2435)	2.9655*** (0.3302)	1.6779*** (0.0401)
HHI*H-Statistic					0.3175*** 0.0748
Pseudo R <sup>2</sup>	0.40	0.40	0.42	0.46	0.46
Observations	522	522	522	522	522

Dependent variable: Multi-bank relationships with 0 being a firm with no bank relationships, 1 being a firm with one bank relationship and 2 representing firms with more than one bank relationship. \*\*\*, \*\*, \* indicates statistical significance at the 1%, 5%, and 10% level respectively.

**Table 3: Regional and financial system characteristics**

	(1)	(2)	(3)	(4)	(5)
Firm Age	0.0986* (0.0560)	0.1027** (0.0551)	0.1033** (0.0578)	0.1048** (0.0552)	0.1053** (0.0487)
Firm Type	0.0068 (0.0673)	0.0179 (0.0662)	0.0161 (0.0600)	0.0177 (0.0662)	0.0163 (0.0503)
Ownership Change	-0.0468 (0.0542)	-0.0683 (0.0535)	-0.0678 (0.0441)	-0.0674 (0.0535)	-0.0672 (0.0555)
R&D investment	-0.1064** (0.0474)	-0.0890** (0.0470)	-0.0903** (0.0378)	-0.0890** (0.0470)	-0.0869* (0.0441)
Turnover	0.0067 (0.0259)	0.0093 (0.0256)	0.0103 (0.0274)	0.0091 (0.0256)	0.0171 (0.1228)
Distance	0.2796*** (0.0454)	0.2433*** (0.0457)	0.2479*** (0.0401)	0.2464*** (0.0457)	0.2490*** (0.0456)
Bank Role	0.1082** (0.0672)	0.2572*** (0.0628)	0.2498*** (0.0633)	0.2530*** (0.0628)	0.2544*** (0.0629)
Bank Terms	0.1409** (0.0599)	0.1731** (0.0584)	0.1624** (0.0678)	0.1618** (0.0584)	0.1583** (0.0661)
Amount of bank finance used	0.0687*** (0.0205)	0.0699** (0.0203)	0.0689** (0.0204)	0.0652** (0.0204)	0.0515*** (0.0167)
HHI	-0.4442*** (0.4857)	-1.5006*** (2.6788)	-1.8143*** (3.4093)	-0.6918*** (0.8705)	-0.2560*** (0.5624)
H-Statistic	1.6382** (0.7317)	0.8170*** (1.3338)	0.9812*** (1.7122)	0.4081*** (0.4618)	1.7352*** (0.3872)
Regional bank	1.1540*** (0.0741)	1.0729*** (0.0744)	1.141*** (0.0756)	1.0749*** (0.0763)	1.0812*** (0.0741)
National bank	0.8693** (0.0867)	0.8341** (0.0801)	0.8011*** (0.0845)	0.8398*** (0.0792)	0.8387*** (0.0830)
Access to financial services	0.0080** (0.0037)				
Regional GDP growth		0.0078*** (0.0018)			
Regional population			0.5959*** (0.1405)		
Regional patents				0.0001*** (0.3253)	
Stock market cap/GDP					-0.3130*** (0.0739)
Pseudo R <sup>2</sup>	0.47	0.46	0.46	0.46	0.45
Observations	522	522	522	522	522

Dependent variable: Multi-bank relationships with 0 being a firm with no bank relationships, 1 being a firm with one bank relationship and 2 representing firms with more than one bank relationship. \*\*\*, \*\*, \* indicates statistical significance at the 1%, 5%, and 10% level respectively.



**Table 4: Access to finance and institutional environment**

	(1)	(2)	(3)	(4)	(5)
Firm Age	0.1033** (0.0549)	0.1048** (0.0551)	0.0018** (0.0008)	0.1067* (0.0552)	0.1060* (0.0552)
Firm Type	0.0129 (0.0662)	0.0177 (0.0662)	0.0346 (0.0657)	0.0181 (0.0662)	0.0165 (0.0661)
Ownership Change	-0.0641 (0.0514)	-0.0674 (0.0535)	-0.0592 (0.0534)	-0.0659 (0.0536)	-0.0677 (0.0535)
R&D investment	-0.1023** (0.0523)	-0.0890** (0.0470)	-0.0924** (0.0467)	-0.1077* (0.0609)	-0.0871* (0.0470)
Turnover	0.0201 (0.0226)	0.0091 (0.0256)	0.0414 (0.1201)	0.0244 (0.1217)	0.0188 (0.1213)
Distance	0.2458*** (0.0409)	0.2464*** (0.0457)	0.2478*** (0.0458)	0.2451*** (0.0460)	0.2469*** (0.0459)
Bank Role	0.2531*** (0.0633)	0.2530*** (0.0628)	0.2554*** (0.0627)	0.2535*** (0.0628)	0.2528*** (0.0629)
Bank Terms	0.1637** (0.0567)	0.1618** (0.0584)	0.1584** (0.0583)	0.1603** (0.0585)	0.1621** (0.0584)
Amount of bank finance used	0.0697** (0.0213)	0.0652** (0.0203)	0.0642** (0.0199)	0.0670** (0.0199)	0.0672** (0.0199)
HHI	-0.4185*** (0.4833)	-0.0278* (1.0147)	-0.6160*** (0.7499)	-0.2796*** (5.7435)	-0.4929*** (0.5457)
H-Statistic	0.6323*** (0.9175)	0.9785*** (0.3634)	0.3025*** (0.3257)	0.2618*** (5.5940)	1.7976 (0.3792)
Regional bank	1.0768*** (0.0761)	1.0772*** (0.0756)	1.0778*** (0.0752)	1.0731*** (0.0756)	1.0751*** (0.0755)
National bank	0.8341*** (0.0847)	0.8399*** (0.0845)	0.8570*** (0.0844)	0.8369*** (0.0846)	0.8383*** (0.0846)
Legal obstacles	-1.1850*** (0.2794)				
Financing obstacles		-0.7608*** (0.1794)			
Time to start business			0.0257*** (0.0066)		
Cost to start business				0.3564*** (0.0846)	
Banking Freedom					0.4141*** (0.0977)
Pseudo R <sup>2</sup>	0.46	0.46	0.45	0.48	0.45
Observations	522	522	522	522	522

Dependent variable: Multi-bank relationships with 0 being a firm with no bank relationships, 1 being a firm with one bank relationship and 2 representing firms with more than one bank relationship. \*\*\*, \*\*, \* indicates statistical significance at the 1%, 5%, and 10% level respectively.

**Table 5: Robustness tests with alternative measures of competition and concentration**

	(1)	(2)	(3)	(4)
Firm Age	0.1210** (0.0559)	0.1048* (0.0551)	0.1167** (0.0571)	0.1048* (0.0551)
Firm Type	-0.0864 (0.0627)	0.0177 (0.0662)	-0.0403 (0.0673)	0.0177 (0.0662)
Ownership Change	-0.1312** (0.0527)	-0.0674 (0.0535)	-0.1101** (0.0542)	-0.0674 (0.0535)
R&D investment	-0.0910* (0.0484)	-0.0890* (0.0470)	-0.1006** (0.0484)	-0.0890* (0.0470)
Turnover	0.0206 (0.0261)	0.0091 (0.0256)	0.0214 (0.0263)	0.0091 (0.0256)
Distance	0.2469*** (0.0472)	0.2464*** (0.0457)	0.2312*** (0.0467)	0.2464*** (0.0457)
Bank Role	0.3794*** (0.0582)	0.2530*** (0.0628)	0.1532** (0.0595)	0.2530*** (0.0628)
Bank Terms	0.1990*** (0.0597)	0.1618** (0.0584)	0.1531** (0.0599)	0.1618*** (0.0584)
Amount of bank finance used	0.0539** (0.0207)	0.0652** (0.0203)	0.0678** (0.0209)	0.0652** (0.0203)
Regional bank	1.0841*** (0.0777)	1.0772*** (0.0756)	1.1279*** (0.0774)	1.0772*** (0.0756)
National bank	0.7205*** (0.0806)	0.8399*** (0.0845)	1.0075*** (0.0796)	0.8399*** (0.0845)
H-Statistic (total revenue)				1.1291*** (0.2601)
H-Statistic (interest revenue)	0.8101*** (0.3612)	0.9775*** (0.4429)		
HHI		-2.0537*** (0.4786)		
3-bank concentration ratio			1.6763*** (0.2138)	-1.2038*** (0.2295)
Pseudo R <sup>2</sup>	0.43	0.46	0.44	0.46
Observations	522	522	522	522

Dependent variable: Multi-bank relationships with 0 being a firm with no bank relationships, 1 being a firm with one bank relationship and 2 representing firms with more than one bank relationship. \*\*\*, \*\*, \* indicates statistical significance at the 1%, 5%, and 10% level respectively.