

NUMBER OF BANKS AND CREDIT RELATIONSHIPS
EMPIRICAL RESULTS FROM FRENCH SMALL BUSINESS DATA

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Running title : Number of banks and credit relationships : an empirical approach

Abstract

In this contribution, we test various theories relative to the choice of the number of bank lending relationships on a self-made sample of French small and medium business. We also use these theories to formulate hypotheses relative to collateral requirements, costs and availability of credit financing. We use specific data-set reporting detailed information on lending relationships and firm's characteristics from a sample of 244 firms. Our results suggest that firm's size, profitability and the degree of information opacity significantly reduce the number of credit relationships. Single-bank firms are more likely to face important collateral requirements, indicating that banks adopt strategic behaviours depending on the competition level represented by the number of banks. Results also put into light that potential lenders are more likely to extend credit to firms with long-term lending relationships, in the framework of credit financing which does not expose banks beyond a certain risk level.

J.E.L Classification: G21; G32

Keywords: Lending relationships, Multiple bank, Small and medium business, Loan contract design

1. Introduction

A long-term bank lending relationship can be defined as a repetition, in the course of time, of supply and demand for credit, emanating respectively from a bank and a firm for the financing of the latter. This relationship appears as the expression of the ability of credit institutions to partially eliminate costly information asymmetries about firms by creating information through time. Thus, an established bank lending relationship allows the lender to renegotiate contract terms at low cost, thereby creating financial flexibility and reducing credit rationing. These benefits are particularly important for Small and Medium Business (S.M.B) in the sense that a relationship with a bank is often the only way to obtain outside financing. In that context, the theory of financial intermediation focuses on the unique characteristic of the relationship as an essential factor with the achievement and the sharing of these economies of scale, explaining that a single-bank relationship arises as the optimal mechanism for channelling loans from investors to firms. However, available data suggest that S.M.B adopt, considering the choice of the number of banks, a notably different strategy by maintaining multiple relationships (Table 1).

Empirical works on this question propose various explanations for firm's behaviour maintaining multiple-bank lending relationships but there is little evidence proving the influence of the number of bank relationships on loan agreements and the performance of firms within the French financial system. In this contribution, a specific data-set of French S.M.B enables to empirically examine the determinants of the number of banks. We also use this information in the carrying out of tests relating to the effects of pre-existing relationships on collateral requirements, credit interest rate and exposure to credit rationing.

Our work is organised in the following way. In section 2, an overview of the theoretical literature relating to the subject permits to formulate testable hypotheses for the empirical part of the paper. Section 3 describes data and methodology. Section 4 presents econometric results and section 5 concludes.

2. Associated literature and testable hypotheses

2.1. Number of banks and firm's characteristics

Firm's size can be viewed as the first indicator of the number of maintained bank relationships. Three main reasons explain this choice. First, firm's size is initially regarded as an indicator in the financial needs to come. Moreover, maintaining bank relationships for a firm implies a certain number of quasi-fixed costs (research, co-ordination and transmission of information), which represent an heavy expenses as firm's size is reduced (Machauer and Weber, 2000). Lastly, from the bank's point of view, firm's size also plays a role within the framework of a policy of diversification of default risk. Thus, multiple lenders appear, for the bank, as a less risky process to finance investment plans (Detragiache and al., 2000). These elements enable to formulate the first subject to test, "smallest" firms are characterised by a less significant number of banks.

Similarly, one can regard the firm's life-span as a significant determinant of the number of banks. Indeed, prior works (Farinha and Santos, 2000; D'Auria and al., 1999) underline the existence of a life-cycle of the financial relationships of S.M.B. According to this cycle, first years of firm's life are characterised by a reduced number of bank relationships while the older firms count a more significant average number. This relation is confirmed by the analysis of the determinants of switching from single to multiple-bank relationships, duration of the current relationship¹ and firm's age are significant factors of switching according to Farinha

and Santos (2000), whereas Ongena and Smith (1997) highlight a positive link between duration of an established relationship and the probability of its end. Thus, value of the bank lending relationship is supposed to be a decreasing function of its duration (Greenbaum and al., 1989). Then, hypothesis n°2 is that the “youngest” firms are characterised by a less significant number of banks.

From a qualitative point of view, lending relationships between a bank and a firm are characterised by some process of creation, exchange and consequently disclosure of proprietary information about firm’s activity. In that context, a number of banks higher than one implies, within the framework of competing local market or strategic activities, a multiplication of risks of “leaks” of strategic information about firm’s plans. Battacharya and Chiesa (1995) underline that maintaining a single-bank relationship protects proprietary information about firms. Yosha (1995) using the game theory shows that, with regard to the existing competition level, the number of banking sources determines the degree of revelation of firm’s confidential information concerning investment plan quality. In this framework, most profitable firms should be characterised by a reduced number of bank relationships to avoid disclosure of strategic information, that’s our hypothesis n°4.

The lack of transparency of a firm, a synonym for high costs to collect information for external lenders, is another supposed factor increasing the likelihood of maintaining a bilateral bank relationship. These predictions are defined under the “single-bank firm-opacity hypothesis” (Berger and al., 2001). Previously defined assumptions 1 and 2 integrate this context of analysis since size and age are viewed as firm’s opacity indicators. However, we formulate a more general assumption using other measurements of the level of transparency, notably indicators concerning the structure of property of firms. According to Berger and al. (2001), the most

informational opaque firms are characterised by a reduced number of bank relationships (hypothesis n°4).

2.2. *Number of banks and banking competition*

In this second approach, we will review theoretical contributions emphasising bank pricing strategies according to the level of banking competition. These contributions allow, among others, a better understanding of the consequences related to the movements of reorganisation observed in financial circles, particularly in the current French banking sector. There are mainly two types of models, providing opposed conclusions on the way long-term banking relationships affect financial and non-financial terms of loan agreements.

2.2.1. *Models with inter-temporal transfer of value in aid of the bank*

In this first type of model, a dynamic use of terms of loan agreements, within a little competitive banking environment, allows banks to consider, in their price strategies, an “informational capture” and the extraction of an “information rent” to the detriment of the most profitable S.M.B of its customer base (Greenbaum and al., 1989; Sharpe, 1990; Von Thadden, 1998), according to the following process :

- In the first period ($T=0$), the bank cannot distinguish good from bad borrowers, thus it supposes an average quality of firm’s investment plans. Then, all the loan demands are granted according to moderated terms of loan agreements. This process notably limits opportunist behaviours from firms for which a disproportional pricing of default risk, due to phenomenon of redlining and adverse selection on small firm’s credit markets, could be harmful to the bank (Stiglitz and Weiss, 1981).

- In the second period ($T=1$), the bank with proprietary information accumulated during first period, identifies the type of each borrower and only renews loans to customers of higher quality, according to financial terms stricter than in the

first period. Thus, the bank adopts a behaviour close to a situation of monopoly because of information asymmetries preventing other banks from identifying the real type of each borrower. The inter-temporal transfer of value is carried out by compensation of the loss generated in the first period by a modest pricing.

Thus, a good quality S.M.B is constrained, in the context of a single-bank relationship, to pay a higher interest rate and to face more important collateral requirements because of the “informational hold-up” exercised by the bank providing credit in first period. However, theory underlines the existence of mechanisms allowing, in a more or less efficient way, to limit this type of banking behaviour :

- Switching from single to multiple-bank lending relationships is the first. Von Thadden (1998) recommends working with only two banks to limit costs related to the maintenance of multiple relationships without exposure to the risk of “informational capture”. However, this behaviour appears as an insufficient answer since any competitor offering a lower interest rate than that proposed by the informed bank will be confronted to the “winner’s curse” problem². Furthermore, the charge of financial costs, connected to the switching bank decisions, establishes a limit³. On an aggregate level, multiplication of banking relationships can also involve limited efficiency of the process of following and controlling firms by the banking system, which can increase system risk (Foglia and al., 1998).

- The establishment of a certain reputation by banks is also a factor likely to limit the extraction of an informational rent (Sharpe, 1990).

- Taking into account specific contractual clauses at the first period is also a solution (Von Thadden, 1995).

- Finally, the “informational hold-up” can, in some cases, present an advantage in terms of credit availability for firms. Indeed, according to the “soft

budget constraint”⁴, identified by Kornai (1980), a firm having paid off a loan without difficulties in the first period is, as a good quality firm, partially assured of liquidity and support, on behalf of the informed bank for the following periods.

2.2.2. Models with inter-temporal smoothing of terms of loan agreements

According to the model developed by Boot and Thakor (1994), the competitive pressure exercised by the banking sector as a whole does not allow to envisage a compensatory behaviour of informed banks granting loans in the first period. Inversely, probability that firms switch their main bank any time constantly induces an attitude in favour of a taxation raised during first periods and then gradually decreasing. In our view, this process allows a more efficient taxing of risks according to real firm’s characteristics and not only according to a previously defined calendar. Furthermore, these models restore an important function of the expensive use of collateral, which permits to identify more efficiently good investment plans and to assess the lender’s strategic position vis-à-vis the borrower (and others lenders) in future games of renegotiating. Uninformed about specific characteristics of firm’s loan agreements, we formulate the following alternative hypothesis n°5 : duration of established banking relationships is negatively/positively associated with financial and non-financial conditions of loan contracts.

2.3. Number of banks and illiquidity risk

The establishment of one or several banking relationships for the firm needing financing can also be guided by the need to protect itself from an illiquidity risk of banking origin. Indeed, in the event of a restrictive shock of the monetary policy, the banking system as a whole is constrained to reduce bank credit supply to the private sector (Bernanke and Blinder, 1988). So, profits expected from long-term relationships are reduced for S.M.B, which influences financing costs and reduces

real activity. Firms, for which the demand for bank credit is the least flexible thus undergo, in terms of rationing, the most austere consequences of such a contraction (Gertler and Gilchrist, 1994; Kashyap and Stein, 1997). The youngest, smallest firms and those maintaining a unique bank relationship are strongly exposed. In this situation, searching for new financial partners, able to bring the necessary funds to the continuation of engaged investment plans, implies very high costs for these opaque firms exposed to adverse selection. It's the "multiple-bank bank-distress hypothesis" (Detragiache and al., 2000; Berger and al., 2001), according to which costs related to the risk of illiquidity being higher than those of maintenance of multiple relationships, the most exposed firms will opt for a diversification of financing sources. This argument is used in the analysis of the massive reorganisations (mergers and acquisitions) observed in banking and financial circles for the last years and their consequences on the supply of credit to most exposed firms (Berger and al., 1998; Sapienza, 1998)⁵. However, some models stress the fact that stable banking relationships allow to limit, to a certain extent, the risk of illiquidity crisis of the banking sector (Demsetz and al., 1996). Thus, within a financial system privileging arm's length financing or long-term lending relationships, cyclic trends in credit markets would be related to the dominating mode of financing. As De Bodt and al. (2001) underline, taking into account all these parameters stresses the importance attached by banks, during the (adverse) selection of firms, with the financial characteristics of S.M.B. So, our work consists in using available information, testing the assumption n°6 : firms rationed, in terms of bank credit, show characteristics significantly different from others.

Summarizing the theoretical arguments presented, we obtain four hypotheses based on relations between firm's characteristics and the number of bank lending

relationships (H1-H4). H5 is an alternative hypothesis representing the contradict predictions from competing models about the effects of long-term lending relationships on bank pricing strategies according to the level of competition. Hypothesis 6 is a less controversial one dealing with availability of capital.

H1. The smallest firms count a reduced number of bank relationships.

H2. The youngest firms are characterised by a reduced number of banks.

H3. Given that a bank relationship is characterised by some strategic information exchanges about firm's activities, most profitable firms should be characterised by a reduced number of banks.

H4. Most informationally opaque S.M.B are characterised by a reduced number of bank relationships.

H5. As the main lending relationship continues, financial and non-financial credit conditions will increase/decrease due to the emergence of an informational monopoly/to the competitive pressure exercised by the banking sector.

H6. Firms faced credit rationing present characteristics significantly different from others.

To be able to test these predictions we need a double level of information that is why we used a two-step process to collect qualitative and quantitative information to obtain a sufficient level of information to carry out an original econometric analysis. The data and variables at hand are described in the following section.

3. Data description and methodology

3.1. Data source

Data used come mainly from information that we collected by inquiry during the first quarter of 2002 and concerning bank-firm relationships during 2001. In a first step, a questionnaire was sent by mailing, to a panel of 1800 S.M.B stemming

from a French database called D.I.A.N.E (DIsc for Economic ANalysis) edited by Bureau Van Dijk. The selection of firms took place according to the updated and the available financial statements. Companies belonging to the sector of financial activities and public administration (Code J and L of the French nomenclature of activities) were excluded. Moreover, the manpower of selected companies is lower than 500 employees. Finally, because of specificity in management presented by S.M.B quoted on French stock markets, we excluded these firms. Collected information concerns relationships maintained by managers with banks and more particularly with their main bank, as well as complementary indications on the structure of property of selected firms. The number of exploitable answers, after elimination of questionnaires presenting a significant number of missing answers, amounts to 244 or 13.5% of the panel. In a second step, standard accounting information contained in annual financial statements was extracted from the same database and completed these answers.

3.2. *Variables description*

We present indicators held in our analysis. They relate to general and financial characteristics, banking relationships maintained and the structure of property of the 244 firms belonging to the final sample. Appendix 1 provides summary statistics by size.

➤ *General and financial characteristics*

Size. The average number of employee during 2001 determines firm's size (EMP).

Age. With the date of creation, we calculate firm's age in years (AGE).

Debt. We use a classical debt ratio corresponding to the value of total debt reported to the value of equity (LEV).

Profitability. In order to obtain a satisfactory evaluation of profitability and to approach the banking diagnosis as well as possible, we use a measure of profitability and a calculated scoring variable. The rate of gross margin of exploitation (PROF) is used as an indicator of profit. Furthermore, we form a financial appreciation of firms using a scoring variable (SCOR) whose calculation mode is detailed in appendix 2.

➤ *Bank relationships characteristics*

Number of banks. Number of banks in relation with the firm during 2001 (NBQ).

Main bank. The main bank is defined as the one with whom the firm maintains the closest links and which mostly takes a part in its financing. The questionnaire informs about its identity, which allows us to distinguish, by a dummy variable (BQTYP), banks belonging to the banking pole of the French Banking Association (A.F.B) or to the pole grouping together mutual and cooperative banks⁶; as well as on the duration, in years, of the relationship in progress (DURAT). The importance of the main bank with regard to firm's bank financing is also taken into account by the dummy variable (MBFIN0-MBFIN3), which measures the percentage represented by the main bank financing according to four class of importance (-25%; 25-50%; 50-75%; +75%). Lastly, the dummy variable (CREA) indicates if the main bank has been the same one since firm's creation or if a main bank switching has already taken place in the history of the firm's bank relationships.

Guarantees. The information we have does not allow to distinguish precisely the nature of guarantees supplied by firms in the context of specific clauses of loan contracts (inside/outside collateral, surety, assignments of account receivable, mortgages)⁷. However, the questionnaire allows measuring the percentage of credit financing which is subject to collateral requirements (COLL).

Interest rate. Following predictions by Berger and Udell (1995), we decide to measure interest rate on lines of credit, since this type of credit should be the more revealing source of information. Investigations only provide 189 exploitable answers with regard to the lines of credit interest rate (IR). For the 55 remaining firms, since information is unavailable for different reasons (confidentiality, approximations, ignorance/forgetting), consequently we exclude these firms from the estimates relating to this variable.

Credit rationing. There is no hope to estimate seriously credit rationing limiting ourselves to information coming from annual financial statements. So, credit rationing is directly estimated according to the opinion of financial managers. To identify firms financially constrained, we checked⁸ the coherence of answers to various questions relative to presence, level and impact of credit rationing during the year 2001, hence we identify firms rationed in credit requirements (RAT) or not.

➤ *Characteristics relative to the structure of property of firms*

Shareholders. A dummy variable (NBSHA0-NBSHA2) takes the values 1,2 or 3 according to the number of shareholders of firms, the latter including firms having three shareholders and more.

Main shareholder. The importance of firm's main shareholder is measured by the dummy variable (IMSHA0-IMSHA3) according to the 4 class of importance previously defined. This information is provided by our questionnaire and is supplemented by the database quoted previously. Furthermore, in order to take into account all the parameters related to informational asymmetries between firms and outsiders, but also between shareholders and managers, we distinguish firms for which property and management are not under the same responsibility. The variable (MANOW) indicates if the main shareholder is also the manager or not.

Group. The dummy variable (GROUP) indicates if the firm is a subsidiary of a group or not.

➤ *Control variables*

Sector. Industry variables are used according to the French Nomenclature of Activities (N.A.F) at the most aggregated level (17 sections). Then, we deduct four industry dummies used in the regressions (MANUF-SERV-TRADE-CONST).

Type Market. We also take into account the type of sale's market on which the company carries on its activities by means of a dummy variable (MARSZO-MARSZ3), it can be a local, regional, national or international market.

Level of Competition. The nature of the banking supply also determines the number of banks (Petersen and Rajan, 1995). Supposing the number of bank agencies proportional to the density of population, we integrate a dummy variable (DPOPO-DPOP2) taking values 0, 1 or 2 depending if the firm's county is inhabited by less than 1 million, between 1 and 2, or more than 2 million people. This measure is mainly intended to control the effects related to the local banking market size.

3.3. *Methodology*

To test assumptions H1-H6 defined previously, we study successively econometric determinants of the number of bank relationships maintained by firms, explanatory factors of guarantees requirements and interest rate paid as well as particular characteristics presented by firms financially constrained. Given the possible existence of interdependence between explanatory variables, we will proceed sequentially to observe the way coefficients react to the inclusion of further determinants. The number of bank relationships maintained by firms is regarded as a count variable taking values ranging between 1 and 16, an econometric model for analysis of such data can be approximated by a model of Poisson⁹. Concerning

collateral requirements, our variable (COLL) represents the percentage of bank credit that is subject to collateral requirements. This variable is valued bounded between 0 and 100, which permits to run a Tobit model of estimation¹⁰. For interest rate, results of an ordinary least square regression on various sets of explanatory variables are presented. We model the interest rate on lines of credit as a function of firm's characteristic, variable describing the lending relationship, ownership characteristics, and control variables. To analyse specific characteristics of firms exposed to credit rationing within the framework of customers relationship with their main bank, we model the probability that firms face credit rationing using a Logit model to estimate the dummy variable (RAT) indicating if firms obtain or not all required bank credit financing.

4. Econometric results

4.1. The number of banks

Econometric results are presented table 2. Assumption 1, relative to firm's size, is validated since size variable (EMP) influences positively, and to a significant degree, the number of banks in tested models. This result is confirmed by the coefficients relating to the various types of market on which a company carries on its activity (MARSZ0-MARSZ3). First and last modality of these variables are significant with an opposed sign, indicating that smallest firms exercising on local markets count a reduced number of banks, while exercising on an international market increases this number significantly.

The variable representing the firm's lifespan (AGE) is no significant which indicates that the firm's age effect is very weak and widely compensated by the effect of the duration of the relationship in progress. This effect related to the duration (DURAT) is negative, which denotes an aversion to the multiplication of

financing sources on behalf of firms maintaining a durable lending relationship with their main bank. The importance of the main bank's financing confirms this result as shown by models 2 and 3 of table 2. The extreme modalities of the variable (MBFIN) have a significant but opposite influence on the number of banks of firms. These results, as those developed by Farinha and Santos (2000), reflect the firm's financing strategy in the sense that a lower (higher) importance of the main bank implies a higher (lower) number of bank lending relations.

Relating to the impact of profitability on the number of banks (PROF), results validate the third assumption (H3). Similarly to the conclusions presented by Degryse and Ongena (2000) and Petersen and Rajan (1994), it proves that most profitable firms are characterised by a reduced number of banks. The scoring variable (SCOR) validates this trend with less precision. If one regards credit rationing as an indicator of quality, coefficients of variable (RAT), which is worth 0 if the firm is not rationed and 1 otherwise, confirm that best firms maintain fewer relationships than others. These results are consistent with Cole (1998) and De Bodt and al. (2001). Debt ratio is also an explanatory factor of the number of banks of firms. Coefficients of variable LEV are positive and significant at the 5% level, indicating that firms with higher debt ratio have a higher number of banks. Refait (2001), Detragiache and al. (2000), Farinha and Santos (2000) confirm this result for France, Italy and Portugal respectively.

Results also show that firms maintaining long-term lending relationships with some mutual or cooperative banks count a lower number of banks. On the one hand, this trend confirms the fact that these financial institutions, particularly committed to retail banking according to a decentralized organisation, value the customer relationship differently from other institutions. On the other hand, it consolidates an

idea notably advanced by De Bodt and al. (2001) according to which small firms maintaining bank relationships with relative big institutions count a higher number of banks than those being in relation with smallest sized institutions. The number of banks thus depends on the type of main bank chosen by S.M.B.

Model 3 of table 2 exposes results concerning the characteristics of property of selected firms. It appears that firms whose manager is not the main shareholder (MANOW) have a higher number of banks than others. First, this report makes it possible, if necessary, to validate once again hypothesis n°1, since firms whose manager is not the main shareholder are bigger than others¹¹. Furthermore, the existence of a separation between property and management is viewed as a mode of governance reducing the degree of opaqueness of the information intended for the outside stakeholders of firms, which permits a first validation of assumption n°4. Variables (IMSHA) and (NBSHA) confirm in a more clear-cut way the “single-bank firm-opacity hypothesis” formulated by Berger, Klapper and Udell (2001). Indeed, it appears that firms whose share of capital held by the main shareholder is higher than 75% (IMSHA3), maintain relationships with a lower number of banks. On the contrary, the positive and significant coefficient of the first modality of this variable (IMSHA0) shows that a less concentrated shareholding is a factor influencing positively the number of banks. The third modality of the variable representing the number of shareholders (NBSHA2), significant at the 5% level, indicates that a scattered shareholding, characteristic of the degree of firm’s transparency, facilitates the multiplication of the number of financial partners.

4.2. Guarantees requirements and credit interest rate

4.2.1. Guarantees requirements

Guarantees provided by firms to banks in loan contracting mainly aim at limiting default risk. Results of estimates are presented in table 3, models 1 and 2 correspond to estimates carried out on the entire sample, while models 3 and 4 present results after segmenting the sample depending on the number of banks (single vs multiple-bank relationships firms).

Firm's size, measured by the variable (EMP), has a significant negative impact on the importance of guarantees requirements. Within the category of S.M.B, the largest companies benefit from a more important amount of non-guaranteed credit. This result is also found in Harhoff and Körting (1998) and Lehmann and Neuberger (1999). A supposed theoretical link between size and default risk can constitute a valid explanation for this fact¹². On the other hand, coefficients of the variable measuring firm's age (AGE) do not present, in spite of a negative sign, a sufficient level of significance to confirm that older firms bring less guarantees to their main bank (Berger and Udell, 1995; Lehmann and Neuberger, 1999). The variable (LEV) establishes a positive and significant link between debt ratio and the importance of collateral provided to the main bank. This result is stable in all tested model and joins early conclusions by Degryse and Van Cayseele (1998) and Harhoff and Körting (1998). With regard to profitability (PROF) and scoring (SCOR) variables, our results do not underline, contrary to Machauer and Weber (2000), a strong link between the supposed quality of a firm and the degree of insurance required by its main bank. However, if we suppose once again that availability of credit is an indicator of quality, our variable (RAT), indicating if firms are rationed or not in their bank financing, validates these predictions. Indeed, in our sample firms subject to credit rationing on behalf of their main bank face, to a 5 and 10% significant level, a more important degree of collateralization.

Duration of the main bank's relationship (DURAT) is negatively linked to the proportion of guaranteed bank credit but this result is not significant. The type of main bank of firms also partly explains the importance of the supplied guarantees, variable (BQTYP) shows that mutual and cooperative banks require, at the 10% level, a more significant proportion of guarantees than other banks.

In connection with models of compensatory pricing, variable (NBQ) clearly states that a diversification of banks makes it possible for firms to reduce their collateral requirements facing their main banks. First, this result is not surprising because an increase of financial partners involves a decrease of the relative share of the main bank in firm financing; conversely, variable (MBFIN0-MBFIN3) shows that an inverse situation is characterised by a significant progression of the percentage of guaranteed bank credit. However, beyond this number of banks effect, it appears that main banks act in a significant different way with firms in relation with a unique bank and firms borrowing from several banks. Thus, models 3 and 4 of table 3 show, through the different modality of indicator (MBFIN0-MBFIN3), that a decrease in the main bank financing of multiple-bank firms results in a significant decrease of collateral requirements (MBFIN0 in model 4 = -1.477 (0.04)**), which is not significant for single bank firms (MBFIN0 in model 3 = -2.694 (0.18)). On the contrary, this percentage seems to grow in a more significant way in model 3 for modality MBFIN2 (0.809 (0.05)*) and MBFIN3 (3.294 (0.04)**) than in model 4 (MBFIN2 = 0.884 (0.21) and MBFIN3 = 2.447 (0.07)*). These results indicate that banks adopt a more aggressive behaviour in terms of collateral requirements with "single-bank firms" than with "multiple-bank firms". Models developed on German samples show that the presence of a main bank is a sufficient element to justify a particular behaviour of accumulation of guarantees at the expense of the firm,

notably for insurance by expertise against default risk¹³. In our analysis, such behaviours seem subordinated to the degree of competition materialised by the number of bank lending relationships maintained by firms.

4.2.2. *Lines of credit interest rate*

Table 4 present results relative to the determinants of bank pricing on lines of credit (IR). Model 1 examines the entire sample whereas models 2 and 3 establish a size distinction between firms depending on the median (+/- 22) number of employee in 2001. Our results point out a negative correlation between firm's size (EMP) and the credit costs to firms. Indeed, banks use firm's size as a predominant element in their credit risk's evaluation (Lehmann and Neuberger, 1999; Harhoff and Körting, 1998). Once again, age variable (AGE) is not significant. A dominant firm characteristic determining lines of credit pricing appears to be the debt ratio with a positive and significant coefficient to a 5% level. As expected, this fact is particularly true for smallest firms in model 2.

Concerning relationship characteristics, credit rationed firms (RAT) face significant higher interest rates, to a 5% level, than those obtaining all necessary bank funds. In contrast to Petersen and Rajan (1994) results, our estimates present no evidence of the expected link between the number of lenders and interest rates. With the rationing variable, the only relationship variable that turns out to be significant is the indicator of the main bank's importance. Both last modalities of this variable are positive and significant (MBFIN2-MBFIN3), especially for smallest firms (model 2). Other estimates established according to the number of banks (single vs multiple-bank firms) do not allow attributing this result to an "informational capture" of single-bank firms as in models with inter-temporal transfer of value in aid of banks¹⁴. In our view, these elements state that, from a certain level of financing, main banks

use higher interest rate in order to limit their commitments and finally their exposition to default risk with the smallest firms whose major needs they already finance.

Moreover, regarding firm's property characteristics, it appears that S.M.B belonging to a group (GROUP) face lower interest rate, to a significant 10% level in all tested model. This result, confirming the influence of firm's size (EMP), can be explained by the reduction of default risk related to the group structure standing guarantor for subsidiary firms.

4.3. Credit bank availability

Results are presented in table 5. With regard to firm's characteristics, estimates underline the significant influence of firm's quality measured by the level of profitability (PROF) and scoring variable (SCOR). A worse credit rating and poor performances reduce the probability of bank credit approval. Debt variable (LEV) is positive and significant to a 5% level in all models. Firms with high debt ratio are most exposed to credit rationing from their main bank. Firm's age (AGE) presents no significant impact on credit rationing, similarly to De Bodt and al. (2001) and Lehmann and Neuberger (1999). Firm's size affects credit availability but only to a 10% level in models 1 and 2.

Relationship characteristics establish a negative and significant impact of the number of lenders (NBQ) on credit rationing to a 5% level. Main banks perceive the multiplication of relationships, increasing asymmetric information, as a negative sign. Moreover, we find that duration of the current lending relationship (DURAT) positively affects availability of loan credit to a 5% level. With (NBQ) and (DURAT), the importance of main bank's financing is a relevant determinant of credit rationing. The first modality (MBFIN0) of this variable indicates that a weak

share of the main bank in the external financing of firms reduces the probability of credit rationing. Conversely, a strong implication (MBFIN3) increases this risk with significant levels (5%-10% in models 2 and 3). This result confirms the existence of mechanisms permitting to main banks to limit their financial commitments towards firms with whom they are very engaged (MBFIN3). Credit rationing, as well as collateral requirements, permits to limit main bank commitments and exposition to default risk. Thus, the insurance of liquidity provided through a bank lending relationship is not definitive but related to the risk exposition of the main bank, measured by its importance in firm's financing.

With regard to firm's property characteristics, we notice a positive and significant impact of the indicator of firm's capital concentration on the exposition to credit rationing (IMSHA2 and IMSHA3). Increasing capital concentration appears to have an unfavourable impact on the availability of debt capital. On the contrary, firms pertaining to a group (GROUP) are more likely than others to obtain credit financing from their main bank. None of the remaining variables, representing the separation of management and property (MANOW) and the number of shareholders (NBSHA), turn out to be significant.

5. Conclusion

Our objective is to better understand the nature of relationships established between S.M.B and banks in France. We formulate testable hypotheses relative to the number of lenders, collateral requirements, credit interest rate and availability of bank financing. Specific used data stress that French S.M.B have banking practice, as regards the number of banks, close to other developed countries, except for the specific case of Italy. Tests relative to the number of banks validate hypotheses 1, 3 and 4. Indeed, our results show that firm's size positively influences this number,

whereas profitability and concentration of firm's capital decrease the number of banks. Moreover, duration and strength of the current bank-borrower relationship are factors limiting the multiplication of financial sources, especially in the case of mutual or cooperative main banks. Hypothesis 2 cannot be validated at this stage because the firm's age effect is weak and largely compensated by the effect linked to the duration of the current lending relationship. Firms with high debt ratio and those exposed to credit rationing are characterised by a more important number of bank relationships. Concerning the cost of credit financing and guarantees requirements, we are not able to validate hypothesis n°5 because firm's age appears as an irrelevant determinant. However, data show that if firms maintain a single-bank relationship, the likelihood of collateral requirements increases. These elements do not make it possible to fully validate models privileging inter-temporal transfer of value in the aim of banks but indicate that French banks adopt a more aggressive strategy within the framework of a bilateral customer relationship.

For credit availability, we have used indicators of rationing built from the opinions received from firm managers. We note a negative impact of both the number of lenders and the importance of debt ratio on the approval of credit financing. Conversely, the most profitable firms, those pertaining to a group and those maintaining a long-term relationship with their main bank appear to be less finance-constrained. In addition, data prove that even main banks seem to be reluctant to finance small firms beyond a certain level of implication.

All these elements justify the use of long-term lending relationships to limit adverse effects related to the existence of asymmetric information between banks and small business firms. This report is confirmed by the behaviour of the most profitable firms in our sample, which tend to have a reduced number of bank relationships in

order to maximise the awaited benefits of their commercial relationship with a financial institution. This result is consistent with the previous literature. However, a direct access to loan contracts and using social indicators of customer relationships would certainly make possible additional investigations.

TABLE 1: EVIDENCE ON BANK RELATIONSHIPS : NUMBER AND DURATION, BY COUNTRY

This table presents number and duration of bank relationships from recent empirical research on small and medium business, average and (median). This table is non-exhaustive.

COUNTRY	AUTHORS	SAMPLES	NUMBER OF RELATIONSHIPS	DURATION
<i>Germany</i>	Harhoff and Körting (98)	1399 firms in 1997	1.8 (1)	(13)
	Elsas and Krahen (98)	78 firms in 1996 classify in 4 size group: 1/2/3/4	4.1(4)/5.3(5)/6.4(4)/9(7)	24(16)/23(20)/22(19)/35(25)
	Machauer and Weber (00)	190 firms between 1992 and 1996: 1992/1993/1994/1995/1996	6.21(5)/5.84(5)/5.68(5)/5.66(5)/5.7(5)	-
<i>Argentina</i>	Berger-Klapper-and Udell (01)	61 295 loans in 1998	1 bank = 43.95% / +1 Bank = 56.05%	-
<i>Belgium</i>	Degryse and Van Cayseele (98)	17 776 loans in 1997	1.8 (1)	(12.8)
	De Bodt and al. (01)	296 firms in 1998	2.45	
<i>United States</i>	Petersen and Rajan (95)	3404 firms of the N.S.S.B.F ¹ in 1988: Firms of -10 years / Firms of +10 years	1.38 (1) / 1.4 (1)	4.6 (4) / 17 (15)
	Cole (98)	2007 firms of the N.S.S.B.F in 1993	2.96	7.69
	Scott (01)	3642 firms of the C.B.S.B.S ² in 1995	1.88	-
	Bodenhorn (01)	2674 loans in 1855	-	4.1
<i>France</i>	Proust and Cadillat (96)	Firms between 1992-1995	1.44	-
	Refait (01)	628 firms between 1993-1997	3.89 (3)	-
	Ziane (02)	244 firms in 2001	2.35 (2)	14.41 (10)
<i>Italy</i>	Angelini and al. (98)	1858 firms in 1995	2.4	14
	Pagano and al. (98)	19274 firms between 1982-1992	13.9 (11)	-
	D'Auria and al. (98)	5239 firms between 1985 and 1994: 1985/1990/1994	(12)/(13)/(11)	-
	Foglia and al. (98)	27000 firms between 1988 and 1995: 1988/1991/1995	(11)/(12)/(11)	-
<i>Japan</i>	Horiuchi (93)	126 firms in 1990	3.6	-
	Horiuchi (94)	175 firms in 1992 : -10 employees / +10 employees	2.9 (3) / 3.1 (3)	-
<i>Norway</i>	Degryse and Ongena (00)	110 firms between 1979 and 1994 ³	1.4 (1)	16.95
<i>Portugal</i>	Farinha and Santos (00)	54182 firms between 1980 and 1996	1.87 (1)	1.62 (1)
<i>Sweden</i>	Zineldin (95)	179 firms in 1994	(1)	

¹ National Survey of Small Business Finance.

² Credit, Banks and Small Business Survey.

³ Sample of publicly listed firms on the Oslo Stock Exchange but more than 50% of these firms have less than 500 employees.

TABLE 2
DETERMINANTS OF THE NUMBER OF BANKS
Dependent variable : Number of bank relationships (NBQ)
Poisson regression coefficients (P-values)

VARIABLES	MODEL 1	MODEL 2	MODEL 3
<i>Firm variables</i>			
AGE	0.102 (0.18)	0.011 (0.12)	0.021 (0.18)
EMP	0.167 (0.00)***	0.121 (0.04)**	0.102 (0.08)*
LEV	0.164 (0.02)**	0.156 (0.03)**	0.201 (0.05)**
PROF	-0.012 (0.04)**	-0.013 (0.05)*	-0.012 (0.03)**
SCOR	-0.005 (0.08)*	-0.007 (0.12)	-0.011 (0.05)*
<i>Relationship variables</i>			
DURAT	-0.012 (0.04)**	-0.019 (0.03)**	-0.013 (0.08)*
BQTYP	-0.114 (0.04)**	-0.133 (0.06)*	-0.266 (0.08)*
CREA	0.067 (0.18)	0.149 (0.24)	0.172 (0.43)
RAT	0.201 (0.04)**	0.177 (0.05)*	0.167 (0.03)**
MBFIN0	-	0.073 (0.08)*	0.147 (0.06)*
MBFIN1	-	0.109 (0.21)	0.085 (0.14)
MBFIN2	-	0.102 (0.24)	-0.017 (0.31)
MBFIN3	-	-0.092 (0.04)**	-0.105 (0.06)*
<i>Property variables</i>			
MANOW	0.041 (0.08)*	-	0.086 (0.05)*
GROUP	-0.102 (0.21)	-	-0.029 (0.22)
IMSHA0	-	-	0.148 (0.08)*
IMSHA1	-	-	0.103 (0.07)*
IMSHA2	-	-	-0.087 (0.21)
IMSHA3	-	-	-0.022 (0.04)**
NBSHA0	-	-	-0.049 (0.27)
NBSHA1	-	-	0.021 (0.31)
NBSHA2	-	-	0.187 (0.06)**
<i>Control variables</i>			
INTERCEPT	0.897 (0.02)**	1.024 (0.00)***	1.213 (0.00)***
MANUF	0.106 (0.24)	0.098 (0.21)	0.095 (0.18)
TRADE	0.056 (0.22)	0.057 (0.09)*	0.051 (0.27)
SERV	0.201 (0.41)	0.035 (0.43)	0.179 (0.09)*
CONST	-0.047 (0.19)	-0.105 (0.09)*	0.043 (0.25)
MARSZ0	-	-0.168 (0.00)***	-0.247 (0.04)**
MARSZ1	-	0.011 (0.25)	-0.008 (0.18)
MARSZ2	-	0.096 (0.09)*	0.117 (0.11)
MARSZ3	-	0.043 (0.04)**	0.064 (0.06)*
DPOP0	0.078 (0.15)	-0.017 (0.23)	-
DPOP1	0.081 (0.27)	0.023 (0.19)	-
DPOP2	0.072 (0.06)*	0.112 (0.17)	-
<i>Quality adjustment</i>			
Pseudo-R ²	0.231	0.273	0.314
-2 Log Likelihood	338.94	372.82	375.49
N	244	244	244

*, **, *** : Significance at the 10%, 5% and 1%, respectively.

TABLE 3
DETERMINANTS OF COLLATERAL REQUIREMENTS
Dependent variable : % of collateral requirements (COLL)
Tobit regression coefficients (P-values)

VARIABLES	MODEL 1	MODEL 2	MODEL 3 Single-bank firms	MODEL 4 Multi-banks firms
<i>Firm variables</i>				
AGE	-3.652 (0.27)	-4.055 (0.19)	-2.147 (0.17)	-4.739 (0.21)
EMP	-12.224 (0.01)**	-11.94 (0.03)**	-8.042 (0.08)*	-9.118 (0.04)**
LEV	6.588 (0.03)**	4.183 (0.03)**	4.805 (0.04)**	5.014 (0.05)**
PROF	-3.105 (0.15)	-2.547 (0.17)	-1.433 (0.26)	-2.279 (0.19)
SCOR	-0.437 (0.19)	-0.493 (0.11)	-1.105 (0.16)	-0.284 (0.08)*
<i>Relationship variables</i>				
DURAT	-7.580 (0.14)	-8.336 (0.24)	-12.719 (0.31)	-7.022 (0.16)
NBQ	-1.701 (0.01)**	-2.305 (0.03)**	-	-2.282 (0.01)**
BQTYP	6.542 (0.09)*	6.127 (0.08)*	4.608 (0.07)*	5.102 (0.08)*
CREA	3.060 (0.47)	4.136 (0.28)	4.059 (0.17)	3.356 (0.25)
RAT	8.604 (0.03)**	8.049 (0.06)*	9.174 (0.07)*	8.257 (0.03)**
MBFIN0	-	-1.852 (0.07)*	-2.694 (0.18)	-1.477 (0.04)**
MBFIN1	-	4.714 (0.21)	3.164 (0.19)	2.044 (0.15)
MBFIN2	-	1.251 (0.14)	0.809 (0.05)*	0.884 (0.21)
MBFIN3	-	2.877 (0.08)*	3.294 (0.04)**	2.447 (0.07)*
<i>Property variables</i>				
MANOW	1.537 (0.31)	-1.108 (0.24)	-	-
GROUP	-1.024 (0.16)	-1.279 (0.18)	-	-
<i>Control variables</i>				
INTERCEPT	26.894 (0.02)**	31.567 (0.04)**	17.414 (0.02)**	21.915 (0.01)**
MANUF	4.157 (0.21)	5.291 (0.28)	4.115 (0.31)	3.312 (0.34)
TRADE	3.736 (0.07)*	5.128 (0.06)*	2.835 (0.09)*	5.173 (0.03)**
SERV	4.501 (0.31)	6.137 (0.19)	5.711 (0.22)	4.787 (0.07)*
CONST	6.102 (0.21)	7.842 (0.132)	5.218 (0.16)	6.606 (0.24)
<i>Quality adjustment</i>				
Pseudo-R ²	0.106	0.114	0.092	0.131
-2 Log Likelihood	257.64	297.97	173.34	208.97
N	244	244	102	142

*, **, *** : Significance at the 10%, 5% and 1%, respectively.

TABLE 4
DETERMINANTS OF LINES OF CREDIT INTEREST RATE
Dependent variable : lines of credit interest rate (IR)
O.L.S regression coefficients (P-values)

VARIABLES	MODEL 1	MODEL 2 Firm's size < 22	MODEL 3 Firm's size > 22
<i>Firm variables</i>			
AGE	0.147 (0.21)	0.175 (0.27)	0.108 (0.18)
EMP	-0.471 (0.03)**	-0.366 (0.06)*	-0.528 (0.02)**
LEV	0.291 (0.02)**	0.293 (0.03)**	0.279 (0.05)*
PROF	0.052 (0.41)	0.046 (0.34)	0.082 (0.27)
SCOR	-0.031 (0.17)	-0.058 (0.19)	-0.042 (0.15)
<i>Relationship variables</i>			
DURAT	-0.202 (0.14)	-0.259 (0.12)	-0.175 (0.19)
NBQ	0.514 (0.21)	0.601 (0.19)	0.367 (0.24)
BQTYP	0.114 (0.21)	0.185 (0.18)	0.094 (0.24)
COLL	-0.202 (0.21)	-0.259 (0.19)	-0.172 (0.28)
RAT	0.141 (0.02)**	0.217 (0.01)**	0.098 (0.03)**
MBFIN0	0.091 (0.12)	0.058 (0.26)	0.097 (0.19)
MBFIN1	-0.159 (0.24)	-0.197 (0.16)	-0.092 (0.26)
MBFIN2	0.129 (0.08)*	0.142 (0.04)**	0.074 (0.07)*
MBFIN3	0.201 (0.07)*	0.232 (0.05)*	0.173 (0.18)
<i>Property variables</i>			
MANOW	-0.084 (0.24)	0.072 (0.21)	-0.172 (0.15)
GROUP	-0.177 (0.08)*	-0.259 (0.05)*	-0.145 (0.07)*
<i>Control variables</i>			
INTERCEPT	2.147 (0.03)**	3.421 (0.01)**	2.018 (0.04)**
MANUF	0.332 (0.14)	0.204 (0.09)*	0.451 (0.12)
TRADE	0.431 (0.11)	0.355 (0.18)	0.486 (0.21)
SERV	0.296 (0.21)	0.217 (0.16)	0.321 (0.31)
CONST	0.271 (0.09)*	0.112 (0.08)*	0.361 (0.09)*
<i>Quality adjustment</i>			
Adjusted-R ²	0.226	0.247	0.218
F-test	4.58**	3.51**	4.84**
N	189	95	94

*, **, *** : Significance at the 10%, 5% and 1%, respectively.

TABLE 5
DETERMINANTS OF CREDIT RATIONING
Dependent variable : Credit rationing (RAT)
Logit regression coefficients (P-values)

VARIABLES	MODEL 1	MODEL 2	MODEL 3
<i>Firm variables</i>			
AGE	-0.025 (0.21)	-0.014 (0.23)	-0.082 (0.21)
EMP	-0.315 (0.08)*	-0.264 (0.09)*	-0.221 (0.17)
LEV	1.062 (0.02)**	1.264 (0.01)**	1.409 (0.02)**
PROF	-0.041 (0.04)**	-0.045 (0.02)**	-0.039 (0.07)*
SCOR	-0.075 (0.07)*	-0.067 (0.06)*	-0.078 (0.06)**
<i>Relationship variables</i>			
DURAT	-0.095 (0.02)**	-0.115 (0.03)**	-0.091 (0.04)**
NBQ	0.174 (0.01)**	0.131 (0.02)**	0.211 (0.02)**
BQTYP	0.114 (0.18)	0.121 (0.1)*	0.097 (0.13)
COLL	-0.097 (0.14)	-0.094 (0.16)	-0.108 (0.15)
MBFIN0	-	-0.553 (0.02)**	-0.627 (0.03)**
MBFIN1	-	-0.206 (0.21)	-0.211 (0.17)
MBFIN2	-	0.087 (0.18)	0.055 (0.28)
MBFIN3	-	0.194 (0.04)**	0.352 (0.05)*
<i>Property variables</i>			
MANOW	-0.172 (0.16)	-0.098 (0.22)	-0.108 (0.19)
GROUP	0.084 (0.05)*	0.079 (0.06)*	0.121 (0.05)*
IMSHA0	-	0.016 (0.18)	-0.021 (0.27)
IMSHA1	-	0.074 (0.14)	0.108 (0.19)
IMSHA2	-	0.046 (0.09)*	0.094 (0.07)*
IMSHA3	-	0.116 (0.04)**	0.097 (0.04)**
NBSHA0	-	-	0.047 (0.17)
NBSHA1	-	-	0.158 (0.21)
NBSHA2	-	-	-0.082 (0.18)
<i>Control variables</i>			
INTERCEPT	2.798 (0.01)**	3.203 (0.02)**	2.993 (0.01)**
MANUF	-0.074 (0.42)	-0.082 (0.26)	0.059 (0.31)
TRADE	0.102 (0.38)	0.194 (0.41)	0.113 (0.49)
SERV	0.365 (0.27)	0.212 (0.09)*	0.198 (0.21)
CONST	0.102 (0.34)	-0.042 (0.31)	0.017 (0.28)
<i>Quality adjustment</i>			
Pseudo-R ²	0.102	0.132	0.155
-2 Log Likelihood	230.282	264.783	268.584
N	244	244	244

*, **, *** : Significance at the 10%, 5% and 1%, respectively.

APPENDIX 1 : DEFINITION AND DESCRIPTIVE STATISTICS OF VARIABLES

This table presents definition and descriptive statistics of variables used in the study by class of size according to the number of employee in 2001, mean/median.

	Explanation of variables	All firms (N=244)	Class [0-9] (67)	[10-19] (39)	[20-49] (78)	[50-99] (43)	[100-499] (17)
EMP	Number of employee in 2001	32/22	4/3	13/13	33/33.5	64/60	239/229
AGE	Firm age in 2001 (in years)	19.04/12	12.03/8	16.51/11	21.83/15	27.11/23	29.57/17
LEV	Ratio of total debt to equity (en %)	.72/.71	.74/.73	.75/.75	.71/.72	.7/.71	.58/.62
PROF	Ratio of operating profitability to turnover	.06/.04	.05/.04	.04/.03	.05/.04	.06/.05	.06/.08
SCOR	Calculated scoring variable	.62/.36	.24/.18	.34/.25	.31/.3	.68/.45	.72/.52
NBQ	Number of banks in relation with firm in 2001	2.35/2	1.78/2	2.23/2	2.45/2	3.07/3	3.85/4
BQTYP	Dummy variable indicating main bank's type of firm (0 = A.F.B bank ; 1 = mutual-cooperative bank)	.48/0	.66/1	.48/0	.45/0	.23/0	.43/0
DURAT	Duration of the lending relationship with the main bank	14.41/10	11.89/9	11.51/9	16.87/10	18.72/15	24.14/15
MBFIN	Relative importance of main bank financing (0= -25%, 1 = 25-50%, 2 = 50-75%, 3 = > 75%)	1.45/1	2.15/3	1.51/1	1.75/2	1.41/1	0.71/0
CREA	Dummy variable indicating if the main bank is the same since firm creation (0) or not (1)	.39/0	.26/0	.53/1	.48/0	.39/0	.14/0
COLL	% of main bank financing subject to collateral requirements	.78/.68	.85/.81	.78/.72	.72/.67	.71/.65	.7/.65
IR	Interest rate on lines of credit in 2001	8.42/7.17	11.25/10	10.41/9	9.88/8.5	8.25/7	8.05/7
RAT	Dummy variable indicating if the firm is subject to credit rationing (1) or not (0)	.27/0	.32/0	.24/0	.25/0	.22/0	.18/0
NBSHA	Number of shareholders of the firm (1=1, 2=2 , 3=3 et +)	1.83/1	1.18/1	1.43/1	1.97/1	2.18/2	2.43/2
IMSHA	Relative importance of the main shareholder of the firm (0= -25%, 1 = 25-50%, 2 = 50-75%, 3 = > 75%)	2.22/3	2.14/2	2.25/3	2.05/2	2.6/3	2.57/3
MANOW	Variable indicating if the manager of the firm is the main shareholder (0) or not (1)	.32/0	.26/0	.28/0	.31/0	.43/0	.48/0
GROUP	Variable indicating if the firm belongs to a group (0) or not (1)	.76/1	.81/1	.71/1	.74/1	.73/1	.68/1
SECTOR	Industry variables (1=manufacturing 2=trade 3=service 4=construction)	2.12/2	-	-	-	-	-
MARSZ	Variable indicating size of sale's market of the firm (0= local, 1= regional, 2= national, 3= international)	1.13/1	.71/0	1.26/1	1.25/1	1.44/1	1.86/2
DPOP	Variable indicating density of population of firm's county (0= <1 million, 1= 1-2 millions, 2= > 2 millions)	.99/1	-	-	-	-	-

APPENDIX 2 : CALCULATION METHOD OF THE SCORING VARIABLE

Numerous methods of evaluation of default risk exist, the evaluation can be done by reference to a standard type, then it acts to determine if the borrower financial situation is excellent, good, average, poor or bad. It's also possible to measure more precisely, according to a single synthetic indicator, a borrower credit rating. We choose to adopt this last method using the Z-bis scoring function of the French central bank reconstituted by Galesne (1999) for small and medium industrial business as :

$$Z_{bis} = 1.429 + 0.043 X_1 - 0.0088 X_2 - 0.0111 X_3 + 0.0212 X_4 - 0.0064 X_5 + 0.0059 X_6 + 0.0034 X_7 - 0.0144 X_8$$

with :

Variables	Relative discriminating power (%)
X1 = Equity growth rate	33.3
X2 = Total debt / equity	26.7
X3 = Interest expense / income from operations	20.1
X4 = Long Term Debt / (equity + LTD)	5.2
X5 = Trade receivable delay	4.8
X6 = [LTD / (equity + LTD)] / accounting added value	4.5
X7 = Trade payable delay	3.7
X8 = Estimated irrecoverable trade receivable / trade receivable	1.7
Total	100

Source : A.Galesne,1994/1999. Le diagnostic bancaire de l'entreprise. Rennes, CEREFIA.

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NOTES

¹ For a discussion about the choice of the duration as an indicator of intensity of bank relationships, see Elsas and Krahnén (1998).

² According to this mechanism, the informed bank will agree to let leave towards another bank only lower quality firms.

³ For an estimate of these costs, see Kim, Kliger and Bent Vale (2001).

⁴ The “soft budget constraint” results from the analysis of planned economies, see Maskin (1999).

⁵ These authors show that long-term bank relationships become less attractive for firms after a merger of their main bank.

⁶ The statute of foreign main banks (12 cases) is considered according similar criteria.

⁷ Concerning collateral requirements, see Berger and Udell (1998) for a survey, and Elsas and Krahnén (2000) for an empirical approach.

⁸ A classical case of incoherence is when the firm declares not to be subject to credit rationing but to have faced many problems with financing investment projects.

⁹ For more details see Hausman and al. (1984) and Gouriéroux (1989). Estimates are carried out using macro-orders usable with SAS, for details see Crépon and Duguet (1995).

¹⁰ For details, see Tobin (1958) and Gouriéroux (1989).

¹¹ 22.5% of firms whose the manager is the main shareholders have less than 4 employees versus 12.5 % of firms for which it is not the case.

¹² For an elaborate justification of this result, see Paraque and Cieply (1997).

¹³ See Elsas and Krahnén (2000), Machauer and Weber (2000), Lehmann and Neuberger (1999) for the German case but also Degryse and Van Cayseele (1998) in the Belgian case.

¹⁴ This effect resists the cutting of the sample according to the number of bank relationships (single-bank firms vs multiple-banks firms), these estimates are not reproduced.