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Europe's changing financial landscape: The financing of small and medium-sized enterprises

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Preface

Ewald Nowotny
Vice-President

Europe's financial landscape is changing fundamentally. Key signs of this change include banking sector consolidation, mergers between different types of financial institutions – such as banks and insurance companies – that used to concentrate on particular financial services, a declining importance of bank intermediation relative to funds channelled through capital markets, and regulatory reforms.

These changes are likely to affect small and medium-sized enterprises (SMEs), and concerns have been raised that they could lead to a shortage of finance. As these enterprises are the backbone of the EU economy, accounting for the bulk of employment and contributing significantly to the diversity and resilience of our economies, economic policy cannot turn a blind eye to possible problems in SME finance. Against this background, the purpose of this edition of the *EIB Papers* is to explore the nature of SME finance in the EU (another edition of the *EIB Papers* – namely Volume 8, Number 1 – reviews the main features of Europe's changing financial landscape).

The questions addressed in this edition are diverse and include: how do SMEs finance their activities, investment in particular? Are small firms at the mercy of (too) few suppliers of finance and, related to this, do small firms usually rely only on one bank? Can we detect significant differences in the financial structure of small and large firms? If so, do these differences reflect firms' choice or constraints they face in financial markets? Irrespective of the answer to the last question, do possible differences in financial structure matter for the growth of firms? If so - and if it is not due to firms' choice - what can be done about it? Specifically, what is the proper role of economic policy in all this, and to what extent can firms themselves improve their access to finance? To conclude a long but far from exhaustive list: is the picture on SME finance roughly the same for all EU countries and, if not, what are the main country specifics?

As a policy-driven institution with a mandate to support SMEs by extending loans and by providing equity capital and guarantees via its venture capital arm, the European Investment Fund, the European Investment Bank obviously has a keen interest in understanding the challenges of SME finance. I am convinced that with the research put together in this edition we have made great strides in this respect, and I am pleased that we can share our insights with the readers of the *EIB Papers*.

Europe's changing financial landscape:

The financing of small and medium-sized enterprises

The 2003 EIB Conference on Economics and Finance, which was held at the EIB on 23 January 2003, aimed at reviewing Europe's changing financial landscape and the policy challenges arising from this. The conference concentrated on two main issues. Firstly, developments in the European capital market, the increasing importance of active institutional asset managers and the restructuring of the EU banking sector. The second issue related to the capital structure and finance of European SMEs, which is bound to be affected by the ongoing changes in the structure and regulation of banking.

Speakers included:

Patrick Artus,
of CDC IXIS, Paris

Thorsten Beck,
of the World Bank, Washington

Graham Bishop,
of GrahamBishop.com, Battle

Arnoud Boot,
of the University of Amsterdam

E. Philip Davis,
of Brunel University,
West London

Michel Dietsch,
of the University of Strasbourg

Luigi Guiso,
of the University of Sassari

Ulrich Hommel,
of the European Business School,
Oestrich-Winkel

Philippe Maystadt,
President of the EIB

Rien Wagenvoort,
of the EIB

Editors' comment

Europe's financial landscape is undergoing fundamental changes, which are driven by market forces, demographic trends, and – last but not least – economic policies, notably the creation of the European Monetary Union and the move towards the Single Market for financial services.

These changes are having a considerable impact on EU economies. It is against this background that both editions of this year's *EIB Papers* are devoted to Europe's changing financial landscape. This edition concentrates on the impact of these changes on the financing of small and medium-sized enterprises. The other edition (Volume 8, Number 1) looks more broadly on recent developments and prospects for finance in Europe. That edition also features an overview paper, which leads into the theme and summarises the papers in both editions. The papers contained in Volume 8, Number 1 are:

The transformation of finance in Europe: intoduction and overview
Eric Perée & Armin Riess (European Investment Bank)

Stock markets, banks, and economic development: theory and evidence
Thorsten Beck (World Bank)

The role and development of EU capital markets
Graham Bishop (GrahamBishop.com)

Institutional investors, financial market efficiency, and financial stability
E. Philip Davis (Brunel University)

Restructuring in the banking industry with implications for Europe
Arnoud Boot (University of Amsterdam)

Armin Riess and Rien Wagenvoort

ABSTRACT

Introducing the topic of SME finance and summarising *the main findings of the contributions to this edition of the* EIB Papers, *this overview stresses the importance of relationship banking for the supply of SME credit; points out the differences and similarities in the capital structure of firms across size classes and across Europe; observes that while there is little evidence of widespread SME credit rationing, financial market imperfections may nevertheless curb SME growth; and highlights that the changes in Europe's financial landscape – including bank consolidation and Basel II – promise to foster SME finance.*

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SME finance in Europe: introduction and overview

Noise proves nothing. Often a hen who merely laid an egg cackles as if she had laid an asteroid.
Mark Twain

Rien Wagenvoort

1. Introduction

Europe's financial landscape is experiencing sweeping changes, driven by a variety of factors, notably the introduction of the euro, deregulation and liberalisation aimed at creating the Single Market for financial services, progress in information and communication technology, increasing wealth, and population ageing. These changes – in particular the restructuring, consolidation, and reorientation of banking – are likely to affect the financing of small and medium-sized enterprises (SMEs). But are these changes a blow or a blessing for SME finance?

Some of the changes in Europe's financial landscape should work in favour of SME finance. Firstly, new information and communication technologies contribute, at a lower cost, to reducing information asymmetries between lenders and borrowers, thereby making SME lending more attractive (see, among others, Frame *et al.* 2001). Secondly, partly due to progress in information technology, new banking methods are being developed and implemented. For instance, banks adopt new portfolio credit risk models that allow them to allocate and price their resources more effectively. Moreover, the use of credit risk transfer mechanisms (such as the securitarisation of SME loans) is spreading, allowing banks to focus on comparative-advantage activities, notably credit risk assessment, loan origination, and credit risk monitoring – all activities crucial for the provision of finance to SMEs. Thirdly, equity capital is becoming increasingly available to SMEs through the development of (secondary) capital markets and venture capital finance. Fourthly, the second banking directive of the EU aims at boosting competition between banks, thereby improving the terms and conditions of bank finance, including those supplied to SMEs.

Other features of Europe's financial landscape have raised concerns about a possible deterioration of conditions for SME finance. Firstly, consolidation in national banking markets has reduced the number of banks and has in many EU countries, especially in the smaller ones, increased the market share of the top-five largest institutions (see, among others, ECB 2002). This may be detrimental to SME lending since there is evidence that large banks devote a lesser proportion of their assets to small business loans in comparison to small, often regional banks.[1] Secondly, there is evidence (Davis, this volume) that capital markets and institutional investors are gaining ground over banks. Institutional investors are in competition with banks when collecting savings in the economy, but they tend to lend less to SMEs than banks do. Thirdly, a new capital adequacy framework for banks (Basel II) is in the making. The thrust of Basel II is to better align capital charges and, by extension, interest rates on loans with underlying credit risks. As SME lending is often perceived, rightly or wrongly, as particularly risky, many observers – in particular SMEs themselves – have been vocal in warning against a (further) deterioration of SME finance.

1 See, among others, Berger *et al.* 1998 who present evidence on US banks.

The contributions in this edition of the *EIB Papers* are firmly set against the backdrop of challenges to SME finance in general and, in particular, concerns that the creation of Europe's new financial architecture will leave SMEs out in the cold. The common feature of all contributions is that they examine the structure of SME finance and analyse whether SMEs are finance constrained. **Rien Wagenvoort** approaches these issues from a European-wide perspective whereas **Luigi Guiso**, **Ulrich Hommel** and **Hilmar Schneider**, and **Michel Dietsch** each undertake a country case study, covering Italy, Germany, and France, respectively.

The remainder of this overview paper is organised as follows: Section 2 sets the stage for summarising the main messages of the various contributions by explaining why financing of SMEs tends to be more challenging than financing of large firms. Reflecting these challenges, small businesses often have no other choice than to rely on bank relationships for their external financing while large firms may turn to banks as well as capital markets. We will also elaborate on the benefits and costs of relationship banking and briefly consider the impact of bank competition on relationship banking. In Section 3, we discuss the capital structure of the average European firm across different size classes and review similar results for Italy, Germany, and France. In Section 4, we evaluate whether SMEs in Europe suffer from credit constraints and whether financial market imperfections hamper the growth of companies. Section 5 begins with a brief empirical description of relationship banking in the three countries covered here and continues with an evaluation of the impact of bank consolidation on relationship banking in France. The implications of Basel II are discussed in Section 6. Finally, Section 7 concludes.

2. The challenges of SME lending, relationship banking, and credit rationing

Since SMEs are often less transparent than large firms, their financing is more challenging.

Information and control problems are crucial for understanding the financing of firms. In comparison to large enterprises, SMEs are often more information opaque. This makes the financing of SMEs especially challenging since asymmetric information may create adverse selection and moral hazard problems. As a result of these problems, firms may be credit rationed (Stiglitz and Weiss 1981), meaning that they do not get as much credit as they want although they are willing to meet the conditions set by the lender on equivalent credit contracts. SMEs in Europe often complain about financing problems and the behaviour of their banks.

One way of reducing asymmetric information is to build a long relationship with creditors. One can speak of relationship banking as opposed to transaction banking when the following three conditions are met: "(i) The intermediary gathers information beyond readily available public information; (ii) information gathering takes place over time through multiple interactions with the borrower, often through the provision of multiple financial services; (iii) the information remains confidential (proprietary)"[2]. Relationship banking may create value as it can stimulate the channelling of information on the borrower to the lender. Firstly, a firm may disclose information to the intermediary without making strategic knowledge known to competitors. Secondly, a firm can signal its quality to the lender over time by establishing a solid track record in meeting debt service obligations. Finally, at least in theory, relationship banking allows intertemporal

2 Boot (2000, p. 10). Boot argues that relationship intermediation would be a more appropriate term than relationship banking as other non-bank financial institutions such as venture capitalists, finance companies etc. engage in similar activities.

smoothing of financing costs (Petersen and Rajan 1992). For instance, a bank may subsidise a firm at the beginning of a product cycle and receive compensation for initially accepting a low interest rate when product sales have matured.

While possibly mitigating information asymmetries, relationship banking has its own drawbacks. One is that relationship banking introduces a soft-budget constraint: lenders with outstanding claims on a firm that is on the verge of bankruptcy may be willing to provide additional finance to this firm at terms that would be unacceptable for new lenders. Borrowers aware of such a weakness of lenders may have perverse incentives *ex ante*.

Another problem of relationship banking is that the borrower may become captive of its lender if the latter increases its power over time due to its information monopoly. In contrast with the intertemporal smoothing argument mentioned above, finance conditions may actually deteriorate when the bank-firm relationship lasts. For instance, Degryse and Van Cayseele (2000) find for small European businesses that interest rates on loans tend to increase with the duration of a bank-firm relationship. One can think of several solutions to solve this hold-up problem: a firm may choose to borrow from more than one bank at the same time (multiple banking) and/or may insist on a termination clause in the credit contract that protects the firm from future abuse by the lender (von Thadden 1995).

What is the effect of competition in banking on relationship banking? There are two opposing forces. On the one hand, competition may stimulate relationship intermediation, as investment in information acquisition gives the bank an opportunity to create a competitive advantage vis-à-vis other lenders. On the other hand, competition in banking may rule out intertemporal smoothing of the cost of credit and, hence, take away one of the benefits of relationship banking.

Overall, if relationship banking cannot solve the problems stemming from asymmetric information, the outcome may be finance constraints, which in turn could result in under-investment in the economy. Before looking at the empirical evidence for credit rationing and, more generally, for growth-impeding finance constraints, we will shed some light on the capital structure of SMEs.

3. Capital structure of the average firm across size classes

On average, capital structure of European firms is similar across size classes, but large differences across countries exist.

In analysing the capital structure of firms, Wagenvoort distinguishes five different size classes: very small, small, medium-sized, large, and very large firms. To motivate this analysis, one needs to bear in mind that a possible lack of external financing for small businesses could show up on the liability side of their balance sheet. Looking over a long period and at Europe as a whole, the ratio of equity to total liabilities is broadly similar across size classes and, therefore, leverage is more or less the same for a typical SME and a typical large firm. The ratio of financial debt to total liabilities, which mainly contains bank loans in the case of SMEs,[3] is also roughly equal across size classes.

However, Wagenvoort also shows that there are striking differences in the capital structure of the average SME across EU countries. The three country studies confirm this result. Guiso shows that the financial debt of small Italian firms in proportion to their total

3 For large firms financial debt also contains commercial paper and bonds.

assets is substantially lower than for large Italian firms. Guiso carefully explains that this difference is because many small firms do not have any loans outstanding at financial institutions. Indeed, conditional on having financial debt, the financial debt ratio and the maturity structure of financial debt are broadly similar across size classes. In sharp contrast with the Italian case, Hommel and Schneider find that the *Mittelstand* (i.e. German small and medium-sized enterprises) is much more indebted than large German firms. Two-thirds of German firms operate with an equity ratio lower than 20 percent, and 41 percent of German firms report equity ratios below 10 percent. This compares to a European average equity ratio of around one-third (see Wagenvoort). Dietsch finds a similar equity ratio for French companies regardless of their size. Overall, while the average European, French, and Italian SME does not appear to be undercapitalised, German SMEs are.

Wagenvoort also analyses how firms' capital structure changes over time. He finds that the dynamics of the financial debt ratio are very different for the average firm in the small and medium size classes in comparison to the average firm in the large and very large size classes. More specifically, SMEs appear to be less flexible than larger firms in adjusting the structure of their balance sheets to changing growth opportunities. In particular, the financial debt ratio increases (falls) at a slower rate in growing (shrinking) small firms than in growing (shrinking) large firms. Our interpretation of this result is that small firms have less flexibility in adjusting financial debt in response to changing growth conditions.

4. Finance constraints

Credit rationing of European SMEs is not a widespread phenomenon.

Is this lack of flexibility due to credit rationing? The three country case studies draw a firm conclusion: SME credit rationing is not a widespread phenomenon in Italy, France, and Germany. Guiso builds a model that can explain why some small firms carry financial debt whereas others do not. The empirical results show that those firms without bank loans are often the ones that finance a relatively high proportion of their assets with equity. Guiso argues that a negative relationship between the equity ratio and the probability of carrying financial debt stands in sharp conflict with the rationing hypothesis since a credit rationed firm is unlikely to substitute equity for financial debt. The absence of financial debt on the balance sheet of many Italian firms is thus mainly because they do not want to borrow, not because lenders do not want to lend. However, Guiso finds that when credit constraints are binding, size and lack of equity seem to play a key role. So, credit rationing happens more often with smaller firms than with larger firms. Dietsch observes that, except for very small French firms with an annual turnover of less than EUR 2 million, French SMEs do not increase bank borrowing when their credit status improves. In contrast with small and medium-sized firms, very small firms with a solid credit standing do raise more loans than their peers of equal size but lower credit standing. In light of this, Dietsch concludes that credit rationing is only relevant for very small firms with unfavourable credit ratings, and he shows that relatively few firms in France have these characteristics. Hommel and Schneider argue that the virtual standstill of credit growth in Germany in 2002 can mainly be attributed to the current cyclical downturn of the German economy. Whether, in addition, the *Mittelstand* suffers from structural adverse supply-side effects remains to be determined. However, given the large equity gap in German companies, lack of equity is the main finance constraint and additional debt does not seem to be the optimal way forward in Germany.

A few qualifying remarks are worth making. One needs to bear in mind that the Stiglitz and Weiss definition of credit constraints implies that a firm is only considered to be rationed if

lenders reject the demand for loans although the borrower is willing to pay the going interest rate (and to meet other conditions) on equivalent loans made to others borrowers of the same quality. In other words, according to this definition a firm is not considered credit rationed if it does not want to borrow at the requested interest rate even when the conditions imposed by the bank are too demanding relative to the true creditworthiness of the borrower. In this respect it is worthwhile observing that interest rates on bank loans are in general substantially higher for SMEs than for large firms.[4] Both the empirical findings of Dietsch and Wagenvoort suggest that from a portfolio credit risk viewpoint this may not be justified. It is true that on an individual basis smaller firms are riskier than larger firms because the expected default probability is negatively related to firm size. Banks in general use this argument to defend a higher risk premium on small business loans. But a portfolio of loans to small firms is not necessarily riskier than a portfolio of loans to large companies. Dietsch finds that default correlations are lower within the group of SMEs than within the group of large firms. Lower default correlations can offset the higher individual default probabilities within a pool of credits. Indeed, firm-specific risk can be diversified as opposed to systematic risk. According to Dietsch, large firms are more sensitive to the systematic factor (the general state of the economy) than small firms. This may be surprising as small firms are usually less diversified than large firms. However, SMEs may show greater flexibility in the transformation of their business when macroeconomic conditions deteriorate or improve. Large firms are often locked in to existing organisational structures and technologies.

In sum, the higher interest rates observed on SME loans seem difficult to justify on credit risk grounds only. It could be that SMEs pay high interest rates for wrong reasons. Banks may succeed in over-charging SMEs due to limited competition in (local) banking markets and the lock-in effect mentioned above. Therefore, due to finance constraints, under-investment by SMEs may happen on a large scale while credit rationing in the strict sense of Stiglitz and Weiss 1981 does not widely occur.

Financial market imperfections hinder the growth of small firms in particular.

Wagenvoort moves beyond credit rationing and tests for financial market imperfections that may lead to finance constraints, which include credit rationing but also constraints resulting from excessive loan pricing and difficulties in raising outside equity. The empirical test of finance constraints here boils down to testing whether financial variables, such as the amount of available internal funds, have a significant impact on the firm's investment and, thus, its growth. More precisely, Wagenvoort estimates the relationship between, on the one hand, firm growth and, on the other hand, cashflow and capital structure. A high growth-cashflow sensitivity is an indication that finance is binding. The following findings are worth highlighting. Firstly, finance constraints tend to hinder the growth of small and very small firms (i.e. firms with less than 50 employees); on average, the growth of these firms is one-to-one related to retained profits. Secondly, while finance constraints seem to be less binding for medium-sized enterprises, their growth, in comparison to the growth of large firms, nevertheless depends more on the availability of internal funds. Thirdly, highly leveraged firms have greater difficulties in tapping external finance and, hence, exploiting their growth potential.

How could one possibly improve the supply of finance to SMEs? It is useful to distinguish between public policy measures and efforts that lenders and borrowers can make to

4 Guiso provides indirect evidence of higher interest rates on loans to small firms. On average the inverse coverage ratio (i.e. interest expenses in percent of gross profits) is considerably higher for the group of small Italian firms in comparison to large firms while small Italian firms carry less financial debt.

alleviate finance constraints. Wagenvoort briefly reviews the literature on the effectiveness of public lending programmes and guarantee schemes. The main conclusion is that while direct lending and guarantee programmes usually benefit the recipients and help ease finance constraints, it has been questioned whether they improve the allocation of resources in an economy. Nevertheless a positive net return on public intervention can be expected if intervention reduces information asymmetries between borrowers and lenders and thus helps solving information problems. For instance, public authorities may stimulate information sharing among lenders. A recent study (Jappelli and Pagano 2002) shows that information sharing among lenders increases bank lending and reduces credit risk. Borrowers and lenders themselves can also contribute to solve finance problems of SMEs by reducing information asymmetries directly. As argued above, the establishment of long-term relationships has the potential to achieve this.

5. Relationship banking and bank consolidation

Multiple banking and relationship banking improve credit availability for SMEs.

Is there empirical evidence to support the view that relationship banking can mitigate finance constraints? Ongena and Smith (2000) report substantial variation in the average number of bank-firm relationships across European countries. The three country studies reviewed here confirm this result and they show that firms make considerable use of multiple banking. Guiso's analysis reveals that in Italy small firms keep on average more than four bank relationships whereas large Italian firms diversify their credit needs over more than 10 credit institutions. As shown by Hommel and Schneider, the *Mittelstand* in Germany relies on a smaller number of bank ties but even the small German firms on average borrow from more than one lender. Very small German firms borrow on average from two banks whereas large German corporates have relationships with about four banks. Dietsch finds a similar situation in France, except for very small French firms, which borrow only from a single institution. Smaller firms thus keep fewer bank-firm relationships than larger firms. The three case studies also document that SMEs keep shorter relationships than large firms. The econometric study of Dietsch clearly establishes a positive link between credit availability, on the one hand, and the number and duration of bank-firm relationships on the other hand. Moreover, the smaller the firm, the larger the impact. For example, smaller firms are more sensitive to the length of their bank relationships than larger firms. From Dietsch's work, we conclude that both relationship banking and multiple banking can stimulate SME finance.

Why is it then that SMEs keep fewer and shorter bank relationships than large firms? As credit availability improves when relationships become longer, one would expect information-opaque SMEs to stay with the same creditor(s). To begin with the number of relationships, as Dietsch notes, an obvious reason is that SMEs have to spread out fixed costs of lending over a smaller loan amount. Adding more creditors to the list of the firm's financial intermediaries will trigger additional costs. Therefore, smaller firms may be less willing to borrow from several banks at the same time. However, the disadvantage of relying only on one bank is that this bank may turn into a monopolist over time. Dietsch explains that, although it is expensive for the smaller firms to provoke competitive behaviour of their lenders by maintaining multiple relationships, smaller firms may still break monopolies by switching banks when time passes. This may explain the relatively short duration of bank-firm relationships of smaller firms.

One remark is called for. Hommel and Schneider point out that the number of initial credit offers a firm enquires about before finalising a loan contract may be more informative than

the number of its relationships. This is especially the case if firms seek offers from banks they had no prior relationship with. Another important element is whether firms seek offers from banks that are not located in the area where the firms have their headquarters. Overall, the authors conclude that *Mittelstand* firms seem to be more flexible than commonly assumed. Companies approaching several banks obtain an average of approximately three loan offers. What is more, a substantial amount of offers originates from banks that had no prior relationship with the firm and/or from banks situated outside the immediate geographical vicinity of the firm seeking finance. This is quite surprising because it is often argued that a local bank is best informed about firms in its region, essentially tying small firms to local banks.

Having established that both relationship banking and multiple banking enhance credit availability for SMEs, Dietsch continues his analysis by investigating whether bank consolidation in France has altered those two important features of European banking. He emphasises that bank consolidation in France went hand in hand with a lower concentration level in the business loan market. The wave of mergers and acquisitions thus seems to have stimulated competition between credit institutions. The author also shows that the number of bank-firm relationships significantly increased during the consolidation period. The relative change in the number of relationships is most important for small and medium-sized companies. An increase in the number of creditors tends to improve credit availability and, indeed, the share of SMEs in the French business loan market has significantly increased during the 1990s. The mirror image of this is a relative decline in lending to large firms, which lost 8 percent of their initial market share of 65 percent in 1993.

Recent studies (such as Berger *et al.* 1998) on the effects of bank mergers and acquisitions in the United States find that a possible decline in small business lending due to consolidation is mostly offset by the reaction of other existing (smaller) banks in the same market and new entrants, the so-called *de novo* banks. We conclude that SMEs should not necessarily fear consolidation of the banking industry. So far, there is no evidence that bank consolidation in Europe has been detrimental for the credit availability of SMEs.

There is no empirical evidence that bank consolidation in Europe is detrimental for SME finance.

We now turn to our final topic, namely the possible impact on SME lending of a new Basel Accord (Basel II).

6. Basel II

In April 2003, the Basel Committee on Banking Supervision issued its final consultative document on capital requirements of internationally operating banks (BIS 2003a). While the final decisions of the Basel Committee could still deviate from its current position, changes, if any, are likely to be moderate.

The Basel II proposal partly repairs the mispricing of corporate bank loans inherent in the current capital adequacy framework by allowing banks to set capital requirements as a function of a firm's credit rating and to take into account portfolio diversification effects. The proposal foresees two main approaches: the "Standardised Approach" (SA) rests on credit ratings of external rating agencies for corporates. This approach is less suitable for most SMEs as they lack size to obtain a costly rating. Nevertheless, the standardised approach is likely to be applied by small banks, which often focus on small business lending. The alternative "Internal Ratings Based Approach" (IRBA) allows banks to develop their own model to compute expected default probabilities (PDs), i.e. the main driver of credit ratings, under a set of rules. Most medium-sized and large banks are

expected to use this approach. For the IRBA, the Basel II proposal specifies functions to compute default correlations on the basis of the computed PDs. When determining default correlations a distinction is made between retail exposures and corporate exposures. Risk weights for bank assets are then computed as a function of both the expected default probability and the default correlation. Retail assets require lower capital requirements than corporate assets due to their smaller size and, hence, greater scope for diversification gains.

As argued by many practitioners and politicians, the recommendations put forward by the Basel Committee in the 2nd consultative document of January 2001 would likely have put SMEs at a disadvantage in comparison to large firms. Hommel and Schneider and Dietsch argue that this general conclusion is no longer valid since the Basel Committee published a revised recommendation in October 2002. Two significant changes were made to the Basel II proposal to lower capital requirements on loans to SMEs. Firstly, SME lending can be treated as part of the retail credit portfolio for exposures of up to EUR 1 million provided that a loan does not account for more than 0.2 percent of the total retail credit portfolio. Under the standardised approach, the risk-weighting factor will be set at 75 percent of the nominal retail exposure. This corresponds to the average of the risk weighting for A and BBB rated corporate credits. Under the IRBA, the revised proposal introduces new formulae for the computation of default correlations. The new functions exhibit a negative correlation between PDs and default correlations. Since PDs are higher for SMEs than for large firms, default correlations are by construction lower. These lower default correlations, in turn, reduce the risk weights on SME credits. Exposures to SMEs in excess of EUR 1 million will be treated like other corporate loans but a size correction to default correlations is made for firms with an annual turnover between EUR 5 million and EUR 50 million. The results of the third Quantitative Impact Study (BIS 2003b) shows that capital requirements for loans to SMEs will generally be no higher than at present – indeed in many cases they will be lower.

Hommel and Schneider believe that the current Basel II proposal meets the demands of the German *Mittelstand* to a large extent. Dietsch argues that capital charges on SME loans could be even further reduced. The outcome of his credit risk model clearly shows that actual default correlations within the group of SMEs are still substantially lower than implied by the IRBA risk formulae. In addition, Dietsch strongly argues against the assumed negative relationship between PDs and correlations since it induces too high capital charges for the less risky medium-sized enterprises in comparison to smaller firms. Indeed, actual default correlations are higher among small firms than among medium-sized enterprises.

The revised Basel II proposal, if implemented, is likely to foster SME finance.

Although the treatment of SMEs in the latest Basel II proposal is still seen as conservative by some observers, an important conclusion to be drawn from these impact studies is that if banks are adopting the advanced Internal Rating Based Approach of Basel II, it is likely that capital charges on SME credits will be substantially lower than today under the Basel I Accord.

7. Concluding remarks

Bank consolidation and Basel II have widely raised the fear that banks may reduce their participation in the SME loan market segment. So far, these expectations cannot be borne by empirical findings. On the contrary, there are indications that recent and future developments in the European banking industry will actually foster SME lending.

That said, especially for firms with less than 50 employees (or an annual turnover less than EUR 2 million) finance constraints still seem to hamper their development. It is worthwhile noting that a lack of financing does not necessarily imply a lack of debt. Indeed, credit rationing in the strict sense is rarely observed in France, Italy, and Germany. However, this does not rule out that banks overcharge SME loans and, as a consequence, that financial market imperfections have a negative impact on the growth of SMEs and thus the economy at large.

Public policy in support of SMEs needs to be designed in such a way that relief is offered where finance constraints are most binding. In this respect, equity financing deserves more attention. According to a recent OECD report (OECD 2002), small businesses experience considerable difficulty in obtaining risk capital. In Europe, small firms are relatively unimportant on the equity market in comparison to the United States. Therefore, the promotion of secondary capital markets and venture capital funds need to rank high on the political agenda.

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ABSTRACT

This paper examines whether small and medium-sized enterprises (SMEs) in Europe *suffer from a structural financing problem that hinders their growth. To this end, we estimate growth-cashflow sensitivities for firms in different size classes. Our results show that the sensitivity of company growth to cashflow rises as company size falls, which suggests that SMEs indeed encountered finance constraints that prevented them from fully exploiting their growth potential during the sample period 1996-2000. However, within each size class, quoted firms - even when small - tend to suffer less from finance constraints than unquoted firms.*

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Are finance constraints hindering the growth of SMEs in Europe?

The little things are infinitely the most important
A. Conan Doyle, The Adventures of Sherlock Holmes

Rien Wagenvoort

1. Introduction

Small and medium-sized enterprises (SMEs) play an essential role in the European economy.[1] To illustrate, they account for around two-thirds of jobs and half of the turnover in the non-agricultural business sector. Furthermore, empirical research suggests that SMEs help stabilise overall employment, especially during an economic downturn (among others, see Davis and Haltiwanger 1992, Fendel and Frenkel 1998). Moreover, there are indications (Eurostat 2002) that SMEs are, on average, as innovative as large-scale enterprises. Given the prominent role of SMEs, a financial environment that promotes their growth is essential for the success of EU economies. By extension, limited access to external finance – often reported by small and medium-sized businesses – could unduly restrict employment and growth in the EU.

Although anecdotal evidence indeed points at financing problems of small businesses, this cannot be taken as hard proof. Small and medium-sized firms may have incentives to complain to trigger financial support from the government. They may also find it unfair that they are asked to pay higher interest rates and/or provide more collateral for their loans than large companies. But lenders may have good reasons to do so. After all, the probability of default tends to decrease with the size of a firm. More generally, lending usually follows the business cycle and it is, thus, standard practice that financial institutions tighten credit conditions in some periods and relax them in others. In an economic downturn, complaints of SMEs about financing constraints could thus well reflect cyclical problems rather than structural ones.

Against this background, this paper analyses whether SMEs suffer from a structural financing problem that hinders their growth. To this end, we address two broad questions. First, do capital structures of firms differ across size classes? To motivate this question, one needs to bear in mind that a possible lack of external finance for small businesses could show up on the liability side of their balance sheet. For instance, a large share of relatively expensive financing sources, such as trade debt, could be an indication that SMEs suffer from finance constraints more than large firms. Also, a low proportion of bank debt could indicate difficulties of small businesses to access credit markets. But financing problems may also be revealed on the asset side of the balance sheet. For example, a company that has limited finance opportunities often needs a higher cash position.

Finding differences between the capital structures of large firms, on the one hand, and small firms, on the other hand, may hint at difficulties of SMEs to access external finance.

1 In defining SMEs, we adopt in this paper the size classification of the European Commission and, thus, consider a firm with less than 250 employees an SME. We distinguish three SME size classes: (i) very small, so-called micro firms (less than 10 employees), (ii) small firms (10-49), and (iii) medium-sized firms (50-249). To compare SMEs with large-scale enterprises, this paper uses data on large firms (250-4,999) and very large firms (5,000 or more employees).

But it would not tell us whether or not a possibly distinct capital structure of SMEs hinders their growth - which is the second key question that we plan to address. To motivate this question, suffice to note here that modest bank borrowing, for instance, could reflect deliberate choice rather than supply constraints. To answer this question we provide a formal empirical test of finance constraints. Following Carpenter and Petersen (2002), we estimate for different size classes of firms the sensitivity of a firm's growth rate to cashflow. Relatively high growth-cashflow sensitivities indicate that firms need to rely extensively on internal funds to finance new investment projects. In other words, the growth of these companies will be restricted by the profit generating capacity of their existing production facilities.

The remainder of the paper proceeds as follows. In Section 2, we briefly discuss why SMEs may be at disadvantage compared to large firms when raising external finance. In Section 3, we look at key characteristics of firms' balance sheets. In addition to providing a static analysis, we examine the dynamic behaviour of capital structure of firms in different size classes. In section 4, we present and estimate a simple model of firm growth. The purpose of this model is to test for the empirical relevance of finance constraints of small and medium-sized manufacturing and construction firms in the EU. By splitting the sample on a finance characteristic of firms, namely whether or not firms are quoted on the capital markets, we gain further insights into the determinants of possible finance constraints. In Section 5, we discuss how possible finance constraints could be mitigated. Finally, Section 6 concludes.

2. Why is raising external finance especially challenging for SMEs?

Problems of asymmetric information in the credit market may lead to credit rationing.

In developing an answer to this question, we begin by pointing out that firms may suffer from credit rationing (Stiglitz and Weiss 1981), which essentially means that they do not get as much credit as they want although they are willing to pay the going market interest rate and meet other conditions set by lenders. To understand why this is possible, recall that in most markets excess demand would lead to a price increase, which – in turn – increases supply and reduces demand until an equilibrium between the two is achieved. But in credit markets, lenders may be unwilling to raise the interest rate and increase the supply of loans even if there is unsatisfied demand. The key to understanding credit rationing are information asymmetries between lenders and borrowers. Information asymmetries may prevent lenders from observing the true nature of borrowers; they may also prevent lenders from influencing the behaviour of borrowers once the credit contract is signed. In principle, lenders could raise the risk premium on loans, but doing so may increase the probability of default by attracting riskier borrowers (adverse selection) and/or by encouraging riskier behaviour of borrowers (moral hazard). Since adverse selection and moral hazard could cause the lenders' expected payoff to diminish when raising the interest rate, they may refrain from raising rates beyond a certain level even if this means not fully satisfying the demand for credit. The negative welfare effects of such credit rationing are underinvestment and lower growth.

There are a number of reasons why especially smaller firms could be vulnerable to credit rationing. One reason is that small and young businesses often have no access to capital markets and, therefore, rely heavily on credit markets to finance investment projects when internal funds have been exhausted. Another reason is that smaller firms typically

suffer more from information asymmetries than larger ones. Many smaller firms are younger and have less credit history. In addition, they face less rigorous reporting requirements and, as a result, information on them is less easily available. More fundamentally, small firms may be more reluctant than large firms to be fully open about their business structure, growth opportunities, and strategic orientation. Family-owned businesses, for instance, are sometimes hesitant to make their ownership structure public. A final reason why smaller firms could be particularly vulnerable to credit rationing is that they often have less collateral that could shield creditors from the harmful effects of adverse selection and moral hazard.

External finance tends to be more expensive for small enterprises than for large ones.

Credit rationing apart, external finance tends to be more expensive for small firms than for large ones. An obvious explanation is that fixed costs of lending – which are not proportional to the size of the loan (e.g. administrative costs and the costs of collecting information about the borrower) – inevitably make small loans more expensive than large loans.

One could also argue that small firms are, on average, riskier for the lender than large ones and, thus, need to be charged a higher interest rate. But the argument is not as straightforward as it appears at first sight. It is true that small firms may have a higher probability of failing; in particular, start-ups have a high probability (more than 50 percent) of perishing within their first five years and – consequently – small, young firms are rightly perceived as riskier (OECD 1997). But it is also true that simply comparing small and large firms individually is inappropriate since credit risk can partially be diversified away for smaller firms. A well-diversified basket of many small borrowers could be less risky than a portfolio of the same size comprising loans to large customers. To investigate this issue we looked at a concept of risk that differs from default probabilities, namely the variance in the return on equity. Indeed, preliminary calculations (not shown) on our database indicate the following: the variance in the return on equity of a synthetic firm created with a portfolio of EUR 1 billion of total assets of micro firms is considerably lower than the variance in the return on equity of a synthetic firm that represents EUR 1 billion invested in very large firms. The same result applies when small firms or medium-sized firms are compared with large and very large firms. This suggests that the underlying business risk is lower with small and medium-sized firms than with larger firms if banks construct well-diversified loan portfolios. However, this does not necessarily imply that lending to a pool of SMEs is less costly for credit institutions. In addition to the expected default probability and/or the variance in the return on equity, institutions need to account for the expected recovery rate when setting the lending rate. Small and medium-sized firms often have less collateral to underpin the repayment of the loan. Considering all these effects, even a diversified SME loan portfolio could be riskier than one consisting of loans to large companies.

A more mundane explanation for relatively high costs of SME lending is a possible lack of competition among lenders, which enables them to charge interest rates that are in excess of what the underlying credit risk requires. In general, it is plausible to argue that SMEs have fewer options when raising external finance, and this makes them depend more on a limited number of financial institutions. But there is also a specific dimension: small businesses are usually entirely dependent on the local bank market whereas large firms can shop around on global financial markets. In this context, it is worth noting that there is evidence for a clear relationship between bank size and SME lending, with large banks devoting a lesser proportion of their assets to small business loans (see, among others, Berger *et al.* 1998). In

fact, small, local banks may have an advantage in offering SME finance because of their local knowledge and experience. While this strengthens the bank-firm relationship and, thus, helps reduce information asymmetries, it tends to create market power, allowing banks to extract rents from SMEs. We discuss this problem in more detail in Section 5.

SME risks also explain why raising external finance can be challenging.

To summarise, asymmetric information, limited competition in local banking markets, but also SME risks explain why one would expect that raising external finance is especially challenging for SMEs. In the next section, we take the first step in analysing whether there is empirical evidence for this expectation.

3. Capital structure and firm size

In this section, we compare average balance sheets of EU firms in different size classes. The main purpose is to document how firms of different sizes are financed. Data sources and sample selection criteria are spelled out in detail in Box 1. Suffice to note here that the focus is on manufacturing and construction firms, which are grouped in five size classes - three for small and medium-sized enterprises and two for large firms (see Table B1), and that in this section the sample includes roughly 200,000 observations on 45,000 firms over the period 1988-2000. For data quality reasons we restrict the sample in section 3 to firms that carry financial debt and trade debt.

Although this section is on the capital structure of firms, it is useful to first look at the asset structure of the average firm in different size classes. After all, if there are important differences in the asset structure across size classes, one may expect to find differences on the liability side of the balance sheet as well. For instance, an obvious way to mitigate the credit rationing problem and to contain the cost of finance is to pledge some of the fixed assets as collateral in the credit contract. Indeed, many empirical studies find a significant positive relationship between the share of fixed assets in total assets and the share of debt in total liabilities (see, for instance, Guiso, this volume).

We distinguish four broad categories of assets: fixed assets, trade credit[2], other current assets, and cash. Fixed assets include tangible assets (e.g. machinery and buildings), intangible assets (patents, for instance), and other fixed assets such as investments in subsidiaries. Trade credit on the asset side of the balance sheet is a receivable; it represents bills customers owe to the company. Other current assets include stocks as an important component, and cash includes cash equivalents such as liquid securities.

Figure 1 reveals two striking differences across size classes. One is that trade credit is substantially higher for SMEs than for large firms. We will elaborate on this feature later on when discussing trade debt on the liability side of the balance sheet. The other difference is that the share of fixed assets clearly increases with size: fixed assets account for only one-third of SMEs' total assets, but represent almost half the total assets of very large firms. How do these differences affect firms' capital structure?

In theory, the structure of assets should have no bearing on the composition of liabilities. The famous irrelevance theorem of Modigliani and Miller (1958) asserts that the investment

2 It is common practice in the academic literature to use the term trade credit for bills payable and the term trade debtors for bills receivable. We deviate from this terminology and reserve the term trade debt for bills payable. The logic equivalent for bills receivable is then trade credit.

Box 1. Data sources and sample selection

In this study, we use the AMADEUS DVD (June 2002) and OSIRIS CD-ROM (2002) of Bureau Van Dijk (Brussels). The first source contains the balance sheets and income statements of some 4 million firms (all size classes); the second source provides data on 22,000 listed corporates. Initially, we have selected a subset of 211,374 firms in manufacturing and construction for the period 1988-2001 from AMADEUS. By selecting firms in these industries the original sample of 4 million firms is reduced to firms that generally need to make a considerable investment in fixed assets. In this way, we choose firms for which finance requirements are in general also considerable. For reasons of data processing capacity, we only select those companies that had at least 10 employees in the final year available. The category of "very small firms" (see footnote 1) is limited to a subgroup of very small firms that had less than 10 employees over the period. Our sample selection criteria thus exclude many very small stagnant or shrinking firms. Where this choice may create a distorted picture due to the sample selection bias, we do not show the very-small-firm case. From the original sample of 211,374 firms, different samples are created for the capital structure analysis (Section 3) and the growth analysis (Section 4); the purpose is to maximise the number of available and reliable observations for each analysis. In both sections, we exclude observations for 2001 since the number of firms for which data is reported is too small to construct a representative sample.

There are several shortcomings with Bureau Van Dijk's data sets. Firstly, for 5 percent of the observations, the sum of individual assets on the balance sheet is not equal to reported total assets, the sum of individual liabilities is not equal to total liabilities, or total assets are zero or negative. These observations are excluded from the capital structure analysis. Secondly, a thorough comparison with firms' annual reports reveals that zero values in the AMADEUS database are often data errors. Hence, for the analysis in Section 3, we ignore firms with zero total financial debt, zero trade debt, and zero trade credit. Thirdly, the AMADEUS database is not consistent in the definition of financial debt across different countries. In this study, financial debt includes short and long-term bank loans, commercial paper, bonds, and leasing contracts. AMADEUS adopts a broadly similar definition only for Belgium, Greece, Ireland, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom. Reflecting this limitation, Figures 1-4 and Figure 6 include only these countries. For cross-country comparisons (Figure 5), we use the BACH database (Eurostat 2001) for the remaining EU countries. Where two databases overlap, the data are very similar. This supports the validity of the cross-country comparisons in Section 3. Unfortunately, the BACH database is far too restricted to serve as a representative sample for all EU countries over the period 1988-2001. Finally, we exclude in the analysis of Section 3 observations that show negative stocks or negative "other current liabilities".

Even when excluding obviously erroneous observations, extreme observations can still spoil the statistical analysis. We therefore trim each variable to reduce the influence of outliers. We leave out 1 percent of the total number of observations on each variable; 0.5 percent of each side of the distribution. After applying the data cleaning procedures, the selected final sample for the analysis in Section 3 contains 194,208 firm observations. Table B1 shows how the observations are distributed over the different size classes. Box 2 and Box 3 explain - among other things - sample selection criteria as well as outlier detection and cleaning mechanisms used in Section 4.

The results for each size class shown in Figures 1 to 6 represent weighted averages. Each firm is weighted according to its size relative to the sum of total assets of all firms in its size category.

Table B1 Distribution of firm observations over size classes as shown in Figures 1-6.

Size class	Very small	Small	Medium	Large	Very large
Number of employees	# < 10	10 ≤ # < 50	50 ≤ # < 250	250 ≤ # < 5,000	# ≥ 5,000
Number of firm observations	9,152	84,800	73,359	25,582	1,315
Percentage of total observations	5%	44%	38%	13%	1%

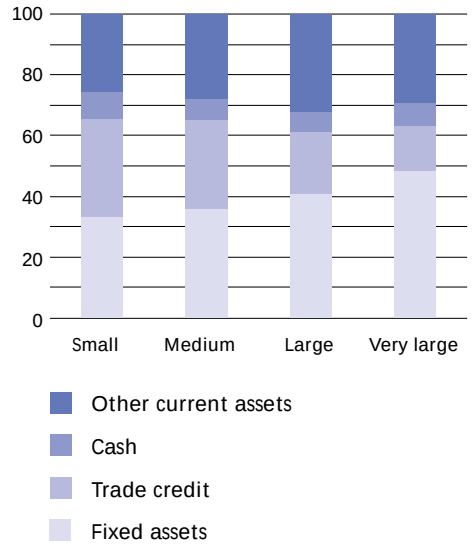
and financing decisions can be taken independently since the value of a firm is only determined by its assets and does neither depend on the type nor the maturity of the claims on the firm. In practice, however, capital structure matters.[3] For instance, debt can provide tax shields that increase the value of the firm. That said, the cost of possible financial distress when leverage is excessive could offset the tax advantages of debt. But this offsetting effect is probably the lower the more collateral firms can offer. In light of this, one could expect large firms, which have more fixed assets to pledge as collateral than small firms, to have a comparatively high share of debt on the liability side of their balance sheets.

On average, firms in different size classes have a broadly similar share of equity in total liabilities.

This is not at all the case, however. Distinguishing four types of liabilities (shareholder funds - or equity, financial debt, trade debt, and other liabilities),[4] Figure 2 shows that, on average, the share of equity in total liabilities is broadly the same across size classes and, by definition, the share of total debt is similar too. More specifically, the share of equity moderately increases with firm size, from 34 percent for small firms to 37 percent for the largest firms. One possible explanation for the lower equity share in the case of small firms is that this category includes a relatively larger proportion of young firms that may not yet have accumulated substantial profits to be added to shareholder funds. The mirror image of a somewhat lower equity share is that debt accounts for a slightly higher share in liabilities of smaller firms. In sum, in contrast to what the asset structure could suggest, we find that larger firms, on average, do not carry more debt.

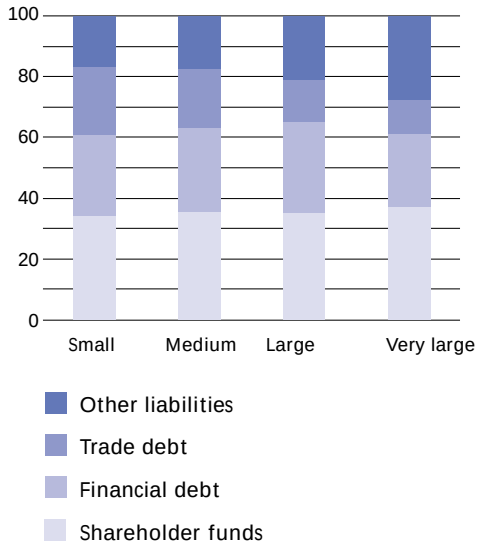
Having said this, the structure of debt differs markedly across size classes. In particular, smaller firms seem to rely less on other liabilities than larger firms; at the same time, they rely much more on trade debt than large companies. Let us look at these two types of liabilities one by one.

Figure 1. Asset structure by size class, in %



Source: Own calculation based on AMADEUS DVD

Figure 2. Liability structure by size class, in %



Source: Own calculation based on AMADEUS DVD

3 See Myers (2001) for an excellent overview of the theory and empirics of corporate capital structure.

4 Financial debt mainly consists of short and long-term bank debt and, for quoted firms, bonds and commercial paper; it also includes leasing contracts. Trade debt consists of unpaid bills, and other liabilities include, for instance, pension claims and provisions for restructuring costs.

The reasons why other liabilities, which include pension claims and provisions for future restructuring cost, account for a much larger part of the liabilities of larger companies than for smaller companies are not entirely clear. But a possible explanation for this result is that especially larger firms have to build up pension funds. In some countries, small firms do not make pension promises or do not need to book pension liabilities. Furthermore, the age distribution of employees of large firms may differ from that of small firms. Another potential explanation is that the accounts of larger firms are more transparent and comprehensive. For instance, large firms are more likely to properly account for the cost of future restructuring than small enterprises.

SMEs rely more on trade debt than large enterprises.

Turning to trade debt, we note first that several researchers have argued that smaller firms have a finance motive in addition to a transaction motive when using this type of debt. The finance motive implies that companies resort to expensive trade debt only when cheaper sources of funds have been exhausted. If this is so, the empirical finding that smaller firms rely heavily on trade debt could be seen as evidence that small and medium-sized firms face financing problems. In line with such a view, Nilsen (2002) finds that small businesses, and non-rated large companies, increase the share of trade debt in total liabilities during periods of monetary contractions. Wagenvoort and Hurst (1999) report that SMEs tend to reduce trade debt as they become older. Older firms are less likely to suffer from information problems. As a consequence, they may have better access to bank debt and substitute loans for trade debt.

However, this does not necessarily support the view that trade debt has an important financing function. Wagenvoort and Hurst (1999) also reason that the overall liquidity position of firms needs to be taken into account when discussing the function of trade debt. The authors measure liquidity as the ratio of liquid assets (cash plus trade credit) to liquid assets plus trade debt. A high liquidity ratio shows that the firm is in a strong position to cover short-run liabilities; all other things being equal, a decline in trade debt leads to a higher liquidity ratio. To the extent that trade debt is used as a source of financing – and not mainly to smooth transactions – trade debt is expensive. In these circumstances, one would expect that other forms of finance (e.g. bank loans) replace trade debt as young, initially finance-constrained firms grow older; by extension, one would expect an increase in the liquidity ratio. Wagenvoort and Hurst (1999) find, however, that in practice this does not happen. The liquidity ratio only moderately improves for SMEs that grow older. Against this background, the hypothesis that small and medium-sized firms use trade debt to finance their investment becomes less convincing. This is because liquid assets, such as trade credit, are reduced more or less in line with trade debt as firms mature. In sum, when firms get older the overall management of receivables and bills to be paid seems to improve, suggesting that SMEs keep trade debt foremost for a transaction motive.

All this indicates that we cannot look at trade debt in isolation, but have to examine it in conjunction with items on the asset side of firms' balance sheets, notably trade credit and cash. To start with trade credit, we have already emphasised its importance, in particular for small firms (Figure 1). Looking at the balance of trade debt and trade credit, it turns out that small and medium-sized firms are at a disadvantage relative to larger firms. As Figure 3 indicates, manufacturing and construction firms of all size classes extend more trade credit than they receive. Hence, they are all net creditors to the rest of the economy

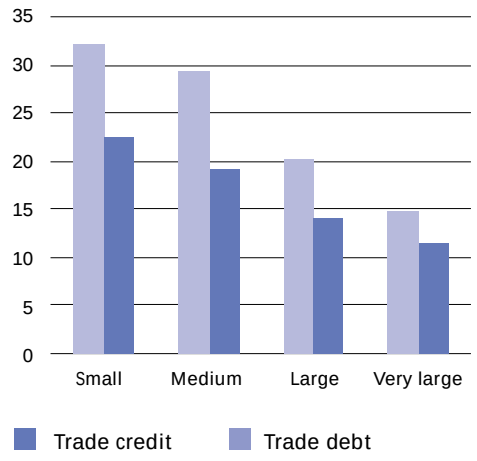
Small firms are the largest net providers of trade credit.

(i.e. the household, government, and foreign sectors as well as firms outside manufacturing and construction). But it is clear from Figure 3 that especially SMEs are, relative to their balance sheets, large net providers of trade credit.

In explaining this result, it is plausible to argue that smaller firms are less able than large firms to insist on prompt payment. This, in turn, may be because SMEs operate in a more competitive environment and/or are perceived as higher credit risk. Despite the cost of extending trade credit on a net basis, SMEs may have to offer this financial service just to stay in business. Whatever the reasons, it is somewhat ironic that this service is offered by firms that are believed to find it particularly challenging to obtain external finance on good terms. The gap between trade credit and trade debt needs to be financed with other sources of finance, like bank debt. Another conclusion is that, with trade debt falling short of trade credit, SMEs cannot systematically use current liabilities to finance long-term capital investment.

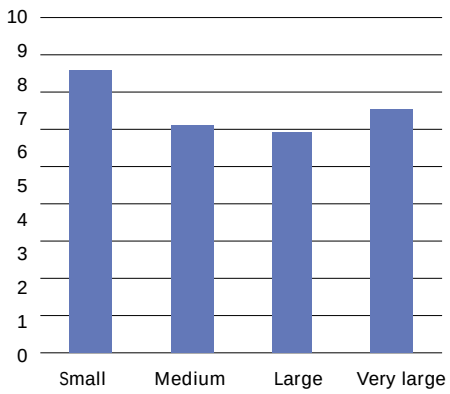
The other components of liquid assets are cash and cash equivalent items. Opler *et al.* (1999) find that the same factors that can explain a firm's capital structure also determine a firm's cash holdings. For example, companies with a higher share of fixed assets are generally more leveraged and keep a lower stock of cash.[5] Figure 4 supports this finding; it reveals that small firms, which have a lower share of fixed assets in total assets than larger firms, have higher cash holdings (relative to total assets) than medium-sized and large companies. The economic rationale for this behaviour is that small firms are liable to face greater uncertainty regarding short-term refinancing and, therefore, choose to hold more liquid assets to meet unexpected expenses. Obviously, this is costly since, at the

Figure 3. Trade credit and trade debt (in % of balance sheet total)



Source: Own calculation based on AMADEUS DVD

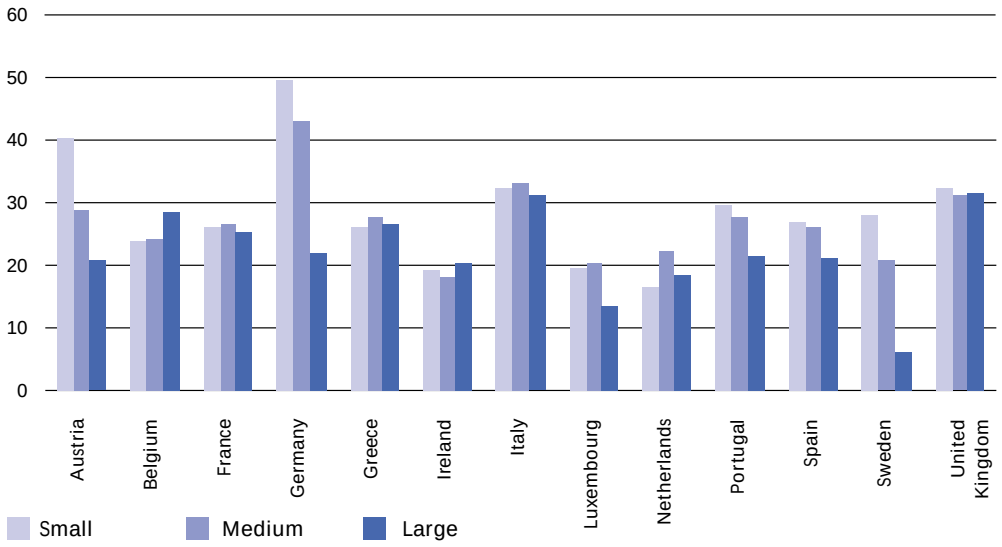
Figure 4. Cash (in % of total assets)



Source: Own calculation based on AMADEUS DVD

5 The relationship between fixed assets and financial debt does not come to the front in Figures 1 and 2 because we condition on size. Within each size class the standard result in empirical capital structure analyses is expected to hold.

Figure 5. Financial debt of enterprises in EU countries (in % of total liabilities)



Sources: Own calculations based on Amadeus DVD for Belgium, Greece, Ireland, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom; Eurostat (Enterprises in Europe, sixth report) for Austria, France, Germany, and Italy.

margin, cash holdings are financed by debt; the spread between the cost of debt and the return on cash (and cash equivalents) represents a liquidity insurance premium that larger firms with better access to credit need not pay.

In the remainder of this section we will discuss two important variations on our theme: first, differences in the capital structure of firms across individual EU countries and, second, the flexibility that firms in different size classes have in adjusting their capital structures to firm growth.

Large differences in the capital structure of SMEs continue to exist across countries.

Let us start with a brief look at the regional dimension. Figure 5, which shows the importance of financial debt across size classes for individual EU countries, suggests that in some countries (e.g. Austria, Germany, and Sweden) differences across size classes are more pronounced than in other countries. Germany stands out because its small and medium-sized firms have an unusually high share of financial debt on their balance sheets – not only relative to large firms in Germany but also compared to SMEs in other EU countries. Hommel and Schneider (this volume), who analyse the German case in more detail, point at the idiosyncrasies of the German firm-bank relationships, the attitude of German company owners towards outside equity, and – probably most important – the tax system as key reasons for the high financial debt of German SMEs. More generally, the large cross-country differences clearly indicate the continuing importance of country-specific features. It follows that any proposal aimed at improving the financing conditions for SMEs must rest on a sound understanding of country-specific circumstances.

Turning to the flexibility that firms have in adjusting their capital structures, it is useful to note, first, that the static analysis presented so far rests on balance sheet data that are

averaged over the period 1988-2000. Obviously, period averages cannot show how capital structures respond to firm growth. Moreover, the average capital structure for each size class hides a large diversity of financing patterns within each class; indeed, the standard deviations of the liability shares shown in Figure 2 are of similar magnitude as the shares themselves.

To analyse the scope for adjusting capital structure, we distinguish, in each size class, four categories that reflect the growth experience of firms. Specifically, for a given year, we classify firms as either (i) growing, (ii) fast growing, (iii) stagnant, or (iv) fast shrinking.[6] Figure 6 indicates how the share of financial debt in total liabilities varies with firm growth.

As a point of reference, we note that during 1988-2000, the average firm experienced an increase in their financial debt ratio, with a stronger upward drift in the case of large and very large firms (see in Figure 6 the columns "full sample"). As very large firms were much less leveraged than other firms at the depth of the recession in 1993, the more rapid increase in large firms' financial debt ratio has led to a notable convergence of financial debt ratio across size classes. In explaining why larger firms increased their financial debt ratio more rapidly than other firms, one could suspect that larger firms had better investment opportunities. This was, however, not the case: over the last decade, the assets of smaller firms grew more rapidly than those of large firms.

But how does the financial debt ratio behave if we distinguish firms according to their growth experience and their size? Let us focus first on the link between growth and financial debt. As Figure 6 suggests, the financial debt ratio increases when a firm expands, and it falls when a firm shrinks. What is more, the financial debt ratio increases (falls) the faster, the faster the firm grows (shrinks). This behaviour helps firms to adjust to changing growth opportunities. For instance, an increase in financial debt helps a firm to grow faster in an expansion, essentially overcoming a lack of shareholder funds. In other words, once retained earnings are exhausted, a firm needs to look for external finance, and if it goes first to the bank and/or debt market before raising external equity, its financial debt ratio rises. Likewise, when a firm is not growing, the financial debt ratio is likely to fall, as new borrowing is limited and existing debt is paid back.

Small businesses have less flexibility in adjusting financial debt to changing growth opportunities.

Probably the most striking message of Figure 6 is that small firms seem to have less flexibility in adjusting their financial debt ratio: the ratio increases (falls) at a slower rate in fast-growing (fast-shrinking) small firms than in fast-growing (fast-shrinking) large firms. Our interpretation of this result is that small firms have less flexibility in adjusting financial debt in response to changing growth conditions. When growth prospects are good, small firms may find it difficult to fully exploit their growth potential. Likewise, when growth prospects are bad, small firms may keep more financial debt on their balance sheets than large firms to avoid financing problems as and when growth prospects improve.

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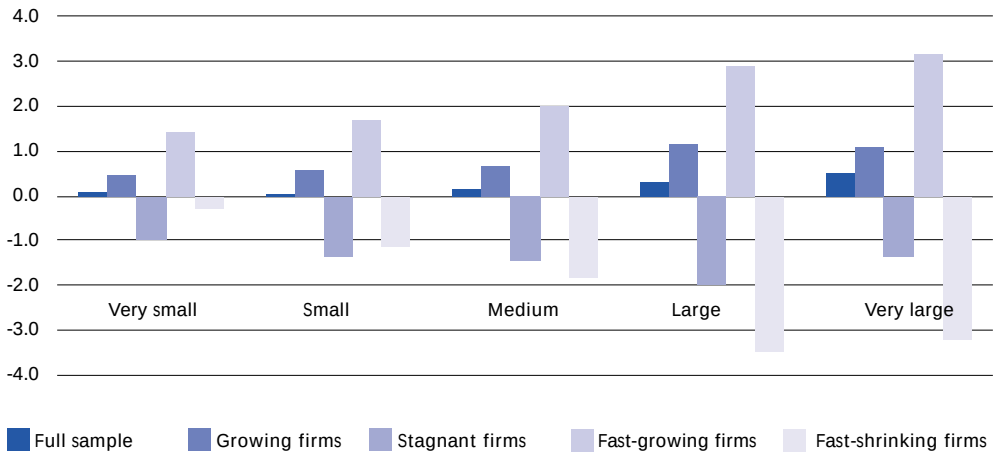
6 In any one year, we classify a firm as (i) "growing" if its asset grew by up to 15 percent, (ii) "fast growing" if asset growth was in excess of 15 percent, (iii) "stagnant" if its assets declined by up to 15 percent, and (iv) "fast shrinking" if assets declined by more than 15 percent.

Figure 6. Annual average change in ratio of financial debt to total liabilities, in %



Source: Own calculations based on Amadeus DVD

The average SME is neither undercapitalised nor overcapitalised.

To summarise the gist of the descriptive analysis presented in this section: the capital structure of firms does not differ markedly across size classes, and the average SME is neither undercapitalised nor overcapitalised compared to large firms; while SMEs rely more on trade debt than larger firms, this financing source is more than offset by trade credit granted by SMEs and, thus, SMEs are net trade creditors, in contrast to conventional wisdom; an important result is that SMEs appear to be less flexible than larger firms in adjusting the structure of their balance sheets to changing growth opportunities.

The last result could indicate that SMEs are indeed credit constrained. However, while our descriptive analysis may provide some hints, it cannot determine whether or not this has a tangible impact on the growth of SMEs and the economy as a whole. To address this issue, a more rigorous empirical approach is warranted. This takes us to the next section.

4. Empirial evidence for finance constraints

This section presents empirical evidence for finance constraints affecting small and medium-sized firms in Europe. We focus on two types of evidence:[7] first, surveys and, second, a model of firm growth, which we estimate on the basis of data published in firms' annual reports.

Under the aegis of the European Commission, the European Observatory of SMEs regularly surveys over 7,600 small and medium-sized firms in 19 European countries. Figure 7, which reflects 1999 and 2001 survey results (European Commission 2000, 2002), indicates that about 15 percent of the firms with less than 50 employees feel that finance

7 Several other approaches have been adopted to establish the empirical significance of finance rationing. For instance, Berger and Udell (1992) test for credit rationing by explaining the stickiness of commercial loan rates on more than a million loans of US banks between 1977 and 1988. They suggest that equilibrium credit rationing is not a significant macroeconomic phenomenon. Guiso (this volume) follows another approach. Using survey data on small, Italian manufacturing firms, he applies probit regression techniques to estimate, among other things, the probability of a firm's credit request being rejected. He shows that this probability decreases with firm size, even when controlling for other firm characteristics.

is the major constraint to the development of their business. About 9 percent of medium-sized firms (50-249 employees) consider insufficient access to finance the main bottleneck. The results of the 2001 survey suggest that the financing situation of SMEs has remained largely unchanged in recent years.

Figure 8 reveals large disparities in the perception of finance constraints across EU countries. For instance, almost one quarter of the Greek SMEs report that finance is the major restriction for future growth whereas only 5 percent of the SMEs in the Netherlands express worries about finance. It is tempting to think that differences across countries reflect differences in the degree of financial sector development. However, Figure 8 also shows that a non-negligible number of SMEs perceives finance constraints even in countries, such as the United Kingdom, with well-developed banking and capital markets. This suggests that finance constraints do not only stem from a lack of financial sector development. As a matter of fact, the Competition Commission of the United Kingdom reported in March 2002 (UK Competition Commission 2002) that the four largest financial institutions in England and Wales overcharged SMEs during 1998-2000.

SMEs consider a lack of skilled labour a more important obstacle to growth than finance.

The surveys reviewed here do not provide overwhelming evidence that also medium-sized firms suffer from finance constraints, given that only less than 10 percent of the companies reply that finance is the major bottleneck. Factors other than finance seem to be more important. To illustrate, the majority of SMEs – across all size classes – consider the lack of skilled labour the most important obstacle to business performance. That said, a survey carried out by Eurostat (2002) suggests that finance constraints could be more binding for particular SME activities: 28 percent of medium-sized firms report (in May 2001) that finance is the most important obstacle to innovation. Likewise, 24 percent of small-firm respondents and 22 percent of large-firm respondents, feel that a shortage of finance is holding back innovation in their enterprises. Therefore, in practice, finance constraints seem to be especially relevant to innovative firms, and among innovators problems of finance are felt across all size classes.

Figure 7. Share of firms considering access to finance the major business constraint, by size class, in %

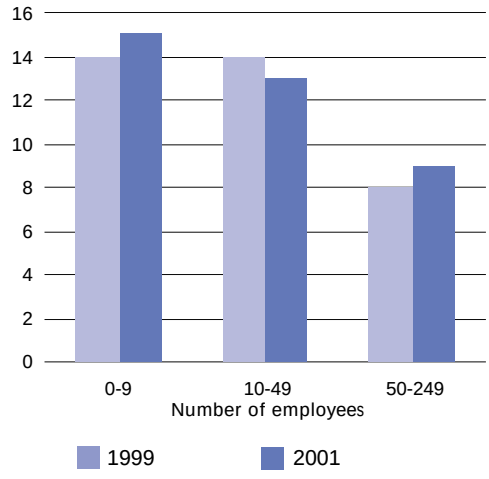
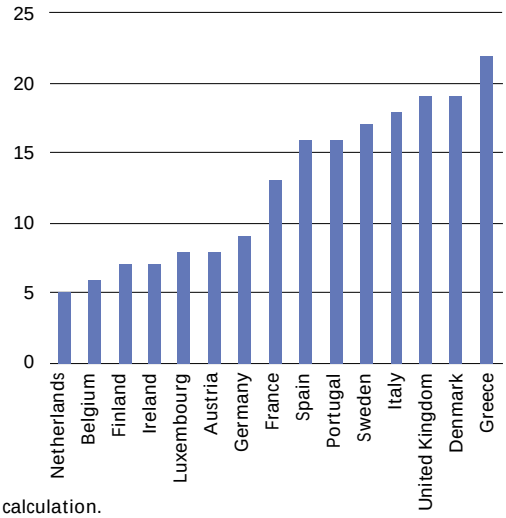


Figure 8. Share of SMEs considering access to finance the major business constraint, by country (1999), in %



Sources: European Commission (2000 and 2002), and own calculation.

Surveys are certainly informative, but they have shortcomings. One is that simply asking for the views of SME managers cannot provide hard evidence for finance constraints. Indeed, one can imagine that respondents have an incentive to overstate financing problems to foster public support. Nevertheless, we believe that their responses provide interesting insights. Another shortcoming is that while SME managers may perceive external finance as expensive, banks may have included in the proposed interest rate a justified risk premium. If firms are not willing to borrow at this rate, they can hardly be considered finance constrained although entrepreneurs are likely to report in the survey that finance holds back the growth of their businesses.

Simply asking for the views of SME managers cannot provide hard evidence of finance constraints.

All this calls for a more rigorous approach to the question of whether finance constraints hinder SME growth. One way to tackle this question empirically is to estimate a firm's optimal investment ratio and to assess whether or not the firm is in a position to realise that level of investment. The underlying idea of this approach is the following. In a perfect capital market, the type of finance (equity vs. debt or internal vs. external finance) does not determine how much a firm invests and, thus, the firm should be in a position to realise its desired level of investment. By contrast, when capital markets are imperfect and the firm faces external finance constraints, the availability of internal finance may limit the investment of a firm. Against this background, the empirical test for finance constraints boils down to testing whether financial variables, such as the amount of available internal funds, have a significant impact on the firm's investment and, thus, its growth. If they do, it is reasonable to conclude that the firm faces an external finance constraint. This is because in the absence of external finance constraints one would not expect to find a statistically significant and economically important link between a firm's internal finance and its investment.

Fazzari *et al.* (1988a, 1988b) initiated a voluminous literature that presents strong empirical evidence, within a neoclassical investment model with capital adjustment costs, that the empirical investment rate is highly sensitive to cashflow, i.e. a key component of internal finance. Many of these studies split the sample of firms on certain characteristics, such as dividend payouts and size, that allow differentiating, *a priori*, a group of firms that is likely to be finance constrained from a group that is not. Comparing empirical investment-cashflow sensitivities of the two groups usually confirms prior expectations. Overall, these results are interpreted as finance rationing being a real phenomenon.

Kaplan and Zingales (1997, 2000) critically review the adopted methodology. They argue, correctly, that for empirical investment-cashflow sensitivities to be informative about finance constraints, we must have, *a priori*, a convincing theoretical case for a positive relationship between investment-cashflow sensitivities, on the one hand, and the degree of finance constraints on other hand. But Kaplan and Zingales then wrongly argue that this means that investment-cashflow sensitivities need to be decreasing in cashflow. Kaplan and Zingales (1997) furthermore compare annual report information on firms' liquidity position and financing needs with the investment-cashflow sensitivities resulting from the regression model of Fazzari *et al.* Interestingly enough, some of the firms that Fazzari *et al.* earmarked as "likely to be finance constrained" reported in their annual reports that finance did not curb firm growth. Overall, Kaplan and Zingales conclude that empirical investment-cashflow sensitivities are uninformative about possible finance constraints.

Commenting on this critique, Fazzari *et al.* (2000) convincingly stress that when *a priori* classifying firms according to whether or not they can be expected to encounter finance

constraints, internal wealth – which is the sorting characteristic suggested by Kaplan-Zingales – is not the relevant issue. What is needed is a sorting characteristic that classifies firms, *a priori*, according to the finance supply function they face, and the key is to separate firms that encounter less binding finance supply functions from those that have to operate under more binding finance supply functions. An important issue here is that the sorting characteristic must be exogenous instead of endogenous to the model. Both internal wealth and dividend payouts (as in the seminal papers of Fazzari *et al.* 1988a, 1988b) are not perfect screening devices. Overall, we agree nonetheless with Fazzari *et al.* that the cashflow sensitivity is a useful indicator for the relative importance of financing problems across different groups of firms. Against this background, we take a look at one contribution that follows this approach before developing our own model.

Higher growth-cashflow sensitivities are a sign of bigger finance problems.

Carpenter and Petersen (2002) follow the approach of Fazzari *et al.* (1988a, 1988b). But instead of examining how possible finance constraints could affect investment (as Fazzari *et al.* (1988a, 1988b) do), they investigate how possible finance constraints could affect total asset growth. After all, investment in fixed assets covers only part of the use of a firm's funds. Production, cash holdings, and late payments also need to be financed. To take into account the full spectrum of the use of finance, Carpenter and Petersen propose to estimate the sensitivity of a firm's growth rate to its cashflow, with the growth rate measured by the relative change in total assets. The test on the relevance of finance constraints boils down to the same principle as applied to models of investment: higher growth-cashflow sensitivities are a sign of bigger financing problems. Carpenter and Petersen (2002) find for small, quoted firms in the United States that the growth-cashflow sensitivity of firms that use external equity is lower than the growth-cashflow sensitivity of firms that make little use of external equity. They therefore conclude that financing constraints are binding for the latter companies.

In the remainder of this section, we develop a simple model of firm growth, which is similar to the one in Carpenter and Petersen (2002). Our model relates firm growth to the availability of internal finance (measured by the ratio of cashflow to total assets), profit opportunities (measured by Tobin's Q), leverage (equity ratio), and size (log of total assets), and it controls for firm-specific fixed effects and time effects. Box 2 sets out the model, the sample selection procedure, and the regression method in more detail. But three points are worth mentioning here. First, we include Q to control for a firm's investment opportunities; this reflects the notion that firms with good investment opportunities (high value of Q) are likely to grow more rapidly than firms with more limited investment opportunities (low value of Q). To arrive at estimates for Q - i.e. the market value of a firm relative to its replacement costs - we need the market value of shareholder funds. Most SMEs are not quoted on stock markets. Hence, the market value of shareholder funds is not directly available. In Box 3 we present a solution to this problem. In a nutshell, we explain Q-values of quoted companies and use the econometric model to obtain Q-values of unquoted companies. Second, we include the size variable to pick up differences in investment opportunities between size classes that the Q-values do not capture. The inclusion of both Tobin's Q, as a measure of investment opportunities, and the size variable should assuage the Kaplan-Zingales critique that investment-cashflow sensitivities depend on the curvature of the investment demand function. Third, leverage is included not only because it may carry additional information on finance constraints but also because it may signal risk.

Let us elaborate on the internal finance theory of growth, which is behind the idea of testing empirically the relation between firm growth and the availability of internal finance. By definition, the growth of a firm without any access to external finance cannot exceed the growth of its own funds. Furthermore, a firm with difficult access to external finance is likely to retain all profits; obviously, this applies to a firm with good investment opportunities, but it is also true when opportunities are temporarily poor because the firm cannot rely on external finance when investment opportunities subsequently improve. Overall, for firms with reasonably good investment prospects but without any access to external finance, we would expect a one-to-one relationship between firm growth and cashflow (see Box 2, equation 2). More generally, we define growth-cashflow sensitivity as the change in total assets generated by an increase of one unit of cashflow.

What about the growth-cashflow sensitivity of a firm with easy access to external finance? The growth of such a firm can be larger than the growth of its internal funds, and such a firm is likely to pay out dividends more often than a firm with difficult access to external finance. In principle, a fully unconstrained firm could decide to use none of its cashflow for new investment projects and pay out all profits as dividends. For such a firm, new assets could be financed by new debt and/or new equity and, therefore, one may expect that there is no significant relationship between cashflow and firm growth. In practice, however, this is unlikely to be the case. There could be a significantly positive relationship between firm growth and cashflow simply because companies first use their retained earnings before applying for external funding – even if the cost of internal funds equals the cost of external funds. In sum, we would expect the growth-cashflow sensitivity of firms with easy access to external finance to be smaller than one, but not necessarily zero.

Having established the range of values that growth-cashflow sensitivity can take[8], we need to set a benchmark that allows assessing differences in finance constraints of firms in different size classes. It is plausible to argue that the very large firms are probably the least finance constrained since they have easy access to capital markets. Therefore, we choose the estimated growth-cashflow sensitivity of very large firms as a benchmark for firms in other size categories. By comparing growth-cashflow sensitivities across size classes, including a category of very large, essentially unconstrained companies, we obtain evidence of finance constraints.

Growth-cashflow sensitivities of small firms indicate that finance constraints are binding.

Figure 9 shows estimated growth-cashflow sensitivities across size classes. Obviously, cashflow is a key determinant of firm growth – irrespective of firm size. But we find striking differences across size classes. At one end of the range, we find that the growth-cashflow sensitivity of very large firms is lower than 0.5. At the other end, growth-cashflow sensitivity is close to one for small and very small firms, suggesting that finance constraints appear particularly acute for firms with less than 50 employees. For medium-sized firms (50-249 employees), the growth-cashflow sensitivity has been estimated at 0.7, indicating finance constraints are less binding than in the case of smaller firms. The figure also shows that even large firms (250-4,999 employees) are, on average, less flexible in their financing opportunities than very large firms. Overall, we conclude that – after controlling for investment opportunities – the growth of smaller firms is to a larger extent determined by the availability of internal funding than the growth of larger firms.

8 Strictly speaking, as argued by Carpenter and Petersen (2002), growth-cashflow sensitivities may slightly exceed 1 if high cashflow allows the firm to increase its debt level.

Box 2. Modelling firm growth

Methodology

Following Carpenter and Petersen (2002), we consider a simple model that relates firm growth to the availability of internal finance and other explanatory factors:

$$(1) \quad g_{ti} = c_i + cfr_{ti}\,\beta_1 + Q_{t-1,i}\,\beta_2 + \frac{E_{t-1,i}}{TA_{t-1,i}}\,\beta_3 + \ln(TA_{t-1,i})\,\beta_4 + \mathrm{d}_t\beta_t + \varepsilon_{ti}$$

where $g_{ti} = (TA_{ti} - TA_{t-1,i})/TA_{t-1,i}$ is the growth rate of total assets of firm i between the end of period $t-1$ and the end of period t; $cfr_{ti} = Cashflow_{ti}/TA_{t-1,i}$ is the ratio of cashflow (after-tax profits plus depreciation) to total assets; Tobin's $Q_{t-1,i}$ (a measure of investment opportunities) at the beginning of period t is computed with equation (2) of Box 3; E_{ti} is the book value of equity; d_t are time dummies; c_i are firm-specific fixed effects; and ε_{ti} is the error term.

Discussion

The relationship between firm growth and cashflow

For a firm without any access to external finance the theoretical relationship between growth and the cashflow ratio is one-to-one if the firm has good investment opportunities and, hence, retains all profits. In this case, the following accounting identity holds:

$$(2) \quad g_{ti} \equiv \delta_{ti} + cfr_{ti}$$

where δ_{ti} is the depreciation rate applied to $TA_{t-1,i}$ during period t. Firm-specific fixed effects in equation (1) will pick up the constant component of the depreciation rate.

The relationship between firm growth and the equity ratio

In addition to the variables considered by Carpenter and Petersen (2002), we include leverage (ratio of equity to total liabilities) and a proxy for firm size (the natural logarithm of total assets). The coefficient on the equity ratio can also measure finance constraints in addition to growth-cashflow sensitivity. Firms with a solid capital structure at the beginning of period *t* are, *a priori,* less likely to be finance constrained than highly leveraged firms. Hence, if the sample contains finance-constrained firms, we expect to find a positive relationship between the growth rate and the equity ratio. We note, however, that leverage may also be a proxy for business risk. If firms with more risky projects carry less debt, a positive relationship between the growth rate and the equity ratio can also simply imply that risky ventures exhibit higher growth rates. In these circumstances, one cannot draw definite conclusions about the relevance of finance constraints by solely looking at the coefficient on the equity ratio.

Controlling for investment opportunities

We control for investment opportunities by including an estimate for Tobin's Q (see Box 3). We take Q at the beginning of period *t* because our objective is to test for finance constraints during period *t*. Q at the end of period *t* signals expectations of investment opportunities that may arise only after period *t*. Our estimate of Tobin's Q cannot be expected to deliver a perfect proxy for investment opportunities. Therefore, the size variable is included to control for different investment opportunities, which are not captured by the estimated Q, between smaller and larger firms within each size class. To summarise, our model includes two variables, the cashflow ratio and the equity ratio, which may pick up finance constraints, and two other variables, Tobin's Q and size, which control for the possibility that companies of different size may have different investment opportunities.

Gibrat's law

The "Law of Proportional Effect", first advocated by Gibrat in 1931, dictates that the growth rate of a firm is independent of its initial size (for an extensive discussion of Gibrat's law and its empirical relevance see Sutton 1997). For the relatively short period under investigation in this paper, our empirical results strongly reject the hypothesis that the increment to a firm's size is proportional to its current size. We find that small firms grow faster than larger firms. Table A1 in the Annex shows that coefficients on the size variable are close to –1 for all size classes. Evidently, this does not mean that the same result holds for other periods in history. Gibrat's law may still apply over a longer period.

Regression technique

We estimate equation (1) in first differences to eliminate the fixed effects. Before applying OLS, both the dependent variable and the explanatory variables are trimmed to reduce the influence of outliers on the estimates. Specifically, we leave out 1 percent of the total number of observations on each variable; 0.5 percent of each side of the distribution. Not necessarily the same observations are ignored for different variables. Hence, in total, more than 1 percent (namely 3.7 percent) of the observations in the original sample are left out. Due to limited available computation capacity, we cannot apply Minimum Volume Ellipsoid (MVE) weights (see Box 3) instead of the data trimming procedure. Data trimming is less reliable since it does not take into account the correlations between the variables. The firm observations on equation (1) contain both quoted and unquoted companies. This allows us to construct a sample that is considerably larger than the sample used to estimate the Q-model. Obviously, our Tobin's Q estimate can only be a proxy of investment opportunities and, as a consequence, measurement errors are present. OLS will thus underestimate the coefficient on Tobin's Q. We have been unable to solve this estimation problem satisfactorily. Estimates obtained with an instrumental variable regression technique turn out very similar to OLS estimates since no good instruments are available.

Data

The balance sheet and income statement of manufacturing and construction firms are taken from the AMADEUS DVD ROM (June 2002) of Bureau Van Dijk. We have eliminated firm observations with negative total assets. Data availability in both OSIRIS and AMADEUS restricts the sample period for equation (1) to the period 1996-2000, with year 1995 observations used to construct lagged variables. After cleaning for outliers and anomalous observations, there are 355,693 firm observations left in the sample.

Results

Table B2 shows basic descriptive statistics of the sample. Firm size (measured by total assets) varies from EUR 14,000 to EUR 31 billion. Investment opportunities were good during the second half of the 1990s. On average, firms grew in total assets at a rate of 10 percent a year and Tobin's Q was equal to 1.14.

Table A1 in the Annex contains the regression results, which are extensively discussed in the main text.

Table B2. Descriptive statistics of the variables included in the growth model (1)

	Mean	Median	Minimum	Maximum	Standard deviation
g_{ti}	0.10	0.07	-1.00	2.06	0.24
cfr_{ti}	0.10	0.08	-0.58	0.89	0.09
$Q_{t-1,i}$	1.14	0.99	0.28	5.49	0.55
$E_{t-1,i}/TA_{t-1,i}$	0.32	0.30	-0.39	0.86	0.20
$\ln(TA_{t-1,i})$	7.96	7.82	2.64	17.24	1.55

Box 3. Estimating firms' investment opportunties

Methodology

We estimate the investment opportunities of a firm by computing Tobin's Q, i.e. the market value of the firm relative to its replacement costs. A company will invest in an additional unit of capital if the marginal value of the investment exceeds its marginal costs. Marginal q is difficult to measure, but Hayashi (1982) shows that under certain assumptions marginal q is equal to average Q. For quoted firms we approximate average Q as follows:

$$(1)\quad Q_{ti} = \frac{E^{m}_{ti} + B_{ti}}{TA_{ti}}$$

where TA_{ti} is the book value of total assets of firm i in period t; B_{ti} is the book value of total debt; and E^{m}_{ti} is the market value of equity as determined on the stock exchange. Evidently, for unquoted firms, like most of the SMEs, the market value of equity is not directly available. We therefore resort to a two-step procedure to estimate the investment opportunities of a firm.

In step one, we explain Q-values (as computed in (1)) of quoted firms with firm-specific variables – such as firm size, capital structure, and profitability – and non-firm-specific variables, including the firm's industry and country of residence, as well as time dummies. Using the data on quoted firms, we obtain parameter estimates of the following Q-model:

$$(2)\quad \ln(Q_{ti}) = d_j\beta_j + d_t\beta_t + d_k\beta_k + ROA_{ti}\beta_1 + ROA_{t\text{-}1,i}\beta_2 + ROA_{t\text{-}2,i}\beta_3 + \ln(TA_{ti})\beta_4 + \frac{E_{ti}}{TA_{ti}}\beta_5$$
$$+ ROA^2_{ti}\beta_6 + ROA^2_{t\text{-}1,i}\beta_7 + ROA^2_{t\text{-}2,i}\beta_8 + \ln(TA_{ti})\beta^2_9 + \frac{E^2_{ti}}{TA^2_{ti}}\beta_{10} + \varepsilon_{ti}$$

where d_j are 14 country dummies (Austria is default); d_t are six time dummies (2001 is default); d_k are 73 industry dummies; ROA_{ti} is the ratio of earnings (before interest, taxes, depreciation, and amortisation) to total assets; E_{ti} is the book value of equity; and ε_{ti} is the error term.

In step two, we compute Q-values for all firms, including quoted and unquoted companies, by inserting in the right-hand side of equation (2) the parameter estimates for β_j, β_t, β_k and β_j,..., β_{10}, and by setting the error term equal to zero. We include squared explanatory variables to allow for non-linearities.

Discussion

Market valuation of equity

Investors may make wrong predictions about future investment opportunities. Incorrect valuations of equity can be due to forecast errors of general trends or firm-specific forecast errors. General forecast errors are made for all firms to the same degree. By computing Q-values as described in step two, the idiosyncratic component of investors' incorrect stock evaluation of a firm's real investment opportunities will not affect our predicted Q-value. Idiosyncratic errors will, on average, cancel out. However, the general forecast error will lead to a general over- or underestimation of the firms' investment opportunities. This does not necessarily pose a problem to the estimation of the growth equation (1) in Box 2 if firm managers and stock investors make the same general forecast error. However, if managers and stock investors have different views, estimated growth-cashflow sensitivities may be biased. There is no strong reason to believe that this bias will have a different impact on SMEs than on large firms. Comparing growth-cashflow sensitivities across size classes is thus a useful tool to detect financing constraints even when investors may make wrong predictions.

Valuation of debt

Since we do not take into account the market valuation of debt, Tobin's Q, as computed in (1), is sensitive to leverage. Therefore, leverage, as measured by the ratio of equity to total liabilities, needs to be included in equation (2).

Regression technique

Two observations are warranted. First, firm-level databases are notorious for hosting extreme observations. To limit the impact of outliers on the regression estimates we adjust outlying observations downward by multiplying the data set with Minimum Volume Ellipsoid (MVE) weights (based on the re-sampling algorithm as explained in Hinloopen and Wagenvoort 1997). MVE distances measure how far an observation (including both dependent and independent variables) is located from the centre of the data. Second, a scatter plot revealed that Q-values are truncated from below. Indeed, one would expect a firm to dissolve when its market value drops substantially below its replacement value. When the sum of the individual assets of a firm is considerably higher than the value of the combined assets, the firm will be liquidated. As a consequence, OLS applied to equation (2) will give biased estimates. We therefore employ the truncated regression technique as described in Maddala (1983). OLS results are shown in Figure B1 for comparison.

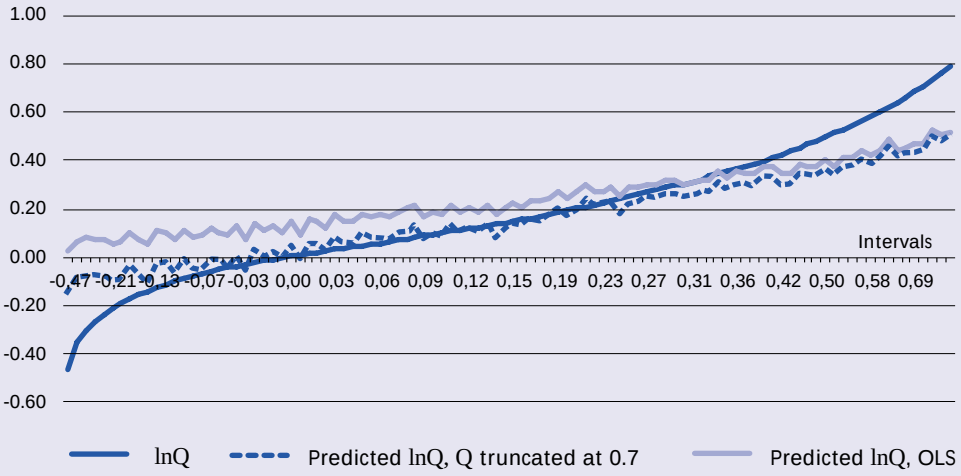
Data

11,128 firm observations on listed industrial companies in the EU during 1993-2001 were selected from the database OSIRIS (Bureau Van Dijk, Brussels). OSIRIS contains balance sheets and income statements of quoted firms. We rely on the BLOOMBERG database to provide information on the market value of equity. Firm observations with negative book value for equity are eliminated. Tobin's Q-model is estimated for the period 1995-2001 since observations for 1993 and 1994 are used to construct lagged variables in equation (2).

Results

Table A2 in the Annex shows parameter estimates of equation (2) based on truncated regression with the cut-off value for Tobin's Q chosen at 0.7. The explanatory power of the model is high given that the adjusted R^2 is equal to 0.63. However, as Figure B1 shows, the explanatory power of the model is unsatisfactory with regard to predicting relatively low as well as high Q-values. But the model works fine for Q-values between 0.8 and 1.5. The investment opportunities of the majority of firms are valued within this interval. Figure B1 also clearly illustrates that OLS estimates are inadequate in predicting Tobin's Q over the full range of average Q-values in 100 intervals except where diamonds (average values for actual ln Q) cross triangles (average values for ln Q predicted with OLS).[a]

Figure B1 Predicting Tobin's Q values for quoted firms[a]



a ln(Q) is sorted and average values of ln(Q) are computed for 100 observations in 100 intervals. Hence, Figure B1 shows 100 average values of ln(Q) and 100 corresponding predicted values obtained with OLS, and 100 corresponding predicted values obtained with truncated regression.

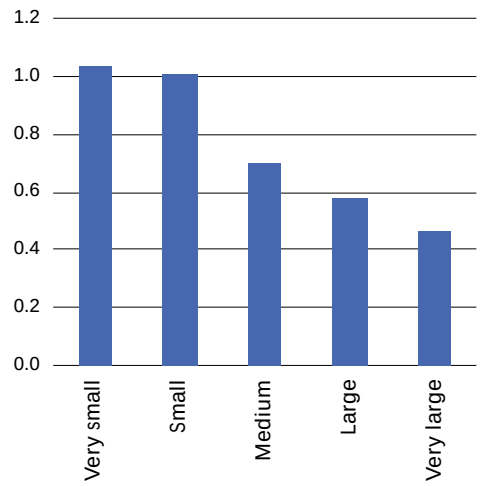
Table A1 in the Annex provides additional evidence that SMEs may face greater difficulties in obtaining external finance than large firms. It shows the regression results of the growth model spelled out in Box 2. Two findings are worth highlighting. One is that our empirical model has more explanatory power for the three size categories representing SMEs than for the two groups of large firms and, more generally, the explanatory power of the model clearly diminishes with firm size. To illustrate, for small and very small firms the model can explain about 55 percent of the variation in growth rates whereas for very large firms it can explain only 42 percent. The decline in explanatory power with size is not entirely surprising: as our empirical measure of investment opportunities (Tobin's Q) may be inaccurate, we expect the model to be more successful for finance-constrained companies. Second, we find a positive and significant relationship between the equity ratio and firm growth, indicating that highly leveraged firms may have greater difficulties in obtaining finance and, hence, exploiting their growth potential. But also here we find that the relationship of the model is stronger for SMEs than for the group of larger firms.

Growth-cashflow sensitivities are higher for unquoted firms than for quoted ones.

As emphasised in Section 2, information asymmetries are at the heart of possible financial market failures. Our analysis indeed supports the view that better information can play a crucial role in reducing finance constraints. To arrive at this conclusion, we have split the sample into two groups: quoted and unquoted companies. Reporting requirements are usually higher for quoted companies. As a result, more and better information is available for quoted firms and, *a priori*, asymmetric information problems should be less relevant. Indeed, our estimates – summarised in Figure 10 – show higher growth-cashflow sensitivities for unquoted firms than for quoted ones; the difference is especially pronounced for small firms, with growth-cashflow sensitivities of quoted firms being 20 percent lower than for unquoted firms.

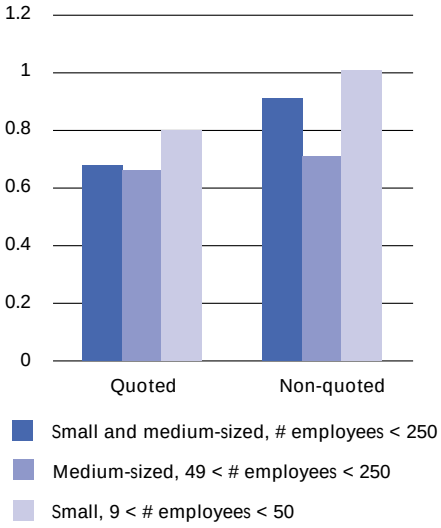
We end this section with a few remarks on possible differences in growth-cashflow sensitivities across countries. Figure 11 shows that growth-cashflow sensitivities of SMEs are broadly similar for most of EU countries. This evenness contrasts with the findings -

Figure 9. Growth-cashflow sensitivities, by size class



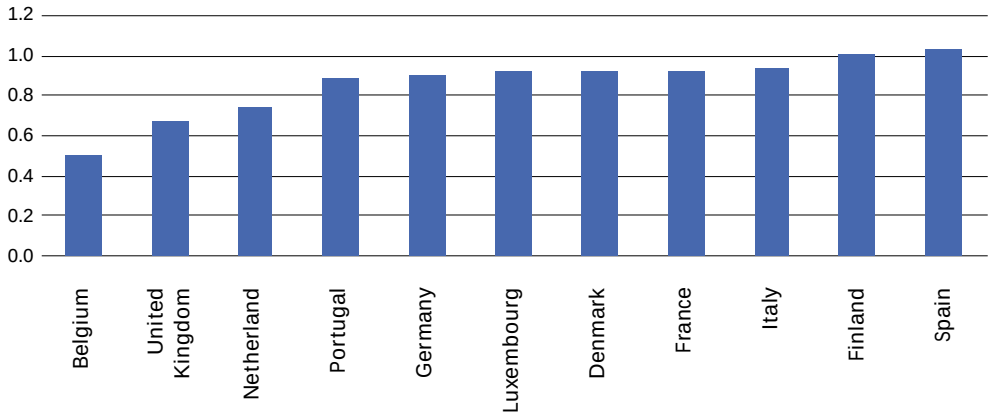
Source: Own calculations based on AMADEUS DVD

Figure 10. Growth-cashflow sensitivities (quoted vs. unquoted SMEs)



Source: Own calculations based on AMADEUS DVD

Figure 11. SME growth-cashflow sensitivities in selected EU countries



Source: Own calculations based on AMADEUS DVD-ROM

summarised in Figure 5 – that leverage of small and medium-sized enterprises varies considerably across countries. This means that while national factors, such as the tax systems and regulations, play an important role in determining the capital structure of firms, they appear to have less influence on the degree of finance constraints. There are however three countries – namely Belgium, the Netherlands, and the United Kingdom – where finance constraints seem to matter less. We cannot yet fully explain why these countries stand out. In general, however, one cannot dismiss the possibility that the overall development, structure, and efficiency of a country's capital and banking markets have an impact on how binding finance constraints are. Beck *et al.* (2002), among others, find in a cross-country study that underdeveloped financial and legal systems impede firm growth. That said, it remains to be verified whether the differences in SME growth-cashflow sensitivities that we have identified in this paper are the result of differences in financial system developments across the EU.

Growth-cashflow sensitivities of SMEs are broadly similar across EU countries.

To summarise the essence of this section, we note, first, that our empirical work supports survey results, suggesting that finance constraints tend to hinder the growth of small and very small firms; on average, the growth of these firms is one-to-one related to internal funds, notably retained profits. Second, while finance constraints seem to be less binding for medium-sized enterprises, their growth nevertheless depends more on the availability of internal funds than the growth of large firms. Third, we have presented empirical evidence for the importance of equity: highly leveraged firms have greater difficulties in tapping external finance and, hence, exploiting their growth potential. Finally, our results support the view that more and better information on firms alleviate finance constraints and thus foster firm growth.

5. Mitigating finance constraints

We can only provide a sketch of measures that could alleviate finance constraints of small and medium-sized enterprises. It is useful to distinguish between public policy measures, on the one hand, and efforts that lenders and borrowers can take on the other hand.

A variety of public policy schemes have been set up to mitigate finance rationing of SMEs. Examples include direct loans, interest subsidies, and loan guarantees – extended by both

national and international institutions in and outside the EU. While such schemes usually benefit the recipients and help ease finance constraints, it has been questioned whether they improve the allocation of resources in an economy. For instance, Williamson (1994) argues – in the context of an asymmetric information model – that government intervention in the credit market through direct lending, loan guarantees, and interest rate subsidies cannot lead to a Pareto improvement in the allocation of funds, which essentially means that gains accruing to the beneficiaries of such schemes come at the expense of others in the economy. Overall, while the case for public intervention is challenging to make on efficiency grounds, considerations of fairness and equity could justify intervention if the purpose is to create a level playing field in the credit market for large and small firms.

The slightly sober assessment of the efficiency effects of public intervention should not really come as a surprise. This is because public intervention as mentioned above will find it difficult to address the root of finance constraints, namely information asymmetries. However, where public intervention reduces information problems, for instance, by setting up an information sharing mechanism between lenders (see below), it may lead to efficiency gains.

A lack of finance does not necessarily imply a lack of debt.

Moving on to what lenders and borrowers can do to alleviate finance constraints, we recall first that lack of finance does not necessarily imply a lack of debt. As we know from Figure 5, in some countries, such as Germany, small businesses are possibly overleveraged, and we demonstrated in the previous section that companies with a robust capital structure are less likely to be finance constrained given that growth-cashflow sensitivities tend to decrease with the equity ratio. This clearly highlights the importance of equity for overcoming credit constraints. To the extent that the lack of equity stems from tax and regulatory frameworks (see, for instance, Hommel and Schneider, this volume), the best approach for public intervention is to remove the cause of the problem instead of dealing with its symptoms. In addition, it is true that SMEs are often not sufficiently transparent or willing, or both, to attract outside equity. It seems uncontroversial that improvements in this area have a role to play in alleviating the access of small and medium-sized firms to finance - both equity and debt.

An important means of reducing information asymmetries between borrowers and lenders is the establishment of long-term relationships (Boot 1999). Indeed, the potential for reducing information asymmetries through relationship banking is one of the main reasons why banks exist in the first place, and banks clearly have an advantage over capital markets in supplying funds to SMEs that need relatively small amounts of finance. In addition, there is evidence (see, among others, Berger *et al.* 1998) that local, often small banks have a higher share of SME loans in their portfolio than large, global banks. This is mainly because small, local banks have a comparative advantage in building valuable relationships with small customers.

While relationship banking reduces information asymmetries, it could create a hold-up problem for the borrower: once a borrower has developed a relationship with only one external financier, this so-called house-bank has proprietary information on the borrower. This enables the house-bank to overcharge, within limits, the borrower without facing a serious threat of losing her to a competitor. If the borrower nevertheless tries to switch banks, a potential lender may interpret the attempt to switch itself as a sign that the

borrower has problems that are known to its current house-bank. In sum, the hold-up problem may considerably reduce the advantages of establishing firm-bank relationships.

Information sharing among lenders helps maintain the value of individual firm-bank relationships.

Nevertheless, the solution to information asymmetries probably still lies in providing better information to lenders, but in such a way that this information does not become an informational monopoly of a single bank. One possible way to achieve this is for firms to establish relationships with more than one bank (multiple firm-bank relationships). Dietsch, Guiso, and Hommel and Schneider (all this volume) present empirical evidence on multiple firm-bank relationships in selected EU countries. Suffice to point out here that while reducing the hold-up problem, multiple firm-bank relationships do not solve, but may even worsen the information problem, because signing loan contracts with more than one lender diminishes the value of individual firm-bank relationships. Information sharing among lenders helps maintain the value of individual firm-bank relationships. A recent study (Jappelli and Pagano 2002) shows that information sharing increases bank lending and reduces credit risk, regardless of whether information sharing is privately or publicly organised. Advancements in information technology also contribute to a better dissemination of information on potential borrowers and, as a result, make SMEs less dependent on local, small banks and stimulate larger banks to increasingly target small customers. A recent study (Frame *et al.* 2001) on the two hundred largest US banking organisations examines the effect of automated scoring of small business lending. The introduction of credit scoring is found to be associated with an eight-percent increase (about USD 4 billion per institution) in the portfolio share of small business loans. With information sharing that maintains the advantages of individual firm-bank relationships in a context of multiple firm-bank relationships, the hold-up problem can be further reduced by making it less costly for SMEs to switch banks. Switching costs should therefore be kept at a minimum. It seems natural for banks to create barriers that make it difficult for clients to switch so that monopoly rents can be extracted. Properly designed regulation and the promotion of competition hold considerable potential to keep switching costs low.

6. Conclusions

Finding empirical evidence of finance constraints is inherently difficult, and very little is factually known about their relevance and consequences. Certainly, in a number of EU countries, small and medium-sized firms complain about limited access to credit markets and/or excessive financing costs. These complaints, however, do not tell us whether lenders have turned down firms for the wrong reasons. This paper substantiates the perception expressed by potential borrowers: our analysis shows that the sensitivity of company growth to cashflow rises as company size falls, which suggests that SMEs indeed encounter finance constraints that prevent them from fully exploiting their growth potential. The smaller the firm is, the stronger the binding nature of finance is.

Two caveats are worth mentioning. First, the analysis shown in this paper rests on the assumption that managers of firms across all size classes have the same preferences and wish to follow the same profit maximisation strategy. In practice, preferences differ, in particular with regard to providing information and accepting the scrutiny, even the influence, of external financiers. In light of this, we cannot exclude that the growth-constraining obstacles to finance reflect, in part, managers' choice rather than financial market imperfections.

There is no such thing as a typical SME.

Second, in deriving the results we found that there is no such a thing as a typical SME. The variation in balance sheet structure within each size class is much more important than the variation across the average firm of each size class. Some small businesses are therefore more likely than others to be finance constrained. Young and information-opaque borrowers with little credit history are more vulnerable to imperfections in financial markets than more mature firms. We find that quoted firms, even when small, suffer less from finance constraints than unquoted firms. Geographical differences are also an important determinant of the liability structure of the balance sheet, suggesting that national factors need to be taken into account when addressing the problem of finance constraints.

We have also sketched how to address the problem of finance constraints, pointing out that public policy can be helpful, but that SMEs and banks themselves have considerable scope for mitigating the problem. More generally, when thinking about solutions it is good to bear in mind that often "the little things are infinitely the most important".

Table A1. First difference regression results of the firm growth model (equation (1) of Box 2)

	Very small		Small		Medium		Large		Very large	
Explanatory variable[a]	Parameter[b]	t-value	Parameter[b]	t-value	Parameter[b]	t-value	Parameter[b]	t-value	Parameter[b]	t-value
cfr_{ti}	1.04*	25.5	1.00*	101.2	0.70*	57.5	0.58*	26.9	0.46*	4.0
$Q_{t-1,i}$	0.05*	4.7	0.03*	13.4	0.04*	12.1	0.04*	7.3	0.07	1.5
$E_{t-1,i}/TA_{t-1,i}$	0.57*	12.0	0.70*	63.7	0.49*	39.1	0.33*	15.3	0.42*	3.2
$\ln(TA_{t-1,i})$	-1.09*	-64.0	-0.99*	-244.6	-0.98*	-194.3	-0.95*	-98.4	-0.95*	-16.4
d_{1996}	0.10*	12.9	0.05*	30.3	0.05*	25.8	0.03*	9.0	0.00	0.0
d_{1997}	0.12*	17.4	0.06*	41.4	0.05*	30.5	0.04*	11.4	0.04	1.8
d_{1998}	0.15*	22.3	0.08*	58.7	0.08*	50.4	0.09*	29.1	0.15*	7.9
d_{1999}	0.14*	21.8	0.09*	69.0	0.09*	53.5	0.06*	20.0	0.07*	3.3
Adjusted R2	0.55		0.56		0.51		0.47		0.42	

a TA_{ti} is the book value of total assets of firm i, in period t, E_{ti} is the book value of equity, cfr_{ti} is the ratio of cashflow to total assets and Q_{ti} is Tobin's Q as computed in Box 3, equation (2).

b Parameter estimates with an asterisk are significantly different from zero at the 95% confidence interval.

Table A2. Truncated regression[a] results of Tobin's Q-model (equation (2) of Box 3)[b]

Explanatory variable[c]	Parameter estimate[d]	t-value
$d_{Belgium}$	0.141*	3.51
$d_{Denmark}$	0.115*	2.97
$d_{Finland}$	0.039	0.89
d_{France}	0.114*	3.33
$d_{Germany}$	0.150*	4.31
d_{Greece}	0.570*	12.61
$d_{Ireland}$	0.233*	5.01
d_{Italy}	0.230*	5.55
$d_{Luxembourg}$	0.143	1.44
$d_{Netherlands}$	0.138*	3.73
$d_{Portugal}$	0.095	1.66
d_{Spain}	0.140*	3.16
d_{Sweden}	0.239*	6.39
$d_{United\ Kingdom}$	0.100*	2.98
d_{1995}	-0.007	-0.30
d_{1996}	0.080*	3.54
d_{1997}	0.116*	5.24
d_{1998}	0.058*	2.67
d_{1999}	0.148*	6.87
d_{2000}	0.054*	2.48
ROA_{ti}	1.833*	5.99
$ROA_{t\text{-}1,i}$	1.335*	3.81
$ROA_{t\text{-}2,i}$	0.510	1.86
$\ln(TA_{ti})$	0.120*	3.98
E_{ti}/TA_{ti}	-0.643*	-5.10
ROA_{ti}^2	3.375*	3.33
$ROA_{t\text{-}1,i}^2$	-0.943	-0.84
$ROA_{t\text{-}2,i}^2$	0.019	0.02
$\ln(TA_{ti})^2$	-0.004*	-3.27
E_{ti}^2/TA_{ti}^2	0.723*	5.20
Adjusted R^2	0.63	

a The cut-off value for Tobin's Q is set at 0.7.

b Sector dummies are not shown but are included in the regression.

c TA_{ti} is the book value of total assets of firm i in period t, E_{ti} is the book value of equity, ROA_{ti} is the ratio of earnings (before interest, taxes, depreciation, and amortisation) to total assets.

d Parameter estimates with an asterisk are significantly different from zero at the 95% confidence interval.

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ABSTRACT

Based on a survey conducted among German **Mittelstand** *firms and capital structure data on the* Mittelstand*, this paper sheds light on the current and future financing situation of the* Mittelstand*. The paper documents the equity shortage and dependence on bank debt typically associated with the* Mittelstand*. It further emphasises that - at present - fears of systematic credit rationing are difficult to substantiate (though a lack of alternative sources of finance can be expected to adversely affect future credit supply) and argues that the consolidation of the German banking sector as well as Basel II should not constitute major obstacles to the future growth of the* Mittelstand*. Still, the paper concludes that a typical* Mittelstand *firm's access to external finance will remain a key factor and, against that background, comments on specific measures of improvement from the perspective of regulators, banks, and firms.*

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Financing the German Mittelstand

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1. Introduction

Germany's small and medium-sized companies (SMEs), commonly referred to as *Mittelstand*, have shaped the country's economic development since 1945. The *Mittelstand* had been the driving force behind the economic miracle (*Wirtschaftswunder*) during the 1950s when Germany was quickly recovering from the destruction resulting from World War II. Today, approximately 3.3 million *Mittelstand* companies account for nearly 44 percent of gross value added as well as for about 50 percent of gross investments and employ nearly 70 percent of the German work force. In addition, the *Mittelstand* instructs about 80 percent of all German trainees and represents the most important job-generating entity in the German economy. Hence, any structural problems encountered by this class of companies are likely to be transmitted to the economy as a whole and to cause macroeconomic frictions.

Mittelstand financing has been at the forefront of the public policy debate since the mid-1960s reflecting the continuous downward trend of equity ratios. Germany's system of relation-based financing has led to an overemphasis of bank debt as a source of funds and has limited the development of organised capital markets. Private equity markets have been virtually non-existent prior to the emergence of the historic bull market during the late 1990s. Succession problems can be expected to lead to an additional depletion of financial resources in the coming years. As a consequence, the typical *Mittelstand* company has to cope with an inadequate equity base and an overdependence on (local) banks for the provision of external finance, which is particularly problematic given that the structure of liabilities increasingly influence the competitiveness of the *Mittelstand*.

The challenges of financing the *Mittelstand* are mostly discussed in practitioner publications, which are in many cases co-sponsored by organisations with a commercial interest in funding these types of companies. Empirical treatments of the subject are scarce and typically struggle with the limited availability of adequate data sources. The absence of a generally accepted definition of *Mittelstand* adds to the difficulty. Quantitative approaches generally use a size criterion - either the number of employees, annual turnover, or a combination of both - to differentiate between *Mittelstand* and other firms. Table 1 provides an illustration.

Table 1. Company classification schemes

Size	Size of the work force		Annual turnover (in million of EUR)	
	EU	IfM	EU	IfM
Small	up to 49	up to 9	up to 7	Up to 1
Medium	50 - 249	10 - 499	7 - 40 *	1 - 50
Large	250 or more	500 or more	more than 40	more than 50

Notes: EU = standards of the EU Commission; IfM = standards of the Institut für Mittelstandsforschung (IfM), Bonn
* As additional requirements, the balance sheet total should not exceed EUR 27 million, and not more than 25 percent of equity should be held by a non-Mittelstand company.
Sources: EU Commission (1996); Hansmann and Ringle (2002); IfM (2002).

It is apparent that the EU Commission applies a much narrower view when defining *Mittelstand* while the German literature largely follows the standards of the *Institut für Mittelstandsforschung* (IfM). This paper adopts a slightly different approach and focuses on companies with an annual turnover of up to EUR 100 million to permit an explicit comparison between small, medium-sized, and larger enterprises. Theoretically, it is possible (and sometimes advisable) to rely on a more qualitative definition of *Mittelstand*. Typical indicators thereof are an identity of ownership and control, personal liability for the providers of equity (coupled with a low degree of personal portfolio diversification), no direct access to public equity markets as well as on/off-shore money and credit markets and, finally, a low degree of internationalisation.[1]

There are reasons to believe that a long-time fostered and cherished relationship between smaller borrowers and their (house-)banks seems to be eroding. First, there is some empirical evidence that German banks have adjusted their lending policies to the detriment of smaller borrowers. Second, Basel II is expected to induce lenders to optimise their portfolios in advance of its anticipated adoption in 2007 - again at the expense of smaller borrowers. How these problems have been exacerbated in recent years and what mitigating measures could be taken is the focus of this paper.

***Changes in the German banking industry will affect the relationship between* Mittelstand *borrowers and their* Hausbanken.**

This issue is to be analysed in the light of the recent stock market downturn after its historic peak in the spring of 2000. IPO activity has basically come to a halt and special market segments for *Mittelstand* firms (e.g. *Prädikatsmarkt* of the *Bayerische Börse*, Munich) still fail to provide an attractive platform for public equity issues by SMEs. While the German venture capital market seems to have weathered the crisis better than its European counterparts (Hommel *et al*. 2002), private equity funds have also reduced their investment activity significantly. Other financing alternatives of note do not exist or still seem to lack acceptance. Hence, the key question is how can the *Mittelstand* cope with the changes in the German banking industry in the absence of adequate financing alternatives. Resolving this issue becomes all the more pressing during the current downturn of the German economy as many companies need additional funds to keep their operations afloat and avoid insolvency.

For the purpose of addressing the issues outlined above, the Center for Entrepreneurial and Small Business Finance (*esbf*) at the European Business School has conducted a survey among *Mittelstand* companies (subsequently referred to as *esbf* survey). The survey was carried out in cooperation with the chambers of commerce (IHKs) of Koblenz, Cologne, Saarland, and Wiesbaden. Additional annual report data has been provided by *Deutscher Sparkassen- und Giroverband*.

The remainder of this paper is structured as follows: The following section provides a brief overview of the empirical literature on *Mittelstand* financing. Evidence on financing behaviour is presented in Section 3. In this context, the equity-financing gap, the role of bank financing and the *Hausbanken* (house-banks), and evidence on credit rationing are of particular relevance. In addition, evidence will be presented on the prevalence of alternative financing instruments and public support schemes. Section 4 provides an analysis of how recent developments - the consolidation of the German banking industry, Basel II, and tax reform - affect the *Mittelstand*. Alternative ways of mitigating financing problems

1 For a more extensive discussion, see Dufey and Hommel (1999) and Hauser (2000).

of *Mittelstand* companies are presented in Section 5. In this context, the paper analyses this issue from the perspective of the *Mittelstand* companies themselves, the banks, and the public support agencies (government).

2. Empirical evidence on *Mittelstand* financing

The existing empirical evidence on *Mittelstand* financing is quite limited due to the lack of adequate quantitative data sources - a shortcoming this study has to cope with as well. German disclosure regulations require corporations (*Aktiengesellschaften*), limited liability partnerships (*Gesellschaften mit beschränkter Haftung*), and partnerships completely owned by the aforementioned to submit their annual reports to the company registrar. Other proprietorships and partnerships are forced to disclose as well if they satisfy two of the following three criteria on three consecutive balance sheet dates: balance sheet total of more than EUR 65 million, annual turnover of more than EUR 130 million, and number of employees exceeding 5,000. Due to the absence of adequate legal sanction, compliance has been lacklustre up to the introduction of a new law (*Kapitalgesellschaften & Co. Richtlinien-Gesetz*) in 2000. Even today, however, only a minority of SMEs discloses annual figures.

The existing empirical evidence on* Mittelstand *financing is limited and largely based on qualitative information.

When studying *Mittelstand* financing, one therefore has to rely heavily on survey evidence that largely comprises qualitative information. Available studies provide - in an ordinal sense - detailed insights into how *Mittelstand* companies view their own situation as well as their economic environment, but offer little information on capital structure, financing costs, and other quantitative information of interest. One notable exception is the study of the *Deutscher Sparkassen- und Giroverband* (DSGV) based on its balance-sheet database consisting of some 170,000 annual reports (DSGV 2002).

Table 2 provides a summary of recent survey studies. The various contributions do not lend themselves easily for comparisons and generalisations for a number of reasons. First of all, the studies rely on different definitions for *Mittelstand* as explained in Section 1. Second, while some studies control for company size (reflecting turnover or labour force) and sectoral affiliation in the sample selection stage, others do not. None of the studies controls ex post for potential size (or other) biases due to differential participation rates across size brackets. Third, as a number of studies focus on specific regions within Germany, they do not explicitly capture differences between the former East and West Germany. Fourth, differences in the wording of questions and heterogeneous methods of measurement complicate the interpretation of results obtained from different studies. Lastly, the change in economic conditions experienced by *Mittelstand* firms since the height of the bull market in the spring of 2000 makes it difficult to compare surveys conducted at different points in time - even for such a fairly short time span.

The studies by DG Bank, DSGV and Creditreform primarily focus on (financial) performance and on the business outlook of German *Mittelstand* companies, while the remaining papers present survey data on different aspects of SME financing. All financing-related surveys have to cope with the limited access to information. With the exception of studies by KfW and DIHK, no survey obtained more than 1,000 responses. The by far largest sample was collected by the DIHK. With over 20,000 responses, it is the only study that could qualify as a general reference, but it still falls short in providing a comprehensive picture of the *Mittelstand*'s financing situation.

Table 2. Selected empirical studies on *Mittelstand* financing

Study	Sample size	Focus
Institut für Mittelstandsforschung, IfM, (2000a, 2000b)	1,025 [a] 123 [b]	Structured interviews: capital structure and financial policy, venture capital and going public, bank financing.
IfM (2001)	1,027 [a]	Structured interviews: impact of globalisation, regulatory framework, procurement, alternative financing instruments, and relevance of ratings.
Kreditanstalt für Wiederaufbau, KfW, (2001a)	6,392 [c]	Mail-in survey: bank financing and bank relationship, relevance of alternative financing instruments, Basel II and ratings, public support schemes.
DG Bank (2001)	2,445 [d]	Structured telephone interviews: economic and financial performance, business outlook, relevance of ratings, impact of Basel II.
DSGV (2002)	50,000 [e] 540	Balance sheet data of 50,000 *Mittelstand* companies (2000) and mail-in survey of 540 savings and loans institutions (2001): equity positions and financial performance, business outlook.
Deutscher Industrie- und Handelskammertag (DIHK) – Schoder and Nitschke (2002).	20,000	Mail-in survey: loan provisions, relevance of debt financing, impact of Basel II.
Creditreform (2002a, 2002b)	4,498	Mail-in survey: general economic climate, insolvencies, and investments (carried out semi-annually).
Hansmann and Ringle (2001)	511 [f]	Mail-in survey: debt financing, bank financing and bank relationships, company policies to enhance liquidity/solvency, relevance of ratings.
Hansmann and Ringle (2002)	485 [f]	Mail-in survey: bank financing and bank relationships, relevance of ratings, public support schemes

Notes:
[a] At least DEM 250,000 annual turnover (500,000 for retail and 1m for wholesale) and less than 500 employees
[b] Add-on survey of *Mittelstand* corporations satisfying the criteria specified in ([a]).
[c] Sample is divided into very small businesses (up to EUR 2.5m annual turnover), small, medium and large *Mittelstand* companies (annual turnover of EUR 2.5m to EUR 10m, EUR 10m to EUR 50m, EUR 50m to EUR 250m, respectively) as well as large companies (more than EUR 250m annual turnover, 4.5 percent or 288 of total sample).
[d] Sample consists of companies with an annual turnover of up to DEM 250m, 98 percent of those have less than 500 employees.
[e] Sample is divided in small, medium, and large *Mittelstand* companies with annual turnover of less than EUR 0.5m, EUR 0.5m to EUR 5m, and EUR 5m to EUR 50m, respectively. The sample is a sub-set of the full DSGV database.
[f] *Mittelstand* companies organised within the *Unternehmens- und Arbeitgeberverband Großhandel-Außenhandel-Dienstleistung e.V.* (AGA).

Despite potential inconsistencies resulting from differences in sample selection and survey design, the outcomes regarding the supply of credit are fairly stable over time and across studies: between autumn 2000 and autumn 2002, 23 to 32 percent of the respondents experienced a worsening credit supply. The studies unanimously ascertain

the particular importance of internal financing and bank debt as the main funding sources. In addition, leasing and trade credit seem to be the sole alternative financing forms of note. At the same time, less than 20 percent of survey respondents anticipated a declining relevance of external (bank) financing. The results on the impact of Basel II are more diverging. Some 30 percent of DG Bank respondents expected Basel II to foster the refusal of loan applications. At the same time, 50 percent (74 percent) of the firms sampled by the DIHK (KfW) anticipated negative consequences. The studies display only a limited overlap and, with the exception of the KfW study, fail to consider alternative financing forms.

This paper differs from prior work in various respects. Box 1 sets out the study design and sample properties. Most importantly, it offers a comprehensive and up-to-date analysis of all aspects relevant to *Mittelstand* financing. Next to presenting new survey evidence, it relates its results to other findings reported in the SME financing literature. The paper also contains a detailed analysis of the sources of the *Mittelstand*'s financing problems as well as specific recommendations as to how the documented shortage of funds can be alleviated.

3. Evidence on capital structure and financing behaviour of *Mittelstand* firms

The* Mittelstand *is characterised by high leverage and strong dependence on bank debt, with owners' net wealth serving as a substitute for equity.

In comparison to their Anglo-Saxon counterparts, the financing behaviour of *Mittelstand* companies can be described by five stylised facts: low equity ratios, strong dependence on internally generated cashflow, equity deposits by owners, trade credit and bank debt as the primary forms of external financing, and a minor relevance of alternative forms of financing (KfW 2001a). This section aims at substantiating these insights. In addition, it examines to what extent current developments in the banking industry imply a so-called "credit crunch" for *Mittelstand* companies.

3.1 The equity financing gap

In the perfect world of Modigliani and Miller (1958), capital-structure decisions would be irrelevant as shareholders can freely replicate any financial policy decision at zero cost. Real-world imperfections explain why a certain level of equity and debt is actually desirable from a value-maximising point of view. Debt is generally cheaper than equity as it merely requires compensation for liquidity and default risk and entails, under most real-world tax regimes, an additional tax-shield effect, thereby effectively lowering the cost of debt. In addition, it helps to resolve incentive problems associated with the separation of ownership and control as increasing leverage entails higher financial distress risk and thus higher performance pressure for the company's management. Equity is primarily needed as residual risk capital in order to shield the company against the impact of cash volatility and to reduce financial distress risk.

Companies in or close to a state of financial distress but short of insolvency may be caught in a vicious cycle. Creditors are faced with the risk of having to assume the role of shareholders, which will be reflected either by the refusal to supply new debt or by a higher risk premium. Thus, underperforming companies may enter a downward spiral without being able to close existing financing gaps. As evidenced by the capital structure data provided by DSGV, large parts of the German *Mittelstand* – deliberately or not – seem

Box 1. Study design and sample properties

The *esfb* survey has been designed to capture general attitudes of *Mittelstand* managers with regard to their financial policies, bank relationships, public support programmes, Basel II, and political reform projects. The survey form consists of a total of 27 questions and is divided into two parts. Part 1 covers general firm characteristics (sectoral affiliation, turnover, size of the work force, capital structure, etc.) to be subsequently used to differentiate between subgroups of *Mittelstand* firms. All answers in this category have been captured with numerical variables. In addition, respondents were asked to supply information on their bank relationships - in particular the number of partner (house-) banks and their general type - the relevance of bank finance, and on recent experiences when applying for bank loans. These questions generated a combination of numerical and ordinal variables, the latter typically requiring respondents to rank answers from 1 (unimportant) to 5 (very important). Part 2 deals with regulatory and political issues (Basel II, impact of bank restructuring, relevance of public support programmes, and attitudes regarding certain policy reform projects), again mostly captured with ordinal variables.

In the context of *Mittelstand* financing, two company types are of special importance: on the one hand, settled (capital-intensive) firms characterised by a steady and strong financing demand; on the other hand, young (innovative) companies highly dependent on external financing and therefore particularly exposed to a possible tightening of financing conditions. The former are most likely to be found in the manufacturing, construction, and retail sectors; the latter typically belong to the services sector. With regard to the size criterion, all companies achieving a turnover of up to EUR 100 million have been classified as *Mittelstand*.

To match the envisaged size and industry focus and to ensure an adequate sample size, the survey was carried out in cooperation with four regional IHKs. All registered companies (except craft occupations organised in *Handwerkskammern*) are required to become members of their regional IHK. IHKs collect data on firm size (number of employees, turnover, etc.) and sectoral code on a regular basis, using periodic membership surveys and trade tax (*Gewerbesteuer*) registrations. Hence, they represent ideal partners for the focus of the present study.

The survey sample was compiled in September/October of 2002 and the survey forms were mailed in November 2002 to the official IHK contact addresses. The total sample consists of 5,729 firms (Koblenz 2,500; Cologne 1,243; Saarland 1,050; and Wiesbaden 936 firms). 403 survey forms were received, of which 10 were not filled out. 17 companies were eliminated because they exceeded the size criterion. Hence, the empirical analysis is based on a total of 376 observations (44 percent from Koblenz, 23 percent from Cologne, 18 percent from the Saarland, and 15 percent from Wiesbaden).

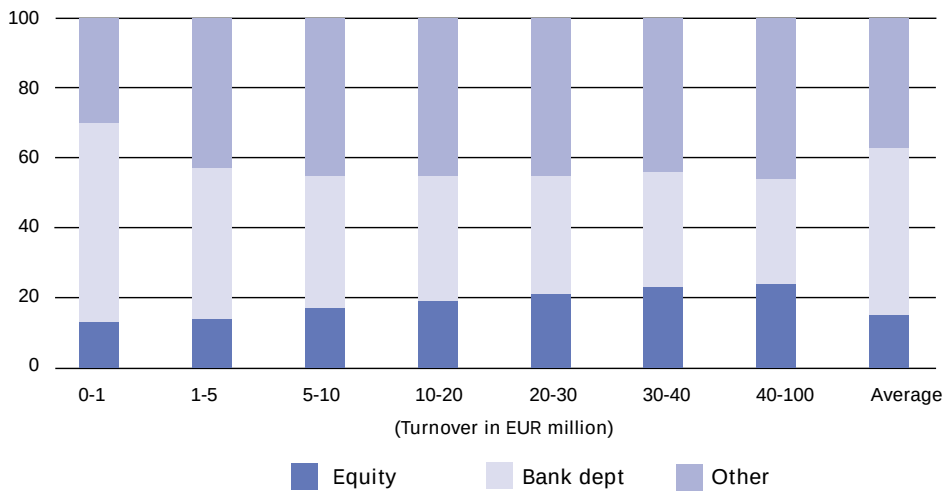
The sample was largely constructed according to the aspired size and industry focus. Two IHKs filtered their databases correspondingly and, subsequently, used random sampling while controlling for firm size and sectoral affiliation. Another IHK further reduced the sample by sorting the data by geographical areas, as some regions were not considered representative for the *Mittelstand*. Finally, the remaining IHK provided the address information of its own representative sample without correcting for size or industry focus. The non-homogenous method of constructing the sample imposed an irresolvable constraint. Further shortcomings should be pointed out. First, the selection of the IHKs implies a regional bias and does not capture, for instance, peculiarities of *Mittelstand* financing in eastern Germany (see in this context also Scheuer 2001). Second, turnover and employee data are updated infrequently or, in some cases, were not on file at the respective IHKs; as a result, the questionnaire was sent out to very small and large companies as well. Finally, the sample includes some companies still registered but not operating anymore.

General sample properties are summarised in Table A1 in the Annex. The collected data fits reasonably well to the envisaged size and industry focus. The average (median) sample firm has about 54 (18) employees and was founded 46 (28) years ago. The implied skewness in the distribution can be explained to a large extent by the numerous services and retail companies; the median workforce (age) of services companies and retail companies amount to about 11 and 13 (12 and 32), respectively. Some 43 percent (95 percent) of responding firms had one (not more than five) equity holders. The generally low number of equity holders underlines that *Mittelstand* companies are traditionally family businesses. Noteworthy are the results related to international trade, as they reveal the so-called hidden SME champions. While almost 60 percent of the respondents do not engage - consistent with the common perception of the *Mittelstand* - in any export activities at all, close to 9 percent realise at least 50 percent of their turnover abroad. These belong mostly to the manufacturing sector.

to take that risk (see Figure 1).[2] More than 50 percent of the smallest German firms have operated with a non-positive equity capitalisation over the last few years, but personal assets of company owners typically substitute for equity on the balance sheet. Even medium-sized firms often have an equity ratio that is below 10 percent. Consequently, approximately 37 percent of all German companies realised an adverse balance in 2000. In the same year, the average (median) equity ratio of *Mittelstand* companies amounted to only 15 percent (4 percent). Creditreform (2002a) reports similar figures. While equity as a share of total assets has been rising slightly since 2000, 41 percent of all firms surveyed still report equity ratios below 10 percent. Two thirds of firms operate with an equity ratio lower than 20 percent. The DSGV data further highlights the positive relationship between firm size and equity ratio, i.e., smaller companies generally work with a smaller risk capital base relative to the balance sheet total.

Two thirds of firms operate with an equity ratio lower than 20 percent, and 41 percent of firms report equity ratios below 10 percent.

Figure 1. Capital structure of German *Mittelstand* firms by size class (2000), in %



Source: Annual Report database of DSGV

2 Table A2 in the Annex provides further information on capital structure. About 69 percent of the *esbf* survey participants either refused to supply information on their capital structure or provided incomplete or non-sensible information. In light of this, Section 3 largely relies on information from other data sources.

The Deutsche Bundesbank (2001a) also emphasises the lack of equity of *Mittelstand* firms and notes a positive correlation between firm size and equity ratios (see Table A3 in the Annex). The Bundesbank data further show that the equity ratios vary considerably across industries and also depend on the companies' legal form, with limited liability companies having a much stronger equity base than proprietorships and partnerships. It is noteworthy that according to Bundesbank data firms in eastern Germany have higher equity ratios than firms in western Germany (Deutsche Bundesbank 2001b). This is largely explained by differences in age and by the privatisation and restructuring efforts that followed reunification.

Taking a longer perspective, Dufey and Hommel (1999) point out that during 1967-94 equity ratios of *Mittelstand* firms fell from about 31 to 17 percent. The steady decline of the average equity ratio over time hints at the fact that regulatory and/or behavioural factors must – at least to some extent – be the driving forces underlying the "equity gap" as it is commonly referred to in the popular press.

The ability to raise new risk capital is determined by the availability of alternative financing sources. Table 3 illustrates that equity financing is primarily obtained out of the owners' own funds complemented by other block owners, mainly personal and typically minority shareholders. Unlocking more equity from these sources can prove difficult and is likely to imply considerable transaction costs.

Surveys indicate that the Mittelstand's weak equity base is a major cause for credit refusals.

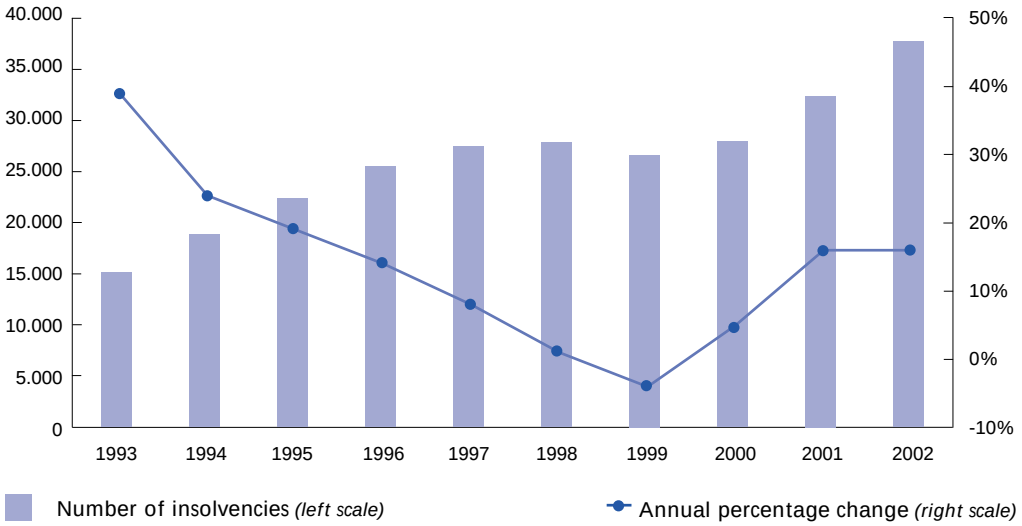
The need to enlarge the *Mittelstand*'s equity base can be substantiated by using a variety of indicators, including - most obviously - the rising incidence of company insolvencies over the previous decade as shown in Figure 2 (see also Hauser 2000). This trend is expected to continue in 2003 as almost 50 (16) percent of firms surveyed by Creditreform (2002a, 2002b) anticipate falling (rising) earnings - which compares to about 35 (29) percent in 2001 - and close to 74 percent have indicated their unwillingness to undertake new investments (compared to some 56 percent in 2001). Results from the KfW and *esbf* surveys further illustrate that the weak equity base is a major cause for credit refusals. Some 18 percent of *esbf* respondents with leverage were actually turned down as a consequence of an inadequate equity base. Moreover, current ratios also reflect the prevalence of equity shortages, as excessive use of short-term debt is in most cases inevitable (see Figure 3). If current liabilities exceed current assets, companies are exposed to significant insolvency risk due to potential illiquidity.

Table 3. Equity ownership in *Mittelstand* companies

	Importance of different owners	Percentage of cases where provider of equity holds ...	
		... less than 50% of equity	... more than 50% of equity
Entrepreneur	95	10	90
Active shareholder	22	59	41
Silent partner	11	86	14
Other companies	5	100	0
Private equity firm	5	92	8
Employees	4	83	17
Business angels	<1	97	3
Other	6	71	29

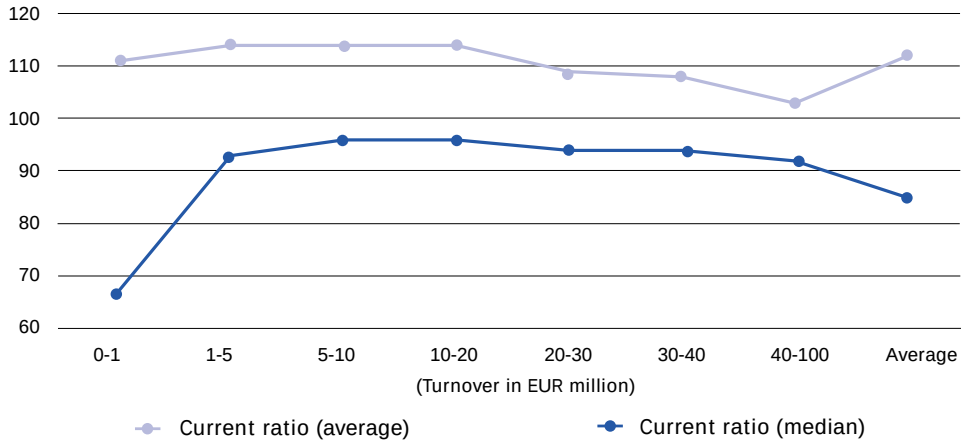
Notes: Figures in column 1 show the percentage of firms that have this type of owner. As firms can have different types of owners, the sum of figures in column 1 exceeds 100.
Source: IfM (2000a).

Figure 2. Company insolvencies in Germany, 1993-2002



Notes: Estimate for 2002; figures have been adjusted to account for the reform of the insolvency code in 2001.
Source: Creditreform (2002a).

Figure 3. Current ratio (average and median) of German *Mittelstand* firms by size class (2000), in %

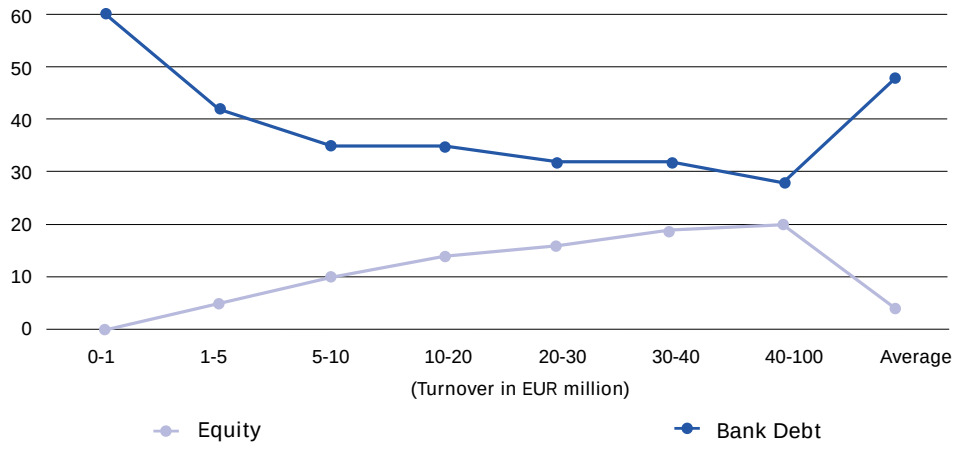


Source: Annual Report database of DSGV.

A word of caution needs to be added in connection with equity gap measurement. In most cases, the absolute magnitude of balance-sheet based equity ratios fails to reveal any meaningful insights – and even less so for smaller *Mittelstand* enterprises. As most firms are organised as proprietorships or partnerships, owners have to fully account for the company's debt with their personal assets. In other words, the owner's net worth serves as an equity substitute so that recorded equity ratios are subject to a systematic downward bias and do not necessarily signal the existence of a structural impediment limiting the

access to debt financing. Otherwise, more than 35,000 companies included in the DSGV sample would already have been forced out of business due to the complete lack of equity (see also Figure 4). The same also applies to limited liability partnerships where company owners typically submit personal assets to serve as collateral for specific debt-financing measures.

Figure 4: Median capital structure of German *Mittelstand* firms by size class (2000), in % of balance sheet total



Source: Annual Report database of DSGV.

Two tax-related factors amplify the downward bias even further. First, the German tax code requires a company's tax balance sheet (*Steuerbilanz*) to be directly derived from its trade balance sheet (*Handelsbilanz*) so that there exists an incentive to understate asset values and build up hidden reserves as a means of managing the effective tax burden. Second, corporations and limited liability partnerships face a positive tax shield that was until recently coupled with a tax incentive to withdraw company earnings (see also Section 4.2).

3.2 Dependence on intermediated debt

Mittelstand *firms depend heavily on bank debt for long-term external financing.*

Mittelstand firms are historically highly dependent on the provision of bank debt for their long-term external financing as illustrated by the Tables A2 and A3 in the Annex. According to DSGV data, bank debt represented 48 percent of total debt for the average firm in 2000. Surprisingly, the median bank-debt-to-total-debt ratio is virtually identical - a result that holds for individual size classes as well, whereby the use of (but not necessarily the dependence on) bank debt decreases with size. The *esbf* survey qualitatively confirms this result when looking at the relevance of bank loans for short- and long-term finance (see Table 4). Further to the results reported in Table 4, it is worth noting that only 20 (23) percent of the survey participants consider short-term (long-term) bank debt as being unimportant. With the exception of medium-term loans, the relevance of debt financing is independent of size. However, the dependence on bank debt seems to be at least partially due to structural reasons. Almost 90 percent of the respondents indicate that they are not in a position to raise equity via an initial public offering (IPO); similarly, close to 80 percent do not see any possibility of issuing corporate bonds.

Table 4. Relevance of bank loans for German Mittelstand firms, by size class

	Turnover (in million of EUR)				
	< 1	1-10	10-20	20-40	40-100
Relevance for short-term financing					
Short-term loans	4.4	4.3	4.2	4.0	4.3
	(1.5)	*(1.4)*	*(1.6)*	*(1.5)*	*(1.9)*
Medium-term loans $^{++}$	3.4	3.4	2.5	2.9	2.6
	(1.5)	*(1.4)*	*(1.4)*	*(1.3)*	*(1.6)*
Long-term loans	3.5	2.3	1.9	2.0	2.3
	(1.7)	*(1.6)*	*(1.5)*	*(1.4)*	*(1.4)*
Relevance for long-term financing					
Short-term loans	2.9	1.8	1.9	1.8	1.8
	(1.6)	*(1.5)*	*(1.6)*	*(1.7)*	*(1.4)*
Medium-term loans	3.1	2.8	2.6	3.3	2.8
	(1.4)	*(1.4)*	*(1.6)*	*(1.3)*	*(1.4)*
Long-term loans	4.2	4.0	4.0	3.4	4.1
	(1.4)	*(1.5)*	*(1.6)*	*(1.4)*	*(1.5)*

Notes: Relevance of bank loans has been rated on an ordinal scale from 1 (unimportant) to 5 (very important); absolute scores represent the median for each size class; standard deviations are given in brackets. Unless otherwise indicated, the paper applies group difference tests by Kruskal/Wallis and Mann/Whitney to all tables. The Mann/Whitney-Test is generally performed between two sub-samples of firms, namely firms with a turnover of less than EUR 10m, on the one hand, and firms with a turnover larger than EUR 10m, on the other hand. Significant differences are indicated by °°° ($^{+++}$) at the 0.1 percent level, °° ($^{++}$) at the 1 percent level, and ° ($^{+}$) at the 5 percent level for the Kruskal/Wallis-Test (Mann/Whitney-Test).

Source: *esbf* survey

Table 5 provides further evidence for the importance of bank loans for the financing of the *Mittelstand*. Participants in the *esbf* survey do not appear to be confident with regard to their ability to replace a large part of bank debt with alternative forms of financing (see also Section 3.5). Only 18 percent of firms feel that they can replace more than 30 percent of bank loans with other means of finance. Wimmer *et al.* (2001) report similar findings.

Table 5. Scope for replacing bank debt with alternative sources of finance, by size class

Bank debt (in %) that could be replaced	percentage of firms that consider x percent of bank debt replaceable					
	Turnover (in million of EUR)					
	< 1	1-10	10-20	20-40	40-100	Total
< 5%	19.3	21.5	26.7	7.7	6.3	19.8
5 - 10%	14.0	21.5	16.7	15.4	37.5	19.8
10 - 20%	24.6	19.8	23.3	61.5	18.8	23.6
20 - 30%	15.8	20.7	16.7	15.4	18.8	18.6
> 30%	26.3	16.5	16.7	0.0	18.8	18.1

Notes: Neither Kruskal/Wallis-Test nor Mann/Whitney-Test indicated significant differences among the respective groups. The table only includes the responses of indebted firms.

Source: *esbf* survey

Mittelstand firms, however, seem to be partially unsatisfied with the level of service quality provided by their main bank(s), as Table 6 indicates. Interestingly, smaller companies are significantly less content with the service level than their larger counterparts, a fact possibly reflecting a higher exposure to monopoly power in the market for intermediated debt.

Table 6. General satisfaction with services provided by main bank(s), by size class

	Turnover (in million of EUR)				
	< 1	1-10	10-20	20-40	40-100
Type of service					
General advisory +	3.1	3.1	3.4	3.4	3.5
Public support programme info °°/+++	2.4	2.3	2.9	3.3	2.6
Service/product portfolio °/++	2.9	2.9	3.4	3.1	3.4
Terms and conditions of loans °°/+++	2.7	2.9	3.4	3.5	3.2

Notes: Satisfaction has been rated from 1 (extremely unsatisfied) to 5 (very satisfied); absolute scores represent the median for each size class; for an explanation of the significance levels and statistical tests see Notes to Table 4. The data on loan provisions only include the responses of indebted firms.
Source: *esbf* survey

It is sometimes argued that *Mittelstand* firms are put at a disadvantage not only because of their dependence on bank debt but also because of their reliance on one bank. With the exception of very small companies, this hypothesis is not borne out by the data (see Table 7). KfW (2001a) reports similar findings.

Table 7. Prevalence of multi-banking relationships and multiple offers, by size class

	Turnover (in million of EUR)				
	< 1	1-10	10-20	20-40	40-100
Average number of banking relationships					
In 1997	2.0	2.8	3.7	4.8	5.2
In 2001	1.8	2.6	3.7	4.2	4.8
In 2002	1.9	2.6	3.4	4.0	4.5
Planned for the future	1.8	2.5	3.3	3.8	3.9
Multiple offers					
Share of firms obtaining multiple offers +	80.2%	78.7%	89.2%	85.0%	94.4%
Average number of multiple offers	2.9	2.9	2.7	3.1	3.0
Average percentage of offers obtained from banks without prior relationship °°/++	40.5%	27.6%	27.5%	15.7%	14.1%
Average percentage of offers obtained					
Outside municipality +	22.4%	24.6%	36.6%	30.4%	43.9%
Outside county °/++	11.6%	14.4%	19.7%	31.5%	31.9%
Outside state	7.7%	7.3%	8.9%	11.1%	16.7%

Notes: For an explanation of the significance levels and statistical tests see Notes to Table 4. The data on multiple offers only include the responses of indebted firms.
Source: *esbf* survey

Above all, the number of established bank relationships depends on the size of the respective company. In 2002, firms in the smallest (largest) size bracket had, on average, 1.9 (4.5) bank relationships. The relative number of banks swiftly declines with size. Although not shown in the table, *Mittelstand* firms are less likely to maintain multiple banking relationships with institutions belonging to the cooperative sector (*Volks- und Raiffeisenbanken*) than with savings and loan institutions (*Sparkassen*) or private banks. It is noteworthy that the number of bank relationships dropped from 1997 to 2002 and is expected to fall further. At least from a purely quantitative perspective, this result is contradictory to the hypothesis that house-bank relationships are losing importance.

Whether or not *Mittelstand* companies are exposed to local monopoly power can be further examined on the basis of the number of offers typically generated for each bank-financing measure and of the location and relationship with these banks. Table 7 provides a summary of the empirical results. *Mittelstand* firms seem to be more flexible than commonly assumed. Companies approaching several banks obtain an average of approximately three loan offers. What is more, a substantial amount of offers originates from banks that had no prior relationship with the firm and/or from banks situated outside the immediate geographical vicinity of the firm seeking finance. Larger *Mittelstand* firms have less difficulty or are somewhat more willing to overcome geographical obstacles, whereas smaller firms – given their lower number of bank relationships – consult more new banks. The averages, however, are somewhat misleading given that almost half of the respondents do not contact non-relationship banks and only half of the respondents leave their municipality when applying for loans. In such cases, the local market power of banks may be important inasmuch as switching options do not exist. However, only about 30 percent of the sample firms relying exclusively on relationship banks are dissatisfied with their loan conditions. Given the systematic downward bias such survey inquiries entail, the vast majority of firms seem to voluntarily stick to their relationship banks. These results also hold true for the considerable fraction of firms relying on single offers (some 19 percent of the respondents), of which about two thirds are reasonably satisfied; yet, some 18 percent are highly dissatisfied with their current loan conditions. At least for the latter, switching options appear to be non-existent, which implies monopolistic power of the respective house-bank.

The above results confirm the dependence on bank debt and the but they do not substantiate fears of excessive market power of local banking institutions. Nevertheless, overcoming the dependence on debt financing is vitally important, above all as there is mounting evidence that banks no longer regard loans as an attractive business opportunity.

Although the* Mittelstand *depends on bank finance, there is no evidence that banks have excessive market power.

3.3 Evidence on credit rationing

As shown by Deutsche Bundesbank (2002), German enterprises as a whole do not suffer from systematic credit rationing. Aggregate credit to the enterprise sector increased substantially during the 1990s (at an annual average rate of 6.5 percent), partially as a consequence of two extraordinary effects: the reconstruction of eastern Germany following reunification and a substantial increase of foreign direct investments (FDI) by German companies in the second half of the decade.[3] Since the turn of the century,

3 Annual FDI expenditures had increased by a factor of 7 between 1989 and 1999. See Deutsche Bundesbank (2002).

volume growth has dropped to an annual average of 1.8 percent, but credit growth came to a virtual standstill in 2002 (see Figure A1 in the Annex). However, this effect can mainly be attributed to the current cyclical downturn of the German economy (Deutsche Bundesbank 2002). Several factors support this conclusion: when accounting for reunification and FDI expansion, changes in credit growth rates are largely explained by variations in GDP and interest rates. This holds true in particular for long-term financing.

Nevertheless, the results of the *esbf* survey indicate that *Mittelstand* firms do suffer from a variety of adverse supply-side effects, but it cannot be determined whether these have structural origins. While responding firms appear to be exposed to a rise in the cost of bank debt at a time of falling interest rates, there is no clear evidence that this development puts them at a disadvantage compared to their (foreign) competitors.[4] Priewasser and Kleinbrod (2002) explain lucidly that the cost of debt appears comparatively low in absolute terms (with the possible exception of proprietorships) and overall investment performance seems quite insensitive to variations in interest rates. Interest rate adjustments triggered by the adoption of Basel II will also simply put an end to the common practice of cross subsidisation between different risk classes, i.e., more risky loans become more expensive and will more closely approximate fair market rates (Sachverständigenrat 2002).

KfW (2001a), IfM (2000a), and Hansmann and Ringle (2002) report a reduction in credit availability mainly resulting from a tightening of the banks' loan policies.[5] About 42 percent (37 percent) of the firms participating in the *esbf* survey have experienced a reduction in short-term (long-term) loan availability during the previous year. Firms in smaller size classes were particularly affected by this reduction. Specifically, 43 percent (40 percent) of the companies with an annual turnover of up to EUR 10 million complain of difficulties in the supply of short-term (long-term) loans compared to about 37 percent (26 percent) of medium-sized companies (annual turnover between EUR 10 and EUR 100 million). Loan rejections were experienced by 31 percent of the debt-financed companies. Cooperative banks and savings and loan institutions rejected most loan applications in absolute terms, which is not surprising given that nearly all sample firms have established relationships with these banking groups.

Banks are adjusting their credit policies, including the adoption of risk-adequate loan pricing strategies.

When asked for the main reasons for loan rejections, firms reported that this was largely a consequence of inadequate collateral, changed bank policies, and/or an insufficient equity base (see Table 8); a result supported by other studies, including KfW (2001a). As to how terms and conditions of loans had been adjusted, respondents assigned the highest weight to additional collateral requirements and to more extensive reporting obligations (see also Table 8). In total, close to 60 percent of *esbf* survey respondents complain of more unfavourable loan terms. Even when ignoring more extensive information requirements, about half of the respondents have observed more restrictive credit terms. This exceptionally high share indicates that banks are currently adjusting their credit policies on a broad basis, a fact that essentially reflects the adoption of risk-adequate loan pricing strategies.

4 Close to 92 percent (85 percent) of the 70 (33) responding companies experienced an increase in interest rates on short-term (secured long-term) loans. The average increase was 1.05 (0.63) percentage points.

5 In October 2002, the Ifo Institut conducted a telephone survey with a representative sample of 1,100 firms. 45 percent of those had attempted to raise new bank debt, extend or raise credit lines. Only 11 percent of firms in this category experienced no problems, 17 percent reported additional transaction costs, 5 percent had to accept higher cost of debt, and 12 percent were turned down or presented with unacceptable conditions. See Russ (2002).

Table 8. Reasons for loan rejections and changes in terms of loans by type of bank

	Cooperative banks	S&L institutions	Private banks	Other banks
Reasons for loan rejection				
General bank policy	27	23	28	4
Lacking equity base	36	34	18	3
Insufficient collateral	34	39	25	6
Reservations regarding investment	10	14	6	3
Unresolved succession problems	1	2	0	0
Changes in terms of loans				
Higher cost of loans	34	53	32	6
Additional collateral required	74	95	40	6
More extensive reporting	70	73	40	7

Notes: The data on reasons for loan rejection are based on the responses of 104 firms; data on changes in loan conditions reflect the responses of 192 firms. As multiple responses were possible, group difference tests could not be applied.
Source: *esbf* survey.

To summarise, based on the evidence presented, one cannot conclusively determine whether *Mittelstand* firms do actually suffer from systematic credit rationing or whether specific banking groups abstain from granting loans. So far, also the market shares of individual banking groups in the credit supply to companies and self-employed have been extremely stable and do consequently not (yet) reveal further insights.

3.4 The role of public support schemes

A wide variety of public support programmes is available for the **Mittelstand.**

An enormous variety of public support programmes is available for the German *Mittelstand*.[6] The main suppliers are at the level of the European Union, the Federal Republic of Germany, and the different federal states. Due to the frequently criticised opaqueness of Germany's public support system, the relevance of such programmes can only be roughly estimated, as aggregate statistics on number, volume, and origin of such activities do not exist. For the purpose of long-term financing, only programmes supplying funds as debt substitutes in the form of subsidised loans are of relevance. In contrast, consulting services, tax relief, or infrastructure investments are ignored. Non-refundable investment grants, though debt substitutes, will not be considered either since they represent irrevocably lost one-time subsidies.

To avoid cannibalisation effects for non-public lenders, public support programmes are committed to finance only activities that would not receive funding otherwise due to market failure.[7] This includes, for instance, start-up financing and investments in research and development as well as environmental protection. Nevertheless, German *Mittelstand* firms have access to a great variety of programmes to finance expansion and restructuring strategies, undoubtedly a result of the widespread perception that financial intermediaries cannot supply a sufficient level of funding.

6 The public support database of the Federal Ministry for Economic Affairs and Technology lists 785 different programmes available for companies. Other sources report 1,800 different programmes.

7 See, for instance, Art. 2(1) of the *KfW-Gesetz*, which governs the activities of KfW.

The main players at the federal level are the recently merged KfW and Deutsche Ausgleichsbank (DtA). They are in charge of managing the funds recycled from the European Recovery Programme (ERP), but also offer independent programmes refinanced on the open market. In 2002, the total volume of public support loans channelled through these institutions amounted to some EUR 14 billion. In addition, the European Investment Bank (EIB) and the European Investment Fund (EIF) have provided EUR 3 billion in long-term finance, largely channelled through German credit institutions (Bundesministerium für Wirtschaft und Technologie 2002). Compared to a gross fixed capital formation of about EUR 290 billion and total bank loans outstanding to domestic corporate borrowers of EUR 1.3 trillion as of December 2002, it is obvious that public support schemes do not (and should not) even come close to replacing bank debt as a means of *Mittelstand* financing.[8] However, they can serve as an important supplement potentially capable of spurring innovative financing solutions.

The majority of Mittelstand firms does not use public support programmes, partly reflecting a lack of information on such programmes.

The empirical evidence indicates that most *Mittelstand* firms fail to use public support programmes. The *esbf* survey shows that 76 percent of the responding firms are currently not using public support finance and 68 percent have never done so in the past.[9] When asked whether the company engages in eligible activities for public support programmes, 18 percent answered they do, 43 percent said they do not, and 39 percent responded they were unable to judge. The latter figure indicates that the effectiveness of existing programmes may suffer from the general lack of information on the part of *Mittelstand* management.

Particularly interesting are the reasons why firms with eligible activities fail to use these co-funding opportunities. Table 9 summarises the responses of the survey participants. Information deficits and a general belief that support programmes are overburdened with transaction costs explain why most sample firms refrain from making use of these funding opportunities. Compared to smaller firms, larger firms perceive support programmes to be economically less attractive. This view reflects the fact that many programmes are

Table 9. Reasons for not utilising public support programmes

	Turnover (in million of EUR)				
	< 1	1-10	10-20	20-40	40-100
Lack of information	4.2	4.1	3.3	4.0	2.3
Excessive transaction costs °	3.0	4.2	4.2	4.5	1.8
Lack of economic attractiveness	2.5	3.6	3.5	4.0	1.0
Lack of house-bank support °/$^{+++}$	3.7	4.1	2.3	1.0	2.3
Other reasons	3.0	3.5	3.7	1.0	3.0

Notes: Reasons have been rated from 1 (unimportant) to 5 (very important); absolute scores represent the median for each size class. For an explanation of the significance levels and statistical tests see Notes to Table 4.
Source: *esbf* survey

8 Data reported by Städtler (2001), based on information from *Ifo Investitionstest* and the Federal Statistical Office as well as Deutsche Bundesbank (2003).
9 Only 14 percent of the responding firms in the KfW survey have received public support loans (KfW 2001a).

specifically offered for, and tailored to, the needs of smaller enterprises. In contrast, smaller firms complain of insufficient house-bank support – with highest significance – more frequently than larger ones.

These results extend the findings of KfW (2001a) and Bornemann *et al.* (2001), which also identified the lack of information as the primary reason for not using public support offerings. Several reasons explain why *Mittelstand* firms appear to be reluctant users (or house-banks reluctant supporters) of public support programmes. First, as a matter of general procedure, *Mittelstand* firms must apply for public loans through their house-bank, which has to certify the economic viability of the funding proposal. Once approved, the house-bank acts as the representative of the public support agency and is typically fully liable for the amount of the loan. Hence, banks generally apply the same credit policy standards (e.g. collateral and information requirements) as for their own loan business. As a consequence, support programmes do not aid companies that are struggling to raise more debt.

Public support programmes often are of little help for* Mittelstand *firms that are struggling to raise more debt.

Second, house-banks often receive a fixed margin – ranging from 50 to 200 basis points –as a compensation for bearing the default risk and providing their services. It is generally risk-insensitive and too low compared to going market rates.[10] The adoption of Basel II is likely to aggravate this problem, as no bank will be inclined to grant public support loans at such a low margin to sub-investment grade borrowers such as the majority of the *Mittelstand* (see, for instance, Schmitt 2002). Most likely, public support agencies will respond by reducing the default obligations of house-banks and transferring them to specialised intermediaries (*Bürgschaftsbanken*) or by keeping them on their own books at an acceptable premium (see also Bundesministeruim für Wirtschaft und Technologie 2002).

Third, *Mittelstand* loans generally cause proportionally higher administrative costs relative to loans to large borrowers. Apart from the usual credit check, there are additional costs related to the application for a public support loan. The margin received fails to take these expenditures into account. Some public support agencies, however, have started to pay a fixed service charge per application irrespective of loan size (e.g. *LfA Förderbank Bayern* pays EUR 200 for each application).

3.5 Alternative financing instruments

While fears of systematic credit rationing appear to be unjustified, the recent tightening of the credit market and the equity shortage identified for the *Mittelstand* indicate the need to search for alternative financing. A closer look at the main possible instruments often discussed in this context reveals their general inaptitude (see also Pruss *et al.* 2003).

The lack of suitable alternatives is obvious with regard to capital-market-related financing solutions. In spite of sharply increasing volumes, which has led to new issuance records, the corporate bond markets will remain foreclosed for the overwhelming number of *Mittelstand* firms. Minimum notionals of EUR 100 million highlight that only the upper

10 EU corporate bond spreads for BB rated firms - the approximate average of a typical corporate credit portfolio (see Wambach and Rödl 2001) - are on average 200 bps above LIBOR. See RiskMetrics Group (2002). See Taistra *et al.* (2001) for the composition of a *Mittelstand*-oriented credit portfolio.

size bracket of *Mittelstand* firms will realistically have the ability to access this market (Kolbeck and Wimmer 2002). The same holds true for the securitisation of accounts receivable unless the *Mittelstand* engages in some form of pooling involving a specialised intermediary. The minimum lot size for such transactions is comparable to corporate bond issues whereas the issue-related costs and the expertise needed are even more significant. Floating the company stock through an IPO fails for similar reasons. Stock exchange rules and market conventions require IPO candidates to have attained a certain size reflected by minimum issue volumes and the magnitude of the annual turnover. The range of candidate firms has been further narrowed following the burst of the speculative bubble in 2000 as additional criteria (e.g. profitability, industry sector, age) have gained relevance for the success of a public issue. The results of the *esbf* survey confirm this argument. None of the responding firms had ever issued equity or bonds before, and only a few believed that using these instruments in future would be feasible. The outlook may become slightly more optimistic in the years to come if the critical size for asset-backed securities and bond issues keeps on falling. Nevertheless, transactions will continue to involve several tens of millions of euros (Kolbeck and Wimmer 2002).

Capital market finance is currently not an option available for most Mittelstand firms

Private equity as an alternative form of external equity financing cannot be expected to resolve the *Mittelstand*'s financing gap either, as it is a suitable alternative for only a small minority of *Mittelstand* firms.[11] Specifically, required returns of private equity funds can only be met by high-growth companies and firms faced with restructuring problems. In addition, the corporate governance standards of private equity investors are generally irreconcilable with the management approach of traditional *Mittelstand* entrepreneurs. A core principle of private equity investing is the acquisition of cashflow and control rights that are subsequently again yielded to the seller (buyback) or a third party (trade sale, IPO). Conceding voting rights to a third party, however, is unacceptable for typical *Mittelstand* owners. The *Mittelstand's* attitude towards private equity is reflected in the survey of IfM (2000a): responding firms rejected private equity because they wanted to keep their independence, financial flexibility, and/or status of a family enterprise. Finally, the fairly short holding periods of private equity investors are irreconcilable with the *Mittelstand*'s long-term financing needs.[12]

Also mezzanine finance, which combines the characteristics of equity and straight debt in various ways, does not offer any relief.[13] Most prominent mezzanine instruments are subordinated debt and privately placed convertible debt. Companies already facing a restricted access to loans will almost surely find it impossible to raise mezzanine capital, as it is by definition more risky than straight debt. If held by banks, it will also be subject to Basel II and will receive an equal or even higher risk weight compared to loans. Thus, solely financially sound *Mittelstand* firms may consider these options as a means to improve their solvency ratios. Nevertheless, mezzanine capital is an expensive funding source with expected returns, depending on the instrument used, usually exceeding 10, often 20 percent,

11 See also Achleitner (2002). The German Venture Capital Association (BVK) estimates that 10 percent of all SMEs may qualify for private equity.

12 The *esbf* venture capital survey determined an average holding period of approximately 4 years. See Hommel *et al.* (2002).

13 One can generally distinguish between three forms (see for instance Nelles and Klusemann 2003): (i) debt mezzanine capital (e.g. subordinated/junior debt with a performance-linked interest premium - therefore rated as economic equity by banks), (ii) equity mezzanine capital (silent partnerships, atypical silent partnerships with some form of an "equity kicker"), and (iii) hybrid forms of mezzanine capital (e.g. convertible debt).

per year (Nelles and Klusemann 2003). Minimum size requirements – ranging from EUR 1 to 10 million – further reduce the common applicability of such facilities. Convertibles and silent partnerships also entail the transfer of control rights to mezzanine investors; *Mittelstand* owners have historically shown great reluctance to accept such a transfer. Moreover, the fact that only few *Mittelstand* firms are organised as corporations complicates the use of conversion features in mezzanine contracts as no standardised convertible debt instruments exist for other legal forms.

Thus, for the majority of *Mittelstand* firms only a few options remain. Trade credit represents a form of short-term, tactical financing. If offered without a discount for early payment, it is always optimal to cover payables at the latest time possible. If a discount (of usually 1-2 percent for a few weeks) is granted – a common practice in Germany – trade credit is comparable or even inferior to sub-investment grade loans and therefore never preferable to bank debt or similar forms of financing. It is also important to note that *Mittelstand* firms are already fully exploiting this financing option so that no additional funds can be unlocked in the future. Current ratio data provided by DSGV supports this conclusion (see Figure 3).

Neither trade credit, leasing, nor factoring seems to offer scope for becoming a more important source of finance.

Among the class of external financing instruments, the only remaining options for the typical *Mittelstand* firm are leasing and factoring. In Germany, about 17 percent of gross fixed capital formation (without housing) and more than half of externally financed investments in machinery and equipment are currently leasing-based (Städtler 2001, Stephan 2002). Typically, the advantage that neither the leasing object, nor the obligation resulting from the leasing contract needs to be included in the lessee's balance sheet leads to more favourable capital structure ratios. As contractual terms and prerequisites for access to this form of financing are similar to those of bank loans, leasing effectively becomes impossible when the company is foreclosed from raising additional bank debt. This conclusion holds in particular because lessors are forced to take the risk exposures into account as their refinancing conditions directly depend on the credit rating of their leasing portfolio (Gödel 2001).

Finally, factoring is normally seen as a supporting measure to cover short-term working capital requirements. However, if receivables are sold on a roll-over basis – so that the level of receivables on the books is reduced on a permanent basis – it effectively generates funds to cover longer-term financing needs. Using this financing option can cause substantial costs, including the refinancing cost of the factor, a service charge, and a risk premium. Furthermore, the factor only reimburses a portion of the invoice total upfront.[14] On a stand-alone basis, companies can only engage in factoring activities if a substantial and stable flow of receivables is generated from the same customer base, a criterion often not met by *Mittelstand* firms.

Due to the limited availability of alternative external financing instruments, the *Mittelstand* probably has to focus more than large firms on internally generated cashflow as an alternative form of financing. In this context, the regulatory environment, especially the tax treatment of SMEs, plays a crucial role. Further discussion of this aspect is provided in Section 4.2.

14 Dresdner Factoring AG for instance currently charges a factoring fee of 4-6 percent and pays out 75 percent of the invoice total (factoring programme for *Mittelstand* firms in Saxony, 04.11.2002).

Overall, this analysis is confirmed by the results of the *esbf* survey summarised in Table 10 and by evidence reported in KfW (2001a).

The relevance of individual financing sources does not fundamentally differ across size classes. With the exception of public support and supplier loans, funding sources are not rated differently for varying maturities. As also shown by other studies, internal financing is by far the most important financing source for short- and long-term financing needs. Shareholder loans play a prominent role as they are often used as an equity substitute. The relevance of public support loans as a long-term financing source is surprising given that only about one third of the companies included in the survey have ever used them. With the exception of leasing, respondents assign a minor importance to all other alternatives.

Table 10. Relevance of alternative financing instruments for the Mittelstand firms, by size class

	Turnover (in million of EUR)				
	< 1	1-10	10-20	20-40	40-100
Internal financing with earnings	4.2	4.3	4.3	4.7	4.5
	4.0	4.2	4.3	4.5	4.3
Internal financing with pension reserves $^{+}$ ($^{+}$)	1.4	1.5	2.1	1.6	1.6
	1.4	1.6	2.0	2.3	1.8
Conglomerate financing °°°/$^{+++}$ (°°°/$^{+}$)	1.2	1.2	1.3	1.6	3.0
	1.2	1.2	1.4	1.5	2.7
Public support programmes	2.4	1.7	1.6	1.9	1.6
	3.3	2.4	1.9	3.1	2.0
Loans from shareholders	3.6	3.4	3.3	2.8	3.5
	3.5	3.2	3.2	2.5	3.8
Silent partnerships $^{++}$	1.4	1.5	1.3	1.3	1.1
	1.6	1.5	1.3	1.5	1.2
Supplier loans	2.5	3.0	2.6	2.9	3.3
	1.7	1.6	1.7	1.6	2.3
Employee ownership plans	1.2	1.1	1.2	1.2	1.1
	1.4	1.2	1.1	1.2	1.5
Leasing	2.5	2.6	2.1	2.9	3.0
	2.5	2.4	2.8	2.4	3.2
Factoring (°)	1.2	1.2	1.2	1.2	1.6
	1.3	1.3	1.1	1.1	1.6
Private equity $^{+}$	1.3	1.2	1.1	1.2	1.1
	1.4	1.3	1.2	1.2	1.3

Notes: The first entry for each financing alternative and size class refers to short-term financing, the second to long-term financing; the relevance of alternative financing instruments has been rated from 1 (unimportant) to 5 (very important); absolute scores represent the median for each size class; results of significance tests for short-term (long-term) financing are given without (in) brackets. For an explanation of the significance levels and statistical tests see Notes to Table 4.

Source: *esbf* survey

4. Impact of recent and future developments

4.1 Consolidation and restructuring of the German banking industry

The German banking industry is currently experiencing a fundamental upheaval, most directly exemplified by an intense merger activity (especially within the cooperative banking sector and between savings and loan institutions). Large private banks, too, have shown a pronounced tendency to reformulate their business models and shift their focus from traditional commercial banking activities towards investment banking. The number of independent banking institutions has dropped by approximately 40 percent since 1990, reaching some 2,700 in 2001. Merger activity was particularly high in the cooperative banking sector and in the savings and loan sector (Bundesverband deutscher Banken 2002a). Furthermore, between 1998 and 2001, more than 10,000 bank branches were closed in Germany, which almost fully explains the overall decline in the euro zone (see Table A4 in the Annex). This number is expected to fall further in the coming years in response to continued merger activity and to the implementation of new business models emphasising electronic banking (Deutsche Bundesbank 2003, Bundesverband deutscher Banken 2002b).

The German banking sector is "over-banked" and "over-branched", is struggling for profitability, and will thus experience further consolidation and restructuring.

Consolidation and restructuring of the German banking industry, however, must to some degree be seen as a natural adjustment process in an "over-banked" market. A comparison with other EU countries reveals that Germany has more banking institutions than France, Great Britain and Italy together. Undoubtedly, this results from the prominent role of the cooperative banking sector and savings and loan institutions. Not surprisingly, Germany also experienced the sharpest drop in the number of banking institutions between 1998 and 2001, but still has the third-lowest population per branch (1,450) in the EU. A low level of concentration indicates potential for further consolidation. The five-firm concentration ratio is around 20 percent in Germany compared to 40 percent and 55 percent in France and the EU, respectively. Another salient feature of the German banking market is the large number of smaller banks: 42 percent of all EU banking institutions with a balance sheet total of less than EUR 1 billion are in Germany. However, the EU-initiated withdrawal of government loss guarantees for savings and loan institutions (*Anstaltslast* and *Gewährträgerhaftung*), to become effective in July 2005, promises to trigger substantial merger activity within this sub-sector in the years to come.

As a consequence of these structural impediments and of a highly competitive environment, the German banking industry is performing significantly worse than its EU counterparts. In 1999, it achieved the third-lowest interest surplus to total assets in the euro zone (1.02 percent), the lowest net income to balance sheet total (0.34 percent), and a very unfavourable cost-to-income ratio (64 percent), the latter clearly indicating a considerable scope for rationalisation.

Further consolidation and restructuring will affect the *Mittelstand* in various ways. To begin with, balance sheets over-burdened with unprofitable *Mittelstand* loans cause banks to reconsider their role as the *Mittelstand*'s primary financing source. Risk-adequate credit pricing – not only through Basel II – will be the guideline shaping the future development of the lending business. Second, as the closing of local branches leads to a (potentially frequent) shift of the bank liaison, especially small enterprises will be subject to a

worsening of service quality. Third, as argued by Davis (this volume), for instance, household savings will continue to shift towards insurance companies and fund investors. Together with the emergence of different forms of refinancing, this implies an increase in funding costs for banks, which – to some extent – is likely to be passed on to borrowers (Bundesverband deutscher Banken 2002a). Fourth, as highly rated clients have obtained access to non-bank finance, the banks' credit portfolios have suffered, thus creating an added incentive to review the importance of traditional lending activities. The entry of foreign banks into the German market and their focus on cream-skimming activities magnify this effect. Finally, synergies achieved in larger banking groups could, if passed on, lead to a lower cost of debt for clients – but this favourable effect on borrowers may be counter-balanced by an increasing market concentration.

4.2 Reform of the German tax law

Germany's tax system has not been conducive to the formation of equity of **Mittelstand** *firms.*

The *Mittelstand*'s historically low equity ratios can to some degree be explained by German tax provisions. The federal tax code distinguishes between, on the one hand, corporations and limited liability partnerships (*Gesellschaft mit beschränkter Haftung* or *GmbH*) and, on the other hand, proprietorships and partnerships. While the former are treated as distinct legal entities subject to a fixed corporate income tax (*Körperschaftsteuer*), earnings of the latter are always treated at the level of the individual owner at a progressively defined personal income tax rate. In the past, high corporate and personal (income) tax burdens hindered companies from building up equity internally. Until 2001, owners of proprietorship and partnerships faced a maximum marginal personal income tax rate of 51 percent to 56 percent. Those tax rates were already applied at relatively low levels of earnings: in 1986 (2000), profits exceeding EUR 34,200 (57,300) were subject to a 50 percent tax rate. Similarly, limited liability companies paid a minimum tax rate of 50 percent on their retained profits until 1993. In addition, all companies were – and still are – subject to other taxes (notably the *Gewerbesteuer*, a municipal trade tax), which further increases the overall tax burden by several percentage points.

Indirect effects of the tax code on capital structure can be identified as well. Next to the issues raised in section 3.1, there are codified disincentives for limited liability companies against withholding their profits. Until 2001, corporations and limited liability partnerships faced a split tax regime with retained profits taxed at a higher rate than distributed profits.[15] Initially, the latter were also subject to double taxation as dividends were subject to personal income tax without corporate income taxes having been taken into account as credit. Double taxation was eliminated in 1977, but the split tax regime was maintained. Shareholders received a tax credit amounting to the corporate income tax paid on their personal income tax. Consequently, the incentives to distribute company income depended on the personal income tax bracket of the owner. Recipients operating in low-tax brackets had the incentive to withdraw all earnings and to subsequently reinvest the funds needed to cover the company's cash needs (*Schütt-aus-Hol-zurück-Verfahren*). Thus, distribution of earnings proved beneficial for shareholders facing a marginal income tax rate below the rate for retained earnings.

In 2001, the German legislator reintroduced a slightly reformulated double-taxation model to encourage the retaining of earnings in limited liability companies

15 The rates for retained/distributed profits have varied over time as follows: 56/36 percent (1977-89), 50/36 percent (1990-93), 45/30 percent (1994-98), 40/30 percent (1999-2000) and 25/25 percent (2001).

(*Halbeinkünfteverfahren*). All profits are now taxed at 25 percent at the corporate level and, if distributed, shareholders receive half of the dividend tax-free while the other half is subject to personal income tax. By 2002, most EU member states had similar corporate income tax systems in place (Bundesministerium der Finanzen 2003). Under these regimes, double taxation is alleviated but not fully avoided through (a mixture of) special income tax rates on dividends, the partial tax exemption of dividend income, and/or a partial imputation of the corporate income tax. Although the *Halbeinkünfteverfahren* clearly treats retention preferentially, debt financing also becomes more favourable than before due to the enlarged tax shield (see also Drukarczyk 2001). Companies generating sufficient internal cash will therefore exclusively rely on internal financing whereas external capital will surely be invested as debt.

Such preferential tax treatment of retained profits does not exist for proprietorships and partnerships, still representing the overwhelming majority of the German *Mittelstand*. At present, the partial imputation of municipal trade tax with personal income tax offers relief for those companies. Furthermore, they benefit from the gradual lowering of personal income tax to 42 percent by 2005.

To summarise, tax regulations can partly explain the low equity ratios of *Mittelstand* firms. For those organised as limited liability companies, the distribution incentive became obsolete with tax reforms effective since 2001. The reduction of corporate and personal income tax rates strengthens the capital formation ability for all legal forms. However, *esbf* survey respondents apparently do not share this view: only 39 percent – thereof 41 percent (36 percent) corporations and limited liability partnerships (proprietorships and partnerships) – expressed the view that the withholding of earnings will become more attractive in the future. In addition, only 35 percent of the responding companies – thereof 37 percent (29 percent) corporations and limited partnerships (proprietorships and partnerships) – stated that they had retained more earnings over the previous four years in response to changes in the tax code. Neither legal form nor size seems to have significantly influenced these results, and sector affiliation also does not appear to have shaped the views of survey respondents.

Recent tax reforms aim at strengthening the formation of equity, but many* Mittelstand *firms remain sceptical that they will.

4.3 What will change with the adoption of Basel II?

Until recently, it had been considered a foregone conclusion that the new Basel Capital Accord was a major reason for the observed weak credit supply and a future driving force behind a possible credit rationing for a large part of German *Mittelstand* firms. In particular, the recommendations put forward by the Basel Committee in the 2nd consultative document in January 2001 would have entailed significant disadvantages for most *Mittelstand* firms relative to large corporations.[16] This general conclusion is no longer valid, mainly due to the efforts made to avert negative consequences for smaller banking institutions and their clients, the *Mittelstand* firms.

16 Grunert *et al.* (2001) have shown that, based on the regulations defined in the Quantitative Impact Study II, the average cost of bank loans would have increased by about 1.1 percentage points while small *Mittelstand* firms would have even faced an increase of about 2.2 percentage points. Close to 40 percent of all firms would have been expected to experience falling interest rates, however. The KfW's simulations on the basis of an exemplary *Mittelstand* loan portfolio, ignoring any collateral, would have implied an increase of the average risk weight by 18 percent. See Sachverständigenrat (2002).

In October 2002, the Basel Committee on Banking Supervision (2002) published a technical guidance document. Reflecting the results of two quantitative impact studies, this document contains revised recommendations and gives special regard to SME financing under both the internal-ratings-based approach (IRBA) as well as the standardised approach (SA). These proposals are currently being reviewed on the basis of a third quantitative impact study (QIS 3).

Despite its practical ease and the recent adaptations, the SA can currently not meaningfully be used in Continental Europe where only the largest companies are rated. Owing to the substantial direct and indirect costs associated with an external rating, the vast majority of SMEs would, as unrated companies, remain in the unfavourable 100 percent risk bracket. As a consequence, the banks' primary focus would be on larger (rated) enterprises offering sizable discounts on regulatory capital while the unrated and, thus, far less profitable *Mittelstand* loans would be neglected or would become significantly more expensive. In the new technical document (October 2002), the Committee proposes a preferential treatment for small firms. According to this proposal, corporate exposures of up to EUR 1 million could be included in the retail portfolio and would carry a risk weight of 75 percent. For small firms, this would not only prevent a deterioration in the availability and the cost of loans, but it could – in fact – increase the attractiveness of loans to small borrowers in comparison to Basel I. However, the proposal fails to provide relief for medium-sized firms with capital needs exceeding this limit. For these firms, Basel II could adversely affect the supply of loans – at least until banks are in a position to apply the IRBA.

In designing Basel II, major demands of the German* Mittelstand *have been taken into account.

In contrast to external ratings, the internal assessment of corporate borrowers does not automatically put SMEs at a disadvantage because of high rating costs. However, capital-structure-related balance sheet ratios crucially determine internal ratings; judged on the basis of such ratios, SMEs – on average – perform rather poorly. To avoid negative consequences for the majority of SMEs, the Basel Committee has modified the IRBA in a number of ways. First, the corporate risk weight curve has been flattened significantly and loans of up to EUR 1 million extended to small businesses can – similar to the SA – be included in the retail class, which is characterised by an even flatter risk weight curve. Estimates of Deutsche Bundesbank (2002) suggest that almost 90 percent of all German *Mittelstand* firms qualify for such a treatment. Second, within the corporate risk weight formula, banks can further add a firm-size adjustment lowering the regulatory capital for borrowers with a turnover of less than EUR 50 million. Finally, at national discretion, the maturity adjustment under the advanced IRBA does not have to be applied for companies with a turnover of less than EUR 500 million.

With these modifications, major demands of the *Mittelstand* have been included in the revised draft document. There will be no charge for long-maturity loans, a fact especially important given the dominance of long-term debt for the *Mittelstand*. The possibility of including small businesses in the privileged retail portfolio promises a sustained credit supply to borrowers admitted to this segment. In addition, the flattening of the corporate risk weight curve implies more moderate increases in capital charges on exposures internally rated below average; this would benefit *Mittelstand* firms not included in the retail portfolio. The most important advantage of the IRBA for the *Mittelstand* is often overlooked: in contrast to the still narrow definition of admissible collateral under the SA,

the IRBA allows banks – at least under the advanced approach – to recognise any collateral in their loss-given-default estimation (see, for instance, Elschen 2002)[17]. Thus, personal assets or guarantees can, for the first time, serve as instruments to bring about lower risk weights. Nonetheless, the precise effects of the revised IRBA on *Mittelstand* financing are note fully predictable since the banks will control the process of determining the risk-weighted capital requirements through their internal rating assessments and their loss-given-default estimations.

Basel II apart, German banks increasingly recognise the need for adequate risk-pricing of* Mittelstand *loans.

Notwithstanding a now far more positive outlook, Basel II still may have some adverse effects on the German *Mittelstand*. First of all, the German banking sector is expected to improve its risk awareness and thus price for risks that were not fully accounted for in the past. Second, the adoption of Basel II will make banks' loan policies more pro-cyclical, given that banks are now forced to adapt their ratings continuously, which implies that in an economic downturn the banks' ability to grant new loans is reduced since more regulatory capital needs to be committed (Deutsche Bundesbank 2002).

We now turn to a brief discussion on how Basel II is perceived by the *Mittelstand* firms. In the context of the *esbf* survey, respondents were asked how well they considered themselves informed about Basel II and what implications they expected Basel II to have. Table 11 summarises the main results.

Table 11. The Mittelstand's perception of Basel II, by size class

	Turnover (in million of EUR)				
	< 1	1-10	10-20	20-40	40-100
Information on ...					
Content of Basel II °°°/$^{+}$	2.8	3.5	3.7	3.3	3.8
	(1.2)	*(1.2)*	*(0.9)*	*(0.9)*	*(1.1)*
Rating criteria of house-bank °°°/$^{+}$	2.3	3.0	3.2	2.6	3.5
	(1.2)	*(1.2)*	*(1.2)*	*(1.3)*	*(1.2)*
Structure of formal rating exercise °°/$^{++}$	1.8	2.3	2.5	2.8	2.6
	(1.0)	*(1.2)*	*(1.1)*	*(1.0)*	*(1.1)*
Impact on ...					
Credit availability	2.3	2.4	2.7	2.7	2.4
	(1.0)	*(1.0)*	*(1.1)*	*(0.9)*	*(0.9)*
Terms and conditions of loans	2.2	2.4	2.5	2.7	2.3
	(1.0)	*(1.0)*	*(1.0)*	*(0.9)*	*(0.9)*

Notes: The level of information has been rated on an ordinal scale from 1 (very deficient) to 5 (very good); the perceived impact has been rated from 1 (distinct disadvantages) to 5 (distinct advantages); absolute scores represent the median for each size class; standard deviations are given in brackets. For an explanation of the significance levels and statistical tests see Notes to Table 4. The table only includes the responses of indebted firms.

Source: *esbf* survey

17 Further verified with the *Bundesanstalt für Finanzdienstleistungsaufsicht*, Department for Banking Supervision.

Further to the results summarised in Table 11, it is worth noting that 24 percent of all respondents feel insufficiently informed about the content of Basel II. Almost 40 percent of respondents do not sufficiently know the internal credit assessment system of their banks, and close to 60 percent observed that they have insufficient knowledge of external ratings. Overall, the *esbf* survey points at substantial information deficiencies on the part of the *Mittelstand*. As to the impact of Basel II, the majority of firms expect negative consequences. Only about 10 percent (11 percent) envisage better credit availability (terms and conditions of loans). In particular, companies heavily depending on external finance expect adverse implications of Basel II.

Other studies support the conclusion that firms are often unable to evaluate the potential impact of Basel II on their operations. While dissemination of information has clearly improved over the past two years, both KfW (2001a) and Schoder and Nitschke (2002) document that a substantial fraction of *Mittelstand* firms still lacks the knowledge to determine the implication of this regulatory initiative. According to Hansmann and Ringle (2002), the same applies to the way house-banks determine internal credit ratings.

5. Mitigating financing problems of the *Mittelstand*

5.1 Measures at the disposal of companies

Mittelstand firms have to accept that capital providers are genuinely interested in obtaining a true and fair view of the company and must therefore relay sufficient and reliable information to enable creditors to assess the prospects of their investment. While the company's balance sheet represents the most objective reference to outsiders, corporate reporting must gain comprehensiveness to allow the reconstruction of pro forma statements.

The* Mittelstand *can contribute significantly to improving its access to external finance.

Low equity ratios signal higher counterparty exposures to creditors irrespective of the existence of hidden reserves. For company-outsiders the latter are, at least to some extent, always a matter of belief and accordingly discounted in valuation or rating exercises. The same holds for the value of personal assets held by the owners. It is for these reasons that the systematic concealment of information or the transformation of corporate assets into personal ones by withdrawing funds prove clearly sub-optimal strategies – at least if the company is seen as going concern. In particular, banks will honour higher solvency ratios with an improved credit rating whereas distributed equity (in terms of personal assets) will not be recognised as collateral under the SA or the IRBA. The *esbf* survey confirms the still existing reluctance to provide additional information to creditors. Some 24 percent of the respondents are not willing to use this option at all; close to 40 percent consider extending their disclosure in the future.

The empirical evidence presented in this and other studies indicates that Germany's *Mittelstand* is not exploiting its full potential to raise funds via alternative financing instruments. The same is true for the use of public support programmes given that almost 40 percent of the respondents do not even know whether the activities of their companies potentially qualify for such financing alternatives.

The internal improvements that the *Mittelstand* can still achieve are almost as important. Corporate planning, though generally considered an indispensable management task, is not performed by a substantial number of companies. One fourth of surveyed firms have no liquidity management, more than one third no strategic planning function, and almost half

no formalised capital budgeting process in place. Nearly 90 percent do not assign risk management tasks to specific employees, and 64 percent work without a controller. As expected, small companies perform significantly worse. These results are in line with results of other surveys (IfM 2000b, Hansmann and Ringle 2002). Prospective measures can also consist in establishing cooperative arrangements between *Mittelstand* firms, for instance in pooling loan requests or receivables for securitisation with a view to meeting the capital market's minimum size criteria.[18]

Lastly, larger *Mittelstand* firms can give positive signals to the investor community by means of an external credit rating. As a side benefit, management would be directly confronted with the company's weaknesses and opportunities. It can, however, not be expected that ratings will gain prominence among *Mittelstand* firms. Only 3 percent of the responding firms have an external rating and 70 percent (39 percent of the firms with an annual turnover above EUR 20 million) categorically reject this option. Table 12 summarises the survey findings.

Table 12. Percentage of firms using or considering measures to enhance rating status or credit availability

	Turnover (in million of EUR)				
	< 1	1-10	10-20	20-40	40-100
Measure used or considered					
Internal accounting °	69.8	80.9	92.9	90.0	84.2
	12.8	9.2	2.4	10.0	0.0
Cash management °°°	62.1	74.6	87.5	90.9	95.0
	26.4	21.5	12.5	9.1	5.0
Strategic planning °°°	53.7	62.3	69.2	95.5	85.0
	34.1	30.3	30.8	4.5	15.0
Capital budgeting °°°	35.4	51.2	65.8	86.4	95.0
	32.9	33.5	31.6	13.6	5.0
Controlling °°°	19.2	27.3	50.0	85.7	95.0
	9.0	20.6	40.0	9.5	5.0
External company rating °°°	0.0	2.4	5.3	9.5	5.0
	18.4	22.4	36.8	47.6	60.0
Risk management °°°	6.8	9.2	18.4	33.3	15.0
	12.2	22.1	55.3	42.9	70.0
Extensive reporting to banks	25.9	40.1	40.0	47.6	50.0
	42.4	38.3	45.0	33.3	20.0

Notes: The first (second) entry for each measure and size class represents the percentage of firms that use (plan to use) this measure. For all measures except "extensive reporting to banks", Chi-Square-Tests suggest statistically significant differences between the turnover groups with °°° at the 0.1 percent level, °° at the 1 percent level, and ° at the 5 percent level.

Source: *esbf* survey

18 Fifty *Mittelstand* firms in southern Germany have jointly formed the KMU Financial Service AG with the initial objective to bundle company loan requests and place them in larger lots at other banks. This is to be followed in the medium term by an application for a full-fledged banking license and the formation of a *Mittelstand*-Bank (see Bertram and Heilmann 2002).

5.2 Measures at the disposal of banks

The most pressing issue for *Mittelstand* firms is the impact of Basel II on the customer relationship with their house-banks. In particular, banks can help improve the information their clients have about banks' internal assessment criteria given that almost 40 percent of the respondents do not consider themselves well informed on this issue. Ideally, banks should explain their rating norms pro-actively to gain the understanding of their clients. A noteworthy initiative is the "rating coach" programme of Commerzbank AG: rating specialists and corporate client advisors thoroughly analyse the company to finally formulate recommendations to the company management and to support the implementation of the proposed measures.

***Loan factory and loan securitisation schemes have a potential to ease the supply of finance to the* Mittelstand.**

To enhance the availability of debt finance, banks should also carefully consider the so-called "loan factory" models designed to reduce the processing costs of their lending business. Such plans are currently analysed in the savings and loan sector and within KfW. Banks could also set up platforms to pool *Mittelstand* clients and thus enable them to make use of attractive financing forms (e.g. factoring programmes for the *Mittelstand* as already offered by Dresdner Factoring AG in Saxony and TEBA Kreditbank in North-Rhine-Westphalia).

An obvious measure for enhancing the banks' lending capacity to *Mittelstand* firms is to securitise the associated credit risk and to spin it off to institutional investors. In 2000, KfW has initiated such a programme – PROMISE – and has since completed nine transactions with a total volume of almost EUR 13 billion (KfW 2003). The general deal structure is represented in Figure A2 in the Annex and a detailed description of the programme is provided in Box 2. Suffice to note here that PROMISE is designed to eventually accommodate multi-seller transactions, i.e., KfW would bundle the default risk associated with reference portfolios from various (also smaller) banks and enter into credit risk hedges with other parties. So far, only single-seller transactions with major German banks have been completed (KfW 2003). Recently, KfW has started to combine PROMISE transactions with general loan commitments to be called up in tranches by the originators and to be subsequently channelled through to the bank's *Mittelstand* clients.

5.3 Regulatory adjustments

While *Mittelstand* firms themselves and the German banking industry must adopt measures that help alleviate the equity gap, any serious attempt to do so is preconditioned on adjustments of the regulatory framework in three major areas. First, implementing a tax system that favours internal cashflow financing is a crucial measure. A retention incentive has already been created for limited liability enterprises through the introduction of the *Halbeinkünfteverfahren.* Similar regulations have not yet been achieved for proprietorships and partnerships, as they are much more demanding to implement. Therefore, the gradual lowering of the personal income tax is most important for the latter. The case of France impressively documents how quickly such a tax reform can impact equity ratios and lower the dependence on bank debt: the weighted average equity ratio of limited liability enterprises was below the comparable German rate and had increased, following the tax reform in the late 1980s, to over 30 percent for all size brackets by 1995 (Deutsche Bundesbank 1999, Dietsch, this volume).

Box 2. Loan securitisation – PROMISE an example

Unlike some asset-backed-securities transactions, participating banks do not actually sell their *Mittelstand* credit portfolios (or part thereof), but merely pass on the default risk to KfW by using credit default swaps (CDSs) and pay a swap fee in return. In the case of default, KfW has to intervene and indemnify the originator. KfW hedges the risk by also entering into CDSs with other parties, for instance a special purpose vehicle (SPV). Subsequently, the SPV issues credit-linked notes (CLNs) promising interest and full repayment of the principle only in case no default of the underlying loan portfolio takes place. The CLNs themselves are subdivided in several tranches reflecting different investment grades ranging from BBB to AAA rating. Losses from default are first assigned to the BBB tranche and, once exhausted, are systematically moved to higher tranches. Default risk premiums are set accordingly. Funds received from the sale of CLNs are invested in high-grade fixed income securities (also called security pool) and subsequently liquidated for repayment or default claim coverage.

As an optional feature, the combined reference portfolio itself may be divided into several tranches. As depicted in Figure A2 in the Annex, the default risk for the middle tranche is moved into the SPV while senior and junior tranches are hedged with third parties via CDSs. Default would first affect the junior tranche, then move to the SPV and finally be covered with the senior tranche. In order to manage asymmetric information problems (specifically, moral hazard) associated with securitising default risk, originators typically retain residual exposure based on historical default rates. In this case, CDSs will only cover losses in excess of the originator's loss participation (first-loss principle).

PROMISE is to be seen as a government-sponsored initiative to encourage the emergence of a secondary market for *Mittelstand* loans and, thereby, the creation of a new asset class (KfW 2001b). Pooling different reference portfolios enables KfW to create a standardised platform as a catalyst for further market growth. Market participation requires banks to have a functioning internal rating system at their disposal; this explains why, so far, only large banks have engaged in such transactions. The programme should be particularly attractive for smaller banks that – due to size limitations, high transaction costs, and lack of expertise – were unable to participate in the securitisation market. It is hoped that PROMISE enhances credit availability for *Mittelstand* firms as banks get the opportunity to free up regulatory risk capital.

Second, given the lack of transparency of Germany's public support measures, a grouping of similar programmes appears advisable. On account of the large number of legally separate support institutions, "support tasks" should be assigned clearly to eliminate the duplicity of support measures. At the federal level, this ought to be attained through the recent formation of the *Mittelstandsbank* operating under the roof of KfW.

Finally, although only indirectly related to finance, plans of the federal government to reduce red tape, deregulate the labour market, and reduce labour costs hold considerable potential to strengthen firms' access to finance. The *esbf* survey indicates that the *Mittelstand* regards these plans as reform projects of utmost importance. Table 13 summarises the results. Creditreform (2002b), for instance, reports similar findings: *Mittelstand* firms assign the highest priority to the reduction of social security charges (89 percent) and to the reduction and simplification of the corporate tax system (81 percent) while only 49 percent of the responding firms view better access to external finance as an important reform project.

Although the* Mittelstand *welcomes better access to finance, it considers improvements in other areas more important.

Table 13. Importance of regulatory measures for improving Mittelstand financing

	Turnover (in million of EUR)				
	< 1	1-10	10-20	20-40	40-100
Reduction of taxes on earnings	3.5	3.7	4.1	4.0	4.3
	(1.5)	*(1.6)*	*(1.7)*	*(1.4)*	*(1.0)*
Reduction of other taxes	3.0	3.1	3.3	2.6	4.0
	(1.4)	*(1.2)*	*(1.1)*	*(1.4)*	*(1.7)*
Reduction of social security charges	5.1	5.2	5.2	5.5	6.0
	(1.7)	*(1.1)*	*(1.9)*	*(0.5)*	*(0.0)*
Deregulation of labour law	3.2	4.1	3.1	4.0	3.7
	(1.6)	*(1.5)*	*(1.2)*	*(1.4)*	*(1.0)*
Simplification of tax law and reduction of regulatory overhead	3.9	2.9	3.5	2.8	2.8
	(1.7)	*(1.7)*	*(1.6)*	*(1.6)*	*(1.5)*
Expansion of Mittelstand support programmes	2.8	1.7	1.8	1.6	2.3
	(1.9)	*(1.6)*	*(2.2)*	*(0.9)*	*(1.9)*

Notes: The importance of measures has been rated from 1 (unimportant) to 6 (very important); respondents were asked to assign each grade only once; absolute scores represent the (grouped) median for each size class; standard deviations are given in brackets.

Source: *esbf* survey

6. Conclusions

A well-balanced capital structure is the core of sustained competitiveness. Equity shortages coupled with a high dependence on bank debt are likely to become major impediments for the German *Mittelstand*. Today already, many companies have to compensate investors not only for the operating but also for the significant financial risk of their businesses. The SME-friendly modifications to Basel II cannot (and should not) belie this. Irrespective of regulatory standards, risk always requires adequate returns in the long run. Competition is therefore no longer limited to the output market but extends to the liability side of the balance sheet. In line with other studies, the findings of this paper suggest that large parts of the *Mittelstand* are not yet prepared for (or not even aware of) the challenges ahead. At the same time, only few measures apt to prevent or alleviate potential financing constraints have already been implemented. Due to their inappropriateness for the typical *Mittelstand* firm, other measures often fail. Considering the enormous competitive pressure and the unfavourable economic conditions facing the German *Mittelstand*, one may conclude that the *Mittelstand* is currently at risk. Enhancing the (financial) situation of the *Mittelstand* and managing the risks is therefore an objective that needs to be reached by joint effort. It presupposes the readiness to change of all involved parties, especially the support of the companies' owners.

Annex

Table A1. General sample properties of the *esbf* survey

Company characteristics	Sample properties
Sector affiliation (responding firms per sector)	
Manufacturing	93
Retail	44
Wholesale/international trade	42
Services	98
Construction	47
Other	17
Turnover (responding firms per turnover bracket)	
less than EUR 1 million	100
EUR 1-10 million	187
EUR 10-20 million	44
EUR 20-40 million	22
EUR 40-100 million	20
more than EUR 100 million	17
Employees *	
Average	54.4
Standard deviation	110.2
Age of the Enterprise *	
Average	45.5
Standard deviation	48.9
Number of equity holders (responding firms per bracket) *	
1	156
2-5	185
6-10	12
more than 10	8
Cross-border transactions in % of turnover *	
Average	10.6
Standard deviation	21.5

* Companies with a turnover equal to or less than EUR 100 million.

Table A2. Financing sources of German *Mittelstand* companies (in percent of balance sheet total)

	Turnover in EUR million.																				
	< 1			1 - 5			5 - 10			10 - 20			20 - 30			30 - 40			40 - 100		
1995																					
Equity	12.8	0.0	21.3	13.4	5.3	18.4	16.3	9.6	19.0	18.4	12.4	19.1	20.7	15.5	19.6	22.0	17.8	19.0	23.0	19.2	18.8
Bank Debt	55.2	58.3	27.4	40.8	39.5	25.2	36.4	34.5	24.0	34.2	31.9	23.0	32.8	31.1	22.6	30.6	29.2	21.3	28.2	25.6	21.1
Current Ratio	102.4	69.0		108.5	92.4		110.7	96.0		108.4	96.0		108.8	95.1		103.9	94.7		105.5	94.0	
1998																					
Equity	12.4	0.0	21.3	13.7	5.2	18.9	17.1	10.3	19.5	19.4	13.3	19.9	21.3	16.1	19.9	23.4	18.7	19.6	23.9	20.1	19.1
Bank Debt	56.3	60.0	27.5	42.3	41.2	25.6	37.6	35.6	24.3	36.5	34.9	23.6	33.8	32.5	22.7	31.4	29.1	22.3	30.1	27.4	21.2
Current Ratio	109.1	67.4		114.8	93.4		113.9	96.9		115.0	96.9		111.6	95.7		105.7	93.7		105.4	93.1	
2000																					
Equity	13.2	0.0	22.2	13.8	5.3	18.9	17.1	10.2	19.4	19.4	13.7	19.7	21.2	16.0	19.9	23.2	18.7	19.6	24.0	20.4	19.3
Bank Debt	56.5	60.1	27.6	42.7	41.7	25.7	37.7	35.4	24.2	35.9	34.5	23.5	33.8	31.9	22.7	33.3	31.7	22.4	29.8	27.8	21.4
Current Ratio	111.3	66.7		114.0	92.7		113.7	96.4		113.6	96.0		109.4	93.5		108.4	93.6		103.2	92.0	
2001																					
Equity	13.5	0.0	22.2	14.7	6.3	19.3	17.8	11.6	19.3	20.5	15.7	19.5	23.0	18.4	19.8	24.3	20.7	19.5	24.8	21.5	18.7
Bank Debt	57.9	62.2	27.8	44.0	43.4	25.8	38.4	37.4	24.0	35.9	34.5	23.0	32.8	30.6	21.9	31.2	29.8	21.6	29.9	28.5	21.0
Current Ratio	125.0	63.9		117.6	91.9		111.5	96.0		112.2	95.1		111.0	95.0		105.1	92.9		100.7	91.1	

Notes: Figures for equity and bank loans represent in the order given mean, median, and standard deviation. Information on current ratio represents the mean and median, respectively.
Source: DSGV

Table A3. Capital structure of eastern and western German companies by size (1998, in percent of balance sheet total)

	Turnover in EUR million (eastern / western)											
	< 2.5		2.5 - 5.0		5.0 - 12.5		12.5 - 50.0		> 50.0		Average	
All Companies												
Equity	9.6	4.9	13.7	10.1	16.0	13.1	24.9	18.2	36.6	26.4	31.0	24.7
Debt	84.9	87.1	79.2	81.0	77.1	76.7	65.2	68.8	43.4	43.1	53.0	47.6
- thereof short-term bank loans	14.1	17.5	13.2	16.5	15.4	17.0	12.5	13.9	4.8	4.4	7.8	6.1
- thereof long-term bank loans	26.5	22.0	23.8	17.5	22.2	14.6	18.7	11.2	10.6	3.9	14.0	5.3
Processing Industry												
Equity	12.8	10.3	15.8	11.3	23.3	14.8	31.0	20.8	36.5	29.0	33.0	27.6
Debt	81.1	78.6	76.4	78.1	68.3	72.4	58.0	63.9	53.8	40.1	57.3	43.7
- thereof short-term bank loans	11.2	15.8	10.5	14.9	11.1	14.1	9.4	11.2	5.8	3.5	7.3	4.7
- thereof long-term bank loans	28.1	22.6	26.4	19.1	21.5	16.0	17.3	11.1	6.7	3.2	11.4	4.5
Construction												
Equity	6.3	-1.3	6.9	2.6	8.3	7.5	13.8	8.3	*	14.8	10.9	12.6
Debt	88.1	94.3	86.2	89.1	84.6	82.3	74.1	78.5	*	69.1	79.4	72.5
- thereof short-term bank loans	11.4	15.3	8.6	13.8	5.5	9.3	10.9	7.5	*	2.9	9.4	4.6
- thereof long-term bank loans	24.9	17.9	15.9	14.2	12.2	11.3	10.3	5.6	*	2.7	12.8	4.4
Wholesale												
Equity	11.1	10.3	15.8	13.1	14.7	14.5	17.5	16.6	32.3	20.2	20.2	18.8
Debt	84.8	83.9	78.6	80.3	79.3	77.9	76.7	74.9	62.1	67.5	74.0	70.2
- thereof short-term bank loans	14.8	17.0	12.3	16.3	14.2	17.6	17.7	16.7	9.7	12.3	14.0	13.7
- thereof long-term bank loans	21.0	14.3	19.7	13.8	21.5	12.2	18.7	10.2	5.4	4.3	16.1	6.4
Retail												
Equity	1.5	-7.1	7.0	6.0	8.6	8.6	20.1	9.7	*	19.6	12.8	15.9
Debt	94.2	102.9	88.6	88.9	86.6	85.5	74.4	83.3	*	60.9	82.2	68.7
- thereof short-term bank loans	17.9	22.6	25.8	24.0	32.2	30.4	24.5	31.1	*	12.6	27.1	17.9
- thereof long-term bank loans	29.8	29.7	24.6	19.7	20.3	14.2	16.7	11.5	*	5.9	20.0	8.5

Notes: * for construction and retail in eastern Germany, the category “12.5-50” covers all companies with at least EUR 12.5m of annual turnover.

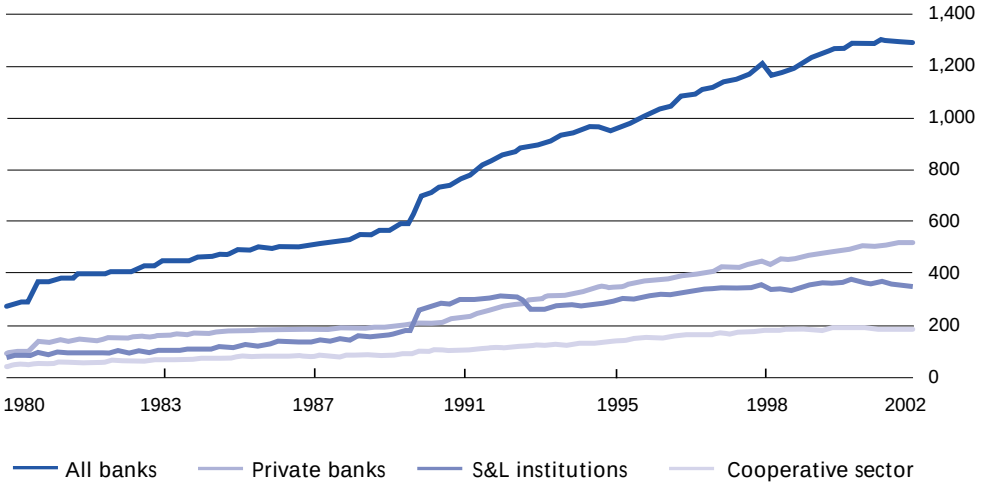
Source: Own compilation on the basis of Deutsche Bundesbank (2001b).

Table A4. Selected indicators of the EU banking sector

	Number of banks		Number of bank branches		Population per branch	Interest surplus (% of balance sheet)	Cost-income-ratio in %	EBT (% of balance sheet)
	Jan 1999	Dec 2001	1998	2001	2001	1999	1999	1999
Austria	898	836	5,498	5,391[1]	1,500[1]	1.19	66	0.40
Belgium	123	112	5,676	5,727[1]	1,785[1]	1.22	61	0.57
Finland	348	369	1,964	-	-	-	-	-
France	1,226	1,050	26,611	25,657[2]	2,375[2]	0.89	70	0.54
Germany	3,238	2,526	66,764	56,627	1,450	1.02	64	0.34
Greece	59	61	2,401	2,447[1]	4,305[1]	2.28	49	2.61
Ireland	78	88	-	-	-	-	-	-
Italy	934	843	26,252	27,170[2]	2,125[2]	1.94	72	1.08
Luxembourg	212	194	289	310[1]	1,395[1]	0.52	50	0.51
Portugal	227	212	5,056	5,491[2]	1,820[2]	1.36	52	0.65
Spain	402	366	39,039	39,040	1,008	1.88	54	0.92
The Netherlands	634	561	6,854	6,830[1]	2,315[1]	1.37	92	0.91
Euro-Zone	8,320	7,218	186,404[3]	176,654	1,750	1.18	65	0.56
Denmark	212	203	2,185	2,099	2,550	1.39	64	0.70
United Kingdom	521	452	15,873	15,470[1]	3,845[1]	1.11	62	0.53
Sweden	148	149	2,197	2,024	4,390	1.34	58	0.99
EU	9,260	8,022	206,659	193,630	1,960	-	-	-

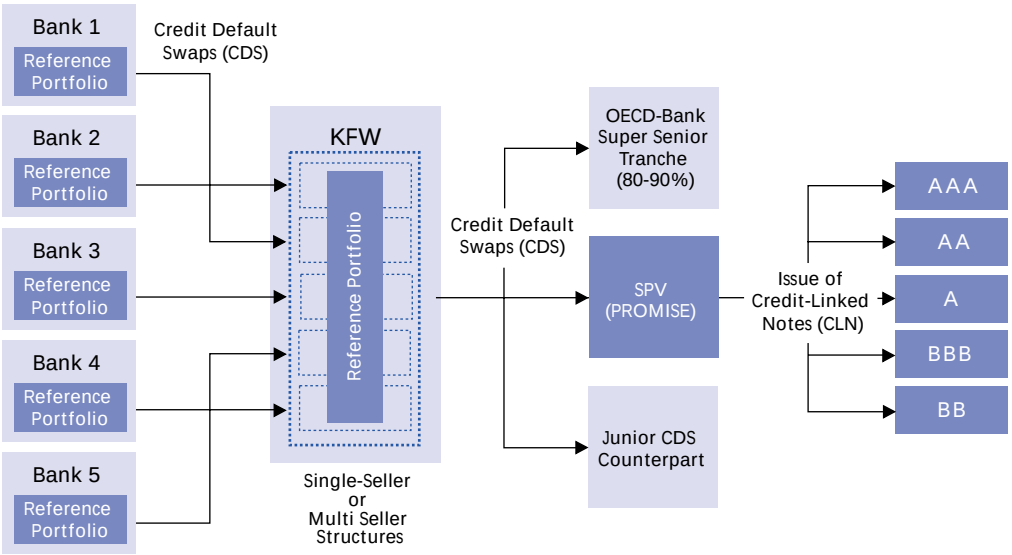
Notes: [1] 1999 [2] 2000 [3] including Greece, excluding Ireland
Source: Bundesverband deutscher Banken (2002b)

Figure A1. Aggregate credit volume to companies and self-employed (in EUR billion)



Source: Deutsche Bundesbank

Figure A2. PROMISE Programme – securitisation of *Mittelstand* loans



Source: Kreditanstalt für Wiederaufbau (2003)

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ABSTRACT

This paper explores empirically the effect of consolidation *in the French banking industry and of Basel II on the availability of credit for small and medium-sized enterprises (SMEs). Consolidation has been associated with an increase in the number of banks the average firm borrows from and this has improved credit availability. Furthermore, the paper shows, for France, that the current Basel II proposal would result in lower capital charges on SME loans due to portfolio diversification effects and low default correlations of SMEs. It also argues that the current Basel II proposal is conservative: capital charges could be even lower if they were based on our estimates of SME loan portfolio risk. Overall, in France, credit rationing of SMEs does not seem to be a serious problem and Basel II is unlikely to hold back SME lending.*

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Financing small businesses in France

Michel Dietsch

1. Introduction

Small and medium-sized enterprises (SMEs) are of considerable importance for the French economy. To illustrate, in 1999, they accounted for around half of the turnover and the value added generated by the 2 million French non-financial firms (Ministère de l'Economie et des Finances 2002). In the same year, they carried out 41 percent of total investment and, with more than 10 million employees, accounted for about two-thirds of total employment in France.

Notwithstanding their weight in the economy, SMEs regularly complain about severe financial constraints. In a recent report, the *Conseil National du Crédit et du Titre* (CNCT 1999) recognised that the capital structure of French firms was favourable in the sense that firms were sufficiently capitalised, but observed that some firms actually encountered difficulties in obtaining additional finance to grow. In fact, the recession of the early 1990s compelled non-financial firms to devote considerable efforts to reduce their indebtedness and to strengthen their capital structure. The report emphasised that this change in leverage characterised both large firms and most SMEs. However, according to the CNCT report, financing difficulties remained for small businesses due to difficulties in accessing external funds or obstacles that make managers reluctant to borrow. The CNCT found that these problems did not affect large SMEs and well-established firms, but mainly new firms, very small firms, more traditional SMEs, and firms whose activities were considered "risky".

Until the end of 1996, the move towards greater consolidation of the French banking system, which started in the early 1990s, mainly involved mergers between banks that were affiliated to a banking group. Acquisitions between groups were rare and merely involved takeovers of single banks. All in all, even though the number of credit institutions fell sharply, the number of competing banking groups remained unchanged, and the groups retained their respective market shares. After 1996, all this changed with the first mergers between major banking groups. Crédit Agricole's takeover of Indosuez in 1996 marked the first significant change in the competitive balance of the French banking system. The system then went through a period of sweeping changes with the mergers of Crédit du Nord and Société Générale and Crédit Industriel et Commercial (CIC) and Crédit Mutuel in 1997, followed by the merger of Paribas and BNP in 1999. This consolidation phenomenon is not restricted to France; it is part of a worldwide trend (BIS 2001b).

The main goal of this paper is to explore empirically the influence of the consolidation in the French banking industry on the business loan market in general and on the credit availability for SMEs in particular. Bank credit still remains the major source of external financing for SMEs. Indeed, one of the major functions of banks is to fund complex, illiquid positions, which implies long-term lending to borrowers that constitute "difficult" credits. In carrying out this function, banks have to solve problems resulting from asymmetric information between borrowers and lenders. These information asymmetries

Information asymmetries explain why especially SMEs may encounter problems to access external finance.

are especially pertinent to small and medium-sized businesses, mainly due to two salient characteristics of SMEs: first, a comparatively high preference for secrecy and independence of the firm's owner-managers and, second, a relatively high dependence of the firm's performance on the value of human capital. These characteristics could explain why SMEs may encounter problems to access external finance. The consequence of asymmetric information is not that lending to SMEs is necessarily a risky business, but that the risk of these firms is more difficult to assess.

Relationship banking and multiple bank-firm relationships can help mitigate information problems between lenders and borrowers. By establishing relationships with firms, banks learn about the firms' prospects and alternative uses of firms' assets. Thus, building a bank-firm relationship is an effective way to partly solve the risk assessment problem. In addition, having a relationship with more than one bank (multiple banking) is a way to restore competition between lenders. Indeed, relationship banking with a single creditor may lead to a captivity problem and, thus, relationship banking in combination with multiple banking may mitigate credit constraints. To investigate whether bank consolidation has affected the availability of credit for French SMEs, we will analyse - in the context of a changing banking sector - the relevance of relationship banking and multiple banking for firms of different sizes.

The performance of small businesses potentially exhibits a higher sensitivity to macroeconomic conditions as they are less diversified in comparison to larger companies. As a consequence, there may be more uncertainty about the performance of small businesses in periods when it is difficult to forecast the future macroeconomic climate. To shed light on this issue, we will focus on the credit risk of SME lending and we will test, in particular, whether and how the availability of credit for SMEs depends on banks' risk assessment.

Banks' risk assessment is changing, not least because of the envisaged changes to the Basel capital adequacy requirements. The current Basel Accord (Basel I) stipulates that international banks must back the total amount of their loans to corporate clients with a capital charge of 8 percent of own funds. Such a rule does not take into account that some corporate clients are riskier than others. As a result, the amount of own funds that Basel I requires for a loan to a corporate client may not correspond to its actual risk. The "economic" capital requirement, i.e. the minimum amount of capital needed to cover losses on a certain type of asset, may be substantially lower for good corporate credits than for bad ones. The proposed new capital adequacy legislation (Basel II) partly corrects for the mispricing of corporate loans inherent in Basel I by allowing international banks to set capital requirements as a function of a firm's credit rating. Moreover, Basel II allows for portfolio diversification effects: the foreseen minimum capital requirement is higher on a portfolio with assets that exhibit higher default correlations. Overall, there is the question whether Basel II will hinder or facilitate lending to small businesses. In light of this question, we will examine the possible implications for SME lending of the implementation of the latest Basel capital adequacy proposal.

A salient feature of the analysis presented in this paper is that it matches firm data with bank data. The firm database allows for SMEs' main characteristics, such as risk or

information opacity, that determine the demand and supply of loans; the bank database allows to account for the characteristics of banks, such as size or membership of a banking group, that may affect the loan supply to small and medium-sized enterprises. In presenting our findings, we proceed as follows. Section 2 describes the French businesses' capital structure and the level of credit risk by firm size. In this context, we will also examine the effect of size on the companies' ability to build a bank-firm relationship and to have more than one relationship. Section 3 analyses the impact of consolidation in the French banking industry on the availability of credit for SMEs. We will see that bank consolidation led to important changes in the market structure for business loans and that there are two main channels through which consolidation has affected credit availability: the bank-firm relationship channel and the risk diversification channel. Section 4 explores the possible implications of a new Basel Accord for SME lending and Section 5 concludes. The Annex presents an econometric model that relates the loan amount received by a firm to characteristics of its relationships with banks while controlling for the size and risk of the firm.

There are two main channels through which bank consolidation affects credit availability: bank-firm relationships and risk diversification.

2. Capital structure and credit risk of French SMEs

In this section, we will show that the capital structure of French SMEs is quite strong, characterise the nature of bank-firm relationships in France, and argue that - broadly speaking - a diversified portfolio of credits to these businesses is not riskier than a portfolio of credits to large firms. The empirical analysis uses both bank and firm data, coming from two very comprehensive databases (see Box 1): first, a bank database that contains information on all bank loans above EUR 76,000 to individual businesses supplied by all French banks during 1993-2000 and, second, a firm database, covering the same period, that contains balance sheets and income statements for practically all French SMEs (except some very small firms) as well as large firms.

Box 1. Data sources and size class definition

This paper uses two main databases. One is a firm database provided by the Coface group, a large French credit insurance company, which is also a large provider of financial information on businesses. It contains (i) balance sheets and income statements of individual firms for the period 1993-2000 and (ii) firms' credit ratings – based on the internal rating system of Coface – for the period 1995-2001. The database covers more than 450,000 French SMEs, but excludes those very small firms with an annual turnover lower than EUR 150,000. The second database is the central loan register "Centrale des risques" of the Banque de France. This bank database compiles information on all business loans (commercial and industrial loans) above EUR 76,224 over the period 1993-2000. It contains around 700,000 loans per year.

Following the definition of the European Commission, SMEs are defined for the purpose of this paper as firms with a total turnover of up to EUR 40 million. However, very small firms with an annual turnover lower than EUR 150,000 are not considered. We generally distinguish among four size classes: (i) "very small" firms (annual turnover is less than EUR 2 million but more than EUR 150,000), (ii) "small" firms (turnover between EUR 2 million and EUR 7.5 million), (iii) "medium-sized" firms (turnover between EUR 7.5 million and EUR 40 million), (iv) and "large" firms (turnover exceeding EUR 40 million). All tables and figures except for Table 1 and Figure 1 show data for these size classes; Table 1 and Figure 1 exhibit more than four size classes.

2.1 Capital structure

The capital structure of French SMEs is strong.

Since the mid-1980s, the ratio of equity to total liabilities of non-financial French firms has increased from around 15 percent to more than 30 percent at the end of the 1990s (CNCT 1999). The underlying strengthening of capital structure applies to SMEs as well as large businesses. Table 1 illustrates the situation for manufacturing firms on the basis of the median firm in each size class: in 2000, the median of the equity ratio hardly varied across size classes; French manufacturing SMEs thus appear to have a sound capital structure and, on average, are not undercapitalised.

However, Figure 1, which presents quartiles and the median of the ratio of equity to total liabilities for each size class, reveals that leverage varies considerably within each size class. Firms in the highest quartile are financed to 50 percent or more with equity whereas firms in the first quartile of the sample finance less than 20 percent of their assets with equity. So, a typical SME does not exist. The leverage of firms differs widely, but firm size does not seem to be a determinant of capital structure.

From Table 1 one can also observe that trade credit plays a major role in business finance, as it is the second largest source of finance after equity. Again, there is no strong evidence that SMEs' use of trade credit differs much from that of large businesses, but there is some indication that SMEs with an annual turnover between EUR 2.5 and EUR 10 million rely more on trade credit than all other firms[1].

The use of financial debt by French manufacturing firms is relatively low in comparison to their peers in other countries of the European Union. Table 1 shows that the median of the share of financial debt in total liabilities varies between 13 and 15 percent across size classes. Wagenvoort (this volume) finds that SMEs in other European countries on average hold almost twice as much financial debt.

Table 1 also indicates that more than 80 percent of financial debt of SMEs is bank debt whereas in the case of large firms (turnover between EUR 50 and EUR 100 million) and

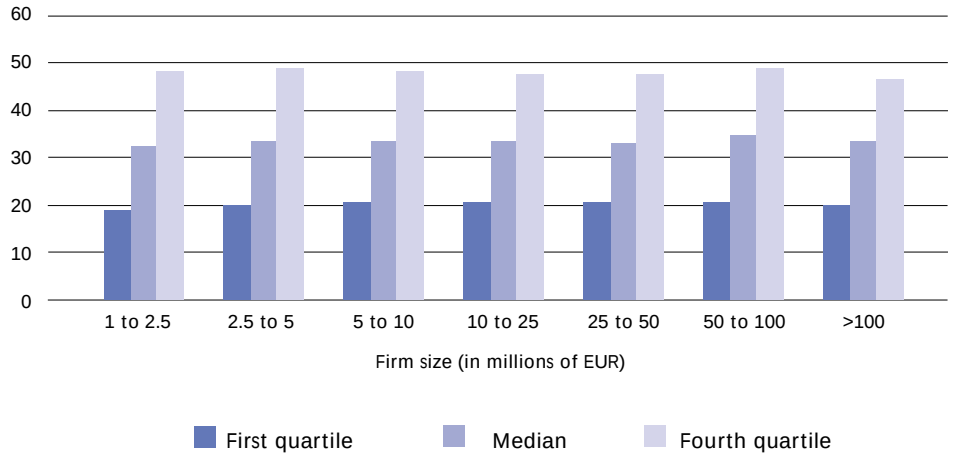
Table 1. Indicators of capital structure in manufacturing, by firm size, in 2000 (in %)

Firm size (turnover in EUR million)	Equity/ liabilities	Trade credit/liabilities	Financial debt/liabilities	Bank debt/ financial debt
1 - 2.5	32	25	13	81
2.5 - 5	33	28	14	85
5 - 10	33	28	14	85
10 - 25	33	26	15	83
25 - 50	33	25	15	81
50 - 100	35	25	14	74
> 100	33	25	13	59

Notes: For each indicator, the table shows the value for the median firm in each size class.
Source: Coface SCRL

1 Dietsch and Kremp (1998) and Delannay and Dietsch (1999) argue that French SMEs rely on trade credit mainly for financial reasons, while large businesses use trade credit for strategic reasons as a means to extract rents from their suppliers in the vertical production-retailing chain.

Figure 1. Distribution of firms' equity ratio, by firm size, in 2000 (in %)



Source: Own calculation based on Coface SCRL

very large firms (turnover larger than EUR 100 million) bank debt represents only 74 and 59 percent of financial debt, respectively. Bank loans are less important for the latter companies as many of them may tap capital markets.

French SMEs carry relatively little bank loans on their balance sheets.

To summarise our main findings on the capital structure of French SMEs, we find that, on average, they are not undercapitalised and their use of financial debt, notably bank loans, is low in comparison to small businesses in other EU countries. This leads to the important question of whether the French banking environment nourishes or rather hampers bank lending to SMEs. In Section 3, we will look more deeply into this issue. To provide background to this analysis, we proceed here with a description of bank-firm relationships in France and credit risk in French companies.

2.2 Bank-firm relationships and multiple banking

Following recent theory of financial intermediation, an information-opaque company can increase credit availability over time by building a long-term relationship with a bank. Indeed, through such a relationship, the bank acquires information about the risk and quality of the borrower, making the bank more willing over time to lend to such a business. However, this positive effect of relationship banking on credit availability diminishes if the bank extracts a monopoly rent from the customer. Due to the private nature of the information acquired by the bank, the firm may become captive to its bank. As a consequence, firms may need to borrow from several banks to prevent each bank from gaining market power. Thus, when problems of asymmetric information are relevant, the optimal strategy for firms may be to establish long-term relationships with more than one bank.

Following this logic one could expect that both the number of bank-firm relationships and the length of bank-firm relationships decrease with firm size because smaller firms are more likely to suffer from information problems than larger firms. However, the following results show that, for France, this is not at all the case.

Table 2. Number of bank-firm relationships, by firm size, 1993-2000

	Size class (turnover in EUR million)			
	Very small (≤ 2)	Small (2< # ≤ 7.5)	Medium-sized (7.5 < # ≤ 40)	Large (# > 40)
1993	1	1	2	3
1994	1	1	2	3
1995	1	1	2	3
1996	1	1	2	3
1997	1	2	2	3
1998	1	2	3	4
1999	1	2	3	4
2000	1	2	3	4

Notes: For each size class, the table shows the median number of bank-firm relationships. To be precise, the number of relationships reflects the number of relationships with banking groups rather than banks.
Source: Own calculations based on Banque de France data.

Firstly, as Table 2 shows, the occurrence of multiple banking increases with firm size. In 2000, the median very small firm in France obtained credit from only one creditor whereas large firms had, on average, loans outstanding at four credit institutions. Table 2 clearly shows that the number of banks increases monotonically with company size. One can also observe that the number of banks increased over the period for all size classes except for very small firms.

Smaller firms have fewer and shorter bank relationships than larger firms.

Secondly, Table 3 reveals that the length of the bank-firm relationship also increases significantly with firm size. Unfortunately, we do not have data on the actual duration of bank-firm relationships. Duration is measured here as the number of successive years during which the company received loans from the same banking group over the period under review, i.e. 1993-2000. Therefore, by construction, maximum duration is eight years. Evidently, in practice, many firms will stay with their creditor(s) for more than eight years. However, our measure still provides a valid comparison between firms in different size classes with respect to their willingness and/or capacity to stay with the same creditor. We find that, during this period, very small firms on average did not stay longer than about 3 years with the same bank whereas large firms on average kept relationships for about 5 years. We recall from Table 2, however, that large firms maintain more than one relationship at the same time. It may thus well be that large firms kept a relationship for the whole period with one or several of their main creditors, the so-called house banks, while changing their less important creditors relatively frequently. Thus, an average

Table 3. Average duration (in years) of bank-firm relationship in 1993-2000, by firm size

Size class (turnover in EUR million)	First quartile	Median	Fourth quartile
Very small (≤ 2)	2	3	4
Small (2< # ≤ 7.5)	2	4	5
Medium-sized (7.5 < # ≤ 40)	3	5	7
Large (# > 40)	3	5	8

Notes: By construction, maximum duration is 8 years.
Source: Own calculations based on Banque de France data.

duration of five years does not imply that large firms suspended the relationship with all their banks at least once during the eight-year period 1993-2000. The far right column of Table 3 shows that a quarter of large firms did not end any of their relationships that existed in 1993 since the duration for this group of firms is eight years.

The results shown in Table 3 are somewhat in contradiction with the traditional belief that relationship banking creates more value for small, information-opaque firms than for large, more transparent ones. However, one caveat is worth mentioning. In Table 3 we do not control for differences in age. If the share of firms that existed for less than eight years is substantially higher among SMEs than among large firms, the observed shorter duration of relationships in the case of small firms may simply be because they had less time to build relationships. But it is unlikely that differences in the age structure across size classes can fully explain differences in the duration of bank-firm relationships because the data set includes a substantial number of SMEs that were more than eight years old. Bearing this in mind it is striking to observe that even for the upper quartile, duration increases with size. But why would smaller French firms keep shorter and fewer bank relationships?

One can approach this question both from the demand side and the supply side of credit. Starting with the demand side, we note that establishing a relationship with a bank imposes fixed costs on firms and, thus, adding a new creditor to the list of a firm's financial intermediaries will trigger additional fixed costs. For small firms it is more costly to establish multiple bank relationships than for large firms because small firms have to spread the fixed costs of lending over a smaller loan amount. Therefore, smaller firms may be less willing to borrow from several banks at the same time, implying that the results shown in Table 2 are demand driven. As mentioned above, the disadvantage of having only one bank is that the bank may turn into a monopolist over time. Although it is expensive for smaller firms to provoke competitive behaviour of banks by maintaining multiple relationships, smaller firms may still break monopolies by switching bank in the course of time. This could explain the relatively short duration of bank-firm relationships in the case of smaller firms. So, the results summarised in Table 3 could be demand driven as well. This reasoning implies, however, that the value of relationship banking is smaller than the value of fierce competition between lenders. In other words, the positive effect of building a bank-firm relationship that results from a reduction of information asymmetry is more than offset by growing market power of the bank.

Smaller firms may switch banks more often to reduce the monopoly power of banks.

With regard to supply-side explanations, the lower number and shorter duration of bank-firm relationships in the case of small firms could be explained by credit rationing: creditors are more likely to turn down small firms than large ones. We will return to this possibility in Section 3 when analysing whether differences in the capacity or willingness to diversify creditors and to increase the length of banking relationships affects the availability of credit.

2.3 Is lending to French SMEs risky business?

The credit risk on a portfolio of loans depends broadly speaking on two variables: (i) the probability of default (PD) of the individual loans and (ii) the correlations between individual default probabilities. Higher correlations imply that it is more likely that loans default at the same time. A loan portfolio with high default correlations is thus riskier than one with low default correlations. Diversifying a portfolio means adding loans with low or even negative default correlations. For instance, loans to firms operating in different

industry sectors will normally exhibit lower default correlations than loans to firms within the same sector. The dependence of default probabilities on macroeconomic conditions will also determine the extent to which credit risk can be diversified. For example, suppose that all firms are profitable when the economy is good and suffer losses when the economy is bad. But suppose further that the performance of small firms is more sensitive to the business cycle than the performance of large firms in the sense that small firms make higher profits (losses) in a boom (during a recession) than large firms. In these circumstances, a portfolio of loans to small businesses will be riskier than a portfolio of loans to large companies. Indeed, the default correlations in the latter portfolio will be lower since large firms react less strongly to changes in macroeconomic conditions. In these circumstances, the idiosyncratic risk, i.e. the risk that can be diversified, will be more important relative to the systematic (macroeconomic) risk for large firms than for small firms.

In answering the question whether lending to French SMEs is risky business – that is, compared to lending to large firms – we need to account for both the probability of default of the individual loans and the correlations between individual default probabilities. In what follows, we use a simple one-factor model of portfolio credit risk (see Box 2). "One-factor" means that PDs and correlations of individual PDs depend on only one variable - the general state of the economy in our model. We have estimated stationary PDs, i.e. the weighted average of annual PDs over the period 1995-2001, and default correlations using the internal rating system and database of Coface (see Box 1).

Considered in isolation, a small firm is riskier than a large one.

Our results, summarised in Table 4, strongly indicate that the average PDs decrease with firm size: as the last row shows, the average PDs decrease monotonically from 2.6 percent for very small firms to 0.3 percent for large enterprises. So, on average, a stand-alone credit to a French SME is far riskier than a credit to a large enterprise. Table 4 distinguishes eight rating classes, ranging from class 1 (= low risk) to class 8 (= high risk). By way of illustration, note that large firms in rating classes 5 and 6 are expected to default once in a hundred years as their PDs are approximately equal to 1 percent.

Table 5 indicates how firms' credit standing has evolved over time. For the average firm in each size class, the Coface credit rating decreased sharply and, thus, credit risk fell over the

Table 4. Average default probabilities of French firms (in %), 1995-2001

	Size class (turnover in EUR million)				
Risk classes	Very small (# ≤ 1)	Small (1< # ≤ 7.5)	Medium-sized (7.5 <# ≤ 40)	Large (# > 40)	SMEs (≤ 40)
1 (low risk)	0.3	0.2	0.2	0.03	0.2
2	0.4	0.3	0.2	0.1	0.3
3	0.9	0.7	0.5	0.1	0.7
4	1.6	1.4	0.8	0.4	1.3
5	2.8	2.6	1.5	1.1	2.4
6	4.9	4.5	2.4	1.1	4.2
7	10.0	9.4	5.5	2.3	8.6
8 (high risk)	14.9	16.2	13.3	*	13.8
Total	**2.6**	**1.7**	**0.8**	**0.3**	**2.2**

Notes: Default is defined as legal bankruptcy; * = no default in this class.
Source: Coface SCRL and own computations.

period 1994-2000. Favourable economic conditions during the second half of the 1990s strengthened the quality of the loan portfolios of French credit institutions regardless of bank consolidation. As a result, in 2001, almost 40 percent of SMEs were in the second-lowest risk class of the Coface credit rating, which corresponds to an average probability of default of 0.32 percent (Figure 2). More generally, Figure 2 shows that some 60 percent of SMEs are in low-risk classes, with an average PD below 0.72 percent.

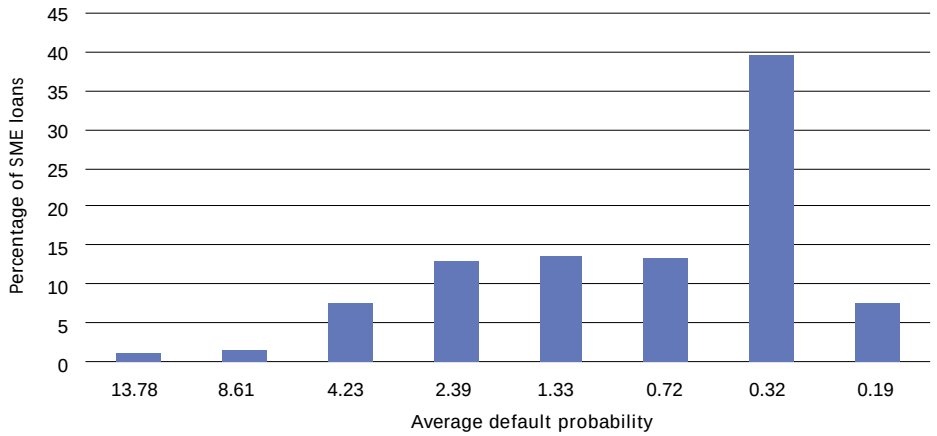
We now turn to the correlation between default probabilities and thus assess the scope for diversification. Table 6 presents default correlations between firms of the same size for a given risk class. Three main results stand out. Firstly, default correlations of loans to French firms are very small. The average value is 0.013 and 0.022 for SMEs and large firms, respectively. The maximum value, which is indeed a striking outlier, is observed for medium-sized firms in rating class 8, i.e. borrowers close to default. Secondly, on average,

Table 5. Average credit rating of business loan portfolios, by size class, in 1994-2000

	Size class (turnover in EUR million)			
	Very small (# ≤ 1)	Small (1 < # ≤ 7.5)	Medium-sized (7.5 < # ≤ 40)	Large (# > 40)
1994	4.2	3.7	3.3	2.8
1995	4.1	3.6	3.2	2.7
1996	4.1	3.6	3.3	2.7
1997	4.1	3.7	3.3	2.7
1998	4.1	3.7	3.3	2.7
1999	3.8	3.4	3.1	2.5
2000	3.7	3.4	3.1	2.4

Notes: Risk classes range from 1 (=low risk) to 8 (=high risk).
Source: Coface and own computations.

Figure 2. Distribution of SME loans over risk classes (in %) in 2001



Notes: The risk class to the extreme left corresponds to Coface rating class 8 (=high risk); the average PD of loans in this risk class is 13.78 percent. The risk class to the extreme right corresponds to Coface rating class 1 (=low risk); the average PD of loans in this risk class is 0.19 percent.
Source: Coface SCRL and own computations.

Box 2. Computation of default correlations

Methodology

We compute default correlations within a one-factor ordered probit model (see Gordy 2000, and Dietsch and Petey 2002). The same methodology also serves to calibrate the proposed Basel II risk weights formulas (see section 4).

In this model, by definition, borrower i will default if the latent (unobserved) random variable U_i is smaller than $\Phi^{-1}(\bar{p}_{rs})$, where $\Phi(.)$ is the cumulative distribution function of the standard normal distribution and $\bar{p}_{rs}$ is the stationary (average) probability of default corresponding to a firm with a rating $r\,(r = 1,..,R)$ in size class $s\,(s = 1,..,S)$. In this paper we consider four different size categories $(S = 4)$ and eight rating categories $(R = 8)$. The latent random variable U_i is assumed to be normally distributed and is defined as a function of a single systematic factor x and a specific idiosyncratic factor ε_i :

(1) $$U_i = w_{rs}x + \sqrt{1 - w_{rs}^2}\,\varepsilon_i$$

where x and ε_i are independent standard normal random variables and w_{rs} is an unknown parameter. The systematic factor x represents the state of the economy. The parameter w measures the sensitivity of borrower i's performance to the business cycle and is bound to the interval [-1,1]. We note that this sensitivity may differ depending on the rating and size of the borrower. Higher values for w signal that the performance of firms in the same rating and size class will exhibit more similarity since firms within that group are more sensitive to the state of the economy. Putting it differently, as w_{rs} decreases, the performance of borrowers with rating r and of size s tend to be less correlated as the idiosyncratic risk component ε_i becomes more important.

In extension, the degree of correlation between defaults of borrowers is determined by the parameter w. More precisely, for two borrowers i and j belonging to the same size class and with the same rating grade, the correlation between their latent variables is equal to:

(2) $$Corr[U_i; U_j] = \frac{E[U_i U_j] - E[U_i]E[U_j]}{\sqrt{var(U_i)}\,\sqrt{var(U_j)}} = w_{rs}^2 \quad .$$

Therefore, the correlation between individual defaults is fully explained by the sensitivity of borrowers to aggregate shocks in the economy.

How to compute the parameter w? Using (1) we derive that a borrower defaults if :

(3) $$\varepsilon_i < \frac{\Phi^{-1}(\bar{p}_{rs}) - w_{rs}x}{\sqrt{1 - w_{rs}^2}} \quad .$$

From (3) one can observe that any variation in x, the systematic factor, induces a variation in the PD of borrower i if w is not equal to zero. Under the assumption that the idiosyncratic component ε_i is standard normally distributed, the PD of borrowers with rating rating r and of size s, conditional on the realisation of the systematic factor x, is equal to:

(4) $$p(x)_{rs} = \Pr\left[\varepsilon_i < \frac{\Phi^{-1}(\bar{p}_{rs}) - w_{rs}x}{\sqrt{1 - w_{rs}^2}}\right] = \Phi\left[\frac{\Phi^{-1}(\bar{p}_{rs}) - w_{rs}x}{\sqrt{1 - w_{rs}^2}}\right] \quad .$$

Dietsch and Petey (2002) show that if the realisations of the systematic factor are independent, the variance of the conditional PD $p(x)_{rs}$ is equal to:

(5) $$Var\,[\,p(x)_{rs}\,] = bivnor\left(\Phi^{-1}(\bar{p}_{rs}),\Phi^{-1}(\bar{p}_{rs}),w_{rs}^{2}\right) - \bar{p}_{rs}^{2}$$

where $bivnor$ is the probability density function of a bi-variate normal distribution. Once the left-hand-side of equation (5) is approximated with the help of the non-parametric method proposed by Gordy (2000), we can derive w as a solution to equation (5).

So, to calculate default correlations, i.e. correlations between the latent variables, we compute, first, annual PDs by applying a one-year horizon rating transition matrix to 32 different types of borrowers: (3 SME size classes + 1 large-firm class) x (8 risk classes). Second, for each size-risk class we compute stationary PDs by averaging these annual PDs over time; we thus obtain 32 different values for $\bar{p}_{rs}$. Third, we estimate the variance of the conditional PD, $Var[\,p(x)_{rs}]$, for each borrower class using Gordy's approximation method. Fourth, 32 values of w are computed by using equation (5). Finally, correlations are computed with equation (2).

Discussion

First, the Coface database to which we apply our credit risk model covers a rather short time period since it includes only one part of the business cycle. Economic conditions in France were relatively favourable during the time period 1995-2001. As a consequence, stationary PDs and default correlations as reported in Dietsch and Petey (2002) and in this paper are lower than one would expect to observe over a longer period. Second, a simple but elegant one-factor model has its drawbacks. Our methodology implies that default correlations only vary across a relatively small number of rating and size classes. Within each size-rating class, default correlations are the same for each borrower. This is a rather strong result as one may expect that other factors, such as industry affiliation, play an important role. Indeed, one cannot expect a rating system to be a perfect screening device for distinguishing firms with different default correlations.

default correlations decrease significantly with size for SMEs but, at the same time, correlations are higher for large firms. This result shows that the performance of medium-sized firms is less sensitive to the systematic risk factor than the performance of very small and small firms and that the SME group as a whole is less sensitive to macroeconomic conditions than the group of large firms. In other words, credit risk can be better diversified for SMEs than for large firms.[2] Thirdly, for a given size class of firms, default correlations do not necessarily show a negative or positive relationship when moving from a low-risk to a high-risk class. For example, the default correlation increases with risk of default in the sub-sample of very small firms whereas the relation between default correlation and risk of default is "U-shaped" for the other two classes of SMEs.

2 To assess the likelihood of relatively high default correlations in the case of large firms, confidence intervals around average correlations were built by drawing random portfolios for each size-risk class. The size of the portfolios is chosen in accordance with the respective size of the borrowers. After all, the size of the portfolio may determine the default correlations. Simulated SME portfolios comprise 5,000 borrowers whereas simulated large-firm portfolios only 2,000. Portfolio size is kept constant over the period by replacing firms in default by new firms. Results show that the standard deviation increases with size. Volatility is especially high in the case of large firms. This means that it is more difficult to estimate default correlations for large firms than for SMEs. However, we still find that correlations are higher for large firms than for SMEs. For details, see Dietsch and Petey (2003).

Table 6. Default correlations between French firms, 1995-2001

	Size class (turnover in EUR million)				
Risk class	Very small (# ≤ 1)	Small (1< # ≤ 7.5)	Medium-sized (7.5 < # ≤ 40)	Large (# > 40)	SMEs (≤ 40)
1 (low risk)	0.008	0.030	0.028	0.015	0.022
2	0.001	0.020	0.016	0.000	0.023
3	0.016	0.006	0.007	0.044	0.023
4	0.013	0.010	0.006	0.028	0.027
5	0.015	0.010	0.004	0.028	0.015
6	0.018	0.015	0.008	0.000	0.020
7	0.027	0.021	0.021	0.000	0.030
8 (high risk)	0.027	0.028	0.107	0.000	0.031
Total	**0.015**	**0.010**	**0.005**	**0.022**	**0.013**

Source: Coface SCRL and own computations

We should emphasise the limits of our measurement of default correlations (see also Box 2). Default correlations could be underestimated for two main reasons. First, the time period under consideration might be too short to cover an entire business cycle, and this could induce a bias in the measurement of PDs, the volatility of PDs, and default correlations. Second, the estimated correlations were computed on a very large sample, i.e. almost all business loans in France are included. In general, the size of the SME portfolios of French credit institutions is lower, and the size of the portfolio may determine the effective values of correlations in the loan book.

From a credit risk portfolio viewpoint, loans to smaller firms are not necessarily riskier than loans to larger firms.

To summarise, our results confirm the widespread belief that an SME is more likely to default than a large company. But, contrary to conventional wisdom, we also find that SMEs are relatively insensitive to macroeconomic conditions and that it is less likely to find high default correlations for a portfolio of SME loans than for a portfolio of loans to large enterprises. All in all, while individual SMEs are riskier than large firms, a portfolio of SME loans is not necessarily riskier than a portfolio of loans to large firms since idiosyncratic risks can be diversified.

3. Consolidation in the French banking sector and credit supply

This sections starts with a description of the main changes in the French business loan market that accompanied bank consolidation in the 1990s. Subsequently, we will assess whether bank consolidation has had an impact on the availability of credit for SMEs by focusing on the two mechanisms that we described in detail in the previous section, i.e. the effect of bank-firm relationships and portfolio credit risk considerations on the supply of SME loans.

3.1 Bank consolidation and business loan market

Due to mergers and acquisitions in the second half of the 1990s, the number of key players in the French banking industry had fallen to seven by 2000, namely Banques Populaires-Natexis, BNP-Paribas, Caisses d'Epargne, Crédit Agricole-Indosuez, Crédit Lyonnais, Crédit Mutuel-CIC, and Société Générale. These groups adopted different strategies during the

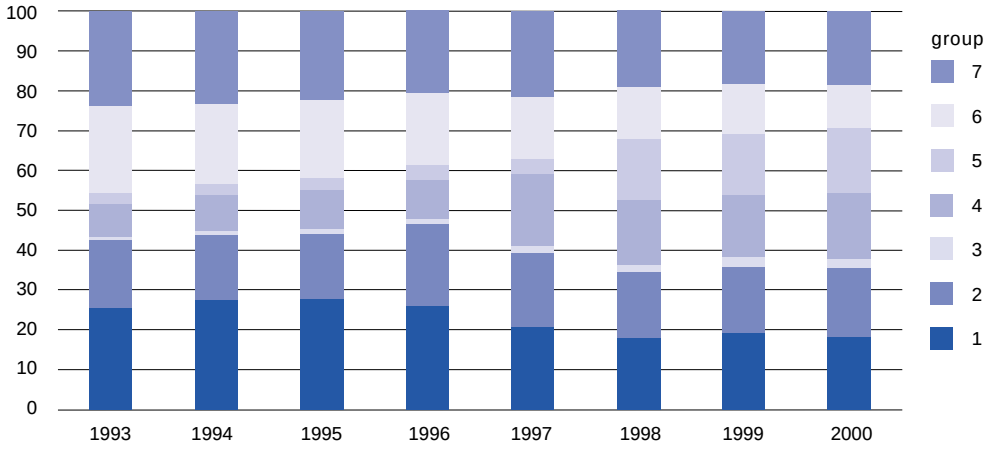
Bank consolidation has stimulated competition in the business loan market.

1990s, some of them favouring the supply of new financial services to large corporate firms, while others focused on the retail market, including small business loans (Dietsch and Golitin 2002). A major consequence of these divergent strategies was a reallocation of banks' market shares in the business loan market. Indeed, as Figure 3 shows, the number of dominant players increased from four at the beginning of the 1990s to six at the end of this period. Interestingly, in 2000, the six most important banking groups share the business loan market almost equally.[3] In other words, banking consolidation did not increase concentration in the business loan market and actually lowered the top-four-bank asset concentration level.

Bank consolidation often raises concerns that large banks might favour larger firms at the expense of smaller firms, thus reducing the participation of banks in the SME loan market segment. In the case of France, these concerns have proved to be unfounded and, in fact, we find the opposite result: as Figure 4 shows, the share of SMEs in the business loan market has increased significantly during the 1990s. This applies especially to very small and small businesses; the former almost doubled their share in total business loans (from 3.0 percent to 5.4 percent) and the latter achieved an increase of close to 40 percent (from 9.6 percent to 13.2 percent). During the same period, the share of loans to large firms fell by 8 percentage points, starting from a share of almost two-thirds in 1993.

In addition to the data shown in Figure 4, we observe that, in 1999, SMEs obtained about 40 percent of total company loans, which is equivalent to their share in overall investment in the French economy (see Section 1). This suggests that SMEs got their fair share of the bank loan market. One should bear in mind, however, that SMEs usually have only few options when raising external finance. Their share in the total amount of debt finance, including market debt finance such as bonds, could still be low compared to the debt

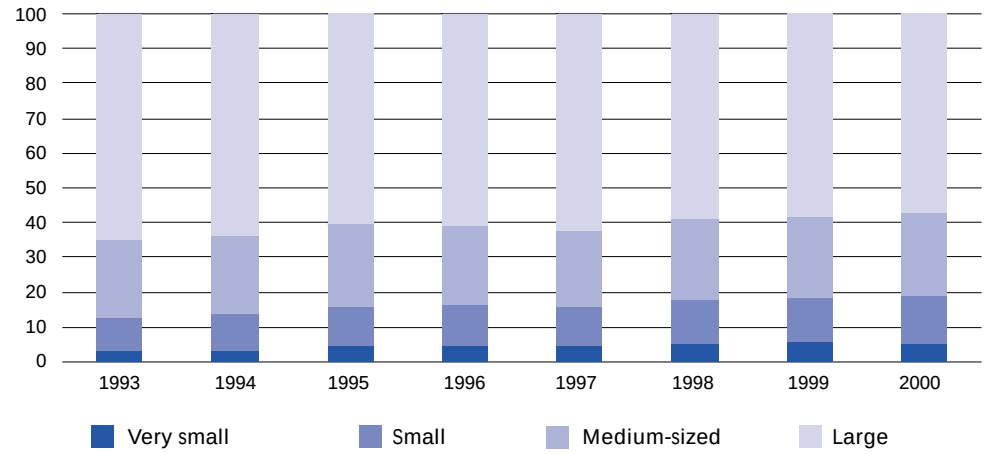
Figure 3. Banking groups' market share in the oustanding business loan market (in %)



Notes: Groups 2 to 5 represent mutual banks and groups 1, 6 and 7 corporate banks.
Source: Banque de France and own calculations.

3 We note that this analysis is restricted to firms belonging to three sectors of the French economy: manufacturing, retail, and transport. Loans from the seven banking groups to these sectors represent almost 90 percent of the total volume of the business loans in our sample.

Figure 4. Outstanding loans to enterprises, by size class, in % of total



Notes: For definition of size classes see Table 2.
Source: Banque de France and own calculations.

finance made available to large firms. Finally, one cannot conclude from Figure 4 that individual small businesses have indeed obtained more loans from their banks since, as shown below, the composition of the SME population has also changed over that period.

3.2 Bank consolidation, bank-firm relationships, and SME credit availability

A priori, the impact of the number and duration of bank-firm relationships on credit supply is unclear.

In Section 2 we found that smaller firms in France have shorter and fewer bank-firm relationships than larger firms. In this section, we will investigate whether the duration and the number of bank-firm relationships have an impact on credit availability. Before turning to the empirics, we should ask what theory predicts. It is fair to say that there is no real consensus on the relationship between the duration and number of bank-firm relationships, on the one hand, and credit availability on the other hand. As argued above, market power can offset the positive effect of acquiring more and better information about borrowers as a result of longer relationships. Regarding multiple banking there are also two possible forces at work. For one thing, multiple banking may increase the probability of a firm being credit rationed because the value of the existing bank-firm relationship may drop when relationships with additional lenders are being built (information opacity hypothesis[4]). For another, multiple banking may decrease the probability of credit rationing because of risk sharing among lenders (diversification hypothesis[5]). Thus, empirical analysis is required to determine which factors dominate.

To start with the effect of multiple banking on credit availability, we recall from Table 2 that the number of relationships firms have with banks has increased, possibly due to the changes in the structure of the banking industry. Table 7 suggests that the increase in multiple banking did not harm the overall level of bank lending: for the average firm, the total amount of loans by all banking groups slightly increased (see the extreme-right

4 Thakor (1996), Berger and Udell (1998), Berger *et al.* (2001), De Bodt *et al.* (2002).
5 Detriagache *et al.* (2000).

Table 7. Average loan amount supplied to French firms, 1993-2000

	Size class (turnover in EUR million)									
	Very small (# ≤ 2)		Small (2 < # ≤ 7.5)		Medium-sized (7.5 < # ≤ 40)		Large (# > 40)		All firms	
	Average loan amount (in EUR million)									
	Per bank	Total	Per bank	Total	Per bank	Total	Per bank	Total	Per bank	Total
1993	0.3	0.4	0.4	0.6	0.8	1.7	5.3	16.8	1.3	3.5
1994	0.3	0.4	0.4	0.6	0.7	1.6	5.1	16.3	1.2	3.3
1995	0.3	0.4	0.3	0.6	0.7	1.7	4.8	14.9	1.1	2.9
1996	0.3	0.3	0.3	0.6	0.7	1.7	4.7	15.6	1.1	2.9
1997	0.2	0.3	0.3	0.5	0.7	1.8	5.1	20.0	1.0	3.2
1998	0.2	0.3	0.3	0.6	0.7	2.1	5.0	21.4	0.9	3.3
1999	0.2	0.3	0.3	0.7	0.8	2.3	5.5	24.2	1.0	3.4
2000	0.2	0.3	0.4	0.7	0.9	2.5	5.8	25.7	1.0	3.7

Source: Banque de France and own computations

column of Table 7). With the exception of very small firms, French businesses simultaneously increased the number of intermediaries they borrow from (Table 2) as well as their volume of credit (Table 7). The average very small firm, which did not extend its bank base, did not receive more credit. The relative change in the number of creditors was the most important for small firms (annual turnover between EUR 2 and 7.5 million) given that for these firms the median number of banks doubled from 1 to 2 (whereas medium-sized firms went from 2 to 3 bank relationships and large firms from 3 to 4). However, over the period 1993-2000, the average total amount of loans obtained by small firms increased only moderately. By contrast, medium-sized firms and large-scale enterprises experienced, on average, a substantial increase (about 50 percent) in annual bank lending. Overall, from Table 7 it remains unclear whether multiple banking actually enhances credit availability.

A further comment is worth making. Table 7 reveals that, on average, very small firms did not obtain more credit in 1993 than in 2000 whereas medium-sized and large firms did. At first sight, this seems to contradict Figure 4, which shows that very small firms have almost doubled their market share in the business loan market whereas the share of large firms fell considerably. We therefore deduce from Figure 4 and Table 7 that the number of very small firms that successfully applied for a bank loan must have increased during the 1990s. Thus, despite a constant average loan amount, the number of very small firms receiving a loan in 2000 must have been substantially larger than in 1993.

Our empirical evidence suggests that multiple banking increases credit availability.

To investigate the relationship between credit availability and multiple banking more formally, we performed a regression analysis (see Annex). With a regression model we can control for simultaneous effects of different factors (such as the firm's credit rating, its size, and the duration of the bank-firm relationship) when testing the effect of multiple banking on the loan amount. Estimation results associated with our econometric model, which explains the ratio of the annual loan amount from one lender to the firm's turnover, show that the number of bank-firm relationships has a positive and significant effect. This

positive relationship between the volume of credit and multiple banking holds true regardless of firm size. However, the magnitude of the impact of multiple banking monotonically decreases with firm size (i.e., the regression coefficients are higher for smaller firms than for larger firms) irrespective of the change in the number of bank-firm relationships (from 1 to 2, from 1 to 3 etc.). In other words, smaller firms can enhance credit availability to a larger extent than larger firms when increasing the number of lenders!

Our findings also suggest that a longer bank relationship increases credit availability more for small firms than for large firms.

Turning to the impact of the duration of a bank-firm relationship on credit availability, we see from Table 8 that across all size classes, credit availability for the average firm improves with the length of the relationship between the firm and its main lender. As the results of our econometric model (summarised in Table A1 of the Annex) indicate, this positive relationship remains even when controlling for other factors, such as the number of relationships. The econometric results further show that the impact of the duration of bank-firm relationship on credit availability is much larger for smaller firms than for larger ones: smaller firms benefit most from maintaining a longer relationship.

Table 8. Duration of main bank-firm relationship and average loan amount (in EUR million) in 2000

	Size (turnover in EUR million)			
Length of relationship (in years)	Very small (# ≤ 2)	Small (2 < # ≤ 7.5)	Medium-sized (7.5 < # ≤ 40)	Large (# > 40)
1	0.2	0.2	0.6	4.3
2	0.2	0.3	0.7	3.6
3	0.3	0.3	0.8	4.4
4	0.2	0.4	0.8	5.5
5	0.3	0.4	0.8	5.6
6	0.3	0.4	0.9	8.2
7	0.3	0.4	0.9	5.7
8	0.3	0.5	1.2	7.2

Source : Banque de France and own computations

To summarise, an increase in multiple banking accompanied the consolidation of the French banking industry. Our econometric estimates suggest a positive link between credit availability and multiple bank-firm relationships and they also show that the smaller the firm, the stronger the link. Except for the very small firms, SMEs have increased the number of their relationships with banks by more, in relative terms, than large firms. In view of these two observations (both the impact of multiple banking and the change in the number of banks is larger in the case of SMEs), one could have expected the total loan amount per firm to increase faster in small and medium-sized firms than in large firms. This, however, was not the case for the average small firm that experienced only a moderate improvement in its overall credit volume. When investigating the impact of credit risk below, we will argue that this is likely to be the outcome of small firms' choice rather than credit rationing. Our regression analysis also shows a strong positive link between the duration of a bank-firm relationship and the amount of credit supplied. Also here smaller firms are more sensitive than larger ones to the duration of their bank

relationships. Smaller firms tend to keep shorter banking relationships and this has a disproportionate effect on their credit availability. We conclude that both relationship banking and multiple banking can create value.

3.3 Bank consolidation, credit risk, and SME credit availability

The second mechanism through which consolidation could have affected the availability of credit to SMEs is portfolio risk diversification. French banking consolidation went together with a significant decrease in credit risk, which was the consequence of good economic conditions during the period under review. In addition, due to diversification effects, bank mergers further reduced the overall risk on business loan portfolios. Indeed, the increasing preference for multiple banking tends to produce a better risk sharing between competing banking groups. As the data for "all firms" in Table 7 indicate, the average loan amount per bank dropped from EUR 1.3 to 1 million between 1993 and 2000, suggesting that each banking group reduced its average exposure to a single borrower.

Bank consolidation has led to better risk sharing among lenders.

A more formal Value at Risk (VaR) analysis shows that acquiring banking groups could reduce their risk profile through acquisitions. Therefore, consolidation produced significant benefits to the overall French banking sector with regard to risk diversification. The VaR on a loan portfolio is equal to the maximum potential loss that can occur with a given probability for a given time horizon[6]. In this paper, we measure the diversification benefit that consolidation generates as the difference between the VaR of the business loan portfolio of the acquiring bank before and after the acquisition. The VaR number is expressed here as a percentage of the total value of credit. In other words, diversification gains are measured as the variation in the required "economic capital" (see Section 1) as a percentage of total credit outstanding. Table 9 shows that out of nine acquiring banking groups, eight banks experienced lower economic capital requirements on their (increased) business loan portfolio after the bank merger took place. The reduction ranged from 3 to 21 percent of the original VaR figure. However, in one case, the bank merger led to an increase in the VaR of the acquiring bank. In this case, the VaR of the acquired portfolio was higher than the VaR on the existing portfolio and diversification effects were not strong enough to compensate the higher risk on the new assets. The remainder of this section aims at analysing the consequences of risk diversification on the credit availability for SMEs.

More specifically, the question is whether risk diversification gains realised by banks benefited SME financing. Distinguishing different size and (Coface) rating classes, Table 10 presents the median amount of loans (in proportion to turnover) that the average firm in each size-rating class obtained from its banks in the year 2000[7]. Due to the higher dependence of SMEs on bank debt, the ratio of loans to turnover, in general, decreases with size.[8] For example, the average very small firm of the highest quality (i.e. with a credit rating of 1) received loans equal to 84 percent of its turnover whereas the average large firm of the highest quality obtained an amount of loans equal to only 15 percent of

6 We note that only firm-specific (idiosyncratic) risks can be diversified. Therefore, the Value at Risk of a loan portfolio asymptotically approaches the general (systematic) risk.

7 We obtained similar results for other years.

8 The exceptions are: going from medium-sized to large enterprises with a credit rating of 2, 5 and 7.

Table 9. Diversification effect observed at the acquiring bank after acquisition

Acquiring banking group	VaR (in % of business loan portfolio)		Gain in VaR (in %)
	Before	After	Relative Difference
A	1.7	1.5	-8
B	1.8	1.6	-13
C	2.0	1.8	-9
D	2.2	2.1	-3
E	2.2	2.1	-7
F	2.3	2.6	13
G	2.5	2.4	-4
H	2.5	2.0	-21
I	2.7	2.3	-16

Notes: VaR is computed as the difference between the mean value and the value of the 99 percentile of the probability density function of loan losses.
Source: Banque de France, Coface rating system, and own computations.

Table 10. Ratio of annual loan volume to turnover, by size class and rating class, in 2000

	Size (turnover in EUR million)			
Risk class	Very small (# ≤ 2)	Small (2 < # ≤ 7.5)	Medium-sized (7.5 < # ≤ 40)	Large (# > 40)
1 (low risk)	84	20	15	5
2	25	15	14	15
3	27	17	16	15
4	29	18	16	14
5	27	18	16	18
6	34	20	18	16
7	28	19	13	78
8 (high risk)	24	19	12	*

Notes: Table reports median values; * no observation.
Source: Banque de France and own computations.

its turnover. Results show that the supply of loans seems to be more sensitive to the level of risk (as measured by the credit rating) in the case of very small SMEs than in the case of small and medium-sized firms. Indeed, very small, high quality firms get significantly higher amounts of loans than very small firms of lesser credit quality, whereas for other SME size classes the amount of loans clearly varies less with the credit rating.

We have introduced two variables in our econometric model of credit availability (see the Annex) to measure the impact of default risk and risk diversification on the availability of loans. The Coface rating class of the borrower measures default risk, and the degree of attainable risk diversification is measured by the size of the business loan portfolio of the lending bank (see Annex for an explanation of the explanatory factors).

The estimation results, reported in Table A1 in the Annex, show that the firm's default risk level significantly affects SME credit availability. In general, a lower default risk creates better opportunities for SMEs to raise funds from banks. In line with Table 10, the effect

is the strongest for the very small firms with the lowest credit risk since the regression coefficient for this group is by far the largest. For all rating classes, the positive effect of moving to a higher grade (lower risk) is more important for very small firms than for other larger SMEs. Although some small and medium-sized firms also profit from better credit availability when their credit status is upgraded, especially when they leave risk classes 7 and 8 for a better rating, we find for the small firms with a rating of 2 or 3 (low credit risk) that the effect can be significantly negative. Moreover, for these two rating classes the effect is not significantly different from zero for the medium-sized and large enterprises. In fact, for large firms, we find a positively significant effect only for firms with a rating of 1 or 6. This suggests that higher quality firms, except the very small ones, tend to have other financing opportunities in addition to bank loans. These firms do not necessarily want to borrow more from banks as their credit rating improves. In this case, credit availability is not influenced by the firm's risk level. We conclude that a better grade (lower risk) improves credit availability of very small firms regardless of their previous credit rating; it improves credit availability for small, medium-sized and large firms with high initial credit risk; but is largely irrelevant for small, medium-sized and large firms with a more moderate risk profile (i.e. a Coface rating equal to 5 or lower).

For the large majority of French SMEs, credit availability is not influenced by their credit risk rating.

As to the effect of our proxy for scope of diversification, i.e. the portfolio size of the lending bank, our econometric results show that the effect is significantly positive only for the group of very small firms. This means that credit availability increases when the bank has the opportunity to diversify credit risk on very small exposures by holding a larger portfolio. However, the sign of this portfolio size variable is significantly negative for the other firm size classes. Our interpretation of this finding is that either diversification gains associated with banking consolidation were too weak to really affect the banks' lending policy, especially with respect to SMEs, or that the time elapsed after French bank consolidation is still too short for banks to have extracted these gains.

To conclude, consolidation of the French banking sector has led to better access to the credit market, especially for SMEs. The number of very small firms that successfully applied for a credit has risen substantially, but the average loan amount supplied remained largely constant. Moreover, very small firms did not step into multiple banking. By contrast, small firms widened their lender base and, on average, obtained slightly more credit. However, as a group, small firms considerably increased their share in the French banking sector's business portfolio, indicating that, as in the case of very small firms, some small firms that obtained a loan had been denied credit previously. Small firms that become better credit risk after having been considered intermediate credit risks do not necessarily increase their use of bank debt. This may indicate that for small and medium-sized enterprises with a good credit risk status, i.e. the large majority of firms (see Section 2), credit constraints are not binding. Medium-sized firms raised substantially more funds from banks, even at firm level, in 2000 than in 1993. Large firms in France suffer hardly from credit restrictions as their credit rating, the number and duration of their relationships with banks, and time dummies have very limited impact on the amount of approved bank loans (see Table A1 in the Annex).

4. A new Basel Accord

The final topic of this paper is the current proposal for a new capital adequacy accord (Basel II) and its possible implications for the availability of credit for SMEs. As noted in the introduction, the Basel Committee on Banking Supervision considers a new bank capital

adequacy framework. Contrary to current practice, where risk weights are determined only by the type of borrower irrespective of his specific credit risk profile, the new legislation allows computing risk weights as a function of individual credit risk, implying that riskier lending needs to be backed-up with more capital.

To calibrate the risk weight formulas of the Basel II proposal, the Committee uses a one-factor credit risk model, similar to the one presented in Box 2. The main purpose of this model is to determine risk weights as a function of individual risk characteristics of every borrower, in particular, its probability of default (PD) and the default correlations with borrowers in the same risk class. As shown in Section 2, PDs are higher for SMEs, but default correlations are lower in SME loan portfolios than in portfolios of loans to large firms. Many commentators of the first draft of the Basel II proposal (BIS 2001a) pointed out a calibration problem with the SME credit risk formulae. They argued that the risk-weight curve was too steep and too high for SMEs, resulting in excessive capital charges on SME loans.

Due to diversification benefits it is justified to treat exposures on very small firms as retail lending.

The second draft of the Basel II proposal (BIS 2002) took this criticism into account, considering two key modifications. One envisages different risk-weight formulae for SMEs and large businesses. Specifically, capital charges for loans to very small firms may be computed on the basis of the retail risk-weight function, which assumes lower default correlations and, therefore, implies lower risk weights and capital charges. The second modification concerns the use of risk-weight formulae that assume a negative relation between PDs and default correlations, i.e. default correlations are posited to be low for high PDs, and vice versa. The result is a risk-weight curve that is generally lower for SMEs than for large firms, producing lower capital charges on SME exposures. Default correlations are thus a key element of Basel II. Overall, compared to the first draft of the Basel II proposal, both modifications would reduce capital requirements for SMEs.

What can be said about the wisdom of these possible modifications? The first one seems to make eminent sense. Even if very small firms are riskier on an individual basis than larger firms, the positive effect of diversification when loans to these firms are integrated into a sizeable loan portfolio justifies treating them as retail lending.

We are far more sceptical about the second modification, however. From an economic viewpoint, a negative relation between PDs and default correlations means that, irrespective of the business cycle, less risky borrowers are more exposed to systematic risk (or to the cycle) than the riskier ones; it also means that for riskier borrowers, the idiosyncratic risk prevails. In Section 2, we did not find a negative relation between PDs and default correlations for our sample of French SMEs[9]. But we found for SMEs that default correlations decrease with firm size. So, larger SMEs should probably receive a more favourable treatment than smaller ones because the former are less sensitive to systematic risk than the latter and, in addition, larger SMEs have lower PDs than smaller ones. Overall, from a capital adequacy viewpoint, the second modification would treat larger French SMEs unfairly compared to smaller SMEs. Having said this, the second modification works better in terms of accounting for differences between SMEs and large firms; this is because PDs are higher and default correlations are lower for SMEs than they are for large firms. But our overall conclusion is that a one-size-fits-all solution is not appropriate, mainly because it penalises medium-sized enterprises relative to small firms.

9 Dietsch and Petey (2003) find no evidence for a negative relation in a large sample of German SMEs.

But apart from an insufficient distinction between SMEs of different sizes, there are some broader implications for the capital requirements envisaged for lending to the SME sector. We have shown that estimated default correlations in the SME population are very low (0.013 on average). In light of this, the second draft proposal of Basel II does perhaps not go far enough in reducing the capital charge on SME loan portfolios. To substantiate this view, we have computed the capital charges on a very large portfolio, including loans of more than 250,000 French SMEs, under different capital adequacy regimes. In calculating capital charges, we adopted two broad approaches - or capital adequacy regimes - both following the internal-ratings-based (IRB) approach envisaged as one possible option under Basel II.[10] The first approach is the current Basel II proposal, which distinguishes loans falling into the retail category from loans not qualifying for this category (see Box 3). The second approach is based on the portfolio model that uses risk-weight formulae (see Box 3) based on PDs and default correlations derived in Section 2; we considered two variants of the portfolio model: one is based on a normal distribution (the probit model) while the other rests on a gamma distribution.

Basel II is likely to provide capital relief on SME loans outstanding at French credit institutions.

Table 11 shows the results of our calculations and also presents the required capital adequacy ratio under current legislation, i.e. the 1988 Basel Accord. The following points are worth highlighting. First, there are large differences between the currently required capital ratio and the two ratios based on the current Basel II proposal. For loans to medium-sized French firms in the non-retail category, the capital charge would fall from 8 to 5 percent if the current Basel II proposal is implemented. The capital relief is even stronger (falling to less than 4 percent) for credits to firms that qualify as retail loan. Therefore, Basel II has the potential to considerably boost the credit availability for SMEs in France! However, we note that European banks in general keep their own funds well above the required minimum set by the regulator.

Second, there are substantial differences between the capital charges under the current Basel II proposal and the capital charges calculated with our portfolio credit risk model, which suggests that the underlying SME portfolio risk would not require a capital adequacy ratio in excess of 2 percent. In light of this, the current Basel II proposal continues to be overly conservative.

Obviously, these striking results are explained by the large differences between the effective values of the default correlations in the SME sample (0.013) and the values

Table 11. Capital charges (in % of loan volume) on a French SME loan portfolio under different capital adequacy approaches

1988 Basel Accord	Basel II			
	Current proposal		Portfolio model of Box 2	
	"Non-retail"	"Retail"	Normal distribution	Gamma distribution
7.9	5.0	3.9	1.4	1.7

Notes: The total volume of the portfolio is equal to EUR 63 billion and includes loans to more than 250,000 SMEs; in the Gamma model, $\sigma^2=2$.

10 Basel II also provides for a "standardised approach" for assets that are rated by external rating agencies.

Box 3. BIS risk weight formulae in Basel II

The last version of the Basel II proposal (BIS, October 2002), the default correlations R are defined by the following equations:

Non-retail exposures

(1) $R = 0.12 \times (1-\exp(-50 \times PD))/(1-\exp(-50)) + 0.24 \times [1-(1-\exp(-50 \times PD))/(1-\exp(-50))]$

Retail exposures

(2) $R = 0.02 \times (1-\exp(-35 \times PD))/(1-\exp(-35)) + 0.17 \times [1-(1-\exp(-35 \times PD))/(1-\exp(-35))]$

where PD is the borrower's probability of default. These formulae give a negative relationship between R and PD. For exposures below EUR 1 million, the retail formula (2) is applied. This gives a value of R between 0.02 and 0.17. Exposures above EUR 1 million are assigned to the corporate segment. However, those businesses with a turnover lower than EUR 50 million (but above EUR 5 million) get a specific treatment: the correlation as computed with (1) is reduced by:

(3) $0.04 \times \left(1-\frac{S - 5}{45}\right)$

where S is the borrower's turnover. This correction takes 4 percent off of the computed correlation in (1) for firms with a EUR 50 million turnover. No correction is made for firms with a turnover between EUR 1 and 5 million. All in all, the default correlation for this class of medium-sized businesses varies between 0.08 and 0.2.

Finally, risk weights are computed as follows:

Non-retail exposures

(4) $K = LGD \times \Phi\left[(1-R)^{-0.5} \times \Phi^{-1}(PD) + (R/(1-R)) \times \Phi^{-1}(0.999)\right] \times \frac{1+(M - 2.5) \times b(PD)}{1-1.5 \times b(PD)}$

Retail exposures

(5) $K = LGD \times \Phi\left[(1-R)^{-0.5} \times \Phi^{-1}(PD) + (R/(1-R))^{0.5} \times \Phi^{-1}(0.999)\right]$

where LGD is the loss given default (following the IRB approach, we assumed a fixed recovery rate of 50 percent), Φ is the normal cumulative distribution function, M is the effective remaining maturity, and $b(PD)$ is a maturity adjustment (the assumed maturity is 3 years) :

$b(PD) = (0.08451 - 0.05898 \times \log(PD))^2$

We note that the granularity condition is largely verified due to the large size of the portfolio.

implicit in the Basel II formulae (between 0.02 and 0.17 for retail exposures, between 0.08 and 0.2 for medium-sized exposures, see Box 3) and the relatively low average level of default risk in the French SME population (see Table 4). Therefore, one needs to be cautious when drawing conclusions from Table 11. Indeed, actual past correlations could be poor estimates of future correlations, as pointed out in Section 2. One reason is that our data covers only a fairly short period of time when the economy was doing well. Another reason mentioned before is that the experiment summarised in Table 11 is not

based on actual bank loan portfolios, but on a larger sample of French SMEs. However, additional simulation exercises on smaller portfolios, created by drawing 5,000 firms randomly from the full sample, reveal a positive relationship between PDs and default correlations, which stands in sharp contrast with the current Basel II proposal.

To conclude, it is misplaced to believe that the implementation of a new Basel Accord will harm bank lending to SMEs in France. Our finding suggests that Basel II will promote credit availability since capital charges on SME loan portfolios are likely to fall considerably. This is mainly the result of low default probabilities and the positive effect of diversification in large SME portfolios. We advocate a possible further reduction of the SME risk weights in the current proposal since we find a very weak sensitivity of SMEs to systematic risk. In addition, we strongly argue against assuming a negative relationship between PDs and default correlations. The data does not support such a relationship, and erroneously using it would result in too high capital charges for the less risky medium-sized enterprises in comparison to smaller firms and, as a result, less risky firms would cross-subsidise riskier firms.

As an aside, the analysis of this paper demonstrates the usefulness of portfolio credit risk models for financial institutions. In particular, credit risk management and the allocation of loans and, ultimately, the economy in general should benefit from the introduction of such a tool.

5. Conclusion

There has been widespread concern that recent and future developments in European banking markets are detrimental to bank lending to small and medium-sized enterprises. Bank consolidation has been deemed to have negative effects on small businesses since large banks tend to focus on large companies. Some observers also warned that the implementation of a new Basel Accord would harm SME financing since many small businesses are not rated by external credit rating agencies and could therefore not apply for lower risk weights. In this paper, we have presented strong empirical evidence that clearly rejects these two hypotheses. In contrast with these two predictions, we find that bank consolidation in France has improved credit availability for SMEs and if banks adopt the Internal Rating Based approach of Basel II, it is likely that French SMEs will have even better access to bank credit in the future.

The transformation of the French banking industry allow SMEs to access bank credit more easily.

During the second half of the 1990s, French banking industry consolidation was accompanied by an increase in multiple banking. We find a strong positive relationship between credit availability and the number of creditors and the duration of bank-firm relationships. Moreover, the smaller the firm is, the greater is the impact of increasing the number of lenders and the duration of relationships. With the exception of very small firms, small and medium-sized enterprises have increased the number of banks they borrow from during the consolidation wave. As a consequence, these companies were able to obtain more bank credit. Very small firms did not increase the number of banks they borrow from, probably because they perceive it as too costly; interestingly enough, our econometric results suggest that the very small firms would profit most from multiple banking. This could be an indication that very small firms in France still face credit constraints. However, finance constraints seem to weaken even for this size class, which

includes many information-opaque customers. Indeed, very small firms substantially increased their share in the total business loan portfolio. Small firms did the same. These changes in the composition of the business loan portfolio came at the expense of large enterprises. It is worthwhile mentioning that the average very small firm and the average small firm did not obtain a substantially bigger loan. But many of these firms that received a bank loan at the end of the 1990s did not obtain any credit in the early 1990s.

Our model of credit availability also shows that an upgrade in the (Coface) credit risk rating improves the credit availability for very small firms, irrespective of their initial rating. However, small and medium-sized firms with intermediate credit risk grades do not substantially increase their use of bank loans when their credit status improves. This suggests that credit constraints are not binding for the majority of small and medium-sized firms in France given that they have a relatively low credit risk profile. In sum, we find that only very small firms, i.e. firms with an annual turnover below EUR 2 million, and firms with high credit risk may have difficulties in accessing bank credit, but credit rationing is not a widespread phenomenon in the market for loans to French SMEs.

To measure the possible effects of the latest Basel II proposal on SME credit availability, we have developed a one-risk factor credit risk model. Credit risk decreases significantly with size. This can partly explain the difficulty of accessing credit for some of the smaller firms, especially when the duration of the bank-firm relationship is short. However, default correlations are lower for SMEs than for large firms. This suggests that, in contrast with conventional wisdom, small and medium-sized enterprises are less sensitive to the business cycle than large companies. A portfolio of SME loans is therefore not necessarily riskier than a portfolio of loans to large firms. Furthermore, we showed that the sensitivity of SMEs to macroeconomic risk does not appear to be as high as assumed in the current Basel II proposal. Although the current Basel II proposal gives considerable scope to improve SME credit availability in the future, our evidence supports even lower risk weights, especially for medium-sized companies, which – if applied – could further stimulate SME lending.

Basel II is still overly conservative with regard to banks' exposures to SMEs.

Annex

An econometric model of SME credit availability

The main purpose of our econometric model of credit availability is to test whether there is a positive effect on the loan amount obtained by a firm in a given year of (i) an increase in multiple banking, (ii) an increase in the length of the bank-firm relationship, (iii) a reduction of credit risk, and (iv) an increase in the size of the lending bank's loan portfolio while controlling for other variables such as company size, year, and a dummy indicating whether or not the lending bank is the borrower's main (house) bank.

The dependent variable of our model is the ratio of the loan amount obtained from a single bank in a given year to the firm's turnover. Note that firms can borrow from several banks in a given year, so that a firm enters the database more than once in that year. Explanatory variables are: (i) the number of banks a firm borrows from, (ii) the length of the lending bank-firm relationship, (iii) the Coface credit rating of the borrower, (iv) the size of the loan portfolio of the lending bank, and (v) control variables:

$$(1)\quad LOAN_{b,it} = \alpha + \beta DSIZE_{it} + \kappa PORTFOLIOSIZE_{b,it} + \varphi DRISK_{it} + \theta MAINBANK_{b,it} + \delta DNBBANK_{it} + \gamma DLENGTH_{it} + \eta DYEAR + \varepsilon_{it}$$

where

$LOAN_{b,it}$ is the annual amount of loans firm i obtained from creditor b in year t, divided (normalised) by the firm's turnover of that year;
$DSIZE$ is a vector of size dummies (when the model is estimated by size class, these dummies were obviously omitted and replaced by the logarithm of the firm's turnover as an indicator of the borrower's size inside each size class);
$PORTFOLIOSIZE_{b,it}$ measures the size (in terms of the number of different borrowers) of the business loan portfolio of the lending bank b of firm i in year t;
$DRISK$ is a vector of dummies corresponding to the firm's Coface credit rating;
$MAINBANK_{b,it}$ is a dummy taking the value one if bank b, which supplies a credit in period t to firm i, is the main bank of firm i (here the main bank is defined as the most important lender of the firm), and zero otherwise;
$DNBBANK$ is a vector of dummies measuring the borrower's number of banks;
$DLENGTH$ is a vector of dummies measuring the length of the bank relationship with the main bank;
$DYEAR$ is a vector of time dummies and ε_{it} is the error term.

The model is estimated with OLS. In the regression analysis, the following dummies are omitted and, consequently, serve as reference points: the size 1 (very small firms) dummy, the rating class 8 (highest risk) dummy, the single bank dummy, the one-year-length of bank-firm relationship dummy, and the 2001 dummy.

Table A1. OLS parameter estimates of the SME credit availability model

		Size (turnover in EUR million)			
Variables	All firms	Very small (# ≤ 2)	Small (2 < # ≤ 7.5)	Medium-sized (7.5 <# ≤ 40)	Large (# > 40)
Intercept	20.0	583.1	106.5	18.6	19.0
Small	-27.5				
Medium-sized	-32.9				
Large	-36.5				
Log turnover		-42.5	-6.9	-1.2	-1.2
Portfolio size	-0.1	0.1	0.0	-0.1	-0.1
Risk class 1	6.5	35.0	4.9	0.7	1.3
Risk class 2	2.0	6.5	-1.8	-0.4*	0.8*
Risk class 3	3.0	7.6	-1.2	0.3*	1.5*
Risk class 4	5.0	8.8	-0.3*	1.4	1.6*
Risk class 5	4.2	7.2	-0.3*	1.7	1.6*
Risk class 6	16.6	19.3	6.6	5.3	4.0
Risk class 7	6.9	7.9	2.1	2.5	1.4*
Main bank dummy	10.1	11.5	7.7	8.6	8.4
Number of banks: 2	6.5	22.7	4.0	3.8	2.9
Number of banks: 3	8.3	36.4	6.3	4.4	3.6
Number of banks: 4	8.6	40.5	8.6	4.6	3.9
Number of banks: 5	8.8	47.7	10.0	5.2	4.2
Number of banks: 6	8.9	46.5	12.3	5.8	4.3
Number of banks: 7	10.3	54.7	12.7	10.0	6.7
Length 2	4.8	10.2	1.3	0.9	0.0*
Length 3	5.0	12.6	1.8	0.7	0.1*
Length 4	7.2	20.3	3.0	1.5	0.9
Length 5	13.7	40.2	7.9	5.5	3.1
Year 1994	0.7	5.6	0.2	-0.1*	-0.7
Year 1995	-2.6	-3.2	-1.8	-1.1	-1.1
Year 1996	-3.3	-4.8	-2.1	-1.6	-1.3
Year 1997	-2.4	-3.2	-1.4	-1.1	-0.8
Year 1998	-3.7	-6.5	-1.9	-1.1	-0.8
Year 1999	-2.9	-5.2	-1.2	-0.8	-0.7
Year 2000	-0.9	-1.4	-0.4	-0.4	-0.4
Number of Observations	2,530,353	752,235	833,531	660,646	283,941

Notes: * non-significant at the 5 % confidence level.

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ABSTRACT

Using survey data on Italian manufacturing firms, *this paper examines firms' capital structure and their access to financial debt, notably bank loans. We find that the share of financial debt in total liabilities is, on average, smaller for small firms than for large ones. However, this is not because the typical small firm borrows less than a large firm, but because small firms are more likely not to borrow at all. For firms that do borrow, the share of financial debt varies little with firm size. The absence of financial debt on the balance sheet of many firms is mainly because they do not want to borrow, not because lenders do not want to lend. Thus, credit rationing does not appear to be a widespread phenomenon, but when it happens, lack of size and equity seems to play a key role.*

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Small business finance in Italy

1. Introduction

Luigi Guiso

Italy is a country of small businesses and compared to other nations at a similar stage of development the average size of its firms is small. To illustrate, the 3.2 million firms in Italy have an average staff of 4.4 employees while the average firm size – measured by number of employees – in Germany, France, and the United Kingdom is respectively 10.3, 7.1 and 9.6.[1] Furthermore, in Italy, firms with less than 100 employees account for close to 70 percent of total employment while in Germany, France, the United Kingdom, and the United States this type of firm does not contribute to more than 30 percent of employment. Mirroring the role of small businesses, firms with more than 500 employees (conventionally taken as the threshold for defining "large" businesses) account for only 15 percent of employment in Italy whereas firms of this size contribute to at least 40 percent of employment in many other countries.

Small is not necessarily beautiful. One concern addressed in this paper is the adequacy of finance for small businesses. There are a number of reasons for raising this question for this particular subset of firms. To begin with, a large part of economic growth is thanks to the growth in the size of existing establishments and the creation of new ones, and the growth of existing firms and start-ups, which typically start small, crucially depend on access to external finance. For instance, for Italy, Guiso *et al.* (2002) find, that credit availability has a strong impact on the growth potential of individual firms and on the creation of new ones.

Second, a large body of literature argues that small businesses are likely to suffer most from information and incentive problems, limiting their ability to obtain external finance. Two strands of literature can be distinguished. One is on investment and finance, and it shows that investment is sensitive to cashflow, with investment-cashflow sensitivity typically limited to small businesses – a result suggesting that smaller firms suffer from financial constraints while larger firms do not (see, among others, Fazzari *et al.* 1988, Hoshi *et al.* 1991, Bond and Meghir 1994, and Hubbard 1998). A variant of this literature examines the link between firm growth and finance; Wagenvoort (this volume), for instance, finds that small companies have higher growth-cashflow sensitivities than large ones, indicating that external finance constraints may prevent small and medium-sized firms to fully exploit their growth potential. The other strand is on the transmission channel of monetary policy and the relevance of the credit channel. Here too the empirical evidence is consistent with the idea that monetary policy contractions and banking crises adversely affect small businesses, in particular because they have no access to sources of finance other than bank loans (see, for example, Gertler and Gilchrist 1994).

A final reason – related to the previous one – that makes the supply of finance to small businesses of particular interest is that small businesses appear to have a limited geographical access to finance. A growing literature argues that distance matters in the

1 See Kumar *et al.* (1999).

Small businesses are of high interest for various reasons, including their importance for employment and their inherent weakness in raising external finance.

provision of funds, especially for small firms. Petersen and Rajan (2002), for instance, provide evidence for the importance of distance in the provision of bank credit to small firms. Similarly, Lerner (1995) documents the importance of distance in the venture capital market. The immediate impact of distance on small firms is that their capital structure and debt capacity are determined by the conditions offered on local financial markets given that they can only borrow locally. Developments in local markets – such as those experienced in many countries over the 1990s with waves of bank consolidation – may have strong effects on the supply of finance to small firms.

Against this background, this paper provides a thorough analysis of small business finance in Italy. Section 2 sets the stage, describing the capital structure of small businesses on the basis of microeconomic data, while Section 3 presents evidence on the determinants of capital structure of small and medium-sized firms and examines their ability to match the maturity of assets and liabilities. Section 4 presents data on credit rationing of small businesses and identifies factors that affect the probability that a firm has no access to credit markets. Probing deeper on previous results in the literature, we provide strong evidence that size is a major determinant of the probability of success in obtaining as much bank finance as needed. But we also show that other features, previously neglected, are even more important. Furthermore, we examine the structure of firm-bank relationships in Italy and examine their importance for firms' access to loans. Section 5 concludes.

2. The capital structure of small firms

To describe the capital structure of small businesses and how it varies with firm attributes, microeconomic data are needed. We draw data from the 1999 Survey of Manufacturing Firms (SMF), which *Mediocredito Centrale*, an investment bank, conducts every three years on a sample of over 4,000 mostly small and medium-sized firms and some larger firms (with more than 500 employees) in manufacturing.[2] The main purpose of the survey is to collect information on several aspects of firms' activities, with a focus on technological innovation and investment in research and development (R&D). However, firms' balance sheets and income statements for the past three years are appended to the survey. This data offers a fair description of firms' assets and liabilities and key profitability indicators. The latest year in the sample is 1997 and small and medium-sized firms are those with less than 500 employees. In what follows, we present different ways of measuring capital structure and we use these measures to analyse the capital structure of firms in different size classes; we then examine the composition of firms' liabilities, the participation of firms in financial debt instruments - notably loans, the maturity structure of debt, and the structure of firms' assets as well as their profitability and financial fragility.

There are different ways of measuring capital structure, each measure having its pros and cons and, ultimately, its usefulness will depend on the purpose of the investigation. Since most of the firms in the data set are non-listed,[3] market-based measures – most appropriate for some purposes – are not available. Consequently, this paper relies on three book-based measures of capital structure. The first is the ratio of total debt to total assets.

2 The new wave, referring to 2001, has not yet been released. For more details about the survey see the Annex.
3 In the sample of firms with up to 500 employees (our reference sample), only 28 firms are listed.

Total debt, i.e. the numerator of this measure, comprises all non-equity liabilities of the firm: short and long-term bank debt, accounts receivable (trade debt), bonds, pension liabilities, and other debt financing such as loans from firms belonging to the same group. The main advantage of this broad measure is that it indicates what would be left to shareholders in case of liquidation. Its shortcoming is that it also includes pension liabilities[4] and trade debt, which may have little to do with financing decisions: the former, for instance, largely reflect the age structure of firms' employees, and the latter may mirror firms' commercial policy. The second measure, namely the ratio of financial debt to total assets, partially accounts for these drawbacks, as financial debt equals total debt minus pension liabilities and trade debt. But as pension liabilities and trade debt contribute to the financing of assets, they still affect firms' capital structure measured in this way and, thus, differences in leverage across firms may still be due to differences in liability items that may have little to do with firms' financing decisions. Our third measure corrects for this distortion by computing capital structure as the ratio of financial debt to capital, with capital being defined – for the purpose of this paper – as the sum of financial debt and the book value of equity.

Table 1 shows – for firms in different size classes – the three measures of capital structure and other indicators that inform about firms' sources of finance. With regard to the SMF sample as a whole, we observe a total debt to asset ratio of the median firm of 57 percent. With 21 percent – also for the median firm – the financial debt to asset ratio is markedly lower, mainly because of the importance of trade debt, which is equivalent to 21 percent of total assets. The third measure, i.e. financial debt relative to capital, amounts to 43 percent, implying that for the median firm in the sample EUR 1 of equity gears EUR 0.77 of financial debt.

Very small firms use far less financial debt than larger firms.

How do these ratios vary across firms? For the whole SMF sample, the standard deviation for all three measures is about 28 percent, 20 percent, and 32 percent, respectively, indicating that total debt and financial debt as source of finance vary considerably across firms, as does financial debt relative to capital. More interesting – given the topic of this paper – are the differences in capital structure for firms in different size classes, ranging from very small firms (less than 30 employees) to larger medium-sized (250 to 500 employees) and large firms (more than 500 employees). As Table 1 indicates, the main differences are clearly between the very small enterprises, on the one hand, and larger enterprises on the other hand. To illustrate, the total debt asset ratio of the median firm in the size class "100-249" is almost 20 percentage points higher than that of the median, very small firm, and differences of a similar size exist for the financial debt to asset ratio. Overall, larger businesses rely more on external debt finance than the very small firms. The distinction between the very small and larger firms is even more striking with regard to the financial debt to capital ratio: while the very small firms use only EUR 0.3 of financial debt for one euro of equity, larger firms use between EUR 0.95 and EUR 1.2 of financial debt. This suggests that firm size amplifies the financial debt capacity of firms.

We now take a look at the structure of firms' liabilities. Trade debt is equivalent to about 21 percent of assets for the SMF sample as whole, but appears to be somewhat less

4 In Italy, pension liabilities offer a cheap way to raise funds for small businesses since the interest rate on them, the so called "legal interest", is typically well below the market rate.

Table 1. Capital structure of manufacturing firms in Italy

		Number of employees				
	Total SMF sample	<30	30-99	100-249	250-500	>500
Total debt/assets	0.572	0.448	0.605	0.640	0.611	0.598
	(0.504)	(0.419)	(0.555)	(0.614)	(0.596)	(0.575)
	[0.281]	[0.313]	[0.250]	[0.175]	[0.193]	[0.197]
Financial debt/assets	0.206	0.092	0.245	0.299	0.299	0.248
	(0.223)	(0.172)	(0.251)	(0.297)	(0.284)	(0.254)
	[0.196]	[0.195]	[0.193]	[0.164]	[0.172]	[0.167]
Financial debt/capital	0.434	0.231	0.493	0.562	0.546	0.488
	(0.404)	(0.322)	(0.448)	(0.520)	(0.491)	(0.462)
	[0.316]	[0.333]	[0.301]	[0.241]	[0.258]	[0.246]
Trade debt/assets	0.214	0.159	0.241	0.237	0.219	0.223
	(0.216)	(0.188)	(0.236)	(0.245)	(0.235)	(0.244)
	[0.164]	[0.193]	[0.152]	[0.118]	[0.103]	[0.117]
Bank debt/financial debt	0.954	1.000	0.962	0.902	0.838	0.809
	(0.781)	(0.789)	(0.789)	(0.769)	(0.728)	(0.691)
	[0.316]	[0.334]	[0.309]	[0.295]	[0.302]	[0.322]
Equity/assets	0.210	0.198	0.227	0.236	0.241	0.235
	(0.252)	(0.239)	(0.228)	(0.264)	(0.280)	(0.278)
	[0.166]	[0.169]	[0.164]	[0.155]	[0.164]	[0.160]

Notes: The table reports the median, (mean) and [standard deviation]; for definition of variables see text.
Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale*.

important for the very small firms. For the SMF sample as whole, banks provide about 95 percent of total financial debt of the median firm. The importance of bank debt moderately decreases with firm size: for very small firms, bank debt fully accounts for financial debt whereas for large firms, bank debt makes up 80 percent of financial debt. Although not shown in Table 1, it is worth noting that for the median firm, bonds do not contribute to finance irrespective of the size class; for the average firm in the SMF sample, bonds account for less that 4 percent of financial debt. The share of equity equals 21 percent for the median firm in the SMF sample, and median equity ratios do not vary a lot across size classes though the very small firms have the lowest ratio and are thus most leveraged. In sum, the debt structure of small businesses is rather simple: trade debt plays a conspicuous role, banks are the main source of financial debt and, by extension, bond finance is negligible.

Leverage does not vary a lot across median firms of different size classes.

Median and average values conceal the fact that some firms do not use certain debt instruments at all.[5] But for a comprehensive analysis of small business finance, we surely need to know whether non-participation in certain debt instruments is a relevant phenomenon. Table 2 suggests that it is. In the total SMF sample, 76 percent of the firms have financial debt, and 70 percent have bank debt, implying that almost one third of firms has no bank debt. As such, this does not tell us whether these firms do not want to or

5 Obviously, this does not apply if the median is zero, which is only the case for bond finance.

cannot raise bank debt. Yet, it highlights that some small businesses have incomplete sources of funds. A large majority (77 percent) have trade debt, but again a non-negligible fraction receives no credit from suppliers. Although the median firm issues no bonds at all, and the average firm very little, 19 percent of firms issue bonds, which is perhaps more than one would expect in light of median and average values. Among the firms that issue bonds, this source of funding accounts for about 10 percent of financial debt. Table 2 finally shows that about 45 percent of firms do not have long-term financial debt and more than half do not have long-term bank debt.

Table 2. Importance of various debt instruments for manufacturing firms in Italy

		Number of employees				
	Total SMF sample	<30	30-99	100-249	250-500	>500
Percentage of firms that use:						
Financial debt	75.6	58.5	85.4	97.5	98.0	99.4
Bank debt	70.3	53.1	79.7	93.6	94.1	95.5
Trade debt	76.7	60.2	85.6	99.3	100.0	100.0
Bonds	19.2	19.3	16.0	25.8	24.8	17.9
Long-term financial debt	54.9	33.7	65.5	84.6	87.1	89.3
Long-term bank debt	42.9	25.3	51.2	70.3	68.4	74.7

Notes: For definition of variables see text.
Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale*.

The use of debt instruments varies considerably with firm size: most striking is many small firms do not borrow at all.

Of course, an intriguing question is how participation in various debt instruments varies across size classes. For all debt instruments, the participation rate increases with size class. The following is worth highlighting: almost half of the very small firms have no bank debt while only 6 percent of the larger small and medium-sized firms operate without bank loans; all firms with more than 100 employees have trade debt while 40 percent of the very small firms do not; the proportion of firms with long-term debt rapidly increases with firm size (only 34 percent of the very small firms compared to almost 90 percent of firms with more than 100 employees have long-term debt). Overall, it is difficult to believe that diversities in production technologies across firms in different size classes cause the variation in debt participation rates. It is more likely that this variation reflects differences in debt contracting problems and the existence of fixed costs of debt finance. Whatever the reason, access to debt finance seems to be more challenging for the very small firms.

We have already touched upon the maturity structure of debt and will now further develop this aspect. Specifically, we examine the maturity structure of financial debt and bank debt, the latter being the key component of the former. We classify debt with a maturity of more than 18 months as long term and use the share of long-term debt in the total to measure the maturity structure of debt. As Table 3 shows, for the median firm in the sample, only 28 percent of total financial debt is long term, implying a relatively short maturity. Debt maturity increases sharply with firm size, as indicated by the jump in the share of long-term debt from 16 percent (firms with less than 30 employees) to over 30 percent (firms with more than 30 employees).

Table 3. Maturity structure of debt of manufacturing firms in Italy

		Number of employees				
	Total SMF sample	<30	30-99	100-249	250-500	>500
Financial debt						
Long-term as a fraction of total	0.278	0.160	0.300	0.373	0.312	0.355
	(0.340)	(0.273)	(0.360)	(0.414)	(0.372)	(0.385)
	[0.315]	[0.313]	[0.318]	[0.294]	[0.295]	[0.289]
Long-term as a fraction of total for firms that have long-term debt	0.395	0.378	0.397	0.435	0.370	0.369
	(0.448)	(0.439)	(0.452)	(0.470)	(0.418)	(0.428)
	[0.287]	[0.292]	[0.291]	[0.267]	[0.280]	[0.273]
Bank debt						
Long-term as a fraction of total	0.131	0.000	0.161	0.265	0.242	0.320
	(0.247)	(0.183)	(0.259)	(0.325)	(0.303)	(0.350)
	[0.294]	[0.274]	[0.296]	[0.296]	[0.300]	[0.302]
Long-term as a fraction of total for firms that have long-term debt	0.267	0.211	0.263	0.320	0.293	0.418
	(0.327)	(0.296)	(0.327)	(0.368)	(0.337)	(0.445)
	[0.297]	[0.296]	[0.297]	[0.289]	[0.297]	[0.270]

Notes: The table reports the median, (mean) and [standard deviation]; for definition of variables see text.
Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale.*

The maturity structure of debt seems too short relative to the lifespan of assets.

The maturity of financial debt is probably too short to adequately match the maturity of assets. To illustrate this, recall from Table 1 that, for the median firm in the sample, financial debt is equivalent to about 21 percent of assets (see Table 1). With long-term financial debt accounting for 28 percent of total financial debt, this implies that long-term financial debt covers only 6 percent of total assets. While the structure of assets will be investigated further below, we note here that fixed assets (net of depreciation) – i.e. assets with a long lifespan – account for about 14 percent of total assets and, thus, long-term financial debt only covers roughly 40 percent of fixed assets. This ratio is much lower for very small firms: with a share of fixed assets in total assets of 13 percent, a financial debt to asset ratio of 9 percent (see Table 1), and a share of long-term financial debt in total financial debt of 16 percent, long-term financial debt is equivalent to only 11 percent of fixed assets.

Table 3 also shows the conditional debt maturity, which is the share of long-term financial debt in total debt for firms that actually have long-term debt. This is relevant because, as we have seen, almost half of the firms do not have long-term debt. Conditional on having it, long-term debt represents about 40 percent of total debt for the median firm in the sample. An interesting finding is that conditional debt maturity varies very little across size classes. This suggests that the sharp maturity lengthening observed when moving from very small firms to larger firms before restricting the

sample to the firms with long-term financial debt is mainly due to the jump in the participation rate reported in Table 2.

The median very small firm does not use any long-term bank debt.

Table 3 shows similar results for the maturity structure of bank debt. For the median firm in the whole sample, 13 percent of bank debt is long-term; but the median very small firm has no long-term bank debt; by contrast, one quarter of the bank debt of firms with 100 to 500 employees is long term. The measure for conditional bank debt maturity is 27 percent and – though increasing with size – is less sensitive to size than the measure of unconditional maturity.

We conclude this section with a few remarks on the structure of assets, profitability, and financial fragility - the main data on these issues are summarised in Table 4. To start with the structure of assets, the share of net tangible assets (i.e. fixed assets minus depreciation) in total assets amounts to 14 percent for the median firm of the full SMF sample. The importance of tangible assets does not vary much across size classes, which confirms that differences in the structure of assets across size classes cannot explain the divergence documented previously in debt maturity. To substantiate this conclusion, we have computed the expected asset lifespan – expressed in years and calculated as the inverse of the depreciation rate. Although there are no substantial differences across size classes, the expected asset lifespan is longer for smaller firms than for larger ones, implying that smaller businesses should rely more on long-term debt than larger ones – which they do not. Overall, in contrast to the structure of liabilities, the structure of assets varies little across size classes.

Table 4. Asset structure, profitability, and financial fragility of manufacturing firms in Italy

		Number of employees				
	Total SMF sample	<30	30-99	100-249	250-500	>500
Assets						
Tangible assets (net)/total assets	0.140	0.132	0.149	0.141	0.134	0.142
	(0.180)	(0.171)	(0.192)	(0.185)	(0.166)	(0.171)
	[0.162]	[0.161]	[0.169]	[0.169]	[0.101]	[0.108]
Expected asset lifespan (in years)						
	11.7	11.4	12.2	11.1	9.7	9.1
	(14.1)	(14.5)	(14.5)	(13.1)	(12.0)	(10.2)
	[13.9]	[16.8]	[11.1]	[9.3]	[12.6]	[6.5]
Gross return on assets (in %)	10.4	10.1	10.8	10.3	10.0	10.8
	(11.6)	(11.6)	(12.0)	(10.9)	(10.4)	(11.9)
	[9.2]	[9.3]	[9.9]	[8.3]	[10.8]	[8.3]
Financial fragility						
Inverse coverage ratio (ICR)	0.286	0.312	0.271	0.250	0.264	0.241
	(0.503)	(0.383)	(0.594)	(0.465)	(0.841)	(0.238)
	[4.39]	[1.76]	[5.73]	[2.47]	[2.31]	[2.14]
Percentage of firms						
with ICR >0.7	22.3	27.7	18.1	15.7	17.5	16.8

Notes: The table reports the median, (mean) and [standard deviation]; for definition of variables see text.
Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale*.

Box 1. Sources of investment finance of small and medium-sized manufacturing firms in Italy

Table B1 shows how small and medium-sized enterprises (SMEs) in the Italian manufacturing sector financed their gross fixed capital formation during 1995-97. Internally generated funds accounted for the bulk of finance, covering on average almost half of fixed investment. The second most important source was bank finance, of which over one third (not shown) was short-term and one third at subsidised interest rates. Transfers and fiscal subsidies covered 11 percent of investment cost. Leasing covered 16 percent, suggesting that this form of finance is a good substitute for long-term bank debt. Interestingly, there is little difference between the average very small firm and larger firms. However, fairly high standard deviations for the full SMF sample (not shown) suggest that there is considerable diversity in the ways firms finance their investment.

The last three rows of Table B1 show, respectively, the share of firms that used no bank debt, bank debt only, and internal funds only, to finance their investment. Very few firms used only bank debt and there is no difference among firms of different sizes. About one fifth of the firms relied only on internally generated funds, and this share is similar across size classes. Finally, half of the firms financed their investment without any bank debt.

The SMF sample indicates similar results as to the financing of expenditure on R&D. In fact, the internal funds are even more important for R&D than for investment in general. It is interesting to note that subsidies accounted for only 5 percent of the financing of R&D, but more than two thirds of firms in the SMF sample have received them.

Overall, the flow-of-funds analysis is remarkably consistent with that based on stocks in suggesting that many firms, small ones in particular, do note use external finance.

Table B1. Sources of investment finance of manufacturing SMEs in Italy, 1995-97

	Number of employees		
	Total SMF sample	<30	100-500
Sources of finance (in % of total finance)			
New equity	1.5	1.1	1.5
Internal funds	47.3	47.3	47.9
Bank debt	15.0	13.9	15.3
Bank debt (subsidised)	7.6	7.2	7.5
Transfers and fiscal subsidies	11.0	10.2	10.8
Leasing	16.5	19.7	15.9
Other sources	1.1	0.6	1.1
Importance of bank finance and internal funds			
Share of firms with no bank finance (in %)	50.9	53.3	47.1
Share of firms with 100% bank finance (in %)	5.6	6.3	4.7
Share of firms with 100% internal funds (in %)	21.0	22.3	22.0

Notes: The table reports the mean, averaged over 1995-97.
Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale*.

Profitability, measured by gross return on assets, does not vary across size classes. Table 4 shows that the gross return on assets (earnings before interest, taxes, and depreciation to assets) represents 10-11 percent for the median firm in all size classes. It also appears that size does not affect firms' net profitability given that the median net return on assets amounts to about 2 percent for all size classes (not shown).

Financial fragility, however, seems to differ between size classes. As a measure of financial fragility we use the inverse coverage ratio (i.e. interest expenses in percent of gross profits). As Table 4 indicates, this ratio is significantly higher for very small businesses (31 percent) than for larger firms. Given that very small firms are less leveraged than larger firms, a higher inverse coverage ratio reflects higher interest rates paid by very small firms compared to larger firms. To further assess the financial fragility of small businesses, we have calculated the fraction of firms for which the value of the inverse coverage ratio is higher than 0.7. This threshold has been chosen because for a firm with an inverse coverage ratio in excess of 0.7, a decline in profitability equivalent to one standard deviation would make the firm unable to meet its interest obligations. For the whole SMF sample, about 22 percent of firms exceed this critical threshold; among very small businesses, 28 percent find themselves in that position, which compares to only 16-18 percent in the case of larger firms. All this suggests that the financial position of very small businesses is relatively weak.

To summarise our findings on the capital structure of small firms in Italy, the data reveal considerable differences in the pattern of financing across firms of different sizes. Most differences arise from heterogeneity in the use of financial debt and long-term debt rather than from heterogeneity in leverage or (conditional debt) maturity. A substantial number of firms, particularly among the very small ones, do not rely on financial debt; flow-of-funds data, which show that fixed investment and especially expenditure on R&D are predominantly financed by internal funds, confirm this result (see Box 1). For firms that actually use financial debt, capital structure and debt maturity is very similar across median firms of different size classes.

For firms that use financial debt, capital structure and debt maturity is very similar across median firms in different size classes.

3. The determinants of capital structure

This section investigates the determinants of capital structure of small and medium-sized manufacturing enterprises (SMEs) in Italy.[6] In this context, we will shed light on the question whether firms that do not use financial debt, in particular bank loans, do so voluntarily or are excluded from the credit market. We will, first, present a set of variables that possibly determine a firm's capital structure, and we will provide descriptive statistics on the link between capital structure and these variables (Section 3.1). We will then analyse the extent to which these variables affect the probability that a firm uses financial debt, notably bank loans (Section 3.2). Finally, going beyond descriptive statistics and an analysis of the probability of having financial debt, we will use regression analyses to further explore the relation between capital structure and our set of variables (Section 3.3).

6 To avoid confusion, we recall that in addition to the abbreviation SME, this paper uses the abbreviation SMF for the Survey of Manufacturing Firms of *Mediocredito Centrale*.

3.1 Possible determinants of capital structure

The set of possible determinants accounted for in this paper are:

- firm size, measured by the average number of employees;[7]
- firm age;
- firm profitability, measured by gross return on assets;
- firm ability to pledge collateral, measured by two indicators, namely (i) the firm's participation in a "collective collateral association" (the so-called Confidi[8]) and (ii) the share of net tangible assets in total assets;
- firm attitude towards R&D and innovation, measured by two dummy variables, the first is equal to 1 if the firm has invested in R&D in the three years covered by the survey (zero otherwise) and the second is equal to 1 if the firm has either bought or sold patents over the past three years;
- ownership concentration, measured by the share of the largest shareholder;
- three dummy variables, indicating whether or not the firm (i) is listed, (ii) reports an interest in going public, and (iii) has received financial subsidies (the dummy equals 1 if the firm has the mentioned characteristic; it is zero otherwise)
- a measure of trust and a measure of court inefficiency, with trust measured by the proportion of people in a province that participate in referenda and court inefficiency measured by the number of pending trials per capita (this approach follows Guiso *et al.* 2002).

There is virtually no leverage-size relationship for firms that use financial debt.

Table 5 reports these characteristics by quartile of the total debt to asset ratio.[9] The following relations between leverage and firm characteristics merit particular attention. First, low-leverage firms are much smaller than highly leveraged ones; from the first to the second quartile of leverage, the number of employees rises from 33 to 86 and levels off for higher quartiles. Figure 1 – which shows a locally weighted smoothing of the relation between the ratio of financial debt to capital and log employment – provides further evidence for the link between leverage and firm size; when size exceeds about 32 employees, the curve flattens. Figure 1 also shows the leverage-size relationship for the firms using financial debt; interestingly, conditional on using financial debt, firms of different sizes have similar leverage; thus, the strong relation between size and (unconditional) leverage is entirely due to the strong effect of size on the probability of using financial debt – an issue that we will discuss in detail below. Second, firm age and ownership concentration seem to be largely unrelated to leverage; and leverage also seems unrelated to whether or not a firm is listed, but not too much can be inferred from this indicator because only 28 firms in our sample are listed. Third, low-leverage firms generate a higher return on assets: firms in the first and second quartile have achieved a return on assets of about 12 percent and 14 percent, respectively, which compares to a

7 Using total assets or sales as size indicators yields similar results.

8 Confidi are associations where participants share funds that can be pledged as collateral when applying for a bank loan.

9 The ratio of total debt to assets and the other capital structure indicators discussed in the previous section (i.e. financial debt relative to assets and financial debt relative to capital) are highly correlated; thus, splitting the sample on the basis of the other indicators yields results similar to those shown in Table 5.

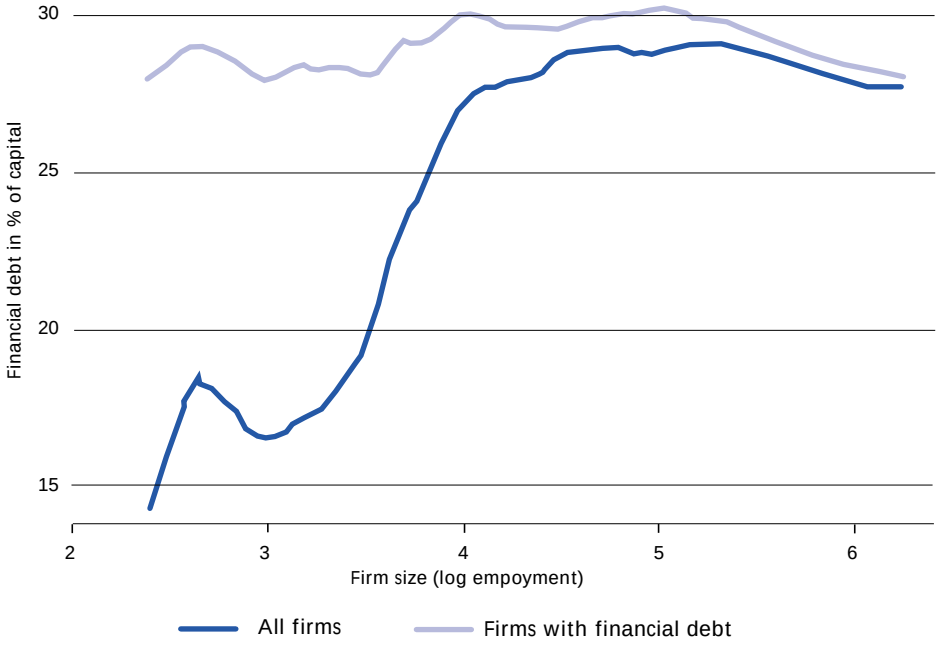
Table 5. Characteristics and capital structure of manufacturing SMEs in Italy

	Firms sorted by the ratio of total debt to assets			
	1. Quartile	2. Quartile	3. Quartile	4. Quartile
Total debt/total assets (in%)	9.0	44.6	65.3	81.4
Firm characteristics:				
Employment (number of employees)	33.2	86.5	89.1	69.6
Age (years)	19.7	26.5	25.4	22.2
Gross return on assets (in %)	12.1	14.3	10.9	9.4
Collateral association (indicator)	0.031	0.048	0.052	0.057
Tangible assets/total assets (in %)	15.5	19.5	19.4	18.0
Ownership concentration (in %)	53.7	58.3	55.1	53.9
Listed (0,1)	0.005	0.016	0.005	0.003
Intention to go public (0,1)	0.009	0.027	0.032	0.031
Investment in R&D (0,1)	0.216	0.334	0.370	0.361
Buying or selling of patents (0,1)	0.023	0.043	0.044	0.055
Recipient of financial subsidies (0,1)	0.322	0.470	0.463	0.418
Features of operating environment:				
Trust (in %)	82.6	83.1	83.4	84.3
Court inefficiency (indicator)	0.038	0.040	0.040	0.037

Notes: The table reports summary statistics of firm characteristics by quartile of the total debt/asset ratio, for definition of variables see text.

Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale* and firms' balance sheet data.

Figure 1. The relation between leverage and firm size



Notes: The relation is estimated non-parametrically using locally weighted smoothing of the dependent variable (leverage) on the explanatory variable (firm size).

Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale*.

rate of about 9 percent for firms in the top quartile. Fourth, there seems to be a positive relation between leverage on the one hand and, on the other hand, the intention to go public, the share of firms that have invested in R&D, the share of firms that have traded patents (suggesting that leverage is positively correlated with the importance of innovative activities), and the use of financial subsidies (suggesting that part of the differences in leverage across firms may reflect the fact that some firms receive subsidies that increase leverage). Finally, leverage - more generally the structure of capital - does not seem to be linked to the degree of trust and court inefficiency in a province.

Obviously, these simple bivariate relationships do not control for the effect of other variables and may disappear, or show up significantly, in controlled regressions, which we present next.

3.2 To have or not to have financial debt?

As pointed out in Section 2 (Table 2), a substantial fraction of small firms does not hold any financial debt and many do not participate in certain forms of financing such as bond issues or trade credit. Against this background, it is important to understand the factors that determine whether or not firms rely on certain types of finance, in particular financial debt and bank loans. The relevant issue here is whether non-participation is voluntary – reflecting a comparison of the benefits and costs of participation – or signals exclusion from the financial debt market.

To investigate this issue, we apply probit regressions to assess whether and how the probability of using financial debt and bank loans changes with changes in the characteristics of firms listed above.[10] The results of the regression analyses, shown in Table 6, are very similar for financial debt and bank debt. This is not surprising since bank debt is the main component of financial debt (see Table 1) and only 17 percent of the firms without bank debt have other financial debt. Given this similarity, we will only comment on the link between firm characteristics and the likelihood that firms have bank loans on their balance sheets, but the comments apply to financial debt as well.

Small firms are less likely to use financial debt, but the effect of size on the probability of borrowing becomes weaker once firms have more than 30-40 employees.

For brevity, we concentrate on results that are statistically significant. First, having a positive amount of bank debt is strongly correlated with firm size. The log form implies that an increase in employment by one unit has a stronger effect on the probability of having bank debt in the case of small firms than in the case of large firms. Indeed, further non-linear terms of log size (not shown) are statistically significant in the regressions, implying a strongly non-linear relation between the probability of holding debt and firm size. To illustrate these results, Figure 2 shows the non-parametric estimate of the relation between the probability of holding bank debt and (log) size. A fair characterisation is that for firms below a threshold of roughly 30-40 employees size strongly affects the probability of borrowing from banks, or having financial debt; for firms above this threshold, size has little impact. Second, controlling for size, the probability of using bank debt increases with the age of the firm. One possible interpretation is that older firms have gained enough reputation to be able to access bank finance. Third, highly profitable firms are less likely to

10 In addition to these characteristics, all regressions include industry dummies (using a two digit classification) to account for differences in financial needs arising from differences in technology. It turns out that the estimated coefficients are statistically not significant.

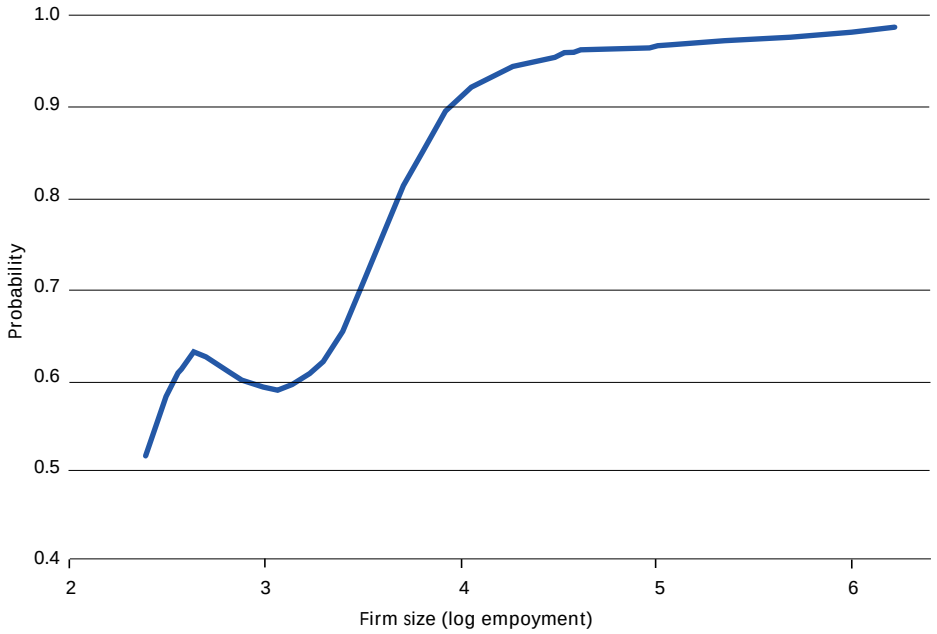
Table 6. Factors determining the use of financial and bank debt of manufacturing SMEs in Italy

	Financial debt (regression 1)	Bank debt (regression 2)
Firm characteristics		
Employment (log)	0.733***	0.579***
Age (log)	0.141***	0.150***
Gross return on assets	-0.538*	-0.728***
Collateral association	0.244*	0.265**
Tangible assets/total assets	1.292***	1.369***
Ownership concentration	-0.005	-0.077
Listed	-0.050	-0.152
Intention to go public	-0.156	-0.063
Investment in R&D	0.237***	0.162***
Recipient of financial subsidies	0.240***	0.165***
Equity/assets	-0.446***	-0.875***
Features of operating environment		
Court inefficiency	5.366**	5.458*
Pseudo R^2	0.204	0.173
Number of observations	3,054	3,054

Notes: The table reports results of probit regressions for the probability that a firm uses financial debt (regression 1) and bank debt (regression 2); *** (**) [*] indicates that the coefficient is significant at the 1% (5%) [10%] confidence level.

Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale*.

Figure 2. The relation between the probability of using bank debt and firm size



Notes: The relation is estimated non-parametrically using locally weighted smoothing of the dependent variable (an indicator variable for whether the firm uses bank debt) on the explanatory variable (firm size).

Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale*.

have bank debt, which probably reflects substitution of cheaper internal funds for more expensive external finance. Fourth, firms that invest in R&D are more likely to hold bank debt, possibly because R&D investment signals promising growth opportunities, which, in turn, facilitate access to external finance. Fifth, our measures of the ability to pledge collateral are all statistically significant and have the expected sign: firms that belong to a collective collateral association and/or have considerable tangible assets are more likely to have bank debt. Sixth, firms that receive financial subsidies are obviously more likely to have bank debt. Finally, firms that operate in a less efficient judicial environment are more likely to use bank debt. The sign of this variable may seem puzzling at first sight. However, a less efficient judicial environment has two effects. On the one hand, it makes lenders less willing to lend since they fear a lack of legal protection. This shrinks the supply of loans and may lead to rationing, thus lowering the probability of obtaining bank debt. On the other hand, shortcomings in the judicial setting reduce the penalty for borrowers in case of default and thus encourage borrowing from banks. The probit estimates suggest that the second effect dominates the first, but the overall impact is small.

While the results are informative, they do not yet tell us whether firms without bank debt voluntarily refrain from borrowing or have no access to loans. The latter would imply that almost half of the very small firms are completely excluded from the bank loan market (Table 2). Theoretical models of firms' debt capacity help discriminate between the two explanations. Many models of firm financing with moral hazard, reviewed in Tirole (2001), imply that lenders are willing to provide finance only if a borrower's equity exceeds a certain minimum. If so, the level of equity should have a positive effect on the probability that a firm has bank debt. But if the absence of bank debt reflects choice, with equity essentially substituting debt, the level of equity should have a negative effect on this probability.

The absence of financial debt on the balance sheet of many firms seems to reflect firms' choice rather than credit rationing by lenders.

To test whether the absence of debt reflects choice or fate, we have included equity (expressed as a fraction of total assets) as an explanatory variable in the probit regressions for the use of financial debt and bank debt. Table 6 shows that equity has a strong negative and significant effect on the probability of having financial debt – bank debt in particular. This suggests that, in general, the absence of financial debt reflects firms' choice, but not exclusion from the credit market because of a lack of equity. Two qualifications should be made. First, the negative effect of equity on the probability of using bank debt does not mean that exclusion from the loan market does not occur. We will document in Section 4 that small businesses face credit rationing and that limited equity plays a key role in explaining this. Second, even if a firm voluntarily decides not to use bank debt, it may do so because the cost of bank debt exceeds its benefits. Small firms, in particular, may find bank debt not attractive if it carries too high an interest rate, reflecting the presumption that lending to small businesses is riskier than the provision of funds to larger firms. The rather important role of size in explaining why firms do not carry bank debt - notably in the case of the very small businesses - may indeed reflect unattractive loan conditions together with fixed costs of debt.[11]

11 Needless to say the effect of equity could be different across types of firms. Firms with a lot of cash are less likely to need funding and, thus, equity should mostly have a negative effect on the probability of having debt. By contrast, firms with low cash may need funding and thus equity may have a positive (or less negative) effect. If we split the sample according to cash needs, measured by the ratio of investment to cashflow, we find that the effect of equity is strongly negative for firms with cash needs below the median (i.e. these firms have a high cashflow compared to investment), but is small - and not statistically different from zero - for firms with high cash needs (high cashflow compared to investment).

3.3 Estimating the impact of firm characteristics on capital structure

Using Tobit regression techniques we have estimated the effect of various firm characteristics on capital structure, with capital structure measured, alternatively, by the ratio of total debt to assets, financial debt to assets, bank debt to assets, and by the ratio of financial debt to capital. Table 7 summarises the main results of this analysis.

In explaining the main findings, it is useful to start with the observation that the results are qualitatively invariant to the specific measure of capital structure; in light of this, we comment only on the last column in Table 7, which shows the effect of firm characteristics on the ratio of financial debt to capital.

Table 7. Determinants of capital structure of manufacturing SMEs in Italy

	Total debt/assets (regression 1)	Financial debt/assets (regression 2)	Bank debt/assets (regression 3)	Financial debt/capital (regression 4)
Firm characteristics				
Employment (log)	0.071***	0.067***	0.057***	0.104***
Age (log)	0.010	0.004	0.002	-0.069
Gross return on assets	-0.409***	-0.470***	-0.447***	-0.752***
Collateral association	0.035*	0.023*	0.022	0.066**
Tangible assets/total assets	0.095***	0.190***	0.153***	0.193***
Ownership concentration	-0.059***	-0.019	-0.033**	-0.042*
Listed	-0.143***	-0.060	-0.078*	-0.148**
Intention to go public	0.017	0.007	0.010	0.022
Investment in R&D	0.0413***	0.033***	0.035***	0.055***
Recipient of financial subsidies	0.020**	0.033***	0.017**	0.058***
Features of operating environment				
Court inefficiency	-0.679**	-0.333**	-0.158	-0.926**
Pseudo R2	0.520	0.450	0.345	0.133
Number of observations	3,068	3,086	3,122	3,069
Left-censored observations	6	675	855	679

Notes: The table reports results of Tobit regressions for various measures of firm leverage; *** (**) [*] indicates that the coefficient is significant at the 1% (5%) [10%] confidence level.
Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale*.

A firm's ratio of financial debt to capital – leverage for short – increases strongly with size: raising the size of the firm from its median (log) value (about 33 employees) to its 99th percentile increases leverage by 22 percentage points. There are several interpretations for the effect of size on leverage. One is that size may be a proxy for the transparency of the firm. Large, possibly listed firms are usually considered less opaque than smaller firms, implying that lenders are better informed and, thus, more willing to lend. That said, less opaque firms should be in a better position to issue information-sensitive securities such as equities, which reduces leverage. *A priori*, the impact of an increase in transparency is thus unclear since both effects work in opposite directions. However, the second effect is

unlikely to be very relevant in our sample, which mainly includes unlisted firms for which the dominant source of external finance is bank lending (see Table 1). Another interpretation of the positive effect of size on leverage is that size could be a proxy for the probability of distress: since smaller firms are typically more likely to fail than larger ones, their access to financial debt is more difficult. This is consistent with the larger variability in performance of smaller firms, especially at the beginning of their activities.[12] If this is so, the leverage of younger firms, which typically are even riskier, should be more sensitive to size. But we also have to account for the length of the relationship that firms have with lenders, notably banks. With a well-established firm-bank relationship, the debt capacity of a firm should be less responsive to the probability of distress and, thus, the link between size and leverage should be flatter for these firms. To examine the link between the age and size of a firm and its leverage as well as the link between firm-bank relationship and size, on the one hand, and leverage on the other hand, we consider two cases. In the first case, we have split the sample according to firm's age and in the second according to the length of the firm-bank relationship using the sample median as the splitting criteria. In both cases the coefficients on size are similar in both sub-samples, suggesting that firm size may be capturing the probability of distress, but it may also be picking up other variables relevant for the capital structure of firms.

Looking at the partial effect of firm age on capital structure, Table 7 indicates that there is no detectable link between the two. By contrast, there is a negative and significant relationship between profitability and the level of financial debt relative to capital: leverage falls with profitability mainly because relatively profitable firms generate ample internal funds and, thus, need less external funds to finance their investment (see also Box 1).

Firms' ability to pledge collateral strengthens their capacity to borrow, in particular when bank-firm relationships are not yet well-established.

Collateral is important for capital structure as well: all other things being equal, firms belonging to a collective collateral association can afford a ratio of financial debt to capital that is 6.6 percentage points higher than the ratio of firms not belonging to such an association; this is a remarkable effect - equivalent to 16 percent of the SMF sample average financial debt to capital ratio. Likewise, firms with more tangible assets can borrow more. This link is, however, not particularly strong: increasing the share of tangible assets from the median to the 95th percentile (i.e. from 14 to 47 percent) would increase leverage by only 3.4 percentage points. If tangible assets are indeed capturing ability to pledge collateral, their effect on leverage should be lower for firms with strong bank ties. This is because – as Berger and Udell (1995), for instance, have argued – bank ties partly substitute for collateral and, thus, firms with stronger ties need to pledge less collateral. To test this hypothesis, we have split the sample into two sub-samples, using the median length of the main firm-bank relationship (which is eight years) as a sorting criteria; this analysis shows indeed that the tangible-asset coefficient is 55 percent larger for firms with short relationships compared to firms with long relationships.

Ownership concentration lowers the ability of the firm to raise financial debt. This runs counter to the idea that tightly controlled firms can more easily commit to repay debt. A possible explanation is that tightly controlled firms also find it easier to transform assets

12 For instance, Guiso and Parigi (1999) compute the conditional variance of future sales growth on a sample of Italian manufacturing firms based on the firms' self-reported subjective distribution of expected demand growth. The authors show that, controlling for expected growth, this measure of uncertainty strongly decreases with the size of the firm.

at the expense of external financiers, engage in assets substitution, and expropriate debt holders by taking excessive risk. In fact, Myers and Rajan (1998) have shown that transformation risk reduces debt capacity.

Listed firms are – as expected – less leveraged since they can more easily raise equity in the market. At the same time, the mere willingness to go public does not have a statistically significant effect on leverage.

Not surprisingly, firms with financial subsidies are more levered: receiving subsidised loans raises, all other things being equal, financial debt relative to capital by 5.8 percentage points on average, a relevant effect that, if not controlled for, could distort comparisons across firms.

Finally, operating in a province with inefficient courts significantly lowers a firm's debt capacity – both statistically and economically. To illustrate, if the level of inefficiency of the most inefficient province could be reduced to that of the sample median, the average leverage of firms located in this province would go up by 7.5 percentage points – all other things being equal. Interestingly, this effect is opposite to the one we found with the probit regression, which suggested that the probability of using financial debt increases with the degree of inefficiency. Since the Tobit estimates presented here combine the effect of the regressors on the extensive margin (the decision to rely on financial debt) with that on the intensive margin (how much debt to raise given that a positive amount has been opted for), the Tobit estimates suggest that the latter effect dominates. Furthermore, it implies that the effect on the intensive margin is actually larger than what Tobit estimates suggest.[13]

3.4 A short summary and a variation on the theme

The capital structure of firms and the maturity structure of their debt depend largely on whether or not firms borrow, but not on how much they borrow if they borrow.

We have seen that the share of financial debt in total liabilities rises with firm size. But we have also learned that once size exceeds a certain threshold, a further increase in size does not fundamentally change the capital structure of firms. One of our key findings is that the positive link between size and the relative importance of financial debt exists largely because small firms often do not have any financial debt at all on their balance sheets. Looking only at those firms that have financial debt, we find no link between firm size and the share of financial debt. But this implies that size must have an effect on the probability of having financial debt. This is indeed what our empirical analysis suggests: firms below a threshold of roughly 30-40 employees are far less likely to have financial debt than firms above this threshold.

A variation on this theme emerges when analysing the link between firm size and the maturity structure of debt. Our main findings on this variation are summarised in Box 2. Suffice to note here that the probability of having long-term debt sharply increases with firm size. But what does all this imply for small firms' access to the market for financial debt, notably bank loans? It is informative to find that the probability of using financial

13 To shed further light on this issue, we have run a Heckman two-step estimator distinguishing the decision of whether to use financial debt from the decision of how much debt to have, given that a positive amount of debt is being used. The results of this exercise (not reported) show that the effect of court inefficiency is strongly negative and twice as large as in the regression for leverage, but positive in the decision of whether to use debt. The two-step estimator also reveals that size mainly affects the extensive margin but leaves the intensive margin basically unaffected. This is consistent with the descriptive evidence shown in Figures 1 and 2.

Box 2. Determinants of debt maturity

A striking feature of small and medium-sized firms in the SMF sample is that almost half of them have no long-term financial debt and close to 60 percent have no long-term bank debt. For the very small businesses, the situation is even more pronounced: two-thirds have no long-term financial debt and three-quarters have no long-term bank debt. Table B2 reports a probit regression for the probability that firms have long-term bank debt and a Tobit regression for debt maturity, measured by the share of long-term bank debt in total bank debt (we have also run regressions for long-term financial debt and the maturity of financial debt; the results - not shown - are very similar to those for bank debt).

Table B2. Determinants of debt maturity of manufacturing SMEs in Italy

	Use of long-term bank debt (probit regression)	Maturity of bank debt (Tobit regression)
Firm characteristics		
Employment (log)	0.498***	0.105***
Age (log)	0.090**	0.005
Gross return on assets	-0.639**	0.359***
Collateral association	0.200*	0.025
Tangible assets/total assets	1.499***	0.568**
Ownership concentration	-0.254***	-0.099**
Listed	0.110	0.093
Intention to go public	0.158	0.039
Investment in R&D	0.137**	-0.001
Depreciation rate	-1.105***	-0.567***
Recipient of financial subsidies	0.292***	0.091***
Features of operating environment		
Court inefficiency	-0.752	-0.615
Pseudo R2	0.15	0.10
Number of observations	2,841	1,998
Left-censored observations	n.a.	744
Right-censored observations	n.a.	47

Notes: The probit regression estimates the effect of the explanatory variables (first column) on the probability of using long-term bank; the two-limit Tobit regression provides estimates for the relation between the explanatory variables and debt maturity; *** (**) [*] indicates that the coefficient is significant at the 1% (5%) [10%] confidence level.

Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale*.

To start with the results of the probit regression, we first note that the probability of using long-term bank debt sharply increases with firm size. To illustrate, for the median firm (32 employees), the probability to have long-term bank debt is 64 percentage points lower than for the 95th percentile firm (432 employees). Older firms are also more likely to rely on long-term debt. Firms with a high return on assets use long-term debt less frequently, as they can replace costly external debt finance of any maturity with cheaper internally generated funds.

The ability to pledge collateral has a positive impact on the probability of using long-term debt. The economic effect of participating in a collective collateral association is particularly important: belonging to such an association raises the probability of using long-term bank debt by almost 7 percentage

points. Firms with a higher share of tangible assets are also more likely to rely on long-term debt: increasing the share of tangible assets raises the probability of using long-term bank debt by about 10 percentage points - a remarkable effect, equal to about 20 percent of the unconditional probability of using long term debt.

There is more to say about the impact of collateral. As argued by Hart and Moore (1994), the maturity of debt should be positively related with the expected lifespan of assets. Given that lifespan and the rate at which capital depreciates are inversely related, one would expect a negative relationship between the depreciation rate and the maturity of debt. The rationale is that when assets and, by extension, collateral lose their value slowly, lenders keep their ability to extract debt service payments; this should make them more willing to commit funds for longer periods. Table B2 shows that the depreciation rate has indeed a negative effect on the probability of using long-term bank debt: lowering the rate of depreciation from its 90th percentile (24 percent a year) to its median value (8 percent a year) increases - all other things being equal - the probability of using long-term bank debt by 7 percentage points. Overall, this shows that firms try to match the maturity of assets and liabilities.

With regard to the other firm characteristics, it is worth noting that ownership concentration has a negative effect on the use of long-term debt. One interpretation is that tightly controlled firms are reluctant to run the risk of releasing control in case of bankruptcy and, thus, avoid debt, particularly long-term debt; another is that lenders are reluctant to lend to tightly controlled firms, particularly long term, because tightly controlled firms can more easily extract surplus from controlling the assets at the expense of the external financiers. Finally, note that court inefficiency has no statistically significant impact on the probability of borrowing long term. One plausible explanation is that judicial inefficiency hampers lending in general, irrespective of whether short- or long term.

Turning to the results of the Tobit regression, we stress that debt maturity is an increasing function of firm size. However, it is unaffected by age. Given that age has a positive impact on the probability of using long-term debt, the absence of a link between age and maturity implies that once firms use long-term debt, the debt maturity is negatively correlated with the age of the firm. This is indeed what one finds if a two-stage Heckman model is fitted to the data.

More profitable firms can afford longer maturities. Thus, the effect of profitability on debt maturity is just opposite to the profitability effect on the probability of using long-term debt: conditional on using long-term debt, which is less likely the more profitable the firm is, the maturity of debt lengthens with the profitability of the firm.

The proxies for collateral have a positive impact on debt maturity while the rate of capital depreciation significantly shortens the maturity of debt. These results confirm that firms tend to match the maturity of assets and liabilities.

debt (of short and long maturity) is lower the smaller firms are. But this does not tell us whether this reflects firms' choice or credit rationing by lenders. However, the negative impact of a firm's equity on the probability of having financial debt is consistent with the hypothesis that the absence of debt reflects choice, but is inconsistent with rationing. But whether small businesses face rationing remains unanswered. We tackle this issue in the next section.

4. Credit rationing of small businesses and the role of firm-bank relationship

The SMF includes questions (and answers) that allow studying whether firms are excluded from the credit market and how possible exclusion depends on firm size. More specifically, firms were asked whether, in 1997, they (i) demanded a larger volume of loans at the

A firm can be considered credit-rationed if it applied for a loan, was willing to pay at least the going market interest rate, an was nevertheless turned down.

prevailing market interest rate, (ii) were willing to pay a slightly higher interest rate to obtain additional loan finance, and (iii) applied for additional loans but were turned down.[14] Answers to these questions can be used to identify credit-rationed firms. To this end, we adopt two definitions of credit rationing. One is relatively broad, considering a firm credit rationed if it applied for additional loan finance, but was turned down. Following this definition, all firms with a positive answer to question (iii) are classified as credit rationed; we shall call this credit rationing of type 1. The other definition is narrower, considering a firm credit rationed only if it was turned down although it was willing to pay a higher interest rate to obtain additional loan finance. Following this definition, all firms with a positive answer to questions (ii) and (iii) are classified as credit rationed; we shall call this credit rationing of type 2.

In addition to collecting this type of information, the SMF also enquires about firm-bank relationships. In particular, firms are asked to describe their relationship with banks along four dimensions: the number of banks they borrow from, the share of loans obtained from the main lender, the length of the relationship with the main lender, and the location of the main lender; the purpose of the last aspect is to determine whether the main lender is a local bank, i.e. one that has its headquarters in the same region as the firm (Box 3 elaborates on small firms and the nature of firm-bank relationships). An important strand of literature, starting with Sharpe (1990) and followed by Petersen and Rajan (1992), argues that stronger ties between a firm and its bank(s) – essentially resulting from long-term relationships – translate into implicit contracts that make lenders more willing to lend to the firm. Hoshi *et al.* (1991), for instance, show that Japanese firms that are affiliated with a *keiretsu* depend less on internally generated funds than firms without such ties; the authors see this as evidence for the hypothesis that tight firm-bank relationships help avoid credit constraints.

Table 8 shows summary statistics that describe two important aspects. One is the composition of the SMF sample if we use the answers to the credit-rationing question as a sorting device. The second aspect concerns the link between the answers to the credit-rationing question, on the one hand, and certain firm characteristics and the information on firm-bank relationship on the other hand.

To analyse the composition of the SMF sample, note that in Table 8 firms have been grouped as follows:

- Column 1 comprises the full SMF sample (4,267 firms);
- Column 2 provides information on firms that demanded more loans at the prevailing interest rates (602 firms), i.e. those firms with a positive answer to the first credit-rationing question;
- Column 3 covers the firms that were willing to pay a slightly higher interest rates to obtain additional bank finance (220 firms), i.e. those firms with a positive answer to the second credit-rationing question;
- Column 4 consists of the firms that did apply for additional loans but were turned down (155 firms), i.e. those firms with a positive answer to the third credit-rationing question;
- Columns 5 and 6 complement the picture, showing information on firms that were not turned down (4,112 firms) and on firms that demanded and received additional loans (447 firms).

14 A Bank of Italy survey on a sample of manufacturing firms raised similar questions; for a study of this survey see Guiso (1997).

Box 3. Small firms and the nature of firm-bank relationships in Italy

As Table B3 shows, a distinctive feature of firm-bank relationships in Italy is that most firms borrow from more than one bank. More specifically, 94 percent of the firms in the SMF sample rely on multiple banking, and the median number of relationships (not shown) is five, which compares to a median of one in the United States. The average number of relationships increases monotonically with firm size; but even very small firms tend to borrow from quite a number of banks.

Table B3. Key features of small firms' relationships with banks in Italy

		Number of employees			
	Total SMF sample	<30	30-100	100-250	250-500
Number of relationships	6.1	4.4	6.2	9.3	11.1
Share of firms with multiple relationships (in %)	94	91	97	98	95
Share of loans from main bank (in%)	30	32	29	27	25
Length of relationship with main bank (in years)	16.1	14.8	16.1	17.9	18.9
Percentage of firms where main bank is local	66	67	65	55	60

Notes: The table shows the average of various measures; banks include commercial banks, saving and loans associations, savings banks, credit unions, and mortgage banks.
Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale*.

Obviously, the number of relationships offers only a partial view. Looking at the main relationship, we find that the share of loans extended by the main lender amounts to an average of 30 percent for the whole SMF sample; this share decreases slightly with firm size. The importance of the main bank varies a lot with the number of firm-bank relationships (not shown): for firms with two relationships, the share of the main bank amounts to 84 percent; for firms with three to five relationships, the main bank accounts, on average, for 46 percent of a firm's borrowing. While the share of the main bank decreases with the number of relationships, there nevertheless remains an asymmetry in the sense that the main bank continues to dominate; this suggests that small businesses, while diversifying their sources of bank funds, try to retain as much as possible the advantages of having a main lender.

Another important dimension of firm-bank relationships is their duration. The average length of firms' relationship with their main lender is 16 years, suggesting that firms seek long-term relationships with the main lender.

An interesting question is whether there is a correlation between the size of firms and that of banks. One feature of small businesses is their lack of transparency and, thus, the need for closer monitoring. Tight relations with banks can be away of mitigating the information problems that arise in small businesses. But which banks are better placed to solve these problems? In general, loan officers of small banks are closer to firm's managers than loan officers of larger banks, allowing the former a better monitoring of firms' actions. Thus, small banks seem to be a good match for small firms. The teaming up of small firms with small banks (and vice versa) is indicated by the high percentage of firms (66 percent) that use a local bank as their main bank, i.e. one that has its headquarters in the same province as the firm. This is consistent with evidence presented by Padoa-Schioppa (1994), who shows that the overwhelming majority of banks that act as main lenders to small firms have their headquarters in the province where the firms are located. Overall, small, local banks tend to concentrate their lending on small businesses and typically act as main lenders.

To summarise, the structure of bank-firm relations among small businesses is such that only a small fraction of manufacturing firms entertain a single relationship. The vast majority borrows from several banks and the number increases with the size of the firm.

Table 8. Summary statistics on the demand for and access to credit of manufacturing SMEs in Italy

	Type of firm					
	(1) All (4,267)	(2) Demanding more loans (602)	(3) Willing to pay higher interest rate (220)	(4) Turned down (155)	(5) Not turned down (4,112)	(6) Demanding more loans but not turned down (447)
Percentage of firms that were ...						
... demanding more loans	14.1	100.0	82.6	100.0	11.1	100.0
... willing to pay higher interest rate	5.2	30.1	100.0	47.0	3.5	23.6
... turned down	3.6	24.2	33.4	100.0	...	...
... turned down & willing to pay higher rate	1.7	11.9	33.4	47.0	...	...
Firm characteristics						
Employment (number of employees)	67.7	55.7	58.9	54.5	68.1	55.9
Age	23.1	21.2	21.9	21.3	23.1	21.2
Gross return on assets (in %)	11.6	9.4	9.5	8.1	11.7	9.8
Equity/asset (in %)	25.2	20.6	19.5	16.1	25.5	22.1
Debt/assets (in %)	50.2	53.7	54.5	57.8	49.9	52.5
Features of firm-bank relationship						
Number of bank relationships	6.1	6.0	5.7	6.0	6.1	5.9
Share of loans from main bank (in %)	30.3	34.0	36.0	34.9	0.3	33.5
Percentage of firms where main bank is local	65.6	70.4	71.6	68.2	60.8	71.0
Length of relationship with main bank (years)	16.1	14.4	15.1	13.8	16.2	14.6

Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale*.

Let us first take a look at the share of firms in the SMF sample that gave a positive answer to the credit-rationing questions (column 1 and rows 1 to 3): 14 percent of all firms in the SMF sample had a demand for additional loan finance; 5.2 percent of all firms (i.e. more than one-third of those demanding additional loan finance) were willing to pay a (slightly) higher rate to receive the additional finance; finally, 3.6 percent of the firms in the sample were turned down, which means that one out of four firms that demanded additional loans was denied credit. An important point to note is that the fraction of firms that were turned down is far below the fraction of firms with zero debt, implying that credit rationing cannot explain why a substantial number of firms do not have bank debt on their balance sheets.

We now highlight some features of those firms (and their relationship with banks) that expressed a demand for additional loan finance (column 2 and rows 5 to 13): these firms had, on average, 56 employees and thus were smaller than the average SMF firm (68 employees); compared to the average SMF firm, they also had a lower return on assets

(9.4 percent), less equity (equivalent to about 21 percent of assets), slightly more financial debt (54 percent of assets), and a somewhat shorter relationship with their main lender (14.4 years), which was a local bank in 70 percent of the cases.

Although credit rationing happens, it is not a widespread phenomenon in Italy.

What can we observe about the firms that were turned down, i.e. credit-rationed firms of type 1? Column 4 and row 4 indicate that 47 percent of these firms were ready to pay a higher interest rate, i.e. they encountered type 2 credit rationing. Given that the share of turned-down firms in the SMF sample is 3.6 percent – let us call this the unconditional probability of credit rationing – credit rationing of type 2 thus applied to about 1.7 percent of firms in the SMF sample (column1, row 4). For comparison we note that 30 percent of all firms demanding additional loan finance were willing to pay higher interest rates while only about 24 percent of the firms that were not turned down would have been willing to pay more for their loans. This comparison suggests the following interpretation: firms that were turned down value an extra euro of bank finance more than firms that were not rejected.

When we compare the characteristics of credit-rationed firms (of type 1 from here on) with those that were not turned down, the following picture emerges (see columns 4 and 5). Credit-rationed firms were somewhat smaller (54 employees compared to 68), two years younger, and less profitable; they also had a much lower equity ratio (16 percent compared to almost 26 percent) and more financial debt. In terms of firm-bank relationships, the two groups are very similar although the average credit-rationed firm had a somewhat shorter relationship with its main bank, which was more likely to be a local bank.

Overall, the summary statistics shown in Table 8 point at characteristics of firms and their relationships with banks that could help assess the probability that small and medium-sized firms are credit rationed. To evaluate more precisely the role of these characteristics and their statistical significance, we have run probit regressions for the probability that firms' credit demand is turned down. Table 9 shows the results, with each column representing a different specification of the regression.

The first three regressions look at the probability of credit rationing as a function of firm characteristics and features of the province in which firms operate, but we do not yet account for the features of firm-bank relationships. In discussing the results and their theoretical underpinning, we start with five issues and we mainly use column 1 to highlight them.

First, firm size has a strong negative impact on the probability of credit rationing: all other things being equal, increasing firm size from the median to the 95th percentile reduces the probability of being turned down by 2.6 percentage points. This is a remarkable effect given that the unconditional probability of being turned down is 3.6 percent. The empirical evidence is thus consistent with *a priori* reasoning, suggesting that size is relevant for credit market access because information on larger firms is more easily available or transferable, which reduces information asymmetries and thus alleviates access to credit markets. Moreover, larger firms are more likely to have access to non-bank finance and a geographically larger market, the latter allowing them to switch banks more easily if turned down by one of the banks. This is consistent with evidence shown in

Table 9. Determinants of credit rationing of manufacturing SMEs in Italy

	Regression (1)	Regression (2)	Regression (3)	Regression (4)	Regression (5)
Firm characteristics					
Employment (log)	-0.18***	-0.19***	-0.18***	-0.19***	-0.17*
Age (log)	-0.035	-0.028	-0.036	0.028	0.004
Gross return on assets	-1.37**	-1.43***	-1.38**	-1.19**	-0.10
Collateral association	0.362**	0.388**	0.359**	0.310*	0.218
Tangible assets/total assets	0.527**	0.556***	0.522**	0.506**	0.874**
Ownership concentration	0.0025	0.0024	0.0025	0.0025	0.0016
Intention to go public	0.212	0.239	0.208	0.192	-0.098
Investment in R&D	0.134	0.131	0.130	0.149	0.104
Equity/assets	-1.72***	-1.63***	-1.71***	-1.65***	-1.64***
Bank debt/assets	0.519**	0.536**	0.522**	0.558**	0.226
Features of firm-bank relationship					
Number of bank relationships				-0.0001	0.0024
Share of loans from main bank (in %)				0.0011	0.0001
Length of relationship with main bank (years)				-0.0083	-0.0048
Percentage of firms where main bank is local				0.1033	-0.0052
Features of operating environment					
Trust	- 2.2***		- 2.7**	- 2.7**	- 0.7**
South			0.095	0.097	0.073
Court inefficiency		5.49**			
Observations	3,541	3,541	3,541	3,236	446
Pseudo R2	0.0085	0.0079	0.0089	0.0091	0.054

Notes: The table reports results of probit regressions for the probability that the demand of a firm for an additional loan is turned down; the left-hand side variable is an indicator equal to 1 if the firm wanted more loans in 1997, applied for them, and was turned down by a financial intermediary; it is equal to zero otherwise; *** (**) [*] indicates that the coefficient is significant at the 1% (5%) [10%] confidence level.
Source: Own calculation based on the 1999 Survey of Manufacturing Firms (SMF) of *Mediocredito Centrale*.

Guiso *et al.* (2002), who find that smaller firms depend more heavily on developments in local bank markets.

Second, firms that can offer more and better collateral should, in principle, have better access to finance because pledging collateral encourages borrowers to use finance wisely. There is a counterargument, however. Stiglitz and Weiss (1981, 1986) have pointed out that collateral requirements may result in adverse selection: firms with larger amounts of marketable wealth may be more inclined to take higher risks, assuming entrepreneurs are risk averse; furthermore, among firms that can offer more and/or better collateral there is likely to be a larger proportion of firms that undertook risky projects in the past, which – by chance – were successful. In these circumstances, collateral may be a proxy for (unobservable) risk taking and, thus, high collateral could be associated with a high probability of credit rationing. Overall, the effect of collateral on the probability of credit rationing is *a priori* ambiguous. Against this background, what does the probit regression tell us? Table 9 indicates that tangible assets and participation in a collective collateral

In theory, the effect of collateral on the probability of credit rationing is ambiguous. Our empirical results do not give a clear-cut answer either.

association have a positive and statistically significant effect on the probability that credit demand is rejected. Being part of a collective collateral association, for instance, raises the probability of being turned down by 3.2 percentage points, virtually doubling the unconditional probability that additional credit demand is being denied. This suggests that the negative effects of collateral on access to credit outweigh the positive effects. An alternative (and in our view more plausible) explanation is that our indicators of collateral reflect self-selection: firms with a high probability of being turned down – because they are riskier and their willingness to bear risk is not observable, for instance – may twist the composition of their assets towards assets that can be pledged, and they may participate in collective collateral associations to avoid credit rationing. Self-selection would bias results towards finding a positive correlation between the probability of being turned down and the measures of collateral. This is indeed what we find.

Lack of equity has a strong effect on the probability of credit rationing.

Third, let us look at the effect of equity. Holmström and Tirole (1997) and Tirole (2001) have argued that credit demand of firms may be rejected simply because they lack equity. Loan contract models that account for moral hazard often have the property that finance will not be forthcoming if the firm's equity falls below a certain threshold. The results of our probit regression are fully consistent with this hypothesis. There is a negative and significant relation between the probability of credit rationing and the equity ratio and, as a result, the credit demand of firms with more equity is less likely to be turned down. To illustrate the effect, note that an increase in the equity to asset ratio by one standard deviation (corresponding to an increase of 16 percentage points) lowers the probability of rationing by 1.6 percentage points, i.e. halving it compared to the unconditional probability. In this context, note that the credit demand of more profitable firms is less likely to be rejected than the demand of less profitable firms – as one would expect.

Fourth, financial leverage – measured by the ratio of bank debt to total assets – can be expected to have an impact on the probability of credit rationing. There are at least two reasons why a highly indebted firm may face problems in obtaining additional bank loans – even if the investment to be financed is profitable. One is that having substantial financial debt limits the collateral available that could be pledged when demanding additional bank loans. Second, as emphasised by Myers (1977) and the subsequent literature, seniority of the initial debt and limitations to debt renegotiation may make the new project undesirable to new investors. In sum, a debt overhang induces rationing. The results of the probit regression on the SMF data set are consistent with this view: the more financial debt a firm has, the higher chances are that a demand for additional credit will be rejected.

Finally, firms located in a province with a high level of trust and, thus, with potentially severe penalties imposed by the local community in case of misbehaviour, are less likely to be turned down. Furthermore, the effect of social enforcement is economically important: all other things being equal, an increase in trust equivalent to a jump in the trust indicator from the 5th percentile to the 95th percentile lowers the probability of credit rationing by 3.4 percentage points. The regressions in columns 2 and 3 offer an elaboration on the theme. In column 2, the trust variable has been replaced by a measure of court inefficiency (with the measure differing across provinces). It turns out that court inefficiency has a positive and statistically significant effect on the probability of rationing, consistent with the idea that lack of enforcement shrinks the supply of loans. However, when we regress the probability of rationing on trust and court inefficiency (not shown), only the latter is

statistically significant. In essence, as trust and court inefficiency are negatively correlated (correlation coefficient -0.23), it is difficult to isolate their distinct contributions. In light of this, the regression in column 3 uses the trust variable again, but also adds a dummy variable indicating whether or not a firm is located in the South of Italy to make sure that the trust variable is not measuring geographical differences. The results show that this is not the case and that trust continues to have a significantly negative impact on the probability of credit rationing. Overall, these results are consistent with the recent literature on law and finance, started by La Porta *et al.* (1998), that shows that legal variables and the efficiency of the judicial system strongly affect the supply of loans since well-functioning legal institutions can more promptly penalise default and strategic non-repayment of loans. For a given level of legal penalty, social regret and punishment exercised by the members of the community of the borrower can also contribute to the enforcement of repayment promises, as shown by Guiso *et al.* (2002).

The efficiency of the judicial system has a strong effect on the supply of loans.

We now widen the scope of the analysis (column 4) and examine how the nature of firm-bank relationships influences the probability of credit rationing. It turns out that none of the four variables describing firm-bank relationship is statistically significant, although the duration of the relationship with the main lender comes close. This suggests that what probably matters for reducing information asymmetries or enhancing commitment to repay is the duration of the relationship with the main lender rather than the number of banks the firm borrows from or the location of the bank. However, when interpreting these results one needs to bear in mind that an endogeneity bias possibly affects the firm-bank relationship variables since the firms may choose the configuration of lending relations, making it hard to isolate the effect of the nature of the relationship on access to credit.

The results discussed so far are based on the full SMF sample. A possible objection is that these results are picking up the effect of firm characteristics (and features of firm-bank relationships) on the probability that a firm applies for a loan rather than on the probability that a loan applicant is turned down. To account for this we have run the probit regression only for those firms that actually asked for more loans. The results are summarised in column 5. As the estimates show, all variables retain their sign though some cease to be statistically significant, mainly because estimates are now based on a much smaller sample. Interestingly, among the variables that are robust to this choice of sample are firm size and the equity to asset ratio: both have a negative and statistically significant effect on the probability of rationing even in this smaller sample. It is worth illustrating the magnitude of these effects: for firms that applied for a loan, increasing firm size from the median to the 95th percentile reduces the probability of credit rationing by almost 11 percentage points; increasing the equity-asset ratio from the median to the 95th percentile reduces the probability of credit rationing by about 17 percentage points; to put things into perspective, we recall from Table 8 (column 2, row 3) that the unconditional probability of being turned down is 24 percent. Thus, size and equity are critical in explaining differences across firms in the access to the credit market.

5. Conclusions

This paper has shown that a distinctive feature of small business finance in Italy is the fairly limited use of financial debt, which largely consists of bank debt. Almost one-third of the firms in the SMF sample have no bank debt, and the share of firms without bank debt is

even larger in the case of very small businesses. Among firms that have positive financial debt, the capital structure is the same across firms of different sizes.

In principle, the absence of bank debt on the balance sheet of many firms could be either because firms choose not to borrow or because banks decide not to lend. The findings of this paper suggest that the first possibility is more likely. In fact, the fraction of firms with no bank debt at all is much larger than the fraction of firms that have experienced credit rationing, which implies that many firms with zero debt are not excluded from the credit market. Furthermore, firms with more equity are less likely to have financial debt on their balance sheets. As more equity improves a firm's capacity to borrow, this feature is inconsistent with the hypothesis that the absence of financial debt reflects credit rationing. While credit rationing may thus not be a widespread phenomenon, it is nevertheless true that firm size and equity help explain differences across firms in their access to the credit market.

Annex

The SMF Survey

The 1999 Survey of Manufacturing Firms (SMF) is the main data source used for this paper. The SMF is conducted every three years on a sample of small and medium-sized manufacturing firms with at least 10 employees. The 1999 sample comprises 4,497 firms, covering the period 1995-1997. The survey collects information on a variety of aspects, including the level and structure of employment, level and type of investment, research and development (R&D) activities, location, ownership structure, industrial sector, year of foundation, capacity utilisation, total sales, export sales, and innovation activity. It also includes the flow of funds for fixed investment and for investment in R&D over the three years preceding the survey. For most of the firms interviewed in the survey the last three balance sheets are also available. For firms with less than 500 employees, the sample is stratified by gross product per employee in order to ensure that it is representative. Also, detailed information on mergers, acquisitions and break-ups is available. A special section reports information on firms' relations with financial intermediaries, access to bank credit, and on firms' credit applications that have been denied, which allows the identification of credit-rationed firms.

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