A More Complete Conceptual Framework for SME Finance

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Prepared for presentation at the

World Bank Conference on

Small and Medium Enterprises: Overcoming Growth Constraints

World Bank, MC 13-121
October 14-15, 2004

The opinions expressed do not necessarily reflect those of the Federal Reserve Board or its staff. The authors thank Thorsten Beck and Asli Demirguc-Kunt for helpful direction with the paper.

1. Introduction

The availability of external finance for small and medium enterprises (SMEs) is a topic of significant research interest to academics and an issue of great importance to policy makers around the globe. The conceptual framework to which most of the current research literature adheres has proven to be quite helpful to advancing our understanding of the markets for providing funds to SMEs in both developed and developing nations. As well, this framework has aided our understanding of the effects of policies that both facilitate and hinder the access to funding by creditworthy SMEs in these nations.

However, we argue that the current framework presents an oversimplified model that overlooks some important distinctions across national financial institution structures and lending infrastructures and the way in which these elements of the financial system affect SME credit availability. By financial institution structure, we mean the market presence of different types of financial institutions that provide credit, as well as the competition among these institutions. By lending infrastructure, we mean the rules and conditions set up mostly by governments that affect financial institutions and their abilities to lend to different potential borrowers. We argue that differences in the financial institution structure and lending infrastructure may significantly affect the availability of funds to SMEs by affecting the feasibility with which financial institutions may employ the different lending technologies in which they have comparative advantages to provide funds to different types of SMEs.

Much of the recent research on SME access to funding, including papers by the present authors, focuses on the comparative advantages of different types of financial institutions in using transactions lending technologies versus relationship lending. Transactions lending technologies are primarily based on "hard" quantitative data that may be observed and verified at about the time of the credit origination. This hard information may include, as examples, financial ratios calculated from certified audited financial statements; credit scores assembled from data on the payments histories of the SME and its owner provided by credit bureaus; or information about accounts receivable from transparent, low-risk obligors that may pledged as collateral by the SME or sold to the financial institution. This information may be relatively easily observed, verified, and transmitted through the communications channels within the financial institution. Individual transactions technologies are distinguished from one another by the type and source of hard information that is main basis for the underwriting decision.

The relationship lending technology, in contrast, is based significantly on "soft" qualitative information gathered through contact over time with the SME and often with its owner and members of the local community. The soft information may include the character and reliability of the SME's owner based on direct contact over time by the institution's loan officer; the payment and receipt history of the SME gathered from the past provision of loans, deposits, or other services to the SME by the institution; or the future prospects of the SME garnered from past communications with SME's suppliers, customers, or neighboring businesses. The soft information may often be proprietary to the loan officer and may not be easily observed by others, verified by others, or transmitted to others within the financial institution.

The most common findings in the extant research are that large institutions have comparative advantages in transactions lending to more transparent SMEs based on hard information, while small institutions have comparative advantages in relationship lending to informationally opaque SMEs based on soft information (e.g., Berger, Miller, Petersen, Rajan, and Stein forthcoming). A policy implication that might at first blush seem reasonable is that the financial institution structure needs to include a substantial market share for small institutions to meet the demands of informationally opaque SMEs, since these SMEs may be constrained in the financing they can obtain through the transactions technologies offered by large institutions.

We contend that these findings represent an oversimplification that may be potentially misleading to both researchers and policy makers. As shown below, there are a number of different transactions lending technologies based on hard information that are quite heterogeneous. We discuss 5 of these transactions technologies – financial statement lending, small business credit scoring, asset-based lending, factoring, and trade credit. We show that while financial statement lending may be limited to transparent borrowers, the other 4 transactions technologies may be well-suited to providing credit to informationally opaque SMEs. Depending upon the borrower characteristics as well as the financial institution structure and lending infrastructure, one or more of these 4 transactions technologies may be used to supply funding to very opaque SMEs even when relationship lending cannot be effectively employed.

As an illustration in a developed nation, research suggests that large banks in the U.S. that adopted the transactions technology of small business credit scoring used it to expand their lending to SMEs that are likely to be relatively opaque – credits of under $100,000 with relatively high interest rates and poor risk

ratings (e.g., Berger, Frame, and Miller forthcoming). As an illustration in developing nations, some highly opaque SMEs in the transition countries of Eastern Europe that might not be able to obtain any type of direct loans from financial institutions may be able to obtain funding through the transactions lending technology of factoring. In many cases, the factored receivables of these SMEs involve an obligor from a developed nation that can be evaluated. The financial institution that buys the receivables bases the lending decision primarily on the creditworthiness of the obligor, rather than the SME that gains access to the funds (e.g., Bakker, Klapper and Udell 2004).

Other research on financial institution structure and SME access to funding focuses on the comparative advantages of foreign versus domestic financial institutions, and state-owned versus privately-owned institutions in lending to SMEs. As well, there is considerable research on the effects of financial institution market concentration on the supply of SME credit (e.g., Petersen and Rajan 1995). The research on these topics, while advancing our understanding of SME finance and associated policy issues, again suffers from the problem that the lending technologies are generally not observed. This makes it difficult to test theories that relate financial institution structure to credit availability for different types of borrowers. Difficulties in observing which lending technologies are employed also complicates policy assessments of which financial institution structure may best address a nation's issues of availability of funds to creditworthy transparent and opaque SMEs.

An additional area of concern regarding SME credit availability is the lending infrastructure of a nation, which defines the rights and flexibility of financial institutions to fund SMEs using the lending technology that best fits the institution and the borrower. This infrastructure includes the commercial and bankruptcy laws that affect creditor rights and their judicial enforcement; the regulation of financial institutions, including restrictions on lending, barriers to entry, and direct state ownership of financial institutions; the information infrastructure, including the accounting standards to which potential borrowers must comply as well as the organizations and rules for sharing information; the taxes that directly affect credit extension; and so forth that provide the economic environment in which financial institutions may lend in a given nation. As shown in recent research by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) and others, the lending infrastructure – as well as the infrastructures that affect equity markets and other parts of the financial system – are quite heterogeneous across both developed and developing nations and may have

important effects on the capacity of financial institutions and markets to provide finance in these nations.

We show how a nation's lending infrastructure directly affects the extent to which each of the individual lending technologies for SMEs are employed. As examples, weak accounting standards may restrict financial statement lending; restrictions on the sharing of credit information may restrict small business credit scoring; weak commercial laws and enforcement of collateral rights may inhibit asset-based lending; and poorly-designed creditor rights and judicial enforcement of these rights may limit most types of lending. In some cases, restrictions that inhibit the use of one lending technology may encourage the use of others. For instance, poor creditor rights with respect to security interests may promote the use of factoring in which the receivables are sold, rather than pledged as collateral.

We also show how other shortcomings in the lending infrastructure may restrict SME credit availability indirectly by constraining the potential financial institution structure, or the market shares of different types of financial institutions, potentially preventing them from capitalizing on their comparative advantages in the different lending technologies. To illustrate, implicit or explicit government barriers to the entry of foreign financial institutions limit the degree to which foreign institutions may compete to provide credit to SMEs using the technologies in which they excel.

Although global data on the use of different lending technologies is quite limited, there is some evidence that the use of these technologies varies significantly across countries. For example, asset-based lending has a significant presence in only 4 nations, Australia, Canada, the U.K. and the U.S. In addition, the use of factoring varies widely across countries. To illustrate, the ratio of the volume of factoring to GDP in 2002 was 11.9% in Italy, but only 0.9% in Switzerland (Bakker, Klapper, and Udell 2004). More generally, the significant variance across nations in the technologies used and the finding that lending technologies may be virtually unavailable in some countries demonstrate the potential importance of both the financial institution structures and lending infrastructures. It appears that suboptimal financial institution structures and/or lending infrastructures in many nations limit the technologies available for funding SMEs, and thereby likely significantly reduce credit availability for SMEs.

Thus, the more complete conceptual framework we emphasize in this paper represents an extension of the framework to which most of the extant research adheres. We focus on the roles of a nation's financial institution structure and lending infrastructure and how they likely affect the use or non-use of the different

lending technologies in that nation, and thereby influence the extent to which creditworthy transparent and opaque SMEs in the nation gain access to credit. The financial institution structure may affect the credit availability for both transparent and opaque SMEs because different types of financial institutions have comparative advantages in different lending technologies. The lending infrastructure may directly affect SME access to credit through restricting the lending technologies that can be legally and profitably employed, and may indirectly affect SME credit supplies through constraining the potential financial institution structure, limiting the abilities of different types of institutions to use their comparative advantages in employing different lending technologies.

Our conceptual framework may be viewed as part of the evolving research literature on the finance-growth nexus. This literature has generally found that countries with "better" financial systems as measured in different ways tend to have superior economic growth (e.g., King and Levine 1993). However, this research has not come to consensus regarding exactly which dimensions of the financial system matter most. We focus on the parts of the financial system that are most relevant to SME finance. We concentrate on the private debt markets that provide external finance to SMEs, and exclude discussions of: the public equity and debt markets, which are generally beyond the reach of SMEs; the private equity markets and the technologies they use (venture capital and angel finance), since access to these markets is typically limited to a small subset of SMEs in specific industries (e.g., Fenn, Liang, and Prowse 1997); and the funding from internal or nearly internal sources like the entrepreneur, family, and friends. The finance-growth nexus as it relates to SMEs also depends on the link between SME activity and economic growth, but we exclude this topic in the interest of brevity and to focus on the financing of SMEs.[1]

Section 2 focuses on financial institution structure and SME lending. We review some of the literature related to the comparative advantages of large versus small financial institutions, foreign-owned versus domestically-owned institutions, and state-owned versus privately-owned institutions in lending to SMEs. We also review the literature on the effects of bank market concentration on the supply of SME credit. We show how these literatures generally are able to differentiate at most between transactions lending and relationship lending. Given that 4 of the 5 transactions lending technologies may be used to fund opaque

[1] The link between SME activity and economic growth is important for research and policy purposes because of the relatively large share of the SME sector in most developing nations and because of the substantial international resources that have been channeled into the SME sectors of these nations (e.g., Beck, Demirguc-Kunt, and Levine 2003).

SMEs, the findings of these literatures may be potentially misleading to researchers and policy makers regarding the financial institution structure that may best supply credit to transparent and opaque SMEs.

Section 3 focuses on the lending infrastructures of nations and how they affect the financing of SMEs. We describe how the information infrastructure, commercial laws, judicial system, bankruptcy system, the tax and regulatory environments may directly affect SME lending. We also discuss the indirect effects of lending infrastructure on SME credit through regulatory restrictions on the financial institution structure. As well, we review some of the relatively limited research literature on lending infrastructure and SMEs.

Section 4 focuses on the lending technologies used to finance SMEs. We describe the 5 transactions lending technologies (financial statement lending, small business credit scoring, asset-based lending, factoring, trade credit) and the relationship lending technology. For each of these 6 technologies, we discuss the primary source of information used in underwriting the credit and the extent to which the technology is used to lend to transparent and opaque SMEs. We also thrash out the financial institution structures and lending infrastructures that are needed for the technology to be legally and profitably employed to lend to these SMEs. We discuss which financial institutions have comparative advantages in each technology, and which commercial/bankruptcy laws, judicial system, financial institution regulation, information infrastructure, or tax policies may encourage or discourage the use of each technology. We point out how policies that affect the use of a technology also have consequences for the availability of funding for creditworthy SMEs that might otherwise receive funding through that technology.

Section 5 provides some brief conclusions.

2. Financial institution structure and lending to SMEs

The research literature provides a considerable amount of evidence on the effects of financial institution structure on SME lending, although as noted above, the findings rarely go beyond the distinction between transactions lending technologies versus relationship lending to parse among the very different transactions technologies. Here, we briefly review the findings with regard to the comparative advantages of large versus small institutions (subsection A), foreign-owned versus domestically-owned institutions (subsection B), state-owned versus privately-owned institutions (subsection C) and market concentration (subsection D). Finally, we note some general issues with measuring the effects of financial institution

structure on SME credit availability (subsection E).

A. Large versus small institutions

There are a number of reasons why large institutions may have comparative advantages in employing transactions lending technologies which are based on hard information and small institutions may have comparative advantages in using the relationship lending technology which is based on soft information. Large institutions may be able to take advantage of economies of scale in the processing of hard information, but be relatively poor at processing soft information because it is difficult to quantify and transmit through the communication channels of large organizations (e.g., Stein 2002). Under relationship lending, there may be agency problems created within the financial institution because the loan officer that has direct contact over time with the SME is the repository of soft information that cannot be easily communicated to the management or owners of the financial institution. This may give comparative advantages in relationship lending to small institutions with lower agency costs within the institution because they typically have less separation (if any) between ownership and management and fewer overall layers of management (e.g., Berger and Udell 2002). Finally, it is often argued that large institutions are relatively disadvantaged at relationship lending to SMEs because of organizational diseconomies with also providing transactions loans and other wholesale services to large corporate customers (e.g., Williamson 1967, 1988).

The empirical literature on this topic usually does not observe the lending technologies used by large and small institutions, but rather draws conclusions about these technologies from the characteristics of the SME borrowers and contract terms on credits issued to these SMEs by institutions of different sizes. In most cases, the research is based on data from U.S. banks and SMEs. Large institutions are found to lend to larger, older, more financially secure SMEs (e.g., Haynes, Ou, and Berney 1999). It is often argued that these findings are consistent with large institutions lending to relatively transparent and relatively safe borrowers that are more likely to receive transactions credits. Large institutions are also found to charge lower interest rates and earn lower yields on SME loan contracts (e.g., Berger, Rosen, and Udell 2003, Berger 2004, Carter, McNulty, and Verbrugge 2004). It is contended that these results may reflect that large institutions lend to safer borrowers and/or employ lending technologies with lower operating costs, which are more likely to be transactions loans. In addition, large institutions are found to have temporally shorter, less exclusive, more impersonal, and longer distance relationships with their SME loan customers (e.g., Berger, Miller, Petersen,

Rajan, and Stein forthcoming). These findings are argued to suggest weaker relationships with borrowers for large institutions, which are indicative of transactions loans. Finally, large institutions appear to base their SME credit decisions more on strong financial ratios than on prior relationships (e.g., Cole, Goldberg, and White 2004, Berger, Miller, Petersen, Rajan, and Stein forthcoming). It is argued that both the dependence on strong financial ratios and the non-dependence on prior relationships for large institutions are indicative of the use of transactions lending technologies.

We argue that these findings are not as clear-cut in their support of the comparative advantages by institution size as they might at first seem. For the most part, prior authors appear to treat transactions lending technologies as a collective whole that may be adequately represented by just one of these technologies, financial statement lending. This is not necessarily the case. We agree that the findings that SME credits by large institutions tend to be associated with weaker lending relationships and less often based on prior relationships and are indeed consistent with the predicted comparative disadvantage of large institutions in relationship lending. However, we do not agree with the contentions in the prior literature that greater SME transparency, safer SME borrowers, lower rates and yields, and possible lower operating costs and greater reliance on financial ratios for large institutions provide strong support for the hypothesis that these institutions have comparative advantages in transactions lending technologies. Although greater transparency, safer borrowers, lower rates, lower operating costs, and greater reliance on financial ratios are indicative of the use of the financial statement lending technology, they are not necessarily indicative of the types of loans or borrowers associated with the other transactions lending technologies. That is, these other transactions technologies may not necessarily be used to lend to SMEs that are less opaque or safer than relationship borrowers, may not have lower rates or smaller processing costs than relationship loans, and may not be based on stronger financial ratios than the relationship lending technology.

To illustrate, note that two of the transactions lending technologies that are often used by large U.S. banks are not consistent with these characteristics. As indicated above, small business credit scoring appears to be employed by large U.S. banks to lend to SMEs that are relatively opaque and risky, and these loans have relatively high interest rates. As discussed further below, this technology is based largely on the personal credit of the SME owner, rather than on strong financial ratios of the firm. Similarly, as discussed below, the asset-based lending technology employed by many large banks is generally used to lend to relatively opaque

and risky borrowers at relatively high interest rates. These loans typically involve relatively high processing costs of monitoring the accounts receivable and inventory pledged as collateral and the primary information is based on the value of the collateral, rather than strong financial ratios of the borrower.

Moreover, even to the extent that large institutions may be disadvantaged in relationship lending and tend to lend to more transparent SME borrowers on average than small institutions, this does not necessarily imply that a sizeable presence of small institutions is necessary for significant credit availability for opaque SMEs. A limited amount of additional research finds that the local market shares of large and small U.S. banks have relatively little association with SME credit availability in their markets (Jayaratne and Wolken 1999, Berger, Rosen, and Udell 2003).

One potential hypothesis that may help explain this finding is that large U.S. banks are able to accommodate many opaque SME loan customers with transactions technologies other than financial statement lending, such as small business credit scoring and asset-based lending. That is, large institutions may have more transparent SME borrowers on average than small institutions because they have more financial statement loans to transparent SMEs than small institutions, but these large institutions may also be able to make credit available to significant numbers of opaque SMEs using the other transactions technologies. This hypothesis is difficult to test because the lending technology is usually unobserved.

A second hypothesis may also help explain the finding of little association between the market shares of large and small institutions and SME credit availability. Large institutions may be disadvantaged at serving a significant subset of opaque SMEs, but market forces may be efficient in sorting these opaque SMEs to small institutions in the market that serve these borrowers using the relationship lending technology. The empirical evidence on the effects of U.S. bank mergers and acquisitions (M&As) on SME lending provides some support for this second hypothesis, although the lending technologies and the opacity of the borrowers is typically not observed in these studies. The studies find that large institutions reduce their SME lending after M&As, but that other banks in the same local markets appear to respond by increasing their own supplies of SME credit substantially (e.g., Berger, Saunders, Scalise, and Udell 1998, Berger, Goldberg, and White 2001, Avery and Samolyk 2004). As well, new small banks are often created in these markets that provide additional boosts to the local supply of SME credit (Berger, Bonime, Goldberg, and White 2004).

The finding that the availability of credit to SMEs does not appear to depend in an important way on

the market presence of large versus small institutions in the U.S. does not necessarily apply to other nations because of other differences in the financial institution structures of these nations or lending infrastructures in these nations that limit competition for SME credits. In an international comparison, greater market shares for small banks are found to be associated with higher SME employment, as well as more overall bank lending (Berger, Hasan, and Klapper 2004). These findings hold for both developed and developing nations, hold with controls included for some other aspects of the financial institution structure (e.g., shares of foreign-owned and state-owned banks, bank concentration), and hold with controls for some aspects of the lending infrastructure (e.g., regulation, legal system).

B. Foreign-owned versus domestically-owned institutions

For a number of reasons, foreign-owned institutions may have comparative advantages in transactions lending and domestically-owned institutions may have comparative advantages in relationship lending. Foreign-owned institutions are typically part of large organizations, and so all of the logic discussed above regarding large institutions generally applies to foreign-owned institutions as well. Foreign-owned institutions may also face additional hurdles in relationship lending because they may have particular difficulties in processing and transmitting soft information over greater distances, through more managerial layers, and having to cope with multiple economic, cultural, language, and regulatory environments (e.g., Buch 2003). Moreover, in developing nations, foreign-owned institutions headquartered in developed nations may have additional advantages in transactions lending to some SMEs because of access to better information technologies for collecting and assessing hard information. For example, some foreign-owned institutions use a form of small business credit scoring to lend to SMEs in developing nations based on the SME's industry. Other institutions provide home-nation training for loan officers stationed in developing nations (Berger, Hasan, and Klapper 2004).

There is very little empirical evidence on SME lending by foreign-owned institutions in developed nations, although some research finds that these institutions tend to have a wholesale orientation (e.g., DeYoung and Nolle 1996), and in some cases tend to specialize in serving multinational corporations headquartered in their home nation, presumably using transactions technologies applied to hard information (e.g., Goldberg and Saunders 1981). Some evidence also is consistent with the hypothesis that foreign-owned institutions may have difficulty processing local soft information needed to provide cash management

services, although this finding is based on data from multinational corporations (e.g., Berger, Dai, Ongena, and Smith 2003). In most cases, the research on bank efficiency in developed nations suggests that the disadvantages of foreign ownership outweigh the disadvantages on average, although it is not known how much of this is attributable to the lending function (e.g., DeYoung and Nolle 1996, Berger, DeYoung, Genay, and Udell 2000).

The empirical findings regarding foreign-owned institutions in developing nations are quite different. Foreign-owned banks usually appear to be more profitable and efficient than domestically-owned banks on average in these nations (e.g., Claessens, Demirguc-Kunt, and Huizinga 2001, Martinez Peria and Mody 2004), although one study finds roughly equal performance after controlling for a number of different types of governance and governance change (Berger, Clarke, Cull, Klapper, and Udell forthcoming). The better performance of foreign-owned banks in developing nations relative to developed nations may be due to the better technology access noted above, or some combination of better access to capital markets, superior ability to diversify risks, or greater managerial experience. There is also evidence on the effects of foreign-owned institutions on SME credit availability in developing nations. In most of the studies, foreign-owned banks individually or larger shares for these banks are associated with greater credit availability for SMEs (e.g., Dages, Goldberg, and Kinney 2000, Clarke, Cull, and Martinez Peria 2002, Beck, Demirguc-Kunt, and Maksimovic 2004, Berger, Hasan, and Klapper 2004, Clarke, Cull, Martinez Peria, and Sanchez forthcoming), although one study finds that foreign-owned banks may have difficulty in supplying SME credit (e.g., Berger, Klapper, and Udell 2001). As above for the U.S. data, the lending technologies are generally unobserved, and there is even less information available about the characteristics of the SME borrowers or contract terms from which to infer these technologies. Although the foreign-owned institutions almost surely use transactions technologies, it is usually not known which among the technologies is employed or the opacity of the borrowers served.

C. State-owned versus privately-owned institutions

State-owned institutions may be expected to have comparative advantages in transactions lending and privately-owned institutions may be expected to have comparative advantages in relationship lending simply because state-owned institutions are typically larger. There are also a number of additional arguments with regard to the general ability of state-owned institutions to affect the supply of funds available to creditworthy

SMEs through any lending technology. State-owned institutions generally operate with government subsidies and often have mandates to supply additional credit to SMEs or entrepreneurs in general, or to those in specific industries, sectors, or regions. Although in principle, this might be expected to improve funding of creditworthy SMEs, it could have the opposite effect in practice because these institutions may be inefficient due to a lack of market discipline. Much of their funding to SMEs may be to firms that are not creditworthy because of this inefficiency. The credit recipients may also not be creditworthy because the lending mandates do not necessarily require the funding be applied to positive net present value projects, or that the loans be expected to be repaid at market rates. As well some of the funds may be channeled for political purposes, rather than for economically creditworthy ends (e.g., Sapienza forthcoming). State-owned institutions may also provide relatively weak monitoring of borrowers and/or refrain from aggressive collection procedures as part of their mandates to subsidize chosen borrowers or because of the lack of market discipline. In nations with substantial state-owned banking sectors, there may also be significant spillover effects that discourage privately-owned institutions from SME lending due to "crowding out" effects of subsidized loans from state-owned institutions or poor credit cultures that are perpetuated by the state-owned presence.

The empirical findings – which are generally either cross-section studies of many nations or focused on one or a few developing nations – are generally consistent with the negative performance effects of state ownership. Studies of general performance typically find that individual state-owned banks are relatively inefficient and that large shares of state bank ownership are typically associated with unfavorable macroeconomic consequences (e.g., Clarke and Cull 2002, La Porta, Lopez-de-Silanes, and Shleifer 2002, Barth, Caprio, and Levine 2004, Berger, Hasan, and Klapper 2004, Berger, Clarke, Cull, Klapper, and Udell forthcoming). The evidence also generally suggests that less SME credit is available in nations with large market shares for state-owned banks (e.g., Beck, Demirguc-Kunt, and Maksimovic 2004, Berger, Hasan, and Klapper 2004). As well, nonperforming loan rates at state-owned banks tend to be very high, consistent with lending to SMEs with negative net present value loans, weak monitoring of loan customers, and/or lack of aggressive collection procedures (e.g., Hanson 2004, Berger, Clarke, Cull, Klapper, and Udell forthcoming). Consistent with these findings of generally negative consequences of state ownership, studies of the effects of bank privatization in both developed nations (e.g., Verbrugge, Megginson, and Owens 2000, Otchere and Chan 2003) and developing nations (e.g., Clarke, Cull, and Megginson forthcoming) typically find

improvements in performance following the elimination of state ownership. Similar to the case for foreign-owned institutions, state-owned institutions likely generally use transactions technologies, but there is little information available on the technologies employed or data from which to infer these technologies.

Finally, note that there are exceptions to the measured unfavorable effects of state ownership – cases in which state-owned institutions have eliminated government subsidies and appear to operate relatively efficiently and provide significant SME credit (e.g., Townsend and Yaron 2001). In some cases, this may occur as the state-owned institutions employ decentralized management techniques with local responsibility to offset some of the lack of market discipline of state ownership and some of the comparative disadvantages of large size (e.g., Robinson 2001).

D. Market concentration

Greater market concentration of financial institutions may either reduce or increase the supply of credit available to creditworthy SMEs. Under the traditional structure-conduct-performance (SCP) hypothesis, greater concentration results in reduced credit access through any lending technology. This may occur in several ways as institutions in more concentrated markets may exercise greater market power. These institutions may choose to raise profits through higher interest rates or fees on loans to SMEs; they may choose to reduce risk or supervisory burden by tightening credit standards for SMEs; and/or they may choose to be less aggressive in finding or serving creditworthy SMEs, taking advantage of a "quiet life" afforded to managers by the market power. Alternatively, institutions in more concentrated markets may increase SME access to credit using one of the lending technologies, relationship lending. Greater concentration may encourage institutions to invest in lending relationships because the SMEs are less likely to find alternative sources of credit in the future. Market power helps the institution enforce a long-term implicit contract in which the borrower receives a subsidized interest rate in the short term, and then compensates the institution by paying a higher-than-competitive rate in a later period (Sharpe 1990, Petersen and Rajan 1995).

Although both theories may apply simultaneously, empirical studies have not come to consensus as to which of these may dominate empirically and whether the net supply of SME credit is lower or higher in concentrated markets. Some studies of the SCP hypothesis using U.S. data found that higher concentration is associated with higher SME loan interest rates (e.g., Hannan 1991, Berger, Rosen, and Udell 2003). Although this finding may appear to support the SCP hypothesis, it may also be consistent with the alternative

hypothesis of an expansion of relationship lending if relationship loans tend to have higher interest rates on average than transactions loans. Relationship loans do not necessarily have higher average rates, as argued above, but we cannot rule out this possibility. As above for the empirical literatures on large versus small, foreign-owned versus domestically-owned, and state-owned versus privately-owned institutions, much of the difficulty in interpreting the effects of market concentration arises because the lending technologies are generally unobserved.

A number of recent studies have looked instead to testing these hypotheses by examining the effects of banking market concentration and other indicators of market power such as regulatory restrictions on competition (part of the lending infrastructure discussed further below) on SMEs and general economic performance. The empirical results are mixed. Some of the studies find unfavorable effects from high banking market concentration and restrictions on competition (e.g., Jayaratne and Strahan 1998, Black and Strahan 2002, Berger, Hasan, and Klapper 2004), others find favorable effects of bank concentration (e.g., Petersen and Rajan 1995, Cetorelli and Gambera 2001, Zarutskie 2003, Cetorelli 2004, Bonaccorsi di Patti and Dell'Ariccia forthcoming), and still others find the effects may differ with the lending infrastructure or economic environment (e.g., DeYoung, Goldberg, and White 1999, Beck, Demirgüç-Kunt, and Maksimovic 2004).

E. Measurement issues

We briefly note here several problems that arise in the empirical literature in measuring the effects of financial institution structure. First, there is a general problem of endogeneity. It is not clear the extent to which financial institution structure measures help determine the performance of the institutions versus how much the performance of the institutions help determine the market structure. For instance, under the well-known efficient-structure hypothesis, markets with superior-performing institutions tend to become concentrated as these institutions gain dominant market shares.

Second, there are issues regarding the appropriate choice of competitive model. The maintained competitive model helps determine the appropriate measure of financial institution structure. For instance, an explicit or implicit assumption of Cournot quantity competition underlies the common specification of the Herfindahl index of concentration.

Third, the geopolitical market size over which the financial institution structure should be measured is

not always clear. Arguments are made for local markets, state markets (in the U.S.), national markets, or even multinational markets (e.g., the EU or Euro Zone). Moreover, these markets are not necessarily constant over time, as technological progress and deregulation allows institutions to offer services at increasing distances over time.

Fourth, the measured effects of financial institution structure are complicated by the direct and indirect effects of the lending infrastructure. The measured effects of financial institution structure on SME credit availability may be attenuated to the extent that a) constraints on the use of lending technologies prevent institutions from legally and profitably exploiting their comparative advantages in these technologies (direct effects); and/or b) regulations that constrain the entry and growth of different types of financial institutions prevent these institutions from gaining the market presence they might otherwise achieve (indirect effects).

The first three sets of problems are discussed in Berger, Demirguc-Kunt, Levine, and Haubrich (2004), and are not discussed further here for the sake of brevity. We discuss issues regarding the effects of lending infrastructure in Section 3 next.

3. The lending infrastructure

In this section, we turn our attention to the lending infrastructures of nations and how they affect the financing of SMEs. The lending infrastructure includes the information environment, the legal, judicial and bankruptcy environment, and the tax and regulatory environments. All of these elements may directly affect SME credit availability by affecting the extent to which the different lending technologies may be legally and profitably employed. The final element, the regulatory environment, may also restrict SME credit availability indirectly by constraining the potential financial institution structure.

A. The Information Environment

The information infrastructure likely has a significant effect on the availability of credit to SMEs. One important aspect of the information infrastructure is the accounting environment. The key issues here are existence of strong account standards and credible independent accounting firms. These are necessary conditions for informative financial statements. These are also necessary conditions for the feasibility of many components of loan contracting. For example, financial covenants are not feasible if the financial ratios calculated from bank financial statements are not reliable. Indices of global accounting standards, not

surprisingly, indicate considerable variation across countries – not only between developed and developing economies but even among developed economies (e.g., La Porta, Lopez-de-Silanes, Shleifer, and Vishny 1998).

Another important aspect of the information infrastructure is the availability of information on payment performance. The extent to which lenders share information about performance has been shown to have a significant effect on credit availability (Jappelli and Pagano 2001, Love and Mylenko 2003). Third-party information exchanges or business credit bureaus provide a formal organizational mechanism for the exchange of commercial payment performance information. Moreover, they have been shown to have power in predicting firm failure beyond financial ratios and other descriptive information about the firm (Kallberg and Udell 2003). Survey data also indicate that without credit bureaus the time to process loans, the cost of making loans, and the level of defaults would all be higher (Miller 2003). These exchanges can be privately owned – such as the world's largest, Dun and Bradstreet – or they can be publicly owned – such as the national credit registries in Italy and Argentina.

There is considerable variation across countries in terms of existence information exchanges, whether they are public or private, and the coverage of the information available through the exchange (Miller 2003). Empirical evidence suggests a statistically important link between the existence of third-party information exchanges and credit availability. Specifically, countries with stronger formal information sharing exhibit greater bank lending relative to GNP and country-level credit risk is negatively correlated with measures of formal information sharing (Jappelli and Pagano 2001).

B. The Legal, Judicial, and Bankruptcy Environment

A country's legal and judicial infrastructure significantly influences the context in which loan contracting is conducted. The legal infrastructure that affects business lending consists of the commercial laws that specify the property rights associated with a commercial transaction and enforcement of these laws. The latter determines the confidence of contracting parties in financial contracts. Collectively, these two features constitute the rule of law as it relates the extension of credit. Countries differ significantly on this dimension: for some, commercial laws are unambiguous and conducive to commercial transactions and enforcement is predictable; for others commercial law is ambiguous and incomplete, enforcement is problematic, and criminal and racketeering behavior block the creation of new businesses, undermine existing

ones, and deter foreign investment (EBRD 2003). Empirical studies have shown that firms in countries with greater financial development and stronger property rights have increased levels of investment funded by external finance while firms in countries with weaker financial development and property rights are more likely to obtain potentially less efficient financing from development banks, the government or from informal sources (Beck, Demirguc-Kunt, and Maksimovic 2004). Smaller firms may be particularly affected. One study found that the effect of financial, legal and corruption problems consistently constrained the growth of smaller firms more than larger firms in a cross-country analysis (Beck, Demirguc-Kunt, and Maksimovic 2003).

A country's commercial laws, its bankruptcy laws, and the enforcement respectively of these laws directly affect the ability of banks to deploy specific contracting elements that can be used to mitigate the problem of informational opacity. Specifically, they can affect the deployment of contracting elements that have been shown literature to minimize problems of adverse selection and moral hazard such as covenants, maturity, collateral and personal commitments (e.g., Berlin and Loeys 1988, Chan and Kanatas 1985, Sharpe 1990).

A country's commercial law on security interests (collateral liens), for example, are crucially important in determining the efficacy of collateral in a loan contract. Key issues included whether a country's commercial law clearly defines how a collateral lien can be perfected, how collateral priority is determined, and how notification of a lien is made. With respect to notification it is important whether a country has an efficient collateral registration system where secured lenders can determine the existence of prior liens and can time-stamp new liens in order to establish temporal priority. A centralized electronic registration system is preferable. At one extreme are countries such as the U.S. that have a well-developed set of commercial laws (Article 9 of the Uniform Commercial Code) and well-defined registration system. At the other extreme are countries with such as many of those in Eastern Europe where commercial laws have only been implemented only recently. Although progress is being made on this dimension, many of these Eastern European countries are still deficient in key areas such as the scope of assets that can be secured, public notification, priority, and in enforcement (EBRD 2003).

Another problem concerns security interests in movable assets such accounts receivable and inventory. While provisions exist in many developing economies that allow for security interests in movable

assets, they do not allow for group lien filings on these assets (EBRD 2003). This dramatically increases the cost of filing a lien vis-à-vis, for example, the U.S. where secured lenders can file a single lien on all currently existing and future accounts receivable and inventory rather than having to identify by invoice number and serial number each receivable and inventory item as it is generated.

The efficiency of bankruptcy system is also critical. How long a company stays in bankruptcy either in liquidation or in reorganization is important. Also important is the degree to which the bankruptcy laws and their enforcement adhere to absolute priority. For example, the power of collateral will ultimately depend on the whether the priority rights of secured lenders are upheld in bankruptcy. Details of the laws that are often missed in academic analyses can be extremely important here. For example, the rights of secured lenders in the U.S. may at first seem relatively weak because an automatic stay is immediately invoked upon acceptance of a bankruptcy petition by the bankruptcy court.[2] The automatic stay prevents all creditors from collecting payments from the bankrupt firm and otherwise enforcing their financial claims. However, under U.S. bankruptcy law, the judge is required to preserve the collateral claim of secured creditors and to give them "adequate protection" if the collateral or its proceeds are denied to the secured lender. That is, the bankruptcy judge is obligated to preserve the value of a secured lender's claim. Moreover, petitions by secured lenders for a waiver from the automatic stay are often filed at the time of the bankruptcy petition and approved by the bankruptcy judge in the case of specific collateral classes, such as accounts receivable (Udell 2004).

Strong commercial and bankruptcy laws are not sufficient to create good lending conditions without strong enforcement of these laws. A recent study of the Czech Republic by the World Bank illustrates some of the problems that can occur on this dimension that may inhibit the amount and type of credit that is made available to SMEs. In pursuing commercial claims outside of bankruptcy (i.e., against a non-bankrupt firm), the World bank found that time absorbed in enforcing loans contracts is considerably longer in the Czech Republic than in five other transition economies that have joined the EU, and somewhat longer than the 15 non-accession EU countries, although it is shorter, interestingly, than in the U.S. However, the cost of enforcement was considerably higher than any of these other groups. Pursuing claims in a bankruptcy

[2] This was one of the reasons why the U.S. has received a low rating in academic analyses of business contracting environments (e.g., La Porta, Lopez-de-Silanes, Shleifer, and Vishny1998).

environment in the Czech Republic appears to be even worse. The World Bank considered this to be worst alternative. It concluded that unsecured creditors can expect little or nothing for their claims and that secured creditors encountered limited rights, long delays with no compensation, and a poor environment for selling collateral assets (World Bank 2003).[3,4] World Bank reports on Slovak Republic and Lithuania found similar results and suggested that while these problems likely discourage most types of lending they may encourage one type, factoring (World Bank 2002a,b). We return to more discussion of the effects of the lending infrastructure, as well as financial institution structure, on the benefit/costs of alternative technologies such as factoring.

C. The Tax and Regulatory Environments

The tax and regulatory environments may have direct effects on SME credit availability. For example, stamp taxes on factored invoices and certain types of value-added taxes can have a negative impact on factoring. In another direct effect, changes in capital regulations and tougher bank supervision in the U.S. are often cited as contributing to the U.S. credit crunch in the early 1990s through a reduction in the supply of business credit (e.g., Berger and Udell 1994, Peek and Rosengren 1995). The implementation of the new Basel Risk-Based Capital requirements – to the extent that they impose a differential implicit tax on SME lending or that they favor one type of lending over another – could also have a direct impact in the future (Berger 2004).

The indirect effects of the lending infrastructure on SME credit availability may occur through regulations that constrain the potential financial institution structure, preventing institutions from capitalizing on their comparative advantages in the different lending technologies. We include here any government policies that affect entry of different types of financial institutions, their market shares, their abilities to compete, their corporate governance structure, and so forth.[5] In many parts of the world, the removal of

[3] Under Czech commercial law, secured creditors must surrender up to 30 percent of their collateral proceeds. Moreover, at best they enjoy a superior standing to unsecured creditors when taking collateral positions in accounts receivable, inventory or real estate (World Bank 2003).

[4] The institutional infrastructure associated with collateral liquidation is also likely to be a dimension on which countries differ significantly. In the U.S., there is an entire industry of companies that specialize in collateral appraisal and liquidation. There is a formal industry certification process for profession collateral appraisers. The past decade has seen the introduction of real-time internet auctions for selling liquidated collateral (Udell 2004). It is likely that similar institutions exist in most developing economies.

[5] We could also include regulations that cover the broader corporate governance structure and the regulations that govern securities markets activities. It has been shown, for example, that firm value, firm growth opportunities and cost of

geographic and product restrictions has resulted in significant consolidation within the banking industry and between banks and other types of financial institutions. Examples include the EU and the U.S. In the EU, the single banking license and other parts of the Single Market Programme appeared to spur considerable financial institution consolidation within nations, although less activity than expected across international borders within the EU. In the U.S. the removal of state geographic restrictions and Riegle-Neal Act clearly led to considerable consolidation within the U.S. banking industry, although the Gramm-Leach-Bliley Act did not appear to results in much additional consolidation between banking organizations and other types of financial institutions. However, as discussed in Section 2, the effects of bank size structure on SME credit availability are ambiguous.

Government policies that restrict foreign entry may have larger effects on SME credit availability, given the findings in Section 2 that larger market shares for foreign-owned banks are often associated with greater SME credit availability in developing nations. Other research has also found that regulatory restrictions on the entry of foreign banks may be more strongly linked to bank performance than the market presence of foreign-owned banks (Levine 2003), which may suggest these restrictions have particularly strong effects on competition, with potential consequences for SME customers.

Finally, government policies with respect to state ownership of financial institutions clearly have important effects on credit availability. Choices to start a state-owned institution, take over a private institution, or privatize an existing state-owned institution may be viewed as regulatory changes to the financial institution structure. As shown in Section 2, state-ownership is generally found to have significant negative effects on SME credit availability.

4. Lending technologies and the supply of SME credit

In this section, we look more closely at each of the lending technologies: the five transactions technologies (financial statement lending, small business credit scoring, asset-based lending, factoring, and trade credit) and the relationship lending technology. In addition to a brief description of each technology, we highlight the nature of the information used in underwriting by each technology (e.g., soft vs. hard), and how

capital have been associated with the strength of these regulations (e.g., Gompers, Ishii and Metrick 2001, Black, Jang and Kim 2003, Drobetz, Schillhofer and Zimmerman 2004, Hail and Leuz 2004). Some work has examined the effect of capital market development on firm access to external finance in analysis that also considers the legal environment and banking market development (Demirguc-Kunt and Maksimovic 1998). However, because most SMEs are owner managed and do not issue publicly traded securities the effects here may be limited and indirect.

each technology solves the opacity problem. We also discuss how the financial institution structure and the lending infrastructure affect the feasibility and efficacy of each technology. We also explore the likely variation in the mix of these technologies across financial systems.

A. Financial Statement Lending

Financial statement lending involves underwriting loans based on the strength of a borrower's financial statements. There are two requirements for this technology. First, the borrower must have informative financial statements (e.g., audited statements prepared by reputable accounting firms according to widely accepted accounting standards such as GAAP). Second, the borrower must have a strong financial condition as reflected in the financial ratios calculated from these statements. The loan contract that arises out of the analysis of these financial statements may reflect a variety of different contracting elements including collateral, personal guarantees and/or covenants. However, under financial statement lending, the lender will view the expected future cash flow of the company as the primary source of repayment.

Financial statement lending, unlike all of the other lending technologies, is reserved for relatively informationally transparent firms. For these firms, financial statement lending provides a distinct advantage: the informativeness of the financial statements addresses the information problem in a very low cost manner. As we discussed in Section II.A, because financial statement lending underwriting and monitoring is based hard information, it can be efficiently offered by larger and more complex financial institutions without incurring the organizational diseconomies discussed in the literature (i.e., discussed in Stein 2002). Importantly, however, the efficacy of financial statement lending depends crucially on the lending infrastructure. Specifically, it depends on the existence of a strong information environment, particularly with respect to accounting standards and credible auditors. Thus, it seems likely that it is not feasible for financial institutions in many developing economies to offer a substantial amount of financial statement lending.

B. Small Business Credit Scoring

Small business credit scoring is a transactions lending technology based on hard information about the SME and its owner. The information on the owner is primarily personal consumer data (e.g., personal income, debt, financial assets, home ownership) obtained from consumer credit bureaus. This is combined with data on the SME collected by the financial institution and in some cases from commercial credit bureaus (e.g., Feldman 1997, Mester 1997). The data are entered into a loan performance prediction model, which

yields a score, or summary statistic for the loan. In some cases, financial institutions make underwriting decisions based on "rules," automatically accepting or rejecting based on the score (with some manual overrides). In other cases, the score is used with "discretion" in conjunction with information gathered using other lending technologies.

Small business credit scoring is a relatively new technology, which was not widely used in the U.S. until the mid-1990s, when the largest external provider of scores, Fair, Isaac and Company, introduced its first small business model. The models are usually designed for use for credits up to $250,000, but many institutions use them only for credits up to $100,000. Similar statistical techniques, such as discriminant analysis, were used in lending to larger firms before this time, but they were based on business data, not the personal credit history of the owners (Saunders 2000). The use of the personal credit history may be viewed as the key innovation behind the development of the small business credit scoring technology. The key motivation for using this technology may often be its low cost – external providers typically charge a modest fee for each score.

Small business credit scoring clearly fits our definition of a transactions technology, given that it is based on hard information that is observed and verified at about the time of the credit origination, although the observation and verification is often performed by agents other than the financial institution extending the credit (external provider of the score, credit bureaus). It is equally clear that this technology may be applied to very opaque SMEs, given that much of the information that determines the score is based on the personal history of the owner, rather than the SME.

As noted above, small business credit scoring appears to be associated with an increase in lending to opaque SMEs in the U.S. Additional empirical findings include an overall increase in lending (e.g., Frame, Srinivasan, and Woosley 2001), that the increase occurs primarily in institutions that follow "rules" rather than "discretion" in underwriting (Berger, Frame, and Miller forthcoming), and that the increase is primarily outside of the banks' local markets (Frame, Padhi, and Woosley 2004). The research also suggests that large U.S. banks adopted this technology earlier than small banks (e.g., Akhavein, Frame, and White 2005).[6]

The effects of financial institution structure and lending infrastructure on the use of this lending

[6] We are not aware of significant research evidence on small business credit scoring outside of the U.S., although as noted above, some foreign-owned institutions from developed nations use a form of this technology in developing nations.

technology are quite important. It is necessary to have a large database on SME loan performance and the variables used to predict that performance in order to estimate a credible credit scoring model. In the U.S., most large banks use external vendors to create the scores, and these vendors rely on a strong information environment in which credit bureaus share consumer (and sometime business) information and financial institutions share their loan performance data to estimate the model. Some large institutions are also able to generate proprietary models based on their own experience. Thus, either a strong information environment, large institution size, or both appear to be needed to use this technology. The finding noted above that the technology was generally adopted earlier by larger institutions is consistent with a size-related comparative advantage, although institutions of any size can employ small business credit scoring by purchasing scores from external vendors.

C. Asset-Based Lending

Under asset-based lending, the financial intermediary looks to the underlying assets of the firm (which are taken as collateral) as the primary source of repayment. For working capital financing, banks use short-term assets, such as accounts receivable and inventory. For long-term financing, they use equipment.[7] The pledging of collateral by itself, however, does not distinguish asset-based lending from any of the other lending technologies. Collateralization with accounts receivable, inventory and/or equipment is often associated, for example, with financial statement lending, relationship lending, and credit scoring where collateral is used a secondary source of repayment. Under asset-based lending, in contrast, the extension of credit is primarily based on the value of specific borrower assets rather than the overall creditworthiness of the borrower.

Under asset-based lending, the amount of credit extended is linked to the value of the collateral on a formula basis to a dynamically managed estimation of the liquidation value of the underlying assets that are used as collateral (i.e., the accounts receivable, inventory and equipment).[8] Thus, asset-based lending is a transactions-based technology based on hard information generated nearly continuously about the value of the

[7] In asset-based lending, underwriting focuses on the value of specific business assets, not personal assets. Thus, this technology focuses on "inside" collateral not "outside" collateral (Berger and Udell 1995). Nevertheless, outside collateral can be used as a supplementary or secondary source of repayment.

[8] The linkage is then managed dynamically (daily in the case of accounts receivable, and typically weekly or monthly in the case of inventory) so that the liquidation value of the underlying assets used as collateral always exceeds the amount of credit exposure (Udell 2004).

underlying collateral. Thus, it can be delivered by large and complex financial institutions without incurring organizational diseconomies. For example, the largest banks in the U.S. have asset-based lending departments. It should be noted that the intensive monitoring of receivables and inventory that typically includes daily flow of information and periodic (usually quarterly) field audits add significantly to the cost of asset-based lending.

Asset-based lending solves the informational opacity problem by shifting the underwriting criteria from a comprehensive evaluation of a firm's risk profile to a specific evaluation of a subset of the firm's assets – specifically the tangible assets of accounts receivable, inventory and equipment.[9] Like financial statement lending and small business credit scoring, the efficacy of asset-based lending depends on the lending infrastructure. Here, however, the components of the lending infrastructure discussed in Section 3 that affect the perfection and enforcement of collateral liens are critical. In particular, the lending environment must include a strong and unambiguous set of commercial laws governing security interests such as those contained in Article 9 of the U.S. Uniform Commercial Code. In addition, it must have an efficient registration system so that lenders can determine the existence of existing liens and priority time-register new liens. And, finally, the lending environment must include a legal and bankruptcy environment that ensures the preservation of collateral priority in liquidation and reorganization.

The fact that asset-based lending in its pure form exists in only four countries suggests that these lending environment conditions represent a significant hurdle. Nevertheless, in the countries where it exists it appears to be quite important. In the U.S., for example, the stock of total asset based lending is about $300 billion (CFA 2003). This compares to the stock of commercial and industrial loans in the U.S. of about $900 billion (inclusive of bank asset-based loans).

D. Factoring

As we noted earlier factoring involves the purchase of accounts receivable by a "lender" known as a factor. Like asset-based lending underwriting focuses on the value of an underlying asset rather than the

[9] There is relatively little empirical evidence on asset-based finance. Exceptions are recent studies that find evidence consistent with practitioner and conventional wisdom that asset-based finance is associated with riskier borrowers (Carey, Post, and Sharpe 1998, Klapper 1998). One study empirically examines the informational opacity of asset-based borrowers does not find evidence of it. However, the data used in this study can not distinguish between bank asset-based and other borrowers, and it is limited to relatively large firms. In addition, its measures of opacity included tangible assets which are the *sine non qua* of asset-based lending.

overall value/risk of the firm. In some sense it is a cousin of asset-based lending. However, there are three important distinctions. First, factoring only involves the financing of accounts receivable unlike asset-based lending which, in addition to accounts receivable, involves financing inventory and equipment. So factoring is more focused. Second, under factoring the underlying asset, accounts receivable, is sold to the "lender" (i.e., the factor). Thus, title to the asset passes from the borrower to the lender. The third distinguishing feature of factoring is that factoring is essentially a bundle of three financial services: a financing component, a credit component and a collections component. Essentially, under most factoring relationships the borrower outsources its credit and collections activities in addition to obtaining financing.

Factoring is a transactions technology because it utilizes an underwriting process that is based on hard information – in this case, hard information about the value of a "borrower's" accounts receivable. Like asset-based lending it is delivered by many large financial institutions as well as smaller financial institutions. Factoring solves the informational opacity problem because under factoring credit extension does not primarily depend on an overall assessment of the quality of the firm. Instead it depends primarily on the quality of the firm.

Factoring may be a particularly valuable technology in countries with weak lending infrastructures. Because factoring involves removing the underlying asset from the bankruptcy estate, it is still feasible in countries with weak commercial laws on security interests, weak collateral registration systems, and/or weak bankruptcy systems. It can also work well in weak information environments if the receivables are associated with large obligors or obligors located in strong information environments. For example, the receivables of an Estonian firm whose customers are located in Germany might be an ideal candidate for factoring because the factor can efficiently assess the value of the receivables (i.e., the creditworthiness of the German account obligors) even though the factor can not easily assess the overall creditworthiness of the Estonian client company.[10]

E. Trade Credit

Many of the procedures and processes associated with the other lending technologies appear to be utilized in underwriting trade credit. For example, credit scoring and similar quantitative techniques have long been a part of the underwriting process used by credit managers. For larger accounts, financial

[10] See Bakker, Klapper, and Udell 2004 for a discussion of factoring in the context of Eastern Europe.

statements are analyzed as part of the underwriting process. No doubt, soft information and mutual trust play a role in some trade credit underwriting similar to relationship lending. However, a compelling argument can be made that trade credit is a distinct lending technology.

Researchers have suggested comparative advantages in funding (Schwartz 1974), production/inventory management (Emery 1987), price discrimination (Meltzer 1960, Schwartz and Whitcomb 1979, Brennan, Maksimovic, and Zechner 1988, Mian and Smith 1992, Petersen and Rajan 1997) or product quality guarantees (Long, Malitz, and Ravid 1993). Some have suggested trade creditors may have an informational advantage over other lenders in evaluating their customers' ability to pay (Emery 1984), solving incentive problems more effectively (Biais and Gollier 1997), in repossessing and reselling goods in the event of default (Mian and Smith 1992, Petersen and Rajan 1997) or in withholding future supplies (Petersen and Rajan 1997). It has also been suggested that trade credit technology may have an advantage over other forms of lending in developing economies (Cook 1999). Finally, it has been argued that if product sellers (i.e., trade venders) have an informational advantage over other lenders (e.g., banks) and have an automatic collateral priority under local commercial law, then a greater amount of trade credit will be used by less creditworthy companies than higher creditworthy companies (Frank and Maksimovic 2003). Empirical analysis is consistent with this finding (Chan, Chan, Jegadeesh, and Lakonishok forthcoming).[11]

Finally, the importance of trade credit as a source of SME financing offers a compelling reason to view it as separate technology. Trade credit represented a third of all debt extended to nonfarm, nonfinancial, non-real estate, for-profit U.S. SMEs as of 1998, an amount almost as large as that extend by commercial banks (Robb 2002). We have categorized it as a transactions-based lending technology because its potentially distinguishing features appear to be more hard-information related. The ubiquitous nature of trade credit also suggests that it may have advantages over the other technologies, particularly in the nations with the most problematic financial institution structures and lending infrastructures.

F. Relationship Lending

Relationship lending is designed to address information problems that are not feasible or cost-

[11] See Petersen and Rajan (1997) for a more complete summary of theories of trade credit.

effectively solved by the other technologies.[12] The primary information used by lenders is based on "soft" information about the relationship between the lender and the borrower in the sense of Rajan (1992). Its emphasis on soft information distinguishes it from all of the other technologies. Under relationship lending, the lender acquires proprietary information about the borrower and the business over time with respect to the provision of loans (Petersen and Rajan 1994, Berger and Udell 1995) and the provision of other products (Nakamura 1993, Cole 1998, Mester, Nakamura, and Renault 1998, Degryse and van Cayseele 2000). Relationship lenders collect information beyond that which is available on the firm's financial statements and information that is readily available to the public. This includes information on the entrepreneur's local community/business environment and the entrepreneur and the SME's interaction with that environment.

The labor-intensive nature of relationship lending likely makes it quite costly. These costs may be passed on to the borrower in the form of higher fees and a higher interest rate. As we emphasized earlier, under many circumstances opaque borrowers have an alternative to relationship borrowing. For small SMEs in information rich environments, small business credit scoring may be feasible. In very strong lending environments, asset-based lending may be feasible for those borrowers with good quality accounts receivables, inventory and/or equipment. Factoring is feasible even in weak lending environments, but it depends on the existence of high quality receivables. While trade credit is ubiquitous, it is quite expensive. Thus, for opaque SMEs for whom small business credit scoring, asset-based lending or factoring are not feasible or cost-effective, relation lending may be the best alternative. However, the availability of relationship lending also appears to depend on the financial institution structure. As noted in Section 2, the evidence suggests that relationship lending may be best delivered by small institutions.

5. Conclusions

We try to offer a more complete conceptual framework for thinking about the research and policy issues surrounding the availability of credit to informationally transparent and opaque SMEs in various circumstances around the globe. We suggest some relatively complex interactions among the elements of the financial institution structure of a nation, the lending infrastructure of that nation, and the lending technologies that are used to provide funding to transparent and opaque SMEs. The financial institution

[12] Most of the lending technologies are mutually exclusive. That is, a borrower utilizes one to the exclusion of the others. Trade credit, however, is an exception. Most SMEs likely obtain some amount of trade credit. However, trade credit is quite expensive, so companies may benefit considerably by displacing trade credit with one of the other technologies.

structure – the market presence of different types of institutions and the competition among them – may have important effects on SME credit availability because institutions of different types may have comparative advantages in different lending technologies. The lending infrastructure – the information environment, the legal, judicial and bankruptcy environment, and the tax and regulatory environments – may directly affect SME credit availability by affecting the extent to which the different lending technologies may be legally and profitably employed. The lending infrastructure may also restrict SME credit availability indirectly by constraining the potential financial institution structure through a restrictive regulatory environment.

We acknowledge that this more complete conceptual framework is difficult to apply to empirical research because lending technologies are typically unobserved. It is much more straightforward to treat transactions lending technologies as a collective whole, but we argue that this conventional approach may yield some potentially conclusions concerning the effects of different financial institution structures and lending infrastructures. A clear implication is that more research is needed on the use of individual lending technologies and how they are affected by elements of the financial institution structure and lending infrastructure to help disentangle some of the important research and policy hypotheses.

We also review much of the extant research on SME credit availability through the lens of this more complete framework, which yields several conclusions. First, the findings argue against drawing simplistic conclusions from the extant research, such as that a substantial market share for small financial institutions is needed to supply credit to opaque SMEs. Although large institutions may have a comparative disadvantage in relationship lending, they appear to have comparative advantages in some transactions lending technologies – such as small business credit scoring and asset-based lending – that are well-suited for funding opaque SMEs. Moreover, the research evidence on U.S. data suggests relatively little association between the local market shares of large and small banks and SME credit availability. This is consistent with the hypothesis that large institutions are able to provide credit to opaque SMEs using some of the transactions technologies, offsetting their disadvantage in relationship lending. However, because lending technologies are generally unobserved, it is difficult to distinguish this hypothesis from the alternative hypothesis that market forces efficiently sort the opaque SMEs to small institutions in the market.

Second, the results make a strong case for taking account of the presence of foreign-owned and state-owned institutions, as well the presence of large and small institutions and conventional measures of financial

institution concentration, particularly when analyzing developing nations. All of these elements of financial institution structure may affect SME credit availability through comparative advantages in the different lending technologies. In particular, a greater presence of foreign-owned institutions and a lesser presence of state-owned institutions is likely to be associated with significantly higher SME credit availability in developing nations because foreign-owned institutions appear to have advantages in some of the lending technologies, and state-owned institutions appear to be generally disadvantaged.

Third, the outcome of our investigation strongly suggests that "better" lending infrastructures may make significant differences in SME credit availability directly through facilitating the use of the various lending technologies. As examples, better accounting standards may help spur the use of financial statement lending, and greater sharing of information may help facilitate the use of small business credit scoring, although other parts of the lending infrastructure must also be in place for these technologies to be legally and profitably employed. Moreover, better creditor protections through the legal, judicial and bankruptcy environment may significantly improve the feasibility of any of the lending technologies other than factoring, which is technically is a purchase of receivables, rather than a loan. For instance, strong commercial law and enforcement with respect to security interests are necessary conditions for asset-based lending to be profitably used. Interestingly, "worse" lending infrastructures may promote the use of the technology of factoring, as financial institutions may refuse direct credit to SMEs, but be willing to buy their receivables in which an obligor is from another nation that can be evaluated because of a "better" lending infrastructure.

Finally, our review of the extant literature through the lens of the more complete framework suggests that "worse" lending infrastructures may also reduce SME credit availability indirectly. This may occur if a restrictive regulatory environment constrains the potential financial institution structure, preventing some types of financial institutions from gaining sufficient market shares to capitalize on their comparative advantages in specific lending technologies. The research evidence suggests that some of these effects may be quite strong. Many nations explicitly or implicitly restrict the entry of foreign institutions. These restrictions may have significant negative effects on SME credit availability, given the advantages that foreign-owned banks appear to have in SME credit availability in developing nations. In addition, the governments of a number of nations maintain large market shares for state-owned financial institutions with lending subsidies and lax collection procedures. These practices appear to "crowd out" more efficient

privately-owned institutions and result in lower overall SME credit availability, despite the mandates of state-owned institutions to the contrary.

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