

THE IMPACT OF TECHNOLOGY AND REGULATION ON THE GEOGRAPHICAL SCOPE OF BANKING

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We review how technological advances and changes in regulation may shape the (future) geographical scope of banking. We first review how both physical distance and the presence of borders currently affect bank lending conditions (loan pricing and credit availability) and market presence (branching and servicing). Next we discuss how technology and regulation have altered this impact and analyse the current state of the European banking sector. We discuss both theoretical contributions and empirical work and highlight open questions along the way. We draw three main lessons from the current theoretical and empirical literature: (i) bank lending to small businesses in Europe may be characterized both by (local) spatial pricing and resilient (regional and/or national) market segmentation; (ii) because of informational asymmetries in the retail market, bank mergers and acquisitions seem the optimal route of entering another market, long before cross-border servicing or direct entry are economically feasible; and (iii) current technological and regulatory developments may, to a large extent, remain impotent in further dismantling the various residual but mutually reinforcing frictions in the retail banking markets in Europe. We conclude the paper by offering pertinent policy recommendations based on these three lessons.

I. INTRODUCTION

Spectacular advances over recent decades in information processing and communication technology

as well as continued deregulation of the financial marketplace on both sides of the Atlantic may have dramatically expanded the geographical reach of financial institutions and their clients. Bankers, con-

¹ We received many valuable comments from an anonymous referee, Chris Allsopp, Jan Bouckaert, Xavier Freixas, Philipp Hartmann, Colin Mayer, John Muellbauer, David Myatt, and participants at the editorial seminar at the Saïd Business School, Oxford, participants at a workshop at the University of Ghent, participants at the 2004 ESF–Economic Geography and European Finance workshop, Oxford, and participants at the 2003 European Central Bank–Center for Financial Studies Network Meeting on ‘Capital Markets and Financial Integration’, Helsinki, where this paper was delivered as a keynote speech. Degryse received financial support from the Fund for Scientific Research, Flanders (FWO).

sultants, and financial journalists alike now envisage a future world in which consumers and businesses seek and access bank services 24/7 (i.e. 24 hours a day, 7 days a week) from any physical location on the wired part of the planet.

Yet (and notwithstanding all the hype) the daily grind of obtaining financing for most businesses still seems strikingly different from a world where ‘distance is about to die’. For example, the median small US business reports, in the 1998 National Survey of Small Business Finance (NSSBF), that it is located a mere 8 km (5 miles) away from its lending bank (though it should be noted that this distance has been increasing steadily over recent decades). In addition, small businesses in the USA still communicate predominantly in person with their lending bank (Petersen and Rajan, 2002).

European small firms are possibly located even closer to their lenders. For example in Degryse and Ongena (2004) we document how the median entrepreneur borrowing from a large Belgian bank in 1997 travelled only 2¼ km (1.4 miles) to the bank branch granting the credit. This very short distance has actually increased by only 30 m (0.02 miles) per year over the last three decades. Other work has also highlighted the lack of integration of (European) retail banking markets. Different measures of integration show that retail banking markets are not (yet) integrated in Europe (Baele *et al.*, 2004), in contrast to, for example, corporate bond and equity markets that have integrated rapidly since the early 1990s.

Why is proximity to a bank branch still very important for most borrowing European small and medium-sized enterprises (SMEs)? And how does geography affect lending conditions and the structure and operation of European retail banking markets? Will technological developments and regulations shape and alter this impact? Will distance only ‘die another day’ in European retail banking markets?

We summarize answers given to these questions by recent banking research. Reviewing contemporary

contributions naturally leads us to highlight open issues and pinpoint unanswered questions. We also provide some recommendations with respect to competition policy in banking and banking supervision towards the end of the paper.

We start by distinguishing between *distance* and *borders*. While intimately related, these concepts are often usefully separable when assessing the geographical scope of financial markets.² *Distance* pertains to physical proximity that can be bridged by traditional modes of transportation, say car or train travel. In other words, by spending some distance-related costs banks or their clients can overcome the distance and engage in transactions with one another. For given locations of banks and borrowers, distance *per se* is exogenous and bridging it (i.e. the lender visiting the borrower and/or the borrower visiting the lender) may be adequate to deal with informational problems for the lender concerning its decision about granting and pricing the loan. As a result, given location, banks play no (or a rather mechanical) role in theoretical competition models featuring only distance.

Borders, on the other hand, are not merely bridgeable by car or train travel, or even more modern technological ways of interacting. Borders result as an artefact of exogenous regulation or endogenously arise through the actions of the competing lenders. We think of borders as being tightly interrelated with informational problems that cannot be easily resolved or ameliorated by technological developments. The national borders of the countries in Europe often coincide with the cultural, informational, and/or regulatory borders that are relevant in this respect (we classify and discuss borders in section II).

Bank lending to small firms in Europe, we contend in this review, remains confined by both distance and borders (Figure 1). In contrast, large multinationals issue corporate bonds on a pan-European market anchored in London, Frankfurt, or Luxembourg. In the corporate bond market neither distance nor borders are relevant any longer. The same can probably be said about European investment/

² Recent empirical work on the geographical scope of banking by, for example, Berger and DeYoung (2001), Berger *et al.* (2003), and Buch (2004b) include measures for both physical distance and cultural, informational, and/or regulatory borders in their specifications. Studies by, for example, Grinblatt and Keloharju (2001) on the portfolio choices of Finnish investors, and Portes and Rey (2004) on international capital flows also include both distance and border variables.

Figure 1
The Importance of Distance and Borders in European Financial Markets

		Borders	
		Important	Not important
Distance	Important	Loans to small firms	
	Not important	Consumer credit cards	Corporate bonds

wholesale banking and, interestingly enough, also about venture capital markets as documented by Mayer *et al.* (2004) (for simplicity reasons we did not include all these markets in Figure 1). Consumer credit cards are an interesting intermediate case. In quite a few European countries banks compete nationwide to enlist credit card users—distance plays no role any more. However, no banks we know of target credit card customers across national borders.

Why do we observe this remarkable diversity in geographical scope of financial and banking markets in Europe? Part of the explanation may reside in the different informational requirements in each of these markets. Small and young businesses often lack publicly accessible accounting statements, an observable repayment track record, or assets that can serve as acceptable collateral (called ‘hard’ information in Petersen (2002) and Stein (2002)). Hence, the assessment by the lending bank’s loan officer of the skills and character of the firm’s management and the quality of the firm’s business vision (called ‘soft’ information) will play a key role in the lending decision. ‘Handshakes’, *in situ* monitoring, and repeated interaction will create trust in the borrowing firm and foster a bank–firm relationship, but may require physical proximity to be economically viable.

In contrast, corporate bond issuers are mostly large and well-known international firms that can easily be assessed by many investors and banks located across Europe on the basis of accounting statements and public track record. Hence, corporate bond markets integrated rather rapidly as regulatory impediments dissolved and a common currency was introduced. Credit cards are intermediate in this regard. Consumers can be readily scored on the

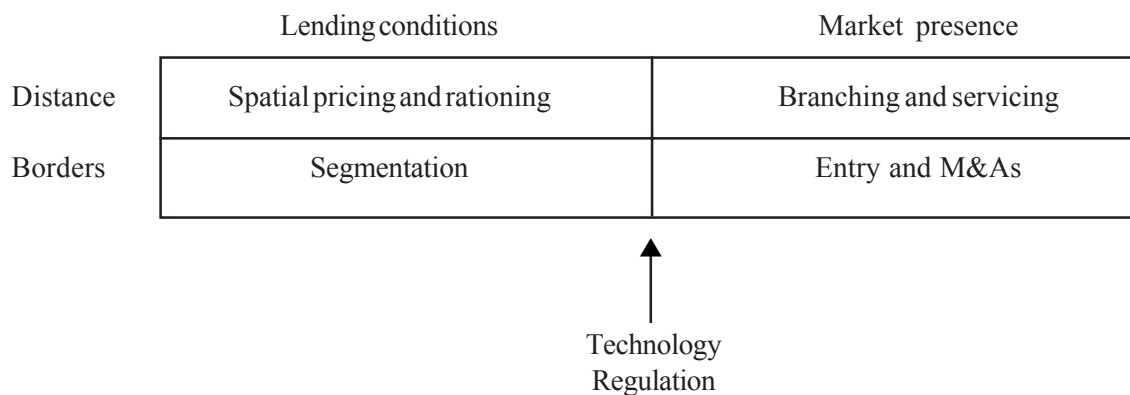
basis of observable characteristics, such as age, income, and marital status, and card balances can be pooled and securitized, making distance within each country increasingly irrelevant. However, consumer characteristics, preferences, and regulatory protection still differ substantially across European countries, making cross-border bank forays more complex.

What are the consequences of a geographical scope determined by both distance and borders for the conditions and structure in the retail banking markets in Europe? Previewing the main lessons we draw in this paper, recent work suggests the following.

- (i) Bank lending to small businesses in Europe may be characterized both by (local) spatial pricing and resilient (regional and/or national) market segmentation.
- (ii) Because of informational asymmetries in the retail market, bank mergers and acquisitions seem the optimal route of entering another market, long before cross-border servicing or direct entry are economically feasible.
- (iii) Current technological and regulatory developments may to a large extent remain impotent in further dismantling the various residual but mutually reinforcing frictions in the retail banking markets in Europe.

We organize the rest of the paper as follows. Section II reviews the theoretical predictions and empirical findings regarding the geographical scope of banking. Section III discusses the impact of technology and regulation on the geographical scope, while section IV assesses the current state of the

**Figure 2
Road Map**



banking sector in the Europe. Section V provides some policy recommendations and concludes.

II. GEOGRAPHICAL SCOPE OF BANKING

(i) Distance versus Borders

To structure our analysis, we commence by distinguishing between *lending conditions* and *market presence* as the first dimension and between *distance* and *borders* as the second dimension. These divisions yield a four-celled matrix as in Figure 2. We aim to position the relevant theoretical contributions and empirical findings in the banking literature in one of these four cells. *Lending conditions* naturally concern the offering, pricing, and rationing of loans, while *market presence* relates to the location and characteristics of bank branches.

We have already introduced our distinction between *distance* and *borders* in the introduction (section I). We further follow Buch (2002) in distinguishing between ‘regulatory’ and ‘economic’ borders. *Regulatory borders* may simply prohibit ‘foreign’ banks from engaging borrowers, setting up branches, and/or acquiring local banks. However the Riegle–Neal Act and Second European Banking Directive in effect removed most if not all such regulatory borders in the United States and Europe, respectively. Most *economic borders*, however, remain unaffected by these specific directives. Take the existing *exogenous economic borders*, such as legal origin and system, supervisory and corporate

governance practices, political framework, language, or cultural differences. We argue in more detail in section IV that these borders, in Europe in particular, remain in place and have been almost unaffected by either technological developments or deregulation.

Endogenous economic borders, on the other hand, are mainly informational and may well be affected by technological developments and deregulation, but the extent to which remains unclear. Informational borders arise because of the formation of bank–firm relationships, adverse selection, or information sharing between (a group of) banks. Take the formation of a *bank–firm relationship*. Banks learn about borrowers by privately observing repayment of earlier loans or observing borrower type (Sharpe, 1990). It is this informational asymmetry between the ‘inside’ bank and other ‘outside’ banks which gives the inside bank a competitive edge and almost assures continued interaction, i.e. the existence of a *relationship*, between the bank and its high-quality borrowers. Inside banks make economic rents while outside banks succeed occasionally in ‘poaching’ mostly low-quality borrowers and at best break even (Rajan, 1992; von Thadden, 2004), in the absence of other frictions. Hence, relationships arise as an endogenous barrier to entry, limiting the number of incumbent inside banks operating in a market (Dell’Ariccia, 2001).

Banks are also faced with *adverse selection*. *De novo* or ‘foreign’ banks, screening a particular pool of borrowers for the first time, face an adverse-selection problem as incumbent local banks will

continue to engage the best customers (Broecker, 1990; Shaffer, 1998). The entrants can be expected to end up ‘fishing in a pretty bad pool’. The harshness of the adverse-selection problem faced by the new banks depends on, for example, the banking structure (e.g. number of incumbent banks), the correlation in outcomes of the screening processes by new and incumbent banks, and the investment in screening accuracy made by the incumbents (Gehrig, 1998).

Information sharing between banks, when accessible by outside banks, may lower this endogenous barrier of pre-existing bank–firm relationships. Indeed, the information dissipated through the information-sharing network decreases the inside bank’s informational advantage (Padilla and Pagano, 1997), reducing the informational lock-in. Initiatives to start the cross-border sharing of information in Europe may lower the informational economic border. On the other hand, information sharing also serves as a collusive device, allowing banks to coordinate, and can be used as a strategic device to soften competition, as it introduces non-information-related switching costs (Gehrig and Stenbacka, 2001; Bouckaert and Degryse, 2004). If coordination can take place and remain (somewhat) exclusive, information sharing between incumbent banks constitutes another endogenous economic border outside that banks need to overcome to enter a market. Alternatively, information sharing introduces other economic borders as switching costs.

(ii) Distance and Lending Conditions: Spatial Pricing

Recent theoretical papers highlight the importance of distance in explaining the availability and pricing of bank loans (the north-west cell ‘Distance/Lending conditions’ in Figure 2). As suggested by a number of theories, lending conditions depend on the distance between the borrower and the lender, and the distance between the borrower and the closest competing bank. We borrow from Degryse and

Ongena (2004) in our discussion of *spatial pricing* in this section and return to *spatial rationing* in section III. Table 1 summarizes the theoretical predictions regarding spatial pricing.

Transportation costs for borrowers

In location-differentiation models (Hotelling, 1929; Salop, 1979), borrowers incur distance-related transportation costs in the action of visiting a bank. Banks necessarily have to price uniformly if they cannot observe borrower location,³ or are prevented from charging different prices to different borrowers. Borrowers pay the same interest rate, but the total transportation costs incurred differ, depending on the firm’s location *vis-à-vis* the lending bank.

However, if banks observe the borrowers’ location and offer interest rates based on that information, they can engage in spatial price discrimination. Banks are often informed about the borrower’s address before even granting or pricing a loan. If borrowers pay for their own transportation, as is mostly likely to be the case, a bank optimally charges a higher interest rate to those borrowers that are located closest to its bank branch (Lederer and Hurter, 1986). The reasoning is that closer borrowers face higher total transportation costs when visiting competing banks (which are located further away than the lending bank), resulting in some market power for the lender over closer borrowers. Similarly, a monopolist bank optimally charges a higher loan rate to close borrowers, as these borrowers incur lower total transportation costs. We summarize these relationships in Table 1.

Monitoring costs for lenders

The cost of monitoring a borrower could also be related to physical distance. Total monitoring costs increase with borrower–lender distance, because of extra communication costs or transportation costs incurred by banks visiting the borrowers’ premises. Loan rates passing through such costs increase with distance. However, distance-related monitoring costs might also allow for discriminatory pricing.

³ Lenders may initially be unsure about the exact location of the borrower. For example, if the borrower is an independent salesman or software consultant and maintains multiple centres of activity, it is not clear at first to the bank where to monitor. In that case, the bank can engage in discriminatory pricing only upon becoming informed about the location and transportation costs faced by their borrowers. In Dell’Ariccia (2001), banks become informed about the location of the borrower through first-period lending. In his model, only ‘relationship’ banks, lending to the same firm for a second time, can engage in spatial price discrimination, while *de novo* ‘transactional’ banks have to resort to ‘mill pricing’.

Table 1
Theoretical Models Linking Loan Rates and Distance

Arguments and discussed models	Impact on the loan rate of the		
	Distance to the lender ^a	Distance to the closest competitor ^a	Number of competitors
Transportation costs (for borrower)			
Uniform pricing	no	no	negative
Discriminatory pricing	negative	positive	negative
Monitoring costs (for lender)			
Marginal cost pricing	positive	negative	negative
Discriminatory pricing	negative	positive	negative
	Distance to the relationship bank ^a	Distance to the transactional bank ^a	Number of competitors
Asymmetric information			
Dell'Ariccia (2001)	negative	no	negative
Hauswald and Marquez (2003a)	negative	positive	positive/negative

Notes: ^a For a given number of competitors.

Source: Degryse and Ongena (2004).

Sussman and Zeira (1995) show that banks face monitoring costs known to increase with distance. As a result, lenders extract rents from close borrowers, because more-distant competing banks take into account their own higher monitoring costs in their loan rate offers. As indicated in Table 1, spatial price discrimination based on bank monitoring costs again implies a negative (positive) relationship between the loan rate and the borrower–lender (borrower–closest competing bank) distance (for a given number of banks).

Distance and lender information

The severity of the asymmetric information problem itself may also increase with distance. Hauswald and Marquez (2003a), for example, develop a model in which the precision of the signal about a borrower's quality received by a bank decreases with (informational) distance. Because banks receive more precise signals about close borrowers in Hauswald and Marquez (2003a), competing banks face increasing adverse-selection problems when approaching borrowers closer to the most informed bank. Hence, the informed relationship bank can charge higher interest rates to closer borrowers,

while the uninformed transactional bank charges higher interest rates to borrowers located farther away (owing to the increase in the adverse-selection problem). Or to put it differently: the uninformed (transactional) lender charges a higher loan rate to remote borrowers in order to compensate for the adverse-selection problem, which intensifies in the vicinity of an informed (relationship) lender. The informed lender accordingly extracts a higher loan rate from closer borrowers. *Ceteris paribus*, Hauswald and Marquez (2003a) derive a negative (positive) relationship between the loan rate and the distance between the borrower and the relationship (transactional) bank. We indicate this result again in Table 1.

We note that the model developed by Hauswald and Marquez (2003a) in effect straddles our 'distance and borders' categorization. Their model also features 'relationship borrowers', whose current borrowing conditions may be determined by past and future borrowing. The transportation and monitoring cost models discussed so far seem mostly relevant for 'transactional borrowers', whose current borrowing conditions are unaffected by past or

future borrowing. Recent work suggests both types of engagements may coexist in banking markets (Boot and Thakor, 2000; Degryse and Ongena, 2003*b*; Elsas, 2004).

Number of banks

In spatial models, the number of banks in the market is typically positively related to the magnitude of the transportation cost, and inversely related to the distance between the lender and the (closest) competing banks. An increase in the number of banks (harsher competition) increases the likelihood of receiving a lower loan rate offer. A decrease in the fixed set-up costs per bank (in, for example, Sussman and Zeira, 1995) increases the number of banks, decreases the distance between any two neighbouring banks, and decreases the loan rate for each bank–borrower distance combination.⁴

On the other hand, an increase in the number of banks aggravates an adverse-selection problem by enabling lower-quality borrowers to obtain financing, resulting in moral hazard and credit rationing (Petersen and Rajan, 1995) or a higher interest rate (Broecker, 1990). In Dell’Ariccia (2001), adverse selection generates an endogenous fixed cost, constituting a barrier to entry in the industry, limiting the number of competing banks even when markets become very large.

Similarly, a decrease in the fixed-cost component of the relationship-building technology in Hauswald and Marquez (2003*a*) not only leads to an increase in the number of banks and more competition, but also results in a retrenchment towards relationship lending. The lower entry barrier then leads to sharper adverse-selection problems and higher loan rates for the borrowers closest to the relationship lender, but lower loan rates for customers farther away. In effect, loan rates will decrease (increase) more per unit of distance between the borrower and the relationship (transactional) bank.

Distance, borrower information, and experience

Casual observation suggests that borrowers do not always frequent the closest bank, as most spatial

models dictate they should. Incomplete borrower information and other bank product characteristics cause borrowers to visit more distant banks.

First, borrowers may not be fully informed about the precise location of all competing banks and the availability and conditions of the loans offered there. Grossman and Shapiro (1984) and Bester and Petrakis (1995) model such location *cum* informational differentiation. In Grossman and Shapiro (1984), consumers buy a product from a particular seller upon becoming informed of its location through advertising. The advertising itself is not localized. The sales price in their model exceeds the full information price, by the magnitude of the transportation cost, as informational differentiation lowers the elasticity of demand. In addition, consumers in their model, as they are unaware of all sellers, do not necessarily patronize the closest one. Bester and Petrakis (1995) model the advertising of lower-price offers. In the absence of advertising, customers are only informed about ‘local’ prices. Producers will advertise lower prices to attract customers from more distant locations. Hence, more distant informed customers will be observed to receive lower prices.

Second, while borrowers often mention bank branch proximity as a major concern (Elliehausen and Wolken, 1990; Binks and Ennew, 1997), location is obviously just one characteristic of a bank’s product that is important for its customers. Hence, borrowers may not patronize the closest bank branch when another bank’s loan product exhibits other, more preferred, characteristics (Pinkse *et al.*, 2002). And, once borrowers have experienced a good match and have observed the high-quality services provided by their current bank, they will switch to another bank only when offered a considerably lower price (Tirole, 1988, p. 294).

To conclude, most theoretical models imply a negative (positive) correspondence between the borrower–lender (competing bank) distance and the loan rate, caused by either transportation costs (for either the borrower or the lender) or asymmetric information. Information availability, experience,

⁴ An increase in the number of banks also decreases the loan rate in more general models of imperfect Cournot competition between a finite number of banks. See, for example, the rendition of the Monti (1972)–Klein (1971) model in Freixas and Rochet (1997, pp. 57–60).

and other product characteristics may abate the strength of the distance–loan rate relationship.

Empirical evidence on spatial pricing

Petersen and Rajan (2002) are among the first to provide concrete evidence on the possible presence of spatial pricing in bank lending. They find, for example, that a small business located 1 mile from the lending bank *ceteris paribus* pays around 38 basis points less than a borrower located around the corner from the lending bank. In Degryse and Ongena (2004) we also include the distance to the closest competitors in the specifications. Notice that both papers include a variety of controls (and exercises to control) for firm risk to avoid picking up the spurious effects of spatial rationing on pricing.

In Degryse and Ongena (2004) we find a somewhat smaller impact of physical distance on the loan rates than Petersen and Rajan (2002), but the impact we measure is still highly statistically significant and economically relevant. The impact on the loan rate of both distance to the lender and distance to the closest competitor is actually similar in absolute magnitude, but of an appropriate opposite sign, which in itself is also evidence suggestive of spatial price discrimination. For example, for small loans loan rates decrease 7 basis points per mile to the lender and similarly increase 7 basis points per mile to the closest (quartile) competitor. We further deduce that, given current transportation costs and opportunity costs of travel, the average first-time borrower in our sample needs to visit the lender between two and three times to obtain a bank loan.

Most studies find no impact of the number of competitors on the loan rate, while the magnitude of the impact of the concentration index varies widely (see the Appendix in Degryse and Ongena (2003a) for details). However, it remains difficult to compare results across specifications, banking markets, periods, and Herfindahl–Hirschman Index measures. Concentration measures are alternatively based on loans, deposits, or branches, and vary widely (across studies) in geographical span (Morgan, 2002).

Location rents for banks

To conclude, spatial price discrimination caused by either (borrower) transportation costs, (lender) monitoring costs, or asymmetric information may

explain the results in both Petersen and Rajan (2002) and Degryse and Ongena (2004). Transportation cost provides the most consistent and comprehensive interpretation of all the results documented in Degryse and Ongena (2004). Inferred changes in lending technology may make an interpretation of the results in Petersen and Rajan (2002) more difficult. In Degryse and Ongena (2004) we run through a number of straightforward exercises but cannot find any trace of adverse selection increasing in the (admittedly short) distances to the uninformed lenders. In either case, our results suggest that the distance to the closest competitors is important for competitive conditions and that the actual location of the bank branches may be relevant when assessing the intensity of competition.

Our estimates in Degryse and Ongena (2004) also indicate that spatial price discrimination, targeting borrowers located near the lending bank branch, yields average bank rents of around 4 per cent (with a maximum of 9 per cent) of the bank's marginal cost of funding. Taken at face value, our findings substantiate an important source of rents accruing to financial intermediaries, based on location. 'Location rents' are distinct from rents derived from customer switching costs (Klemperer, 1995), which in credit markets are often attributed to pervasive informational asymmetries or the endogenous economic borders discussed earlier (Sharpe, 1990; Rajan, 1992; von Thadden, 2004). Kim *et al.* (2003), for example, provide the first estimates of switching costs faced by bank borrowers. Their findings imply average annualized bank rents of roughly 4 per cent of the banks' marginal cost of funding. In Degryse and Ongena (2004) the increase of the loan rate during the average bank–firm relationship points to annual 'information rents' of less than 2 per cent of the bank's marginal cost of funding.

(iii) Distance and Lending Conditions: Spatial Rationing

Distance also affects the availability of credit. Stein (2002), for example, models the organizational impact of the ease and speed at which different types of information can 'travel' within an organization. 'Hard' information (for example, accounting numbers, financial ratios, etc.) can be passed on easily within the organization, while 'soft' information (for example, a character assessment or the degree of

trust) is much harder to relay. Hence, if the organization employs mostly soft information, a simple and flat hierarchical structure and local decision-making may be optimal.

The type of information, hard or soft, that is needed and available to arrive at optimal lending decisions also translates into a correspondence between distance and credit rationing. For example, lines embedded in credit cards are extended solely on the basis of a quantitative analysis of hard and easily verifiable information (for example, age, profession, address, etc. of the applicant). As a result credit cards are offered by mail and across large distances in the USA (Ausubel, 1991).

Much small business lending, on the other hand, is still 'character' lending. To screen successfully, loan officers need to interact with the borrower, establish trust, and be present in the local community. The 'soft' information collected in this way is much harder to frame and to convey to others within the organization. As a result, small (opaque) firms borrow from close, small banks (Petersen and Rajan, 2002), while large banks mainly lend to distant, large firms employing predominantly hard information in the loan decision (Berger *et al.*, 2004). Small firms then may be subject to credit rationing when seeking financing across larger distances.

However, from an empirical point of view, the severity of the rationing of credit affecting small firms is not entirely clear. For example, the results in Petersen and Rajan (2002) indicate that the effect is economically rather small in the USA, while preliminary findings by Carling and Lundberg (2002) seemingly indicate the absence of distance-related credit rationing in the Swedish banking sector. Alternatively, results in Degryse and Ongena (2004) suggest that transportation costs that are fixed per loan (i.e. do not vary by loan size) may explain why larger loans are obtained across larger distances (mainly by larger firms).

(iv) Distance and Market Presence: Branching and Servicing

Only very few papers study the importance of distance in determining market presence, i.e. the branching and servicing within certain areas (the

north-east cell 'Distance/Market presence' in Figure 2). A recent paper by De Juan (2003) is an exception. She studies how distance between own branches influence bank branching decisions in Spain. She finds that the number of own branches in a particular (sub) market has a positive (but small) effect on the further entry decision of the bank in that market. Hence, her results suggest that branch expansion is partly affected by the proximity of other branches of the same bank.

Results by Berger and DeYoung (2001) provide a partial explanation for these findings. They document how efficiency of bank branches slips somewhat as the distance between branch and headquarters of the bank increases. Hence, in order to guarantee consistency in servicing across bank branches, banks decide to branch out methodically across certain areas rather than to build isolated outposts.

(v) Borders and Lending Conditions: Segmentation

Next we turn to the impact of borders on lending conditions and market presence. A recent literature has started to investigate how different types of borders shape lending conditions and result in segmentation of credit markets (the south-west cell 'Borders/Lending conditions' in Figure 2).

National borders that often coincide with many of the exogenous economic borders discussed earlier continue to play an important role across the world. Recent work by Buch *et al.* (2003), for example, suggests that national borders in Europe still hold back bank investments. As a result, European banks 'over'-invest domestically and it is, in particular, country-specific credit risk that does not seem fully reflected in the inter-bank rates (see also Baele *et al.*, 2004).

But other types of borders may also result in segmented credit markets. Empirical evidence suggests that 'outside' lenders often face difficulties (or hesitate) in extending credit to mainly small local firms (Shaffer, 1998; Guiso *et al.*, 2004). This happens in particular when, for example, existing relationships between incumbent banks and borrowers are strong (Bergström *et al.*, 1994) or when the local judicial enforcement of creditor rights is

poor (Bianco *et al.*, 2003). In all these cases, borders will lead to market segmentation and difficulties for cross-border outside banks to engage any local borrowers. In effect, this market segmentation highlights the importance for the outside banks to strive to build an actual physical presence in the targeted market.

(vi) Borders and Market Presence

Indeed, academics and bankers alike have long recognized borders as important factors in impelling bank entry and cross-border bank mergers and acquisitions (the south-east cell 'Borders/Market presence' in Figure 2).

Bank entry

An older literature going back to Goldberg and Saunders (1981) and Kindleberger (1983) asserts that banks often pursue a 'follow-the-customer' strategy when deciding upon cross-border market entry. However, recent evidence casts some doubt on this 'follow-the-customer' strategy as the only game in town. In particular, banks entering the US market have not primarily a follow-the-home-country-customer motive, or at least do not persevere in servicing only the home-country customers. Indeed, foreign banks in the USA also apparently engage many local borrowers (Stanley *et al.*, 1993; Seth *et al.*, 1998; Buch and Golder, 2001).

However, banks encounter many difficulties (in countries other than the USA) in successfully pursuing a strategy of engaging local firms by cross-border entry through local branches. DeYoung and Nolle (1996) and Berger *et al.* (2000), for example, document how most foreign bank affiliates are less efficient than domestic banks, the exceptions being the foreign affiliates of US banks in other countries and most foreign bank affiliates in, for example, Eastern Europe and South America. The latter affiliates are often financially sounder than the domestic banks (Crystal *et al.*, 2002). Why are most foreign bank affiliates less efficient than the local crowd? A paper by Buch (2004b) documents that the inefficiencies by foreign bank affiliates are mostly due to the presence of economic borders (language, culture, etc.) and do not seem driven by physical distance.

But there is a second reason why banks shy away from following the customer, apart from the fear of getting stuck with inefficient branch outposts. Findings by Berger *et al.* (2003) suggest customers are not that interested in being followed! Indeed, they find that foreign affiliates of multinational companies choose host-nation banks for cash-management services more often than home-nation or third-nation banks. This result is consistent with so-called 'concierge' benefits dominating 'home cookin' ' benefits. This is a surprising finding given that these large multinationals might be expected to be prime targets for preferential treatment by their home-nation banks. On the other hand, the opening of a foreign affiliate is a good occasion for a firm to escape a hold-up problem at 'home'. In this way, the establishment of new plants or subsidiaries in foreign countries is an opportunity to add a new (foreign) bank relationship.

Berger *et al.* (2003) also find that bank reach (global versus local) is strongly associated with bank nationality. For example, if a host-nation bank is the choice of nationality, then the firm is much less likely to choose a global bank. Finally, they also find that bank nationality and bank reach both vary significantly with the legal and financial development of the host nation. For example, firms appear to be much less likely to choose a host-nation bank and more likely to choose a global bank when operating in the former socialist nations of Eastern Europe.

Berger *et al.* (2003) conclude, on the basis of this evidence, that the extent of future bank globalization may be significantly limited, as many corporations continue to prefer local or regional banks for at least some of their services. Though, as pointed out by Dermine (2003), this conclusion is partly predicated on the continuing (and endogenous) absence of foreign direct investment and, possibly more importantly, cross-border mergers taking place.

Frequency and value of cross-border bank mergers and acquisitions

However, cross-border bank mergers and acquisitions (M&As) are still a relatively rare species in many parts of the world, though the number in the euro area has steadily increased. Hartmann *et al.* (2003), for example, document that in 1995 61 per

cent of all mergers involved institutions in the same country and only 11 per cent involved banks situated in two different countries of the euro area. By 2002 the percentage of domestic deals dropped to 47 per cent, while the euro-area deals remained stuck at 11 per cent. Focarelli and Pozzolo (2001) also demonstrate that cross-border bank M&As occur relative to within-border M&As less frequently than cross-border M&As in other industries, *ceteris paribus*, while Berger *et al.* (1999) show that cross-border bank M&As occur less frequently than domestic bank M&As. And it is again economic borders,⁵ not distance, that make cross-border bank M&As less likely (Buch and DeLong, 2001).

Hence, taken together, these studies suggest that not only exogenous economic borders (that also affect other industries) but also endogenous economic borders specific to the banking industry (information asymmetries in assessing target bank portfolios) may make it hard to pull off a successful cross-border bank M&A.

Bank managers are apparently aware of the difficulties awaiting them when engaging in a cross-border M&A, and seem to refrain from undertaking many. But also investors recognize the dangers. A nice recent study by Beitel *et al.* (2004), for example, documents that the combined cumulative abnormal returns for stocks of bidder and target bank in cross-border bank M&As in Europe over the last few decades is actually zero or negative! This finding stands in stark contrast with other industries, where the combined cumulative abnormal returns (CARs) of cross-border M&As are typically found to be positive. Hence, investors seemingly evaluate cross-border bank M&As as destroying value. The results of Beitel *et al.* (2004) are quite similar to findings in DeLong (2001). She reports that, in the USA only, the combined CARs of geographically focused bank M&As are positive, although it is not entirely clear what factors are driving this empirical finding.

Borders and cross-border bank mergers and acquisitions?

The evidence presented so far does not make it clear whether it is exogenous or endogenous (informational) economic borders that create most problems in making a cross-border bank M&A possible and successful. A recent paper by Campa and Hernando (2004) suggests that exogenous borders play a role. Their study shows that the combined CARs of M&As are typically lower in industries such as banking, that were until recently, or are still, under government control, or were most heavily regulated. CARs of cross-border M&As in these industries are actually negative, evidence in line with Beitel *et al.* (2004). One possible interpretation is that the (lingering) effects of regulation make for harder economic borders.

However, while such residual regulatory and 'institutional' reasons are undoubtedly important, strong economic forces may impede the unification of banking markets' (Rosengren, 2003). Economic forces may explain why there has also been so little interstate merger activity in the USA, despite very homogeneous banking markets. Cost savings are often impossible in cross-border mergers. In-market mergers, however, allow for a reduction in redundant branch networks, underwriting activities, and/or local monitoring of credits. Anticipating such savings may allow an in-market (domestic) acquirer 'to bid more' than any other out-of-market (foreign) acquirer 'in the auction of the target assets'. More generally, the promise of cost cutting and indirect labour shedding may allow domestic banks to gain an upper hand in any complex and politicized merger dance also involving foreign suitors. In addition, acquiring an in-market competitor limits the number of entry points for any out-of-market competitors and may increase the in-market acquirer's market power and monopoly profits.

Bank industry observers sometimes also note that, for example, bank organization and corporate

⁵ Regulatory borders explicitly prohibiting bank M&As have been removed in Europe. However, national and political interests frequently result in the mobilization of the national anti-trust or banking safety apparatus to block cross-border bank M&As. We acknowledge that these actions reside somewhere in the grey area between explicit prohibition of cross-border bank M&As (regulatory borders) and inherent political and cultural differences creating difficulties in making a cross-border bank M&A possible and successful (economic borders).

governance may be areas shaped in ways that hinder merger activity. The mutual structure of dominant banks in France and Germany, in particular (for example, *Crédit Agricole*, *Landesbanken*), is often passed off as a major hurdle for these banks to initiate and pursue a successful M&A (Wrighton, 2003). But exogenous economic borders may also make cross-border bank M&As result in complex holding structures (Dermine, 2003), i.e. cross-border consolidation in Europe functions through subsidiaries and not branches as is common in US cross-state banking. Hence, it appears as if the so-called ‘single passport’ of the European Second Banking Directive is not very much used. Subsidiary configurations possibly further complicate future M&A activity.

Finally, the impact of endogenous (informational) economic borders on cross-border bank M&A activity is less researched. It is possible that the domestic merger activity we have observed until now in Europe, creating so-called ‘national champions’, is partly made possible by the existence of informational borders. Outside banks seeking to acquire a local bank find it more difficult than incumbent banks to assess the value of the loan portfolio of the possible target banks. As a result of the winner’s-curse problem, outside banks refrain from stepping in and most M&A activity, driven by, for example, (revenue and cost) scale and scope considerations, occurs between domestic banks.

However as the domestic banks increase in size, diversify,⁶ and possibly partly refocus their lending towards larger firms, they become easier-to-value targets. If this is, indeed, the case, we contend that the informational asymmetries facing the outside acquiring banks may actually endogenously decrease over time as possible target banks that are shielded within the bordered area prosper, grow, and merge among themselves, resulting in a further diversification of their loan portfolios. National competition-policy concerns may ultimately hinder further domestic consolidation. As further local mergers may be under scrutiny of competition policy authorities, winner’s-curse problems may further decrease, facilitating cross-border M&As. Hence, one could argue that informational borders and the

accompanying winner’s-curse problem have a tendency partly and endogenously to self-destruct, that M&As may become the optimal route of entering a market long before cross-border servicing or direct entry are economically feasible, and that ‘national champions’ will almost inevitably metamorphose into ‘European champions’.

A natural question is then how borrowers will be affected by cross-border bank M&As. It is possible that ‘in the first round’ small local firms serviced by domestic target banks suffer somewhat as with domestic mergers (Sapienza, 2002; Bonaccorsi di Patti and Gobbi, 2002). Eventually niche banks may arise, taking over part of the foreclosed lending activities (Berger *et al.*, 1998). But technological developments and regulation undoubtedly will also play a role. That is the topic of the next section.

III. THE IMPACT OF TECHNOLOGY AND REGULATION ON THE GEOGRAPHICAL SCOPE OF BANKING

We have argued so far (in section II) that the impact of distance on loan rates seems considerable, that the impact on credit rationing is currently unclear, and that the impact on bank branching and servicing is seemingly minor. We have also discussed how the impact of borders on both lending conditions and market presence seems substantial. We now turn to the second question broached in this paper, which is how technology and regulations may shape the correspondence between distance and borders on the one hand and lending and market presence on the other.

(i) Technology and Distance

Berger (2003) investigates how advances in technology, in particular in communication and information processing, substantially alter current practices in the banking sector. He argues that recent technological developments reduce ‘distance-related diseconomies’, in particular in four areas: (i) the monitoring and risk management of loans, (ii) the offering of traditional banking services, through, for

⁶ We conjecture the winner’s curse in von Thadden (2004), for example, would decrease if the success of multiple projects undertaken by many borrowers was uncorrelated.

example, improvements in credit scoring, (iii) the management of staff, and (iv) the provision of new services over the Internet. Hence Berger, in effect, argues that technological developments will change the impact of distance on both lending conditions and bank market presence.

However, advances in communication technology and increased capacity for information need not imply more exchange of information at different levels. First, take information exchange *inside the banks*. Wilhelm (2001), for example, argues that loan officers have limited incentives to transfer information, as they are not only the content originators but also the monopolists in the human capital needed to create proper credit assessments. Hence, loan officers may try to tie the now commodity-like distribution (sending reports by e-mail) to its origination. They can do so by arguing some information cannot be hardened or is too sensitive to move through the bank (or branch) organization.

In addition, loan officers may initially be uncertain about the value added by the new technologies and may, therefore, be unaware of its desirability. Recent work in game theory shows that both adoption and non-adoption of new technology are potential equilibria, leaving an important role for coordination in equilibrium selection. Pre-play communication or cheap talk may help to choose the Pareto-dominant equilibrium and solve the coordination problem. Myatt *et al.* (2002) show that adoption not only hinges on the expected value added by the new technology, but also on both the ‘fundamental uncertainty’—uncertainty concerning the value added—and the ‘strategic uncertainty’—uncertainty concerning the actions of others. The interaction of these two types of uncertainty determines the strategy selected by the individual players and hence the actual adoption of the new technology.

The advances in communication technology and increased capacity for information need also not imply more exchange of information *between firms and banks*. For example, Yosha (1995) and Bhattacharya and Chiesa (1995) have argued that firms choose the type and the number of financiers on the basis of concerns for confidentiality *vis-à-vis* product-market competitors regarding proprietary information (R&D results, etc.). Similar concerns restrain firms from giving the chosen financier(s)

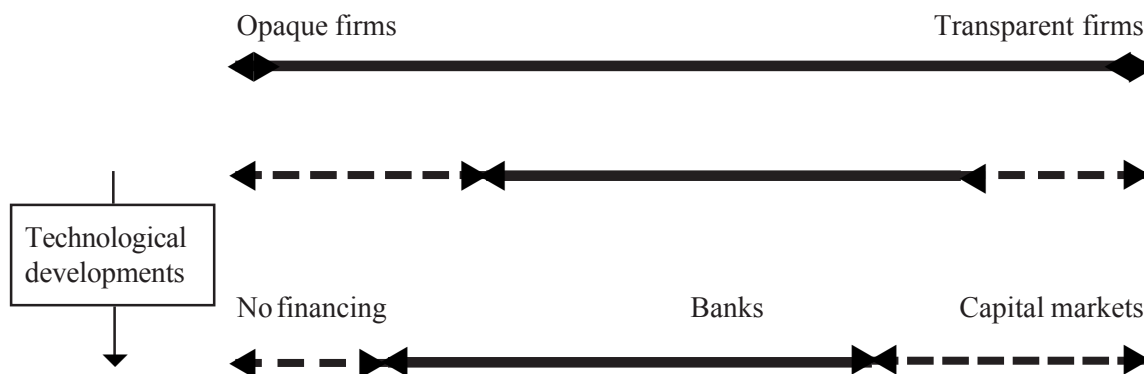
more specific information or limit the format in which the information is transferred (for example, firms prefer to provide oral presentations rather than supply fully fledged project manuals; improved communication technology has not altered this desire).

Finally, technological developments do not necessarily enhance sharing of information *between banks*. While technological progress shapes the structure of the information-sharing industry itself (as it allows, for example, exploitation of economies of scale), the degree of information sharing or incentives to share information may remain unaffected. Concerns about free-riding between banks and adverse selection and moral hazard at the firm level have long been recognized as drivers of the determination of the optimal degree of information sharing. Even dramatically lower costs of information sharing may not alter such fundamental strategic calculations (Padilla and Pagano, 1997; Bouckaert and Degryse, 2004). Similarly, Vercaemmen (1995), for example, argues that it is optimal for information-sharing bureaux to limit the number of years of credit history that is maintained in the database—not for technological reasons (for example, the cost of data storage), but because the incentive of the borrowers for compliance is reduced as credit histories lengthen and the value of a negative piece of information is reduced. And, indeed, in all European countries surveyed by Jappelli and Pagano (2003) the public credit register eventually ‘forgets’, though the precise memory system varies from country to country. Again, it seems unlikely that technological developments will alter these specific trade-offs.

(ii) The Impact of Technology on Spatial Pricing

Nevertheless, technology may have an impact on spatial pricing of deposits and loans. For example, on-line banking spurs competition and alters the impact of distance on deposit rates (Bouckaert and Degryse, 1995). Vesala (2000), for example, shows that loan mark-ups were decreasing substantially in recent years in Finland, in lock step with the rapid development of Internet and mobile banking in that country. On the other hand, Corvoisier and Gropp (2001) find only a small increase in contestability in European loan markets in recent years despite technological advances in many countries and

Figure 3
Financing Habitats



despite an increase in contestability in deposit markets.

A paper by Hauswald and Marquez (2003*b*) offers an explanation for these differential findings, providing yet another take on how technology need not lead to more exchange of information and competition. In their model, better access to information by banks leads to more competition and lower loan rates, but the improved ability by banks to process information actually leads to higher loan rates and higher bank profits as banks are better able to ‘carve out a niche’ and generate informational rents.

(iii) The Impact of Technology on Spatial Rationing

The impact of technology on spatial rationing is equally unclear. First, note that technological developments may increase competition from capital markets as individual investors can more cheaply obtain and process information. Increased capital-market competition pushes the natural habitat of bank financing towards more opaque firms, as depicted in Figure 3 (Berger and Udell, 1993; Greenbaum and Emmons, 1998; Mannonen, 2001). However, increased capital-market competition also leads, for example, to changes in bank orientation, away from relationship banking towards more transactional banking and more bank industry specialization (Boot and Thakor, 2000). In contrast, Boot and Thakor argue that more inter-bank competition

leads to more relationship lending.⁷ Hence, they distinguish between two sources of competition, i.e. capital-market competition and inter-bank competition, and they allow banks to choose between relationship lending and transactional lending. In their model, stiffer capital-market competition reduces relationship lending, while inter-bank competition actually increases the relative amount of relationship lending. A bank offering a relationship loan augments a borrower’s success probability. Relationship lending then allows the extraction of higher rents from the borrower. Fiercer inter-bank competition pushes banks into offering more relationship lending, as this activity permits banks to shield their rents better. Any reorientation in Boot and Thakor (2000) alters both financing habitats and informational needs of the banks and possibly affects the impact of technology on the availability of credit.

Controlling for firm and lender characteristics, Petersen and Rajan (2002) estimate a rather substantial increase in the (predicted) distance between lender and borrowing firms in the USA over recent decades, from around 11 miles in 1973 to around 18 miles in 1991 (their Figure 3).⁸ Petersen and Rajan (2002) also find that the modes of communication between lender and borrowers have become more impersonal over time. In contrast, firms in Belgium ‘moved away’ from their bank by only 0.02 miles per year in the period 1973–97 (Degryse and Ongena, 2004). Differences in technological development seem unlikely to be the only explanation for this

⁷ Degryse and Ongena (2003*b*) and Elsas and Krahnhen (1998) provide empirical evidence broadly supporting both hypotheses.

⁸ The evidence for deposit markets seems to run in the same direction. Heitfield and Prager (2004), for example, document that the geographical scope of competition in US bank deposit markets is still smaller than statewide, though not necessarily local any longer.

divergent growth rate in lender–borrower distance in the USA and Europe, as the divergence started early in the 1970s and seems to have continued to this day.

(iv) The Impact of Technology on Branching and Servicing

The impact of technology on bank branching and servicing may be equally muted. Berger and DeYoung (2001), for example, assert that technological developments only partially mitigate the negative effects of distance on efficiency. But then remember that the effects were relatively mild to start with. In addition, Cabral (2002) points out that the so-called ‘multi-channel’ route in banking has now established itself as the standard in many countries. Bank customers access bank services through automated teller machines, the telephone, the Internet, and through personal contact in the bank branch itself!

Hence, branch proximity continues to play a non-negligible role in determining bank choice, muting the impact technological developments may have. There is even reason to believe bankers and industry watchers for a while have underestimated the importance for customers of bank branch proximity. ‘The hot news in banking: bricks and mortar. Customers prefer branches so banks are opening ’em like crazy’, headlined an article on 21 April 2003 in *Business Week* (Gogoi, 2003) suggesting that de-branching may have gone too far and that incumbent or *de novo* banks are correcting these recent mistakes. In addition, banks have incentives not to cut back on branches too much in order to keep potential entrants out of their incumbent markets.

To conclude, the impact of technological advances may be limited to abating somewhat the impact of distance on the pricing and availability of loans and market presence. There is still only limited evidence that advances in technology completely removed ‘the tyranny of distance’; in particular, in Europe ‘distance still rules’ as before.

(v) Regulation and Borders

The impact of changes in regulation in both the USA and Europe have been substantial and profound.

Nevertheless retail loan markets in Europe remain surprisingly segmented, in contrast to wholesale capital markets in both Europe and the USA (Danthine *et al.*, 2001; Adam *et al.*, 2002). In addition, the distance at which banks lend internationally in Europe, and hence cross border, has not at all increased over time in Europe in contrast to the USA, where the distance at which banks lend internationally has steadily increased (Buch, 2004a).

IV. STATE OF THE EUROPEAN UNION

(i) Exogenous Economic Borders

What does this all mean for European banking? Most regulatory borders are, as already noted, removed and, in principle, the European banking market should be open for business for all banks chartered in the European Union and provided with the single passport of the European Second Banking Directive. In practice things are not that simple, as both exogenous and endogenous economic borders remain formidable barriers.

Take differences in legal systems and practices. Europe contains within its national boundaries all the (former) standard bearers from all major legal regimes, creating work for corporate lawyers but headaches and costs for bank management. Another example: the variation in banking supervisory practices within the European Union is as large as the variation in the world (Barth *et al.*, 2001). Needless to say, it is close to zero within the United States. Differences in corporate governance and the mutual structure of a few key banks in Europe create further barriers to integration.

And then we have not touched yet upon the undeniably profound differences in politics, language, and culture within the European Union. Is there any other common market on earth where people from its various places and corners are, for example, so specialized in very different sports with assorted Olympic medals and world titles to show for it: just think about the Norwegians in cross-country skiing, the Dutch in ice-skating, and the Flemish in cyclo-crossing.⁹

⁹ Riding (or running with) a road bike on a mountain bike track full of mud and puddles is called cyclo-crossing.

(ii) Endogenous Economic Borders

Endogenous (informational) economic borders also remain quite high in Europe. As pointed out before, the impact of technology on informational borders is unclear *a priori* from a theoretical point of view. But Europe further faces specific problems when it comes to reducing informational asymmetries. Hardening of information, for example, could in principle alleviate some of the informational asymmetries. But hardening of information may also be more problematic in Europe than in the USA as it is not clear that all information that is already hardened is equally reliable across Europe. For example, La Porta *et al.* (1998) report a 'Rating on Accounting Standards' that ranges between 36 and 83 for countries in Europe and between 24 and 76 for the rest of the world (the US score equals 71, while the average for all countries is 61). In addition, much local knowledge is often still needed to interpret correctly the 'hard facts', often involving translating 'hard information' into 'soft information'.

Technological developments may bring an outcome. But the introduction of new lending technology seems rather slow in most parts of Europe. Various factors such as the small distances, a lower GDP per capita, centralized decision-making, a wait-and-see attitude, and lack of financing for innovation could reasonably be listed as suspects, but more research seems needed to identify the true culprits.

(iii) Distance Dies Another Day

To conclude, borders (and as a result also distance) 'may die another day' in Europe. We would argue that as most lending occurs over shorter physical distances in Europe, informational asymmetries increasing with distance might not be an important issue. Hence lending practices on the ground may be driven more by transportation technology than by changes in communication and information processing technology.

However, information asymmetries increase dramatically when a border is crossed. In this regard, one could argue that the various exogenous and endogenous economic borders are mutually reinforcing and also that current technological and

regulatory developments remain to a large extent impotent in dismantling these formidable barriers.

V. POLICY RECOMMENDATIONS AND CONCLUSIONS

Our review of the academic banking literature highlights that retail banking markets remain to a large extent local: pricing and availability of credit hinges on local market conditions. We pointed at a number of exogenous and endogenous market imperfections that persistently make retail-banking markets 'less competitive' than in the absence of these imperfections. The most recent deregulatory steps and the recent technological developments will most likely not remove the remaining exogenous and endogenous economic borders. Our policy recommendations are straightforward and have withstood the test of time in terms of having been recommended frequently. That does not make them any less relevant.

To the extent that the rush towards building 'national champions' was the result of a winner's-curse problem, the trend may have run its course (Danthine *et al.*, 2001). It is therefore time that the national champions started naturally spilling across borders as well. We should note, however, that (i) cost savings are often impossible in cross-border mergers and (ii) current cross-border mergers have produced negative combined cumulative abnormal returns. To facilitate cross-border M&As further, national supervisors need to treat domestic and cross-border merger candidacies more equally.

Indeed, in a few high-profile cross-border M&A attempts that took place in Europe, national supervisors wielded their informal and/or formal mandate in the bank merger review process to derail or maim the planned cross-border bank merger. The role of banking supervisors in the merger review process is a natural and undisputable proper corollary to (i) their licensing mandate (capital requirements, 'fit and proper management', etc.), (ii) their role in the bank default or restructuring process, and (iii) their general engagement and responsibility for the maintenance of banking-sector stability (Carletti and Hartmann, 2003). However, it appears as if in a

number of these recent instances national banking supervisors were mobilized or swayed by domestic political interests to block European cross-border bank mergers, fielding arguments of improper management or financial instability as only the flimsiest of excuses. Further pressure from the European executive branch and judicial system, and enhanced national supervisory independence should put a stop to such rather dubious practices.

In tandem with national bank supervisors, national and European competition authorities should pursue a pro-active competition policy and cut large financial institutions seeking yet another domestic partner no slack. In addition, there may be a need for the foreseeable future for flexibility in allowing various organizational and corporate governance structures to co-exist. The recently implemented European Company Statute should improve the situation on the ground in this regard. On the other hand, (admittedly somewhat contradictory) questions may have to be raised about the further fostering (allowing) of mutual structures in banks. Finally, possibilities for

active pan-European take-overs need ultimately to be created (not only in banking, obviously), such that the best combinations of banks can be determined by market participants and not by politicians.

It is not clear that the current supervisory framework is ready to handle national champions growing into pan-European banking behemoths. It may be fruitful to consider rapidly reinforcing the existing web of bilateral memoranda of understanding with multilateral memoranda agreed upon in one or more rounds of negotiation between national supervisors. Multilateral work, if successful, may ultimately be more efficient in achieving the supervisory objectives. In addition, serious consideration may have to be given to the creation of a European Bank Supervisor, to the supervision and authority of which pan-European banks can choose to subject themselves. The newly established Lamfalussy Committees in Banking constitute major steps forward on all of these accounts. In any case, more research on these vital issues seems also warranted.

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