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The Geographical Network of Bank Organizations: Issues and Evidence for Italy

Luca Papi[*], Emma Sarno[**] and Alberto Zazzaro[***]

Abstract
The evolution of the banking industry has always been affected by recurrent waves of technological, regulatory and organizational changes. All such changes have significant effects on the spatial organization of banks, the interconnectedness of geographical credit markets and the core-periphery structure of banking industry. In this chapter, we review the literature on the effects of geographical distances between the key actors of the credit market (the borrowing firm, the lending branch, the lending bank, and rival banks) on lending relationships and interbank competition. Using the metrics and graph techniques for network analysis we then provide evidence concerning the evolving geographical network of bank organizations in Italy.

JEL Classification: G2

Keywords: Distances in credit markets; spatial organization of banks; network analysis.

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1. Introduction

The evolution of the banking industry has always been characterized by recurrent waves of technological, regulatory and organizational changes. The frequency and impact of such changes have increased in recent years, especially in response to the global financial crisis of 2007-2010.

First, a growing number of technological innovations have modified – and continue to do so – the relationships between banks and customers, the competitive advantages of banks and the role of operational (borrower-to-branch), functional (branch-to-headquarter) and interbank (borrower-to-rival banks) geographical distances in lending decisions. Examples refer to the ever-wider utilization of web-based applications for the distribution of banking products and the handling of bank-firm relationships, and the diffusion of sophisticated techniques of risk analysis based on statistical information and automated credit-scoring models.

Secondly, regulatory changes have removed many barriers that limited competition, increasing the ability of financial institutions to operate in further geographical and product areas. At the same time, post-crisis regulation has requested banks to comply with tougher capital requirements and risk management procedures, affecting significantly the cost structure of the banking business[1].

Finally, in response to the new technological opportunities and regulatory constraints, important changes in the organizational and operational structures have been activated by banks during the last twenty-five years, with an unprecedented surge of mergers and acquisitions that resulted in two opposite spatial processes, namely the strong concentration of banking power in a few places and the increase of banks' geographical reach.

The global financial crisis has triggered a new wave of organizational and regulatory changes. The negative consequences of the recent financial and economic crisis on banks' solvency have led in many countries to a new consolidation process that is producing fewer banks and fewer bank branches. In Europe structural changes have gone in tandem with a major ongoing institutional building project (the so-called banking union), which is redesigning the overall framework of the European banking sector. In this renewed regulatory environment, it is likely that the consolidation wave that has so far been mainly characterized by a national dimension will flow beyond national borders to become a cross-country phenomenon.

[1] The actual impact of higher capital requirements on the real economy is a highly debated issue (Berrospide and Edge 2010; Angelini et al 2011;, Noss and Toffano 2014)). Banks can comply with higher regulatory capital ratios by either raising additional capital or shrinking assets, by reducing credit to the economy and selling off parts of their securities portfolio. In times of crisis, banks are more likely to choose the deleveraging option instead of raising more equity capital, with costly consequences for the real economy through credit crunch and fire sales effects.

All such technological, regulatory and organizational changes have had, and continue to have, significant effects on the spatial distribution of the banking industry, the geography of bank power, bank-firm relationships – especially the lending relationships with the local, small and medium enterprises – and ultimately on the spatial distribution of economic development and convergence/divergence processes across regions.

In this chapter we first discuss why and how geographical distances between the key actors of the credit market (the borrowing firm, the lending branch, the lending bank, and the rival banks) forge bank-firm relationships and interbank competition. Then, using the metrics and graph techniques for network analysis we provide evidence about the evolution of the geography of banking industry in Italy and the spatial distribution of bank power between core and peripheral regions. More specifically, in section 2 we discuss the role of geographical distance in banking. In section 3 we present the different concepts of distance and review why bank proximity should affect the provision of financial services and the extant empirical evidence on the role of distance in different realms of banking activity. In section 4 we summarize what it is known and what it is not known about the determinants of distances and the emergence of banking centers and peripheries. In section 5, using the network analysis, we investigate the changing geography of bank organizations, the spatial network of bank power and the geographical interconnectedness among bank structures in the Italian banking industry. In section 6 we conclude and suggest directions for policy initiatives and further research.

2. Why geographical distance still matters in banking

A crucial production factor affecting bank lending decisions is the availability of accurate information about borrowers and their projects. Both the theoretical and empirical banking literature have now definitively shown that asymmetric information between borrowers and lenders and within the banking organizations prevents credit being allocated efficiently in the economy at fair terms. Credit granting necessitates the transfer of hard and soft information between borrowers and loan officers who are in charge of loan applications, and between the latter and senior managers across bank hierarchical layers, who are called upon to review the action of loan officers and, possibly, to make a final decision on certain types of loans.

Hard information consists of quantitative or easily quantifiable data that can be collected and communicated at a distance without any material loss of its intelligence content (e.g. borrowers' financial statements, balance-sheet ratios, repayment records etc.). The quantity and quality of hard information available to banks depend on the legal, institutional and regulatory environment of the banking industry as

well as by the advancements in credit scoring technologies, rather than on their spatial organization. For example, the sharing of information about borrowers' repayment history and debt exposure through public or private credit bureaus improves the screening ability of banks, mitigating selection errors in lending (Pagano and Jappelli 1993), borrowers' indiscipline (Klein 1992) but also reducing the risks of borrowers' information capture by lenders (Padilla and Pagano 1997)[2]. Similarly, better accounting standards (e.g., tighter accounting and reporting rules or stricter sanctions for fraudulent reporting) decrease the costs of information acquisition, thereby increasing resources devoted to selecting good borrowers, improving credit allocation and reducing the average default on granted loans (Zazzaro 2005). Credit scoring techniques allow banks to elaborate many pieces of rough, hard information to obtain new and more accurate evidence about borrower creditworthiness and improve their lending-decision-making (Petersen and Rajan 2002).

In contrast, soft information comprises subjective knowledge accumulated over time by loan officers in the course of repeated face-to-face interactions with borrowers (e.g., assessment of the quality of the firm's management, its customer relationships up and down the value chain, the ethical character and reputation of loan applicants). Soft information is not easily codifiable, storable or objectively verifiable and, as a result, it is difficult to communicate and transmit between agents at a distance (Petersen and Rajan 2002; Berger and Udell 2002; Petersen 2004). Loan officers at the bank branch are the real and often exclusive repositories of soft information, which is very local in nature, largely embedded in local society and the economic environment, and hardly portable (Uzzi 1999; Uzzi and Lancaster 2003; Drexler and Schoar 2014)[3]. In other words, soft information has a fundamental spatial dimension, which makes the geographical distribution of the banking industry, and the spatial organization of each single bank of the utmost importance for an easy and efficient access to credit for new, small and innovative, informationally opaque companies (Klagge and Martin 2005; Alessandrini et al. 2009, 2010). In this context, the geographical proximities between borrowers, the lending and rival bank branches and headquarters impact on the costs and quality of soft information acquisition and its sound transmission flow. In addition, physical proximity reduces transportation costs for searching for prospective borrowers and lenders, for conducting bank-firm relationships in person and for the internal reviewing of loan officers' activity (Degryse and Ongena 2005; Degryse et al. 2009).

[2] Consistently, empirical evidence indicates that in countries where banks can rely on well established credit bureaus and information sharing practices bank lending amount tends to be larger and default rates lower, especially for informationally opaque firms (Jappelli and Pagano 2002; Brown et al. 2009).

[3] However, a recent study conducted on a US credit union by Campbell and Loumioti (2014) has questioned the limited portability of soft information, documenting an enduring effect of the stock of soft information accumulated over time in the bank's monitoring system by different loan officers in different branches on access to credit for borrowers, loan prices and repayment performance.

The different nature of hard and soft information means that different types of banks have different comparative advantages in acquiring, interpreting and using it. In general, large, hierarchical and geographically dispersed banks are in a better position to obtain and process hard information, taking advantage of economies of scale from large technology systems and extensive information datasets from the network of their branches. By contrast, they are at a disadvantage in lending to informationally opaque borrowers due to organizational frictions and the difficulties of sharing soft information across the bank hierarchical layers (Stein 2002; Berger et al. 2005), while small local banks are better equipped to collect and assess soft information through personal and repeated interactions at the local level with local borrowers.

3. Which distance?

The literature on the geography of the banking industry and the spatial organization of banks distinguishes between three main different notions of distance: (i) the operational or borrower-to-branch distance; (ii) the functional or branch-to-headquarter distance; (iii) the interbank or borrower-to-rival-banks distance. These notions of distance have been articulated both at the bank level, to examine the determinants of the spatial organization of banks and its effects on lending decisions, and at the geographical market level, to examine the evolution of the spatial structure of the banking industry and its impact on firms' access to credit and regional development.

3.1. *Operational or borrower-to-branch distance*

The operational distance measures the geographical space that separates a borrower from the bank branch managing the lending relationship. In spite of advances in information and communication technology and the use of automated credit-scoring models, the borrower-branch distance remains surprisingly small: in the USA the median operational distance for credit lines was three miles in 2003 (Brevoort and Wolken 2009); in Japan it was even smaller (in 2010 1.2 miles, according to Ono et al. 2013), and likewise in Europe, as results from studies conducted on single banks in Belgium, Italy and Sweden (Degryse and Ongena 2005; Carling and Lundberg 2005; Bellucci et al. 2013).

Consistent with the enduring importance of operational proximity for doing banking business, starting from the 1980s, banking systems in Europe and the US experienced a sharp increase in the number of branches and a wave of bank acquisitions, with large bank conglomerates spreading their presence across regions and countries through extensive webs of branches and subsidiaries. However, recent developments in the banking industry in many industrialized countries could have contrasting effects on the spatial organization of banks and the importance of operational distance. On the one hand, the new and ongoing

bank consolidation process, starting in response to the global financial crisis, has reduced the number of bank branches and consequently increased the operational distance from local borrowers. In Europe, for example, the number of branches peaked at 186,256 units at the end of 2009; since then the trend has been reversed and a sharp decline has been recorded, with 163,1171 branches operative at the end of 2013 (Figure 1). On the other hand, the increased diffusion of remote, e-banking and other internet-related possibilities for managing lending relationships, while reinforcing the decreasing trend in the number of branches, has produced a "virtual" reduction of importance of operational proximity between borrowers and lenders (Petersen and Rajan 2002).

[Insert Figure 1]

As outlined above, the benefit of greater operational proximity between the contracting parties is to reduce the cost of searching, underwriting and handling loan contracts, both in terms of information and transportation costs. Consistent with this view, the choice of the main bank by firms is found to be positively influenced by their physical proximity to its bank branches (Barone et al. 2008; Ono et al. 2013). The effects of operational proximity on loan origination and loan pricing are however ambiguous, depending on whether banks tend to price discriminate borrowers spatially by location or, alternatively, whether they price loans according to marginal costs. In the former case, transportation and information cost advantages provide the bank branch that is closest to the borrowing firm with a market power against its rivals, that can be thus exploited by charging higher interest rates (Lederer and Hurter 1986; Dell'Ariccia et al., 1999; Degryse et al. 2009). In contrast, if banks follow a simple, non-discriminatory mark-up rule to price loans, the operational proximity of lenders should reduce interest rates and increase credit availability for nearby borrowers (Bellucci et al. 2013).

The uncertain impact of operational distance on loan terms and availability is confirmed by the empirical evidence. Petersen and Rajan (2002) were the first to provide empirical evidence of spatial discriminatory loan pricing, finding a negative relation of the ability to borrow at a distance[4] with the loan interest rates, and a positive impact on the likelihood of loan approvals. The same findings are documented by Agarwal and Hauswald (2010) who analyze the loan applications made by small businesses to a major US bank. Similarly, Breevort and Hannan (2006) find that the probability of a bank approving a loan application in a given area increases with its spatial proximity to the customers. A negative correlation between borrower-to-branch distance and interest rate was also found by Degryse and Ongena (2005) on investigating the pricing behavior of a large Belgian bank in small business lending. To the extent that the

[4] Petersen and Rajan (2002) do not examine the real distance between the lending office and the firm, but consider the ability to borrow at a distance as a measure of firms' information transparency. This is given by the predicted value of a regression of observed geographical distance from lenders on variables capturing public information about borrowers.

effects of distance are significant for transactional loans and not significant for relational loans their results are consistent with the hypothesis that transportation more than information costs motivate spatial price discrimination by banks. Other studies, however, find evidence of mark-up pricing by banks in which transportation and information costs of distance are transferred to the interest rate. Knyazeva and Knyazeva (2012) show that interest rates on syndicated loans to large US firms are positively associated with the geographic distance of the borrowing firm from the lead lender or the pool of lenders. Bellucci et al. (2013) document the same relationship between distance and interest rate in the case of Italian small firms and show that distant borrowers are more likely to be credit-constrained. A similar uncertainty emerges with regard to collateral. Cerqueiro et al. (2009) find that distant loans are more likely to be secured for a sample of US firms, while this relationship is insignificant when considering a sample of firms borrowing from a Belgian bank. In contrast, Bellucci et al. (2010, 2014) document a negative correlation between distance and collateral, even after taking into account the simultaneity of collateral and interest rate decisions.

At the geographical market level, a number of studies have considered the density of bank branches per inhabitants or per square mile as a measure of the average operational distance from borrowers. Once again, the results are mixed. Using US data, Avery and Samolyk (2004) find that the number of branches has no impact on small business lending growth in the local market, whereas the number of banks is only weakly associated with such a variable. By contrast, Bonaccorsi and Gobbi (2001) find that the density of bank branches (the ratio of branches to population) in Italian provinces is positively associated with the credit availability for local firms (particularly for small firms), whereas it is negatively associated with the share of bad loans. However, Alessandrini et al. (2009b) report that the probability of firms being credit-rationed is unaffected by the average operational distance of local branches, whereas the sensitivity of firms' investment to cash flow is weakened by the number of branches in the province per square mile, but becomes magnified if the number of branches is normalized to inhabitants. With regard to the effects of bank operational proximity on firms' innovation propensity, Benfratello et al. (2008) provide evidence that a higher bank branch density increases the probability of firms of introducing innovations in Italy. However, Herrera and Minetti (2007) and Alessandrini et al. (2010) show that the effect of branch density on firm innovation becomes statistically insignificant once controlling for other bank variables (the duration of the lending relationship or the functional distance of local banking industry) and for its possible endogeneity.

3.2. *Functional or branch-to-headquarter distance*

A second fundamental notion of geographical distance in the banking literature is functional distance[5]. While operational distance quantifies a geographical space external to the bank, the notion of functional distance captures the internal spatial remoteness between the different hierarchical layers of a banking organization. Typically, it is measured by the distance between bank branches operated, where loan applications are submitted, information is collected, lending relationships are established and handled, and the bank headquarter, where the ultimate decisions about branch budgeting, loan officers' careers, lending policy and loan provision are taken.

Recent changes in the spatial organization of economic activities emphasize the importance of functional distance for the banking industry. There is a striking trend worldwide to concentrate firms' headquarters and strategic functions in a few cities in order to take advantage of network externalities related to the knowledge and understanding of market and technological opportunities and the availability of high-quality human resources, business services and transport facilities (Klier and Testa 2002; Storper and Venables 2004; Strauss-Kahn and Vives 2005; Bel and Fageda 2008). Face-to-face buzzing and networking, access to high-skilled human resources, financial innovation and information on future trends in the economy and industries are all factors of paramount importance for the banking business (Thrift 1994; Tschoegl 2000; Grote 2009). Consistently, the past and present consolidation process of banking industries in Europe and the US has produced a concentration of bank headquarters and strategic functions in a few financial centers. This has greatly increased the physical distance that separates the actual locus of control of bank lending policy from local branches, local borrowers and the local economy.

Information asymmetries and agency costs within a bank organization and "home biases" in lending policy make functional distance a major determinant of access to credit for local firms (Alessandrini and Zazzaro 1999). Soft information is strongly embedded in the local economy and society, and can be effectively gathered only by loan officers working and living in the same neighborhoods as borrowers. This makes information about borrowers largely asymmetric within the bank organization and provides local loan officers with the opportunity to exploit this informational rent to their own benefit.

Accordingly, banks have to design costly loan reviews, officers' rotation and incentive pay systems in order to mitigate moral hazard behaviors of local officers (Udell 1989; Hertzberg et al. 2010; Uchida et al. 2012). Asymmetry of information and interest disalignment between bank's officers and managers (shareholders) and agency costs vary with the branch-to-headquarter distance. Loan officers at distant branches of a large and geographically dispersed bank conglomerate are often only temporarily active in the

[5] The expression "functional distance" was first used in the banking literature by Alessandrini et al. (2005). The same notion of distance has also been equivalently labeled in other studies as organizational, branch-to-headquarter or hierarchical distance (DeYoung et al. 2004; Jimenez et al. 2009).

local economy, coming from other regions and/or whose opportunities for career promotion will be reaped in different places. Geographical mobility incentivizes loan officers to produce short-term and easily communicable results, shying away from lending to informationally opaque (young, small and innovative) borrowers and assuming too generous an attitude toward hard information loans to well-established enterprises (Hirschleifer and Thakor 1992; Palley 1997; Berger and Udell 2002). In addition, loan officers of local branches can divert time and effort from their due tasks of searching for and monitoring borrowers to lobbying senior managers at the bank headquarters for budgeting and career concerns. In this scenario, loan officers become advocates of their units and exert effort in collecting information to convince their superiors to allocate more of the firm's resources to their operating units (Dewatripont and Tirole 1999). In contrast, loan officers at branches which are functionally proximate to the bank headquarter are often born and bred in the same area as local entrepreneurs and senior bank managers, with whom they share the same culture, values, norms and language. Their strong embeddedness in local society not only increases the opportunity to acquire information about borrowers that is not otherwise available to people external to the local society, but it also makes its transmission easier to the top hierarchical levels of the bank.

Besides information and agency problems, the geographical proximity of the "thinking head" of the bank to a region increases the sensitivity of the bank's lending policy to the needs of the local economy and to the lobbying effort of local society, introducing home and cultural affinity biases in credit allocation. In fact, internal capital budgeting and liquidity flows across bank branches and subsidiaries tend to be decided not only on the basis of local lending opportunities, but are also the result of corporate policies and the economic, social, political and cultural importance that the local economy and society have at the headquarters where the bank CEOs live and work and where budgeting decisions are taken (Meyer et al. 1992; Scharfstein and Stein 2000; Carlin et al. 2006; Landier et al. 2009).

The empirical literature offers many consistent results supporting the importance of agency costs and home bias in geographically dispersed bank organizations. A first group of studies has documented that consolidation dealings involving out-of-region, distant banks cause a decrease in the availability of credit to small firms (Keeton 1995, 1996; Berger et al. 1998; Peek and Rosengren 1998; Alessandrini et al. 2008). In general, there is robust evidence for many countries that branches and subsidiaries of functionally distant banks tend to be less efficient (Berger et al. 2001; Berger and DeYoung 2001) and shy away from small business lending and soft-information-based credit relationships (Mian 2006; Liberti and Mian 2009; DeYoung et al. 2008). Furthermore, firms located in regions disproportionally populated by functionally distant banks tend to have less access to credit, a lower capacity to maintain a long-lasting bank relationship

and a lower propensity to innovate (Detragiache et al. 2008; Alessandrini et al. 2009, 2010; Gormley 2010; Presbitero et al. 2011).

The existence of "home biases" in credit allocation is well documented by the literature on syndicated loans and the functioning of banks' internal capital market, showing that large and geographically dispersed banks (foreign or nationwide) exacerbate the transmission of financial shocks across regions, by moving funds from their peripheral to central (headquartered) markets (Peek and Rosengren 1997, 2000; Cetorelli and Goldberg 2011; Imai and Takarabe 2011; Schnabl 2012; Giannetti and Yafeh 2012; Berrospide et al. 2013) and by limiting access to credit to local firms when the local economy growth rate slows down (Campello 2002, Cremers et al. 2010). This is especially true in times of global crises, when a "flight to home" effect may explain both the decline of the banks' lending exposure to regions farther away from their headquarters (Giannetti and Laven 2011; De Haas and Van Horen 2013) and the restriction in access to credit suffered by firms located in regions disproportionally populated by foreign and functionally distant banks (Popov and Udell 2012; Presbitero et al. 2014).

3.3. *Interbank or borrower-to-rival-banks distance*

A third concept of distance has to do with the presence and proximity of competing banks and branches in a certain area. Interbank distance and the geography of bank market power have a direct influence on credit availability to local economy and intertwine with operational and functional distance.

Firstly, the geographical proximity of bank competitors reduces the benefits of market power coming from operational proximity to borrowers and the opportunity to discriminate them spatially (Degryse et al. 2009). In this vein, Degryse and Ongena (2005) and Agarwal and Hauswald (2010) find that when the rivals of the lending bank are distant from the borrower the interest rate charged to that borrower is lower on average.

Secondly, interbank proximity affects bank information production, lending orientation and access to credit for local firms. On the one hand, the presence of a large number of banks increases the likelihood of borrowers having already been considered and correctly rejected by rival banks, thus eroding the banks' ex-ante beliefs about the applicants' creditworthiness and weakening their screening effort (Broecker 1990; Riordan 1993; Shaffer 1998; Cao and Shi 2000). Further, proximity of bank rivals facilitates the switching of borrowers from one lender to another. This reduces the possibility of the lending bank reaping the benefits of soft information production over time, undermines the incentives to make specific investments in long-lasting lending relationships, and induces the bank to increase its interest rates in the short term (Mayer 1988; Petersen and Rajan 1995; Ogura 2010; Bellucci et al. 2013). In addition, the easy access to

bank rivals and alternative sources of credit makes reputation costs of default less prominent, heightening borrowers' moral hazard behavior (Hoff and Stiglitz 1997). On the other hand, a smaller interbank distance and higher competitive pressure from rivals can induce banks to support local borrowers more effectively. Local banks increase their lending to more informationally opaque borrowers on a relational basis in order to create a competitive edge with respect to their rivals and insulate themselves from pure price competition (Boot and Thakor 2000; Dell'Ariccia and Marquez 2004; Hauswald and Marquez 2006). Conversely, out-of-market, functionally distant banks are forced to engage in specific local objectives in order to overcome the competition of local banks, reducing the impact of "home bias" on credit allocation and the possibility of extracting extra profits (Alessandrini and Zazzaro 1999; Claessens and Van Horen 2009).

Thirdly, the effects of interbank proximity depend on the types of bank rivals in the region. If the regional banking system is predominantly populated by functionally distant banks with a competitive advantage in transactional, hard-information lending, strong interbank competition in the regional credit market tends to be harmful for credit access to young, small and innovative firms: in order to find it rewarding to lend on a relational, soft-information basis, functionally distant banks ought to benefit from their market power, allowing them to extract additional future rents from investing specific resources in a lending relationship. In contrast, the market proximity of rival banks tends to promote relational lending if there is a strong presence of small and functionally close banks prepared to exploit comparative advantages in handling soft information (Presbitero and Zazzaro 2011).

Finally, the geographical proximity of banks in credit markets may have different effects on interbank competition and bank lending orientation according to whether the same or different banks operate in different regions. This is the multimarket contact hypothesis advanced by Edwards (1955), and widely discussed in the banking literature (Heggestad and Rhoades 1978; Mester 1987; De Bonis and Ferrando 2000; Fuentelsaz and Gómez 2006; Degryse and Ongena 2007). According to the traditional mutual forbearance argument, multiple contacts across regional credit markets facilitate tacit collusion amongst rival banks, restraining price competition and encouraging a live-and-let-live behavior (Edwards 1955; Bernheim and Whinston 1990). However, multiple contacts can also have pro-competitive effects (Mester 1992), leading banks to invest in soft information and other relation-specific assets in order to create an edge to competition in some markets and limit the risk of retaliation by rival banks (Anand and Galetovic 2006).

4. Distance determinants and banking centers

What exactly drives distances in the banking industry and the emergence, shaping and evolution of banking cores and peripheries is a crucial, though relatively unexplored, issue. In this section we provide a short review of what is known, and not known, about such matters.

4.1. *What we do know* ….

Some recent studies have tested for the determinants of the operational distance between borrowers and lenders directly. Others, have considered operational and functional distances indirectly by looking at the determinants of the geographic expansion of bank organizations.

4.1.1. *Testing for borrower-to-branch distance*

In an influential paper, Petersen and Rajan (2002) analyze data from the 1993 National Survey of Small Business Finance in the USA, and document that the average borrower-to-branch distance tripled for the lending relationships that began in the 1990s with respect to those than began in the 1970s, while the frequency of conducting bank business impersonally (phone or mail) doubled. In line with the idea that soft information is spatially embedded and hard information is spatially neutral, Petersen and Rajan also find that informationally opaque firms tend to borrow from closer lending branches, while the increasing trend in distance is explained by the productivity of bank employees in producing loans and hence by bank capacity to use hard information technologies. Consistently, bank-firm relationships conducted at a distance tend also to be conducted on an impersonal basis.

Using the same data set, Berger et al. (2005) show that large banks have a comparative advantage in gathering and processing hard information as they lend at a greater distance and make a stronger use of impersonal ways of communication with borrowers (see also Cole et al. 2004). These results hold even after controlling for the potential endogeneity of bank-firm matches. The greater ability of big banks to lend at a distance is confirmed by Uchida et al. (2008) in the case of Japan. In addition, they show that the frequency of contacts between small banks and their borrowers is significantly higher, suggesting a greater use of soft information on the part of those banks.

4.1.2. *Entry into geographic markets and spatial availability of banking services*

Indirect evidence on spatial organization of banks and distance in credit markets comes from the studies on bank entry decisions into geographic markets and availability of banking services to local communities. A first striking result in this literature is that functional and interbank distances have a strong influence on the geographical expansion strategy of banks. At the international level, Focarelli and Pozzolo (2005) show

that distance from the bank headquarter significantly and negatively affects the decision to establish a branch or a subsidiary abroad. Similarly, Magri et al. (2005) consider the activity level of banks from 22 OECD countries in Italy and find that both the number of foreign structures (branches and subsidiaries) and total assets by home (headquarter) country are negatively correlated with the distance from the host country (Italy). Buch and DeLong (2004) look at bank mergers and acquisitions and, in line with studies on entry, find that the number of cross-border bank mergers decreases with the geographical (and cultural) distance between the dealing partners and that such a negative impact increases over time.

At the national level, Chang et al. (1997) provide evidence of herding behavior in location decisions of banks, which leads to a clustering of branches across New York City census tracts. They found a positive correlation between the number of existing branches in a tract and the number of future branch openings in the same tract, thus indicating that spatial proximity to rivals produces major positive information externalities for banks. Partial confirmation of banks' herding behavior in branch openings is documented by Barros (1995) in the case of the Portuguese banking system: new banks (de novo and privatized) tend to establish their branches where incumbents hold a large share of total branches in the market. By contrast, the old banks expand their geographical network of branches relatively more in markets with a small presence of incumbent banks, even if they do not seem to react to the entry of new banks. Finally, both old and new banks tend to open branches where the firm density is low, suggesting that transportation and information costs are relevant factors for operational distance.

Haveman and Nonnemaker (2000) analyze the decision of savings and loan associations in California to establish branches in new geographical markets (at the county level) within the state in question. They show that the degree of multimarket contacts has an inverted U-shaped (positive) effect on the decision of multi-market (single-market) savings and loan associations to expand in a new county, suggesting that proximity to multipoint rivals can spur or deter banks from expanding geographically in order to reduce competitive pressure or to preempt warfare in other markets. An inverted U-shaped effect of multimarket contacts on entry decisions is similarly found by Fuentelsaz and Gómez (2006) for the case of savings banks in Spain. However, they also show that the number of incumbent banks in the market reduces the likelihood of a bank entering that market, consistent with the idea that, *per se*, potential proximity to rivals acts as a barrier to entry into new geographical markets. In contrast, the closer to the bank headquarter the new region, the more likely is the expansion of the bank organization toward that region. These findings are confirmed for Italian banks, which prove less likely to establish branches in provinces which are distant from their headquarter and their pre-entry geographical network of branches (Cerasi et al. 2000; Felici and Pagnini 2008), and in provinces where interbank proximity is strong (Calcagnini et al. 2001).

While all the reviewed papers estimate reduced form models, there are a few studies that have considered bank branching decisions in strategic structural models of price and non-price competition. Kim and Vale (2001 consider the case of Norwegian banks from 1988 to 1995 and find that banks allow for the expected retaliatory response of rivals in their branching decisions. Similar results are documented by Carbó Valverde et al. (2009) for the case of Spanish banks between 1988 and 2002.

Finally, a number of papers have considered the availability of banking services to local communities in terms of total number of branches, branches per population or branches per square mile. Almost all these studies consistently document that the spatial distribution of branches across regions is negatively correlated with regional population density (Lanzillotti and Saving 1969; Seaver and Fraser 1979, 1983; Evanoff 1988; De Juan 2003; Alama et al. 2011), providing indirect evidence in favor of the hypothesis that operational and interbank distance are strongly influenced by average transportation and information costs.

4.2. …. *and what we do not know*

Starting from the pioneering study of Kindelberger (1974), an extensive literature on the emergence and evolution of international financial centers has been developed in financial economics and geography (Porteous 1999; Gehrig 2000; Fratianni 2008; Grote 2009). Much less attention has been paid to the emergence of banking centers, the uneven geography of bank power and the regional interconnectedness among bank structures at the national level.

A number of contributions in the post-Keynesian tradition have analyzed the endogenous emergence and reproduction of a spatial core-periphery structure in national banking systems (Chick and Dow 1988; Dow 1999; Chick et al. 2013; Crocco et al. 2014). However, the sharp dichotomy between center and periphery does not allow these authors to explore the whole complexity of the spatial network of bank power and organizations.

Choi et al. (1986; 1996; 2002) analyzed the matrix of banks in the world's top 300 (according to The Banker ranking) headquartered in one of fourteen major international financial centers which are organizationally present in one of the other financial centers. They document that after a twenty-year period during which the interconnectedness of international financial centers increased, in the 1990s the presence of foreign banks from one center and hosted in the others decreased significantly, with New York confirmed as the major (the most interconnected) financial center in the world, Hong Kong and Singapore that have overtaken London in terms of top foreign banks in their center, and Tokyo losing ground to other financial centers. However, the focus of these studies is the interdependence of the world's top international financial centers. In this context, the authors use the existence in the city home of a financial

center of structures (representative offices, branches, subsidiaries) of banks headquartered in another financial center city as a measure of the degree of interconnection between the two centers, without investigating the properties of the banking network (centrality, density, stability) or the spatial distribution of bank organizations at the country level.

Finally, a recent strand of research has explored the characteristics of the web of aggregate, cross-border bank lending flows, as reported in the financial statistics of the Bank for International Settlements, by using the techniques and metrics of network analysis (von Peter 2010; Minoiu and Reyes 2011; Sá 2013). However, since the latter studies ignore the interlinkages among bank organizations and the spatial structure of bank functional power, they cannot provide insights into the importance of operational, functional and interbank distances.

5. The geographical network of bank organizations in Italy

In this Section we analyze the changing spatial network of banking organizations in Italy. With its predominance of small and medium enterprises and its North-South economic divide, the Italian economy represents an interesting case study to examine the spatialities of credit markets and bank-firm relationships. In addition, the structural and spatial evolution of the banking industry in Italy during the last 25 years has been broadly representative of developments experienced by many other European and non-European countries and can provide some insights into the formation of banking centers and peripheries, the uneven geographical distribution of bank power and regional banking interconnectedness.

5.1 *The Italian banking industry*

To contextualize the environment in which Italian banks operate, it is important to start from the two major structural aspects that have characterized, and continue to shape, the Italian economy. First, the predominance of small and medium-sized enterprises (SMEs) for which concepts such as soft and hard information, relationship and transaction lending, or bank and borrower proximity are particularly relevant in influencing credit and investment decisions. The importance of SMEs within the Italian economy emerges both in terms of workforce and value added. According to Eurostat statistics, in Italy the SMEs account for more than 80% of employment in the non-financial sector, versus an EU average of 67%. A similar gap also emerges when we consider the SME share of value added (67% in Italy versus 57% in the EU). This high share of SMEs contributes to explain the financial structure of Italian firms, with its

relatively widespread use of debt instruments (55% of total liabilities in Italy versus 47% in the Euro area) and a high share of bank loans on total financial debt (64% versus 46% of the Euro area)[6].

The second structural aspect of the Italian economy which is important for the evolution of banking geography is the economic and social divide among the Italian regions, with Southern regions still lagging well behind in terms of income and employment levels compared to Central and Northern regions (Figure 2).

[Insert Figure 2]

During the last two decades, the above-mentioned structural aspects of the Italian economy combined with the increasing regulatory pressures on the banking industry occurring at the European and national level have contributed to shape the new geographical structure of the Italian banking system. During the same period there has been strong liberalization and harmonization of the legal, regulatory and institutional financial framework in the European Union, culminating in the completion of the European Monetary Union, and more recently in the construction of the so-called European Banking Union.

At the national level, a far-reaching overhaul of the banking sector took place in the 1990s: a new consolidated banking law was passed in 1993, paving the way to a relaxation of entry barriers into the sector, a significant liberalization of branches, wide-ranging privatization and a major wave of mergers and acquisitions.

Over the period 1992-2013 the number of banks decreased by 33%, from 1025 to 684. To a large extent this reduction was due both to takeovers of troubled southern banks by northern banks and to the pressures imposed by the quest for greater efficiency in a more integrated market. Consequently, the direction of the consolidation process has brought about a loss of autonomy in the southern banking sector. Nowadays, the latter comprises only a small number of autonomous southern commercial banks, the bulk of banks being members of banking groups headquartered in the northern part of the country (Zazzaro 2006; Giannola et al. 2013).

At the same time, to compete better on local markets, Italian banks have reduced their operational distance from customers through a significant increase in area presence by expanding their network of branches. As a result, the number of banks doing business on local markets[7] increased on average from 28 in 1992 to 32 in 2013. In Figure 3 we depict the variation in the number of banks by province from 1992 to 2013. In 79 provinces there was an increase in the number of independent banks (figure 3, categories 3-6). This increase was exceptionally high (category 6) in Milan (+35), Turin (+22), Florence (+20) and

[6] See ECB 2014.

[7] We follow the Italian Antitrust authority in identifying the NUTS III province as the main local market in banking. Until 1990, the same criterion was used by the Bank of Italy to authorize the opening of a new branch.

Brescia (+19). In contrast, in 25 provinces the number of banks decreased (categories 1 and 2). A first group of provinces experiencing such a contraction is concentrated in the North-East of Italy, reflecting the consolidation process of local cooperative banks that led, in the province of Trento, to an exceptional reduction of stand-alone banking institutions by 46. A decrease in the number of banks also occurred in southern provinces where many local banks were acquired by banks headquartered in the North.

The number of branches went up by more than 60 per cent for the country as a whole, with the average number of branches per province increasing from 180 in 1993 to 289 in 2013. This positive trend affected all Italian provinces with the exception of three provinces in Sicily where the number of branches slightly decreased (Agrigento, Catania and Trapani; category 1 in figure 4). In general, Southern provinces experienced a much less marked increase in the number of bank branches than the rest of the country, such that the branch density significantly diverged between the North, where it is now more than six branches per 10,000 inhabitants, and the South, where there are fewer than four branches per 10,000 (Giannola et al. 2013).

[Insert Figure 3 and 4]

Thus the process of financial consolidation in Italy has led to an increasingly passive financial integration in southern regions. This is clearly testified by the presence of out-of-region banks in the two areas. In the South, in 1986, the share of branches which had their headquarters in the rest of the country was about 16%. At the same time, banks from the South held a modest 1.7% of the active branches in the Center-North, evidencing the coexistence of two geographically segmented and functionally independent banking systems. This structure dissolved in the 1990s with the liquidation and acquisition of the Banco di Napoli, Banco di Sicilia and other major savings banks of the South by banks in the Center-North. In 2010, more than 42% of branches operating in the South were owned by banks headquartered outside the area and another 38% were attributable to banks which, whilst maintaining their headquarters in the South, were part of banking groups whose parent bank was in the Center-North. At the same time, the branches of southern banks in the Centre-North shrank well below 1% (Giannola et al., 2013).

The recent crisis – that has hit the Italian economy more severely than other European economies - has accelerated the bank consolidation process as a result of closures of distressed banks. As reported in table 1, the number of banks decreased in Italy by 17% in the period 2008-2013, more than in the rest of Euro area (-11%)[8]. This decline in the number of banks also increased the concentration of the banking sector as measured by the share of the top five banks in total assets or by the Herfindahl index.

[Table1]

[8] In the same period, the number of bank employees declined by 9.6%. The change in total staff differed according to banking category, with the greatest reduction among banks that downsized their branch networks (Bank of Italy 2014).

The number of bank branches, which increased steadily before the crisis (13% between 2003 and 2008), came to a halt with the inception of the crisis and then started to shrink markedly. In the last five years, the total number of branches has fallen by 7%, numbering 31,700 in 2013. This reduction was almost entirely due to the reorganization of the branch network of the top five largest banking groups that shed about 3500 branches. The overall effect has been a creeping decline in branch density with respect to the local population. At the same time, the introduction of new technologies has boosted the spatial presence of banks based on online distribution channels in favor of firms and households. In spite of the crisis, the diffusion of online banking services is on the rise everywhere, although Italy is still lagging behind other European countries in the use of internet banking. Total users of home and corporate bank services had reached 33.9 million by the end of 2013, versus 24.9 million at the beginning of the crisis (2007) and only 1.3 ml in 1997. Similar growing trends are also observable in the number of access points to the payment system (POS), or in the number of credit and debit cards[9].

All in all, it would seem that due to the crisis, distance has recently become in some ways more relevant to bank-firm relationships, although more relevant does not translate into the same effects across different borrowers and types of services. In the next section, the information about the bank consolidation process and the decline in branch density in Italy will be combined with some measures of banking interconnectedness among Italian regions, applying the statistical tools of network analysis.

5.2. *Network statistics*

Network analysis provides tools for studying relationships (in network terminology, *links* or *edges* or *ties*) among a number of actors (*nodes* or *vertices*). It has been widely employed in economics both in theoretical and empirical research. Starting from Allen and Gale (2000), a growing number of studies have applied concepts and measures drawn from network analysis to investigate financial interconnectedness across countries and banking institutions and provide insights into the effects of financial globalization, resilience and vulnerability of banking systems to liquidity shocks and financial losses (Leitner 2005; Nier et al. 2007, Battiston et al. 2012, Battiston and Caldarelli 2013). As was stated above, empirical research has been devoted to analyzing the network properties of international financial flows (Minoiu and Reyes 2011; Sá 2013) and bank exposures (Hattori and Suda 2007), while, to our knowledge, the topological properties of domestic banking systems and the interconnectedness of local credit markets in terms of banking structures have been neglected.

[9] The number of POS was 0.06 ml in 1992, 1.18 ml in 2007 and 1.53 ml at the end of 2013.

The spatial organization of the banking industry, the financial interconnections among local credit markets and the geography of banking power (banking decisional centers) can be fruitfully analyzed by using networks metrics and graph techniques. In a network perspective, each geographical credit market is a *node* within a directed network (*digraph*), where directed *links* (*arcs*) model the relationships between the geographical market in which a bank has its headquarter and the markets in which it has its own branches (hereafter, the former geographical market is identified as *sender* – nodes for outgoing relationships –, the latter are identified as *receivers* – nodes for incoming relationships).

Each network can be represented by a non-symmetric matrix with non-null diagonal elements, where rows correspond to senders' markets (i.e., the geographical market where bank headquarters are located) and outgoing arcs, while columns correspond to receivers' markets (i.e., the geographical markets where bank branches are located) and incoming arcs. In our networks, edges are weighted according to the number of branches held at the receivers' level and loops are taken into account as they refer to banks that have branches in the same province where they have their headquarters.

The metrics we use to analyze interconnectedness among geographical credit markets include measures of market centrality (*degree*, *strength* and *relative strength*) and network density (*connectivity* and *cliques*). Formally, let M_t be a matrix in which rows represent senders' vertices of outgoing arcs and columns represent receivers' vertices of incoming arcs. Each entry, $m_t = n_{ijt}$, is the total number of branches in market j owned by banks with their headquarters in market i at time t. These matrices can be transformed into their binary counterparts (adjacency matrix) A_t, where each cell a_{ijt} takes value 1 if there are banks with headquarter in i and branches in j at time t, and 0 otherwise, and all 0s on the diagonal. In detail, the descriptive statistics we use are the following.

5.2.1 *Market centrality*

Node degree and normalized node degree. These indicators use information from the binary representation of a network through its adjacency matrix, and count the number of network nodes to which a node is connected by a link. In the case of directed networks, we have to distinguish incoming from outgoing links or arcs. Hence, we compute the *IN-Degree* (the number of incoming arcs) for each geographical market i as the number of markets $j \neq i$ from which it receives branches, and the *OUT-Degree* (the number of outgoing arcs) of a market i as the number of markets $j \neq i$ where senders' banks from i have their branches. In order to compare measures of market centrality for different geographical definitions of market (province and region), we normalize the *IN-Degree* and the *OUT-Degree* indicators by the maximum possible incoming and outgoing arcs N-1, where N is the number of nodes. In formula

terms, using the adjacency matrix A_t, the (normalized) in-degree and out-degree of a node i at time t are, respectively:

$$IN\text{-}Degree_{i,t} = \sum_{j=1}^{N} a_{jit} \quad ; \quad N\text{-}IN\text{-}Degree \frac{\sum_{j=1}^{N} a_{jit}}{N-1}$$

and

$$OUT\text{-}Degree_{i,t} = \sum_{j=1}^{N} a_{ijt} \quad ; \quad N\text{-}OUT\text{-}Degree \frac{\sum_{j=1}^{N} a_{ijt}}{N-1}$$

Node strength. It is the simplest weighted network indicator that captures the intensity of relationships among nodes. It is equal to the total number of connections originating or terminating in a given node, in terms of branches. More precisely, in-strength for market i is the total number of branches that i receives from other markets, whereas out-strength for market i is the total number of branches of banks with their headquarters in that market that are located in other markets. Analytically, out-strength and in-strength are computed by replacing the entries of matrix M_t in the above node degree formulas:

$$IN\text{-}Strength_{i,t} = \sum_{\substack{j=1 \\ j \neq i}}^{N} m_{jit}$$

and

$$OUT\text{-}Strength_{i,t} = \sum_{\substack{j=1 \\ j \neq i}}^{N} m_{ijt}$$

Relative node strength. It considers the relative importance of incoming relationships by normalizing the number of branches in market i from banks headquartered in market j by the total number of branches active in market i. Then we can compute the *relative in-strength* and the *relative out-strength* of a market i as, respectively, the share of branches of banks external to the market i over the total branches in i and the sum of the branch shares in markets $j \neq i$ owned by banks headquartered in market i. To be precise:

$$Relative\text{-}IN\text{-}Strength_{i,t} = \sum_{j=1}^{N} \frac{m_{jit}}{\sum_{j=1}^{N} m_{jit}}$$

and

$$Relative\text{-}OUT\text{-}Strength_{i,t} = \sum_{j=1}^{N} \frac{m_{ijt}}{\sum_{j=1}^{N} m_{jit}}$$

Although all these indicators are measures of market centrality, read together they also provide information about the degree of financial dependency and financial capacity of a region. In this perspective, high values of *OUT-Degree*, *OUT-Strength* and *Relative OUT-Strength* associated to geographical area indicate the capacity of the area to produce financial services and export them to other regions. In contrast, high values of *IN-Degree*[1], *IN-Strength* and *Relative IN-Strength* indicate a widespread use in that market of banking services from banks external to that area which, if accompanied by a low capacity to produce banking services, clearly suggests the financial dependency of the region.

5.2.2 *Density of the credit market network*

Network density. This indicator evaluates the network connectivity globally by considering the number of links existing between geographical markets (i.e. total node degree) expressed as a share of the total possible number of links (excluding loops). Let $L = \sum_i Degree^{IN}_{(i,t)} = \sum_i Degree^{OUT}_{(i,t)}$ be the total number of arcs in the graph *G*. Then the network density is:

$$Density(G) = \frac{L}{N(N-1)}$$

Cliques. A clique is a maximal complete subgraph of three or more nodes: that is, it is subgraph whose vertices are all connected with each other simultaneously. In directed graphs the reciprocity of dyadic ties is required. Hence, a digraph clique is a subgraph with three or more nodes all mutually connected to each another. In our context digraph cliques may be interpreted as geographical areas where incoming and outgoing banking power is balanced.

5.3. *Network analysis*

In our analysis, we consider the 110 Italian provinces (NUTS III level) or, alternatively, the 20 Italian regions (NUTS II level) as the geographical credit markets. Therefore, provinces or regions are the nodes forming the directed network of the banking industry, which are connected with each other by the flow of branches from provinces or regions where banks are headquartered to provinces or regions where they are located. We compute the network statistics described above for all the Italian banks in 1992 (1066 banks) and 2013 (654 banks) using information on the location of banks' headquarters and branches by provinces

drawn from the Bank of Italy. In this way, we build up four different networks (and adjacent matrixes) to study how the spatial organization of the Italian banking industry has changed during the past two decades.

5.3.1 *Credit market connectivity*

The overall connectivity of geographical credit markets has significantly increased over time: the network density at the provincial level rose from 0.11 in 1992 to 0.14 in 2013 (+36%). Such an increase results partly from the thickening of the interregional links, but for the most part it comes from a more capillary dissemination of branches at the regional level (in particular in Veneto, Liguria, Emilia Romagna, Tuscany, Marche, Abruzzo, Puglia and Sardinia). This finds confirmation in the much higher degree of connectivity of geographical credit markets at the regional level, which has only slightly changed in the last two decades (+8.7%, from 0.484 in 1992 to 0.526 in 2003). In graphs reported in figures 5 and 6, provinces and regions are ordered from the center to the periphery according to their gradually decreasing degrees. Not surprisingly, contiguous provinces are close in the graph as a consequence of stronger connections between geographically proximate markets. Southern and insular provinces confirm that they are more peripheral, with a further worsening in 2013 (figure 5, panel b).

[Insert Figures 5-6]

A further indication of the increasing geographical interconnectedness of the Italian banking industry comes from Figure 7 in which we report the nonparametric kernel density estimates of *IN-Degree* and *OUT-Degree* across provinces (panels 7a and 7b) and regions (panels 7c and 7d).

[Insert Figure 7]

The distribution of *IN-Degree* changed significantly from 1992 to 2013: it shifts to the right, and reduces the frequency of the modal degree, especially at the provincial level (panel 7a). As a whole, these changes in the *IN-Degree* distribution suggest that in a greater number of provincial credit markets the competition from outside branches has increased during the last twenty years. In contrast, the shape of *OUT-Degree* remained more similar over time, with only the right tail slightly heavier (panel 7b) as a greater number of banks headquartered in center-northern provinces expanded their web of branches into neighboring provinces and throughout Italy.

Finally, the number of cliques, i.e. the bunch of provinces that are senders and receivers to each other at the same time, greatly increased for any size from 1992 to 2013 (table 2).

[Insert table 2]

In addition, the size of the largest cliques increased: this was 7 in 1992 for 2 cliques with five provinces in common ({Genoa, Rome, Milan, Turin, Vicenza, Naples, Novara} and {Genoa, Rome, Milan, Turin,

Vicenza, Bergamo, Brescia}), to become 10 in 2013 for 2 cliques sharing 9 provinces ({Florence, Genoa, Rome, Milan, Padua, Turin, Venice, Verona, Vicenza, Brescia} and {Florence, Genoa, Rome, Milan, Padua, Turin, Venice, Verona, Vicenza, Bologna}). It is interesting to point out that the largest new cliques include the previous ones only partially, as some provinces like Bergamo, Novara and Naples were unable to expand their reciprocal links to other provinces. In addition, no southern province was present in the largest cliques in 2013.

5.3.1 *Credit market centrality*

Table 3 reports the summary statistics of our measures of credit market centrality for all the Italian provinces and regions and for the southern and centre-northern areas, separately. On average, in 2013 each Italian province receives (or sends) 200 branches from banks headquartered in 15.6 different provinces, with a 110% increase with respect to 1992. The out-of-province branches cover 74.5% of the home credit market, 24% more than in 1992. It is important to note that the range and standard deviation of *IN-Degree* are much lower than those of *OUT-Degree*, indicating that there are few provinces whose home banks export their branches all around Italy, while the import of financial services from other provinces is more uniformly distributed across nodes. The average degree of regions is much more stable over time, even if, as we expected, the normalized centrality (*N-IN-Degree* or *N-OUT-Degree*) is higher at the regional than at the provincial level.

[Insert Table 3]

The kernel density estimates of *Relative IN-Strength* and *Relative OUT-Strength* across provinces (figure 8) indicate that the core-periphery structure of the Italian banking industry and the degree of financial dependency of many Italian provinces strongly increased from 1992 and 2013. The number of provinces whose local banking market is populated by more than 80% of out-of-province branches increased markedly (panel 8a), while the right tail of the *Relative-OUT-Strength* becomes much heavier, suggesting that large banks from a few provinces extended their presence throughout the country, increasing their market shares.

[Insert Figure 8]

The centrality of southern provinces is significantly lower than that of other provinces, especially in terms of home bank branches outreaching. The two most central southern provinces (Matera and Naples) export branches in 41 and 20 provinces, respectively, and these branches belong to two main banks, Banca Popolare della Puglia e della Basilicata and Banco di Napoli, the latter being part of a banking group whose parent bank is headquartered in the North (Intesa-San Paolo in Turin). On average, in 2013 each southern

province received 130 branches from outside banks, corresponding to 83.3% of total branches in these markets, 79% more than in 1992. By contrast, they sent only 52.6 branches to other provinces, with a modest 18% increase over 1992 which led to an extraordinary rise in net imports of branches from 28 in 1992 to 78 in 2013. In contrast, the most central provinces in the Centre-North, Rome, has outgoing links with all the other 109 Italian provinces and the second, Milan, with 107 provinces. In center-northern regions the *IN-Strength* is 240 in 2013, 123% higher than two decades before, but the *OUT-Strength* increased from 107 to 240.

The core-periphery financial divide between Centre-North and South of Italy is even more evident if we consider the rankings of the most and the least central nodes in the provincial and regional networks (see tables 4 and 5). In 2013, only one out of the 15 most financially connected provinces in Italy is in the South (namely, Matera) and the strength of its links is only moderate (142). As cities, Bari and Naples attract a large number of branches from other provinces and are able to export branches to other southern provinces. In fact, for only five southern provinces the number of outgoing branches is larger than the number of incoming branches while for all southern regions this difference is strongly negative.

[Insert tables 4 and 5]

The geographical core of the Italian banking industry is quite stable over time. It is formed by the four main provinces, namely Milan, Rome, Siena and Turin, with the largest and strongest number of outward connections in both 1992 and 2013, as well as Bologna, Genoa, Verona and Vicenza, which feature constantly among the 15 highest ranked provinces.

6. Conclusions

Except for a few critical voices, especially on the part of geographers, warning against the myth of stateless finance and global banking (Chick and Dow 1988, Corbridge, 1988; Amin and Thrift 1992; Thrift and Lyshon 1992; Martin, 1994; Alessandrini and Zazzaro,1999), the common wisdom among scholars and practitioners in 1990s was that deregulation, advancements in ICT and the continuous development of new financial products would have led to the end of banking geography and the emergence of an internationally global banking industry. On the contrary, in the new millennium geographical and cultural distances among actors in credit markets and the spatial organization of banks are still crucial competitive strategic factors and major determinants of credit allocation. Moving from this premise, an ever growing number of studies in financial economics and geography has put the notion of distance at the center of the analysis of the evolution of the banking industry and its impact on the real economy.

In this chapter, first we reviewed the literature on the effects of geographical distances between borrowers

and lenders, loan officers and bank managers, and between banks on lending relationships and interbank competition. We showed that whereas the quantity and quality of hard information depend mainly on external developments and less on spatial dimensions, soft information, being not easily codifiable and transferable, has instead a fundamentally spatial character. All this makes banks' geographical distribution and their spatial organization of paramount importance for credit access and conditions of a wide group of firms. In particular, while empirical results are mixed as far as operational distance is concerned, much clearer and more significant consequences seem to emerge from the findings involving functional distance issues, where the relevance of some kind of home bias over credit allocation is strongly corroborated by the literature. This becomes even more worrying for regional development especially in times of crisis when a "flight to home" effect might exacerbate the reduction of the banks' lending exposure to peripheral regions by functionally distant banks.

Second, we presented the much less developed literature on the determinants of the different distances in banking industry and the formation of banking centers. A first result emerging from this literature is that functional distance has a strong influence on the spatial expansion strategy of banks in terms of both mergers and acquisitions and branch openings. In particular, interconnectedness has been mainly studied at international level explaining the dynamics of international financial centers also using the recent approach of network analysis. Much less attention has instead been paid to the evolution of the geography of bank power and interconnectedness among banks at the single country level.

Consequently, applying the metrics and graph techniques of network analysis we provided some original and new evidence concerning the evolving geographical network of bank organizations within Italy. Our analysis showed that the overall interconnectedness of geographical credit markets has significantly increased over time, whether measured at the provincial or regional level. On the one hand, this dynamic appears to have positively affected the degree of competition, yet on the other, it has contributed to make the largest cliques even bigger, bringing about a higher level of bank service concentration. Within this process, there emerges a growing and marked centrality of a few northern Italian banking centers to the detriment of the southern credit markets and regions. In other words, our analysis shows that the core-periphery financial and banking divide has even become more striking and significant over recent years. Such changes in Italian banking geography highlight the importance of the concept of distance, especially that of functional distance, in shaping the relationships between banks and local borrowers. Consequently, a sort of additional comparative advantage in favor of big enterprises over SMEs and start-ups might emerge embedded in a new type of financial constraint for local borrowers grounded on geographical issues. These spatial developments, together with the fact that young rather than small firms seem to be the

main contributors to employment growth[10], should support and suggest some policy initiatives with a view to easing financial constraints to local borrowers, especially to start-ups and young enterprises to boost economic growth. Economic policies should therefore facilitate credit access for start-ups and SMEs through various measures which are more likely to help these groups of firms, such as policy initiatives aiming to improve the collection and dissemination of firms' credit histories and economic data, or the establishment of mini-finance (like mini-bonds) markets for new companies and SMEs. These policy prescriptions should be supported by further research which might combine improvements in the collection of firm-level survey data with new statistical information on the different concepts of distance discussed above, in order to gain insights into the relationships among distance, financing conditions for firms, and economic growth.

References

Agarwal, S., and R. Hauswald (2010), 'Distance and private information in lending', *Review of Financial Studies,* **23** (7), 2757-2788.

Alama, L. and E. Tortosa (2011), 'Bank branch geographic location patterns in Spain: some implications for financial exclusion', Working Papers, Instituto Valenciano de Investigaciones Económicas, No. 01/2011.

Alessandrini, P., G. Calcagnini and A. Zazzaro (2008), 'Asset restructuring strategies in bank acquisitions: does distance between dealing partners matter?, *Journal of Banking and Finance*, **32** (5), 699-713.

Alessandrini, P., M. Croci and A. Zazzaro (2005), 'The geography of banking power: the role of functional distance', *BNL Quarterly Review*, **58** (235), 129-67.

Alessandrini, P., M. Fratianni and A. Zazzaro (eds) (2009a) *The Changing Geography of Banking and Finance*, New York, USA: Springer.

Alessandrini, P., A.F. Presbitero and A. Zazzaro (2009b), 'Global banking and local markets: a national perspective', *Cambridge Journal of Regions, Economy and Society*, **2** (2), 173-92.

Alessandrini, P., A.F. Presbitero and A. Zazzaro (2009c), 'Banks, distances and firms' financing constraints', *Review of Finance*, **13** (2), 261-307

[10] Recent applied research has identified that young rather than small enterprises are the main contributors to employment growth (see, among others, Lawless 2013, Criscuolo et al. 2014, Banerjee 2014).

Alessandrini, P., A.F. Presbitero and A. Zazzaro (2009d), 'Geographical organization of banking system and innovation diffusion', in P. Alessandrini, M. Fratianni and A. Zazzaro (eds), *The Changing Geography of Banking and Finance*, New York, USA: Springer, pp. 75-108.

Alessandrini, P., A.F. Presbitero and A. Zazzaro (2010), 'Bank size or distance: What hampers innovation adoption by SMEs', *Journal of Economic Geography*, **10** (6), 845-881.

Alessandrini, P. and A. Zazzaro (1999), 'A "possibilist" approach to local financial systems and regional development: the Italian experience', in R. Martin (ed), *Money and the Space Economy*, New York, USA: Wiley and Sons, pp. 71-92.

Allen F. and Gale D. (2000), 'Financial contagion', *Journal of Political Economy*, **108** (1), 1-33.

Almazan, A. (2002), 'A model of competition in banking: bank capital vs expertise," *Journal of Financial Intermediation*, **11** (1), 87-121.

Amin, A. and Thrift, N. (1992), 'Neo-Marshallian nodes in global networks. *International Journal of Urban and Regional Research*,, **16 (**4), 571–587.

Anand, B.N. and A. Galetovic (2006), 'Relationships, competition and the structure of investment banking markets', *Journal of Industrial Economics*, **54** (2), 151-199.

Angelini, P., L. Clerc, V. Cúrdia, L. Gambacorta, A. Gerali, A. Locarno, R. Motto, W. Roeger, S. Van den Heuvel and J. Jan Vlcek (2011), 'Basel III: long-term impact on economic performance and fluctuations', Bank of Italy, Occasional paper, No. 87.

Avery, R.B. and K. Samolyk (2004), 'Bank consolidation and the provision of banking services: small commercial loans', *Journal of Financial Services Research*, **25** (2-3), 291-325.

Banerjee, R. (2014), 'SMEs, financial constraints and growth', BIS Working Papers, No. 475.

Bank of Italy (2014), *Financial Stability Report*, n1/2014, Rome, Bank of Italy.

Barros, P. (1995), 'Post-entry expansion in banking: the case of Portugal', *International Journal of Industrial Organization*, **13** (4), 593-611.Battiston, S. Delli Gatti, D., Gallegati, M., Greenwald, B.C.N., Stiglitz, J.E. (2012), 'Liaisons dangereuses: increasing connectivity, risk sharing, and systemic risk', *Journal of Economic Dynamics and Control Services Research*, **36** (8), 1121-1141.

Battiston, S. Caldarelli, G. (2013) 'Systemic risk in financial networks', *Journal of Financial Management, Markets and Institutions*, **1** (2),129-154.

Bel, G. and X. Fageda (2008), 'Getting there fast: globalization, intercontinental flights and location of headquarters', *Journal of Economic Geography*, **8** (4), 471–495.

Bellucci, A., A. Borisov and Zazzaro A. (2010), 'Does gender matter in bank-firm relationships? Evidence from small business lending', *Journal of Banking and Finance*, **34** (12), 2968-84.

Bellucci, A., A. Borisov and A. Zazzaro (2013) 'Do banks price discriminate spatially? Evidence from small business lending in local credit markets', *Journal of Banking and Finance*, **37** (11), 4183-4197.

Bellucci, A., Borisov, A., Giombini G. and A. Zazzaro (2014), 'Does collateral walk through the road? Testing the lender-based theory of collateral', Università Politecnica delle Marche, *mimeo*.

Benfratello, L., F. Schiantarelli and A. Sembenelli (2008), 'Banks and innovation: microeconometric evidence on Italian firms', *Journal of Financial Economics*, **90** (2), 197–217.

Berger, A.N., A. Saunders, J.M. Scalise and G.F. Udell (1998), 'The effects of bank mergers and acquisitions on small business lending', *Journal of Financial Economics*, **50** (2), 187-229.

Berger, A., N. Miller, M. Petersen, R. Rajan and J. Stein, (2005), 'Does function follow organizational form? Evidence from the lending practices of large and small banks', *Journal of Financial Economics*, **76** (2), 237-69.

Berger, A. N., L. F. Klapper and G. F. Udell (2001), 'The ability of banks to lend to informationally opaque small businesses', *Journal of Banking and Finance*, **25** (12), 2127-67.

Berger, A. N. and R. DeYoung (2001), 'The effects of geographic expansion on bank efficiency', *Journal of Financial Services Research,* **19** (2), 163-184.

Berger, A. N. and G. F. Udell, (2002), 'Small business credit availability and relationship lending: The importance of bank organisational structure', *The Economic Journal,* **112** (477), 32-53.

Bernheim, D. and M. Whinston (1990), 'Multimarket contact and collusive behavior', *RAND Journal of Economics*, **21** (1), 1–26.

Berrospide, J. and R. Edge (2010), 'The effects of bank capital on lending: what do we know, and what does it mean?', Finance and Economics Discussion Series, Divisions of Research and Statistics and Monetary Affairs Federal Reserve Board, Washington D.C., June.

Berrospide, J., L. Black and W. Keeton (2011), 'The cross-market spillover of economic shocks through multi-market banks', Finance and Economics Discussion Series, Divisions of Research and Statistics and Monetary Affairs, Federal Reserve Board, Washington D.C., April, No. 2013-52.

Bolton, P., X. Freixas, L. Gambacorta and P. E. Mistrulli, (2013), 'Relationship and transaction lending in a crisis', BIS Working Paper, No. 417.

Bonaccorsi di Patti, E. and G. Gobbi (2001), 'The changing structure of local credit markets: Are small business special?', *Journal of Banking and Finance*, **25** (12), 2209–37.

Boot, A. and A. Thakor (2000), 'Can relationship banking survive competition?', *Journal of Finance*, **55** (2), 679- 713.

Brevoort, K.B. and T.H. Hannan, (2006), 'Commercial lending and distance: evidence from Community Reinvestment Act data', *Journal of Money, Credit and Banking*, **38** (8), 1991–2012.

Brevoort, K. P. and J.D. Wolken (2009), 'Does distance matter in banking?', in P. Alessandrini, M. Fratianni and A. Zazzaro (eds), *The Changing Geography of Banking and Finance*, New York, USA: Springer, pp. 27-56.

Broecker, T. (1990), 'Credit-worthiness tests and interbank competition', *Econometrica*, **58** (2), 429-452.

Brown, M., T. Jappelli and M. Pagano, (2009) 'Information sharing and credit: Firm-level evidence from transition countries', *Journal of Financial Intermediation*, **13** (4), 787-804.

Buch, C.M. and G. DeLong (2004), 'Cross-border bank mergers: What lures the rare animals?', *Journal of Banking and Finance*, **28** (9), 2077-2102.

Calcagnini, G., R. De Bonis and D. D. Hester (2001), 'Perché le banche aprono sportelli? Un'analisi del caso italiano', in P. Alessandrini (ed.), *Il sistema finanziario italiano tra globalizzazione e localismo*, Bologna: Il Mulino, pp .

Campbel, D. and M. Loumioti (2014), 'Monitoring and the portability of soft information', Harvard Business School Accounting and Management Unit Working Paper No. 13-077.

Campello, M. (2002), 'Internal capital markets in financial conglomerates: Evidence from small bank responses to monetary policy', *Journal of Finance,* **57** (6), 2773-2805.

Cao, M. and S. Shi (2000), 'Screening, bidding, and the loan market tightness', Wharton School Center for Financial Institutions, University of Pennsylvania, No. 00-09.

Carbo, S., J. Fernandez de Guevara, D. Humphrey and J. Maudos (2009), 'Estimating the intensity of price and non-price competition in banking', MPRA Paper No. 17612,

Carling, K. and S. Lundberg (2005), 'Asymmetric information and distance: an empirical assessment of geographical credit rationing', *Journal of Economics and Business,* **57** (1), 39-59.

Carlin, W., A. Charlton and C. Mayer (2006), 'Capital markets, ownership and distance', CEPR Discussion Papers No. 5764.

Cerasi, V., B. Chizzolini B. and M. Ivaldi (2000), 'Branching and Competitiveness across regions in the Italian banking industry", in Polo M. (ed.) *Industria Bancaria e Concorrenza*, Bologna, Il Mulino, pp.

Cerqueiro, G., H. Degryse and S. Ongena (2009), in Alessandrini, P., M. Fratianni and A. Zazzaro (eds), *The Changing Geography of Banking and Finance*, New York, USA: Springer, pp. 57-74.

Cetorelli, N. and L. S. Goldberg (2011), 'Global banks and international shock transmission: Evidence from the crisis', *IMF Economic Review,* **59** (1), 41-76.

Chang, A., Chaudhuri, S. and Jayaratne, J. (1997), 'Rational herding and the spatial clustering of bank

branches: an empirical analysis, Federal Reserve Bank of New York Discussion Paper Series No. 9697-24

Chick, V. and S. Dow (1988), 'A Post-Keynesian Perspective on the Relation Between Banking and Regional Development', in P. Arestis (ed.), *Post-Keynesian Monetary Economics – New Approaches to Financial Modelling*, Cheltenham, UK: Edward Elgar Publishing, pp. 219-250.

Choi, S.-R., Tschoegl, A.E. and Yu, C.-M. (1986), 'Banks and the world's major financial centers, 1970-1980'. *Weltwirtschaftliches Archiv*, **122** (1), 48-64.

Choi, S.-R., Park, D. and Tschoegl, A.E. (1996), 'Banks and the world's major banking centers, 1990". *Weltwirtschaftliches Archiv*, **132** (4), 774-793.

Choi, S.-R., Park, D. and Tschoegl, A.E. (2003), 'Banks and the world's major banking centers, 2000". *Review of World Economy* (*Weltwirtschaftliches Archiv*), **139** (3), 550-568.

Claessens, S. and N. van Horen (2009), 'Being a Foreigner among Domestic Banks: Asset or Liability' MPRA Paper No. 13467.

Cole, R.A., L.G. Golberg and L. J. White (2004), 'Cookie-cutter versus character: The micro structure of small business lending by large and small banks', *Journal of Financial and Quantitative Analysis*, **39** (2), 227-252.

Corbridge, S. (1988), 'The asymmetry of interdependence: the United States and the geopolitics of international finance relations', *Studies in Comparative International Development,* **23** (1) 3–29..

Cremers, K. J. M., R. Huang. and Z. Sautner (2010), 'Internal capital markets and corporate politics in a banking group', *Review of Financial Studies*, **24** (2), 358-401.

Cremer, J., L. Garicano and A. Prat (2007), 'Language and the theory of the firm', *Quarterly Journal of Economics*, **122** (1), 373-407.

Criscuolo, C., P. Gal and C. Menon (2014), 'The dynamics of employment grwth: new evidence from 18 countries', OECD Technology and Industry Policy Papers No. 14.

Crocco, M., F.F. Silva, L.P. Rezende and C.J.R. Fuentes (2014), 'Banks and regional developments: An empirical analysis of the determinants of credit availability in Brazilian regions', *Regional Studies*, **48** (5), 883-895.

De Bonis, R. and A. Ferrando (2000), 'The Italian banking structure in the 1990s: Testing the multimarket contact hypothesis', *Economic Notes*, **29** (2), 215-241.

de Haas, R. and N. van Horen (2013), 'Running for the exit: International banks and crisis transmission', *Review of Financial Studies,* **26** (1), 244-285.

Dell'Ariccia, G. and Marquez, R. (2004), Information and bank credit allocation, *Journal of Financial Economics*, **72** (1), 185-214.

Degryse, H. and S. Ongena (2005), 'Distance, lending relationships and competition', *Journal of Finance*, **6** (1), 231-66.

Degryse, H. and S. Ongena (2007), 'The impact of competition on bank orientation, *Journal of Financial Intermediation*, **16** (3), 399-424.

Degryse, H., L. Laeven and S. Ongena, (2009), 'The impact of organizational structure and lending technology on banking competition', *Review of Finance*, **13** (2), 225-259.

Degryse, H. S., Ongena and G. Tümer-Alkan (2009), 'Lending technology, bank organization and competition', *Journal of Financial Transformation,* **26**, 24-30.

De Juan, R. (2003), 'The independent submarkets model: an application to the Spanish retail banking market', *International Journal of Industrial Organization,* **21 (**10), 1461-1487.

Detragiache, E., T. Tressel and P. Gupta (2008), 'Foreign banks in poor countries: Theory and evidence', *Journal of Finance,* **63** (5), 2123-2160.

De Young, R., W.C. Hunter, and G. F. Udell, (2004), 'The past, present, and probable future for community banks', *Journal of Financial Services Research*, **25** (2-3), 85-133.

De Young, R., D. Glennon, and P. Nigro, (2006), Borrower-Lender Distance, Credit Scoring and the Performance of Small Business Loans, FDIC Center for Financial Research Working Paper No. 2006-04.

De Young, R., D. Glennon and P. Nigro (2008), 'Borrower-lender distance, credit scoring, and loan performance: Evidence from informational-opaque small business borrowers', *Journal of Financial Intermediation,* **17** (1), 113-143.

Dewatripont, M. and J. Tirole (1999), 'Advocates', *Journal of Political Economy*, **107** (1), 1-39.

Drexler, A. and A. Schoar (2014), 'Do Relationships Matter? Evidence from Loan Officer Turnover', *Management Science*, **60** (11), 2722-2736.

ECB (2014), *Banking Structures Repor*t, ECB, October.

Edwards, C.D. (1955), 'Conglomerate bigness as a source of power', in Stigler, G. (ed.), *Business Concentration and Price*, Princeton, USA: Princeton University Press, pp. 331–359.

Elsas, R. (2005), 'Empirical determinants of relationship lending', *Journal of Financial Intermediation*, **14** (1), 32-57.

Evanoff, D.D. (1988), 'Branch banking and service accessibility', *Journal of Money, Credit, and Banking.* **20** (2), 191-202.

Farinha, M.and J. Santos, 2002, Switching from single to multiple bank lending relationships: Determinants and implications, *Journal of Financial Intermediation*, **11** (2), 124-151.

Felici, R. and M. Pagnini (2008), 'Distance, bank heterogeneity and entry in local banking markets', Temi di discussione (Economic working papers), No. 557, Bank of Italy.

Focarelli, D. and A. Pozzolo (2005), 'Where do banks expand abroad? An empirical analysis', *The Journal of Business*, **78** (6), 2435-2464.

Fratianni, M.(2008), 'Financial crises, safety nets and regulation', *Rivista italiana degli economisti*, **2**, 169-208.

Fuentelsaz, L. and J. Gomez (2006), 'Multipoint competition, strategic similarity and entry into geographic markets', *Strategic Management Journal*, **27** (5), 477–499.

Gehrig, T. (2000), 'Cities and the geography of financial centers', in Thisse J.J. and J.M. Huriot (eds.), *The Economics of Cities*, Cambridge, UK: Cambridge University Press, pp. 415-445.

Gerali, A., Neri S., Sessa L., and Signoretti F.M. (2010), 'Credit and banking in a DSGE model of the Euro area, *Journal of Money, Credit and Banking,* **42** (s1), 107-141.

Giannetti, M. and L. Laeven (2011), 'The right home effect: Evidence from the syndicated loan market during financial crises', *Journal of Financial Economics*, **104** (1), 23-43.

Giannetti, M. and Y. Yafeh (2012), 'Do cultural differences between contracting parties matter? Evidence from syndicated bank loans'*, Management Science*, **58** (2), 365-383.

Giannola, A., Lopes, A. and Zazzaro, A. (2013), 'La convergenza dello sviluppo finanziario tra le regioni italiane dal 1890 a oggi', *Rivista di Politica Economica*, **103** (1), 145-197.

Gobbi, G. and Sette, E. (2012), 'Relationship lending in a financial turmoil', Money and Finance Research group (Mo.Fi.R.) Working Papers No. 59, Università Politecnica delle Marche, Department of Economic and Social Sciences.

Gormley, T. A. (2010), 'The impact of foreign bank entry in emerging markets: Evidence from India', *Journal of Financial Intermediation*, **19** (1), 26-51.

Grote, M.H. (2009), 'Financial centers between centralization and virtualization', in Alessandrini, P., M. Fratianni and A. Zazzaro (eds), *The Changing Geography of Banking and Finance*, New York, USA: Springer, pp. 277-294.

Hattori, M. and Suda, Y. (2007), 'Developments in a cross-border bank exposure "network"', Bank of Japan Working Paper Series, No. 07-E-21.

Hauswald, R. and R. Marquez (2006), 'Competition and strategic information acquisition in credit markets', *Review of Financial Studies*, **19** (3), 967-1000.

Haveman, H. A., and L. Nonnemaker (2000), 'Competition in multiple geographic markets: The impact on growth and market entry', *Administrative Science Quarterly*, **45** (2), 233-267.

Heggestad, A. A. and S. E. Rhoades (1978), 'Multimarket interdependence and local market competition in banking', *Review of Economics and Statistics*, **60** (4), 523–532.

Herrera, A. M. and R. Minetti (2007), 'Informed finance and technological change: evidence from credit relationships', *Journal of Financial Economics,* **83** (1), 223-269.

Hertzberg, A., J.M. Liberti and D. Paravisini, D. (2010), 'Information and incentives inside the firm: Evidence from loan officer rotation, *Journal of Finance*, **65** (3), 795-828 .

Hirshleifer, D. and A. V. Thakor (1992), 'Managerial conservatism, project choice, and debt', *Review of Financial Studies,* **5** (3), 437-470.

Hoff, K. and J. E. Stiglitz (1997), 'Moneylenders and bankers: price-increasing subsidies in a monopolistically competitive market', *Journal of Development Economics*, **52** (2), 429-462.

Imai, M. and S. Takarabe (2011), 'Bank integration and transmission of financial shocks: Evidence from Japan', *American Economic Journal: Macroeconomics*, **3** (1), 155-183.

Jappelli, T. and M. Pagano (2002), 'Information sharing, lending and defaults: Cross-country evidence', *Journal of Banking and Finance*, **26** (10), 2017-2045.

Jimenez, G., V. Salas-Fumas and J. Saurina (2009), 'Organizational distance and use of collateral for business loans', *Journal of Banking and Finance*, **33** (2), 234-243.

Keeton, W.R. (1995), 'Multi-office bank lending to small business: Some new evidence', *Federal Reserve Bank of Kansas City Economic Review*, Second quarter, 45-57.

Keeton. W.R. (1996), 'Do Bank Mergers Reduce Lending to Businesses and Farmers? New Evidence from Tenth District States', *Federal Reserve Bank of Kansas City Economic Review*, Third quarter, 63-75.

Kim, M. and B. Vale (2001), 'Non-price strategic behaviour: The case of bank branches', *International Journal of Industrial Organisation* , **19** (10), 1583-1602.

Kindleberger, C. P. (1974), *The formation of Financial Centers*, Princeton Studies in International Finance 36, Princeton, US: Princeton University Press.

Klagge, B. and R. Martin (2005), 'Decentralized versus Centralized Financial Systems: Is There a Case for Local Capital Markets?', *Journal of Economic Geography,* **5** (4), 387-421.

Klein, D. B. (1992), 'Promise keeping in the great society: A model of credit information sharing', *Economics and Politics,* **4** (2), 117-136.

Klier, T. and W. A. Testa (2002), 'The Great Lakes border economy', *Chicago Fed Letter*, Federal Reserve Bank of Chicago, July.

Knyazeva, A. and D. Knyazeva (2012), 'Does being your neighbor's bank matter?', *Journal of Banking and Finance*, **36** (4), 1194-1209.

Landier, A., V.B. Nair and J. Wulf (2009), 'Trade-offs in staying close: Corporate decision making and geographic dispersion', *Review of Financial Studies,* **22** (3), 1119-48.

Lanzilotti, R.F. and T.R. Saving (1969), 'State branch restrictions and the availability of banking services', *Journal of Money, Credit and Banking*, **1** (4), 778–788.

Lawless, M. (2013), 'Age or size? Determinants of job creation', Central Bank of Ireland Research and Technical Papers, No. 02/RT/13.

Lederer, P. J., and A. P. Hurter (1986), 'Competition of firms: Discriminatory pricing and location', *Econometrica,* **54** (3), 623–640.

Leitner, Y. (2005), 'Financial networks: contagion, commitment, and private sector bailouts', *Journal of Finance*, **60** (6), 2925-2953.

Liberti, J. M. and A. Mian (2009), 'Estimating the effect of hierarchies on information use', *Review of Financial Studies*, **22** (10), 4057-4090.

Magri, S., A. Mori and P. Rossi (2005), 'The entry and the activity level of foreign banks in Italy: An analysis of the determinants'*, Journal of Banking and Finance*, **29** (5), 1295-1310.

Martin R. (1994), 'Stateless monies, global financial integration and national economic autonomy: the end of geography?', in Corbridge S., R. Martin and N. Thrift (eds), *Money, Space and Power*, Oxford, UK: Blackwell Publishers, pp. 253-278.

Mayer, C. (1988), 'New Issues in Corporate Finance' *European Economic Review*, **32** (5), 1167 -1189.

Mester, L. J. (1987), 'Multiple market contact between savings and loans', *Journal of Money, Credit and Banking*, **19** (4), 538–549.

Mester, L. J. (1992). 'A multiproduct cost study of savings and loans', *The Journal of Finance*, **42** (2), 423-445.

Meyer, M., P. Milgrom and J Roberts (1992), 'Organizational prospects, influence costs, and ownership changes', *Journal of Economics and Management Strategy,* **1** (1), 9-35.

Mian, A. (2006), 'Distance constraints: The limits of foreign lending in poor economies', *The Journal of Finance,* **61** (3), 1465-1505.

Minoiu, C. and Reyes, J.A. (2011), 'A network analysis of global banking: 1978-2009', IMF Working Paper, No. 11/74.

Noss, J. and P Toffano (2014), 'Estimating the impact of changes in aggregate bank capital requirements during an upswing', Bank of England Working Paper, No. 494.

Ogura, Y. (2010), 'Interbank competition and information production: Evidence from the interest rate difference', *Journal of Financial Intermediation*, **19** (2), 279-304.

Ono, A., Saito, Y., Sakai, K. and Uesugi, I. (2013) 'Does geographical proximity matter in small business lending? Evidence from the switching of main bank relationships'**,** *Hitotsubashi University, Working Paper Series,* No. 29.

Padilla, A. J., and M. Pagano (1997), 'Endogenous communication among lenders and entrepreneurial incentives', *Review of Financial Studies* , **10** (1), 205-236.

Pagano, M., and T. Jappelli (1993), 'Information sharing in credit markets', *Journal of Finance*, **48** (5), 1693-1718.

Palley, T. I. (1997), 'Managerial turnover and the theory of short-termism'*, Journal of Economic Behavior and Organization*, **32** (4), 547-557.

Peek, J. and E. S. Rosengren (1997), 'The international transmission of financial shocks: The case of Japan', *American Economic Review,* **87** (4), 495-505.

Peek, J. and E. S. Rosengren (1998), 'Bank consolidation and small business lending: It's not just bank size that matters', *Journal of Banking and Finance*, **22** (6-8), 799-819.

Peek, J. and E. Rosengren (2000), 'Collateral damage: Effects of the Japanese real estate collapse on credit availability and real activity in the United States', *American Economic Review*, **90** (1), 30-45.

Petersen, M. A. (2004), *Information: Hard and soft*, Chicago, US: Northwestern University.

Petersen, M.A. and R.G. Rajan (1995), 'The effect of credit market competition on lending relationships', *Quarterly Journal of Economics*, **110** (2), 407-443.

Petersen, M. and R. Rajan (2002), 'Does distance still matter? The information revolution in small business lending', *Journal of Finance*, **57** (6), 2533-2570.

Popov, A. and G.F. Udell (2012), 'Cross-border banking, credit access, and the financial crisis', *Journal of International Economics*, **87** (1), 147-161.

Porteous, D.J. (1999), 'The development of financial centers: Location, information externalities and path dependence', in Martin R. (ed), *Money and the Space Economy*, New York, USA: John Wiley&Sons, pp. 95-114.

Presbitero, A. F. and A. Zazzaro (2011), 'Competition and relationship lending: Friends or foes?', *Journal of Financial Intermediation,* **20** (3), 387-413.

Presbitero, A. F., G. F. Udell and A. Zazzaro (2014), 'The home bias and the credit crunch: A regional perspective', *Journal of Money, Credit and Banking*, **46** (s1), 53-85.

Riordan, M. H. (1993), 'Competition and bank performance: a theoretic perspective', in Mayer C. and X. Vives (eds), *Capital Markets and Financial Intermediation*, Cambridge UK: Cambridge University Press, pp. 328-343.

Sá, F. (2013), 'Bilateral financial links', in T. Beck, S. Claessens and S. L. Schmukler (eds.),The Evidence and Impact of Financial Globalization, Amsterdam: Elsevier, pp. 51-65.

Scharfstein, D. S. and J. C. Stein (2000), 'The dark side of internal capital markets: Divisional rent-seeking and inefficient investment', *Journal of Finance,* **55** (6), 2537-2564.

Shaffer, S. (1998), 'The winner's curse in banking', *Journal of Financial Intermediation*, **7** (4), 359-392.

Schnabl, P. (2012), 'The international transmission of bank liquidity shocks: Evidence from an emerging market', *Journal of Finance*, **67** (3), 897-932.

Seaver, W. and D. Fraser (1979), 'Branch banking and the availability of banking services in metropolitan areas', *Journal of Financial and Quantitative Analysis*, **14** (1), 153-160.

Seaver, W. and D. Fraser (1983), 'Branch banking and the availability of banking offices in non-metropolitan areas', *The Atlantic Economic Journal*, **11** (2), 72-78.

Silverman, B. (1986), *Density Estimation for Statistics and Data Analysis*, New York, USA: Chapman and Hall.

Stein, J.C. (2002) 'Information production and capital allocation: Decentralized versus hierarchical firms', *The Journal of Finance*, **57** (5), 1891-1921.

Storper, A. and M. J. Venables (2004), 'Buzz: face-to-face contact and the urban economy, *Journal of Economic Geography*, **4** (4), 351-370.

Strauss-Kahn, V. and X. Vives, (2009), 'Why and where do headquarters move?', *Regional Science and Urban Economics*, **39** (2), 168-186.

Thrift N. (1994), 'On the social and cultural determinants of international financial centers: The case of the city of London', in Corbridge S., N. Thrift and R. Martin (eds), *Money, Power and Space*, Oxford, UK: Blackwell, pp. 327-355.

Thrift, N. and Leyshon, A. (1992), 'In the wake of money: the city of London and the accumulation of value', in L. Budd and S. Whimster (eds.). Global Finance and Urban Living: A Study of Metropolitan Change, London: Routledge, pp. 282–311.

Tschoegl, A. E. (2000), 'International banking centers, geography, and foreign banks', *Financial Markets, Institutions and Instruments,* **9** (1), 1-32.

Uchida, H., G.F. Udell and N. Yamori (2012), 'Loan officers and relationship lending to SMEs', *Journal of Financial Intermediation,* **21** (1), 97-122.

Uchida, H., G.F. Udell and W. Watanabe (2008), 'Bank size and lending relationships in Japan', *Journal of the Japanese and International Economies*, **22** (2), 242-267.

Udell, G. F. (1989), 'Loan quality, commercial loan review and loan officer contracting', *Journal of Banking and Finance*, **13** (3), 367-82.

Uzzi, B. (1999), 'Embeddedness in the making of financial capital: How social relationships and networks benefit firms seeking capital', *American Sociological Review*, **64** (4), 481-505.

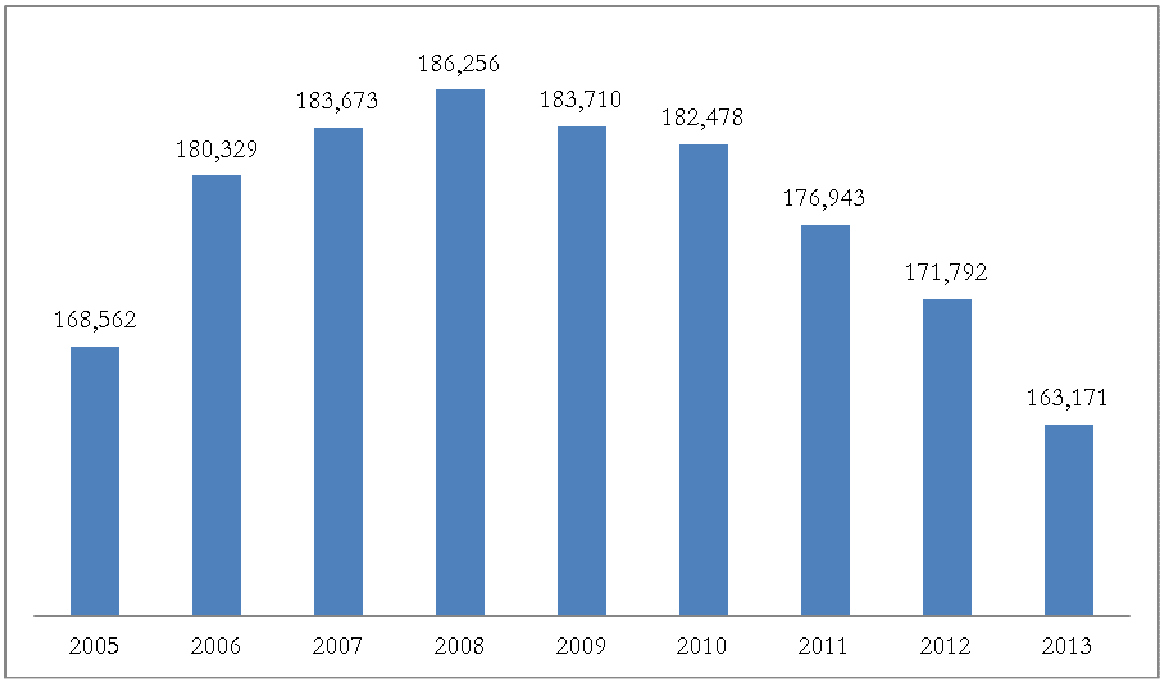
Uzzi B and Lancaster R. (2013), 'Relational embeddedness and learning: the case of bank loan managers and their clients', *Management Science*, **49**(4) 383-399.

von Peter, G. (2010), 'International banking centres: a network perspective', in Bank for International Settlements, Research on global financial stability: the use of BIS international financial statistics, CGFS Papers No. 40, 71-82.

Zazzaro, A. (2005), 'Should courts enforce credit contracts strictly?', *Economic Journal*, **115** (500), 166-184.

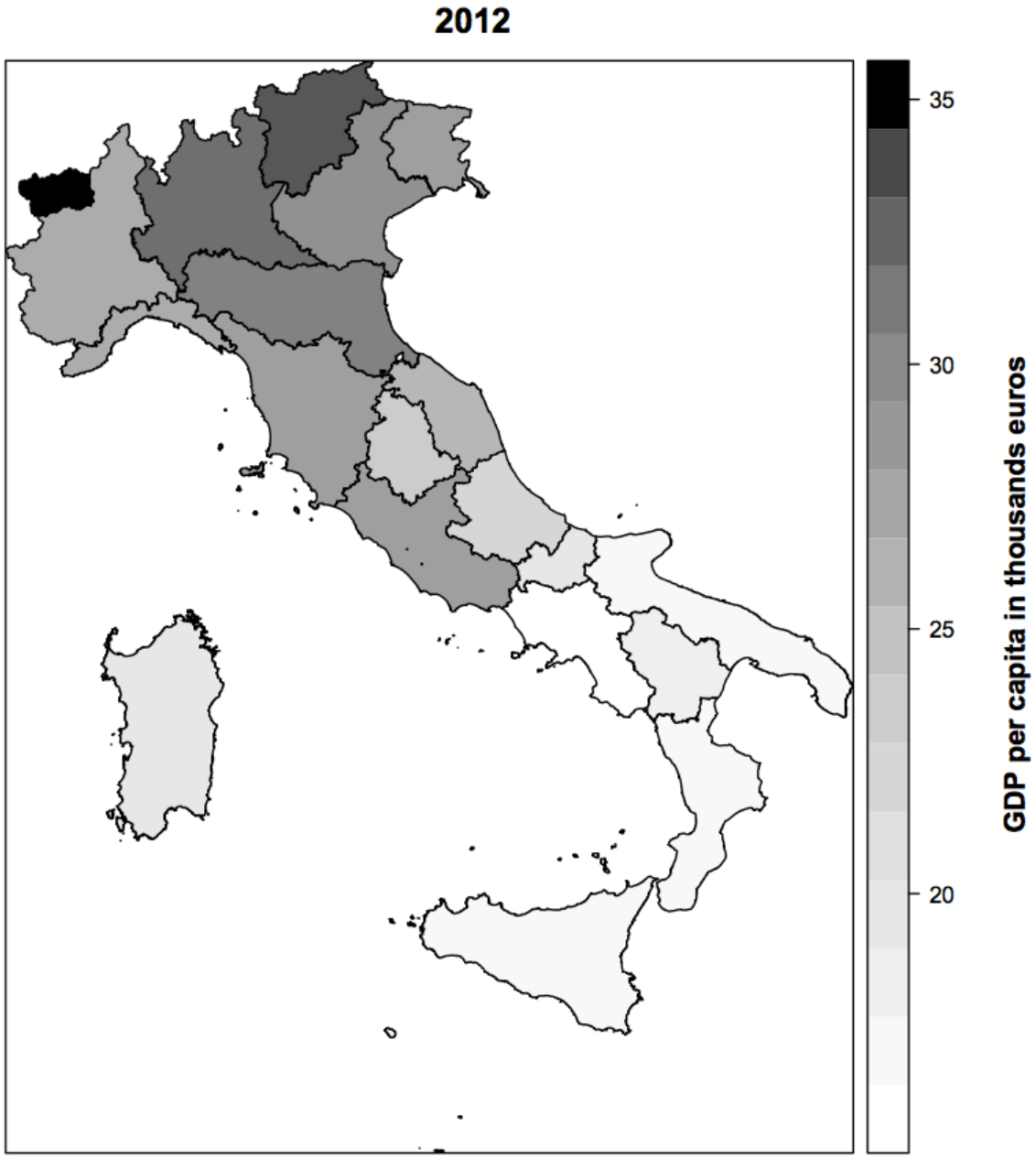
Zazzaro, A. (2006), 'La scomparsa dei centri decisionali dal sistema bancario meridionale', *Rivista di Politica Economica*, **96** (2), 31-60.

Figure 1. Number of branches in Euro area



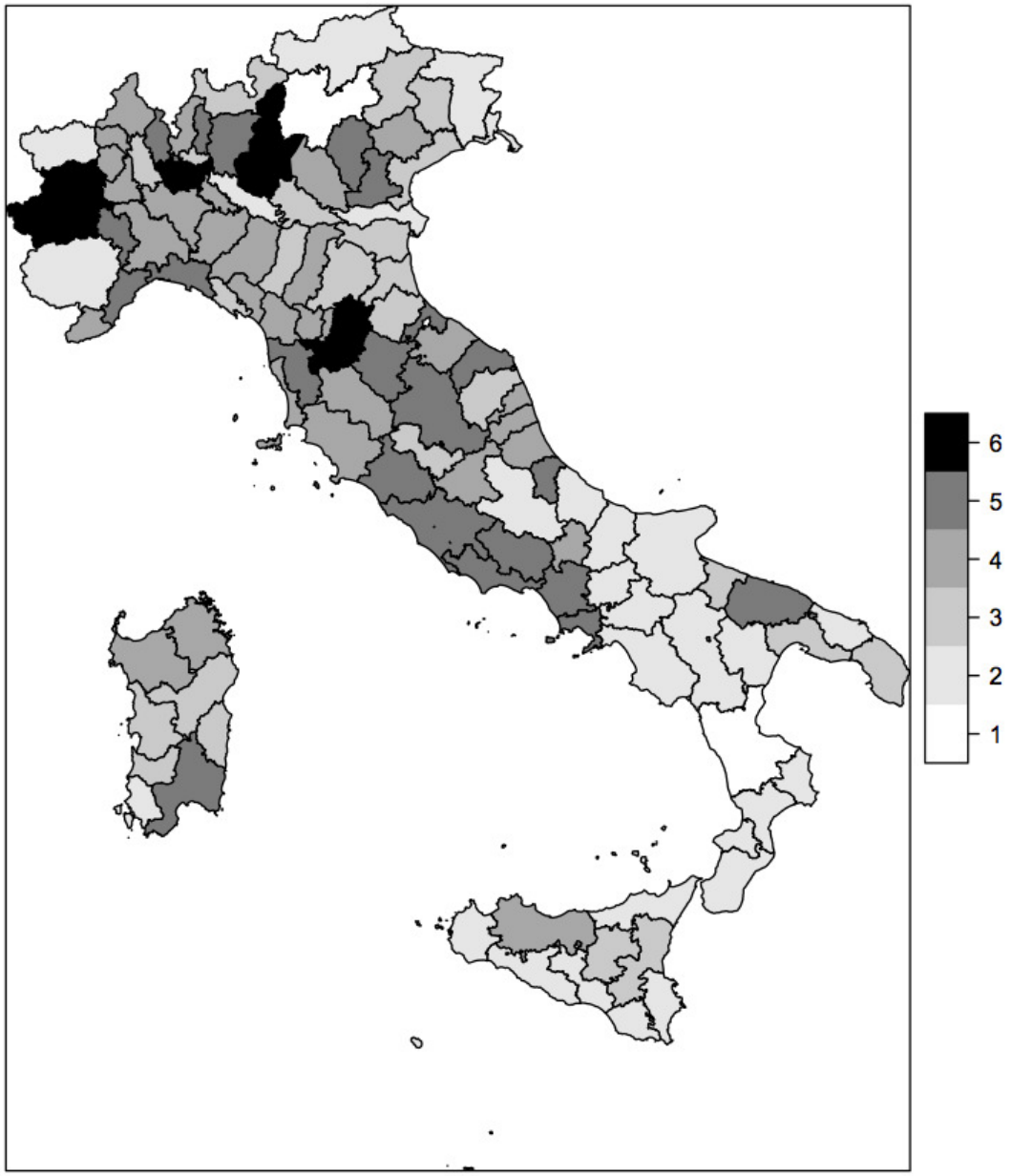
Source: European Central Bank.
Notes. Number of branches of credit institutions in the Euro area at the end of the period.

Figure 2. GDP per capita by region



Source: Italian National Institute of Statistics (ISTAT).
Notes. Category 1: regions with GDP per capita below the first quartile. Category 2: regions with GDP per capita between the first quartile and median. Category 3: regions with GDP per capita between the median and third quartile. Category 4: regions with GDP per capita above the third quartile.

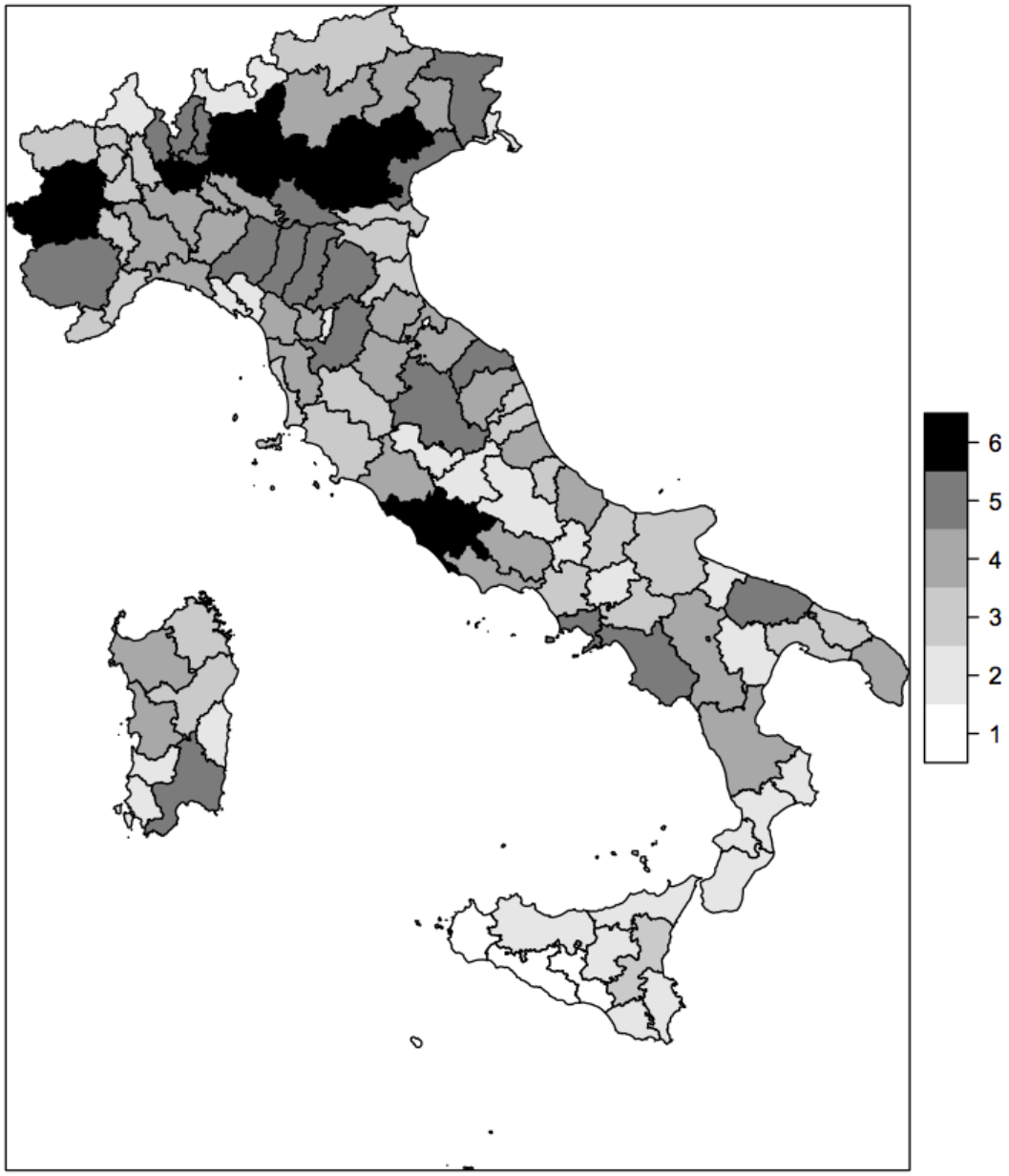
Figure 3. Number of banks by province: variation 1992-2013



Source: Bank of Italy.

Notes. Category 1: provinces where the number of banks decreases exceptionally, Δ Banks < Q1 -1.5*(Q3-Q1) = -11, where Q1 and Q3 indicate the first and third quartile. Category 2: provinces where the variation of the number of banks is below the first quartile but not exceptionally low, -11 ≤ Δ Banks ≤ Q1 = 0. Category 3: provinces where the variation of the number of banks is between the first quartile and the median (M), 0 < Δ Banks ≤ M = 3. Category 4: provinces where the variation of the number of banks is between the median and third quartile, 3 < Δ Banks ≤ Q3 = 7. Category 5: provinces where the variation of the number of banks is above the third quartile but not exceptionally large 7 < Δ Branches ≤ Q3 +1.5*(Q3-Q1) = 18. Category 6: provinces where the number of banks increases exceptionally, Δ Banks > 18.

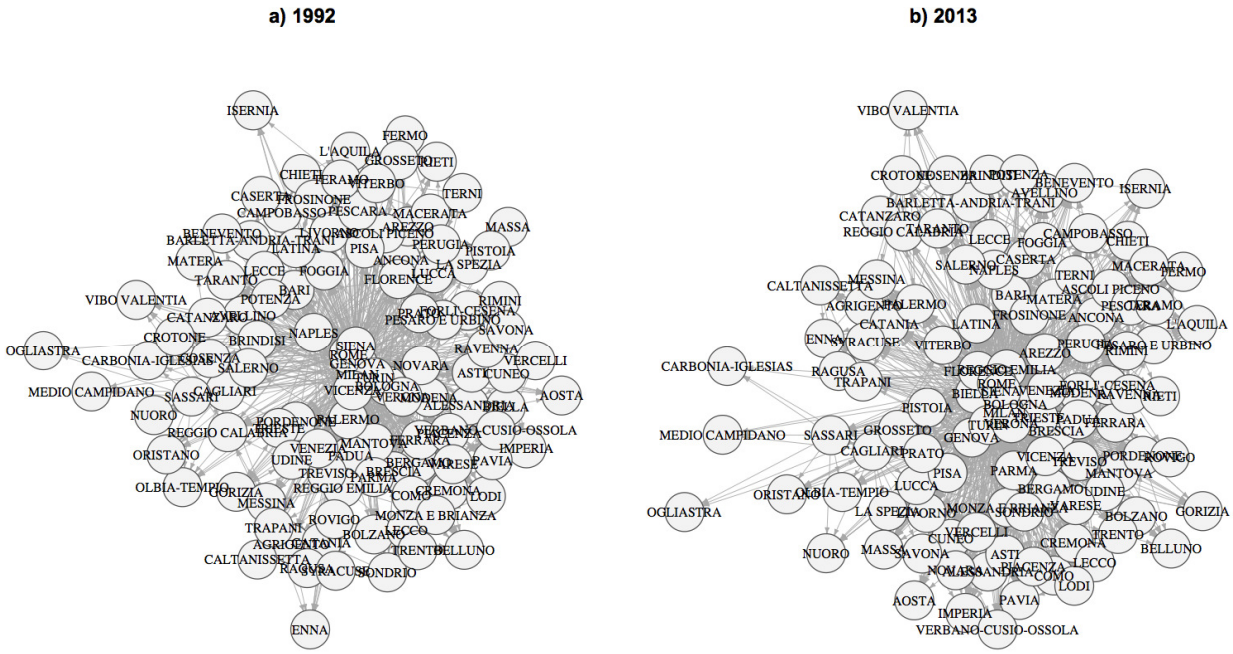
Figure 4. Number of branches by province: variation 1992-2013



Source: Bank of Italy.

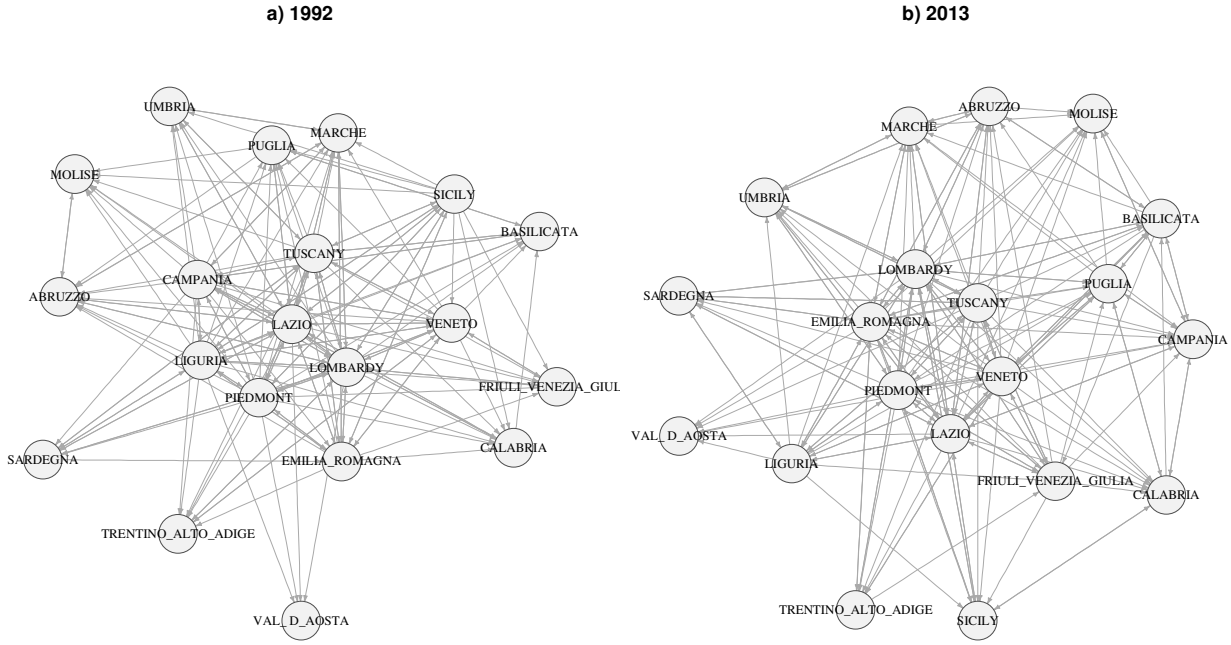
Notes. Category 1: provinces where the number of branches decreases, Δ Branches < 0. Category 2: provinces where the variation of the number of branches is below the first quartile (Q1) but not lower than zero, 0 ≤ Δ Branches ≤ Q1 = 24. Category 3: provinces where the variation of the number of branches is between the first quartile and the median (M), 24 < Δ Branches ≤ M = 42. Category 4: provinces where the variation of the number of branches is between the median and third quartile (Q3), 42 < Δ Branches ≤ Q3 = 83. Category 5: provinces where the variation of the number of branches is above the third quartile but not exceptionally large 83 < Δ Branches ≤ Q3 +1.5*(Q3-Q1) = 171. Category 6: provinces where the number of banks increases exceptionally, Δ Branches > 171.

Figure 5. Network of cross-province bank branching



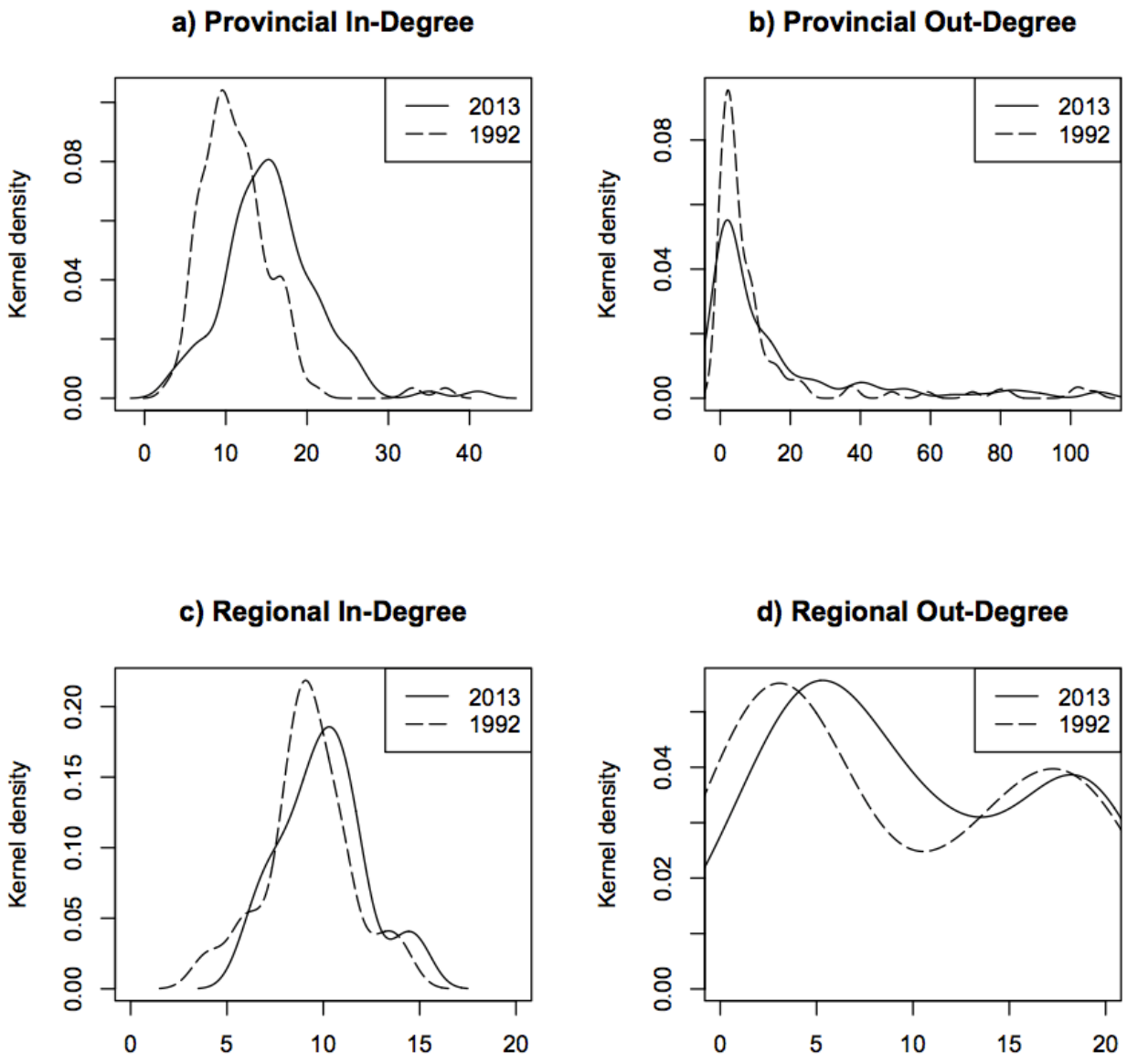
Source: Bank of Italy.
Notes. Nodes indicate provinces; directed link from a province *i* to a province *j* indicates that banks headquartered in province *i* have branches in province *j*.

Figure 6. Network of cross-region bank branching



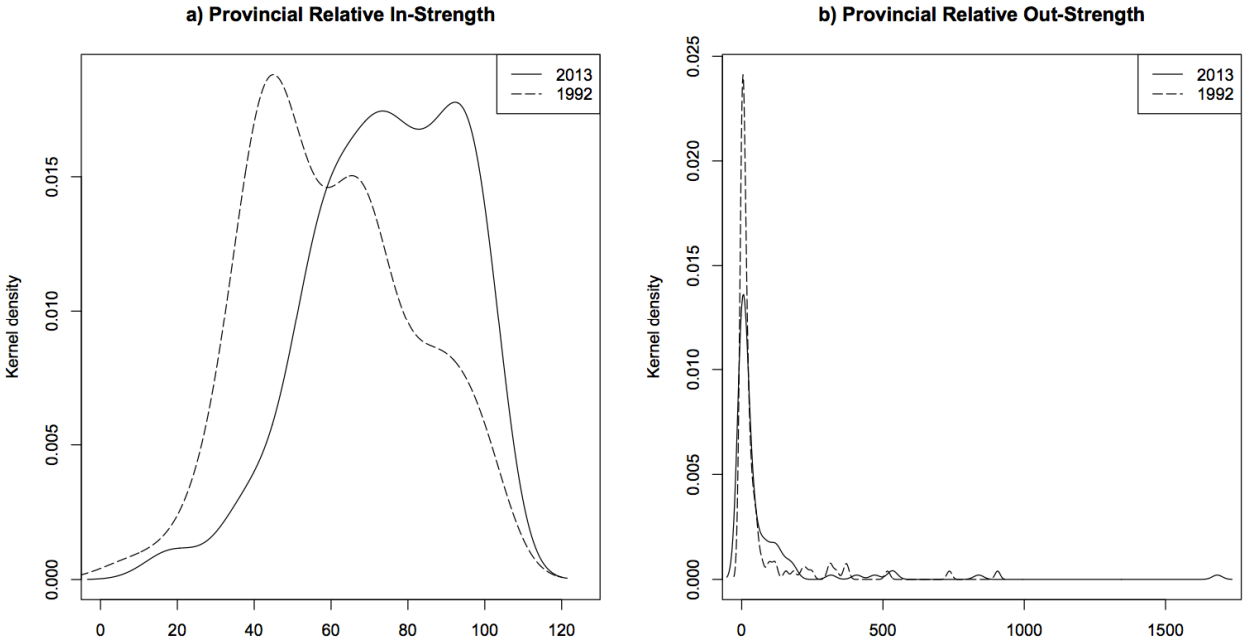
Source: Bank of Italy.
Notes. Nodes indicate regions; directed link from a region *i* to a region *j* indicates that banks headquartered in region *i* have branches in region *j*.

Figure 7. Empirical distribution of *In-Degree* and *Out-Degree* indicators



Source: Bank of Italy.
Notes. The density estimates use Gaussian kernel density and bandwidth specified by Silverman's rule of thumb (Silverman, 1986).

Figure 8. Empirical distribution of *Relative-IN-Degree* and *Relative-Out-Degree* indicators



Source: Bank of Italy.
Notes. The density estimates use Gaussian kernel density and bandwidth specified by Silverman's rule of thumb (Silverman, 1986).

Table 1. Banking sector structural and capacity indicators

	No. of banks		Total assets / GDP (1)		Population per bank (2)		Population per branch		Population per employee		Assets per employee (3)		Herfindhal index (4)		Share of 5 largest banks (5)	
	2008	2013	2013	2013	2008	2013	2008	2013	2008	2013	2008	2013	2008	2013	2008	2013
Italy	729	611	160	154	73	88	1751	1922	177	199	10.8	13.2	307	406	31	40
France	672	579	356	299	88	3	1625	1736	151	158	17	18.2	681	551	51	46
Germany	1882	1734	364	236	41	45	2077	2271	120	126	11.5	11.6	191	266	23	31
Spain	282	204	302	320	126	158	990	1362	165	213	12.2	14.6	497	757	42	56
Euro area	5992	5248	305	241	53	57	1759	2039	146	162	13.5	14.3	686	693	44	47

Source: ECB. (1) Total assets of domestic banks in relation to GDP (in percentage); (2) Thousands of people; (3) Thousands of euros; (4) Index ranging from 0 and 10,000; (5) Share of total assets of five largest banks.

Table 2. Number of cliques

	3 provinces	4 provinces	5 provinces	6 provinces	7 provinces	8 provinces	9 provinces	10 provinces
1992	242	157	64	16	2			
2013	573	805	821	589	288	95	20	2

Source. Authors' calculation using Bank of Italy statistics.

Table 3. Network indicators: summary statistics

	Mean		Median		Min		Max		Standard Deviation	
	1992	2013	1992	2013	1992	2013	1992	2013	1992	2013
	Provinces (110)									
IN-Degree	11.4	15.6	11	15	3	3	37	41	4.9	5.9
Centre-North	12.8	17.5	12	16	6	7	37	41	5.4	5.8
South	9.2	12.4	10	13	3	3	15	22	2.8	4.6
OUT-Degree	11.4	15.6	4	5.5	0	0	107	109	21.5	24.2
Centre-North	14.7	21.3	5	8	0	0	107	109	25	28.4
South	6	6	2	2	0	0	72	41	12.4	8.5
IN-Strength	94.3	199.2	73.5	140	6	16	607	1237	86	187.3
Centre-North	107.3	240.1	84	175	20	25	607	1237	95.2	213.9
South	72.6	130.2	53	108	6	16	314	480	62.8	99.9
OUT-Strength	94.3	199.2	14.5	24.5	0	0	1479	4767.0	232.3	559.9
Centre-North	124	286.2	19	62	0	0	1479	4767	276.1	688.9
South	44.5	52.6	5	4	0	0	566	570	115.6	111.2
Relative-IN-Strength	59.8	74.5	57.3	74.8	5.9	16.7	100	100	21.1	19
Centre-North	53.7	69.3	48.9	69.5	5.9	16.7	98.8	100	18.6	19.2
South	70.1	83.3	69.9	87.3	26.2	43.5	100	100	21.2	15.3
Relative-OUT-Strength	59.8	74.5	10.7	9.9	0	0	905.6	1683.1	139.5	199.4
Centre-North	67.8	95.2	12.7	21.7	0	0	905.6	1683.1	156.7	238.6
South	46.2	39.7	4	2.6	0	0	515.9	534.1	104.9	97.9
	Regions (20)									
IN-Degree	9.2	10	9	10	4	6	14	15	2.31	2.27
Centre-North	9.6	10	9.5	10	4	6	14	15	2.6	2.7
South	8.6	10	9	10.5	6	7	11	12	1.8	1.6
OUT-Degree	9.2	10	5.5	8	0	0	19	19	7.35	6.74
Centre-North	11.2	12.8	13.5	15.5	0	0	19	19.0	7.9	7.1
South	6.3	5.8	4	5	1	1	17	11	5.6	3.2
IN-Strength	280.6	759.8	276	501	45	78	775	2851	200.99	683.04
Centre-North	319.2	921.4	306	725.5	45	78	775	2851	213.8	791.5
South	222.8	517.4	124	328.5	61	127	500	1150	177.2	412.3
OUT-Strength	280.6	759.8	58	204	0	0	1308	4552	382.41	1141.18
Centre-North	415	1186.7	368	900	0	0	1308	4552.0	437.7	1320.6
South	79	119.5	28.5	91.5	1	1	401	329	135.6	116.2
Relative-IN-Strength	37	53.8	34.5	51.3	6.1	17.36	83.1	93	17.93	19.8
Centre-North	32.9	46.6	27.6	45.3	6.1	17.4	83.1	78.8	19.7	15.4
South	43.2	64.6	44.8	66	21.4	24	67.8	92.7	13.9	21.7
Relative-OUT-Strength	37	53.8	10.3	26.9	0	0	169.16	310.78	49.42	74.96
Centre-North	51	77.3	36.3	64	0	0	169.2	310.8	56.9	89.3
South	16	18.6	7.8	10.9	0.3	0.1	80	45.7	26.5	18.8

Source. Authors' calculation using Bank of Italy statistics.

Table 4. Network indicators: provincial rankings

Highest ranked										
IN-Degree		*OUT-Degree*		*IN-Strength*		*OUT-Strength*		*Relative-IN-Strength*		*Relative-OUT-Strength*	
1992											
Rome	37	Rome	107	Milan	607	Rome	1479	Nuoro	100	Rome	905.6
Milan	33	Milan	103	Rome	456	Milan	1460	Olbia-Tempio	100	Milan	735.0
Bologna	21	Genoa	101	Naples	314	Genoa	653	Ogliastra	100	Naples	515.9
Treviso	19	Siena	82	Turin	311	Siena	605	Medio Camp.	100	Genoa	372.7
Turin	18	Turin	79	Varese	269	Naples	566	Carbonia-Iglesia	100	Siena	367.0
Varese	18	Naples	72	Monza	210	Palermo	501	Imperia	98.8	Cagliari	334.5
Brescia	18	Vicenza	59	Pavia	208	Turin	480	Pavia	98.1	Turin	315.4
Monza	17	Novara	49	Catania	201	Vicenza	452	Isernia	95.5	Palermo	309.7
Verona	17	Palermo	38	Florence	196	Novara	424	Oristano	95.2	Novara	247.5
Vicenza	17	Bologna	37	Bari	191	Bologna	367	Belluno	91.5	Florence	227.8
Venezia	17	Bergamo	24	Brescia	186	Bergamo	330	Brindisi	90.2	Vicenza	214.1
Padua	17	Florence	23	Bologna	180	Florence	287	Varese	89.7	Bologna	184
Udine	17	Brescia	21	Messina	179	Verona	223	Reggio Calabria	89	Cosenza	156.4
Parma	17	Verona	20	Venice	178	Padua	179	Barletta	88.2	Bergamo	119.2
Mantova	16	Mantova	17	Genoa	178	Modena	154	Vibo Valentia	88	Verona	117
2013											
Rome	41	Rome	109	Milan	1237	Rome	4767	Vercelli	100	Rome	1683.1
Milan	35	Siena	107	Rome	1092	Siena	2311	Novara	100	Siena	838.8
Padua	27	Milan	92	Turin	794	Turin	1658	Alessandria	100	Cagliari	534.1
Brescia	26	Reggio Emilia	87	Bologna	500	Verona	1501	Verbano	100	Verona	532.8
Ancona	26	Bologna	83	Naples	480	Milan	1474	Varese	100	Turin	471.1
Vicenza	25	Verona	81	Brescia	472	Sondrio	588	Imperia	100	Milan	407.2
Florence	25	Turin	74	Verona	468	Naples	570	Isernia	100	Naples	315.9
Bergamo	24	Genoa	66	Florence	450	Parma	516	Nuoro	100	Reggio Emilia	188.7
Verona	24	Biella	55	Varese	444	Vicenza	476	Olbia-Tempio	100	Ancona	181.4
Bologna	24	Vicenza	52	Treviso	404	Reggio Emilia	474	Ogliastra	100	Genoa	169.2
Turin	22	Florence	52	Monza	389	Ancona	444	Medio Camp.	100	Modena	162
Treviso	22	Parma	45	Padua	382	Modena	438	Carbonia-Igl.	100	Cosenza	154.8
Parma	22	Modena	43	Vicenza	380	Genoa	432	Pavia	99.7	Vicenza	138.4
Bari	22	Matera	41	Bari	380	Bergamo	388	L'Aquila	97.2	Parma	135.5
Varese	21	Sondrio	39	Bergamo	370	Bologna	363	Catania	95.9	Biella	125.7

Lowest ranked										
IN-Degree		*OUT-Degree*		*IN-Strength*		*OUT-Strength*		*Relative-IN-Strength*		*Relative-OUT-Strength*	
1992										
Enna	7	Enna	1	Terni	31	Enna	1	Viterbo	38.6	Barletta	0.33
Sassari	7	Aosta	0	Teramo	28	Aosta	0	Palermo	37.9	Aosta	0
Cagliari	7	Pavia	0	Gorizia	27	Pavia	0	Chieti	37.9	Pavia	0
Aosta	6	Belluno	0	Rieti	26	Belluno	0	Bologna	37.66	Belluno	0
Sondrio	6	Imperia	0	Nuoro	26	Imperia	0	Lecce	37.4	Imperia	0
Siena	6	Isernia	0	Olbia-Tempio	26	Isernia	0	Siena	37.2	Isernia	0
Benevento	6	Caserta	0	Trento	24	Caserta	0	Verona	34.8	Caserta	0
Crotone	6	Brindisi	0	Vibo Valentia	22	Brindisi	0	Padua	32.7	Brindisi	0
Nuoro	6	Vibo Valentia	0	Isernia	21	Vibo Valentia	0	Bergamo	32.4	Vibo Valentia	0
Oristano	6	Nuoro	0	Sondrio	20	Nuoro	0	Pesaro-Urbino	29.3	Nuoro	0
Olbia-Tempio	6	Oristano	0	Oristano	20	Oristano	0	Teramo	28.3	Oristano	0
Carbonia	6	Olbia-Tempio	0	Medio Camp.	15	Olbia-Tempio	0	Cosenza	26.2	Olbia-Tempio	0
Isernia	5	Ogliastra	0	Carbonia-Igl.	13	Ogliastra	0	Sondrio	23	Ogliastra	0
Medio Camp.	4	Medio Camp.	0	Crotone	12	Medio Camp.	0	Bolzano	15.7	Medio Camp.	0
Ogliastra	3	Carbonia-Igl.	0	Ogliastra	6	Carbonia-Igl.	0	Trento	5.9	Carbonia-Igl.	0
2013										
Matera	10	Aosta	0	Bolzano	68	Aosta	0	Ancona	53.7	Aosta	0
Enna	10	Varese	0	Nuoro	68	Varese	0	Teramo	53.2	Varese	0
Sassari	10	Pavia	0	Oristano	67	Pavia	0	Gorizia	53.1	Pavia	0
Olbia-Tempio	10	Belluno	0	Caltanissetta	65	Belluno	0	Brescia	51.3	Belluno	0
Bolzano	8	Imperia	0	Enna	53	Imperia	0	Pistoia	50.8	Imperia	0
Sondrio	7	Isernia	0	Biella	52	Isernia	0	Bergamo	50.1	Isernia	0
Gorizia	7	Avellino	0	Gorizia	51	Avellino	0	Crotone	47.1	Avellino	0
Vibo Valentia	7	Brindisi	0	Rieti	49	Brindisi	0	Forlì	44.7	Brindisi	0
Caltenisetta	7	Vibo Valentia	0	Medio Camp.	38	Vibo Valentia	0	Cagliari	43.5	Vibo Valentia	0
Nuoro	7	Messina	0	Carbomia-Iglesi:	34	Messina	0	Biella	38.8	Messina	0
Oristano	6	Nuoro	0	Isernia	31	Nuoro	0	Siena	37.3	Nuoro	0
Crotone	5	Olbia-Tempio	0	Vibo Valentia	28	Olbia-Tempio	0	Cuneo	37.1	Olbia-Tempio	0
Medio Camp.	4	Ogliastra	0	Ogliastra	26	Ogliastra	0	Trento	32.9	Ogliastra	0
Carbonia-Igl.	4	Medio Camp.	0	Sondrio	25	Medio Camp.	0	Sondrio	20.3	Medio Camp.	0
Ogliastra	3	Carbonia-Igl.	0	Crotone	16	Carbonia-Igl.	0	Bolzano	16.7	Carbonia-Igl.	0

Source. Authors' calculation using Bank of Italy statistics.

Table 5. Network indicators: regional rankings

Highest ranked										
IN-Degree		*OUT-Degree*		*IN-Strength*		*OUT-Strength*		*Relative-IN-Strength*		*Relative-OUT-Strength*	
1992											
Lazio	15	Lombardy	19	Lombardy	775	Lazio	1308	Molise	92.7	Lazio	310.8
Lombardy	14	Veneto	19	Lazio	510	Lombardy	1109	Basilicata	87.3	Tuscany	148
Emilia Romagna	12	Emilia Romagna	19	Campania	500	Piedmont	599	Aosta Valley	78.8	Piedmont	107.2
Campania	12	Tuscany	19	Puglia	462	Liguria	589	Puglia	72.8	Veneto	104.7
Marche	11	Lazio	19	Veneto	458	Tuscany	486	Sicily	69.1	Emilia Romagna	97.5
2013											
Lazio	14	Piedmont	19	Lombardy	2851	Lazio	4552	Aosta Valley	83.1	Lazio	169.2
Lombardy	13	Lombardy	19	Veneto	1519	Tuscany	2058	Molise	67.8	Piedmont	120.5
Tuscany	11	Liguria	19	Lazio	1328	Veneto	1914	Puglia	51.7	Lombardy	114.6
Marche	11	Lazio	19	Emilia Romagna	1326	Piedmont	1741	Liguria	47.8	Campania	80.0
Abruzzo	11	Tuscany	18	Piedmont	1270	Lombardy	1448	Basilicata	47.2	Tuscany	66.9
Lowest ranked											
IN-Degree		*OUT-Degree*		*IN-Strength*		*OUT-Strength*		*Relative-IN-Strength*		*Relative-OUT-Strength*	
1992											
Friuli Venezia Giulia	8	Trentino Alto Adige	4	Umbria	107	Umbria	11	Emilia Romagna	40.1	Sicily	3.3
Liguria	8	Calabria	4	Basilicata	84	Puglia	9	Tuscany	36.1	Umbria	3.0
Aosta Valley	7	Sicily	4	Molise	61	Sardinia	7	Marche	35.7	Sardinia	1.6
Sardinia	7	Molise	1	Aosta Valley	49	Molise	1	Sardinia	24.0	Molise	0.1
Trentino Alto Adige	6	Aosta Valley	0	Trentino Alto Adige	45	Aosta Valley	0	Trentino Alto Adige	17.4	Aosta Valley	0
2013											
Trentino Alto Adige	8	Calabria	3	Basilicata	206	Abruzzo	47	Sicily	21.4	Trentino Alto Adige	1.5
Umbria	8	Trentino Alto Adige	2	Trentino Alto Adige	163	Sardinia	35	Emilia Romagna	21.0	Umbria	1.2
Sicily	6	Friuli Venezia Giulia	2	Sardinia	160	Sicily	20	Lombardy	20.7	Sardinia	0.5
Sardinia	6	Molise	1	Molise	127	Molise	1	Tuscany	19.5	Molise	0.3
Aosta Valley	4	Aosta Valley	0	Aosta Valley	78	Aosta Valley	0	Trentino Alto Adige	6.1	Aosta Valley	0

Source. Authors' calculation using Bank of Italy statistics.