

FINANCIAL CRISIS, PRIVATE EQUITY AND TECHNOLOGICAL DISTRICTS: OPPORTUNITIES AND CHALLENGES FOR LOCAL BANKS

ABSTRACT

The paper focuses on the opportunities for local banks and, in particular for cooperative banks, to offer innovative financial services, such as private equity, to support the competitiveness of Italian technological districts in the light of the financial crisis.

Taking into account the cultural, managerial and organizational requirements of local banks, the work provides insights into how this category of banks can promote innovative financial services to help the development of high-tech districts and maintain a competitive position in relation to the larger banks.

Jel Classification: G21; G24

Keywords: financial crisis, technological districts, private equity, local banks.

1. INTRODUCTION

The paper analyzes the opportunities and challenges for local banks involved with regional innovation systems, such as technological districts, to take the dynamics of the social and economic context into account in the light of the financial crisis. In particular, the work highlights the main cultural and organizational difficulties that prevent local banks from competing with larger banks offering the highest value financial services, such as private equity, in technology-intensive geographical areas.

The intangible nature of the factors leading to the development of technology districts and the lack of physical assets to be used as collateral for credit lines require a transformation of the traditional sources of funding. Intangible assets cause informational asymmetries between lender (bank) and borrower (the firm in the district) and, therefore, they necessitate the search for new approaches and financial tools to handle the increased credit risk better.

Compared with other categories of banking intermediary, local banks can mitigate the effects of asymmetric information by leveraging greater territorial vocation that allows them to have a greater control of the territory and customers. However, this advantage is offset by the lower propensity of local banks to offer non-traditional services such as merchant banking services. The search for solutions that allow local banks to expand their supply without distorting their essence is the goal of this work that is structured as stated below.

The following paragraph describes the characteristics of regional innovation systems and their particular dimension, namely that of technological districts. The third paragraph illustrates the role of local banks within the districts and the intensity of the relationship between businesses, local banks and the territory. The fourth paragraph illustrates the peculiarities of the Italian private equity market highlighting the different dynamics compared with other European markets. The fifth paragraph is devoted to the empirical analysis and aims to identify how the services of merchant banking and, in particular, private equity transactions contribute to the profitability of cooperative banks. Based on the results of the analysis, the sixth paragraph ends with some concluding remarks regarding the strategies that local banks operating in the technology districts can adopt to strengthen the role of higher value financial services.

2. REGIONAL SYSTEMS OF INNOVATION AND TECHNOLOGICAL DISTRICTS

The presentation of technological districts addresses two issues: the systemic dimension of innovation and the concentration of innovative activities on a regional basis. The first dimension illustrates the elements of a generic regional innovation system (RIS) and some empirical studies. The second highlights the distinctive features of a particular example of a regional innovation system, i.e. the technological districts.

The Regional Innovation Systems (RIS)

The systemic view of innovation has remote origins as demonstrated by the contributions of Schumpeter (1934), Piore and Sabel (1984), Becattini (1979, 1999), Rullani (1999) and evolutionary economists such as Nelson and Winter (1982), Dosi (1982), Teece, Pisano and Shuen (1997). These works emphasize the importance within regional innovation systems of elements such as the primacy of small and medium-sized firms, the incremental nature of innovation projects and the achievement of greater variety and flexibility compared with large companies.

Lundwall (1992), Nelson and Rosenberg (1993), Lundwall and Johnson (1994), Malerba (2000), Becattini and Dei Ottati (2006), Crespi and Pianta (2007) also take aspects into

account related to the external environment highlighting the impact of external economies of the district, the social dimension and the crucial role of learning processes.

These contributions anticipate the model of open innovation theorized by Chesebour (2003) as opposed to the model of closed innovation hitherto dominant. Cooke (1998) argues that in order to create efficient high-tech poles it is necessary to abandon the linear, centralized, hierarchical model of innovation and move towards a non-linear decentralized, non-hierarchical model. In this context, Cooke defines a regional innovation system (RIS) as a system in which companies, along with other organizations, are systematically engaged in a process of interactive learning within a specific territorial area. Three elements characterize a RIS: a) interactive learning in which knowledge is conceived as a collective heritage; b) the territorial system seen as an open and complex system involving rules, values, human and material resources; c) economic processes and knowledge that take place within and among enterprises.

The success of a RIS is based on the presence of strong cooperative relationships between all actors and on the interconnections of knowledge coming from both internal and external sources as claimed by Edquist (1997), Nelson and Rosenberg (1993), Cohen and Levinthal (1990), Granstrand et al. (1997), Andersson and Karlsson (2004).

With regard to the classification of RIS, Cooke (1998) distinguishes between regional innovation systems with high potential and those with low potential. The presence of a specific number of elements makes it possible to identify a regional system of innovation with strong potential. These elements include amongst others, a region's autonomous capacity of expenditure, the presence of a developed private finance sector, the control of strategic infrastructures and the presence of universities, research centres and laboratories.

Braczyk, Cooke and Heidenreich (2004) propose a different classification of RIS emphasising the presence of specific models of technology transfer governance. These authors distinguish three types: grassroots-type, network-type, and, finally, dirigiste-type regional innovation systems. The first is characterized by a process of technology transfer organized at a local level, while in the second prototype the transfer is on different levels (local, regional and global). In the third type transfer policies are centralized and top-down.

Acs and Audretsch (1990), Venkataram (2004) identify the RIS as a technology-based model of development where competition is based on the innovation and production of new scientific knowledge that is capable of finding a commercial application.

Asheim e Isaksen (1997) use social cohesion as a classification criterion. There are RIS with limited territorial areas in which companies exploit the advantages of territorial proximity without interacting much with the infrastructure responsible for the creation and dissemination of knowledge.¹ In addition, there are RIS connected to the regional level where businesses are linked to other types of organizations, but only for the purpose of local interactions. Finally, there are regionalised RIS which have two distinguishing features: a) companies and institutions are part of an extensive network of national and international dimensions, and innovative activities take place in collaboration with actors outside the regional boundaries, b) the flow of the innovative process is linear (e.g. technology parks).

A second aspect that characterizes the regional innovation system is the spatial concentration of productive and innovative activities. Von Thunen (1826), Weber (1909), Marshall (1920), Christaller (1933), Losch (1940), Isard (1940) and Henderson (1974) resort to geographical factors to explain the genesis of industrial agglomerations.²

¹ The industrial clusters of SMEs located in Emilia-Romagna and Veneto fall into this category.

² Marshall (1920) used the term "industrial districts" for the first time when referring to the textile and metallurgical mills of Lancashire and Sheffield. According to the British economist, small and medium enterprises of industrial districts were able to keep pace with technological change thanks to the presence of

In the light of the external economy approach presented by Marshall, Krugman (1988, 1991) introduces the concept of agglomeration economies which exist under these conditions: a) the existence of a pool of skilled labor; b) upstream and downstream links of the value chain; c) cognitive spillover due to the greater ease with which the flow of information circulates over short distances rather than larger ones.

Technological districts

In technological districts the concept of intra-organizational innovation plays a key role. This expression defines the ability to enhance the knowledge of the tech-district by identifying the corresponding firm-specific paths of experimentation and interacting with other internal and external partners in the high-tech district. The ability to coordinate the various skills is core to the district's sustainable development and emphasizes the multifaceted nature of technological districts. The triple helix model of Etzkowitz and Leydesdorff (2000) is a useful tool for capturing the essence of technological districts. The theoretical model assumes that the growth of any local economic system is based on continuous interaction amongst three propellers (government, industry and universities) which interact with one another.

Lazzeroni (2004) and Schiavone (2008) emphasize two key aspects in the creation of high-tech poles: the mechanisms of agglomeration and the predominance of science-based sectors. Piccaluga (2003) and Varaldo (2006) point out that, compared with the industrial districts where innovation is incremental, technological districts follow a radical innovation, which essentially consists of the incorporation of scientific knowledge into new products or devices. Therefore, the success of technological districts requires the presence in the same territory of actors who produce knowledge (such as universities and research centers) and those who instead benefit from this knowledge.

According to Porter (1998) the technological districts are a geographic concentration of interconnected companies and institutions in a particular field. The geographical proximity makes the supply of inputs convenient (lower transaction costs) and accelerates the production process more quickly thanks to the presence of face-to-face relationships based on trust. Porter includes both the vertical extent of the activities (i.e. distribution channels and customers) and the horizontal extension (i.e. the interconnection between knowledge, technology and common inputs).

For Manskell (2002) the geographical proximity alone is not sufficient to ensure the development of a technological district. If it promotes the sharing and exchange of knowledge and information, the development of the district requires the presence of a structure of government that carries out coordination functions. In this context, Bonaccorsi and Nesci (2006) highlight the "reservoirs of skills" as the success key, while Cooke and Huggins (2001) muse on the role played by universities, research centres and institutions.

Although showing similarities with traditional industrial districts, technology districts have specific distinguishing features. If industrial districts do not have special links with research centres, technological districts form around scientific centres of excellence which help to transfer research results to the industrial system. Another element of differentiation concerns the genesis. While industrial districts come from below, i.e. from the local socio-economic context in which they are inserted and the willingness of companies to establish a network (Becattini, 1979; Baccarani and Golinelli, 1993), the formation of tech-clusters is

external economies resulting from the mixture of knowledge, values, behaviors and social institutions continually fueled by relationships of trust between businesses, employees and suppliers.

both a result of public investment or the location of a large high-tech enterprise that acts as a bridging institution (Boari and Lipparini, 1999; Lofsten and Lindelof, 2002; Bresnahan et al., 2005). Finally, a third element of differentiation relates to the greater propensity of technological districts to open outwards beyond the boundaries of their territorial base through internationalization policies.

3. DISTRICTS AND LOCAL BANKS

Compared to national banks, local banks have played an important role in the development of Italian industrial districts. As pointed out by Fortis (2008), the support of local banks in the development of Italian districts has been crucial. The direct knowledge of the entrepreneur and of his personal and professional history, the proximity of decision centers and the reflections of a set of social interactions have made it possible to reduce the opacity of information that characterizes the relationship between borrower and lender. In this context, the local bank acquires a competitive advantage over larger credit intermediaries and other financial intermediaries (venture capital and private equity operators).

The intense relationship between the bank and the operating area, of which the district is an expression, allows the bank to collect *soft information* which is instrumental in strengthening the credit process thanks to peer monitoring (Stiglitz, 1990). If a firm adopts unorthodox financial behavior, such conduct may result in negative repercussions on other firms in the district that could suffer a credit crunch for reasons not directly attributable to them. It follows that the members of the district are encouraged to monitor each other to ensure that the quality of their projects is perceived by lenders to be high and not subject to negative externalities.

In addition to peer monitoring, other factors have favored the higher affinity between local banks and districts that, in some cases, is one of the few real applications of relationship banking.³ Some of the factors are due to companies, others to banks and, finally, a third group must be distributed equally between the two actors.

During the development of traditional districts, financial needs can be met by simple technical forms (often accompanied by personal guarantees given by the entrepreneur). These instruments do not require complex contractual clauses and do not require an active role on the part of the lender (Petersen and Rajan, 2004). At the same time, banks with greater territorial vocation seem more willing to lend on the basis of information gathered from an informal knowledge of the company. While not codified, the soft information fits easily into the creditworthiness process due to the physical proximity between the bank's decision-making center and the point of information collection (branch). The absence of pyramidal structures, typical of the largest banks, and the less stringent operational processes enable the local bank to be more effective in serving the needs of the district's member.

However, the balance between local bank and district is not always fixed. The transformation of the banking industry, the change of industrial structures and financial shocks make the connection unstable. The current historical moment sees a convergence of these three factors.

Since the nineteen nineties Italy has been affected by a profound consolidation process that has contributed towards reshaping the scope of banking and changing the relationship

³ Literature tends to classify the modes of interaction between banks and businesses in two ways : the model of relationship banking and the one of transactional banking. In the first, the frequency and intensity of the relationship between banks and firms allow the collection of private information which is used in the granting of the loan and its economic conditions (Elsas, 2005). In the transaction-based model the credit decision is typically public information and the loan has a specific time and purpose (Boot et al, 2000). For a discussion see Bongini et al. (2009) and Modena (2010).

between banks and firms (Bonaccorsi di Patti and Gobbi, 2001, Sapienza, 2002). In this context, two elements are of particular importance: the evolution of the organization and distribution of the bank and the introduction of internal rating systems. The transition from the general to the divisional model and the subsequent return to service models that re-evaluate the role of the relationship manager (i.e. branch manager) has weakened the value of asset information accumulated over time even in local banks. Similarly, the rating is still similar now to a black box with unclear boundaries and content unsuitable for building a long-term relationship (Modina, 2012).

The transformation of the industrial system, the removal of geographic barriers and the growing importance of technological change have altered the characteristics of the districts so far known. The evolution of clusters does not follow a linear path, but takes on new forms which vary depending on the interaction with research centers and the degree of openness to the outside world. This causes a change in the financing needs of firms belonging to districts that is accompanied by an increase in the possibility of failure. It is essential to identify new forms of support (more extensive and flexible than those used so far) and to increase the ability of lenders to identify the long-term success factors of businesses and districts.

The crisis is the third element that redesigns the intensity and duration of the relationship between business, bank and territory. The crisis generates structural fractures that affect the competitive dynamics and make the conditions for accessing the credit market more stringent. The deterioration in the quality of the loan, the pressure on bank capital and the weak economic conditions of the borrower produce a negative impact both on the demand and on the supply side.

In this scenario of uncertainty, local banks have three distinctive elements. In times of economic stress, the smaller geographical diversification of the loan portfolio tends to be reflected in a greater concentration of credit risk. Conversely, the smaller size of the bank tends to mitigate dependence on macroeconomic factors in favor of specific factors of competitiveness (credit selection capacity, better management of soft information, a more intense customer relationship). Likewise, the greater allocation and quality of the asset, which local banks traditionally enjoy, is strategically relevant considering the importance of bank capital as a critical factor for success in the coming years.⁴

However, these elements may not be sufficient to ensure that the local bank maintains the role of promoter of well-being and development in the territory. To continue to support the local economy and the districts, local banks must leverage their key-success factors and develop the ability to read in good time the competitive paradigm that explains the success of businesses. The local bank that wants to continue to act as the engine of the districts must strive for excellence in customer relationships and adopt forward-looking assessment tools (which further enhance the role of soft information) in order to align its credit value proposition to the new needs expressed by districts, especially the technological ones.

⁴ As is known, in a commercial bank the capital provided by shareholders allows banks to take the risks inherent in the banking business against which management must produce an adequate return on capital. Since capital is an expensive and limited resource, its scope must be properly managed to find the optimal combination of risk and return. Local banks and, in particular cooperative ones, are not subject to constraints of remuneration. In fact, the amount of capital is generally higher in the co-operative banks because it reflects both the more prudent exercise of banking and the specific regulations related to the principles of mutuality and localism. For a cooperative bank, capital is not so much a factor of remuneration as a dowry generations that is accumulated over time to be transmitted in the future (Fonteyne, 2007).

4. PRIVATE EQUITY AND VENTURE CAPITAL: THE ITALIAN STATE-OF-THE-ART

Institutional investors in venture capital and private equity in Italy have developed over time and have also been influenced by the Italian business model. The distribution of investment mainly involves operations with small and medium-sized enterprises which represent, on average, between 70% and 80% of the total investments.

After years of growth, the Italian private equity and venture capital market felt the effects of the international financial crisis: in 2010 the investment in the market dropped to 2.4 billion euros compared with 5.4 billion euros invested in 2008. In 2011, the business showed some signs of recovery rising to 3.5 billion euros of loans.

The financial crisis has also reduced the use of debt in acquisitions. In 2011, the net debt paid, on average, appears to have been equal to 2.5 times the EBITDA of the target, reconfirming that it is below the pre-crisis period. Although the use of leverage in Italy was lower than in the international context, the private equity funds active at the national level have had to adapt their methods of intervention to the difficult situation focusing even more on smaller operations and on operating leverage rather than on financial leverage (Bracchi and Del Giudice, 2009).

The value of the investment has been refocused on strategies to build up internationalization where the know-how and expertise of investors in venture capital can support the company in its growth process. In general, managers of private equity funds have concentrated once more on acyclic sectors such as medical, utilities, food and telecommunications that have suffered less from the effects of the economic crisis. If the number of interventions has not differed much in recent years compared with pre-crisis levels (on average three hundred operations per year), the crisis has caused a decrease in the average size of the operations (Bracchi, 2011). The highest number of interventions has concerned the mid-market (companies with a turnover of between 10 and 100 million euros) which now account for around 40% of the total investments. The typical target company of mid-market funds operates in niches of excellence, and has nationally and internationally recognized brand and/or technological know-how.

Looking at the distribution of interventions by type, the main operations were related to investments for development and the acquisition of the majority which is also linked to the generational change. While it is easy to see a strong concentration of operations in Northern Italy, there are no specific data on the impact of private equity investments in the districts and local production areas.

An institutional initiative has been undertaken in this scenario which may boost this market as occurred in some successful international experiences. In December 2009 the Italian Investment Fund was set up, promoted by the Italian Ministry of Economy, for the dual purpose of facilitating the processes of internationalization and aggregation of Italian SMEs and to encourage the growth of the overall market, through the activities of fund of funds. Currently this operator is taking action rather briskly on the market both through direct interventions in companies and with indirect investments in funds that are focused on similar policy intervention.

As far as the venture capital segment is concerned, which focuses on early stage interventions supporting the creation of new business ventures, the Italian market for venture capital is still largely underpowered compared to the major European countries although the segment has been characterized in recent years by greater turmoil. There are about 10 Italian funds specializing in early stage interventions compared with about 140 of the same players in the French market. Although this scenario can be partially justified by the relative youthfulness of the Italian market in this particular segment, the worsening of the crisis has

contributed towards a vicious circle which further restricts the flow of capital to these types of investments. The volumes of investment in start-up companies at the national level showed, in 2011, a decrease of 9% over the previous year for a total of just 82 million euros. In order to strengthen this segment, venture capital operators have focused their investment strategy on more technologically oriented areas and where there is more geographical proximity.

As regards the specific role played by local banks, the importance of private equity in their value proposition has not yet been sufficiently appreciated either in terms of aggregate statistical phenomenon or in terms of quality. Certainly, by embedding in the territory these operators could encourage ties with the entrepreneurial tissue and accommodate the growth needs expressed by the companies operating there in a timely manner. In order to address these opportunities, the cooperative credit banks have recently expressed the need to acquire a financial instrument specialized in private equity business creating an *ad hoc* investment management company with the aim of expanding its supply for corporate customers in search of new forms of financing for enhancing their businesses.

5. LOCAL BANKS AND INNOVATIVE FINANCE: AN EMPIRICAL ANALYSIS

The empirical analysis aims to assess the role that local banks play in supporting the development of technology clusters. The local banks surveyed are those operating in areas where private equity transactions are better and where technological districts have existed longer. Therefore, the regions under investigation are Piedmont, Veneto, Lombardy and Emilia-Romagna where there are technological districts dealing in wireless technologies, nanotechnology, biotechnology and advanced mechanics.

The region with the largest number of investments is Lombardy with 177 investments (37% of the total transactions carried out in the five-year period - Table 1 in the Appendix). The sample of banks is made up of 71 banks (30 in Lombardy, 22 in Veneto, 12 in Emilia - Romagna, 7 in Piedmont) and was defined using the registered office of each local bank and the number of branches. The Tables 5, 6, 7, 8 (see Appendix) show that the sample constructed in this way may be considered sufficiently representative of the local structure of the banking system in the four regions. The dataset used consists of a total of 355 observations; Lombardy contains the largest number of cooperative banks and popular banks (Table 2).

Table 2: Sample Structure

<i>Region</i>	<i>Absolute Frequency</i>	<i>Relative Frequency</i>	<i>Cumulative Frequency</i>
Emilia-Romagna	60	16,90	16,90
Lombardy	150	42,25	59,15
Piedmont	35	9,86	69,01
Veneto	110	30,99	100,00
Total	355	100,00	

The financial sector investigated was merchant banking in that it contains private equity transactions.

In order to monitor the level of diffusion of private equity activity within local banks, a panel model has been preferred rather than an alternative approach (such as linear regression) because it allows different observation units to be monitored (i.e. 71 different local banks) at different moments of time. The panel model has fixed effects since the main objective is not to determine whether there are significant differences in the approach to advanced financial services among individual banks, but if there are any differences between the regions

examined. Since there are no proxies to monitor the specific skills in merchant banking, the quality of the bank management is treated as individual, constant and unknown effects (a_i).

These individual effects are the intercept of a panel model with fixed effects and vary from one observation to another:

$$y_{it} = a_i + x'_{it} \beta + \varepsilon_{it}$$

With reference to this empirical analysis, the effects vary for each of the 71 banks forming part of the sample and include information that cannot be observed and that identifies each of these banks uniquely. Therefore, these individual effects cannot be considered as random variables, that is the result of a random extraction from some underlying population.

The lack of information on these intangible assets of the supply model of local banks is solved by using a fixed effect estimator (or within estimator). Through this preliminary transformation of the variables (both the dependent and explanatory variables), the individual effects a_i are eliminated:

$$y_{it} - \bar{y}_i = (x_{it} - \bar{x}_i)' \beta + (\varepsilon_{it} - \bar{\varepsilon}_i)$$

The OLS estimator obtained on each of the coefficients of the model is often called the transformed panel within the estimator or fixed effects estimator and formally assumes the following expression:

$$\beta_{FE} = \left[\sum_{i=1}^N \sum_{t=1}^T (x_{it} - \bar{x}_i)(x_{it} - \bar{x}_i)' \right]^{-1} \sum_{i=1}^N \sum_{t=1}^T (x_{it} - \bar{x}_i)(y_{it} - \bar{y}_i)$$

Basically, it was decided to estimate a panel model with fixed effects, rather than a random effects panel model, because this empirical analysis does not explain the differences between each bank and because the average individual bank x differs from the average individual bank j . The attention is thus focused on the differences within each local bank as y_{it} differs from \bar{y}_i .

The model aims to evaluate the relationship between a dependent variable indicative of the profitability of local banks and the independent variables, established through the breakdown of the economic "net revenues from services" using the information contained in the bank's balance sheet and in the notes. As proposed by Capizzi (2007), the economic aggregate "net revenues" is broken down into a series of subheadings that can bring the range of products and services offered to customers (investment services, financial advisory services, merchant services, banking services, securities trading for own account). Using this distribution of net revenues, it is possible to check whether a financial shock boosts or cuts the effects of investment banking services on banks' profitability. The analysis focuses on merchant banking because within this sector it is possible to trace the operations of venture capital and private equity.

Model variables

All explanatory variables in the model are expressed as a percentage of net revenues from services. The dependent variable, expressing bank profitability, is constructed as the ratio of net interest income and operating income. It assesses the ability of the bank to offset the lower contribution from money management with the largest contribution from the services. The reciprocity of this indicator summarizes the contribution of management services to

profitability. With a constant interest margin, higher values of the quotient denote a lower capacity of the intermediary bank to generate gross profitability. From this comments can be made on the degree of innovation of the banks under investigation.

The following table shows the explanatory variables of the estimated panel model, their formalization and analytical information being extracted from the notes used in their construction.

Table 3: Explanatory Variables of the Model Panel

Type of Operation <i>Merchant Banking</i>	Proxy variable	Analytical expression (% Revenues from Services)	Sections of the Notes
Operation Funding	TDRS	Debt/Revenues from services	Item 80 - Section 4
Acquisition of investments	TCRS	Equities/Revenues from services	Item 80 - Section 4
Financial covenants	CFRS	Comm. guarantees/Revenues from serv.	Other Information
Dividends	DFRS	Dividends / Revenues from services	Item 70 - Section 3

The first variable (TDRS) provides information on the contribution to revenues from services in the bond buying business. In particular, the dynamics of this variable may provide some indications on the spread of financing operations, which represent a mode of expression of *merchant banking*. The second variable (TCRS) provides information on the average percentage incidence of financial assets available for sale relating to equity securities; in this context it is possible to depict the contribution of the merchant banking business through the acquisition of shares in the share capital of target companies. The third variable (CFRS) provides information on the average percentage incidence of commissions generated from cash loans on net revenues by services and in particular on the local banks' use of financial *covenants* i.e. clauses that guarantee the right of share redemption in the event of failure to achieve the set economic-financial parameters. The last variable (DRS) provides a measure of the average percentage of financial assets and, in particular, the dividends arising from investments in associated companies.

These explanatory variables were combined with regional dummies (royal), which were crossed with each of the explanatory variables (and which identify whether local banks operate primarily in one of four regions under examination).

The panel model is designed in this way:

$$\text{Profitability} = \sum_{i=1}^4 \beta_i * \text{Re } gio + \varepsilon_i$$

In a more extended form:

$$\begin{aligned} \text{Profitability} = & \beta_{1i} + \\ & + \beta_1 \sum_{i=1}^{77} \sum_{2006}^{2010} TDRS_{it} * \text{Re } gio + \\ & + \beta_2 \sum_{i=1}^{77} \sum_{2006}^{2010} TCRS_{it} * \text{Re } gio + \\ & + \beta_3 \sum_{i=1}^{77} \sum_{2006}^{2010} CFRS_{it} * \text{Re } gio + \beta_4 \sum_{i=1}^{77} \sum_{2006}^{2010} DRS_{it} * \text{Re } gio + e_{it} \end{aligned}$$

Results

The dataset consists of 1,155 observations having monitored 5 variables for each of the four years in question (2006-2010) and for each of the 77 sampled banks. The relationship

between each explanatory variable and each dependent variable is observed through economic and statistical interpretation.

With reference to the first variable (TDRS), adopting a probabilistic reasoning (i.e. using the p-value criterion) inhomogeneities emerge within the sample; in fact, with the exception of the banks in Emilia Romagna and Lombardy, none of the other banks have relied on sales of debt securities to raise their levels of economic performance. At a confidence level α amounting to 5%, the coefficients estimated for this first explanatory variable differ significantly from zero only for local banks operating in Emilia Romagna and Lombardy (Table 4 in the Appendix). Observing the standard error which expresses a measurement of the internal variability of local bank samples subdivided per region, they are lower for the banks in Emilia Romagna and Lombardy, thus leading to higher statistical t-Student values (respectively equal to -2,16 and -3,89) than the critical value (equal to 1,984) (i.e. these statistics fall within the region of the null hypothesis rejection). Therefore, financial assets available for sale in the form of financing transactions in the merchant banking sector have exerted a significant contribution on the economic performance of banks located in these two regions.

With regard to the second variable (TCRS), the results indicate that the banks in Lombardy and Piedmont seem to pay more attention to the profitability of management services (i.e. the components of gross income) rather than the profitability of money management (i.e. the components of net interest income). In particular, these banks have a significant average value of the "equity/net revenues from services" ratio in the four-year period observed. The p-value associated with the beta coefficients are estimated to be less than the confidence level α (5%), thus prompting the rejection of the null hypothesis (Table 4 in Appendix).

With regard to the third set of variables (CFRS), local banks in all regions have values close to zero. All p values associated with the estimated coefficients for each of the explanatory variables of the model are lower than the confidence level of 5% α suggesting the importance of these variables on the profitability of local banks in all four regions. Standard errors are less than half of the relevant estimated coefficients thus determining t-Student with higher values and, therefore, within the rejection region of the null hypothesis. Local banks show a preference for receiving collateral for lending rather than resort to other mechanisms for the protection of investments such as the ability to play an active part in the appointment of the management, the right to appoint one or more members on the Board of Administration of the company and even the conclusion of contractual clauses that do not qualify as financial covenants⁵ (Table 4 in Appendix).

With reference to the last variable (DRS), the empirical results show that, with the exception of the banks in Lombardy, the contribution of financial assets and investments in the form of coupon and dividend income is residual. With a p-value of 5%, the estimated coefficients for the explanatory variable in the other three regions differ significantly in fact from zero. The associated standard error is greater than half the value of the estimated coefficients leading to low values of t-Student. (Table 4 in Appendix).

The results allow some considerations to be expressed regarding the critical supply of innovative financial services by local banks operating in technology districts.

⁵ These results for this explanatory variable confirm the findings of Baravelli et al. (2002) which was reached in an earlier contribution, with particular reference to the operations of the Sicilian banks only for the period 1993-1998. This author argued that the increase in non-performing loans in this period demonstrated that local Sicilian banks had accepted a high credit risk and this is why their customers demanded more collateral or they had committed errors in the evaluation of credit risk, with the result that, by failing to have adequate safeguards, they were facing heavy losses.

Despite the fact that in the four regions observed there are significant technological districts (advanced mechanics in Emilia Romagna, biotechnology in Lombardy, nanotechnology in Veneto, ICT in Piedmont), local banks offer a modest presence of services with higher value services such as private equity, which could contribute towards increasing the firm's capitalization and strengthen the ability to do research.

The results of the empirical analysis highlight the need to redesign the relationship between bank and enterprise and to rethink the system of relationships even when bank intermediaries assume the role of local banks. Science-based companies, which operate in sectors with high innovation potential, need advanced lending services and financial tools in order to assist them in the various stages of the research and innovation life cycle. The bank must expand the traditional credit support available to such firms, with functional financial services to facilitate the transfer of research results into profitable businesses.

In this context, the technological district may be an important area of growth and experimentation for local banks that could become a leading actor in the interaction between business, universities and public and private research centres. Leveraging on their local roots, banks operating within technological districts may, in fact, act as a link between the three helices (government, industry and universities) represented in the model of Etzkowitz and Leydesdorff (2000).

The smaller size and traditional lending orientation prevent local banks from offering more sophisticated financial instruments. The size makes it more difficult to achieve sufficient levels of operational and allocative efficiency, while the traditional lending offer leads toward a specialization in customer segments with more limited financial needs. Local banks are thus faced with the choice of either diversifying or maintaining their vantage points relative to the territorial milieu. It is time to think about new forms of organization that can also allow local banks to explore new business areas (such as private equity) in order to maintain their competitive position in districts undergoing profound transformation..

6. CONCLUSIONS

The crisis that began in 2007 has produced important effects on the real and financial economy and on the relationship between banks and companies. The greater pressures from competition have made small and medium-sized Italian companies much more fragile on international markets, especially in the manufacturing sectors. In this macroeconomic environment, activities such as scientific research, the transfer of new technologies and knowledge and technological and organizational innovations emerge as the main key factors in order to boost the competitiveness of Italian firms. The combination of these factors is located in regional innovation systems and, in particular, in technological districts. The more complex financial needs of high-tech clusters require banks operating in these territories to expand their offer proposition in order to include innovative services, such as those related to venture capital and private equity.

The empirical analysis carried out in this paper has highlighted that local banks play a minor role in the private equity segment. Local banks must re-think their business model in order to maintain their key role in supporting Italian districts (including the more tech-oriented ones). Each bank faces significant challenges that require a redefinition of its competitive position. This approach is particularly important for value-added services such as the private equity one.

Any bank wishing to enter the private equity business must be able to design a productive process that can be broken down into eight different stages, each of which requires activities, resources, knowledge and well-defined professional profiles. In the early stages (scouting and starting relations with target companies), it is useful to exploit the benefits

deriving from relationships with external professionals and advisors. In the later stages (negotiation and closing), it is important to avoid potential opportunistic behavior in order to allocate voting rights efficiently in the shareholding structure.

In carrying out these activities, local banks can leverage the informational advantages associated with being a traditional lender (Baravelli 2001, 2003) and the presence of a capillary and less bureaucratic structure (Anolli et al, 2008). On the contrary, they suffer some major weaknesses: a modest ability to negotiate with the target company (lack of senior staff), the lack of knowledge on risk management and evaluation issues especially in the most innovative sectors and a poor track record.

To explore the private equity market successfully, leveraging on the advantage of being a territory-oriented bank, local banks must promote the co-investment logic and develop a widespread value chain approach.

The co-investment logic would lead to a significant increase in the ability to intervene in support of innovative firms where the default risk is higher. In this regard, the creation of a joint national-local fund could be useful. This mechanism, known as an up slide leverage scheme, allows small local banks to co-invest in a national fund; in case of loss, they bear a pre-defined portion of the losses, but they benefit asymmetrically from the return. With reference to the creation of a common value chain, the solid presence in the territory of local banks can foster the private equity activity in technological districts. Territorial knowledge can contribute significantly to enhance origination activities, while the decentralization of the private equity process (screening, evaluation, due diligence) in a logic of co-responsibility among private equity funds and local banks helps to lower operating costs and to create awareness towards small and innovative companies.

Considering the importance of this topic, further research is required into how the local banks could foster their presence in the private equity market. Future research should include in the model panel: a) explanatory variables on the characteristics of regional firms such as age, size, turnover, number of employees, sector specialization; b) a proxy of the intensity of the bank-firm relationship obtained by administering a structured questionnaire to local banks (supply side) and firms operating in science-based sectors (demand side). Some limitations of this study should also be underlined. First of all, the results may have been influenced by the setting in which the research was carried out (four Italian regions). Therefore, attention should be paid when the results are generalized to contexts characterized by a different degree of diversification in the banking supply model.

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APPENDIX

Table 1: The private equity market in Italy

Regions	2006	2007	2008	2009	2010
Abruzzo	0%	0%	1%	0%	0%
Basilicata	0%	0%	0%	0%	0%
Campania	4%	2%	1%	4%	4%
Emilia Romagna	17%	15%	12%	10%	10%
Friuli Venezia Giulia	4%	1%	3%	0%	3%
Lazio	7%	9%	8%	6%	7%
Liguria	3%	0%	3%	4%	3%
Lombardy	32%	36%	39%	35%	41%
Marche	2%	2%	2%	2%	3%
Piemonte	10%	12%	9%	8%	13%
Puglia	1%	2%	2%	0%	0%
Sicily	0%	1%	1%	0%	0%
Tuscany	6%	8%	8%	8%	4%
Trentino	1%	0%	0%	4%	0%
Umbria	0%	2%	2%	2%	1%
Veneto	12%	12%	8%	14%	9%
Calabria	0%	1%	0%	0%	0%
Molise	0%	0%	0%	0%	0%
Sardinia	0%	0%	1%	4%	0%
Italy	100,00%	100,00%	100,00%	100,00%	100,00%

Source: Based on data **PEM Observator**

Table 4: The Private Equity in Regions of Technology Districts

Number of Observations = 355
 Investigated Banks = 71
 R^2 : within estimator = 0.3931
 R^2 : between estimator = 0.0011
 R^2 OLS estimator = 0.0674
 $F(16,268) = 10.85$ Prob > F = 0.0000

PROFITABILITY: DEPENDENT VARIABLE			
<i>Explanatory Variables</i>	<i>Estimates (β)</i>	<i>Standard Error</i>	<i>t-ratio</i>
TDRS _{Romagna}	-.0024776**	.0011461	-2.16
TDRS _{Lombardy}	-.0021535**	.0005541	-3.89
TDRS _{Piedmont}	.0020658	.0012354	1.67
TDRS _{Veneto}	.0000291	.0006221	0.05
TCRS _{Romagna}	-.0031443	.017865	-0.18
TCRS _{Lombardy}	.0327432**	.0158114	2.07
TCRS _{Piedmont}	.018349**	.0045764	4.01
TCRS _{Veneto}	.0428178	.0219142	1.95
CFRS _{Romagna}	.0075852**	.0020401	3.72
CFRS _{Lombardy}	-.0012612**	.0006273	-2.01
CFRS _{Piedmont}	.0286654**	.0083221	3.44
CFRS _{Veneto}	-.0057621**	.0024579	-2.34
DRS _{Romagna}	-.4008466	.5214546	-0.77
DRS _{Lombardy}	1.844903**	.3346828	5.51
DRS _{Piedmont}	-.0011445	.0023021	-0.50
DRS _{Veneto}	.5601624	.9866148	0.57
Costante	.7300348	.0078625	92.85

$F(70,268) = 5.52$ Prob > F = 0.0000

** The estimates are significant at a confidence level α of 5%

Table 5: Cooperative Credit Structure in Piedmont

	Banks Considered	Banks Not Considered	Total banks	Degree of representativeness
Balance sheet and Economic Aggregates	(a)	(b)	(c) =(a)+(b)	(a)/(c)%
Loans to customers	3.249.109.556	720.485.673	3.969.595.229	81,85%
Direct deposits	3.634.542.304	815.800.588	4.450.342.892	81,67%
Total Active	4.253.088.802	1.028.048.412	8.419.938.121	50,51%
Equity	313.732.341	48.613.451	362.345.792	86,58%
Profit	9.333.786	1.275.159	10.608.945	87,98%
Heritage	323.066.127	49.888.610	372.954.737	86,62%
Branches	118	18	136	86,76%

Table 6: Cooperative Credit Structure in Lombardy

	Banks Considered	Banks Not Considered	Total banks	Degree of representativeness
Balance sheet and Economic Aggregates	(a)	(b)	(c) =(a)+(b)	(a)/(c)%
Loans to customers	20.925.546.336	3.423.666.327	24.349.212.663	85,94%
Direct deposits	23.846.341.949	3.274.920.470	27.121.262.419	87,92%
Total Active	28.718.647.938	4.712.388.747	51.470.475.082	55,80%
Equity	3.236.417.469	534.791.712	3.771.209.181	85,82%
Profit	58.795.563	11.886.971	70.682.534	83,18%
Heritage	3.295.213.032	546.678.683	3.841.891.715	85,77%
Branches	671	112	783	85,69%

Table 7: Cooperative Credit Structure in Veneto

	Banks Considered	Banks Not Considered	Total banks	Degree of representativeness
Balance sheet and Economic Aggregates	(a)	(b)	(c) =(a)+(b)	(a)/(c)%
Loans to customers	13.722.173.525	6.596.200.277	20.318.373.802	67,54%
Direct deposits	13.892.504.892	6.532.420.540	20.424.925.432	68,02%
Total Active	15.875.639.382	7.999.704.746	23.875.344.128	66,49%
Equity	1.515.822.872	782.992.119	2.298.814.991	65,94%
Profit	-13.927.424	8.251.859	-5.675.565	245,39%
Heritage	1.501.895.448	791.243.978	2.293.139.426	65,50%
Branches	362	222	584	61,98%

Table 8: Cooperative Credit Structure in Emilia Romagna

	Banks Considered	Banks Not Considered	Total banks	Degree of representativeness
Balance sheet and Economic Aggregates	(a)	(b)	(c) =(a)+(b)	(a)/(c)%
Loans to customers	9.949.526.307	655.659.247	10.605.185.554	93,82%
Direct deposits	10.336.416.164	1.336.035.373	11.672.451.537	88,55%
Total Active	12.615.073.327	1.627.387.857	14.242.461.184	88,57%
Equity	1.275.990.249	87.022.789	1.363.013.038	93,62%
Profit	47.895.318	1.573.345	49.468.663	96,82%
Heritage	1.323.885.567	88.596.134	1.412.481.701	93,73%
Branches	247	31	278	88,84%