Why do acquiring banks in mergers concentrate in well developed areas? Regional development and M&As in banking

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Abstract

We focus on all M&A transactions of regional relevance occurred in the Italian banking sector between 1995 and 2006, finding a strong direct effect of regional economic and social characteristics on the concentration of the banking industry in Italy, and on the agglomeration of acquiring banks

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in well developed regions. This effect survives to a number of robustness checks, including controls for banks' profitability and efficiency, and for their institutional characteristics, indicated by the banking literature as the key factors driving concentration in banking. We also investigate possible theoretical explanations supporting our empirical findings, and discuss their policy implications.

Keywords: banking M&As, regional economic and social conditions, profitability.

JEL codes: R12, G21, G34

1 Introduction

The banking industries of several countries have undergone an unprecedented process of consolidation through M&As, starting in the Eighties in the USA and in the Nineties in most western European countries. Well known consequences of this process have been a reduction in the total number of banks and an increase in their average size. A less emphasized but nonetheless striking feature is the *unequal* geographic distribution of the observed consolidation. The number of banks headquartered in socially and economically underdeveloped areas has substantially *decreased*, while the average size and geographic network of the banks headquartered in well developed areas has *increased*. An extensive literature has investigated the cross-country empirical evidence on the geographic dimension of

banking consolidation. For instance, GROS (2004) reports that in 2001 the share of foreign banks in all Central-Eastern European markets accounted for more than half of the deposits, and up to two-thirds in some of the larger countries (such as Poland, Hungary, the Czech Republic). Along the same lines, focusing on a sample of East European and Baltic countries, NAABORG *et al.* (2003) show that in 2000 foreign banks' assets accounted on average for 64.4% of total banks' assets (starting from 7.5% in 1994). More precisely, in Estonia foreign banks' assets represented 97% of the total (from 2% in 1995); the same ratio was 87% in Croatia (from 1% in 1996), 69% in Poland (from 3% in 1994), and 67% in Hungary (from 14% in 1994). A similar pattern has been observed in Latin American banking markets. DE HAAS and VAN LELYVELD (2002) report that, in 1999, 36% of total loans in Brazil were originated by foreign banks from economically more advanced areas like the U.S.A., or Europe. This percentage reached 58% in Argentina.

The marked geographic characterization of banking consolidation is not specific to cross-country M&As only but it extends to *cross-regional* M&As within countries as well, as noted by, e.g., RODRÍGUEZ-POSE and ZADEMACH (2006). The concentration of the Italian banking industry in the last two decades, which we study in the present paper, is a notable instance of this process at the regional level. It is well known that Italy is characterized by well developed and wealthy Northern regions and by a far less developed South, both in an economic and in a social perspective (e.g., GUISO et al., 2004a and 2004b; DE BLASIO and

NUZZO, 2009). Since the early Nineties, many banks in the South of the country have been taken over by banks headquartered in Central-Northern regions (70 out of 79 in our sample). According to the Bank of Italy, during the Nineties the number of banks headquartered in the South diminished by more than one half, and approximately two-thirds of the loans originated in the South are from Northern banks.

Our analysis focuses specifically on the consolidation of the banking industry in Italy at the *regional* (NUTS 2) level since the mid-Nineties. We investigate empirically the determinants of the concentration of acquiring (target) banks involved in M&A deals in the more (less) developed areas of the country. Combining the regional pattern of the M&As observed in Italy with the widespread and persistent differences in social and economic conditions of Italian regions, we test whether the socio-economic characteristics of regional economies (i.e., the 'quality' of the business environment) play a major role in banking concentration, affecting both the size and the direction of the consolidation process and explaining the observed agglomeration of banks. In particular, we check whether there exists a direct effect of the 'quality' of the business environment on banking concentration, adding to the indirect one working through bank-level variables, such as profitability and efficiency, emphasized by the banking literature.

Our econometric analysis is based on an original dataset containing information at the regional level on all the M&As occurred in the Italian banking industry from 1995 to 2006, plus variables proxying for local (i.e., regional -

NUTS 2) economic and social conditions, banks' profitability and efficiency, and the institutional structure of local banking markets. We first study the probability to observe an active bank (i.e., the acquiring bank in a M&A) in the banking consolidation process using standard probit models, and we then explore the determinants of the number of active banks involved in M&As by means of count data models.[1] Our results document a positive and strong direct effect of economic and social development indicators on the probability of observing acquiring banks concentrating in a given region. Moreover, in line with the traditional banking literature, we also find that the institutional characteristics of banks, as well as their market power, profitability and efficiency matter for consolidation. All results are robust to different econometric specifications, and they are not simply influenced by the marked North-South divide.

The paper is organized as follows. In Section 2 we provide the theoretical background for our empirical analysis, and in Section 3 we present our econometric modeling strategy. In Section 4 we illustrate our data and variables, while in Section 5 we discuss our main results and investigate their policy implications. Section 6 concludes and outlines avenues for future research.

2 Theoretical background

In a theoretical perspective, the implications of regional socio-economic conditions for the functioning and the evolution of financial markets, and in particular for

the behavior of banks, are very different depending on the specific framework considered. It is well known from textbook finance that fully rational profit maximizing agents choose among alternative investment opportunities based on their net present value. Under the assumptions of perfectly competitive markets (which imply free entry, perfect information, and absence of both transaction and agency costs), a first best allocation can always be achieved and there can not be misallocation of loanable funds. In this setup, agents' choices are by definition space neutral and geography can only play an indirect role, as noted, e.g., by KLAGGE and MARTIN (2005). A large part of the banking literature maintains that the M&A processes behind banking consolidation are essentially driven by banks' profitability and efficiency. Economic and social characteristics of local economies are usually taken to play an indirect role, through their implications for banks' profitability and efficiency. The expansionary choices of banks are mainly driven by profit opportunities, which in turn tend to be larger where the expected rate of economic growth is higher and where the efficiency of the banking system is lower (e.g., FOCARELLI and POZZOLO, 2005, focusing on the patterns of expansion of a sample of large OECD banks in foreign markets). Additionally, banks in rich areas are on average more profitable and better performing than those in less developed areas (e.g., GODDARD *et al.*, 2004), so that they have more resources to finance the acquisition of other credit institutions.[2]

This literature notwithstanding, different implications arise when explicitly accounting for the relevance of market imperfections such as asymmetric infor-

mation, uncertainty, agency and transaction costs. In this perspective, as emphasized by, e.g., GÄRTNER (2009) and KLAGGE and MARTIN (2005), the spatial structure of the financial system and, in particular, the distribution of financial intermediaries become important. Overall, this literature suggests that the differences in social and economic conditions, hence in the degree of regional economic development, may have a direct and quantitatively relevant effect on the financial system.

It is therefore natural to ask whether, and to what extent, banking consolidation is influenced by spatial considerations. In an economic perspective, there are at least two channels through which regional socio-economic characteristics may be important in this respect. The first relies on the indirect effect of regional conditions on banks' profitability and efficiency already discussed above. The second – that establishes a direct link – hinges upon the effects of different socio-economic environments on the incentives of banks to grow through consolidation. There are several reasons why banks located in socially and economically richer areas may be more likely to expand their activities through M&As than banks headquartered in poorer regions. In particular, a locational driver of the M&A process in banking, which we will further explore when discussing the results of our econometric exercises, deals with the size of non-financial firms. Regions characterized by better socio-economic conditions (in terms of GDP per capita, social capital, or the level of entrepreneurship), are typically also characterized by a larger actual (or potential) market size, and by larger non-financial firms (e.g.,

GLAESER *et al.*, 2010). As large firms tend to do business with large banks – that are better equipped both in terms of resources and of managerial/organizational skills than small credit institutions to deal with big corporations – the likelihood of observing M&As between banks should be larger in these regions. The empirical literature has indeed highlighted the existence of strong direct relationships between local economic conditions and the size of both financial and non-financial firms (KUMAR *et al.,* 1999, and BECK *et al.,* 2005), as well as between the size of banks and that of the non-financial firms with which they trade (see, e.g., PEEK and ROSENGREN, 1998). Furthermore, size effects of this type may be reinforced by additional strategic effects, inducing banks to expand in order to increase their market shares and prevent entry.

Although the economic explanation above highlights relevant aspects of banking concentration, additional and more refined insights on the relations between regional socio-economic conditions and the locational drivers of M&As in banking (as well as on banks' performances) are gained by looking at a growing, and to a large extent recent, literature that has developed in neighboring fields. Regional scientists, in particular, have systematically investigated the role of geographical factors in explaining M&As, and their impact on economic decision-making. For instance, RODRÍGUEZ-POSE and ZADEMACH (2006: p. 297) stress that - besides their economic implications - M&As have "profound contextual and socio-institutionals implications and are by no means an aspatial phenomenon". Several forces may guide M&As processes, ranging from economies

of proximity and agglomeration to the degree of metropolitan interconnectivity, the concentration of economic decision making in agglomerations, and the role of geographical distance. Investigating M&As in ten industries in Germany during the Nineties, RODRÍGUEZ-POSE and ZADEMACH (2006) find that firms' size and agglomeration are increasingly substituting geographical distance as the determinant factors behind M&As. The concentration of economic decision making is most evident in the financial sector, and especially in banking, where the role played by economies of agglomeration and proximity is particularly relevant. These economies may allow firms to benefit from (and at the same time to favor) larger markets, a vast range of other business activities, better infrastructures, more qualified labor and education, and – even more important – broader social interactions.[3] All these factors lie at the core of the so-called 'competence-based approach', which is helpful in explaining both the functioning and the evolution of banking industries. Differently from more traditional spatial development theories, this approach relates the spatial distribution of firms to the specific forms and intensity of social interactions in specific areas (e.g., GÄRTNER, 2009). In particular, the often used notion of 'innovative milieu' stresses the importance of networks of relations as one of the key competitive advantages of a given geographical area (e.g., CREVOISIER, 2004). In this perspective, the social characteristics of a given area, representing a cultural trait of the local economy, are likely to be important drivers of the consolidation process in banking. Therefore, based on this literature, banks located in regions rich in 'social capital' are expected to be

active players in the consolidation of the banking industry. However, testing this claim is not an easy task since, as we argue later in the paper, measuring properly social interactions poses serious operalization problems for any econometric analysis.

3 The modeling strategy

The theoretical discussion in the previous section makes clear that, although profitability and efficiency are undeniably major determinants of consolidation in banking, they do not tell the entire story. As highlighted above, a vast literature has emphasized that the socio-economic dimensions of regional economies play an important (direct) role in shaping industry dynamics; especially so for banking. Hence, understanding banking consolidation requires a broader approach than the one traditionally pursued in the banking literature; one that allows to properly account also for the geographic dimension of the concentration process.

In accordance with this view, the main goal of our econometric analysis is to assess the *direct* impact of local economic and social conditions on the characteristics and patterns of the consolidation process of the Italian banking industry, and in particular on the observed regional agglomeration of acquiring (and target) banks involved in M&As, controlling explicitly for a variety of bank-level variables, such as profitability and efficiency.

Methodology. Two approaches may be used to disentangle explicitly the direct

effects of macroeconomic and social variables from their indirect effects working through banks' profitability and efficiency: the first based on firm-level data, and the second on aggregate data. The first approach, traditionally used in the banking literature, asks whether two banks located in regions with different social and economic characteristics, but otherwise similar, have different propensities to acquire a competitor. This approach is problematic in a modeling perspective, since an analysis at the bank level would suffer from a serious identification problem of the relevant impacts. In particular, as suggested by FRIODOLFSSON and STENNEK (2005), M&As necessarily determine a change in market conditions by affecting, on the one hand, the performance of the banks involved and, on the other hand, the performance of their competitors in the market. Therefore, in order to assess the relevance of both the direct and the indirect effects, we follow the second approach that – by focusing on variables measured at the *regional* level – allows us to solve the identification problem outlined above by averaging banks' performance measures at the regional level. This amounts by definition to internalize the external effect of M&As on *all* competitors. By means of this alternative approach, we compare two otherwise similar regional banking industries (in terms of banks' average profitability, efficiency and size) to understand whether differences in local economic and social development are able to generate a different number of M&As.

The general equation to be estimated can be written as

$$\Pr(AB_r) = f_1(\mathbf{X}_{1r}, \mathbf{X}_{2r}, \mathbf{Z}_r) + \epsilon, \tag{1}$$

where AB denotes the number of acquiring banks involved in M&As in region r; $\mathbf{X}_1$ is a vector of variables describing the characteristics of local economies along both economic and social dimensions; $\mathbf{X}_2$ are proxies of the (average) profitability and efficiency of regional banks; $\mathbf{Z}$ is a vector of controls accounting for the specific institutional and market characteristics of local banking markets, such as the organizational 'types' of banks (e.g., cooperative and stock-owned) and of the degree of market concentration; ϵ is a disturbance term.

Model (1) allows us to investigate whether the impact of local socio-economic characteristics on the dependent variable AB is completely absorbed by the indirect effect working through $\mathbf{X}_2$, or there is a 'pure' direct effect of $\mathbf{X}_1$ once controlling for banks' profitability and efficiency.[4]

The choice of the econometric model. We first focus on the determinants of the probability to observe an acquiring bank by estimating the probit model

$$\Pr(AB_{it} = 1|\mathbf{X}_1, \mathbf{X}_2, \mathbf{Z}, \mathbf{Y}, \mathbf{Q}, \mathbf{R}) = \Phi\left[(\boldsymbol{\beta}_1'\mathbf{X}_{1it} + \boldsymbol{\beta}_2'\mathbf{X}_{2it} + \boldsymbol{\beta}_3'\mathbf{Z}_{it} + \boldsymbol{\gamma}'\mathbf{Y}_{it} + \boldsymbol{\delta}'\mathbf{Q}_{it} + \boldsymbol{\lambda}'\mathbf{R}_{it})\right], \tag{2}$$

where $i = 1, \ldots, 20$ is an index for regions; $t = 1, \ldots, 24$ is an index for quarters; the dependent variable $\Pr(AB_{it} = 1)$ is a dummy variable assuming value one

when at least one acquiring bank in region i at time t is observed and zero otherwise; Φ is the c.d.f. of the standard normal distribution; $\mathbf{X}_1$, $\mathbf{X}_2$ and $\mathbf{Z}$ are the vectors of geographical determinants introduced above; $\mathbf{Y}$, $\mathbf{Q}$, and $\mathbf{R}$ denote year, quarter, and geographical dummies, respectively, providing a rough control for fixed effects of time and location. Note that area dummies are added to our econometric specifications in order to capture time invariant geographically relevant effects that are not explicitly accounted for by the indicators of economic and social development at the regional level included in X_1.

The estimates of Equation (2), by controlling for (average) bank-level variables, like profitability and efficiency, provide a test for the relevance of the impact of regional socio-economic characteristics on banking consolidation. We confirm the validity of our estimates by explicitly accounting also for the panel structure of the data. Furthermore, we test the robustness of our results by focusing on different geographical sub-samples and by controlling for the potential endogeneity of banks' profitability and efficiency ($\mathbf{X}_2$) with respect to the institutional characteristics of the banking industry ($\mathbf{Z}$) and local socio-economic conditions ($\mathbf{X}_1$).

Finally, as a further refinement and robustness check, we exploit the information provided by the *number* of active banks in each regional market in addition to the information associated to the *probability* of observing a bank actively involved in a M&A. Given that our data are characterized by overdispersion[5], we do so by using a Zero Inflated Poisson (ZIP) model; i.e., a sequential model in

which a regime choice (selection) model is combined with a count data model. The regime choice model splits all observations in two groups, one in which the phenomenon can not be observed and one in which it can be observed (with the outcome being an integer number ranging from zero to n). Given the choice of the latter regime, the count data model explains the number of occurrences by means of a Poisson distribution. Formally, a zero outcome can be the result of one of two alternative regimes indexed by z: one in which the outcome is always zero ($z = 0$), and one in which the outcome $AB = 0$ obtains as a random draw from a Poisson distribution ($z = 1$). In the former case, the outcome zero describes a structural phenomenon; in the latter, it is a result of the sampling distribution. The probability of regime $z = 0$ occurring is modeled as a standard probit. Given regime $z = 1$, the probability of $AB_{it} = n$ follows a Poisson distribution with parameter λ. The general model can thus be written as

$$\Pr[z_{it} = 0] = f(\mathbf{w}, \boldsymbol{\gamma}), \tag{3}$$

$$\Pr[AB_{it} = n > 0 | z_{it} = 1] = \frac{e^{-\lambda(\mathbf{x},\boldsymbol{\beta})}\lambda(\mathbf{x}, \boldsymbol{\beta})^n}{n!}, \tag{4}$$

where the selection model (or regime choice model) in Equation (3) is defined by the set of covariates $\mathbf{w}$ and the vector of parameters $\boldsymbol{\gamma}$. The parameter λ characterizing the Poisson regression in Equation (4) is a linear combination of a vector of regressors $\mathbf{x}$ (including time and macro area fixed effects) and parameters $\boldsymbol{\beta}$ to be estimated. As we discuss in more details in Section 5, the identification

of the selection model (3) is based on the same groups of covariates and dummies used in the Probit specifications of Equation (2). As for the Poisson regression (4), we consider instead a lagged structure aimed at capturing the wave-like behavior of M&A processes found in the literature.[6]

4 Data

Our empirical analysis is based on a dataset relative to the consolidation of the Italian banking industry built for this paper purposes, using the information on mergers and acquisitions reported by the Italian Antitrust Authority (AGCM). Being built on the AGCM records, our dataset is a comprehensive one. In fact, over the entire period covered by our study, the Italian Competition Law required the AGCM either to support the Central Bank in the evaluation of, or to directly evaluate (since 2005) *all* M&As taking place in the banking sector. Our sample covers the period 1995-2006 and it includes all Italian banks active in M&As, classified on a regional basis, with each bank assigned to the region where it is headquartered.[7] Most of the consolidation process of the Italian banking industry took place in the period covered by our sample: the total number of M&As peaked in 1995 and remained at a high level until 1999, to start dropping from 2000 onwards. The concentration of acquiring banks reported in the introduction is confirmed by the geographical distribution of acquiring and target banks in our data: most of the acquiring banks are headquartered in the Northern regions of

the country, while targets seem to be more uniformly distributed (see Table 1).

[INSERT TABLE 1 ABOUT HERE]

Table 2 illustrates the conditional distribution of the dependent variable controlling for geographical location. Again, the (conditional) probability of observing an active bank in a given area decreases significantly moving from Northern to Southern regions.

[INSERT TABLE 2 ABOUT HERE]

The definitions and descriptive statistics of all the covariates discussed in the next sections, and used in our econometric models are summarized in Appendix Table 1.

4.1 The socio-economic characteristics of regional economies

Given the many dimensions according to which the degree of economic and social development at the regional level can be evaluated, we rely on a variety of indicators. As we discuss in details below, while economic characteristics are usually fairly easy to measure, social characteristics can often be identified by means of somewhat loose proxies only.

The main variable to characterize economic conditions is obviously the level of GDP (in per-capita terms), which is a standard measure of residents' personal income – and a widely used proxy of wealth, health, and education. To identify

the characteristics of local labor markets, we focus on unemployment rates at the regional level, and in particular on the long-duration unemployment rate (LUR) and on the youth unemployment rate (YUR). Finally, we use the number of bankruptcies (BKR) and that of dishonored bills and checks (DBC), as well as the net growth rate of the number of firms ($FIRMS$), to proxy for the business cycle at the local level.

Other indicators provide information on the quality of the local environment along 'social' dimensions. In particular, we rely on measures of altruism and civicness considered in previous studies (e.g., GUISO *et al.*, 2004b), such as the number of blood donors (BD), money giving to nonprofit organizations (MG), time giving to voluntary organizations ($TGVO$), and social participation (SPI). Furthermore, we focus on the rate of violent crimes (such as murders, robberies, or kidnapping) observed in a given area (VCI) as an additional 'measure' of the social climate at the local level. Admittedly, these indicators provide only rough controls for the complex contextual and social underpinnings of economic decisions and financial relations. More precise and detailed measures are needed to properly account for, e.g., the role of trust, reputation, personal networks, and cognitive distance or proximity, the importance of which has been investigated by the financial geography literature.[8] However, as already noted, the lack of data and the difficulties in constructing appropriate indicators for these factors force us to rely on measures that are able to capture these relevant phenomena in a rather crude way only.

Despite their shortcomings, taken together, all the variables proxying for the social characteristics of local economies used here can actually be considered as proxies of the level of 'social capital' characterizing a given region (see, e.g., PALDAM, 2000; DURLAUF and FAFCHAMPS, 2005), which is often found to have a positive impact on economic growth (e.g., KNACK and KEEFER, 1997) as well as on bank efficiency (PASTOR and TORTOSA-AUSINA, 2008). Not surprisingly, all these variables are highly correlated with per-capita GDP, so that their inclusion in a regression analysis would generate a multicollinearity problem. An higher GDP per-capita is in fact associated with lower unemployment rates, with higher rates of volunteering and philanthropy, higher social participation, lower crime rates, and stronger entrepreneurial activity (see, e.g., LEE *et al.*, 2004; AUDRETSCH and FRITSCH, 2002; GAROFOLI, 1994; GUISO *et al.*, 2004b). In order to appropriately account for this issue, we perform a Principal Component Analysis (PCA) allowing us to identify a set of (latent) factors underlying the local development indicators X_1. The number of latent factors selected by the PCA has been determined by dropping all components with eigenvalues less than one. Two 'composite' factors – which we label $F1$ and $F2$ – satisfy this criterion and are included in all our econometric exercises. The cumulative variance explained by the retained factors is 80.51%, which accounts for the major part of the contribution of the underlying variables. It is worth noting that the variables $FIRMS$ and VCI have been excluded from the PCA, as their inclusion would generate two additional latent factors, essentially capturing only the impact of

the two variables themselves that turn out to be very little correlated with factors $F1$ and $F2$. Therefore, $FIRMS$ and VCI have been directly included in our estimates.

The contribution of the underlying variables discussed above to the two latent factors identified with the PCA is highlighted in Table 3. As for $F1$, one can notice the positive contribution of GDP and of all the variables measuring civicness, as well as the negative contribution exercised by the two unemployment rates, by the number of bankruptcies and by that of dishonored bills and checks. As for $F2$, the table highlights a positive and significant contribution of the number of bankruptcies and of dishonored bills and checks.

[INSERT TABLE 3 ABOUT HERE]

$F1$ is then a key indicator to assess the effects of the degree of local development for banking consolidation. *Ceteris paribus*, a positive and statistically significant coefficient of $F1$ provides strong empirical support to the existence of an important 'direct' effect of local economic and social conditions on banking consolidation, which in our view lies at the root of the observed geographic agglomeration of the banks involved in M&As. A similar message, although a more indirect one, is conveyed by a negative sign of $F2$, which is essentially an indicator of the financial difficulties experienced by firms in a given regional economy. Similar considerations apply to $FIRMS$ and VCI, for which we expect a positive and a negative sign respectively.

Finally, we include among the controls for the local business environment the number of banks operating in a given region (NB), to account for the likely importance of 'size' effects in determining the presence of acquiring banks at the local level. We obviously expect the probability of observing an acquiring bank in a M&A to be positively correlated with the number of banks present in a given area at each point in time. Note that NB may also be taken as summarizing the process of entry and exit of banks over time in a local market, which allows us to control for the dynamics of the number of banks due to factors other than M&As. We also interact NB with the two composite factors $F1$ and $F2$ in order to explore the hypothesis of a stronger impact of the quality of the regional business environment the higher is the number of banks operating in a given area.

4.2 Banks' profitability and efficiency

In order to guarantee that local economic and social conditions do not capture also the effects of the profitability and efficiency of regional banking industries on M&As (i.e., to disentangle the direct effect of regional development), we consider different (regional averages of) bank-level variables, proxying for banks' margins, the quality of credit, and intermediation policies. All measures are constructed by taking into account only the data relative to the bank branches operating in the specific region considered.

As for banks' margins, we focus on three standard and interconnected indicators of profitability in the 'traditional' intermediation activities of banks –

$SPREAD$, $MKUP$, and $MKDWN$ – that are informative also about the degree of efficiency in a local market. In particular, as far as an increase in the level of competition reduces profits (and improves efficiency) in a given market , a reduction in the difference between the average market rate on loans and the average market rate on deposits ($SPREAD$) may indicate an improved competitive environment.[9] We expect the probability to observe an acquiring bank in a M&A deal being negatively correlated to $SPREAD$, because an higher degree of market power determines less favorable conditions for the occurrence of a M&A, and an higher profitability reduces the incentives of banks to embark in a consolidation deal.

To account for the quality of *credit policies* at the local level, we control for the percentage of bad loans out of total loans (the variable BAD). *Ceteris paribus*, we expect BAD to decrease as the efficiency in discriminating among potential borrowers increases. Since the quality of credit policies could be better measured by the flow of *new* bad loans rather than by the stock of bad loans, we also consider the growth rate of the share of bad loans out of total loans ($dBAD$). By signaling a deterioration of the quality of credit policies at the local level, BAD (as well as $dBAD$) is expected to be negatively correlated to the probability of observing a M&A.

Finally, we measure the difference between per capita loans and deposits within a region, $DIFF$, as a synthetic indicator of banks' *intermediation policies* and as a proxy of the financial depth – and hence of the level of development

– of local banking markets.[10] The expected *ceteris paribus* impact of $DIFF$ on banking consolidation is not clear *a priori*, as there are potentially relevant effects pointing in opposite directions. On the one hand, an excess of loans over deposits ($DIFF > 0$) may induce banks to consider a M&A as a way to raise additional funds. On the other hand, however, banks operating in regions where a shortage of funds is experienced may be in a worse position to get actively involved in a M&A. Conversely, banks operating in areas characterized by larger deposits than loans ($DIFF < 0$) – or where $DIFF$ although positive remains very small – may have in principle more financial resources to be used in a merger or acquisition, but they may be constrained in doing so along several other dimensions (such as their size and efficiency, or the quality of their management). The interplays among opposite forces like those just described render difficult to form strong ex ante expectations about the sign and relevance of $DIFF$.

4.3 The structural and institutional features of the banking industry

We complete our econometric specification by controlling for the institutional and market structure characteristics of local banking markets. As an indicator of the degree of market concentration we focus on the Herfindhal index ($HERF$) computed with respect to the number of bank branches, which is a commonly adopted measure in the (applied) industrial organization literature. The use of

this indicator is consistent with the standard structuralist approach, according to which a higher market concentration implies a lower level of competition and, in turn, a higher level of profits and a lower level of economic efficiency.

As for the institutional characteristics of local banking markets, we control for the different categories of banks in each regional industry in terms of their ownership structure and of the extent of their markets. In particular, we take into account the share of bank branches owned by cooperative institutions (the so called *Banche di Credito Cooperativo*) through the variable $COOP$. These banks, often located in rural areas, specialize in lending to small firms (e.g., ANGELINI *et al.*, 1998) and are characterized by specific statutory clauses that constrain their probability of being involved in a merger or acquisition. Therefore, we expect $COOP$ to be negatively correlated with the probability of observing a M&A. We also control for the share of branches within a region owned by banks with regional networks (REG). As regional banks are those that may benefit the most from extending their networks by achieving efficiency gains and scope economies, we expect *ceteris paribus* a positive effect of REG on the probability of observing a M&A.

5 The empirical analysis: results

5.1 Probit models

The estimates of Equation (2) are shown in Table 4, reporting our baseline specifications, in which we sequentially augment the model in Column I with additional covariates. The models included in Tables 5 and 6 are robustness checks of the baseline analysis.

[INSERT TABLE 4 ABOUT HERE]

Model I in Table 4 focuses on the impact of the degree of economic and social development on the probability of observing a M&A. The marginal effects of the two factors obtained from the PCA ($F1$ and $F2$), firm dynamics ($FIRMS$), and the index of violent crimes (VCI) all have the expected signs and are statistically significant, confirming the importance of local socio-economic characteristics for the observed pattern of banking consolidation.[11] Acquiring banks in M&A deals tend to concentrate in regions characterized by a good economic and social environment. Furthermore, there is a relevant size effect, captured by the strong significance of the number of banks (NB) in regional markets, which is also shown to interact with economic and social conditions.

In order to understand whether the effects outlined above are important *per se*, or whether they play only an indirect role influencing variables such as profitability and efficiency, we further augment our econometric specifications with a set of

controls for the structural characteristics of the banking industry. In Model II of Table 4 we explicitly account for the institutional features (by including $COOP$ and REG), as well as for the degree of competitiveness (by including $HERF$) of the banking industry at the regional level. The marginal effects of all these variables are statistically significant and of the expected sign: the probability of observing a M&A decreases with industry concentration and with the share of cooperative banks, and it increases with the share of regional banks. More importantly, after controlling for these additional covariates, local economic and social conditions still matter, which provides empirical support to the view that they have a significant direct effect.

This result is further confirmed when adding to Model I our main indicators of banks' profitability and efficiency: $SPREAD$, $DIFF$, and BAD (see Model III in Table 4). The marginal effects of all the variables measuring local economic development and proxying for social capital are unaffected. Among the proxies for banks' performance, only $SPREAD$ appears to be statistically significant and with a negative sign, suggesting that acquiring banks are located where rents are lower (and competitive conditions are presumably fiercer). However, when including (Model IV) in the same regression local economic and social indicators, banks' institutional and market characteristics, and banks' profitability and efficiency measures, the latter group of variables never appears to be statistically significant at the usual confidence levels. The same holds true when substituting BAD for $dBAD$ (Model V) and when splitting both $SPREAD$ and $DIFF$ in

their components (Model VI). This finding suggests that the impact of proxies for banks' performance may be captured by other variables included in the model, and in particular by the institutional characteristics of the banking industry. This conjecture is consistent with the literature showing that the institutional characteristics of banks – like the ownership structure, or the geographic extent of bank activity – affect both their profitability and efficiency (see, e.g., RASMUSEN, 1988, and ALTUNBAS *et al.,* 2001).

We further test the correlation between the institutional variables and those summarizing the intermediation activities of banks by removing the stochastic components of the intermediation variables. To do so, we run auxiliary regressions exploiting the panel structure of the data, and we then use the fitted values from these ancillary regressions instead of the actual values (Table 5, Models I-III). In particular, Model I in Table 5 includes the fitted values of $SPREAD$, $DIFF$ and BAD obtained from an ancillary regression on institutional and market structure variables (i.e., $COOP$, REG, and $HERF$) as well as on year, quarter and area dummies. In Model II, we further augment the specification of the auxiliary regression, by adding to the specification of Model I also proxies for the quality of the local business environment ($F1$, $F2$, $FIRMS$ and VCI) as additional determinants of the intermediation variables.[12] Both probit specifications are consistent with the results of the previous models, confirming the key role of local economic and social conditions in addition to that of market power and profitability and of the institutional characteristics of the banking industry

at the local level. We also account for the potential joint correlation among the error terms of equations for $SPREAD$, $DIFF$ and BAD by using the Seemingly Unrelated Regression (SURE) technique to compute the fitted values of the variables describing banks' performance. Again, the results obtained from the probit model embedding fitted values from the SURE specification, reported in Model III of Table 5, confirm our previous findings.

The last two models in Table 5 focus on the same specification of Model IV in Table 4, but for the exclusion of Southern regions (Model IV), and of both Southern and Center regions (Model V). Although all specifications include a rough control for the unobserved factors characterizing local markets by means of area dummy variables, these models allow us to check explicitly whether our results are driven at least to some extent by the wide differences in terms of local economic and social development characterizing Italian regions. All our results on the role of the local environment – as well as on the structural features of the banking industry – remain unchanged when allowing for these further controls.

One possible criticism to the exercises presented above is that they do not fully exploit the panel structure of the data. Therefore, to further check the consistency of our results, we collect in Table 6 our estimates for random effects panel probit models, replicating all the models included in Table 5. All results are fully consistent with those of the pooled cross-section probit specifications discussed above, confirming all our claims.[13]

[INSERT TABLE 5 AND 6 ABOUT HERE]

5.2 Count data models

As the number of M&As is highly concentrated in a subset of regions, it is worth to further investigate the robustness of the conclusions reached with the probit models illustrated above by testing the relationship between our regressors and the *number* of banks involved in M&As by means of count data models, and more precisely Zero Inflated Poisson (ZIP) models. The choice of a model that accounts for overdispersion is confirmed through the computation of the Vuong statistics (see, e.g., CAMERON and TRIVEDI, 1998). As already discussed in Section 3, these models require to identify and separate the set of regressors playing a role as determinants of a *regime* in which M&As can not occur, and those accounting for the *number* of banks eventually observed given a regime in which M&As can take place.

Consistently with our probit specifications, we model the possibility of a M&A occurring (i.e., the selection model) by means of the same set of covariates used in our previous analysis. Qualitatively, all the results emerging from our estimates of the selection equation (see Table 7) are consistent with those obtained with probit models, confirming again the key role of the degree of economic and social development at the regional level even when controlling for industry characteristics.[14]

[INSERT TABLE 7 ABOUT HERE]

In order to identify the determinants of the number of M&As given the regime choice, we follow the approach proposed by BARKOULAS *et al.* (2001), who show that consolidation processes often present a wave-like structure that can be captured econometrically by means of lagged specifications. To roughly account for a time-dependent structure in our context, we identify the Poisson component of the ZIP model by using up to three lags of the dependent variable as covariates.[15] The results we obtain are consistent with BARKOULAS *et al.* (2001), confirming the time dependency of the consolidation process in banking. More precisely, a unit increase in the number of M&As in a given period has a positive impact on the number of M&As in the next period (of about 0.2), rapidly decaying in subsequent periods.

The main claim of the paper – namely that the quality of the business environment matters beyond profitability and efficiency to explain the probability of observing an acquiring bank in M&As (i.e., the selection model) – remains valid, while the observed number of M&As appears to be explained essentially by a 'diffusion' process, possibly driven by the existence of strategic interactions among banks at the local level.

5.3 Discussion and policy implications

The results of all our econometric specifications lend support to a strongly significant direct effect of the degree of economic and social development at the regional level on banking consolidation, explaining the observed reduction of the number of banks in the least developed regions, as well as the increase in banks' size and number in the most developed regions of the country. These empirical findings can be rationalized by means of a simple argument linking local development, firms' size and banks' size. There is widespread agreement in the literature that a higher level of development is associated with a larger market size (actual or potential), which in turn tends to be positively correlated with the size of firms. Figure 1, based on the 2001 Census data, supports this conclusion for Italian regions, showing the existence of a strong positive relationship between GDP per-capita (as a proxy for market size) and the average size of non-financial firms (measured, as suggested in CETORELLI (2004), by the ratio between total employment and number of plants).[16]

[INSERT FIGURE 1 ABOUT HERE]

An increase in the actual or potential market size is also expected to have a positive effect on the size of banks, and therefore on the likelihood of observing active banks in M&As. For instance PEEK and ROSENGREN (1998), among others, have found evidence of a positive correlation between the size of firms in the financial sector and that of the non-financial firms with which they trade.

Figure 2, based again on the 2001 Census data, qualitatively (albeit roughly) confirms this finding for Italian regions, showing the existence of a positive relationship between the average size of non-financial firms and that of banks.

[INSERT FIGURE 2 ABOUT HERE]

Moreover, as already noted in Section 2, this size effect may be further reinforced by an additional strategic complementarity effect. Namely, to the extent that the size of non-financial firms *and* that of competing banks at the regional level tend to increase, it may become more likely that a bank chooses to get larger (for example, through M&As) in order to preserve or increase its market share. Note that a strategic effect of this type would be consistent – and could help explaining – the observed wave-like structure of M&As processes. This view is also consistent with that of horizontal mergers having a 'preemptive' nature (i.e., mergers preventing the possibility of a partner merging with a rival), highlighted for example by FRIDOLFSSON and STENNEK (2005).

In the perspective outlined above, the concentration of banks' headquarters would therefore ensue from the existence of favorable local economic and social conditions that, by determining an enlargement of the (actual or potential) market size, induces an increase in firms' size that in turn creates an incentive for banks to expand, possibly also through a concentration process driven by M&As.

Other explanations, not explored in this paper, may complement the one based on 'size matching' outlined above in accounting for the direct effects of

socio-economic characteristics on banking concentration. For instance, it is often argued that M&As (especially those involving banks headquartered in distant areas) may be used by credit institutions as a way to strengthen their funding opportunities. To the extent that passive banks are mainly found in regions characterized by a lower degree of socio-economic development with respect to those where active banks are typically located, acquiring banks may use (part of) the deposits of the acquired banks as an additional, and often times relatively cheap, source of funds to be used in the more developed regions in which they are headquartered.[17] Such deposit draining, when quantitatively relevant, would obviously contribute to exacerbate the differences in development across regions, as suggested, e.g., by KLAGGE and MARTIN (2005) and GÄRTNER (2009). Therefore, insofar the direction of the consolidation process in banking goes from rich to poor areas, it becomes important to investigate whether the concentration of the banking industry works towards reducing or deepening the North-South divide. At least two opposite effects can be at work. On the one hand, banking consolidation is likely to induce efficiency gains and spread better business practices in less developed regions, contributing to improve the aggregate performance of these economies. On the other hand, it may have negative implications for local development, such as the possibility of a deposit drain driven by differentials in the profitability of deposit-taking activities and lending opportunities in different areas of the country – potentially resulting in credit rationing at the local level.

A careful investigation of the relative importance of these effects in different areas is beyond the scope of this paper. In particular, although the geographic pattern of banking consolidation we highlight is consistent with the deposit drain argument, our data and econometric exercises provide no direct evidence about its actual occurrence, or relevance. Nonetheless, both the 'size matching' and the 'deposit drain' explanations we discuss above suggest that the results of our empirical analysis on the locational drivers of banking consolidation may have important implications for the design of regulatory and regional development policies. For instance, the 'size matching' explanation of the direct effect of socio-economic conditions on banking consolidation establishes a clear link between the growth potential of local firms and that of the local banking system, suggesting that development policies at the regional level should aim at guaranteeing that the growth of the real sector goes hand-in-hand with that of the financial sector. Even deeper implications would arise if deposit drain practices were found to be relevant, as suggested, for instance, by ALESSANDRINI et al. (2007). Although these practices may be justified in an efficiency perspective (if, ceteris paribus, the quality of potential borrowers is higher in some regions than in others), policy makers may still argue that policies limiting their extent may be useful in weakening the disparities in regional development. Indeed, there are examples of legislation looking explicitly at the implications of banking consolidation for the credit needs of local communities. A clear instance of this type of regulation is represented by the Community Reinvestment Act passed in the United States of

America in 1977, which subordinates the authorization of a M&A in the banking industry to the existence of evidence that the financial needs of the involved local communities are appropriately taken into account. Somewhat related policies have recently been proposed, notably in the regional finance literature (see, e.g., GÄRTNER, 2009), building on the idea of relationship banking to promote credit to local firms that lies at the core of the activity of specific classes of credit institutions, such as mutual banks.[18] Given their institutional characteristics, the business model of mutual banks is in fact particularly attractive for the least developed regions, where a good knowledge of the local community and well developed personal networks are important in evaluating the creditworthiness of potential borrowers, hence in sustaining the growth prospects of the local economy.

6 Concluding remarks

Based on the investigation of the concentration process occurred in the Italian banking industry since the mid-Nineties, we argue that the economic and social characteristics of local economies have a strong direct effect on banking consolidation. The Italian banking industry provides an ideal case study, given both the wide socio-economic differences between Italian regions, and the marked geographical characterization of the concentration process occurred in Italian banking, with banks headquartered in the well developed Northern regions taking over

banks based in the less developed Southern areas. Using probit and count data (Zero Inflated Poisson) models, we estimate the direct effect of economic and social indicators at the regional level on the probability to observe an active bank in a M&A operation (and on the number of acquiring banks), controlling at the same time for the profitability and the efficiency of local banking markets. Our results are robust to several perturbations of the baseline specifications, controlling in particular for the possible endogeneity of the variables proxying for the intermediation activities of banks.

Our econometric exercises highlight three findings. The first and main result is that, after controlling for the structural features of local banking industries (institutional characteristics, market power, efficiency, and profitability), the level of regional economic and social development has a statistically significant impact on the M&A process. Local socio-economic conditions play a direct role in the explanation of the localization of acquiring banks in M&A deals, adding to the (bank-level) effects on efficiency and profitability traditionally emphasized in the financial literature. The presence of a direct effect is consistent with the view of a consolidation process driven by a 'size matching' effect: a 'favorable' economic and social environment leads to larger markets and larger firms, which encourages the formation of larger banks.

Second, the indicators of the (average) profitability and efficiency of banks appear to be strictly correlated with the institutional features of local banking markets. In particular, the presence of cooperative banks and of banks charac-

terized by a regional network influences the performance of the banking industry evaluated at the regional level. This adds to the evidence in favor of mutual and local institutions being important determinants of banks' aggregate performance, indirectly supporting also the design of development policies centered on this particular types of banks in areas characterized by poor socio-economic conditions.

Third, our ZIP specifications show that the number of M&As follows a time dependent process. This is consistent with the presence of a strategic effect, reinforcing the size effect highlighted above: when the size of competitors increases, a bank has more incentives to engage in preemptive M&As, which may help explaining the 'wave-like' structure often observed in M&As processes.

The links between the 'quality' of the local business environment (the socio-economic characteristics of local economies) and banking consolidation (with the ensuing concentration of banks' headquarters) pose relevant policy questions. As the consolidation process observed in Italy goes from the richer North of the country to the poorer Southern regions, it becomes important to ask whether the concentration of the banking industry works toward reducing or deepening the divide between rich and poor areas in terms of economic performance. A systematic empirical investigation of this issue should be addressed by future research in this area.

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Notes

[1]The analysis presented here is related to COLOMBO and TURATI (2004 and 2008), in which we investigate the determinants of M&As in the Italian banking industry focusing on a shorter time period (1995-2000) and – more importantly – not controlling for regional social characteristics. As a consequence, in these previous papers, we are not able to properly identify the role played by local socio-economic conditions on the consolidation process of the banking industry, which is the main contribution of the present work.

[2]See, e.g., FOCARELLI *et al.* (2002) for an analysis of the Italian case, and BERGER *et al.* (1999) for a comprehensive survey.

[3]All this may contribute to exacerbate the differences in socio-economic development between different geographical areas, in a cumulative process of circular causation (e.g., GÄRTNER, 2009). Not surprisingly, several economists have explored the links between financial development and economic growth (e.g., LEVINE, 1997), and the effects of social capital on financial development and particularly on banks' efficiency (e.g., PASTOR and TORTOSA-AUSINA, 2008).

[4]A conceptually equivalent exercise can obviously be conducted on target banks, obtaining qualitatively identical results. Details are available from the authors upon request.

[5]The vast majority of acquiring banks have been concentrated in a relatively small subset of regions: 70 in Lombardia, 50 in Emilia Romagna, and 43 in Veneto. In all other regions there have been less than 10 active banks over the entire period considered. In some regions (Valle d'Aosta, Trentino Alto Adige, Abruzzo, Molise, Campania, Basilicata, and Calabria) there have been no acquiring banks at all.

[6]See, e.g., BARKOULAS *et al.* (2001). It is worth noting that our results are fully consistent with those that would be obtained by resorting to other count data models, such as the two-stage Heckman selection model. The choice to concentrate on the ZIP model has been taken based on its better empirical performance according to the Akaike Information Criterion. See CAMERON and TRIVEDI (1998) on the use of this criterion for the choice among count data

models.

[7]We exclude from the analysis all intra-group operations and all operations involving banks the activity of which (before the merger or the acquisition) had a national extent, as our focus is on the effects of local economic conditions on banking consolidation. This last limitation concerns however very few operations (only 13) over the sample period, and it bears no impact on our results even though it is certainly relevant in terms of intermediated resources.

[8]Several papers have emphasized the importance of tacit knowledge in informing actions to explain the relevance of proximity (see, e.g., STORPER and VENABLES, 2004, and GERTLER, 2003). As noted by ENGELEN and FAULCONBRIDGE (2009), "learning always involves the development of capabilities that remain tacit and which are developed through complex processes of socialization in everyday human action" (p. 591). Along the same lines, HALL and APPLEYARD (2009) – focusing on investment banks operating in London – show that bankers' practices are influenced by the educational spaces and the communities in which they learn to do finance. Similarly, FAULCONBRIDGE and MUZIO (2009) show that the restructuring of large law firms to enhance their financial performance is influenced by the geographical context and institutional legacies.

[9]A similar argument applies to the measure of average profits in the market for loans ($MKUP$) and to that of average profits in the market for deposits ($MKDWN$), providing more precise information on the degree of competition in the loans and deposits markets, respectively. The traditional mark-up index $MKUP$ is defined as the difference between the average market rate on loans and the average rate on short-term government bonds. Correspondingly, the mark-down index $MKDWN$ represents the difference between the average rate on short-term government bonds and the average market rate on deposits.

[10]We further split the variable $DIFF$ in its components, namely loans ($LOANS$) and deposits (DEP) measured in per capita terms, to explicitly account for the (potentially) different roles of loans and deposits as determinants of banking consolidation.

[11]We find that the coefficient of VCI is negative and statistically significant. Interestingly, GARMAISE and MOSKOVITZ (2006) reach the opposite conclusion, arguing that M&As in banking determine an increase in crime rates by reducing the supply of loans at the local level.

[12]The results of the auxiliary regressions are not reported here for brevity. They are available from the authors.

[13]Note that, although the signs of all variables remain unchanged between the two approaches, the coefficients obtained in the panel specifications are not immediately comparable with those emerging from the probit models in Table 5, as the latter measure marginal effects. It is also worth noting that all the results obtained for the random effects panel probit models hold true for fixed effects panel logit specifications as well.

[14]Observe that the signs of all coefficients are reversed with respect to those of the probit models. This is due to the fact that the selection model in the ZIP specification identifies the probability of observing a regime in which the phenomenon under study (in our case, a M&A) *can not* occur.

[15]We have also experimented with the same set of variables used for the selection equation, finding however that they are ill suited to solve the problem at hands.

[16]Census data are the only direct and publicly available Italian *regional* data on the size distribution of firms. Although it is possible to derive indicators providing specific information for all the years included in our sample, we abstract from doing so as our purpose here is just to explore a possible causal mechanism behind our main point of highlighting the existence of a direct effect of the local business environment.

[17]According to practitioners, the price of target banks depends positively on deposits, as they represent both an opportunity to enlarge the customers base and to sell new products, as well as a source of funds at a possibly low marginal cost. See, for example, DE VINCENZO *et al.* (2005) for an analysis of the motivations behind takeovers in the Italian banking industry.

[18]More generally, there is a debate in regional finance (see, e.g., KLAGGE and MARTIN,

2005) asking whether the spatial organization of financial markets has an impact on the flows of capital to small firms across regions.

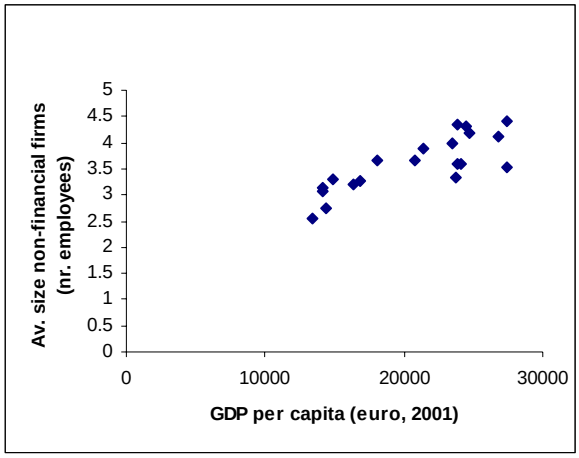

Figure 1: Average size of non-financial firms and GDP per capita (ISTAT, 2001)

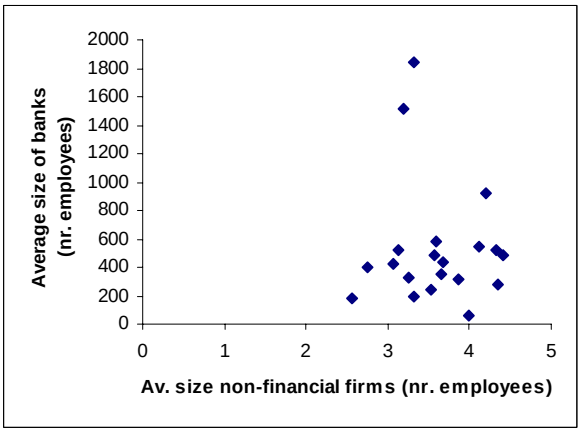

Figure 2: Average size of non-financial firms and average size of banks (ISTAT, 2001)

Table 1. Mergers and acquisitions by area (1995-2006)

		Active Bank			
		North	Center	South	Total
Target Bank	North	85	3	1	89
	Center	23	10	1	34
	South	66	4	9	79
	Total	174	17	11	202

Excluded all operations involving banks whose activity (before M&A) had a national extent, and all intragroup operations.

Definitions (ISTAT):

North: Valle d'Aosta, Piemonte, Lombardia, Trentino A. A., Friuli Venezia Giulia, Veneto, Liguria, Emilia Romagna

Center: Toscana, Umbria, Marche, Lazio

South: Abruzzo, Campania, Molise, Puglia, Calabria, Basilicata, Sicilia, Sardegna

Table 2

Distribution of the dependent variable

Vbs.	*0*	*1*	*2*	*3*	*more than 3*
Active Banks	843 (87.81%)	72 (7.50%)	25 (2.60%)	10 (1.05%)	10 (1.04%)
AB|North	295 (76.82%)	45 (11.73%)	24 (6.25%)	10 (2.60%)	10 (2.60%)
AB|Center	189 (90.87%)	19 (9.13%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
AB|South	406 (97.60%)	9 (2.16%)	1 (0.24%)	0 (0.00%)	0 (0.00%)

Definitions (ISTAT):

North: Valle d'Aosta, Piemonte, Lombardia, Trentino A. A., Friuli Venezia Giulia, Veneto, Liguria, Emilia Romagna

Center: Toscana, Umbria, Marche, Lazio

South: Abruzzo, Campania, Molise, Puglia, Calabria, Basilicata, Sicilia, Sardegna

Table 3. Principal component analysis

	F1(a)	F2(a)	Unexplained variance
Blood Donors (BD)	*0,3187*	-0,097	0,3804
Money Giving (MG)	*0,372*	0,1072	0,1576
Social Participation Index (SPI)	*0,3778*	0,0767	0,1388
Time Giving to Voluntary Organization (TGVO)	*0,3748*	0,0365	0,1578
Youth Unemployment Rate (YUR)	*-0,3641*	-0,0796	0,1989
Long-term Unemployment Rate (LUR)	*-0,3382*	-0,2153	0,2571
Gross Domestic Product (GDP)	*0,3469*	0,15	0,2519
Firms' Bankruptcies (BKR)	-0,0845	*0,8497*	0,0449
Dishonored Bills and Checks (DBC)	-0,3199	*0,4179*	0,1672
Eigenvalues	5,98	1,26	-
Kaiser-Meyer-Olkin statistics	-	-	0,8282
Cumulative variance explained by retained factors	-	-	0,8051

Notes: The factors retained are those having eigenvalues greater than one. The eigenvalue associated to the first excluded factor is 0.59. Adding FIRMS and VCI to the PCA analysis would add two additional latent factors F3 and F4, eventually coinciding with the two variables. Hence they have been added explicitly to the econometric specifications instead.

(a) Eigenvectors.

Table 4. Probit models (marginal effects)

	I	II	III	IV	V	VI
	Local economic development and social capital					
F1	0.0294***	0.0422***	0.0296**	0.0417***	0.0400***	0.0397***
	(0.0115)	(0.0093)	(0.0120)	(0.0089)	(0.0096)	(0.0088)
F2	-0.0321**	0.0015	-0.0243*	0.0076	0.0046	0.0065
	(0.0147)	(0.0110)	(0.0141)	(0.0111)	(0.0109)	(0.107)
NB	0.0033***	0.0023***	0.0030***	0.0025***	0.0023***	0.0024***
	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)	(0.0005)
NB*F1	-0.0008***	-0.0006***	-0.0008***	-0.0006***	-0.0005***	-0.0006***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
NB*F2	-0.0003	-0.0004**	-0.0003	-0.0005**	-0.0004*	-0.0005**
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
FIRMS	0.0024*	0.0018*	0.0025*	0.0019*	0.0019*	0.0016*
	(0.0014)	(0.0011)	(0.0014)	(0.0012)	(0.0012)	(0.0009)
VCI	-0.0099***	-0.0105***	-0.0111***	-0.0106***	-0.0092***	-0.0099***
	(0.0028)	(0.0026)	(0.0029)	(0.0027)	(0.0026)	(0.0026)
	Institutional and market structure					
HERF		-0.4513***		-0.4620***	-0.4139***	-0.4519***
		(0.1475)		(0.1578)	(0.1571)	(0.1574)
COOP		-0.0067***		-0.0066***	-0.0065***	-0.0065***
		(0.0014)		(0.0013)	(0.0014)	(0.0013)
REG		0.0015***		0.0018***	0.0014**	0.0018***
		(0.0005)		(0.0006)	(0.0006)	(0.0006)
	Bank profitability and efficiency					
SPREAD			-0.0360***	-0.0028	-0.0057	
			(0.0104)	(0.0099)	(0.0101)	
MKUP						0.0013
						(0.0101)
MKDWN						-0.0288
						(0.0207)
DIFF			0.0018	-0.0005	-0.0010	
			(0.0017)	(0.0013)	(0.0015)	
LOANS						-0.0004
						(0.0013)
DEP						-0.0002
						(0.0035)
BAD			-0.0013	-0.0025		-0.0034
			(0.0025)	(0.0021)		(0.0022)
dBAD					-0.0193	
					(0.0445)	
Area dummies	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes
Quarter dummies	yes	yes	yes	yes	yes	yes
Nr. Obs.	960	960	960	960	880	960
Time period	95(1) - 06(4)	95(1) - 06(4)	95(1) - 06(4)	95(1) - 06(4)	96(1) - 06(4)	95(1) - 06(4)
Pseudo R-sq.	0.3239	0.4036	0.3373	0.4062	0.3995	0.4091
Wald Chi-sq.	133.28	182.40	169.91	185.25	166.01	188.07
[p-value]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
Log Pseudo-L	-240.5799	-212.2147	-235.7870	-211.2849	-190.7626	-210.2601

MLE; asymptotic robust SE in parenthesis.

Table 5. Probit models (marginal effects) - robustness checks

	I(a)	II(b)	III(c)	IV(d)	V(e)
	Local economic development and social capital				
F1	0.0457***	0.0408***	0.0459***	0.0937***	0.0846**
	(0.0096)	(0.0129)	(0.0169)	(0.0274)	(0.0404)
F2	0.0007	0.0024	0.0059	0.0011	-0.1792**
	(0.0116)	(0.0163)	(0.0113)	(0.0443)	(0.0734)
NB	0.0024***	0.0024***	0.0025***	0.0049***	0.0027**
	(0.0005)	(0.0005)	(0.0005)	(0.0013)	(0.0014)
NB*F1	-0.0007***	-0.0007***	-0.0007***	-0.0014***	-0.0007*
	(0.0001)	(0.0001)	(0.0001)	(0.0003)	(0.0005)
NB*F2	-0.0004**	-0.0004**	-0.0004**	-0.0009	0.0007
	(0.0002)	(0.0002)	(0.0002)	(0.0006)	(0.0008)
FIRMS	0.0028**	0.0028**	0.0029**	0.0053	0.0032***
	(0.0014)	(0.0014)	(0.0015)	(0.0038)	(0.0011)
VCI	-0.0112***	-0.0113***	-0.0117***	-0.0258***	-0.0434***
	(0.0025)	(0.0025)	(0.0031)	(0.0067)	(0.0114)
	Institutional and market structure				
HERF	-0.4889	-0.4776**	-0.4035**	-1.6915***	-2.3528***
	(0.3220)	(0.2148)	(0.1724)	(0.6281)	(0.9253)
COOP	-0.0057*	-0.0056***	-0.0068***	-0.0097**	-0.0106**
	(0.0033)	(0.0021)	(0.0017)	(0.0044)	(0.0056)
REG	0.0014	0.0015**	0.0014*	0.0036*	0.0058
	(0.0012)	(0.0007)	(0.0008)	(0.0020)	(0.0039)
	Bank profitability and efficiency				
SPREAD	-0.0267**	-0.0266**	-0.0280**	-0.0659**	-0.1287***
	(0.0118)	(0.0107)	(0.0131)	(0.0258)	(0.0366)
DIFF	-0.0005	-0.0001	-0.0007	0.0019	0.0039
	(0.0046)	(0.0015)	(0.0018)	(0.0037)	(0.0053)
BAD	0.0057	0.0051	0.0043	0.0233	0.0418**
	(0.0075)	(0.0063)	(0.0066)	(0.0154)	(0.0202)
Area dummies	yes	yes	yes	yes	yes
Year dummies	no	no	no	no	no
Quarter dummies	no	no	no	no	no
Nr. Obs.	960	960	960	576	384
Time period	95(1) - 06(4)	95(1) - 06(4)	95(1) - 06(4)	95(1) - 06(4)	95(1) - 06(4)
Pseudo R-sq.	0.3837	0.3837	0.3834	0.3473	0.4181
Wald Chi-Sq.	167.08	167.21	166.99	123.09	152.99
[p-value]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
Log Pseudo-L	-219.2847	-219.2931	-219.3988	-180.4622	-120.9735

MLE; asymptotic robust SE in parenthesis.

(a) Predicted instead of actual values of Spread, Diff, Bad by using structural vbs. only (COOP, REG, HERF), and area, quarter and year dummies - by means of a panel data model.

(b) Predicted instead of actual values of Spread, Diff, Bad by using structural and macroeconomic vbs. (F1, F2, FIRMS, ICV), and area, quarter and year dummies - by means of a panel data model.

(c) Predicted instead of actual values of Spread, Diff, Bad by using structural, macroeconomic vbs. (F1, F2, FIRMS, ICV), and area, quarter and year dummies - by means of a SURE specification.

(d) Same as model II, but for the exclusion of Southern regions.

(e) Same as model II, but for the exclusion of Southern and Center regions.

All results unchanged when considering clustered robust SE at the regional level.

Table 6. Panel models

	I	II(a)	III(b)	IV(c)	V(d)	VI(e)
	Local economic development and social capital					
F1	0.4909***	0.5730***	0.5116***	0.5756***	0.5377***	0.4604**
	(0.1802)	(0.1262)	(0.1602)	(0.2129)	(0.1719)	(0.2339)
F2	0.1145	0.0091	0.0293	0.0742	0.0064	-0.9749**
	(0.2239)	(0.1685)	(0.2321)	(0.1663)	(0.2740)	(0.4929)
NB	0.0291***	0.0306***	0.0306***	0.0308***	0.0286***	0.0148*
	(0.0047)	(0.0051)	(0.0051)	(0.0049)	(0.0070)	(0.0082)
NB*F1	-0.0072***	-0.0083***	-0.0083***	-0.0083***	-0.0082***	-0.0040
	(0.0023)	(0.0018)	(0.0018)	(0.0017)	(0.0022)	(0.0026)
NB*F2	-0.0052	-0.0053**	-0.0052*	-0.0053**	-0.0051	0.0040
	(0.0032)	(0.0027)	(0.0027)	(0.0027)	(0.0038)	(0.0049)
FIRMS	0.0406**	0.0353*	0.0356*	0.0359*	0.0302	0.0172
	(0.0189)	(0.0197)	(0.0198)	(0.0197)	(0.0243)	(0.0172)
VCI	-0.1086***	-0.1407***	-0.1412***	-0.1463***	-0.1479***	-0.2362***
	(0.0401)	(0.0383)	(0.0384)	(0.0450)	(0.0436)	(0.0678)
	Institutional and market structure					
HERF	-5.6900***	-6.1288	-5.9759**	-5.0627**	-9.7112**	-12.8053**
	(2.1657)	(4.6925)	(2.8676)	(2.1333)	(4.2241)	(6.4536)
COOP	-0.0739***	-0.0711	-0.0700***	-0.0855***	-0.0554**	-0.0579*
	(0.0206)	(0.0460)	(0.0265)	(0.0229)	(0.0283)	(0.0339)
REG	0.0222**	0.0177	0.0190*	0.0174	0.0207*	0.0316
	(0.0088)	(0.0170)	(0.0099)	(0.0109)	(0.0123)	(0.0249)
	Bank profitability and efficiency					
SPREAD	-0.1904	-0.3342**	-0.3329**	-0.3515*	-0.3787**	-0.7003***
	(0.1328)	(0.1660)	(0.1515)	(0.1840)	(0.1665)	(0.2452)
DIFF	-0.0169	-0.0069	-0.0012	-0.0088	0.0112	0.0215
	(0.0159)	(0.0679)	(0.0212)	(0.0258)	(0.0243)	(0.0337)
BAD	-0.0089	0.0718	0.0644	0.0536	0.1337	0.2273*
	(0.0317)	(0.1075)	(0.0861)	(0.0925)	(0.0964)	(0.1229)
Area dummies	yes	yes	yes	yes	yes	yes
Year dummies	no	no	no	no	no	no
Quarter dummies	no	no	no	no	no	no
Nr. Obs.	960	960	960	960	576	384
Time period	95(1) - 06(4)	95(1) - 06(4)	95(1) - 06(4)	95(1) - 06(4)	95(1) - 06(4)	95(1) - 06(4)
Wald Chi-sq.	159.57	173.00	173.07	172.91	131.89	101.10
[p-value]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
Log L	-219.7026	-219.2847	-219.2931	-219.3988	-180.4622	-120.9735

Random effects probit panel specification

(a) Predicted instead of actual values of Spread, Diff, Bad by using structural vbs. (COOP, REG, HERF) and area, year and quarter dummies - by means of a panel data model

(b) Predicted instead of actual values of Spread, Diff, Bad by using structural (COOP, REG, HERF) and macroeconomic vbs. (F1, F2, FIRMS, ICV), and area, quarter and year dummies - by means of a panel data model

(c) Predicted instead of actual values of Spread, Diff, Bad by using structural, macroeconomic vbs. and area, quarter and year dummies - by means of a SURE specification

(d) Same as model IV, but for the exclusion of Southern regions

(e) Same as model IV, but for the exclusion of Southern and Center regions

The results of all models remain substantially unchanged when dropping area dummies as well.

Table 7. ZIP models

	I	II	III	IV	V(a)	VI(b)
Poisson model (nr. of banks)						
L(-1)	0.2086***	0.2062***	0.2500***	0.1926***	0.2083***	0.1596***
	(0.0470)	(0.0469)	(0.0441)	(0.0454)	(0.0473)	(0.0495)
L(-2)	0.0879*	0.0921*	0.1148**	0.0962*	0.0885*	0.0559
	(0.0501)	(0.0481)	(0.0492)	(0.0500)	(0.0495)	(0.0515)
L(-3)	0.0219		0.1018	-0.0369	0.0258	-0.0151
	(0.0701)		(0.0634)	(0.0545)	(0.0664)	(0.0779)
Constant	-0.2216	-0.2002	-0.5048***	-0.1870	-0.2275	0.1731
	(0.1537)	(0.1368)	(0.1489)	(0.1342)	(0.1609)	(0.1668)
Selection model						
	Local economic development and social capital					
F1	-0.5047**	-0.5087**	-0.1067	-0.3211	-0.6362**	-0.6478***
	(0.2176)	(0.2166)	(0.1824)	(0.2707)	(0.2634)	(0.2389)
F2	-0.3389	-0.3346	0.2884	0.1553	0.1829	1.5288*
	(0.3150)	(0.3162)	(0.2877)	(0.3589)	(0.5712)	(0.8028)
NB	-0.0669***	-0.0666***	-0.0497***	-0.0632***	-0.1211***	-0.0305*
	(0.0124)	(0.0122)	(0.0121)	(0.0109)	(0.0347)	(0.0171)
NB*F1	0.0144***	0.0143***	0.0117***	0.0082**	0.0281***	0.0057
	(0.0036)	(0.0036)	(0.0025)	(0.0040)	(0.0084)	(0.0046)
NB*F2	0.0188***	0.0185***	0.0098*	0.0082	0.0332***	-0.0047
	(0.0062)	(0.0063)	(0.0054)	(0.0056)	(0.0127)	(0.0087)
FIRMS	-0.0547	-0.0544	-0.3590**	-0.0498	-0.0997	-0.0255
	(0.0417)	(0.0411)	(0.1518)	(0.0379)	(0.0724)	(0.0235)
VCI	0.2817***	0.2810***	0.1550***	0.2595***	0.3397***	0.2861***
	(0.0733)	(0.0730)	(0.0586)	(0.0678)	(0.1174)	(0.0993)
	Institutional and market structure					
HERF	5.2937*	5.3484*		5.1544*	4.0009	21.6259**
	(2.9473)	(2.9335)		(2.9373)	(7.2703)	(9.2163)
COOP	0.1338***	0.1335***		0.1381***	0.0973**	0.1131**
	(0.0356)	(0.0354)		(0.0293)	(0.0459)	(0.0508)
REG	-0.0355***	-0.0356***		-0.0314**	-0.0399**	-0.0105
	(0.0128)	(0.0127)		(0.0122)	(0.0197)	(0.0387)
	Bank profitability and efficiency					
SPREAD	0.1491	0.1503	0.5020**		0.2430	-0.0217
	(0.2418)	(0.2404)	(0.2298)		(0.4817)	(0.5502)
DIFF	-0.0025	-0.0021	-0.0100		-0.0421	0.0339
	(0.0263)	(0.0263)	(0.0245)		(0.0517)	(0.0512)
BAD	0.0797	0.0789	0.0316		-0.4239*	-0.3237
	(0.0520)	(0.0516)	(0.0520)		(0.2361)	(0.2197)
Constant	-2.6842*	-2.6632*	-3.1316**	-1.3418	1.1662	-1.2031
	(1.4893)	(1.4787)	(1.3689)	(0.8182)	(2.9485)	(2.7987)
Area dummies	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes
Quarter dummies	yes	yes	yes	yes	yes	yes
Nr. Obs.	960	960	960	960	576	384
Zero obs.	843	843	843	843	469	295
Time period	96(1) - 06(4)	96(1) - 06(4)	96(1) - 06(4)	96(1) - 06(4)	96(1) - 06(4)	96(1) - 06(4)
Vuong stat.	6.87 [0.0000]	7.08 [0.0000]	6.28 [0.0000]	6.80 [0.0000]	6.36 [0.0000]	5.83 [0.0000]
LR Chi-sq.	24.49 [0.0000]	24.39 [0.0000]	39.90 [0.0000]	24.02 [0.0000]	20.18 [0.0002]	12.03 [0.0073]
Log-L	-339.5035	-339.5499	-362.0755	-341.7149	-296.5646	-232.2697

Inflation model: probit, coefficients only; standard errors in parentheses

(a) As in model I, but for the exclusion of Southern regions

(b) Same as model I, but for the exclusion of Southern and Center regions

Appendix Table 1

Variables definition and descriptive statistics

Vbs.	*Mean*	*Std. Dev.*	*Min*	*Max*	*Description*
Local economic development and social capital					
GDP	39.53	11:21	18.19	63.68	GDP per capita (1000 Euro)
					Yearly data. Source: ISTAT - Conti economici regionali
FIRMS	0.76	5.67	-106.52	105.45	Growth rate total nr. firms x 1000 pop.
					Quarterly data. Source: Unioncamere - Movimprese
LUR	42.58	14.79	8.14	65.63	Long-term unemployment rate (% region inhabitants looking for a job from at least 12 months on total nr. of people seeking employment)
YUR	25.93	12.81	7.20	53.10	Youth unemployment rate (% region inhabitants aged 15-24 unemployed on total nr. people aged 15-24)
SPI	10.85	4.79	4.42	27.70	Social participation index (% region inhabitants aged >14 volunteering in nonprofits)
VCI	12.12	5.25	3.18	40.08	Violent crimes index (crimes x 10,000 pop.)
					Yearly data. Source: ISTAT - Banca dati territoriale per le politiche di sviluppo
TGVO	8.34	3.89	3.10	22.20	Time giving to voluntary organizations (% region inhabitants aged >14)
MG	16.34	6.36	5.70	38.30	Money giving to non-profit organizations (% region inhabitants aged >14)
					Yearly data. Source: ISTAT - Indagine multiscopo "Aspetti della vita quotidiana"
BD	1.66	0.92	0.15	3.85	Blood donors (% region inhabitants)
					Yearly data. Source: AVIS
BKR	0.02	0.007	0.009	0.05	Firms' bankruptcies per capita
DBC	3.75	2.26	0.59	11.16	Dishonored bills and checks per capita
					Yearly data. Source: ISTAT - Statistiche giustizia
NB	43.38	42.16	2	187	Nr. Banks
					Yearly data. Source: Bank of Italy - Base informativa pubblica (TDB10207)
Institutional and market structure					
HERF	0.11	0.08	0.03	0.48	Herfindhal index defined considering the number of bank branches
					Yearly data. Source: Bank of Italy - "Albi ed elenchi di Vigilanza", sezione "Succursali di banche" e "Gruppi bancari"
COOP	11.93	11.58	0.25	60.65	% regional bank branches owned by cooperative banks
					Yearly data. Source: Bank of Italy - Base informativa pubblica (TDB10207)
REG	17.63	14.87	0.22	68.71	% regional bank branches owned by banks with regional diffusion
					Yearly data. Source: Bank of Italy - Base informativa pubblica (TDB10209)
Bank profitability and efficiency					
SPREAD	4.79	1.40	2.67	9.90	Difference between average rate applied on loans and average rate applied on deposits
MKUP	3.03	1.33	0.48	7.34	Difference between average rate applied on loans and average rate on 1-month Govt. Bond (*Buoni Ordinari del Tesoro*)
MKDWN	1.76	0.80	0.46	4.81	Difference between average rate on 1-month Govt. Bond (*Buoni Ordinari del Tesoro*) and average rate applied on deposits
					Quarterly data. Source: Bank of Italy - Base Informativa pubblica (TDC30045, TDB30820, TDC20013, TDB30950, TAME0280)
BAD	9.56	6.85	1.57	33.73	% bad loans out of total loans
					Quarterly data. Source: Bank of Italy - Base Informativa pubblica (TDB30210)
DIFF	8.45	9.76	-7.78	46.75	Difference between loans and deposits per capita (1000 Euro)
LOANS	25.84	14.86	6.84	83.79	Loans per capita (1000 Euro)
DEP	17.38	6.29	7.60	37.05	Deposits per capita (1000 Euro)
					Quarterly data. Source: Bank of Italy - Base informativa pubblica (TDB10262, TDB10231)