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LOCAL FINANCIAL DEVELOPMENT, SOCIO-INSTITUTIONAL ENVIRONMENT, AND FIRM PRODUCTIVITY: EVIDENCE FROM ITALY

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Local Financial Development, Socio-Institutional Environment, and Firm Productivity: Evidence from Italy

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Abstract

This paper investigates the effects of local financial development and quality of socio-institutional environment on firm's productivity in Italy. We argue that social capital, judicial efficiency, and the presence of criminal organizations might impact the real economy through three channels: i) they have a direct impact through the creation of a business environment; ii) they have an indirect impact, as they are among the main determinants of private credit development and lending risk conditions; iii) they might act as constraints to the effects of financial development on the real economy through misallocation of credit to highly profitable investments. We study the Italian case, using firm level data for productivity and taking advantage of the variation in terms of banking sector development, judicial efficiency, and social capital among Italian provinces. After controlling for potential endogeneity, our empirical results confirm that the real effects of financial development are conditional on the quality of socio-institutional environment. In particular, we find that i) a larger local banking market has higher positive effects on firm productivity when the socio-institutional environment is sufficiently developed; ii) an improvement of lending condition (reduction of lending rates) has higher effects when the socio-institutional environment is not developed. These evidences highlight that an improvement of socio-institutional environment might spur a virtuous cycle.

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1 Introduction and motivation

When we observe large differences in output per worker between firms, it is important to understand whether the causes are related to the lack of highly productive investment *opportunities* in the economy, or to *barriers* that prevent firms from exploiting these opportunities.

Insufficient credit availability is often indicated as a barrier to productive investment, innovation, or growth, and improvements in the access to finance usually have positive effects on the performance of the real sector (for a survey, see Levine, 2005). However, there is evidence of the presence of non-linear relationships. That is, higher levels of financial development are not necessarily associated with the higher performance of the real economy: the effects could be dependent on several factors, such as the initial level of the financial development (see for instance, Rioja and Valev, 2004a and 2004b; Coricelli et al., 2008).

Institutional and social characteristics, such as social capital, law enforcement, or crime, are instead often indicated among the determinants of the investment opportunities that characterize the business environment and the presence of productive activities. These characteristics not only have a direct impact on the business environment; the literature has also pointed out that the social capital and institutional factors are among the determinants of the level of financial development (see for instance La Porta et al., 1997; Beck et al., 2003; Guiso et al. 2004b; Jappelli et al., 2005; Bonaccorsi di Patti, 2009).

Taking into account that the *level* of financial development is a function of the socio-institutional environment, in this paper, we test whether the real *effect* of financial development is conditional (non-linear) on the socio-institutional environment. The idea is to gauge whether a reduction in the barriers to access to financial resources through improvements in the financial development has differential effects on firms' productivity in areas with different qualities of the socio-institutional environment, i.e., with different investment opportunities.

In territories where there are fewer opportunities to develop and initiate highly productive entrepreneurship projects, further credit availability does not have an obvious positive impact on the real economy, as credit might be disallocated. On the one hand, the low presence of highly productive activities decreases the

competition between good projects for credit. On the other hand, a low-quality socio-institutional environment is associated with higher territorial risks, which banks consider when lending: when the territorial risk is high, banks might prefer not to increase their risk by lending to young and innovative entrepreneurs (usually more dynamic but riskier ones), and they might prefer to lend to incumbents who might have a lower level of productivity, but a larger share of tangible capital to ensure the credit.

To test the hypothesis that the effect of financial development on output per worker is conditional on the quality of the socio-institutional environment, in this paper we will consider Italy. Focusing on a single country has the advantage of reducing omitted variable problems, and the Italian context, beyond the large differences in terms of output per worker between firms located in the North and the South of the country, presents a very segmented financial system with Southern regions showing an underdeveloped banking sector compared to the North (see Guiso et al., 2004a and 2004b). Similarly, the efficiency of the courts, the presence of organized crime, and, in general, the level of social capital and quality of institutions vary consistently among Italian regions; again, with Southern regions showing a lower quality socio-institutional environment.

Considerable research has shown that local financial development is important for several aspects of the real sector, and this paper shows that in Italy this effect is conditional on the state of the socio-institutional environment. In particular, in provinces with lower levels of social capital, lower institutional efficiency, and underdeveloped banking systems (e.g., Mezzogiorno), in general, only socio-institutional improvements and more efficient banking systems have significant average effects on the levels of productivity, while a larger quantity of credit does not seem to be a key determinant. In contrast, a larger quantity of credit seems to have positive and significant average effects on firms' productivity in those areas with a better socio-institutional environment (e.g., Northern and Central areas of Italy).

The hypothesis that the real effects of financial development are conditional on the quality of the institutional context can be located within the large strands of the literature referring to the finance-growth nexus (see Section 2.1) as well as to

the economic effects of social capital, crime, and the efficiency of justice (see Section 2.2 and Section 2.3). Johnson et al. (2002) analyzed a similar idea. The authors focused on a sample of post-communist countries and showed that in countries with low institutional development, the security of property rights represents a necessary and sufficient condition for increasing private investments, while financial resources are an important driver of growth, but only when property rights are perceived as secure.

In terms of policy implications, this idea can be related to the work of Hausman et al. (2005). They highlighted that the timing of the economic and institutional reforms i) determines the effectiveness of the reforms' impact on the economy and ii) depends on the initial context and country's characteristics. Reforms that aim to remove barriers to growth should be enacted jointly or after those that increase the effectiveness of business opportunities. In other words, the lack of opportunities dominates the presence of barriers to the exploitations of the opportunities themselves; thus, to maximize the returns of reforms, where business opportunities are low, reforms that remove barriers (e.g., reforms for increasing credit availability) should not precede those that increase investment or business opportunities.

The rest of the paper is organized as follows. Section 2 reviews the empirical evidence of the relevant empirical literature. Section 3 describes the data. Section 4 presents the model specification, the econometric strategy for the estimation, while the main estimation results are presented in Section 5. In Section 6 we discuss an alternative estimation approach related to the differential effects of financial development across industries and we report the estimation results. Finally, Section 7 offers the conclusion.

2 Related empirical literature

This section describes some of the contributions in the economic literature, to introduce the present work and situate it in the relevant strands of research. In particular, the work is related mainly to the strand of the literature that examines the relationship between financial development and the performance of the real economy (see Section 2.1). Furthermore, this work is related to two other

strands of the literature: i) the exogenous determinants of financial development (see Section 2.2); ii) the characteristics of the socio-institutional environment, which also directly impacts the real economy (see Section 2.3).

2.1 Real effects of financial development

The literature has critically analyzed the importance of the development and structure of the banking market and how this affects different aspects of the real sector performance. Levine (2005) provide an excellent survey of the cross-country evidence of the relationship between finance and growth; here, we focus on the evidence based on regional level data and on the evidence of the non-linearity of this relationship.

The US has often provided useful insight into this context. For example, Petersen and Rajan (1995) assessed the effect of bank concentration on lending relationships and found that young and unknown entrepreneurs (i.e., those without previous borrowing records) received more credit in concentrated banking markets. Jayaratne and Strahan (2002) analyzed the effects of US bank and branch deregulation and showed that it was associated with the banks' efficiency gains. Black and Strahan (2002) found higher rates of firm incorporation after US branching liberalization and interstate banking; Cetorelli and Strahan (2006) looked at the effects of competition in local US banking markets on the structure of non-financial sectors and found that more competition in the US banking market positively affects the size and number of firms (i.e., it reduces the typical size and increases the number of small and medium firms).

However, it should be noted that studies focusing on the US, where the State represents the territorial unit of analysis, might point to different conclusions than those drawn from regional studies within the EU.[1] A significant number of works have examined Italy, exploiting the large variability in banking sector development between Italian regions (or provinces) while reducing omitted variables problems, as banks in all the regions respond to the same regulations and legislation.

[1] For studies on the finance growth-nexus with a focus on European regions, see for instance, Hasan et al. (2009); for a study on Spanish regions, see Fernandez de Guevara and Maudos (2009).

Among the studies focusing on Italian regions and provinces, Bonaccorsi di Patti and Dell'Ariccia (2004) found a non-monotonic relationship between the banks' market power and firm creation, where banking market concentration can have a varying beneficial effect. They argued that more opaque firms (i.e., the firms that have a low proportion of physical capital) would benefit more from a concentrated banking market. Guiso et al. (2004a) found that local financial development is positively and causally correlated to firm formation and economic growth. Usai and Vannini (2005) examined the effect of different types of banks on local economic growth and found that cooperative banks are better at spurring local growth, as they have an information advantage over the local economy and entrepreneurs. Vaona (2008) showed that financial development leads to growth even when controlling for spatial unobserved heterogeneity. Furthermore, Benfratello et al. (2008) showed that Italian provincial banking development positively affects the probability of firm innovation. Similarly, Mancusi and Vezzulli (2010) find that credit rationing is related to lower probability to set up R&D activities.

Extensive research at the cross-country level, has highlighted the possibility of non-linearity in the relationship between financial development and the real economy's performance. For instance, Rioja and Valev (2004a, 2004b) found that financial development has a positive effect on productivity growth only for developed countries, and that there exist levels of financial development (e.g., its lower levels), where the effect on growth might be negative. Similarly, Coricelli et al. (2008) found in a sample of EU countries that the growth effects of financial development are higher when the financial sector itself reaches a critical size.[2] Also, Kendall (2012), who used district data for India, found a non-linear relationship between finance and growth and underlined the role of human capital deepening in reducing the financial constraints.

[2] Similar results for a sample of EU countries are found by Moretti (2012), who showed that bank competition has a positive effect on firm entry only when the size of the financial sector is sufficiently large. Also, D'Alfonso and Moretti (2012), using a sample of EU countries, found that the returns in terms of industries' growth rates is higher for higher level of country's financial development.

The fact that some of the evidence of the non-linearity of the finance-growth nexus has identified that for lower *levels* of financial development its *effects* on the real economy are lower *effects* is interesting in terms of understanding the determinants of this non-linearity. In the case of Johnson et al. (2002), it is the security of property rights that produces the effects of finance. In the present study, we proffer the hypothesis that the conditional factors are the socio-institutional characteristics of the economy.

2.2 Determinants of financial development

The socio-institutional characteristics of an economy are not just potential candidates for the conditional factors of the non-linearity of the real *effects* of financial development, but a strand of the literature has underlined that they are among the determinants of the differences in terms of the *levels* of financial development. Economic theory and empirical evidence have shown that among the determinants of the financial development, there are institutional, political, and social factors.[3]

According to the legal origin view, since finance is run through contracts, better creditor rights and enforcement help to improve the financial system, which, in turn, improve access to sources of external finance and firm performance. Thus, differences between civil law and common law legal systems have been put forward as determinants of a country's financial development. The so-called political channel underlines that the protection of private rights and freedom of competition is at the core of financial development. That financial development is higher in common law countries can be explained by the fact that common law systems, for historical reasons, tend to assign larger weights to the role of private rights over the protection of the State, while the opposite occurs in civil law systems. In addition, the so-called adaptability channel underlines that legal traditions differ in their ability to adapt to economic and social changes. In countries with a French civil law tradition, the interpretations of the law and jurisprudence are limited; thus, changes to the law happen slowly through the

[3] See Levine (2005) also for a review of the literature about the determinants of financial development. See also La Porta et al. (1997 and 1998).

legislative system. In contrast, there exists more room for interpretation and jurisprudence in common law countries. Thus, higher levels of financial development in common law countries could be explained by more flexible legal systems, which adapt better and more quickly to the continuous changes of finance and business.[4] There is also empirical evidence that suggests that the adaptability channel can explain the differences in countries' financial development and protection of creditor rights (Beck et al., 2003).

One might argue that different levels of local financial development within a country might not be driven by differences in legislative systems. For instance, Italy has been an integrated country since 1861, where financial regulations and creditor rights are the same in all parts of the country. However, we also observe large differences in Italy in terms of the depth and efficiency of the regional financial systems. As shown by empirical evidence, and also argued by Jappelli et al. (2005), the quality of enforcement might be another driver of local financial development. Better enforcement reduces opportunistic behaviors and improves a firm's capacity to use external finance, through better and more secure relationships between firms and banks (improving banking system development) as well as between firms (improving the use of trade credit).

Other strands of the literature have identified different drivers of financial development.[5] For instance, some have considered social capital as an important determinant of trust and, thus, the use of contracts (including financial transactions). With regard to the social capital and financial development in Italy, Guiso et al. (2004b) showed that in areas with high levels of social capital, households invest less in cash and more in stocks, are more likely to use checks, have easier access to institutional credit, and make less use of informal credit, and that the effect of social capital is stronger among less-educated people and in areas where legal enforcement is weaker. In fact, one might argue that the

[4] See Beck and Levine (2005) for a review of the legal determinants of financial development.

[5] Another strand of the literature, to which this paper does not so closely relate, has studied the political determinants of financial development. See, for instance, Rajan and Zingales (2003) and Campos and Coricelli (2012).

further away legal enforcement is from functioning perfectly, the greater the effect might be of people's trust in financial transactions.

Moreover, the presence of high crime rates can influence the development of the local banking market. For instance, Bonaccorsi di Patti (2009) underlined that the offenses that affect the loan market are those that increase a firm's fragility (e.g., extortion, organized crime) and the expected loss given by a firm's default (e.g., fraud, fraudulent bankruptcy). She found a positive correlation between Italian provinces' crime rates and interest rates and difficulties in access to credit.

2.3 Real effects of social and institutional factors

Social capital also has a direct effect on the real economy. In 1958, Banfield (1958) underlined that social capital was among the determinants of Southern Italy's backwardness. Similarly, Putnam (1993) stated that social capital is a combination of rules, networks, and people's trust, which facilitates the achievement of collective goals and the functioning of political institutions; and he indicated that local institutions in Italy perform better in those areas with civil-minded people.

Many works have underlined the role of social capital in building better and more efficient institutions which, in turn, positively affects the development of economic activities. For example, Fukuyama (1995) argued that people's trust is the most important cultural factor that can impact economic prosperity and competitiveness. Knack and Keefer (1997) illustrated that the relationship between trust and economic growth is more important in poorer countries. This relationship is also relevant because of the presence of a less developed financial system, less secure property rights, and inefficient law enforcement. In fact, according to Knack and Keefer (1997), "interpersonal trust seems to be more important in facilitating economic activity where formal substitutes are unavailable" (p. 1284).[6]

[6] See also La Porta et al. (1997) and Bloom et al. (2009) for analyses of the effect of social capital on firm size, and Fountain (1997) for the effects of social capital on innovation. See also Beugelsdijk et al. (2004) for robust analysis of the real effects of social capital; Akçomak and Ter Weel (2009)

In light of the above findings, it is straightforward to recognize the important role of the social environment on transactions and, thus, economic development. For the purpose of this paper, the definition of social capital not only as people's trust but also trustworthiness, which constitutes people's actual behavior in terms of cooperation and the establishment of functioning political institutions and an economic-friendly environment, is why the proxy measure of social capital in this work includes voter turnout at elections (see Section 3.3).

As with social capital, other institutional characteristics might have a direct impact on the real economy, not only through the financial development. For instance, the quality of law enforcement does not affect only financial contracts; it affects all the transactions between private actors and between private actors and public institutions (see for instance Djankov et al. 2003; Claessens and Klapper, 2005). Some studies have exploited with-in country variation in terms of legal enforcement and assessed the effects of firms' performance. For instance, Chemin (2012) - empirically studying the effect of the judicial reform implemented in 2002 in India - found that increasing the speedy disposal of civil suits allows for fewer breaches of contract, encouraged investment, and facilitated firm's access to finance. While, Laeven and Woodruff (2007) analyzed Mexico and showed that the legal system affects firm size by reducing the idiosyncratic risk faced by firm owners.

Finally, another characteristic of the Italian economy is the presence of crime, and, particularly, criminal organizations, which are based in the Southern regions and operate also in other areas of the country. Concerning the effects on the real economy of the presence of crime, there are numerous evidence for Italy. For instance, Peri (2004) using province-level data found that crime has a statistically significant impact in reducing both per capita income growth and employment growth. Mauro and Carmeci (2007), looking at regional data, found that crime (proxied with homicides) impacts negatively on income levels. Dettoto and Otranto (2010), using monthly data, found that a (small) annualized real-GDP growth reduction is due to crime. Pinotti (2012), using a synthetic counterfactual

for the positive effects of social capital on innovation in European countries; and, Beugelsdijk and Van Schaik (2005) for the effects on growth in European regions.

approach, showed that the presence of Mafia organizations reduces the GDP which reflects a net loss of economic activity.

3 Data

As described in the introduction, the analysis of this paper would like to understand whether the real effects of financial development are conditional upon the quality of the environment in which people participate in social and institutional activities within their community. In particular, we want to understand whether different measures of local financial development (i.e., proxies of banking sector size and efficiency) computed at province-level for Italy have an effect on the firm productivity (as a measure of real sector performance), and whether this effect depends on the indicators of the social and institutional environment.

In this section, the relevant firm-level data (Section 3.1) and province-level indicators (Sections 3.2 and 3.3) are presented.

3.1 Firm level variables

We employ data from the Aida-Bureau Van Dijk database, a comprehensive and harmonized database containing information on the balance sheets and the performance of Italian firms, and from which we extract and compute our firm-level variables of interest.[7]

We compute the dependent variable as a measure of labor productivity, given by the (natural log of the) ratio between the firm's real value added and the number of employees (*ln(Y/L)*). From this database, we also extract some firm-level control variables that have been found to be significant determinants of firm productivity in previous empirical literature. These variables are the capital labor ratio (*ln(K/L)*, given by the natural log of the ratio between real fixed capital and number of employees); firm size (*ln(size)*, given by the natural log of the number of employees); the (natural log of the) firm age (*ln(age)*); and, a measure of the firm's leverage (*Leverage*), given by short-term debt plus long-term debt over total

[7] We draw the firm-level variables from the extended version of the database, which contains information regarding almost the entire population of Italian corporations.

assets.

Before computing these variables, some cleaning criteria have been applied, given that the original database presents a different number of observations over time and industries as well as a large number of missing or unreliable values for some variables.[8]

The Aida database contains information for the last 10 years. We use the 2009 version of the database, but due to the continuous expansion of the sample of included firms as well as delays in the reporting of the files, we drop information for the years 1998 (which represents a small number of included firms relative to ensuing years) and 2008 (because many firms had not yet presented their files). We therefore use data for the period 1999-2007.

We also exclude from the sample firms operating in certain industries to prevent identification problems in the finance and growth analysis.[9] Thus, we are

[8] First, we keep those firms that only report unconsolidated balance sheets and those firms that report consolidated balance sheets only when unconsolidated ones are available. This is to avoid double-counting for firms reporting both consolidated and unconsolidated balance sheets. Then we apply a number of filters to exclude the firms that have reported unreliable information. We drop: (a) those firms that have different values for profits in the balance sheet and under the profits & loss heading; (b) those firms that have negative values for sales; (c) those firms that report negative values for the total value of production and costs of production, i.e. those firms that simultaneously show very negative values of value added and disproportionately high costs of production with respect to the value of production, and those firms with disproportionately low costs of production with respect to the value of production; in particular, given (Filter = Tot#_Val#_of_production/Costs_of_production), we drop: a) Filter>= 0 ; b) (Value_added> -100 OR Filter> 0.001) or Filter=0 (excluding Tot#_Val#_of_production=0); c) Filter<100.

[9] In particular, we exclude firms belonging to region-specific industries (as regions may have different natural resources endowments), such as agriculture (NACE code 1), forestry (NACE code 2), fishing (NACE code 5), and mining (NACE codes 10-14); industries that might heavily rely on business support from public financing or tend to be strongly regulated, such as utilities (NACE codes 40-41); financial intermediaries whose balance sheet and performance tend not to be comparable with those of non-financial sector firms (NACE codes 65-66); and, finally, public sector firms, such as the government/public sector, education, health and social sector, activities of organizations, private households, extra-territorial organizations, and firms that cannot be classified (NACE codes 75, 80, 85, 91, 92, 95, and 99), since they heavily rely upon public financing.

left with 38 industries belonging to manufacturing, construction, transport services, tourism, and market services.[10]

The Aida database contains information pertaining to different types of corporations: sole proprietorship, partnership, cooperatives, foundations, limited liabilities, and private limited liabilities. In order to ensure the correct identification of the effects of local financial development on a firm's productivity, we focus on limited liabilities and private limited liabilities companies.[11]

Finally, we exclude other unreliable data and extreme values from the sample.[12] Hence, the final sample contains 590,079 observations for 177,189 firms. Clearly, since the number of firms varies during the nine years of analysis, we must rely on an unbalanced panel.

As expected, the summary statistics for firm labor productivity show lower values for firms located in southern Italy with respect to firms located in the rest of the country (see Table 1 for summary statistics of firm-level avriables). In fact, our objective is to understand whether, all else equal, provincial-level characteristics, such as local financial development and the quality of the socio-institutional environment, might explain these differences, or whether those differences might be explained in terms of the industrial composition of the areas.

3.2 Measures of local banking market development

Our main indicators of local banking development are commonly used in empirical analyses of the finance-growth nexus. In particular, since one of the objectives of our analysis is to capture different aspects of the local banking system

[10] The information concerning the firm's industry of main activity in the AIDA database is classified according to the Italian ATECO 4-digit code industry classification. We convert this classification into the 2-digit code NACE 1.1 classification. Some firms are dropped from the sample due to missing values in the original database for the industry of main activity.

[11] These types of companies correspond to the Italian Spa (società per azioni) and SRL (società a responsabilità limitata). In the Aida database, they account for roughly 95% of the original sample.

[12] In particular, we drop those observations that show negative values for age, and we exclude the first and last percentiles of firm productivity, capital-labor ratio, firm size, and the measure of leverage distributions.

development and structure, and show the effects on real sector performance, we employ alternatively the following indicators in the main model specification as well as in the robustness checks:

- The ratio of loans to productive sector (i.e., non-financial firms as well as family enterprises) to value added at the provincial level (*Loans/VA*). This indicator reveals the cross-provincial differences in terms of credit to the private productive sector by banks relative to the size of the provincial economy, and represents a measure of the depth of the provincial banking market.[13]
- One minus the spread between lending and deposit rates (1-*Spread*). This index represents a measure of local banking market efficiency: the lower the spread is, the more efficient the relative local banking market is, and the higher our indicator (1-*Spread*) is.[14]

The use of these two indicators allows us to gain a clearer picture of the financial development. In fact, each one disentangles a dimension of the local financial development, where a province to be financially developed should have a sizable credit market with respect to its economy and an efficient management of credit (i.e., because of technological reasons or competitive pressure, the banks are able to charge lower rates on loans respect to rates on deposits).[15]

Both indicators are computed at province level for any year in the period 1999-2007. The variation of these variables at the provincial level (see Map 1 and 2) and over time (Figure 1 and 2) allows us not only to control for the differences in terms of financial development between the Center-North and South of Italy but also for the within-region segmentation of the credit markets. In fact, one might expect that in some regions, the provinces possess significantly different levels of

[13] The data on loans to the productive sector come from the electronic public database (BIP online) of the Bank of Italy, while the data on value added at the province level are available from the Italian National Institute of Statistics (ISTAT).

[14] For lending rates, we refer to interest rates for loan facilities available to total resident non-banking sectors; for deposit rates, we take into account interest rates on sight current account deposits.

[15] To make an easier comparison between the values for these indicators, we reduce their values to the interval [0,1], using a Min-Max standardization approach. This is also done for the indicator of the socio-institutional environment (See next Section).

loans to value-added ratio. Taking Lazio as an example, one might expect the province of Rome to have greater values of the loans to value-added ratio. Although this is true (in 2007, the province of Rome had a standardized loans to value-added ratio of 0.67, while in Rieti, another province of Lazio, it was 0.04), there are also significant differences between the provinces' financial development in the other regions. For example, in Sardinia in 2007, the province of Sassari had a standardized value of 0.63 of the loans to value added ratio, while the province of Oristano had a value 0.01 (see Table 2 for the summary statistics on the banking sector's provincial-level variables).

3.3 A synthetic measure of local socio-institutional environment

Choosing variables as proxies for social capital and the institutional environment is not an easy task. Depending on the adopted definition of social capital, many factors could be employed to represent something that is not directly measurable. We employ a synthetic index (*SI*) for the period 1999-2007 based on the following province-level variables:

- Voter turnout. This is a measure of civicness and is defined as the percentage of eligible voters who cast a ballot in the elections for the European Parliament. We decided not to use data from the Italian general elections, because Italian citizens are required by law to vote. Thus, we would like to capture as much as possible an individual's will to participate in the determination of the institution. We use data released by the Italian Ministry of the Interior related to the European elections held in 1994 (June 12), 1999 (June 13), 2004 (June 12), and 2009 (June 7).
- Average length of bankruptcy procedures (in days). This measure of judicial efficiency is elaborated by ISTAT on the basis of data collected by the Italian Ministry of Justice. It has been previously document that the judicial system has different levels of efficiency between Italian provinces (see for instance Jappelli et al., 2005; Carmignani and Giacomelli, 2009: Coviello et al. 2013); in particular, efficiency is very low in the South as compared to the rest of the country, but variation exists also among provinces in the North and the Centre of the country. This variable allows us to capture the differences in terms of judicial

enforcement between provinces. Furthermore, we should note that judicial efficiency is highly correlated with social capital. In fact, we tentatively put forward judicial efficiency as a determinant of social capital (the lower the judicial efficiency is, the lower the potential trust in institutions is), or as a consequence of social capital (the lower the people's trust and cooperation are, the more difficult it is for institutions to function effectively). The reference dataset includes data on Italian provinces pertaining to the period 1999 to 2007.

- The number of murders and attempted murders per 100,000 inhabitants. This is a measure of violence in the province and, in Italy, shows important territorial variation and tends to be persistent in time. According to Peri (2004), this is due to the territorial presence of criminal organizations (i.e., Mafia, Camorra, and 'Ndrangheta), particularly in the South. It is intuitive that extreme forms of violence negatively affect people's trust; furthermore, the index is developed on the basis of data reported by police to the judicial authorities and collected by the Ministry of the Interior, Department of Public Safety. The analyzed data on Italian provinces correspond to the period 1999 to 2003.

All the variables described above are brought together in a single index of the quality of the local social and institutional environments (*SI*) through the following procedure: (a) standardization of the size of the reference dataset; (b) imputation for missing values, alternatively recurring linear interpolation methods or "nearest neighbor" methods, depending on the stability of the variable basis (see Table 2 for the summary statistics of the provincial-level *SI* indicator).[16]

Similar to the variation of the indicators of financial development, the index of the socio-institutional environment shows large differences between the South

[16] For each variable used to compute the synthetic *SI* indicator, any single provincial observation *Xi* in the distributions is reduced to the range [0,1] using a min-max standardization approach, where the maximum and minimum are respectively the maximum and minimum values of the considered variable during the period 1999-2007. In this way, all three variables are reduced to the range [0,1]. Then for each province and year, the index is obtained from the arithmetic mean of the standardized variables described above. Note also that the average length of the bankruptcy procedures and the number of murders and attempted murders per 100,000 inhabitants are negatively related to the level of social capital. Therefore, for these two variables, we take the complement of 1 for their standardized values.

and the North of Italy (see Map 3) and over time (Figure 3). The provinces with higher social capital, low violence, and a more efficient judicial system are located in Trentino Alto Adige, while Reggio Calabria is at the opposite extreme of the distribution. All the other provinces find themselves in the middle of the distribution: the northern and central provinces are found on the right side, whereas the provinces located south of Rome are found on the lower side of it.

4 Model specification and estimation approach

We assume that the production function for the economy is represented by a Cobb-Douglas function, which can be specified in per worker terms and expressed in logarithmic form. For each firm, the productivity of labor (Y/L) is represented as the ratio between value added and employees, and the capital per worker (K/L) as the ratio between fixed capital stock and employees. To this function we can add additional firm-level control variables as well as our provincial-level variables of interest to identify the relationship between local financial development variables, social capital, and firm productivity.[17] Our estimated model is as follows:

$$\ln(Y_{cpt}/K_{cpt}) = \beta_0 + \beta_1 \ln(K_{cpt}/L_{cpt}) + \beta_2 C_{cpt} + \beta_3 FD_{pt} + \beta_4 SI_{pt} + \beta_5 FD_{pt} * SI_{pt} + \varepsilon_{cpt}$$

where C is a vector of additional control variables (e.g., age, size, and leverage) for each firm c and year t operating in province p, FD is the measure of the financial development of interest measured at the provincial level for each year, SI is the synthetic index of the socio-institutional environment measured at the provincial level for each year, $FD*SI$ between these two measures to capture the conditional effect of financial development on firm productivity.

The error term captures all the factors that influence the productivity of labor, but they are not captured by the variables in the model specification and are composed of firm-specific time invariant effects, an idiosyncratic component of time-varying firm-specific effects, and time-varying macro effects that influence all firms.

[17] See Beck (2008) and Levine (2005) for extensive reviews of the empirical approaches to the finance-growth nexus.

We estimate this model specification following four different estimation approaches.

Our first estimation approach consists of the inclusion of industry, region, and time dummies to control for those effects that might affect productivity in firms with similar production processes (i.e. operating in the same industry), in firms operating within the same region, and to control for those macro shocks that might affect productivity in a given year. This augmented model is then estimated using a pooled ordinary least squares (pooled-OLS) estimator with clustered standard error at the provincial level, allowing for heteroskedasticity between the error terms for firms within the same province.

The second estimation approach tries to control for those time-invariant firm-specific characteristics that affect productivity, but are not captured by firm-level control variables and the industry, region, and time dummies. In particular, we exploit the time dimension of our data and we estimate the model specification using a within group estimator (i.e., firm-fixed effects). The provincial location of the firm is among the firm-specific time-invariant characteristics that this approach allows to control for. This is particularly important, since it allows us to reduce any possible bias coming from the correlation between the province-level financial development variable of interest and the error term.

The third and fourth estimation approach take into account the fact the regressors might be correlated with the firm-specific time-varying idiosyncratic component of the error term, and this might be a source of endogeneity. For instance, a shock at the provincial level might affect both firm productivity and the bank's decision to increase the supply of credit or reduce the lending (or deposit) rates. We deal with this potential endogeneity problem by using a 2SLS pooled estimator and a GMM estimator.

In order to test for the potential endogeneity of the banking market variables, the Durbin-Wu-Hausman test is performed in its regression-based form, using all the exogenous explanatory variables of the model and some additional instruments as instrumental variables.[18] In particular, in the 2SLS estimator, we use the original instruments used by Guiso et al. (2004a): the characteristics of

[18] See Wooldridge (2002), pp. 118–122.

the banking market in 1936 at the provincial level are chosen to instrument the current level of provincial financial development. Guiso et al. (2004a) explained in detail the reasons for, and advantages of, using these instruments for the current values of the Italian local banking markets. The idea is that, in Italy, the rules for regulation imposed by the "Legge bancaria" of 1936, shaped the banking system until a process of deregulation occurred at the end of the 1980s. Thus, these rules shaped the banking system for over 50 years by imposing constraints on opening new branches in different types of banks (national banks were more tightly regulated, and among the local banks, cooperative banks faced tighter constraints). Guiso et al. (2004a) tested some exclusion restrictions and demonstrated the quality of these instruments by showing that these rules were unrelated to the level of economic development in each region in 1936, and that they are only political by nature. In particular, we use the 1936 values of branches per inhabitant, the share of bank branches owned by local banks over total branches, the number of savings banks, and the number of cooperative banks per capita, and, following Benfratello et al. (2008), we interact all these variables with year dummies, as they are instruments for the values of bank loans-to-value added ratio and bank spread which in our analysis vary in time.[19]

Finally, we use the first-difference GMM estimator, developed by Arellano-Bond (1991) and Arellano and Bover (1995). The variables are first-differenced (to eliminate firm-specific time-invariant effects) and then the first-differences of endogenous variables are instrumented using suitable lags of their levels. In this case, the estimated model is slightly different, since we introduce the lagged value of productivity as a regressor; thus, we assume that firm productivity follows a persistent process.

5 Estimation results

For each employed measure of local financial development (*FD*: *Loans/VA* or 1-*Spread*; Tables 4 and 6, and Tables 5 and 7, respectively) and for each employed

[19] Note that the same set of instruments interacted with the socio-institutional indicator are used as instruments for the values of the interaction terms between the banking market variable of reference (bank loans-to-value added ratio and bank spread) and the socio-institutional indicator.

estimator (pooled OLS, panel within group, pooled 2SLS, and GMM),[20] we first estimate a model specification including the linear effects of financial development (*FD*) and the social-institutional indicator (*SI*) on firm productivity (columns 1 and 4), then we introduce the interaction term *FD*SI* (columns 2 and 5), and finally we introduce both the interaction term *FD*SI* and the squared values of SI (SI^2, columns 3 and 6).

This last specification is particularly helpful for understanding both the non-linearity of financial development (*FD*) and the socio-institutional environment (*SI*) on firm productivity. In fact, suppose that both *FD* and *SI* have non-linear effects on firm productivity, and suppose that *FD* has a higher impact on firm productivity for a higher level of *SI*, while the impact of *SI* on firm productivity has a non-monotonic form: higher for a lower level of *SI* and lower for a higher level of *SI*. Checking for these non-linearities seems reasonable, but introducing only one interaction term (*FD*SI*) in the model specification might not show the actual impact of these two variables. In fact, if *FD* has a higher impact on firm productivity for a higher level of *SI*, we would expect a positive and statistically significant coefficient of the interaction term (*FD*SI*). However, given that *SI* and *FD* are highly and positively correlated, if the impact on firm productivity of *SI* is lower for higher levels of *SI* (or simply linear), we might expect to find a negative (or non-significant) coefficient of the interaction term (*FD*SI*). These opposing forces captured only by one interaction term (*FD*SI*) might result in a non-statistically significant coefficient of this interaction term. The inclusion of the squared term (SI^2) might allows us to capture both the opposing effects. In fact, if *FD* has a higher impact on firm productivity for a higher level of *SI*, we would expect a positive and statistically significant coefficient of the interaction term (*FD*SI*) and, at the same time, if the impact on the firm productivity of *SI* is lower for higher levels of *SI*, we might expect to find a negative and statistically significant coefficient of the squared term (SI^2).

Clearly, this is necessary only when the non-linear effects of *FD* and *SI* contrast with each other. For instance, if *FD* has a higher impact on firm productivity for

[20] When we use the within-group fixed effect estimator, we employ a restricted sample with any firm required to be present for at least 3 years.

lower levels of *SI* and the impact on firm productivity of *SI* is lower for higher levels of *SI*, we might expect to find a negative coefficient of the interaction term *FD*SI*, which might capture both of these non-linearities.

In all the model specifications that we employ for estimating the average effects of *FD* and *SI*, we control for firm level time-varying variables that might influence firm productivity (e.g., the natural log of fixed capital per employee – *ln(K/L)*, the natural log of the size of the firm – *ln(size)*, a measure of leverage – *leverage*, its squared value – $leverage^2$, and the natural log of the age of the firm – *ln(age)*) as well as for region, industry, and time fixed effects.[21]

To gauge the average effect of provincial *FD* as well as the average effects of *SI* on firm productivity, we must take the partial derivative of these variables with respect to firm productivity.

Table 4 shows the estimated results when we use the ratio of loans to provincial value added (*Loans/VA*) as a proxy of local financial development (*FD*). The pooled OLS estimation (Table 4, columns 1–3) shows the presence of a non-linear effect of *Loans/VA* on firm productivity, with a higher effect for a higher level of *SI* as well as a non-linear effect of the *SI*. These results are also confirmed by within group estimations (Table 4, columns 4–6).

On the basis of the estimated coefficients in Table 4 column 6, let us conduct the following exercise of comparative statics to give a clearer idea of the effect of *Loans/VA* and *SI* on firm productivity. Suppose an increase of the variable *Loans/VA* in all the provinces from their actual values to the highest value (i.e.,

[21] The estimation results in any model specification show fixed capital per employee (*ln(K/L)*) as a positive and statistically significant effect; the coefficient of the size (*ln(size)*) is statistically significant and negative (rejecting the presence of constant returns to scale); this result is in line with some studies on productivity in Italy, but in contrast to others (see Aquino et al. 2008, for a brief discussion on this point); the coefficient of the measure of leverage (*leverage*) is positive and statistically significant, while the coefficient of its squared value ($leverage^2$) is negative and statistically significant, indicating that a low level of debt relative to total assets might be useful for firm performance, while higher levels might reduce firms growth opportunity; finally, the coefficient of age (*ln(age)*) is positive and statistically significant (showing the presence of a leaning-by-doing process). Estimation results for these variables are not reported in tables because they are beyond the scope of this paper. However, they are available upon request.

Milano in 2007).[22] This improvement will increase the average productivity by 0.7% in the province with the value of the socio-institutional indicator at the 25th percentile of its distribution. Consequently, this improvement will increase the average productivity in the province by around 3.5% with the value of the socio-institutional indicator at the 75th of its distribution.

One might also be interested in understanding the effect of *SI* on productivity. According to our evidence, the effect of an increase in *SI* is positive and non-linear both for its own levels as well as the levels of *Loans/VA*. Clearly, given that the effect of SI is non-linear both in *SI* and *Loans/VA*, it is difficult to interpret this effect in terms of South-North differences.[23] However, the finding to be underlined for the objective of this work is that improvements in *SI* have a greater impact than improvements in *Loans/VA* in the southern provinces, while improvements in *Loans/VA* are more effective in the North than in the South.

Table 5 shows the estimation results when we use the spread between lending and deposit rates (1-*Spread*), so an increase of it must be interpreted as an increase in banking efficiency) as a proxy of financial development. Again, the pooled OLS (Table 5, columns 1–3) and within group (Table 5, columns 4–6) estimations show that the effect of this measure of financial development is conditional on the socio-institutional environment level. In particular, given the values of the provincial *SI*, the evidence shows that, on average, the lower the difference between lending and deposit rates is, the higher firm productivity is. This effect is higher when the province has relatively lower socio-institutional environment levels. Thus, an increase in the efficiency of the banking system, in addition to an increase in the socio-institutional environment level, seems to be important for an increase in productivity for provinces with lower socio-institutional environment levels.

On the basis of the estimated coefficients in Table 5 column 5, suppose an

[22] Our min-max standardization approach helps us conduct this exercise, as the highest value takes the value 1.

[23] Some examples of the effects of an improvement in the quality of the socio-institutional environment to its highest value are: +1.2% in the average productivity in the Northern province of Venice; +4.2% in the Central province of Florence, and +7.1% in the Southern province of Palermo.

increase of the variable 1-*Spread* in all the provinces from their actual values to the highest values. This improvement will increase the average productivity in the province by 7% with the value of the socio-institutional indicator at the 25th percentile of its distribution. Simultaneously, it will increase the average productivity in the province by around 1% with the value of the socio-institutional indicator at the 75th percentile of its distribution.

One might also argue that differences in the lending and deposit rates merely reflect the risk associated with credit in the province, which would mean that our indicator is not a pure measure of bank efficiency. This might be reasonable, but our estimation results confirm that an important determinant of productivity, in those provinces with lower socio-institutional environment levels, is an increase in the socio-institutional environment level itself. Thus, an improvement in the institutions will have direct positive effects on the productivity and will improve the banking market condition by reducing the territorial risk associated to the credit and reduce the spread between lending and deposit rates.

As described in Section 4, the regressors might be correlated with the firm-specific time-varying idiosyncratic component of the error term. We control for this potential endogeneity problem by using both a 2SLS pooled and a difference GMM estimator.[24]

The estimation results (Table 6 and 7) confirm the main results obtained with the pooled OLS and panel within-group estimators, even if some results turn out to be slightly weaker.

6 Differential effects

6.1 Model specification and estimation approach

To test for the effect of local financial development on productivity, we also propose an alternative approach that looks at the differential effects between industries. In particular, we build a test similar to the one proposed by Fisman

[24] In the first-difference GMM estimation, we use as instruments the five lagged values of all the regressors except the time dummies and the index of the socio-institutional environment (which are used as instruments). The Sargan test in all the model specifications does not indicate the presence of important model misspecifications.

and Love (2007), who assumed that exogenous shocks create new opportunities for growth in some industries, and show that a higher level of financial development is a determinant of the exploitation of these industries' growth.[25]

This test allows us to identify one of the channels through which finance has an impact on the real economy, and thus it reduces the endogeneity problems that might affect our estimated relationship.

Following Fisman and Love (2007), our measure of growth opportunities is defined as the median firm average real growth rate of sales for each industry in the benchmark economy, with Lombardy (the Italian region with the most developed banking market) acting as a benchmark economy.[26]

Thus, we use our main estimation sample of Italian firms (excluding firms operating in Lombardy, to ensure the exogeneity of the industry-specific indicator of growth opportunity) and we estimate a model specification including an interaction term between the measure of financial development of interests and an industry-specific indicator of growth opportunities (*GO*). We average the data over the period 1999 to 2007 and we estimate a cross-section, since our measure of industry growth opportunity and instrumental variables do not have a time dimension.[27]

If financial development (*FD*) contributes to the higher value of productivity in those industries that, in our benchmark economy (Lombardy), are experiencing higher growth rates (i.e., they have more growth opportunities, *GO*), we would expect to find a positive and statistically significant sign for the coefficient of the interaction term between financial development and growth opportunity indicator

[25] The idea is a variant of the Rajan and Zingales' (1998) original approach, which is widely used in the finance and growth literature. Rajan and Zingales' (1998) estimated the differential effect of financial development on firms' growth across industries, assuming that the industries differ from each other in terms of external financial dependence.

[26] The firm-level data for the real growth rate of sales in Lombardy come from the Aida dataset for the period 1999–2007. We apply to this sub-sample of firms the same cleaning criteria illustrated in Section 3. In Table 3, we report the value of the computed growth opportunity indicator for each industry.

[27] However, we have tried to build an industry-year index of growth opportunity and interact it with province-year measures of financial dependence; we have obtained similar results.

(*FD*GO*). Similarly, if the effect of financial development is conditional on the quality of the socio-institutional environment, we will find a statistically significant coefficient of the interaction term between financial development, the index of the socio-institutional environment, and the growth opportunity indicator (*FD*SI*GO*).

This model specification and the interaction term between our measures of financial development and the industry-specific index of growth opportunity (computed using a benchmark economy) might partially reduce the endogeneity problems in the relationship between the performance of the real economy and financial development. In particular, by using the estimated model specification (which is now a cross-section and does not have a time dimension), we reduce the omitted variable problems by including industry and provincial fixed effects without introducing identification problems. In fact, the effect of financial development is still identified, since it is interacted with an industry-specific index of growth opportunity.

6.2 Estimation results

In Table 8, we report the OLS and 2SLS estimations of our measures of banking development for different socio-institutional environment levels, differencing the effects between industries according to their growth opportunities.[28]

The OLS estimation results (Table 8, columns 1–2) show that firms operating in industries with higher growth opportunities are associated with higher productivity if they are located in provinces with higher levels of financial development (either higher values of *Loans*/*VA* or higher values of 1-*Spread*) and socio-institutional environment (*SI*).

However, we check whether our estimation results might be affected by endogeneity problems (Table 8 columns 3–4). We instrument our suspected endogenous regressors *FD*GO* and *FD*SI*GO* with measures of the 1936 banking market structure in the same province. In particular, we use the 1936 bank

[28] In these model specifications, we use the alternative version of the synthetic index of the socio-institutional environment, which also includes a measure of violence. However, when using the previous version, we obtain similar estimation results.

branches and share of branches owned by local banks over the total number of branches (interacted by *GO* as instruments for *FD*GO*, and interacted by *SI* and *GO* as instruments for *FD*SI*GO*).[29] These instruments always show a statistically significant sign in first-stage regressions. The regression-based form of the Durbin-Wu-Hausman test for exogeneity indicates that both the interaction terms *FD*GO* and *FD*SI*GO* might be endogenous. Therefore, we might prefer to use a 2SLS estimator, as the error terms of the first-stage regressions are not jointly equal to 0 when we include them in the model specification with both *FD*GO* and *FD*SI*GO*.

Now, let us conduct the following exercises to better understand the estimated coefficients. For instance, the productivity of firms operating in the industry at the 75th percentile of the growth opportunity indicator would be 0.4% higher than firms operating in the 25th percentile of the same distribution when the socio-institutional environment is at the 75th percentile of its distribution. This result confirms that larger sized local banking systems help to exploit growth opportunities, but this advantage is larger when the quality of the socio-institutional environment is better.[30]

Then we show interesting (and tricky) results of the differential effect of a decrease in the difference between the lending and deposit rates (higher values of the variable 1-*Spread*). In fact, if in the previous estimations we have seen that the *average* effects of higher 1-*Spread* are positive and decreasing for higher levels of socio-institutional environment; the estimation results in Table 8 columns 2 and 4 indicate that higher 1-*Spread* does not help to exploit growth opportunities, and, in particular, the *differential* effects between industries with different growth opportunities are negatively larger for lower socio-institutional environment

[29] This is similar to assuming that the old structure of the provincial banking system has differential effects on the current structure, depending on the quality of the socio-institutional environment.

[30] When controlling for extreme values of the averaged dependent variable and when employing a dummy variable (instead of a continuous variable) as an indicator of growth opportunities (taking the value of 1 for industries growing above the median value and 0 otherwise), we obtain similar results.

levels. In other words, in South Italy, the average effect of an increase in the efficiency of the banking market on productivity is larger and positive, but firms operating in high-growth opportunities industries need an improvement of the quality of the socio-institutional environment to exploit their potential. Conversely, in the rest of the country, the average effect of an increase in the efficiency of the banking market is lower than in the South, but it helps firms operating in high-growth opportunities industries to exploit their potential and to have higher productivity levels than the firms in low-growth opportunities industries.

7 Conclusions

The Italian banking market is highly segmented. The Northern and Central provinces have more developed markets compared to the Southern provinces, in terms of the dimension and efficiency of the banking services. In this study, we tested whether the local banking markets' characteristics are among the determinants of the differences in productivity between the provinces. In particular, taking into account that the socio-institutional environment is a determinant of local financial development, we tested whether the real effects of local banking market characteristics are conditional on the quality of the socio-institutional environment.

We found that larger local banking markets are associated with higher labor productivity when the socio-institutional environment is developed, that is, in the Northern and Central areas of the country. Furthermore, an increase in banking market efficiency has a larger effect on productivity in those areas characterized by low levels of trust, low participation in determining political institutions, the presence of criminal organizations, and low levels of enforcement (e.g., Mezzogiorno).

According to our results, we can interpret improvements in the socio-institutional environment as enhancing a virtuous cycle: they can increase the *level* of local financial development and create better business opportunities that facilitate the positive *effects* of easier credit availability.

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Table 1. Firm-level variables: summary statistics

Variable	Obs.	mean	sd	p25	p50	p75
FULL SAMPLE						
ln(Y/L)	590079	3.905	0.551	3.558	3.820	4.177
ln(K/L)	590079	3.020	1.447	2.051	3.049	3.979
ln(leverage)	590079	0.655	0.266	0.522	0.731	0.859
ln(size)	590079	2.640	1.289	1.792	2.639	3.497
ln(age)	590079	2.592	0.787	2.079	2.708	3.135
CENTRE-NORTH						
ln(Y/L)	497864	3.922	0.547	3.573	3.841	4.190
ln(K/L)	497864	2.966	1.432	2.009	2.994	3.908
ln(leverage)	497864	0.653	0.268	0.519	0.730	0.857
ln(size)	497864	2.700	1.282	1.792	2.708	3.526
ln(age)	497864	2.633	0.776	2.197	2.773	3.178
MEZZOGIORNO						
ln(Y/L)	92215	3.813	0.563	3.480	3.759	4.102
ln(K/L)	92215	3.314	1.494	2.310	3.377	4.336
ln(leverage)	92215	0.667	0.261	0.533	0.736	0.869
ln(size)	92215	2.316	1.277	1.386	2.303	3.178
ln(age)	92215	2.368	0.805	1.792	2.485	2.944

Note: Data refer to variables at the firm-level for an unbalanced panel of 177,189 Italian firms in the period 1999-2007. Data come from AIDA-Bureau Van Dijk database. ln(Y/L) is the log of the real value added per worker. ln(K/L) is the log of the real fixed capital per worker. ln(size) is the log of the number of workers, ln(age) is the log of the firm's age. ln(leverage) is the log of a measure of leverage, given by short-term debt plus long-term debt over total assets.

Table 2. Province-level variables: summary statistics

Variable	Obs.	mean	sd	Min	p25	p50	p75	Max
FULL SAMPLE								
Loans/VA	927	0.326	0.186	0	0.18	0.32	0.45	1
(1-Spread)	927	0.642	0.216	0	0.53	0.66	0.83	1
SI	927	0.724	0.108	0.17	0.67	0.75	0.8	0.93
CENTRE-NORTH								
Loans/VA	603	0.406	0.164	0.01	0.3	0.39	0.49	1
(1-Spread)	603	0.727	0.158	0.31	0.61	0.71	0.86	1
SI	603	0.775	0.060	0.74	0.78	0.82	0.93	0.74
MEZZOGIORNO								
Loans/VA	324	0.175	0.119	0	0.08	0.15	0.24	0.63
(1-Spread)	324	0.484	0.220	0.31	0.53	0.66	0.87	0.31
SI	324	0.628	0.113	0.55	0.64	0.72	0.87	0.55

Note: Data refer to variables at province-level for 103 provinces in the period 1999-2007. All variables are standardized using a min-max approach. Loans/VA is the ratio of loans to productive sector (i.e., non-financial firms as well as family enterprises) to value added (sources: Bank of Italy and ISTAT): an higher value indicates a larger size of the banking sector respect to the province's economy. 1-Spread is 1 minus the spread between lending and deposit rates (source: Bank of Italy): a higher value indicates a more efficient banking sector. SI is our synthetic indicator of the quality of socio-institutional environment (based on voter turnout, the average length of bankruptcy procedures, the number of murders or attempted murders 100,000 inhabitants (soirces: ISTAT and Ministry of the Interior): an higher value indicates an higher quality of the socio-institutional environment.

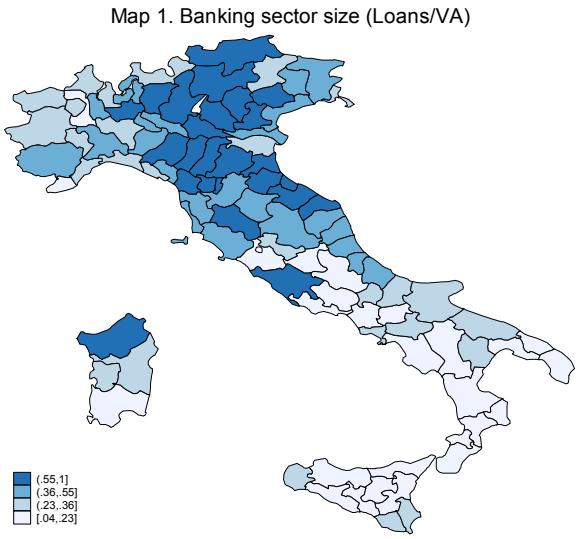
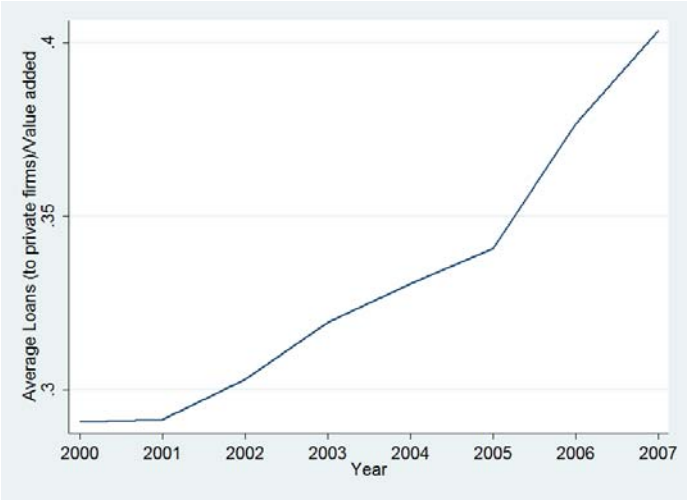


Figure 1. Time trend of the Loans/VA indicator



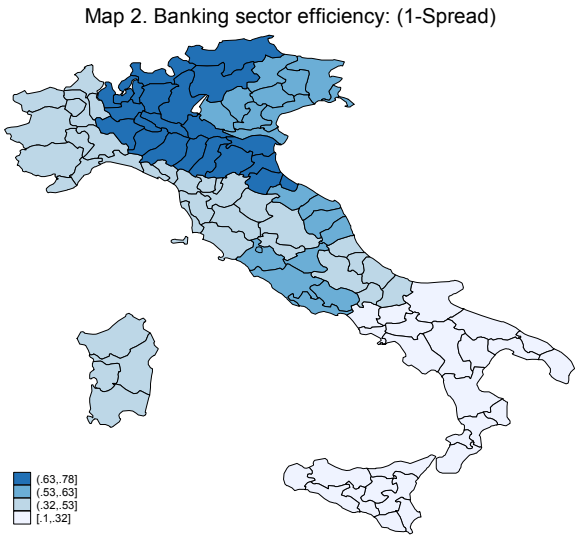
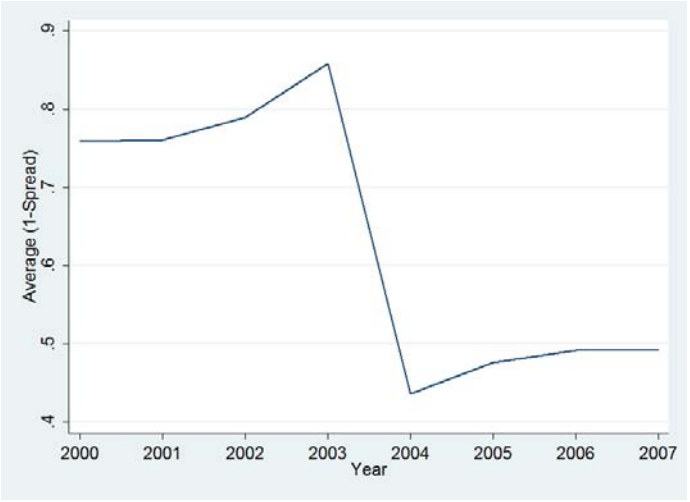


Figure 2. Time trend of the (1-Spread) indicator



Map 3. Indicator of quality of the socio-insitutional environment

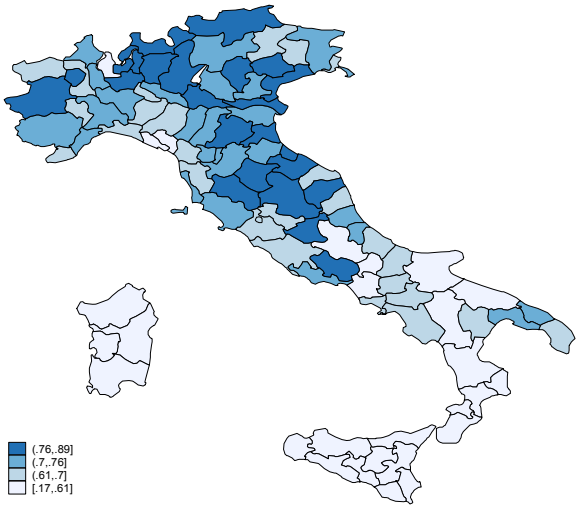


Figure 2. Time trend of the socio-institutional environment indicator

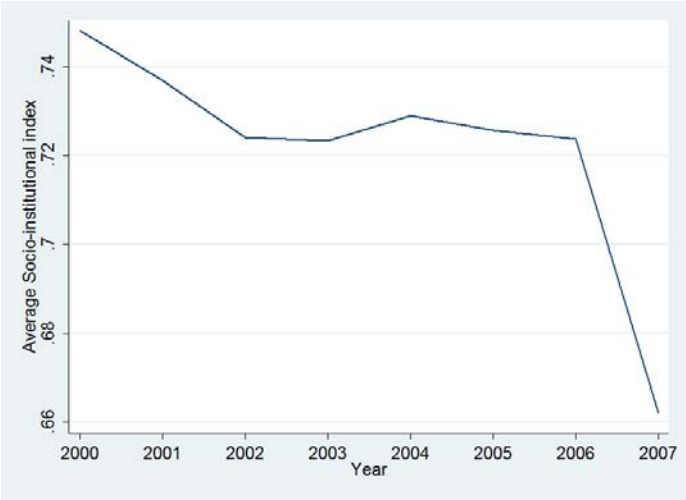


Table 3. Industry level indicator of growth opportunities (GO)

Manufacturing		Construction		Wholesale-Retail		Services	
NACE	GO	NACE	GO	NACE	GO	NACE	GO
15	0.027	45	0.056	50	0.024	60	0.028
16	NA			51	0.027	61	NA
17	-0.005			52	0.007	62	0.083
18	-0.15			55	0.013	63	0.023
19	0.029					64	0.021
20	0.032					70	0.031
21	0.016					71	0.031
22	0.005					72	0.018
23	0.048					73	0.058
24	0.034					74	0.030
25	0.030					93	0.006
26	0.042						
27	0.070						
28	0.040						
29	0.031						
30	0.029						
31	0.036						
32	0.023						
33	0.016						
34	0.031						
35	0.040						
36	0.018						

Note: The table reports the NACE 1.1 industry and our corresponding indicator of growth opportunities (GO). The indicator is computed for a sample of firms located in Lombardy (the richest Italian region) in the period 1999-2007. It represents the median firm average real growth rate of sales in each industry (source: AIDA Bureau van Dijk).

Table 4. Banking sector size, socio-institutional environment and firm productivity: pooled OLS and panel fixed effects estimations

Dependent	ln(VA/L): labor productivity					
	Pooled OLS	Pooled OLS	Pooled OLS	Panel FE	Panel FE	Panel FE
	(1)	(2)	(3)	(4)	(5)	(6)
Loans/VA	0.226***	0.044	-0.364	0.086**	-0.397**	-0.467**
	(0.037)	(0.241)	(0.253)	(0.043)	(0.177)	(0.197)
Loans/VA*SI		0.236	0.760**		0.621***	0.711***
		(0.315)	(0.335)		(0.222)	(0.250)
SI	-0.086	-0.174	1.490***	0.080*	-0.144*	0.451**
	(0.062)	(0.119)	(0.320)	(0.044)	(0.085)	(0.197)
SI^2			-1.307***			-0.464***
			(0.272)			(0.162)
Firm-level controls	X	X	X	X	X	X
Industry FE	X	X	X			
Region FE	X	X	X			
Year dummy	X	X	X	X	X	X
Observations	590,079	590,079	590,079	477,768	477,768	477,768
R-squared	0.253	0.253	0.254	0.436	0.437	0.437

Note: Robust standard errors clustered at the province-level in parentheses. Significance: ***p<0.01, **p<0.05, *p<0.1. The dependent variable is the log of the real value added per worker (ln(Y/L). Loans/VA is the ratio of loans to productive sector (i.e., non-financial firms as well as family enterprises) to value added. SI is our indicator of quality socio-institutional environment. When denoted X regressions additionally include: firm-level control variables (i.e., the log of the real fixed capital per worker ln(K/L). the log of the number of workers ln(size), the log of the firm's age ln(age), a measure of leverage and its squared term, given by short-term debt plus long-term debt over total assets (leverage)); Region FE (i.e., a set of dummy variables for region where the firm is located; Industry FE (i.e. a set of dummy variables for the main industry the firm operates); Year FE (i.e. a set of dummy variables for the corresponding year).

Table 5. Banking efficiency, socio-institutional environment and firm productivity: pooled OLS and panel fixed effects estimations

Dependent	ln(VA/L): labor productivity					
	Pooled OLS	Pooled OLS	Pooled OLS	Panel FE	Panel FE	Panel FE
	(1)	(2)	(3)	(4)	(5)	(6)
(1-Spread)	0.323***	1.187***	1.185***	0.088***	0.529***	0.573***
	(0.078)	(0.205)	(0.196)	(0.028)	(0.106)	(0.121)
(1-Spread)*SI		-1.305***	-1.301***		-0.636***	-0.698***
		(0.248)	(0.241)		(0.139)	(0.161)
SI	-0.030	0.866***	0.876**	0.098**	0.491***	0.247
	(0.085)	(0.156)	(0.359)	(0.045)	(0.103)	(0.198)
SI^2			-0.009			0.209
			(0.269)			(0.181)
Firm-level controls	X	X	X	X	X	X
Industry FE	X	X	X			
Region FE	X	X	X			
Year dummy	X	X	X	X	X	X
Observations	590,079	590,079	590,079	477,768	477,768	477,768
R-squared	0.252	0.253	0.253	0.436	0.437	0.437

Note: Robust standard errors clustered at the province-level in parentheses. Significance: ***p<0.01, **p<0.05, *p<0.1. The dependent variable is the log of the real value added per worker (ln(Y/L). 1-Spread is the 1 minus the spread between lending and deposit rates. SI is our indicator of the quality of socio-institutional environment. When denoted X regressions additionally include: firm-level control variables (i.e., the log of the real fixed capital per worker ln(K/L). the log of the number of workers ln(size), the log of the firm's age ln(age), a measure of leverage and its squared term, given by short-term debt plus long-term debt over total assets (leverage)); Region FE (i.e., a set of dummy variables for region where the firm is located; Industry FE (i.e. a set of dummy variables for the main industry the firm operates); Year FE (i.e. a set of dummy variables for the corresponding year).

Table 6. Banking sector size, socio-institutional environment and firm productivity: pooled 2SLS and GMM first-diff estimations

Dependent	ln(VA/L): labor productivity					
	Pooled 2SLS	Pooled 2SLS	Pooled 2SLS	GMM FD	GMM FD	GMM FD
	(1)	(2)	(3)	(4)	(5)	(6)
Loans/VA	0.496***	-0.754***	-0.523**	0.280*	-0.332	-0.472
	(0.085)	(0.286)	(0.243)	(0.153)	(0.305)	(0.326)
Loans/VA*SI		1.664***	1.249***	0.849*	0.987**	0.849*
		(0.414)	(0.325)	(0.445)	(0.450)	(0.445)
SI	-0.167**	-0.798***	1.351***	0.004	-0.256*	0.633***
	(0.084)	(0.197)	(0.340)	(0.035)	(0.144)	(0.241)
SI^2			-1.385***			-0.670***
			(0.306)			(0.245)
Firm-level controls	X	X	X	X	X	X
Industry FE	X	X	X			
Region FE	X	X	X			
Year dummy	X	X	X	X	X	X
Observations	590,079	590,079	590,079	193,359	193,359	193,359
R-squared	0.252	0.253	0.253			
Endogeneity test	0.000	0.000	0.000			
AR(1)				0.000	0.000	0.000
AR(2)				0.653	0.423	0.335
Sargan test				0.401	0.187	0.283

Note: Robust standard errors clustered at the province-level in parentheses. Significance: ***p<0.01, **p<0.05, *p<0.1. The dependent variable is the log of the real value added per worker (ln(Y/L). Loans/VA is the ratio of loans to productive sector (i.e., non-financial firms as well as family enterprises) to value added. SI is our indicator of quality socio-institutional environment. When denoted X regressions additionally include: firm-level control variables (i.e., the log of the real fixed capital per worker ln(K/L). the log of the number of workers ln(size), the log of the firm's age ln(age), a measure of leverage and its squared term, given by short-term debt plus long-term debt over total assets (leverage)); Region FE (i.e., a set of dummy variables for region where the firm is located; Industry FE (i.e. a set of dummy variables for the main industry the firm operates); Year FE (i.e. a set of dummy variables for the corresponding year). In columns (1-3) the 1936 values of branches per inhabitant, the share of bank branches owned by local banks over total branches, the number of saving banks, and the number of cooperative banks per capita, all interacted with time dummies, are used as instruments for the values of bank loans-to-value added ratio; the same set of instruments interacted with the socio-institutional indicator are used as instruments for the values of the interaction terms between bank loans-to-value added ratio and the socio-institutional indicator. In columns (4-6), the set of instruments include lagged values of loans-to-value added ratio, lagged values of loans-to-value added ratio interacted with the socio-institutional indicator (only in columns 5-6), lagged values of fixed capital per employee, lagged values of size, and lagged values of leverage and its squared values. Values of age, year dummies, and values of socio- institutional indicator, and squared values of institutional indicator (only in column 6) are also used as instruments. Exogeneity is the regression-based form of the Durbin-Wu-Hausman test: if the null hypothesis is not rejected OLS estimations are preferred: p-values are reported. AR(1) and AR(2) test the presence of first and second order serial correlation in the transformed error: p-values are reported. Sargan is a Sargan test of the validity of the overidentifying orthogonality conditions: p-values are reported.

Table 7. Banking efficiency, socio-institutional environment and firm productivity: pooled 2SLS and GMM first-diff estimations

Dependent	ln(VA/L): labor productivity					
	Pooled 2SLS	Pooled 2SLS	Pooled 2SLS	GMM FD	GMM FD	GMM FD
	(1)	(2)	(3)	(4)	(5)	(6)
(1-Spread)	0.461***	1.136***	0.861**	-0.322*	0.392**	0.495**
	(0.136)	(0.243)	(0.390)	(0.193)	(0.172)	(0.204)
(1-Spread)*SI		-1.177***	-0.698		-1.282***	-1.515***
		(0.275)	(0.465)		(0.347)	(0.430)
SI	-0.035	0.777***	1.133**	0.038	0.950***	0.432**
	(0.086)	(0.200)	(0.553)	(0.036)	(0.252)	(0.210)
SI^2			-0.483			0.494*
			(0.589)			(0.262)
Firm-level controls	X	X	X	X	X	X
Industry FE	X	X	X			
Region FE	X	X	X			
Year dummy	X	X	X	X	X	X
Observations	590,079	590,079	590,079	193,359	193,359	193,359
R-squared	0.251	0.251	0.252			
Endogeneity test	0.351	0.187	0.843			
AR(1)				0.000	0.000	0.000
AR(2)				0.917	0.125	0.107
Sargan test				0.118	0.463	0.482

Note: Robust standard errors clustered at the province-level in parentheses. Significance: ***p<0.01, **p<0.05, *p<0.1. The dependent variable is the log of the real value added per worker (ln(Y/L). 1-Spread is the 1 minus the spread between lending and deposit rates. SI is our indicator of the quality of socio-institutional environment. When denoted X regressions additionally include: firm-level control variables (i.e., the log of the real fixed capital per worker ln(K/L). the log of the number of workers ln(size), the log of the firm's age ln(age), a measure of leverage and its squared term, given by short-term debt plus long-term debt over total assets (leverage)); Region FE (i.e., a set of dummy variables for region where the firm is located; Industry FE (i.e. a set of dummy variables for the main industry the firm operates); Year FE (i.e. a set of dummy variables for the corresponding year). In columns (1-3) the 1936 values of branches per inhabitant, the share of bank branches owned by local banks over total branches, the number of saving banks, and the number of cooperative banks per capita, all interacted with time dummies, are used as instruments for the values of 1-Spread; the same set of instruments interacted with the socio-institutional indicator are used as instruments for the values of the interaction terms between bank loans-to-value added ratio and the socio-institutional indicator. In columns (4-6), the set of instruments include lagged values of 1-Spread, lagged values of 1-Spread interacted with the socio-institutional indicator (only in columns 5-6), lagged values of fixed capital per employee, lagged values of size, and lagged values of leverage and its squared values. Values of age, year dummies, and values of socio-institutional indicator, and squared values of institutional indicator (only in column 6) are also used as instruments. Exogeneity is the regression-based form of the Durbin-Wu-Hausman test: if the null hypothesis is not rejected OLS estimations are preferred: p-values are reported. AR(1) and AR(2) test the presence of first and second order serial correlation in the transformed error: p-values are reported. Sargan is a Sargan test of the validity of the overidentifying orthogonality conditions: p-values are reported.

Table 8. Banking sector development, socio-institutional environment and firm productivity: differential effects across different growth-opportunity industries

Dependent	ln(VA/L): labor productivity			
	OLS	OLS	OLS	2SLS
	(1)	(2)	(3)	(4)
Loans/VA*GO	-4.7382		-11.791**	
	(2.094)		(4.829)	
Loans/VA*SI*GO	9.646**		16.568***	
	(4.267)		(5.157)	
(1-Spread)*GO		-1.932		-13.961***
		(3.463)		(5.264)
(1-Spread)*SI*GO		5.380		15.737***
		(3.274)		(4.754)
Firm-level controls	X	X	X	X
Industry FE	X	X	X	
Province FE	X	X	X	
Observations	590,079	590,079	590,079	193,359
R-squared	0.251	0.251	0.252	
Endogeneity test			0.024	0.122

Note: Robust standard errors clustered at the province-level in parentheses. Significance: ***p<0.01, **p<0.05, *p<0.1. All variables are averaged for the period 1999-2007. The dependent variable is the log of the real value added per worker (ln(Y/L). Loans/VA is the ratio of loans to productive sector (i.e., non-financial firms as well as family enterprises) to value added. 1-Spread is the 1 minus the spread between lending and deposit rates. SI is our indicator of the quality of socio-institutional environment. The GO industry specific indicator of growth opportunities is computed on Lombardia. Firms located in Lomabardia are excluded from this sample. This sample is restricted to 36 NACE sectors because of missing value for the GO indicator. When denoted X regressions additionally include: firm-level control variables (i.e., the log of the real fixed capital per worker ln(K/L). the log of the number of workers ln(size), the log of the firm's age ln(age), a measure of leverage and its squared term, given by short-term debt plus long-term debt over total assets (leverage)); Province FE (i.e., a set of dummy variables for province where the firm is located; Industry FE (i.e. a set of dummy variables for the main industry the firm operates). The 1936 values of bank branches per inhabitant, the 1936 share of branches owned by local banks over total number of branches, the 1936 values of bank branches per inhabitant interacted with the socio-institutional indicator, and the 1936 share of branches owned by local banks over total number of branches interacted with the socio-institutional indicator are used as instruments for: in column 3, the 1999-2007 average loans to value added ratio and loans to value added ratio interacted with the socio-institutional indicator, respectively; in column 4, the 1999-2007 average bank spread and bank spread interacted with the socio- institutional indicator, respectively. Exogeneity is the regression-based form of the Durbin-Wu-Hausman test: if the null hypothesis is not rejected OLS estimations are preferred: p-values are reported.