One size does not fit all. Cooperative banking and income inequality

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Abstract

The re-regulation wave following the global financial crisis is putting pressure on local community and cooperative banks. In this paper, we show that cooperative banking can play a pivotal role in reducing income inequalities in local communities. By analyzing Italian local (provincial) credit markets over the 2001-2011 period, we find that cooperative banks mitigate income inequality more than their commercial counterparts. This effect remains significant when we account for the pervasiveness of relationship lending in the provinces, suggesting that it is the specific nature and orientation of cooperative banks, rather than their lending technologies, that improve income distribution. The impact of cooperative banking on inequality appears to be mainly channeled by reduced migratory flows and lower business turnover.

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1 Introduction

The re-regulation wave following the global financial crisis has produced a complex system of new rules. Under the pressure of the crisis, Basel III emerged as a much more complete version of Basel II, combining high capital requirements, time variant macro-prudential buffers, continuous sound liquidity, availability of stable funding sources, and risk management practices. But the feature that really stands out in the new regulation is complexity, in terms of data, analytics, implementation and reporting requirements (Masera, 2015).[1] The application of the new regulation is challenging to all financial market participants, but especially to small financial institutions. Basel III treats all banks virtually the same, and this uniformity affects unfavorably the smaller local or community banks, which are at risk of losing ground. This issue has been intensely debated in the United States, where a dual-regulatory system has already been implemented. The European application of Basel III, instead, does not make any substantial distinction between large and local banks: with the exception of the global systematically important financial institutions, the European regulatory approach envisages a one-size-fits-all regulatory framework. The asymmetric effect of regulation on banking structure can reverberate onto firms and regional economies, in light of the fact that small firms and peripheral regions are highly dependent on bank credit (Alessandrini et al., 2016).

The literature on the real effects of financial institutions is large. By performing critical functions in the economic system, i.e. the reduction of transaction costs and asymmetric information, the efficient allocation of financial resources, the hedging, sharing and pricing of risk, financial institutions can foster economic growth, mitigate income inequality and reduce poverty (King and Levine, 1993; Beck and Levine, 2004). Although the literature has widely investigated this topic, it has generally considered homogeneous financial institutions, without distinguishing the effect of different financial intermediaries. The aim of this study is to fill this gap, by investigating whether the nature of credit institutions, especially their engagement in cooperative banking, plays a role in the reduction of income inequalities. The comparative advantage in lending to informationally opaque borrowers by engaging in "relationship lending" and the local orientation of cooperative banks could have a beneficial effect on inequalities (Angelini et al., 1998; Berger et al., 2004; Liang, 2008). A local bank operating in a small community, owned and/or managed by community members, may take advantage of privileged information in the lending activity thus improving credit availability. Moreover, the commitment to support the economic development of the local community by reinvesting a significant portion of their available profits back into the territory may make cooperative banks more effective in improving income distribution (EACB, 2018).

In order to test these predictions, we analyze Italian local credit markets, i.e. Italian provinces, over the period 2001-2011. By drawing information from the Italian Ministry of Economics and Finance, the Bank of Italy, and the Italian National Statistics Office (Istat), we find that cooperative banks reduce income inequality significantly more than their commercial counterparts. This finding is robust to different measures of income inequality, different proxies of local banking structure (cooperative bank branches, popular bank branches, commercial bank branches), and a battery of estimation techniques (panel fixed effects, Arellano-Bond

[1] Haldane (2011) provides a simple metric of such complexity: "Using an advanced internal set of models to calibrate capital [...] the number of risk buckets has increased from around seven under Basel I [...] to, on a conservative estimate, over 200,000 under Basel II [...] to over 200 million under Basel III."

and 2SLS models). Moreover, we find that the effect of cooperative bank branches on income inequality remains significant even controlling for the pervasiveness of relationship lending in the province, suggesting that cooperative banks have a beneficial effect on inequality that is not entirely explained by their lending technology. The analysis then turns to investigate the channels through which cooperative banks mitigate income inequality. In particular, we focus on the role played by the effects of cooperative banking on urbanization, geographical mobility, material infrastructures, entrepreneurship and human capital. Estimation results indicate that the reduction of income inequality produced by cooperative banks is mainly channeled by a reduction of migratory flows and a lower turnover of local businesses.

The analysis contributes to different fields of the economic and finance literature. First, we contribute to the extensive literature on finance and inequality, by analyzing the effect of different types of banks on income inequality. By highlighting a beneficial role of cooperative banks on income distribution, we also contribute to the literature on the advantages of cooperative banking. To the best of our knowledge, this is the first study showing that cooperative banking reduces income inequality more than other types of financial intermediaries. Finally, we add to the literature on the mechanisms affecting the financial development - inequality nexus, by highlighting the crucial role of geographical mobility and entrepreneurship. As noted, the results can also provide important insights into the optimal design of banking regulations.

The remainder of the paper is organized as follows. Section 2 provides a general outlook of the history of the local banking system in Italy. Section 3 reviews the current literature on the link between finance and inequality, and on the role of cooperative banks in the financial system. Section 4 describes the data and the econometric approach. Section 5 discusses the main empirical results. In Section 6, we investigate the mechanisms underlying our findings. Section 7 concludes.

2 Institutional background

Italy provides an ideal environment to study the impact of cooperative banks on income inequality. As the stock market capitalization is still low, the Italian financial system is dominated by the banking sector.[2] On average, over the 2000-2010 period, the ratio of bank credit over GDP was 72.36 percent, a figure similar to that of France (82.02 percent), Belgium (85.23 percent) and Finland (84.35 percent). Also, the high dependence of Italian firms on bank lending is analogous to that observed in other European countries. At the end of 2010, bank lending to Italian firms was equal to 57 percent of GDP, compared with 43 percent in France and 36 percent in Germany (De Bonis et al., 2012). Among banks, a crucial role is played by cooperative ones. According to Cihák and Hesse (2007), in the European Union cooperative banks' market share rose from 9 to 15 percent from the mid-1990s to 2004 in terms of total assets.[3] As documented by Becchetti et al. (2016), the increase in the market share of cooperative banks was even stronger in the Italian banking sector.

[2] In 2011, the stock market capitalization, as a percentage of the gross domestic product, was almost 18 percent in Italy, compared to 100 percent in the United States (Minetti et al., 2015).

[3] Specifically, in 2012 the EU had 4000 cooperative banks with 72,000 branches, more than 850,000 employees, 56 million members, 217 million clients, 3932 billion Euro in deposits, 4034 billion Euro of loans, and 6951 billion Euro in total assets (Fiordelisi and Mare, 2014).

Due to the liberalization of branches and the increase in mergers and acquisitions, since 1990 the structure of the Italian banking system has changed drastically. Despite the overall reduction in the number of banks, between 1990 and 2010 the number of branches jumped from 16,600 to 33,600. The average number of banks per province has risen and the greater territorial overlap among banks has fostered competition (De Bonis et al., 2012). In Italy, a strong provincial presence of bank branches has traditionally been crucial for promoting access to credit and financial inclusion. As it is particularly difficult for households and firms to borrow in a market other than the local one, the presence of banks in a province is the main driver of economic growth (Petersen and Rajan, 2002; Guiso et al., 2004, 2012). Moreover, due to informational disadvantages, banks entering new provincial markets have been shown to suffer from higher loan default rates (Bofondi and Gobbi, 2006).

3 Literature review

Financial intermediaries perform critical functions in the economic system. They reduce the frictions stemming from transaction costs and asymmetric information and efficiently allocate financial resources (Allen and Santomero, 1997; Stein, 2002). Financial intermediaries also provide ways of transferring economic resources through time, across borders, and among industries (Merton and Bodie, 1995). Further, they make it possible for corporations and individuals to efficiently handle economic uncertainties by hedging, pooling, and pricing risks. The recent theoretical and empirical literature has convincingly shown that well-functioning financial systems can foster economic growth and reduce poverty (King and Levine, 1993; Bencivenga et al., 1995; Beck and Levine, 2004). However, the relative impact of different financial intermediaries, such as cooperative and commercial banks, on economic growth and income inequality has not been properly investigated. In order to provide a better understanding of the relation between cooperative banks' presence and income inequality, in this section we review the current literature on the finance-inequality nexus and discuss the role of cooperative banks in the financial system.

3.1 The finance-inequality nexus

When financial markets and intermediaries work well, they provide opportunities for all market participants to take advantage of effective investments by diverting resources to more productive uses, thus promoting economic growth and reducing inequalities (Seven and Coscun, 2016). The theoretical literature describes different channels through which financial development can reduce inequality. First, financial development may allow low-income individuals to invest in education (Galor and Zeira, 1993; Aghion and Bolton, 1997; Galor and Moav, 2004). Second, by improving credit availability, financial development may decrease collateral requirements and borrowing costs, promoting entrepreneurship and new firm creation (Banerjee and Newman, 1993). Third, financial development may alter the distribution of income through an increased labour demand by firms, which may benefit low-income employees (Beck et al., 2010).

A growing empirical literature has tested these theoretical predictions. Using data for 49 developed and developing countries for the period 1947-1994, Li et al. (1998) provide evidence that financial development significantly reduces income inequality. Clarke et al.

(2006) confirm this result. By investigating the relationship between financial development and income inequality for a sample of 83 countries over the period 1960-1995, the authors find that inequality is reduced when financial development increases. By extending the time period until 2005 and analyzing 72 countries, Beck et al. (2007) show that financial development strongly decreases income inequality and disproportionately raises the income of the poorest quintile of the distribution.[4] Kappel (2010) finds that financial development reduces both poverty and income inequality, with a stronger effect of financial development on poverty than on income distribution. Recently, some studies have also performed country-level analyses, which allows to mitigate the risk of omitted variable bias. Gine and Townsend (2004) analyse the impact of financial development on income inequality in Thailand and find that access to financial services has a negative impact on income inequality through an increase in labour demand. By studying the effects of a state-led bank branch expansion program in Indian states during the period 1997-1990, Burgess and Pande (2005) indicate that local financial development significantly reduces rural poverty. Beck et al. (2010) report that the bank deregulation of the United States tightened the income distribution by increasing incomes in the lower tail. Finally, more closely related to our paper, D'Onofrio et al. (2019) find that local banking development mitigates income inequality in Italy. Some theoretical and empirical studies also show that the link between financial development and income inequality may be non-linear but depend on the level of economic development. For example, Greenwood and Jovanovic (1990) show that income inequality first increases and then decreases as higher levels of economic and financial development are reached and larger segments of the population can access the growing financial markets. A similar inverted U-shaped relationship between finance and income inequality is described by Greenwood and Smith (1997) and Townsend and Ueda (2006). These authors suggest that important non-linearities can occur in the financial development-inequality nexus because the development of sophisticated financial institutions may entail sizeable fixed costs.

Our paper contributes to this strand of literature. In particular, we investigate whether different types of financial intermediaries have a different impact on income inequality. The historical segmentation of the Italian local (provincial) credit markets provides us with a unique empirical setting characterized by exogenous heterogeneity in the local importance of different types of credit institutions.

3.2 The role of cooperative banks

According to the literature, cooperative banks differ from other credit institutions in several dimensions (Ferri et al., 2014; Fiordelisi and Mare, 2014; Becchetti et al., 2016).[5] First, their ownership is not transferrable, is limited to individual equity shares, and is redeemable only at the nominal value. In addition, as cooperative banks are mainly locally based and have strong

[4] Deininger and Squire (1998), Dollar and Kraay (2002), White and Anderson (2001) and Ravallion (2001) also uncover a positive effect of finance on poverty reduction.

[5] The International Cooperative Alliance (ICA) defines a cooperative bank as "an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically controlled enterprises. Cooperatives are based on the values of self-help, self-responsibility, democracy, equality, equity and solidarity. In the tradition of their founders, co-operative members believe in the ethical values of honesty, openness, social responsibility and caring for others'" (ICA, 2007).

ties with the community they serve, cooperative banks' members are also the bank's main customers. Second, in terms of control, the primary characteristics of cooperative banks is the "one-member one-vote" rule, regardless of the amount of capital owned. As a consequence, members cannot accumulate votes by underwriting new shares. Finally, and most importantly, cooperative banks aim to maximize members' value by offering products and services along with the distribution of profits.[6]

From a theoretical point of view, the goals and characteristics of cooperative banks can have both pros and cons in terms of quality and availability of credit. On the one hand, the small size and the local orientation of cooperative banks should reduce informational asymmetries between lenders and borrowers (Petersen and Rajan, 1994; Berger and Udell, 1995). Agents taking part in the life of a community develop relationships that allow them to garner information that would be costly for outsiders. A bank operating in a small community, owned and/or managed by community members, may take advantage of this information in its lending activity, thus improving access to credit. On the other hand, local banks may suffer more from scale inefficiencies and be more exposed to the risk of local political capture and higher indulgence toward local businesses, thus undermining the quality of credit (Wheelock and Wilson, 2010; Becchetti et al., 2016). Banerjee et al. (1994) propose two distinct hypotheses related to the patterns of credit relationships developed by cooperative banks. The "long-term interaction" hypothesis emphasizes that credit conditions for small firms are affected not only by individual customer relationships, but also by group interactions within the local community. The "peer-monitoring" hypothesis focuses instead on the specific features of debt contracts embodying group incentive schemes, in which the availability of credit for each member depends on the performance of loans granted to all the others.[7]

Berger et al. (2004) confirm the existence of a comparative advantage of small banks in lending to informationally opaque borrowers. By engaging in "relationship lending", small banks accumulate proprietary information through contact over time with the firm, its owner, its suppliers and customers, and its local community on a variety of dimensions. Some of this relationship-based information is "soft", i.e. not easily quantified or transferrable, such as information about the character and reliability of the firm's owner. [8] Large banks can encounter difficulties in collecting this type of information. They cannot transmit soft information through the communication channels of large banking organizations (Stein, 2002), and are on average headquartered at larger distances from potential SME relationship borrowers, making it difficult to process local, soft information (Alessandrini et al., 2008). The empirical literature generally supports the hypothesis that small and cooperative banks are advantaged in opaque borrowers lending. Some studies find that large banks allocate a much lower portion of their assets to SME loans than do small banks (Berger et al. 2004) and that the ratio of SME loans to assets declines after large banks are involved in M&As (Peek and Rosen-

[6] The cooperative credit sector in Europe is not entirely uniform in terms of legal framework, size, and organization (Fiordelisi and Mare, 2014). However, distinctive features differentiate cooperative banks from other financial intermediaries.

[7] Although this and other studies focus on developing or rural economies, one may argue that, in principle, analogous mechanisms may also be operating in local communities of industrialized countries, thus providing a link with our analysis (Angelini et al., 1998).

[8] In this sense, relationship lending is distinguished from "transactional lending" , under which the borrower's creditworthiness is assessed on the basis of "hard" information which is quantifiable and easily transferrable, such as financial statements, payments histories or credit scores (Berger and Udell, 2006).

gren, 1998; Strahan and Weston, 1998). Using sectoral data, Cannari and Signorini (1997) suggest that the availability of credit in Italy is larger for cooperative banks' customers than for comparable pools of borrowers. More recently, Ferri et al. (2014; 2019) show that local and cooperative banks, because of their better ability to screen and monitor informationally opaque borrowers, reduce less the availability of credit during crisis periods in comparison to other types of credit institutions.

In this paper, we contribute to the literature on cooperative banks by investigating whether cooperative banking reduces income inequality.

4 Data and empirical methodology

4.1 Data set and variable definitions

The data employed to perform the empirical investigation are drawn from three main sources: (i) the Department of Finance of the Italian Ministry of Economics and Finance; (ii) the Statistical Bulletin of the Bank of Italy; (iii) and the Italian National Statistics Office (Istat). More specifically, we first hand-collected and elaborated data from the municipality-level database on tax revenue compiled by the Italian Ministry of Economics and Finance. Then, we obtained information about the typology of bank branches per province from the Bank of Italy, and conditioning provincial information from the Italian National Statistics Office.

Since province-level data of income distribution are not available, we computed them starting from the income data. In particular, we downloaded the spreadsheets on the distribution of taxable income for each of the 8056 Italian municipalities over the 2001-2011 period from the Department of Finance website. For each municipality and each year, we have the frequency and the average income of 28 to 30 income classes. We aggregated this information assigning each municipality to its province and computed the indicators traditionally used in the inequality literature. First, from the Lorenz curve, we derived the Gini coefficient of income distribution (see Appendix Table A.1 for the definition of all variables). The Gini coefficient takes the value of zero if everyone in the province has the same income, and the value of 100 if a single individual receives the income of the entire province. Second, as an alternative measure of income distribution, we computed the Theil index, which is also increasing in the degree of income inequality. This index is equal to zero when all the individuals in a province have the same income, and it is equal to ln(n), with n representing the number of individuals, if one individual receives all of the province's income. Third, as a further measure of income inequality, we examine the difference between the logarithm of incomes of those at the 90th percentile and those at the 10th percentile, and the difference between the logarithm of incomes of those at the 75th percentile and those at the 25th percentile. Finally, we consider a measure of poverty, given by the logarithm of incomes of those at the 10th percentile.

Following the banking literature, we use different measures of local banking structure. First, as our main independent variable, we use the number of cooperative bank branches in a province, normalized by the population of the province. Then, in order to analyze the impact of other credit institutions on income inequality, we computed the same measure also for popular banks (*Banche Popolari*) and commercial banks (*Spa*).[9] Branch density is a key

[9] Popular banks initially shared some common origins with cooperative banks. However, over the decades

indicator of financial inclusion and financial access, which are central elements in the nexus between banking development and inequality (Beck et al., 2007). The rationale for the use of branch density as a measure of local banking development is twofold. First, branch density displays a large dispersion among provinces and is largely affected by the 1936 Italian banking regulation (Benfratello et al., 2008). Second, the number of bank branches over the population is a suitable metric of the demographic penetration of banking services in the provincial credit markets (the relevant market in the Italian banking system) and, hence, of the accessibility of banking services.

As conditioning information, we use a comprehensive set of province-level control variables. From the Istat database we drew information about per capita GDP, unemployment, the distribution of workers among sectors, the trade openness, and the Herfindahl-Hirschman index of bank branches.

Table 1 displays summary statistics for the variables used in the analysis. Appendix Table A.2 provides summary statistics at the regional level (a region comprises one or more provinces). Unsurprisingly, Table 1 shows that commercial banks have the largest presence in the provinces, followed by cooperative banks, and finally by popular banks. Table A.1 also reveals that the average income inequality, measured by the Gini coefficient and the Theil index, is similar among the three Italian macro-areas (North, Center, and South). On average, the regions located in the South of Italy exhibit a lower per capita GDP and a higher unemployment rate. Branch density (number of branches normalized by the population) is larger in northern provinces for all types of financial intermediaries, although cooperative and popular banks seem to be more homogeneously distributed in the Italian territory. Similar conclusions can be drawn from Figure 1, which displays a map of the 103 Italian provinces by Gini coefficient (Figure 1a), and by density of cooperative (Figure 1b), commercial (Figure 1c), and popular bank branches (Figure 1d).

4.2 Econometric specification

To perform our empirical investigation, we start building an empirical model that estimates the impact of the local banking structure on income inequality. In particular, we employ the following regression set-up:

$$Y_p = \alpha_1 + \beta_1 B_p + \beta_2 X_p + \epsilon_p \tag{1}$$

where Y_p denotes, alternatively, one of our proxies of income inequality (i.e., the logarithm of the Gini coefficient or of the Theil index) in province p; B_p is a vector of variables measuring the banking structure of province p; X_p is a vector of province-level control variables and ϵ_p is the error term. The coefficients of interest (β_1) capture the effect of the presence of different types of banks on income inequality in the province.

As noted, considering the provinces of a single country enables us to reduce the risk of omitted variable bias and to implicitly control for differences in formal institutions. However, it is still possible that local banking structure and inequality are jointly determined and that unobserved factors are correlated with both. To further tackle these possible endogeneity

the two types of banks diverged significantly in terms of statutes, organizational features, role of stakeholders, and goals. It is then important to keep the two types of banks carefully distinct in the analysis.

issues, we use an instrumental variable (IV) approach. Let I_p be a vector of instruments correlated with the provincial banking structure, which affect income inequality only through the banking channel. The impact of these instruments on B_p is captured by β_4 in the following equation:

$$B_p = \beta_3 X_p + \beta_4 I_p + u_p \tag{2}$$

where X_p is the vector of control variables of Equation (1), I_p is the vector of instruments, and u_p is the residual.

We first exploit the panel dimension of our dataset by estimating Equation (1) with a fixed effects model, and Equations (1)-(2) through the Arellano-Bond estimator. Then, we use a two-stage least square (2SLS) estimation technique. To implement the latter two empirical approaches, we need an appropriate set of instruments. Following Guiso et al. (2004), Benfratello et al. (2008) and D'Onofrio et al. (2019), we exploit the 1936 Italian banking law and we choose as instruments three different indicators (all measured in 1936): (i) the number of bank branches in the province (per 100,000 inhabitants), the number of savings banks in the province (per 100,000 inhabitants), and the number of popular banks (*Banche Popolari*) in the province (per 100,000 inhabitants). The objective of the 1936 regulation was to enhance bank stability through restrictions on bank competition. The law imposed strict limits on the ability of different types of banks to open new branches. In particular, each credit institution was attributed to a geographical area of competence based on its presence in 1936 and its ability to grow and lend was restricted to that area.[10] Bank entry in local credit markets was fully liberalized only towards the end of the 1990s, but the 1936 banking regulation affected the local banking structure also in the following decades (Guiso et al., 2004). Hence, we expect the local tightness of the regulation to be correlated with the current local banking structure. As discussed by Guiso et al. (2004), in 1936 the distribution of types of banks across provinces, and hence, the constrictiveness of regulation in a province, did not reflect market forces but stemmed from "historical accident" and in particular from the interaction between previous waves of bank creation and the history of the Italian unification. In addition, the banking law was not designed looking at the needs of the provinces. In fact, differences in the restrictions on the various types of banks were related to differences in banks' connections with the Fascist regime. Therefore, the 1936 banking law is unlikely to have any direct effect on income inequality nowadays.

5 Results

5.1 Local banking structure and income inequality

In this section, we investigate the impact of the local banking structure, i.e. the local importance of cooperative, popular and commercial bank branches, on income inequality. Table 2 reports estimation results for the panel specifications (columns 1-8) and 2SLS (columns 9-12). Starting with our main independent variable, i.e. the density of cooperative bank branches in

[10] National banks could open branches only in the main cities; cooperative and local commercial banks could open branches in the province where they operated in 1936; savings banks could expand within the boundaries of the region (which comprises multiple provinces) where they operated in 1936.

the province, the coefficient reported in column (1) indicates that a higher presence of cooperative banks in the local market is negatively associated with the level of income inequality. The estimated coefficient equals -0.033 and it is statistically significant at the 5 percent level. This suggests that an increase by 10 percent of cooperative branch density is associated with a reduction of 0.33 percent of the provincial Gini coefficient. This effect of cooperative banks remains statistically significant when we include all types of bank branches in the estimation (column 4). It is further confirmed when we employ different estimation techniques, such as the Arellano-Bond estimator (columns 5-8), which accounts for the dynamic dimension of the panel, and the 2SLS model (columns 9-12).[11] Very different results are obtained for the other two categories of banks. Across estimation methods, we find no evidence of a significant impact of commercial branch density on income inequality when we control for cooperative and popular branch density in the provinces. As for popular banks, some evidence of a significant but positive impact on income inequality emerges when using the fixed effects model. However, this result disappears when considering other estimation methods. Altogether, the findings in Table 2 support the hypothesis that cooperative banks tighten income inequality at the provincial level significantly more than commercial and popular banks.

For the purpose of testing the robustness of our results, in Table 3 we estimate the impact of the local banking structure on a set of alternative measures of income distribution: the logarithm of the Theil index (Panel A), the difference between the logarithm of incomes of those at the 90th percentile and those at the 10th percentile (Panel B), and the difference between the logarithm of incomes of those at the 75th percentile and those at the 25th percentile (Panel C). Moreover, we estimate the effect of the presence of cooperative, popular, and commercial bank branches on the level of poverty in the province, by looking at the logarithm of income of those at the 10th percentile (Panel D). Estimation results indicate that cooperative bank branches are negatively associated with the Theil index of the province. As reported in column (1) of Panel A, an increase of 10 percent in the density of cooperative bank branches induces a reduction of 0.74 percent of income inequality (statistically significant at the 5 percent level). This result remains statistically significant when the model is estimated with panel FE, Arellano-Bond and 2SLS. The negative effect of cooperative banks on income inequality is confirmed when we employ as dependent variable the difference between the logarithm of incomes of those at the 75th percentile and those at the 25th percentile (Panel C), whereas it is not significant when we consider the 90th and 10th percentiles (Panel B). The estimation of the impact of cooperative banks on the level of poverty in the province (Panel D) yields further insights. As reported in columns (1)-(2) of Table 3, the estimated coefficient for the cooperative bank branches variable is positive and statistically significant at the 5 percent level. This suggests that an increase in the density of cooperative banks raises the level of incomes of those at the 10th percentile of the distribution. Although the coefficients are no longer significant when we employ the Arellano-Bond estimator and the 2SLS model, this result suggests that cooperative banks reduce income inequality by increasing the income of the poorest.

[11] In the estimation of the Arellano-Bond model, we employ lagged values of the regressors as internal instruments and the indicators of tightness of the 1936 banking regulation as external ones.

5.2 Non-linearities

The literature on the real effects of financial development predicts a non-linear relationship between bank branch density and income inequality (D'Onofrio et al., 2019). Theoretical models (see, e.g., Greenwood and Jovanovic, 1990; Deidda, 2006) suggest that financial development reduces income inequality only when high levels of economic development are reached and larger segments of the population can access the growing financial markets. This inverted U-shape relationship is mainly driven by the sizeable fixed costs characterizing the development of sophisticated financial institutions, so that at early stages of economic development only the rich can profit from mature financial institutions. Based on these theoretical arguments, in Table 4a we estimate our main regressions on the subsamples of provinces located in the North (Panel A), Center (Panel B) and South (Panel C) of Italy. As discussed in Section 3.1, the three macro areas of the country differ significantly in the degree of economic development. Hence, we expect a different effect of the presence of cooperative, popular, and commercial bank branches on income inequality in the three regions. Estimation results mostly confirm our expectations: the presence of cooperative bank branches is negatively related with the level of income inequality in the provinces located in the North of Italy, whereas it is not statistically significant in the other two regions of the country.

In Table 4b, we check the robustness of this result by employing an alternative measure of economic development, the distribution of provincial GDP per capita (Panel A), and by analyzing whether the impact of the local banking structure on income inequality changes with the level of financial development and inclusion (Panels B and C). Estimation results yield interesting insights. First, we find that cooperative bank branches reduce income inequality in provinces with high levels of GDP per capita, whereas they are not statistically significant where our proxy of economic development is lower than the median value. Second, we obtain that the relationship between the presence of cooperative banks and the Gini coefficient does not change with the level of financial development, measured by the number of bank branches over the population (at the provincial level). The coefficients of the Cooperative bank branches variable are almost always negative and statistically significant. Finally, we find that the level of financial inclusion in the local market affects the relationship between local banking structure and income inequality.[12] The presence of cooperative bank branches seems to mitigate income inequality in provinces with low levels of financial access, whereas it is not statistically significant where financial inclusion is higher than the median value.

5.3 The role of lending technologies

The reader could wonder whether the negative impact of cooperative banks on income inequality is mainly due to the lending technology they use, rather than their specific nature and objective function. In fact, small and local financial institutions are characterized by an extensive use of relationship lending techniques, which are found to reduce asymmetric information problems and liquidity constraints for more opaque borrowers, such as small and medium-sized enterprises (Rajan, 1992; Petersen and Rajan, 1994; Angelini et al., 1998). To test whether this is the case in our data, in Table 5 we add as control variable an indicator of relationship lending, given by the average length of the bank-firm relationships in the

[12] Financial inclusion is measured as the share of people with a bank account in the province.

province.[13] Estimation results show that the coefficients of the cooperative bank branches variable remain statistically significant and essentially unaltered after conditioning on the pervasiveness of relationship lending in the province. This suggests that it is not the lending technology, but the specific nature and orientation of cooperative banks that reduce the level of income inequality.

6 Disentangling the channels of influence

Cooperative banks can affect income distribution in different ways. The finance-inequality literature highlights three main channels of influence: labor demand, entrepreneurship, and new firm creation (Beck et al., 2010). The banking literature provides more evidence about the real effects of local banks. By reducing asymmetric information for opaque borrowers, small and cooperative banks improve SMEs' credit availability (Petersen and Rajan, 1994; Angelini et al., 1998). In spite of that, clear evidence on the nexus between local banking structure and income inequality is still missing. In this section, we take a step forward in this direction. In particular, we try to understand under which conditions cooperative banks are more effective in reducing income inequality.

In Tables 6-8, we investigate different structural channels through which the local banking structure can affect income inequality. Specifically, we focus on the role of urban structure and inter-province migratory flows (Table 6), material infrastructures and entrepreneurship (Table 7), labor force participation and education (Table 8). In each table, we perform two kinds of tests. First, we add these structural indicators to our baseline regressions in order to verify whether and to what extent they absorb the effect produced by the local banking structure on income inequality. Second, we test the direct impact of cooperative banks on these proxies of local socio-economic structure.

6.1 Urbanization and migration

In Table 6, we investigate the first two channels through which cooperative banks may affect income inequality: urban structure and migration flows. The economic literature predicts that both urbanization and migratory flows can have a significant impact on income inequality in local communities. Regarding the urban structure, Baum-Snow and Pavan (2013) and Behrens and Robert-Nicoud (2014) report that a more widespread urbanization and a lower concentration in big cities reduce income inequality. By generating productivity improvements through agglomeration economies, large cities promote segmentation and the selection of highly productive entrepreneurs, with adverse consequences on inequality. As for migratory flows, the net impact of migration on income distribution is ambiguous a priori (Card, 2009; Blau and Kahn, 2015). On the one hand, immigration may intensify inequality in local communities through the inflow of relatively poor immigrants that tends to widen the income distribution. On the other, provinces with a larger outflow of emigrants may experience either an increase or a decrease in inequality. For example, the remittances of emigrants can

[13] To build the relationship lending variable, we rely on three waves of the "Survey on Italian Manufacturing Firms", which cover the three year periods ending in 2000, 2003 and 2006. This survey, conducted by the banking group Capitalia, has been used as a testing ground by many studies, including Benfratello et al. (2008) and Minetti et al. (2015).

moderate inequalities; but, in the opposite direction, the loss of human capital may exacerbate inequalities.

Based on these arguments, in Table 6 we analyze the two channels by including the following measures of urbanization and migratory flows: *Share of small municipality 2001*, given by the percentage of population living in small municipalities (less than 15,000 inhabitants) in the province in 2001 (columns 1-5); *Gross flow 1991*, measured by the logarithm of the gross migratory flow (immigration plus emigration) of the province in 1991 (columns 6-10). Estimation results indicate that the urban structure does not significantly affect the logarithm of the Gini coefficient in the province. The coefficients reported in columns (1)-(4) are negative but not statistically significant. However, as displayed in column (5), we estimate a positive and significant impact of the presence of cooperative banks on the percentage of population living in small cities. More interesting results are found with respect to migratory flows. As columns (6)-(9) report, the gross migratory flow of the province increases the level of income inequality. Moreover, when migration is accounted for, the coefficients of our measures of local banking structure tend to lose their statistical significance. The relevance of the migration channel is confirmed by the estimations reported in column (10), which indicate that the presence of cooperative banks has a negative and significant impact on gross migratory flows. In fact, by investing in the local community, cooperative banks may reduce the incentives to emigrate and the consequent "drain" of human capital and workforce (De Rosa, 1980). Overall, the findings in this table suggest that geographical mobility and, to a lesser extent, urbanization, could be a channel whereby cooperative banks mitigate income inequality.

6.2 Material infrastructure and entrepreneurship

In Table 7, we investigate the effect of material infrastructures and entrepreneurship. Material infrastructures may have a negative impact on inequality because they increase the possibility for the poor to access productive opportunities (World Bank, 2003). Entrepreneurship, instead, may widen the income distribution (Astebro et al., 2011; Atems and Shand, 2018; Halvarsson et al., 2018). There is evidence that entrepreneurial activities increase the income of some entrepreneurs, but most of the self-employed have average earnings lower than the population average. Moreover, a higher turnover of firms in the province can increase income instability. In order to test these channels, we consider the following proxies of infrastructures and entrepreneurship: *Material infrastructure*, a composite indicator of material infrastructure in the province provided by Geoweb, which accounts for road networks, railways, ports, airports, environmental energy networks, and broadband services (columns 1-5); *New firms creation*, computed as the ratio of net entrants (i.e. newly registered firms minus deregistered firms) over incumbents in the province (columns 6-10). Consistently with our predictions, we find that material infrastructures reduce income inequality in the province, although with a weak statistical significance. However, as reported in columns (1)-(5), our coefficients of local banking structure remain essentially unaltered after conditioning on the new variable, and cooperative bank branches do not significantly affect the level of material infrastructures in the province. This result is in line with the observation that in Italy infrastructures are mostly financed through public (both central and local government) budgets rather than private financing (D'Onofrio et al., 2019). Regarding the firm turnover channel, the findings reported in columns (6)-(9) are in line with the arguments above: income inequalities are larger in

provinces with higher turnovers of firms. Moreover, the presence of cooperative banks in the province is negatively related to new firms' creation (column 10), suggesting that the negative effect of cooperative banks on income inequality is partially due to the negative impact on firm turnover in the provinces. This result is somewhat confirmed by the fact that the newly added regressor partially absorbs the effect of the cooperative branches indicator.

6.3 Labor force participation and education

The finance-inequality literature predicts that labor force participation and education are relevant channels whereby financial development could affect income distribution (Beck et al., 2010). First, by reducing firms' financing constraints, financial institutions may foster labor demand and promote labor force participation from low-income and female employees. Second, by allowing low-income individuals to invest in education, banks may reduce income inequality through an increase in human capital. Both mechanisms may be amplified in the case of cooperative banks, because of their local orientation and their commitment to support job creation and a sustainable development of their regions. In Table 8, we test the relevance of these channels by employing the following proxies of job participation and human capital: *Female rate of participation*, given by the female rate of participation in the labour market in the province (columns 1-5); *Share of graduated in the province*, that is the number of graduated people over the population in the province (columns 6-10). Estimation results confirm the relevance of female participation in the labour market in reducing income inequality (columns 1-4), although the presence of cooperative banks in the province does not have a significant effect on this variable (column 5). Conversely, we do not find a clear and significant impact of education on the Gini coefficient in the province. This result is consistent with previous studies on Italy, which do not find a relationship between financial development and education due to the relevant role of public budgets in financing education and school development (D'Onofrio et al., 2019).

7 Conclusions

In this paper we have investigated whether different credit institutions affect differently income inequalities by exploiting data from Italian provinces in the 2001-2011 period. We have found that cooperative banks significantly reduce income inequality and more so than commercial banks. We have tested the robustness of this result in different ways: we have used alternative measures of income inequality, different proxies of local banking structure and different estimation techniques (panel fixed effects, Arellano-Bond, and 2SLS models). Moreover, the effect of cooperative bank branches remains significant even controlling for the pervasiveness of relationship lending in the provinces. This suggests that it is not the lending technology, but the specific nature and orientation of cooperative banks that improves income distribution. The analysis has then turned to investigate the mechanisms whereby cooperative banks mitigate income inequality. Estimation results indicate that the reduction of income inequality produced by cooperative banks is mainly channeled by a reduction in migratory flows and in the turnover of local businesses.

Our results support the hypothesis that cooperative banks positively affect local economies by reducing income inequality. They also suggest relevant mechanisms of influence, although

more work is needed to better ascertain the contribution of these channels to the finance-inequality nexus. Finally, in a policy perspective, the findings reveal a need for banking regulation and supervision to encompass banking business models in evaluating banks (Ayadi et al., 2012). The one-size-fits-all approach might not be suitable for cooperative banks and could weaken their ability to mitigate income inequalities in local communities.

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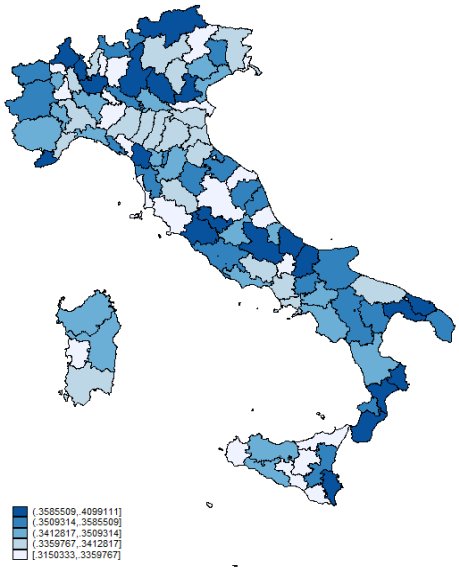
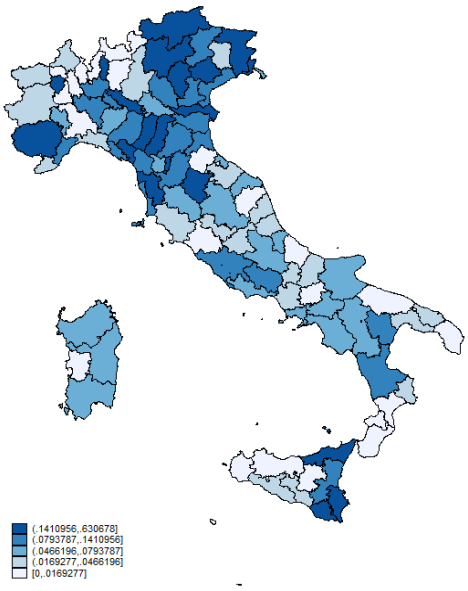
Figure 1: Gini coefficient and local banking structure

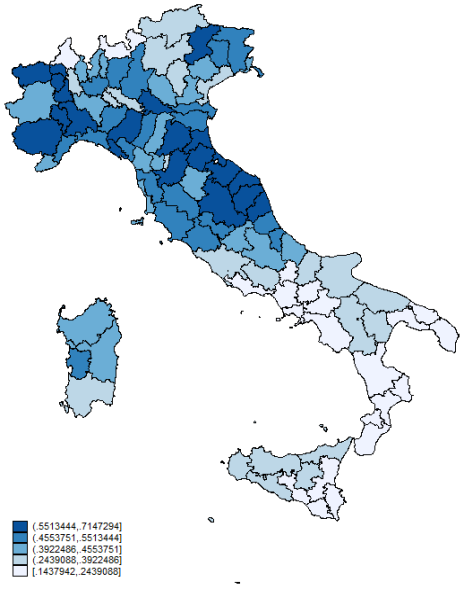
1a. Gini coefficient



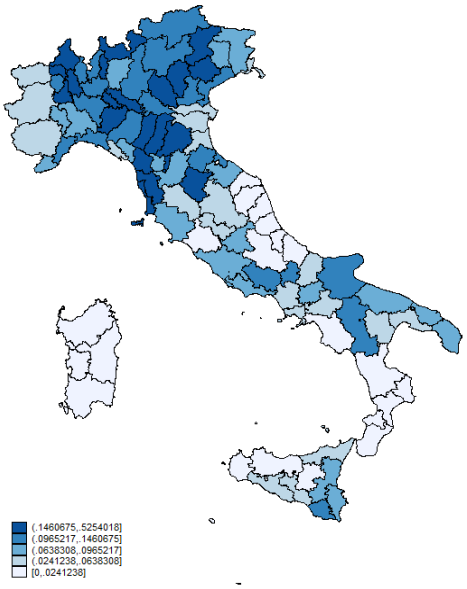
1b. Cooperative bank branches



1c. Commercial bank branches



1d. Popular bank branches



Notes: Our calculations on Bank of Italy, Italian Department of Finance and Istat data. The map shows the level of Gini coefficient, cooperative, commercial and popular branch density (branches per 1,000 inhabitants) in 2011 in the 103 Italian provinces, classified in quintiles.

Table 1. Summary statistics

	Obs	Mean	*St. Dev.*	Min	Max
Main dependent variables					
Gini coefficient	1,133	0.357	*0.033*	0.301	0.499
Theil index	1,133	0.266	*0.046*	0.184	0.459
Ratio of the 90th and 10th percentiles of income	1,133	4.994	*3.565*	2.872	57.569
Ratio of the 75th and 25th percentiles of income	1,133	2.056	*0.418*	1.548	4.369
Income at the 10th percentile	1,133	7,552	*2,033*	380	12,407
Local banking structure					
Cooperative bank branches over population	1,133	0.074	*0.089*	0.000	0.679
Popular bank branches over population	1,133	0.063	*0.074*	0.000	0.525
Commercial bank branches over population	1,133	0.436	*0.149*	0.144	0.758
Relationship lending (length of relationships)	1,097	15.909	*4.674*	2.000	32.000
Control variables					
Per capita GDP	1,133	20,988	*5,309*	10,034	34,234
Unemployment	1,133	7.913	*4.865*	1.500	27.600
Agriculture (share)	1,133	0.061	*0.044*	0.002	0.239
Manufacturing (share)	1,133	0.206	*0.086*	0.056	0.429
Construction (share)	1,133	0.081	*0.016*	0.042	0.161
Trade Openess	1,133	0.415	*0.302*	0.014	3.190
HHI of bank branches	1,133	0.128	*0.073*	0.035	0.626
Center	1,133	0.204	*0.403*	0.000	1.000
South	1,133	0.350	*0.477*	0.000	1.000
Provincial branch density	1,133	0.575	*0.195*	0.212	1.064
Financial access	1,133	0.745	*0.194*	0.230	1.000
Small municipality 2001 (share)	1,133	0.255	*0.182*	0.000	0.715
Gross migratory flow 1991 (log)	1,133	9.349	*0.633*	7.892	11.688
Material infrastructure	1,133	-0.047	*0.495*	-1.394	1.808
New firms over total firms	1,133	1.179	*1.391*	-7.100	6.400
Female rate of participation	1,133	46.548	*11.686*	19.800	66.800
Share of graduates in the province	617	0.045	*0.043*	0.001	0.275
Instrumental variables					
Savings banks in 1936	1,133	0.267	*0.361*	0.000	1.612
Popular banks in 1936	1,133	0.806	*0.651*	0.000	2.679
Number of branches in 1936	1,133	20.358	*10.948*	3.668	61.777

Table 2. Local banking structure and income inequality

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Panel Fixed Effects				Arellano-Bond				2SLS			
	Gini coefficient (log)				Gini coefficient (log)				Gini coefficient (log)			
Cooperative bank branches (log)	-0.033**			-0.039**	-0.022**			-0.025**	-0.023***			-0.026***
	(0.016)			(0.015)	(0.009)			(0.010)	(0.009)			(0.009)
Popular bank branches (log)		0.020***		0.018**		0.015**		0.000		0.020***		0.006
		(0.005)		(0.008)		(0.006)		(0.008)		(0.008)		(0.012)
Commercial bank branches (log)			-0.118***	-0.034			-0.075***	-0.079*			-0.079***	-0.070
			(0.028)	(0.037)			(0.026)	(0.042)			(0.027)	(0.051)
Per capita GDP (log)	-0.422***	-0.424***	-0.410***	-0.362***	0.208***	0.159***	0.182***	0.239***	0.223***	0.173***	0.195***	0.248***
	(0.049)	(0.041)	(0.043)	(0.047)	(0.044)	(0.035)	(0.037)	(0.043)	(0.046)	(0.036)	(0.039)	(0.041)
Unemployment rate (log)	0.010	-0.006	0.005	-0.002	0.001	0.013*	0.001	-0.004	0.003	0.020**	0.003	-0.002
	(0.009)	(0.008)	(0.009)	(0.008)	(0.007)	(0.007)	(0.006)	(0.011)	(0.010)	(0.010)	(0.009)	(0.016)
Agriculture (share)	1.826***	1.845***	1.801***	1.911***	0.194	-0.146	-0.124	0.193	0.207	-0.146	-0.128	0.212
	(0.282)	(0.292)	(0.272)	(0.292)	(0.153)	(0.095)	(0.091)	(0.173)	(0.158)	(0.096)	(0.095)	(0.178)
Manufacturing (share)	-0.088	0.227	0.064	0.060	-0.189***	-0.275***	-0.238***	-0.164**	-0.183***	-0.270***	-0.234***	-0.167**
	(0.242)	(0.201)	(0.184)	(0.249)	(0.070)	(0.064)	(0.056)	(0.071)	(0.070)	(0.064)	(0.057)	(0.072)
Construction (share)	1.497***	1.354**	1.379***	1.478**	-0.132	-0.599**	-0.597**	-0.511	-0.115	-0.687**	-0.619**	-0.574
	(0.522)	(0.565)	(0.494)	(0.574)	(0.214)	(0.278)	(0.256)	(0.326)	(0.221)	(0.316)	(0.277)	(0.359)
Trade openess (log)	0.029**	0.028*	0.021*	0.038***	-0.014**	-0.011***	-0.009*	-0.013**	-0.015**	-0.013***	-0.010**	-0.015**
	(0.013)	(0.015)	(0.012)	(0.014)	(0.006)	(0.004)	(0.004)	(0.006)	(0.006)	(0.004)	(0.005)	(0.007)
HHI of bank branches	0.502**	0.701***	0.478**	0.698***	-0.376***	-0.191*	-0.170***	-0.458**	-0.385***	-0.167	-0.169***	-0.455*
	(0.219)	(0.248)	(0.193)	(0.235)	(0.080)	(0.102)	(0.057)	(0.218)	(0.083)	(0.119)	(0.060)	(0.240)
Observations	1,072	1,017	1,133	984	1,072	1,017	1,133	984	1,072	1,017	1,133	984
R-squared	0.305	0.323	0.316	0.327					0.784	0.789	0.769	0.754
Sargan p value					0.000	0.000	0.000	0.737				
F instruments									18.37	11.82	7.348	2.758

Notes: The table reports regression coefficients estimated with fixed effects model (columns 1-4), Arellano-Bond model (columns 5-8) and 2SLS model (columns 9-12) for the period 2001-2011. Standard errors clustered at the provincial level are in parentheses. The dependent variables and the estimation methods are reported at the top of each column. Three, two and one star (*) denote, respectively, 1, 5, and 10 percent level of significance.

Table 3. Robustness checks: alternative measures of income distribution

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel Fixed Effects		Arellano-Bond		2SLS	
	Panel A: Theil index (log)					
Cooperative bank branches (log)	-0.074**	-0.088***	-0.053***	-0.057***	-0.054***	-0.059***
	(0.028)	(0.027)	(0.019)	(0.021)	(0.019)	(0.021)
Popular bank branches (log)		0.026**		0.001		0.014
		(0.013)		(0.018)		(0.027)
Commercial bank branches (log)		-0.050		-0.186*		-0.170
		(0.061)		(0.099)		(0.122)
+ controls	Y	Y	Y	Y	Y	Y
Observations	1,072	984	1,072	984	1,072	984
R-squared	0.334	0.356			0.703	0.646
	Panel B: ratio of the 90th and 10th percentiles of income (log)					
Cooperative bank branches (log)	-0.153	-0.182	-0.014	-0.026	-0.011	-0.026
	(0.127)	(0.134)	(0.021)	(0.021)	(0.021)	(0.023)
Popular bank branches (log)		0.051		0.011		0.007
		(0.034)		(0.024)		(0.034)
Commercial bank branches (log)		-0.008		-0.171		-0.204
		(0.197)		(0.104)		(0.132)
+ controls	Y	Y	Y	Y	Y	Y
Observations	1,072	984	1,072	984	1,072	984
R-squared	0.334	0.333			0.685	0.680
	Panel C: ratio of the 75th and 25th percentiles of income (log)					
Cooperative bank branches (log)	-0.027	-0.043	-0.017*	-0.016	-0.015*	-0.014
	(0.049)	(0.050)	(0.009)	(0.011)	(0.009)	(0.011)
Popular bank branches (log)		0.051***		-0.011		-0.010
		(0.017)		(0.011)		(0.015)
Commercial bank branches (log)		-0.088		-0.080		-0.079
		(0.096)		(0.055)		(0.065)
+ controls	Y	Y	Y	Y	Y	Y
Observations	1,072	984	1,072	984	1,072	984
R-squared	0.236	0.271			0.716	0.726
	Panel D: income at the 10th percentile (log)					
Cooperative bank branches (log)	0.283**	0.322**	-0.002	0.005	-0.006	0.003
	(0.126)	(0.129)	(0.016)	(0.017)	(0.017)	(0.018)
Popular bank branches (log)		-0.055		-0.012		-0.002
		(0.035)		(0.023)		(0.032)
Commercial bank branches (log)		0.128		0.050		0.081
		(0.200)		(0.091)		(0.117)
+ controls	Y	Y	Y	Y	Y	Y
Observations	1,072	984	1,072	984	1,072	984
R-squared	0.466	0.468			0.809	0.808

Notes: The table reports regression coefficients estimated with fixed effects model (columns 1-2), Arellano-Bond model (columns 3-4) and 2SLS model (columns 5-6) for the period 2001-2011. Standard errors clustered at the provincial level are in parentheses. The estimation methods are reported at the top of each column. The dependent variables are reported at the top of each Panel. Three, two and one star (*) denote, respectively, 1, 5, and 10 percent level of significance.

Table 4A. Non-linearities: Italian macro-areas

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel Fixed Effects		Arellano-Bond		2SLS	
	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)
			Panel A: North			
Cooperative bank branches (log)	-0.023	-0.022	-0.024***	-0.032***	-0.025***	-0.041**
	(0.021)	(0.018)	(0.009)	(0.011)	(0.008)	(0.018)
Popular bank branches (log)		0.017**		-0.003		0.010
		(0.008)		(0.009)		(0.026)
Commercial bank branches (log)		-0.020		-0.052		-0.092
		(0.032)		(0.056)		(0.102)
+ controls	Y	Y	Y	Y	Y	Y
Observations	473	446	473	446	473	446
R-squared	0.365	0.404			0.749	0.603
			Panel B: Center			
Cooperative bank branches (log)	-0.062*	-0.084**	-0.020	0.004	-0.018	0.073
	(0.035)	(0.040)	(0.014)	(0.022)	(0.014)	(0.266)
Popular bank branches (log)		0.022		-0.006		-0.043
		(0.013)		(0.004)		(0.193)
Commercial bank branches (log)		0.012		-0.099		-0.340
		(0.084)		(0.072)		(0.979)
+ controls	Y	Y	Y	Y	Y	Y
Observations	228	220	228	220	228	220
R-squared	0.455	0.488			0.906	0.603
			Panel C: South			
Cooperative bank branches (log)	-0.019	-0.041*	-0.008	-0.020	-0.007	-0.013
	(0.023)	(0.023)	(0.011)	(0.012)	(0.011)	(0.025)
Popular bank branches (log)		0.032		0.003		-0.038
		(0.026)		(0.011)		(0.065)
Commercial bank branches (log)		0.051		0.070		-0.112
		(0.159)		(0.075)		(0.361)
+ controls	Y	Y	Y	Y	Y	Y
Observations	371	318	371	318	371	318
R-squared	0.331	0.330			0.924	0.751

Notes: The table reports regression coefficients estimated with fixed effects model (columns 1-2), Arellano-Bond model (columns 3-4) and 2SLS model (columns 5-6) for the period 2001-2011. Standard errors clustered at the provincial level are in parentheses. The estimation methods and dependent variables are reported at the top of each column. Three, two and one star (*) denote, respectively, 1, 5, and 10 percent level of significance.

Table 4B. Non-linearities: economic and financial development

	Panel A: Provincial GDP per capita							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Arellano-Bond				2SLS			
	GDP per capita < median	GDP per capita > median	GDP per capita < median	GDP per capita > median	GDP per capita < median	GDP per capita > median	GDP per capita < median	GDP per capita > median
Cooperative bank branches (log)	-0.003	-0.023***	-0.006	-0.036***	-0.003	-0.024***	-0.006	-0.055*
	(0.011)	(0.008)	(0.012)	(0.013)	(0.011)	(0.008)	(0.015)	(0.032)
Popular bank branches (log)			0.007	0.003			0.008	0.030
			(0.007)	(0.008)			(0.024)	(0.030)
Commercial bank branches (log)			-0.003	-0.097			-0.001	-0.179
			(0.045)	(0.068)			(0.093)	(0.169)
+ controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	533	539	468	516	533	539	468	516
R-squared					0.898	0.807	0.906	0.371
	Panel B: Provincial branch density							
	Branch density < median	Branch density > median	Branch density < median	Branch density > median	Branch density < median	Branch density > median	Branch density < median	Branch density > median
Cooperative bank branches (log)	-0.012	-0.025**	-0.020*	-0.030**	-0.013	-0.027***	-0.025**	-0.045*
	(0.009)	(0.010)	(0.011)	(0.012)	(0.009)	(0.010)	(0.011)	(0.026)
Popular bank branches (log)			-0.002	-0.012			0.018	0.027
			(0.013)	(0.008)			(0.032)	(0.066)
Commercial bank branches (log)			-0.125	-0.063			-0.061	-0.153
			(0.109)	(0.055)			(0.153)	(0.207)
+ controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	503	569	415	569	503	569	415	569
R-squared					0.859	0.800	0.808	0.525
	Panel C: Provincial financial inclusion							
	Financial inclusion < median	Financial inclusion > median	Financial inclusion < median	Financial inclusion > median	Financial inclusion < median	Financial inclusion > median	Financial inclusion < median	Financial inclusion > median
Cooperative bank branches (log)	-0.049***	-0.013	-0.052**	-0.030	-0.052***	-0.014	-0.059**	-0.072
	(0.015)	(0.012)	(0.020)	(0.018)	(0.016)	(0.012)	(0.025)	(0.066)
Popular bank branches (log)			0.010	-0.008			0.017	-0.006
			(0.012)	(0.010)			(0.032)	(0.036)
Commercial bank branches (log)			0.051	-0.111*			0.087	-0.347
			(0.071)	(0.065)			(0.128)	(0.334)
+ controls	Y	Y	Y	Y	Y	Y	Y	Y
Observations	525	547	469	515	525	547	469	515
R-squared					0.755	0.794	0.748	-0.345

Notes: The table reports regression coefficients estimated with Arellano-Bond model (columns 1-4) and 2SLS model (columns 5-8) for the period 2001-2011. Standard errors clustered at the provincial level are in parentheses. The dependent variable is the log of the Gini coefficient. The estimation methods are reported at the top of each column. Three, two and one star (*) denote, respectively, 1, 5, and 10 percent level of significance.

Table 5. The role of lending technologies

	(1) Panel Fixed Effects Gini (log)	(2) Arellano-Bond Gini (log)	(3) 2SLS Gini (log)
Relationship lending	-0.001	0.001**	0.012
	(0.001)	(0.001)	(0.010)
Cooperative bank branches (log)	-0.038**	-0.023**	-0.015
	(0.016)	(0.009)	(0.014)
+ controls	Y	Y	Y
Observations	1,036	1,036	1,036
R-squared	0.305		0.513

Notes: The table reports regression coefficients estimated with fixed effects model (column 1), Arellano-Bond model (column 2) and 2SLS model (column 3) for the period 2001-2011. Standard errors clustered at the provincial level are in parentheses. The estimation methods and dependent variables are reported at the top of each column. Three, two and one star (*) denote, respectively, 1, 5, and 10 percent level of significance.

Table 6. Local banking structure and income inequality: urbanization and gross migration flow

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Urbanization					Migration				
	Years 2001-2011				Year 2001	Years 2001-2011				Year 1991
	Arellano-Bond		2SLS		2SLS	Arellano-Bond		2SLS		2SLS
	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Small municipality	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gross migratory flow
Cooperative bank branches (log)	-0.029	-0.019	-0.022**	-0.024**	0.057**	0.018	0.008	-0.006	-0.016	-0.518***
	(0.019)	(0.017)	(0.010)	(0.010)	(0.029)	(0.016)	(0.015)	(0.009)	(0.013)	(0.174)
Popular bank branches (log)		-0.003		0.005			-0.003		0.004	
		(0.006)		(0.012)			(0.008)		(0.010)	
Commercial bank branches (log)		-0.097**		-0.075			-0.036		-0.060	
		(0.046)		(0.054)			(0.051)		(0.050)	
Share of small municipality 2001	0.095	-0.084	-0.020	-0.022						
	(0.221)	(0.142)	(0.025)	(0.031)						
Gross migratory flow 1991						0.074***	0.061**	0.029***	0.017	
						(0.023)	(0.023)	(0.007)	(0.012)	
+ controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,072	984	1,072	984	96	1,072	984	1,072	984	96
R-squared			0.788	0.755	0.481			0.832	0.797	0.161

Notes: The table reports regression coefficients estimated with Arellano-Bond model (columns 1-2 and 6-7) and 2SLS model (columns 3-5 and 8-10). Standard errors clustered at the provincial level are in parentheses. The estimation methods, the dependent variables and the time-span of the regressions are reported at the top of each column. Three, two and one star (*) denote, respectively, 1, 5, and 10 percent level of significance.

Table 7. Local banking structure and income inequality: material infrastructures and firm turnover

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Material infrastructure					Entrepreneurship				
	Years 2001-2011				Year 2001	Years 2001-2011				Year 2001
	Arellano-Bond		2SLS		2SLS	Arellano-Bond		2SLS		2SLS
	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Material Infrastructures	Gini (log)	Gini (log)	Gini (log)	Gini (log)	New firm entry
Cooperative bank branches (log)	-0.030***	-0.025**	-0.024***	-0.027***	-0.100	-0.017*	-0.021**	-0.021**	-0.024***	-0.279*
	(0.009)	(0.010)	(0.008)	(0.009)	(0.103)	(0.010)	(0.009)	(0.008)	(0.009)	(0.146)
Popular bank branches (log)		0.000		0.005			-0.001		0.006	
		(0.008)		(0.012)			(0.008)		(0.011)	
Commercial bank branches (log)		-0.079*		-0.071			-0.085**		-0.072	
		(0.042)		(0.050)			(0.041)		(0.049)	
Material infrastructures (log)	-0.088	0.002	-0.014**	-0.014*						
	(0.057)	(0.008)	(0.006)	(0.008)						
New firm entry						0.017	0.012**	0.006***	0.005*	
						(0.014)	(0.006)	(0.002)	(0.003)	
+ controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,072	984	1,072	984	96	1,072	984	1,072	984	96
R-squared			0.784	0.755	0.582			0.793	0.759	0.376

Notes: The table reports regression coefficients estimated with Arellano-Bond model (columns 1-2 and 6-7) and 2SLS model (columns 3-5 and 8-10). Standard errors clustered at the provincial level are in parentheses. The estimation methods, the dependent variables and the time-span of the regressions are reported at the top of each column. Three, two and one star (*) denote, respectively, 1, 5, and 10 percent level of significance.

Table 8. Local banking structure and income inequality: labor force participation and education

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Female participation					Education				
	Years 2001-2011				Year 2001	Years 2001-2011				Year 2001
	Arellano-Bond		2SLS		2SLS	Arellano-Bond		2SLS		2SLS
	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Female rate participation	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Share of graduates
Cooperative bank branches (log)	-0.017*	-0.021**	-0.022**	-0.026***	-0.790	-0.020*	-0.022*	-0.021**	-0.019**	0.001
	(0.009)	(0.010)	(0.009)	(0.010)	(1.098)	(0.011)	(0.011)	(0.009)	(0.009)	(0.006)
Popular bank branches (log)		-0.002		0.008			-0.010		0.014	
		(0.007)		(0.012)			(0.009)		(0.012)	
Commercial bank branches (log)		-0.016		-0.087			-0.093		-0.056	
		(0.048)		(0.072)			(0.060)		(0.054)	
Female rate of participation	-0.005***	-0.005**	-0.002**	0.001						
	(0.002)	(0.002)	(0.001)	(0.002)						
Share of graduates in the province						0.712*	0.691	-0.054	-0.244**	
						(0.426)	(0.548)	(0.069)	(0.123)	
+ controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,072	984	1,072	984	96	581	543	581	543	95
R-squared			0.791	0.731	0.864			0.838	0.832	0.383

Notes: The table reports regression coefficients estimated with Arellano-Bond model (columns 1-2 and 6-7) and 2SLS model (columns 3-5 and 8-10). Standard errors clustered at the provincial level are in parentheses. The estimation methods, the dependent variables and the time-span of the regressions are reported at the top of each column. Three, two and one star (*) denote, respectively, 1, 5, and 10 percent level of significance.

Table A.1 Data sources and variable definitions

This table describes the definitions of the variables used in the paper. Three main data sources are used in the empirical analysis: (i) hand-collected data from the municipality-level database on tax revenue compiled by the Department of Finance of the Italian Ministry of Economy and Finance (MEF); (ii) the Statistical Bulletin of the Bank of Italy (BI); and (iii) the province-level database of the Italian National Statistics Office (ISTAT). Finally, we use two other sources: (iv) three survey waves of Capitalia survey, which cover three-year periods ending in 2000, 2003, and 2006 (Capitalia); and (v) the Register of the Italian Chambers of Commerce (Register).

Variable	Definition and source (in parentheses)
Main dependent variables	
Gini coefficient (log)	Logarithm of Gini index at provincial level, computed starting by income data at municipial level. (MEF)
Theil index (log)	Logarithm of Theil index at provincial level, computed starting by income data at municipial level. (MEF)
Ratio of the 90th and 10th percentiles of income (log)	Logarithm of the ratio between the 90th and 10th percentiles of income at provincial level, computed starting by income data at municipial level. (MEF)
Ratio of the 75th and 25th percentiles of income (log)	Logarithm of the ratio between the 75th and 25th percentiles of income at provincial level, computed starting by income data at municipial level. (MEF)
Income at the 10th percentile (log)	Logarithm of the 10th percentile of income at provincial level, computed starting by income data at municipial level. (MEF)
Local banking structure	
Cooperative bank branches (log)	Logarithm of the number of cooperative bank branches normalized by the population. (BI and ISTAT)
Popular bank branches (log)	Logarithm of the number of popular bank branches normalized by the population. (BI and ISTAT)
Commercial bank branches (log)	Logarithm of the number of commercial bank branches normalized by the population. (BI and ISTAT)
Relationship lending	Average years of relation with the firms' main bank in the province (Capitalia)
Control variables	
Per capita GDP (log)	Logarithm of provincial GDP per capita. (ISTAT)
Unemployment (log)	Logarithm of provincial unemployment rate. (ISTAT)
Agriculture (share)	Share of total workers occupied in the Agriculture sector in the province. (ISTAT)
Manufacturing (share)	Share of total workers occupied in the Manifacturing sector in the province. (ISTAT)
Construction (share)	Share of total workers occupied in the Manifacturing sector in the province. (ISTAT)
Trade Openess (log)	Logarithm of the ratio of trade on GDP in the province. (ISTAT)
HHI of bank branches	HHI index of bank branches in the province. (BI)
Center	Dummy that takes the value of one if the province is located in the central area of Italy; zero otherwise. (ISTAT)
South	Dummy that takes the value of one if the province is located in a southern area of Italy; zero otherwise. (ISTAT)
Provincial branch density	Total branch density by province, number of branches normalized by the population. (BI and ISTAT)
Financial inclusion	Share of people with a bank account in the province (BI)
Small municipality 2001 (share)	The percentage of population living in small municipalities (less than 15,000 inhabitants) in 2001. (ISTAT)
Gross migratory flow 1991 (log)	Logarithm of gross flow of migrants in the province in 1991. (ISTAT)
Material infrastructures	Synthetic index of material infrastructure in the province. This data contains informations about: Road Network, Railways, Ports, Airports, Environmental Energy Networks, Broadband Services, Business Structure. (GEOWEB)
New firm entry	Newly registered firms minus deregistered firms over total registered firms in the province (Register)
Female rate of participation	Rate of female labor force participation in the province. (ISTAT)
Share of graduates in the province	Share of the provincial population with the tertiary degree. Data are available for the period 2001-2006. (ISTAT)
Instrumental variables	
Savings banks in 1936	Number of savings banks in the year 1936 in the province, per 100,000 inhabitants. (BI)
Popular banks in 1936	Number of popular banks in the year 1936 in the province, per 100,000 inhabitants. (BI)
Number of branches in 1936	Number of bank branches in the year 1936 in the province, per 100,000 inhabitants. (BI)

Table A2: Regional summary statistics

	Gini coefficient		Theil index		Cooperative banks		Popular banks		Commercial banks		GDP per capita		Unemployment rate	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Piemonte	0.346	*0.003*	0.263	*0.004*	0.032	*0.007*	0.046	*0.008*	0.586	*0.014*	23,331	*254.23*	5.316	*0.166*
Valle D'aosta	0.357	*0.007*	0.264	*0.012*	0.148	*0.005*	0.010	*0.007*	0.618	*0.008*	25,891	*464.68*	5.073	*0.914*
Lombardia	0.359	*0.003*	0.286	*0.004*	0.087	*0.006*	0.143	*0.012*	0.445	*0.011*	26,011	*296.97*	4.102	*0.103*
Trentino-Alto Adige	0.374	*0.007*	0.294	*0.010*	0.528	*0.029*	0.101	*0.009*	0.314	*0.004*	27,493	*492.71*	3.105	*0.185*
Veneto	0.351	*0.003*	0.271	*0.005*	0.127	*0.005*	0.129	*0.009*	0.482	*0.009*	25,627	*231.65*	4.312	*0.122*
Friuli-Venezia Giulia	0.342	*0.004*	0.250	*0.006*	0.160	*0.012*	0.065	*0.004*	0.509	*0.006*	24,456	*306.57*	4.534	*0.149*
Liguria	0.364	*0.004*	0.273	*0.006*	0.018	*0.002*	0.027	*0.004*	0.546	*0.008*	22,065	*294.03*	6.361	*0.312*
Emilia-Romagna	0.359	*0.003*	0.277	*0.004*	0.091	*0.007*	0.121	*0.007*	0.588	*0.008*	26,393	*251.62*	3.928	*0.146*
North	0.355	*0.001*	0.274	*0.002*	0.105	*0.005*	0.098	*0.004*	0.516	*0.005*	25,145	*129.71*	4.523	*0.071*
Toscana	0.355	*0.003*	0.267	*0.003*	0.079	*0.005*	0.049	*0.005*	0.517	*0.005*	23,309	*246.10*	5.380	*0.154*
Umbria	0.342	*0.005*	0.244	*0.007*	0.038	*0.003*	0.025	*0.003*	0.544	*0.008*	20,229	*283.63*	5.955	*0.238*
Marche	0.348	*0.004*	0.256	*0.005*	0.108	*0.004*	0.022	*0.003*	0.609	*0.006*	22,082	*329.43*	5.202	*0.221*
Lazio	0.360	*0.006*	0.262	*0.009*	0.056	*0.005*	0.057	*0.002*	0.365	*0.013*	21,185	*577.46*	9.047	*0.228*
Center	0.354	*0.002*	0.261	*0.003*	0.075	*0.003*	0.043	*0.003*	0.501	*0.007*	22,276	*205.13*	6.274	*0.145*
Abruzzo	0.350	*0.005*	0.250	*0.006*	0.054	*0.003*	0.006	*0.001*	0.448	*0.007*	18,159	*149.41*	7.923	*0.230*
Molise	0.357	*0.007*	0.253	*0.010*	0.037	*0.003*	0.049	*0.007*	0.336	*0.011*	16,438	*300.11*	9.332	*0.230*
Campania	0.364	*0.005*	0.262	*0.007*	0.032	*0.004*	0.026	*0.002*	0.227	*0.003*	14,112	*156.96*	13.018	*0.406*
Puglia	0.362	*0.005*	0.263	*0.007*	0.021	*0.001*	0.065	*0.002*	0.241	*0.003*	14,044	*178.56*	13.633	*0.318*
Basilicata	0.352	*0.008*	0.246	*0.010*	0.054	*0.002*	0.057	*0.007*	0.304	*0.007*	15,809	*280.97*	12.346	*0.394*
Calabria	0.362	*0.005*	0.256	*0.007*	0.043	*0.002*	0.004	*0.001*	0.205	*0.003*	13,735	*191.81*	14.351	*0.480*
Sicilia	0.373	*0.004*	0.271	*0.006*	0.038	*0.003*	0.043	*0.003*	0.275	*0.004*	13,857	*138.95*	16.170	*0.494*
Sardegna	0.348	*0.005*	0.239	*0.007*	0.008	*0.002*	0.000	*0.000*	0.431	*0.008*	16,503	*321.58*	12.411	*0.376*
South	0.361	*0.002*	0.258	*0.003*	0.035	*0.001*	0.031	*0.002*	0.295	*0.005*	14,925	*103.87*	13.201	*0.209*
Italy	0.357	*0.001*	0.266	*0.001*	0.074	*0.003*	0.063	*0.002*	0.435	*0.004*	20,987	*157.72*	7.913	*0.144*