Working Paper Series

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ECINEQ WP 2018 - 481

ECINEQ 2018 - 481
November 2018

www.ecineq.org

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Abstract

The aim of this paper is to investigate whether different credit institutions, and in particular cooperative banks, have a different impact on the reduction of income inequalities. By analyzing Italian local credit markets, i.e. Italian provinces, over the period 2001-2011, we find that cooperative banks' diffusion significantly reduces income inequality. This finding is robust to different measures of income inequality, different proxies of local banking structure (cooperative banks branches, popular banks branches, commercial banks branches), and different estimation techniques. When we study the channel of influence, we find that the diffusion of cooperative banks is particularly relevant for income distribution where loans to families and firms are larger, bank-firm relationships are tighter and the number of new firms over incumbent is larger.

Keywords: Cooperative banks, income inequality, financial development.

JEL Classification: G21; G38; O15.

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1 Introduction

Financial institutions perform critical functions in the economic system. They efficiently allocate financial resources by reducing transaction costs and asymmetric information; they provide ways of transferring funds through time, across borders, and among industries; they allow corporations and individuals to handle economic uncertainties by hedging, pooling, sharing and pricing risks (Merton and Bodie, 1995; Niemeyer, 2001; Stein, 2002). When these functions are performed well, economic growth is fostered, poverty is reduced, and income inequalities are mitigated (King and Levine, 1993; Bencivenga et al., 1995; Beck and Levine, 2004). The theoretical literature has described different channels through which financial development can reduce inequality. First, it 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; D'Onofrio et al., 2017).

Although the current literature has largely investigated the impact of finance on economic growth, poverty, and income inequality, it has always considered homogeneous financial institutions, without distinguishing the impact of different financial intermediaries. The aim of this study is to fill this gap by investigating whether different credit institutions, and in particular cooperative banks, have a different impact on the reduction of income inequalities. In fact, 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; Elsas, 2005). Agents taking part in the life of a community develop relationships that allow them to acquire 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 the lending activity thus improving credit availability, especially for more opaque borrowers. This in turn may promote entrepreneurship and foster new firm creation.

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 Ministry of Economics and Finance, the Bank of Italy, and the Italian National Statistics Office (Istat), we find an interesting result: cooperative banks' diffusion significantly reduces income inequality in Italy. This finding is robust to different measures of income inequality, different proxies of local banking structure (cooperative banks branches, popular

banks branches, commercial banks branches), and different estimation techniques (2SLS, Fixed Effects, Arellano-Bond estimator). The analysis then turns to investigate the channels through which cooperative banks mitigate income inequality. Estimation results indicate that the diffusion of cooperative banks is particularly relevant for income distribution where new firm creation, female labor market participation and education are higher. Moreover, cooperative banks are found to better mitigate income inequality where loans to families and firms are larger and companies are more likely to enjoy exclusive relationships with banks.

In providing this evidence, we contribute to different fields of the economic and finance literature. First, we contribute to the large literature on finance and growth, 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 banks. To the best of our knowledge, this is the first study showing that cooperative banks reduce more income inequality in comparison to other financial intermediaries. Third, we add to the literature on the channels affecting the financial development – inequality nexus, by highlighting the crucial role of new firm creation, female labor market participation, education and loans provision.

The remainder of the paper is organized as follows. Section 2 provides a general outlook on the history of the local banking system in Italy. Section 3 reviews the 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. Sections 5 and 6 discuss the main empirical results, and Section 7 concludes.

2 Institutional background

Italy provides an ideal environment to study the impact of cooperative banks' distribution on income inequality. As the stock market capitalization is still rather low, the Italian financial system is dominated by the banking sector.[1] In this sense, it results to be very close to that of other countries of continental Europe and of Japan. On average, over the 2000-2010 period, the ratio of bank credit over GDP was 72.36 percent in Italy, a figure similar to that of France (82.02 percent), Belgium (85.23 percent) and Finland (84.35 percent).[2] Also the high dependence of Italian firms on bank lending is analogous to that

[1] In 2011, the stock market capitalization, as percentage of the gross domestic product was almost 18 percent in Italy, compared to 100 percent in the United States (Minetti et al., 2015).
[2] See D'Onofrio et al. (2017).

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), cooperative banks' market shares rose from 9 to 15 percent from mid 1990s to 2004 in terms of total assets in the European Union.[3] In 2010, as documented by Becchetti et al. (2016), cooperative banks accounted for about one third of the deposits, loans, and branches of the Italian banking industry.[4] Cooperative branch shares in the other European countries were even higher: 60 percent in France, 50 percent in Austria, and about 40 percent in Germany and the Netherlands.

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 between banks has fostered competition (De Bonis et al., 2012). In Italy, a strong provincial presence of bank branches has been crucial for promoting access to credit and financial inclusion during the recent years. As it is particularly difficult for households and firms to borrow in a market other than the local one, the distribution of banks in a province has been the main driver of economic growth (Petersen and Rajan, 2002; Guiso et al., 2004, 2013; D'Onofrio et al., 2017). 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 markets and intermediaries perform critical functions in the economic system. Financial intermediaries reduce the frictions of transaction costs and asymmetric information and efficiently allocate financial resources (Allen and Santomero, 1997; Stein, 2002). They provide ways of transferring economic resources through time, across border, and among industries (Merton and Bodie, 1995). Financial markets make it possible for corporations and individuals to efficiently handle economic uncertainties by hedging, pooling, sharing and pricing risks (Niemeyer, 2001). The recent theoretical and empirical literature has convincingly shown that well-functioning financial systems can foster economic

[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).

[4] In 2010, cooperative banks represented 33.7 percent of deposits and 29.5 percent of loans of the Italian banking sector.

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 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' distribution 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 investment by diverting resources to more productive use, thus promoting economic growth (Seven and Coscun, 2016). On the contrary, if financial markets do not work well, growth opportunities are missed and inequalities persist. 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; D'Onofrio et al., 2017). 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) further 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 reduces when financial development increases. By extending the time period until 2005 and analysing 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.[5] Kappel (2010) finds that financial development reduces both poverty and income inequality, with a stronger effect of financial development on poverty than on income inequality. Recently, some studies have also performed country-level analyses, which allows to reduce the risk of omitted variable bias (D'Onofrio et

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

al., 2017). 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. Burgess and Pande (2005), by studying the effects of state-led bank branch expansion program in Indian states during the period 1997-1990, indicate that financial local development significantly reduces rural poverty. Beck et al. (2010) report that the bank deregulation of the U.S. tightened the income distribution by increasing incomes in the lower tail. Finally, more closely related to our paper, D'Onofrio et al. (2017) find that local banking development mitigates income inequality in Italy by affecting geographical mobility and urbanization. Some theoretical and empirical studies have also indicated that the link between financial development and income inequality may be non-linear depending 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 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 start from D'Onofrio et al. (2017) and investigate whether different local banking structure and the presence of cooperative banks reduced income inequality in Italian provinces between 2001 and 2011. The historical segmentation of the Italian local (provincial) credit markets provides us a unique empirical setting characterized by the exogenous heterogeneity in bank access to credit within Italy.

3.2 *The role of cooperative banks*

According to the current literature, cooperative banks differentiate from other credit institutions in several ways (Ferri and Messori, 2000; Ferri et al., 2014; Fiordelisi and Mare, 2014; Becchetti et al., 2016).[6] 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 local based and have

[6] 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).

strong 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.[7] From a theoretical point of view, the goals and characteristics of cooperative banks should 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; Elsas, 2005). Agents taking part in the life of a community develop relationships that allow them to acquire 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 the lending activity thus improving credit availability. 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.[8]

Berger et al. (2004) further 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, its customer, 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,

[7] The cooperative credit sector in Europe is not entirely uniform in terms of legal framework, size, and organization (Fiordelisi and Mare, 2014). However, these distinctive features differentiate well cooperative banks from other financial intermediaries.
[8] 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).

the reliability, and the reputation of the firm's owner.[9] In gathering this type of information, large banks are hypothesized to have difficulty. They cannot transmit soft information through the communication channels of large banking organizations (Stein, 2002), and are on average headquartered at longer distances from potential SME relationship borrowers, making it difficult to process locally based 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., 1995; 2004) and that the ratio of SME loans to assets declines after large banks are involved in M&As (Peek and Rosengren, 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; 2017) indicate that local and cooperative banks, because of their better ability in screening and monitoring opaque borrowers, reduced less the availability of credit during the crisis period in comparison to other types of credit institutions.

In this paper, we contribute to the literature on cooperative banks by investigating whether cooperative banks' distribution reduces income inequality. By mitigating asymmetric information in the borrower-lender relationship, cooperative banks may improve financing opportunities for more opaque borrowers, thus promoting entrepreneurship and new firm creation.

4 Data and empirical method

4.1 *Dataset and variable definitions*

The data employed to perform the empirical investigation have been 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 got information about the typology of bank branches per province from the Bank of Italy, and conditioning information from the Italian National Statistics Office. Since provincial-level data of income distribution were not available, we computed them starting from the income data. We download from the Department of Finance website the spreadsheets on the

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

distribution of taxable income for each of the 8056 Italian municipalities over the 2001–2011 period. 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 then we computed the indicators used in the inequality literature. First, we derived the Gini coefficient of income distribution from the Lorenz curve. The Gini coefficient is equal to 0 if everyone has the same income, and it is equal to 100 if a single individual receives the income of the entire province. Hence, larger values of the Gini indicator imply greater income inequality. The alternative measure of income distribution that we use is the Theil index. Theil index is also increasing in the degree of income inequality: if all individuals have the same income, the index equals 0, while it is equal to ln(n) if one individual receives all of the province's income, and n is the number of individuals.

Following the literature on local banking development and economic growth, we use different measures of local banking structure. In particular, we use cooperative banks branches per province (number of branches normalized by the population) as our main independent variable. 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*). Finally, we use a wider measure (Other bank branches) to compare cooperative banks with all the other financial institutions. Branch density is a key 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 of 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 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 bank system) and, hence, of the accessibility of banking services.

As conditioning information, we use a wide set of control variables. From the Istat database we got information about per capita GDP, the distribution of workers among sectors, the trade openness and the rate of female participation in the labor market.

Table 1 displays summary statistics at the regional level. The figures reveal that the average income inequality, measured by the Gini index, is similar among the three Italian macro-areas (North, Center and South). Instead, Theil index shows more differences among areas (in particular for the North of Italy). On average, the regions located in the South of Italy exhibit a lower per capita GDP and a higher unemployment rate. Moreover, branch density of all the typology of banks is larger in North provinces

with respect to Center and South. Figure 1 displays a map of the 103 Italian provinces by the number of cooperative banks branches (Figure 1a) and the value of the Gini coefficient (Figure 1b). As can be noted, northern provinces have both the highest number of cooperative banks branches and the lowest value of the Gini coefficient. This suggests that a high presence of small local banks may be able to reduce income inequalities.

4.2 *Econometric specification*

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

$$Y_p = a_1 + b_1 LB_p + b_2 C_p + \varepsilon_p \qquad (1)$$

where, Y_p is one of our proxies of income inequality (e.g., the logarithm of the Gini coefficient or of the Theil index) in province p; LB_p is a vector of variables measuring the banking structure of province p (e.g., the log of cooperative banks branches density); C_p is a vector of province level control variables; ε_p is the error term. Our coefficient of interest is b_1, which captures the effect of different bank branches' distribution on income inequality in the province.

As discussed in the previous sections, 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 take into account these possible endogeneity issues, we use an instrumental variable (IV) approach. Let I_p be a vector of instruments correlated with local banking structure, which affect income inequality only through the banking channel. The impact of these instruments on LB_p is captured by b_4 in the following equation:

$$LB_p = b_3 C_p + b_4 I_p + u_p \qquad (2)$$

where C_p is the vector of control variables of Equation (1); I_p is the vector of instruments; u_p is the residual.

We first estimate models (1)–(2) using two-stage least square (2SLS). Moreover, we exploit the panel dimension of our data by considering a fixed effects model and by employing the Arellano-Bond estimator to account for the dynamic dimension of the panel. To follow this empirical approach, we need an appropriate set of instruments. Following Guiso et al. (2004), Benfratello et al. (2008) and D'Onofrio et al. (2017) we exploit the 1936 banking law. In particular, we choose as instruments three different indicators (all taken in 1936): 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 regulation was to enhance bank stability through restrictions on bank competition. The law imposed strict limits on the ability of different types of banking institutions to open new branches. In particular, each credit institution was attributed 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. Guiso et al. (2004) demonstrate that the regulation deeply affected the creation and localization of new bank branches in the following decades. Thus, we expect that the 1936 banking law affected the local banking structure during the decades in which it was in place and that this effect continued for several years after the removal of the regulation. Hence, we assume the local tightness of the regulation to be correlated with the current local banking structure. Moreover, 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 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, we can assume that the 1936 banking law is unlikely to have any direct effect on income inequality nowadays.

5 Results

5.1 *Baseline estimations*

[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 baseline results for the impact of local banking structure and cooperative banks' distribution on income inequalities are reported in Table 2. Columns (1)-(5) present 2SLS coefficient estimates; columns (6)-(10) report the estimation results obtained from panel fixed effects; columns (11)-(15) present the results of the Arellano Bond model.[11] In all columns, the dependent variable is the log of the Gini coefficient. Starting with our main independent variable, the density of cooperative bank branches, the coefficient reported in column (1) indicates that a higher presence of cooperative banks in the province significantly decreases the level of inequalities. The estimated coefficient of cooperative branches equals −0.018 and is significant at the 5% level.[12] This suggests that an increase by 10% of the bank branch density induces a reduction of approximately 0.2% of the income inequality in the province. On the contrary, a wider presence of popular banks results to increase income inequalities (column 2), whereas commercial banks branches do not have a significant impact on them (column 3). The effect of cooperative banks' diffusion becomes larger when we include all the bank branches measures together (column 4). In this case, a larger presence of cooperative banks in the province reduces significantly the level of income inequalities in the province (the estimated coefficient is -0.025, statistically significant at 5 percent level). The findings are similar when we consider the other bank branches (commercial banks, popular banks and foreign banks) together (column 5).

Estimation results are robust when we consider the panel dimension of our dataset (both fixed effects and dynamic panel). In both cases, we find a negative and statistically significant effect of cooperative banks' distribution on income inequalities, a positive and statistically significant impact of popular banks on the Gini coefficient, and a partially negative effect of commercial banks on the level of inequalities in the Italian provinces. In the fixed effects model, cooperative banks are associated with a stronger reduction of income inequalities, as the estimated coefficients are -0.033 (statistically significant at 95 percent) and -0.025 (statistically significant at 95 percent) in columns (6) and (10), respectively. Moreover, in this case commercial banks significantly reduce income inequalities, whereas popular banks seem to increase the level of inequalities in Italian provinces. However, when we consider all the bank branches measures together only the coefficient of cooperative banks significantly reduces income inequality (column 9). Finally, Arellano-Bond estimations are very similar to 2SLS regressions.

[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.

[12] To conserve space, we do not report the coefficients on the instrumental variables from the first-stage regression. As expected, cooperative branch density increases with the number of bank branches, popular and savings banks in the province in 1936. In fact, provinces with a larger number of bank branches and savings banks should have suffered less from the regulatory freeze (see Guiso et al., 2004).

Altogether, the findings in Table 2 support the hypothesis that the density of cooperative bank branches tightens the income distribution.

Regarding the set of control variables, we find that a higher level of per capita GDP is associated with a higher level of income inequality. However, when we consider the regressions with fixed effects, per capita GDP seems to have a negative impact on income inequality. The percentage of workers in the manufacturing sector, the trade openness and the female participation in the labor market significantly reduce the Gini index. Finally, as expected, income inequalities appear to be more pronounced in southern provinces.

5.2 *Robustness checks*

For the purpose of testing the robustness of our findings, in Table 3 we estimate the impact of the local banking structure on an alternative measure of income distribution, i.e. the Theil index (expressed in logarithm). Similar to the Gini coefficient, the Theil index is increasing in the degree of income inequality: if all individuals have the same income, the index is equal to 0; if one individual receives all of the province's income, the index is equal to *ln(n)*, where *n* is the number of individuals. The estimation results reported in Table 3 further confirm our findings. Looking directly at the 2SLS results, the coefficients presented in columns (1) and (5), equal to -0.045 (statistically significant at 5 percent level), indicate that cooperative banks significantly reduce income inequalities. Also with Theil index, when we include all the bank branches measures together (column 4, 9 and 14), the coefficients of cooperative banks are larger and more significant (for example in 2SLS estimation, the estimated coefficient is -0.058, statistically significant at 1 percent level).

5.3 *Cooperative banks and income inequality: Non-linearities*

The literature on the real effects of financial development suggests a non-linearity in the relationship between financial development and income inequality. Theoretical models (see, e.g., Greenwood and Jovanovic, 1990 and Deidda, 2006) highlight 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-shaped relationship is mainly driven by the sizeable fixed costs characterizing the development of sophisticated financial institutions. Following the theory, in this section we study the impact of cooperative banks distributions on income inequality for three main subsamples of Italian provinces, distinguished on the basis of their level of economic development:

North, Center, and South. As detailed in Section 4.1, the three macro-regions differ significantly in terms of economic growth. Hence, we expect a different effect of bank branches distribution on income inequality in the three geographical areas. The estimation results reported in Table 4 partially confirm our expectations.[13] Cooperative banks distribution negatively and significantly affect income inequality in the North of Italy. The coefficients of cooperative banks are instead no longer or weakly significant for the provinces in the Center and South of Italy, respectively.[14]

6 Cooperative banks and income inequality: Investigating the channels of influence

Cooperative banks can affect income inequality through various channels. The finance-inequality literature highlights three main mechanisms of influence: labor demand, entrepreneurship, and firm creation (Beck et al., 2010). The banking literature provides more evidence about the effects of local banks on the real economy: small and cooperative banks reduce asymmetric information of more opaque borrowers and improve SMEs' credit availability (Petersen and Rajan, 1994; Angelini et al., 1998). In spite of that, a clear nexus between local banking characteristics and income inequality is still missing. The aim of this section is to 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 comparison to other financial institutions.

6.1 *Bank lending channel*

In Table 5 we investigate the first channel through which cooperative banks could affect income inequality: bank lending. Following the literature on finance and growth, in columns (1)-(8), we analyze the impact of cooperative banks distribution on income inequality in provinces with high and low levels of loans provisions both to families and firms. In particular, sample provinces are distinguished on the basis of the median values of the aggregate loans provided to families and firms, respectively (divided by GDP). Estimation results confirm our expectations: cooperative banks reduce income inequality in provinces with higher levels of loans to families and firms, whereas they are not statistically significant

[13] In Table 4, for reasons of space, we report only Arellano-Bond regressions. The results using other methodologies, available upon request, are qualitatively similar.

[14] These findings are confirmed by splitting the sample at the median value of GDP per capita: the coefficient for cooperative banks becomes negative and significant only for provinces with a level of per capita GDP above the median. These regressions are available from the authors upon request.

in areas with low amounts of loans provision.[15] Based on the banking literature, in columns (9)-(12), we also distinguish sample provinces on the basis of the intensity of *relationship lending*. There is a wide consensus that close lending relationships reduce liquidity constraints (Rajan, 1992; Petersen and Rajan, 1994). This is particularly true when the relationship involves small cooperative banks, which may reduce SMEs' financing constraints thanks to their ability to screen and monitor opaque borrowers through interactions within the local community (Angelini et al., 1998; Berger et al., 2004). In order to measure the pervasiveness of relationship lending in a province, we use the Capitalia survey to compute the share of firms with a single credit relationship in the province.[16] Petersen and Rajan (1994) show that multiple credit relationships can dilute the relationship with the main bank. Hence, we expect that cooperative banks are more effective where the share of single relationships is larger. Estimation results support our a priori considerations: cooperative banks reduce income inequality in provinces where companies are more likely to create exclusive lending relationships. Conversely, the impact of cooperative banks on income inequality is not significantly different from the one of other financial institutions in areas with lower shares of companies with single credit relationships.

6.2 *Entrepreneurship, job participation and human capital*

As suggested by the finance-inequality literature, entrepreneurship, job participation and education are relevant channels through which financial development could affect inequality (Beck et al., 2010). In Table 6, we test the effectiveness of these mechanisms also for the relationship between cooperative banks distribution and income inequality. Starting with the entrepreneurship channel, cooperative banks by improving credit availability should promote new firm creation at the local level, thus mitigating income inequalities (Banerjee and Newman, 1993; Angelini et al., 1998). In order to create a measure of entrepreneurship and test this channel, we rely on the Register of the Italian Chambers of Commerce and compute the ratio of net entrants over incumbents in the province (newly registered firms minus deregistered firms over total registered firms). Then, in columns (1)-(4) of Table 6, we split the sample of provinces on the basis of this indicator (Cao et al., 2018). Estimation results indicate that cooperative

[15] As for Table 4, also in Tables 5 and 6, we only show Arellano-Bond regressions. The results using other methodologies, available upon request, are qualitatively similar.

[16] The "Survey on Italian Manufacturing Firms", conducted by the Italian banking group Capitalia, has been used as a testing ground by many studies, including Benfratello et al. (2008) and Minetti et al. (2015). To compute our proxy of lending relationships, we use three survey waves, which cover three-year periods ending in 2000, 2003, and 2006.

banks reduce income inequality in provinces with higher values of new entrant firms over incumbents, whereas the coefficient is no statistically significant in areas where entrepreneurial behavior is moderate. Another channel through which cooperative banks distribution may affect income inequality is job participation. By reducing firms' financing constraints, cooperative banks may foster labor demand and increase job participation from low-income and female employees (Beck et al., 2010; D'Onofrio et al., 2017). Hence, in columns (5)-(8) of Table 6, we split the sample of provinces on the basis of the female rate of participation to the labor market. Estimation results support the relevance of this mechanism: cooperative banks mitigate income inequality in areas with higher rates of female employees. Finally, by allowing low-income individuals to invest in education, cooperative banks may reduce income inequality through an increase of human capital. In columns (9)-(12), we test the validity of this mechanism by distinguishing provinces on the basis of the percentage of provincial population with at least a secondary school degree. Results indicate that cooperative banks reduce income inequality in areas with high levels of education, but the statistical significance of this finding is quite weak. This is in line with previous studies on Italy, which do not find a relationships between financial development and education due to the relevant role of public budgets in financing education and school development.

7 Conclusions

In this paper we have investigated whether different credit institutions, and in particular cooperative banks, have had a different impact on the reduction of income inequalities in Italian provinces in the 2001-2011 period. By drawing information from the Ministry of Economics and Finance, the Bank of Italy, and the Italian National Statistics Office (Istat), we have found that cooperative banks significantly reduce income inequality. Conversely, popular banks and commercial banks have, respectively, a positive and a non-statistically significant impact on the Gini coefficient. We have tested the robustness of these finding in different ways: we have used alternative measures of income inequality, different proxies of local banking structure (cooperative banks branches, popular banks branches, commercial banks branches), and different estimation techniques (2SLS, Fixed Effects, Arellano-Bond estimator). By analyzing the channels through which cooperative banks reduce income inequality, we have also found that the diffusion of cooperative banks is particularly relevant where new firm creation, female labor market participation and education are higher. Moreover, cooperative banks are found to better mitigate income inequality where loans to families and firms are larger and companies are more likely to enjoy exclusive relationships with banks. Our results support the hypothesis that cooperative banks

positively affect local economies, by reducing income inequality. They also suggest relevant mechanisms of influence tied to the lending and entrepreneurship channels, although more work is needed to better ascertain the contribution of these channels to the finance-inequality nexus. Finally, in a policy perspective, these findings reveals a need for banking regulation and supervision to encompass banking business models in evaluating banks (Ayadi et al., 2012).

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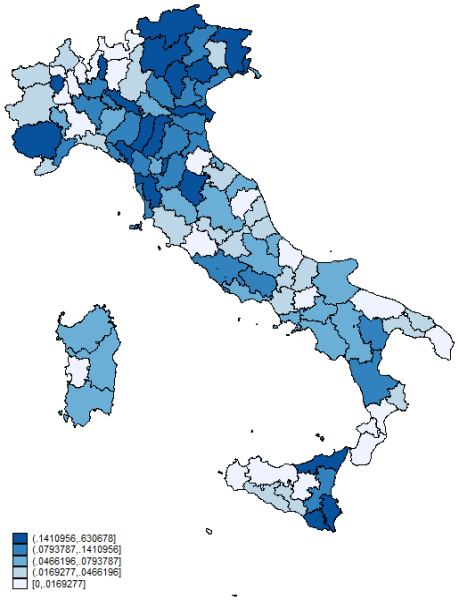
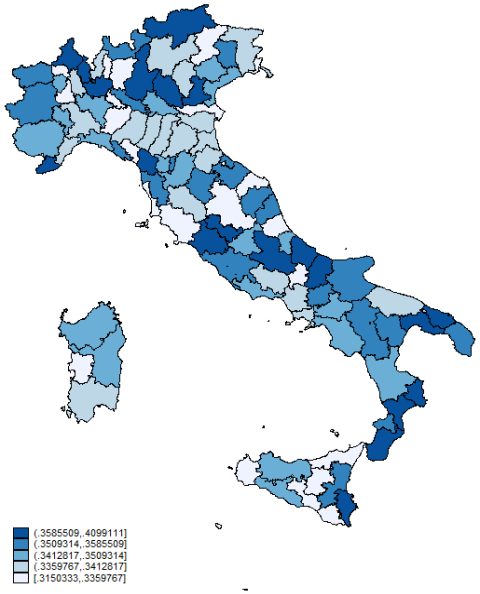
Figure 1: Cooperative bank branches and Gini coefficient

1a. Cooperative banks branches



1b. Gini coefficient



Note : Our calculations on Bank of Italy, Italian Department of Finance and Istat data. The map shows the level of Cooperative banks branches and the Gini coefficient, in 2011 in the 103 Italian provinces, classified in quintiles.

Table 1: Summary statistics

	Gini index		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*

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Table 2. Baseline estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
			2SLS					Panel FE					Arellano Bond		
VARIABLES	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)
Cooperative banks branches (log)	-0.018**			-0.025**	-0.018**	-0.033**			-0.039**	-0.033**	-0.018**			-0.024**	-0.018**
	(0.009)			(0.010)	(0.009)	(0.016)			(0.016)	(0.016)	(0.009)			(0.010)	(0.009)
Popular banks branches (log)		0.015*		0.007			0.019***		0.016**			0.011*		0.002	
		(0.009)		(0.013)			(0.005)		(0.008)			(0.006)		(0.008)	
Commercial banks branches (log)			-0.048	-0.044				-0.119***	-0.045				-0.049	-0.045	
			(0.036)	(0.053)				(0.029)	(0.039)				(0.032)	(0.043)	
Other banks branches (log)					0.009					0.011					-0.012
					(0.066)					(0.085)					(0.060)
Per capita GDP (log)	0.294***	0.223***	0.224***	0.304***	0.294***	-0.432***	-0.438***	-0.421***	-0.376***	-0.435***	0.269***	0.213***	0.207***	0.290***	0.270***
	(0.053)	(0.040)	(0.040)	(0.055)	(0.053)	(0.048)	(0.045)	(0.044)	(0.051)	(0.052)	(0.052)	(0.038)	(0.039)	(0.050)	(0.053)
Unemployment rate (log)	-0.010	0.010	-0.004	0.002	-0.010	0.011	-0.004	0.005	0.000	0.011	-0.008	0.005	-0.004	-0.001	-0.008
	(0.010)	(0.012)	(0.009)	(0.014)	(0.011)	(0.009)	(0.008)	(0.009)	(0.008)	(0.009)	(0.007)	(0.008)	(0.007)	(0.009)	(0.007)
Agriculture (share)	-0.007	-0.158*	-0.193*	0.181	-0.008	1.841***	1.855***	1.820***	1.912***	1.841***	-0.005	-0.153	-0.181*	0.160	-0.005
	(0.170)	(0.094)	(0.101)	(0.179)	(0.174)	(0.291)	(0.306)	(0.280)	(0.305)	(0.292)	(0.166)	(0.094)	(0.099)	(0.169)	(0.166)
Manufacturing (share)	-0.158**	-0.258***	-0.230***	-0.161*	-0.161**	-0.089	0.249	0.067	0.074	-0.087	-0.163**	-0.260***	-0.233***	-0.163*	-0.159**
	(0.077)	(0.067)	(0.059)	(0.085)	(0.078)	(0.238)	(0.200)	(0.183)	(0.240)	(0.237)	(0.077)	(0.067)	(0.059)	(0.083)	(0.077)
Construction (share)	-0.216	-0.701**	-0.487*	-0.657*	-0.208	1.427***	1.246**	1.341***	1.381**	1.418***	-0.228	-0.641**	-0.490*	-0.582*	-0.238
	(0.268)	(0.316)	(0.273)	(0.387)	(0.272)	(0.511)	(0.549)	(0.483)	(0.560)	(0.524)	(0.255)	(0.280)	(0.253)	(0.332)	(0.256)
Trade openess (log)	-0.017***	-0.013***	-0.009*	-0.016***	-0.017***	0.029**	0.028*	0.021	0.038**	0.029*	-0.015***	-0.012***	-0.008*	-0.014**	-0.015***
	(0.005)	(0.004)	(0.005)	(0.006)	(0.005)	(0.015)	(0.016)	(0.013)	(0.016)	(0.015)	(0.005)	(0.004)	(0.005)	(0.006)	(0.005)
Female rate of activity (log)	-0.125***	-0.063*	-0.078	-0.045	-0.132**	-0.024	-0.030	-0.026	-0.028	-0.024	-0.107***	-0.066**	-0.065*	-0.049	-0.100**
	(0.031)	(0.037)	(0.048)	(0.055)	(0.055)	(0.055)	(0.061)	(0.054)	(0.060)	(0.054)	(0.027)	(0.029)	(0.038)	(0.041)	(0.046)
Center	0.010	0.014	0.007	0.022*	0.011						0.009	0.011	0.006	0.018	0.008
	(0.010)	(0.011)	(0.010)	(0.012)	(0.010)						(0.010)	(0.011)	(0.010)	(0.012)	(0.010)
South	0.063***	0.083***	0.049***	0.076***	0.065***						0.060***	0.078***	0.046**	0.067***	0.058***
	(0.019)	(0.020)	(0.018)	(0.024)	(0.022)						(0.019)	(0.019)	(0.018)	(0.022)	(0.022)
Constant	-3.270***	-2.680***	-2.703***	-3.723***	-3.171***	3.051***	3.271***	2.921***	2.504***	3.157***	-3.095***	-2.572***	-2.580***	-3.583***	-3.216***
	(0.522)	(0.352)	(0.409)	(0.528)	(0.926)	(0.522)	(0.441)	(0.440)	(0.539)	(1.004)	(0.513)	(0.345)	(0.394)	(0.511)	(0.902)
Observations	1,072	1,017	1,133	984	1,072	1,072	1,017	1,133	984	1,072	1,072	1,017	1,133	984	1,072
R-squared	0.770	0.798	0.775	0.747	0.769	0.301	0.315	0.312	0.320	0.301					
F instruments	14.19	9.199	3.592	3.126	3.383										

Notes: The table reports regression coefficients estimated with Arellano-Bond model. Standard errors clustered at the provincial levels are in parenthesese. The dependent variables and the estimation methods are reported at the top of each column. Three, two and one star (*) mean, respectively, at 1, 5, and 10 percent level of significance.

Table 3. Robustness check: Theil index

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
			2SLS					Panel FE					Arellano Bond		
VARIABLES	Theil (log)	Theil (log)	Theil (log)	Theil (log)	Theil (log)	Theil (log)	Theil (log)	Theil (log)	Theil (log)	Theil (log)	Theil (log)	Theil (log)	Theil (log)	Theil (log)	Theil (log)
Cooperative banks branches (log)	-0.045**			-0.058***	-0.045**	-0.075**			-0.088***	-0.076**	-0.044**			-0.056**	-0.0[illegible]**
	(0.019)			(0.022)	(0.019)	(0.029)			(0.028)	(0.029)	(0.019)			(0.022)	(0.020)
Popular banks branches (log)		0.034*		0.017			0.027***		0.023*			0.025*		0.005	
		(0.019)		(0.029)			(0.008)		(0.013)			(0.013)		(0.019)	
Commercial banks branches (log)			-0.123	-0.119				-0.172***	-0.066				-0.120*	-0.114	
			(0.078)	(0.130)				(0.046)	(0.063)				(0.069)	(0.100)	
Other banks branches (log)					-0.020					0.036					-0.061
					(0.143)					(0.152)					(0.132)
Per capita GDP (log)	0.705***	0.525***	0.526***	0.714***	0.706***	-0.728***	-0.771***	-0.740***	-0.647***	-0.736***	0.651***	0.502***	0.489***	0.686***	0.655***
	(0.124)	(0.098)	(0.098)	(0.127)	(0.125)	(0.084)	(0.082)	(0.078)	(0.089)	(0.092)	(0.122)	(0.094)	(0.094)	(0.117)	(0.124)
Unemployment rate (log)	-0.025	0.026	-0.003	0.004	-0.025	0.002	-0.023	-0.008	-0.015	0.003	-0.021	0.012	-0.006	-0.005	-0.022
	(0.022)	(0.025)	(0.020)	(0.030)	(0.022)	(0.015)	(0.015)	(0.015)	(0.014)	(0.015)	(0.016)	(0.017)	(0.015)	(0.020)	(0.016)
Agriculture (share)	-0.114	-0.551***	-0.569***	0.242	-0.111	3.369***	3.357***	3.328***	3.456***	3.370***	-0.105	-0.536**	-0.544**	0.194	-0.100
	(0.345)	(0.210)	(0.219)	(0.398)	(0.346)	(0.486)	(0.513)	(0.470)	(0.506)	(0.490)	(0.338)	(0.208)	(0.213)	(0.368)	(0.335)
Manufacturing (share)	-0.071	-0.298**	-0.229*	-0.081	-0.065	0.241	0.831**	0.570*	0.465	0.246	-0.084	-0.307**	-0.241*	-0.090	-0.065
	(0.160)	(0.143)	(0.129)	(0.182)	(0.162)	(0.404)	(0.343)	(0.309)	(0.408)	(0.404)	(0.161)	(0.144)	(0.130)	(0.176)	(0.162)
Construction (share)	-0.509	-1.590**	-1.222**	-1.565*	-0.525	2.739***	2.489***	2.550***	2.756***	2.710***	-0.533	-1.453**	-1.211**	-1.350*	-0.581
	(0.575)	(0.710)	(0.605)	(0.883)	(0.583)	(0.890)	(0.947)	(0.845)	(0.968)	(0.909)	(0.550)	(0.627)	(0.560)	(0.746)	(0.557)
Trade openess (log)	-0.042***	-0.032***	-0.021**	-0.040***	-0.042***	0.052**	0.047	0.036	0.067**	0.051**	-0.038***	-0.029***	-0.019*	-0.035***	-0.037***
	(0.011)	(0.008)	(0.010)	(0.013)	(0.011)	(0.024)	(0.029)	(0.022)	(0.028)	(0.025)	(0.010)	(0.007)	(0.010)	(0.012)	(0.011)
Female rate of activity (log)	-0.272***	-0.122	-0.139	-0.070	-0.258**	-0.060	-0.072	-0.065	-0.067	-0.057	-0.234***	-0.132**	-0.122	-0.089	-0.195**
	(0.068)	(0.081)	(0.104)	(0.123)	(0.118)	(0.090)	(0.103)	(0.090)	(0.100)	(0.089)	(0.060)	(0.064)	(0.083)	(0.090)	(0.098)
Center	0.003	0.007	-0.007	0.030	0.003						0.000	0.001	-0.009	0.019	-0.001
	(0.022)	(0.025)	(0.022)	(0.028)	(0.023)						(0.023)	(0.024)	(0.022)	(0.026)	(0.023)
South	0.105**	0.146***	0.064	0.131**	0.102**						0.098**	0.134***	0.060	0.112**	0.085*
	(0.044)	(0.047)	(0.042)	(0.057)	(0.050)						(0.044)	(0.045)	(0.042)	(0.052)	(0.050)
Constant	-7.002***	-5.507***	-5.607***	-7.971***	-7.208***	5.462***	6.213***	5.625***	4.688***	5.802***	-6.607***	-5.244***	-5.300***	-7.630***	-7.256***
	(1.201)	(0.881)	(0.988)	(1.246)	(2.024)	(0.902)	(0.788)	(0.768)	(0.940)	(1.789)	(1.179)	(0.857)	(0.946)	(1.189)	(1.990)
Observations	1,072	1,017	1,133	984	1,072	1,072	1,017	1,133	984	1,072	1,072	1,017	1,133	984	1,072
R-squared	0.689	0.718	0.686	0.635	0.689	0.332	0.344	0.336	0.351	0.332					
F instruments	14.19	9.199	3.592	3.126	3.383										

Notes: The table reports regression coefficients. Standard errors clustered at the provincial levels are in parenthesese. The dependent variables and the estimation methods are reported at the top of each column. Three, two and one star (*) mean, respectively, at 1, 5, and 10 percent level of significance.

Table 4. Non linearities: Differences among geographic areas

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
			North					Center					South		
VARIABLES	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)	Gini (log)
Cooperative banks branches (log)	-0.025**			-0.029**	-0.028**	-0.020			-0.010	0.006	-0.009			-0.024*	-0.023
	(0.010)			(0.012)	(0.011)	(0.013)			(0.016)	(0.026)	(0.012)			(0.014)	(0.015)
Popular banks branches (log)		-0.008		-0.008			0.009		-0.000			-0.002		0.001	
		(0.008)		(0.013)			(0.009)		(0.007)			(0.009)		(0.012)	
Commercial banks branches (log)			0.001	-0.040				-0.088	-0.044				0.074	0.040	
			(0.041)	(0.068)				(0.068)	(0.082)				(0.090)	(0.081)	
Other banks branches (log)					-0.069					-0.139					0.125
					(0.076)					(0.187)					(0.090)
Per capita GDP (log)	0.366***	0.277***	0.256***	0.384***	0.390***	0.312***	0.242***	0.182**	0.255***	0.190	0.008	0.000	-0.071	0.008	-0.070
	(0.069)	(0.059)	(0.055)	(0.070)	(0.072)	(0.044)	(0.057)	(0.083)	(0.090)	(0.160)	(0.034)	(0.047)	(0.079)	(0.052)	(0.078)
Unemployment rate (log)	-0.008	-0.006	-0.002	-0.011	-0.009	0.012	0.024*	0.011	0.012	0.009	-0.013	-0.019	-0.019	0.006	-0.007
	(0.011)	(0.014)	(0.012)	(0.013)	(0.010)	(0.012)	(0.012)	(0.014)	(0.014)	(0.017)	(0.019)	(0.019)	(0.021)	(0.023)	(0.020)
Agriculture (share)	0.151	-0.580**	-0.424	0.221	0.288	0.437*	0.073	-0.126	0.182	-0.140	-0.314*	-0.255**	-0.352**	-0.067	-0.257
	(0.352)	(0.259)	(0.273)	(0.488)	(0.416)	(0.242)	(0.275)	(0.318)	(0.412)	(0.734)	(0.164)	(0.123)	(0.161)	(0.143)	(0.210)
Manufacturing (share)	-0.197**	-0.241**	-0.253***	-0.186*	-0.161	-0.152	-0.226**	-0.209**	-0.175	-0.198*	-0.221	-0.430**	-0.318*	-0.349**	-0.137
	(0.097)	(0.095)	(0.092)	(0.103)	(0.097)	(0.091)	(0.105)	(0.092)	(0.104)	(0.107)	(0.165)	(0.162)	(0.158)	(0.150)	(0.176)
Construction (share)	0.109	0.214	-0.042	0.082	0.100	-1.467***	-1.572***	-1.881***	-1.678***	-1.699**	0.246	-0.089	0.543	0.132	0.558
	(0.275)	(0.390)	(0.323)	(0.350)	(0.291)	(0.392)	(0.473)	(0.639)	(0.547)	(0.625)	(0.310)	(0.368)	(0.554)	(0.501)	(0.607)
Trade openess (log)	0.008	0.001	0.004	0.015	0.009	-0.025**	-0.019*	-0.031*	-0.028**	-0.028*	-0.009	-0.003	-0.001	-0.007	-0.016*
	(0.022)	(0.016)	(0.018)	(0.031)	(0.024)	(0.010)	(0.010)	(0.015)	(0.014)	(0.014)	(0.005)	(0.006)	(0.007)	(0.007)	(0.009)
Female rate of activity (log)	-0.079	-0.014	-0.024	-0.071	-0.052	-0.054	-0.047	0.028	-0.017	0.056	-0.052*	-0.039	-0.104*	-0.002	-0.087
	(0.061)	(0.060)	(0.061)	(0.068)	(0.067)	(0.033)	(0.043)	(0.066)	(0.066)	(0.136)	(0.029)	(0.030)	(0.055)	(0.048)	(0.067)
Constant	-4.234***	-3.519***	-3.238***	-4.508***	-5.124***	0.000	0.000	0.000	0.000	-3.849***	0.000	0.000	0.000	0.000	0.000
	(0.622)	(0.566)	(0.541)	(0.732)	(1.103)	(0.000)	(0.000)	(0.000)	(0.000)	(0.606)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	473	473	506	446	473	228	222	231	220	228	371	322	396	318	371
Over identification (p value)	0.229	0.002	0.001	0.998	0.998	0.467	0.169	0.782	0.954	0.993	0.497	0.068	0.192	0.998	0.998
AB test AR2 (p value)	0.058	0.011	0.009	0.029	0.061	0.079	0.489	0.664	0.394	0.196	0.017	0.120	0.089	0.268	0.082

Notes: The table reports regression coefficients estimated with Arellano-Bond model. Standard errors clustered at the provincial levels are in parenthesese. The dependent variable is reported at the top of each column. Three, two and one star (*) mean, respectively, at 1, 5, and 10 percent level of significance. Provinces in the north of Florence are located in the North, provinces between Florence and Rome are located in the Center, and provinces in the south of Rome are in the South.

Table 5. Cooperative banks and income inequality: the banking channel

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Loans to family over GDP				Loans to firms over GDP				Share of firms with only one bank			
VARIABLES	< median Gini (log)	≥ median Gini (log)	< median Gini (log)	≥ median Gini (log)	< median Gini (log)	≥ median Gini (log)	< median Gini (log)	≥ median Gini (log)	< median Gini (log)	≥ median Gini (log)	< median Gini (log)	≥ median Gini (log)
Cooperative banks branches (log)	-0.016	-0.020***	-0.019	-0.021***	-0.007	-0.025***	-0.005	-0.029***	0.000	-0.034***	-0.004	-0.032***
	(0.011)	(0.008)	(0.012)	(0.008)	(0.010)	(0.008)	(0.013)	(0.009)	(0.010)	(0.007)	(0.012)	(0.009)
Other banks branches (log)			0.058	-0.001			-0.034	-0.067			-0.045	-0.042
			(0.127)	(0.049)			(0.134)	(0.058)			(0.083)	(0.076)
Per capita GDP (log)	0.220***	0.350***	0.222***	0.351***	0.033	0.364***	0.039	0.373***	0.251***	0.213**	0.263***	0.217**
	(0.061)	(0.056)	(0.062)	(0.057)	(0.042)	(0.051)	(0.059)	(0.052)	(0.065)	(0.104)	(0.066)	(0.103)
Unemployment rate (log)	0.003	-0.018**	0.005	-0.018**	0.005	-0.022**	0.004	-0.024**	-0.009	-0.003	-0.009	-0.005
	(0.010)	(0.009)	(0.011)	(0.009)	(0.010)	(0.010)	(0.010)	(0.011)	(0.009)	(0.011)	(0.008)	(0.012)
Agriculture (share)	-0.004	-0.087	0.005	-0.083	-0.203	0.027	-0.219	0.138	-0.544**	0.139	-0.439	0.090
	(0.196)	(0.145)	(0.222)	(0.147)	(0.169)	(0.232)	(0.159)	(0.255)	(0.204)	(0.192)	(0.284)	(0.211)
Manufacturing (share)	-0.110	-0.197***	-0.109	-0.196**	-0.296**	-0.180**	-0.319**	-0.134*	-0.279***	-0.102	-0.243**	-0.100
	(0.087)	(0.073)	(0.085)	(0.076)	(0.116)	(0.078)	(0.133)	(0.080)	(0.085)	(0.094)	(0.104)	(0.094)
Construction (share)	-0.160	-0.060	-0.115	-0.060	0.070	-0.200	0.049	-0.225	-0.222	0.100	-0.342	0.113
	(0.298)	(0.266)	(0.290)	(0.268)	(0.272)	(0.222)	(0.266)	(0.235)	(0.355)	(0.299)	(0.367)	(0.301)
Trade openess (log)	-0.014**	-0.019***	-0.016**	-0.019***	-0.006	-0.016	-0.005	-0.019	-0.002	-0.015**	-0.003	-0.014**
	(0.006)	(0.006)	(0.007)	(0.006)	(0.005)	(0.014)	(0.008)	(0.014)	(0.013)	(0.006)	(0.013)	(0.007)
Female rate of activity (log)	-0.092***	-0.137***	-0.131	-0.137***	-0.042	-0.102***	-0.024	-0.063	-0.017	-0.086*	0.018	-0.069
	(0.032)	(0.028)	(0.086)	(0.043)	(0.027)	(0.034)	(0.069)	(0.048)	(0.042)	(0.043)	(0.080)	(0.048)
Center	0.002	0.012	0.008	0.013	-0.017	0.023*	-0.021	0.023*	0.014	0.023	0.013	0.020
	(0.013)	(0.010)	(0.016)	(0.010)	(0.016)	(0.012)	(0.021)	(0.013)	(0.011)	(0.017)	(0.011)	(0.019)
South	0.052**	0.080***	0.065*	0.079***	0.011	0.097***	0.004	0.084***	0.147***	0.043	0.135***	0.034
	(0.020)	(0.022)	(0.039)	(0.021)	(0.018)	(0.025)	(0.034)	(0.026)	(0.039)	(0.030)	(0.043)	(0.031)
Constant	-2.697***	-3.766***	-2.153	-3.791***	-0.959**	-4.101***	-1.329	-4.873***	-3.166***	-2.724***	-3.779***	-3.125**
	(0.601)	(0.533)	(1.439)	(0.811)	(0.417)	(0.481)	(1.697)	(0.839)	(0.633)	(0.959)	(1.269)	(1.306)
Observations	528	544	528	544	528	544	528	544	492	580	492	580
Over identification (p value)	0.758	0.005	0.995	0.031	0.616	0.033	0.984	0.903	0.413	0.998	0.852	0.998
AB test AR2 (p value)	0.003	0.047	0.003	0.048	0.000	0.107	0.000	0.111	0.023	0.000	0.040	0.000

Notes: The table reports regression coefficients estimated with Arellano-Bond model. Standard errors clustered at the provincial levels are in parenthesese. The dependent variable is reported at the top of each column. Three, two and one star (*) mean, respectively, at 1, 5, and 10 percent level of significance.

Table 6. Cooperative banks and income inequality: the role of entrepreneurship, job participation and education

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	New firms over total firms				Female rate of participation				Share of population with a secondary degree			
VARIABLES	< median Gini (log)	≥ median Gini (log)	< median Gini (log)	≥ median Gini (log)	< median Gini (log)	≥ median Gini (log)	< median Gini (log)	≥ median Gini (log)	< median Gini (log)	≥ median Gini (log)	< median Gini (log)	≥ median Gini (log)
Cooperative banks branches (log)	-0.009	-0.021**	-0.009	-0.021**	-0.008	-0.027***	-0.005	-0.030***	-0.007	-0.014*	-0.012	-0.013
	(0.008)	(0.009)	(0.008)	(0.009)	(0.013)	(0.009)	(0.013)	(0.010)	(0.011)	(0.008)	(0.013)	(0.008)
Other banks branches (log)			-0.024	-0.037			-0.017	-0.069			-0.046	-0.021
			(0.059)	(0.080)			(0.064)	(0.067)			(0.074)	(0.096)
Per capita GDP (log)	0.161***	0.327***	0.161***	0.329***	0.137***	0.394***	0.138***	0.412***	0.254***	0.273***	0.273***	0.275***
	(0.053)	(0.054)	(0.054)	(0.053)	(0.050)	(0.057)	(0.050)	(0.059)	(0.069)	(0.053)	(0.078)	(0.056)
Unemployment rate (log)	-0.017	-0.004	-0.017*	-0.005	0.005	-0.020**	0.005	-0.021**	-0.006	-0.009	-0.008	-0.010
	(0.011)	(0.007)	(0.010)	(0.009)	(0.011)	(0.010)	(0.011)	(0.010)	(0.010)	(0.007)	(0.010)	(0.009)
Agriculture (share)	-0.049	-0.074	-0.042	-0.080	-0.203	0.123	-0.225	0.249	-0.064	-0.074	0.012	-0.072
	(0.164)	(0.184)	(0.168)	(0.185)	(0.186)	(0.303)	(0.185)	(0.363)	(0.167)	(0.183)	(0.208)	(0.176)
Manufacturing (share)	-0.231**	-0.109*	-0.216**	-0.109	-0.228*	-0.178*	-0.244*	-0.134	-0.242**	-0.102	-0.208**	-0.099
	(0.097)	(0.066)	(0.101)	(0.066)	(0.134)	(0.091)	(0.128)	(0.096)	(0.093)	(0.075)	(0.104)	(0.079)
Construction (share)	-0.194	-0.311	-0.201	-0.352	-0.140	0.002	-0.172	-0.022	-0.560*	-0.016	-0.479	-0.005
	(0.288)	(0.235)	(0.286)	(0.251)	(0.308)	(0.282)	(0.301)	(0.285)	(0.283)	(0.346)	(0.344)	(0.356)
Trade openess (log)	-0.008	-0.025***	-0.007	-0.024***	-0.011**	-0.010	-0.010	-0.010	-0.009*	-0.023***	-0.009*	-0.022***
	(0.005)	(0.005)	(0.005)	(0.007)	(0.005)	(0.014)	(0.006)	(0.015)	(0.005)	(0.006)	(0.005)	(0.007)
Female rate of activity (log)	-0.088***	-0.128***	-0.074*	-0.100	-0.074***	-0.130**	-0.064	-0.096	-0.027	-0.093**	-0.024	-0.077
	(0.033)	(0.026)	(0.043)	(0.063)	(0.027)	(0.053)	(0.039)	(0.063)	(0.031)	(0.037)	(0.033)	(0.075)
Center	-0.005	0.014	-0.006	0.013	0.006	0.030**	0.005	0.032**	-0.006	0.013	-0.009	0.012
	(0.012)	(0.010)	(0.012)	(0.010)	(0.015)	(0.013)	(0.014)	(0.014)	(0.015)	(0.011)	(0.017)	(0.012)
South	0.035*	0.076***	0.029	0.071***	0.045**	0.115***	0.043*	0.101***	0.128***	0.052**	0.106**	0.049*
	(0.021)	(0.019)	(0.025)	(0.022)	(0.021)	(0.017)	(0.023)	(0.019)	(0.027)	(0.020)	(0.049)	(0.025)
Constant	-2.004***	-3.626***	-2.241**	-4.023***	-1.869***	-4.312***	-2.029**	-5.170***	-3.170***	-3.216***	-3.746***	-3.463***
	(0.500)	(0.520)	(0.940)	(1.000)	(0.513)	(0.551)	(0.910)	(1.008)	(0.670)	(0.491)	(1.158)	(1.285)
Observations	533	539	533	539	535	537	535	537	517	555	517	555
Over identification (p value)	0.963	0.003	0.961	0.111	0.550	0.262	0.959	0.998	0.387	0.000	0.693	0.001
AB test AR2 (p value)	0.000	0.050	0.000	0.041	0.000	0.197	0.000	0.170	0.001	0.008	0.001	0.009

Notes: The table reports regression coefficients estimated with Arellano-Bond model. Standard errors clustered at the provincial levels are in parenthesese. The dependent variable is reported at the top of each column. Three, two and one star (*) mean, respectively, at 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 (Regsiter).

Variable	Definition and source (in parentheses)
Main dependent variables	
Gini index (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)
Banking development	
Cooperative banks branches (log)	Logarithm of cooperative banks branch density by province, number of branches normalized by the population. (BI and ISTAT)
Popular banks branches (log)	Logarithm of popular banks branch density by province, number of branches normalized by the population. (BI and ISTAT)
Commercial banks branches (log)	Logarithm of commercial banks branch density by province, number of branches normalized by the population. (BI and ISTAT)
Other bank branches (log)	Logarithm of popular, commercial and foreign banks branch density by province, number of branches normalized by the population. (BI and ISTAT)
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)
Female rate of activity (log)	Logarithm of the female rate of activity in the province. (ISTAT)
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)
Loans to family over GDP	The ratio of loans to family over GDP in the province (BI)
Loans to firms over GDP	The ratio of loans to firms over GDP in the province (BI)
Share of firms with only one bank	Share of firms with only one credit relationship in the province (Capitalia)
New firms over total firms	Newly registered firms minus deregistered firms over total registered firms in the province (Register)
Secondary degree	The percentage of the provincial population with at least a secondary school degree. (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)