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Abstract

We examine the geography of productivity leaders and laggards in the population of Italian joint stock manufacturing companies between 2007 and 2017 and analyse how far such patterns can be related to their financial structure and the provision of financial services in the Italian provinces. To do so we exploit the reform of the Italian banking system in the mid-Nineties as an exogenous shock on the structure of local banking markets and examine whether this shock affects productivity patterns at the firm level. We find a robust descriptive evidence of a widening of the leader-laggard gaps, with a very sizeable productivity divide between the North and the South of the country. Leaders are concentrated in the North. Leaders, especially in the North are also more likely to have access to capital markets. Firms in the South, instead, also those at the frontier, are more reliant on bank lending. The liberalization of the banking market in the mid 90s and the growth of joint stock banks at the provincial level positively affected firms' productivity outcomes, possibly through an improvement of firms' financial structure. We also use a firm specific measure of core-periphery based on distance from airport hubs and find that the likelihood of activating a virtuous capital market productivity link declines with distance from core areas.

JEL: R1, O4, G21
Keywords: productivity, bank liberalization, core-periphery dynamics

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1. Introduction

The now well documented large and generally growing gap between firms in the top percentiles of productivity distributions and other firms in lower deciles (Andrews et al, 2016) indicates a pattern of rising inequality in performance between the two groups, with laggards less and less able to converge to the frontier.

These trends have been analysed with respect to several crucial and related economic issues: i) the declining labour shares in production in most industries, hence the implicit rise of income inequality (Autor et al, 2017; Hartman-Glaser et al, 2016; Schwellnus et al, 2018); ii) the rising mark ups and the winners-take-all syndrome, hence the increase in the market power of leaders with loose competition policy (Van Reenen, 2018; Autor et al, 2017; De Loecker et al, 2018; Gutiérrez and Philippon, 2019); iii) the lack of technology diffusion and catching up (Andrews et al 2015 and 2016; Akcigit and Ates, 2019); iv) slow aggregate productivity growth (Akcigit and Ates, 2019). Whatever the perspective, the fast rise of a fairly small group of leaders, with limited ability for the others to catch up, generates increasingly less diffused patterns of growth.

The key contribution of this paper is to examine the geography of leaders and laggards in the population of Italian joint stock manufacturing companies between 2007 and 2017 and analyse how far such patterns can be related to their financial structure and the provision of financial services in the Italian provinces. To do so we exploit the reform of the Italian banking system in the mid-Nineties as an exogenous shock on the structure of local banking markets and examine whether this shock affects productivity patterns at the firm level.

Alfaro et al (2019) show, for a large sample of EU and US companies, that industry leaders tend to concentrate in central areas and that they agglomerate many other firms. If leaders are concentrated in a few core areas, gaps in productivity will also result in the strengthening of core-periphery patterns. The core-periphery issue is especially meaningful in economies with deep geographic divides like Italy. The productivity of individual firms is affected by the environment in which they operate: agglomeration economies, knowledge spillovers, economies of scope and availability of specialized labour, components, services and finance are all elements related to productivity growth. In this paper we especially focus on the role of finance.

A large body of literature has considered the relationship between access to credit and productivity, and generally found in different contexts and using different analytical frameworks, that access to credit does foster productivity growth (Aghion et al, 2010, Benfratello et al, 2008, Garcia-Macia, 2017; Caggese, 2016; Midrigan & Xu, 2014; Bircan and De Haas, 2020). This issue has been studied recently exploiting the financial crisis in 2009 and the subsequent sovereign crisis in the EU as an exogenous instrument affecting credit supply, independently of firms and local market characteristics. Manaresi and Pierri (2018), using firm-banks-matched credit relationships, find that credit supply in Italy had a positive impact on output growth and productivity.

However, leverage and dependence from bank credit may in the longer term weaken firms' performance. Investment in intangibles like R&D, brand awareness, market penetration etc., instrumental for growth and efficiency, requires long-term capital, possibly equity or market debt. Firms with a weak financial structure and excessive bank dependence will likely have less access to market based financial instruments for equity and long-term debt. Nucci et al (2005) find that the

financial structure affects innovation in Italy and that more leveraged firms innovate less. Several recent studies have shown how investment in intangibles are especially sensitive to firms being financially constrained (Demmou et al, 2019, Ahn et al, 2019).

Firms with a weak financial structure will also have less access to bank credit. The consolidation of the banking industry, and the wider use of prudential requirements geared to the quality of credit, induced banks, especially large ones, to move from relationship-based criteria of evaluation, soft information, to standardized mechanisms based on hard information. Hard information of course works only if companies are sufficiently transparent and able to convincingly provide such information to their financial counterparts. We expect such companies to be less bank dependent and leveraged, but also less credit constrained, hence also better able to use bank loans to finance their investments. For all these reasons, we consider the overall financial structure of firms and in particular leverage, bank dependence and use of non-bank external finance (equity and debt). At the same time, we expect local financial markets and their level of development to impact on the financial structure of firms, and consequently also on their productivity.

We find convincing descriptive evidence of a strong divide in Italy between the North and the South of the country both in terms of firm level productivity and financial structure. Leaders are to a large extent concentrated in the richer regions in the North of the country. As for finance, leaders are more likely to issue corporate bonds, are less leveraged and less bank dependent. A divide is also detectible in the financial structure of firms, independently from their productivity. Access to capital markets is only sizeable and positively correlated to being a leader in the North. Firms in the South are more bank dependent, and contrary to their Northern counterparts, their degree of bank dependence is positively related to productivity and the probability of upgrading as leaders. This is a sign of how peripheral financial markets are less diversified and how firms located in economically weaker regions still depend on banks to finance productivity-enhancing investment.

Consequently, in the second part of the paper we take a step further and analyse the relationship between productivity and financial market development at the level of Italian provinces. According to Barba Navaretti et al (2019), the increasing global integration of financial markets and the prospect of the Capital Markets Union in the EU are likely to strengthen the concentration of financial activities in core areas and hence foster core-periphery patterns in finance, with firms in peripheral areas less likely to access capital markets. The role of banks in local financial markets can be very valuable in this respect. Banks sufficiently large to be branched to international capital market, can support firms in their access to capital, besides for providing bank loans. In a world where the allocation of finance is increasingly based on hard information, banks, especially when they hold long term interactions with their clients, can broker soft information into hard one and convey it to distant capital markets.

The structure of local banking markets can be of high importance in favouring the diversification of firms' financial structures, their access to global capital markets and, through this channel, enhance productivity growth. There is a large body of evidence supporting the view that financial markets are highly segmented (Guiso et al, 2004 on Italy, Bircan and De Haas, 2020 on Russia, Cornaggia et al, 2015 on the US) and therefore it matters to focus on their characteristics. Rodriguez-Pose et al (2020) show that lack of access to finance represent a serious barrier to firm performance, especially for micro and small firms, yet this effect is mitigated by high-quality regional institutions. Guiso et al (2004) show, for example, that the level of financial development varies across Italian provinces (as measured by the probability that households are shut off the credit market) and that this in turns

affects many economic outcomes: firms' growth, the intensity of competition and entry and exit of firms. Benfratello et al (2008) relate firms' innovation activities to the number of branches per head in the Italian provinces. They use 1936 historical data as an instrument of local financial development and find that branch density (number of branches per head) is positively related to innovation for a sample of Italian firms in the late Nineties.

Our identification strategy exploits the exogenous shock of the transformation of public banks into joint stock companies and their subsequent privatization in the early 1990s (see Appendix B for a thorough description of the institutional features of the banking reforms in Italy). We expect that joint stock banks, which since being privatised mostly belong to large private national and foreign banking institutions, are more likely than locally geared mutual banks to allocate credit according to standard procedures favouring access to capital markets.

The distribution of banks' branches at the provincial level before banking reforms was strictly regulated. Almost 80% of total branches belonged to public commercial or saving banks. Consequently, the geographical distribution of different types of branches (joint stock or mutual banks) at the beginning of the privatization process, between 1996 and 1998, is exogenous to local economic conditions of today.

Subsequent changes in the industry and the geographical distribution of branches were instead market driven. In 2006, almost 80% of the branches belonged to private joint stock national or foreign commercial banks. According to Saccomanni (2008), in Italy between 1997 and 2007, 300 mergers and acquisitions took place leading to an increased concentration of assets and more than 50% of the market share in total assets changed owners.

To obtain an exogenous time varying measure of local financial development, we simulate the local growth of mutual and joint stock branches by allocating the 10 years lagged nationwide yearly level and growth rates of branches using the shares of branches by province and type of bank in 1996-1998, in a very similar fashion to the Bartik methodology (see Goldsmith-Pinkham et al, 2019).

We are interested in identifying the effect of changes of the firms' financial structure following the reform on firm level outcomes. We do this by estimating a reduced-form relationship between the simulated level/growth of branches in the province and firm productivity. We privilege this estimation to a two-stage least square (2SLS) estimation because of concerns about the exclusion restriction. The bank liberalization reform also impacted on other factors in the province that could ultimately affect firm performance, creating invalid conditions to perform a 2SLS estimation. For example, the change in the financial culture of local markets following privatization and liberalization is expected to have induced subsequent shifts from relationship lending and patterns of credit allocation essentially driven by local interests, typical of locally focused mutual banks, to patterns driven by market motives and based on hard information. Also, the change in the allocation strategy of banks has likely affected the behaviour of firms, which faced a higher incentive to improve their financial structure and reduce their leverage in order to keep accessing credit. This virtuous pattern may in the end also have helped firms access non-banking capital.

Our reduced form estimates show that firms based in Italian provinces with a growing simulated share of joint stock branches had faster productivity growth and a higher probability to be a leader. We also interact financial market conditions with a core-periphery measure of firms' location: weighted distance from airports. We find that the link between financial development and firm

performance gets looser with the distance from core travelling hubs. An increase by 1 standard deviation of the distance from the main hub in the area reduces TFP by 1.63%, whereas an increase in 1 standard deviation of our preferred measure of bank liberalization increases TFP by 0.21%. We show that if we interact these distance and financial conditions, the effect of bank liberalization is linearly lowered by 0.014 percentage points each km away from the main hub. If we carry out separate estimations for the three Italian macro regions, we find that national results are mostly driven by the North and the South. In the Centre of Italy all measures of financial market development are also positively related to productivity outcomes, yet results are not significant. We show that the above findings are likely to be driven by both a decrease in firms' bank exposure and increase in access to capital markets. We find that as firms move away from core areas, access to capital markets is negatively while bank exposure is positively affected, pointing to the plausible interpretation that as firms move away from financially developed areas, they still strongly rely on bank debts as the main source of funding.

These latter results stress the view that financial development favours productivity growth mostly in core economic regions, decreasing in the periphery. This could be due to the resilience of mutual and small banks still linked to or captured by local interests and less connected to international capital markets. Marchetti and Pozzolo (2019) show that in the aftermath of the financial crisis (they use the financial crisis as an exogenous shock affecting credit supply) small banks with internal organizations and lending strategies based on soft information kept higher lending levels than larger structured banks.

In what follows we discuss data, the computation of TFP measures and the allocation of firms in different productivity groupings. We then provide descriptive evidence of productivity patterns in total and across the Italian territory and of their relationship to financial structures. We finally carry out a reduced form estimation of the relationship between financial market development and productivity outcomes.

2. Data and productivity measures

Our analysis is based on the population of Italian manufacturing joint stock companies between 2007 and 2017 provided by Cerved from *Centrali dei Bilanci*. This includes an average of 47,865 observations per year varying between 41,029 in 2007 and 57,400 in 2017. The analysis is therefore done at the firm level. Following some sample restrictions related to the presence of detailed information on the firm location and on the financial variables (see Appendix C for information about sample construction), the final sample consists of 328,207 year-firm observations.[4]

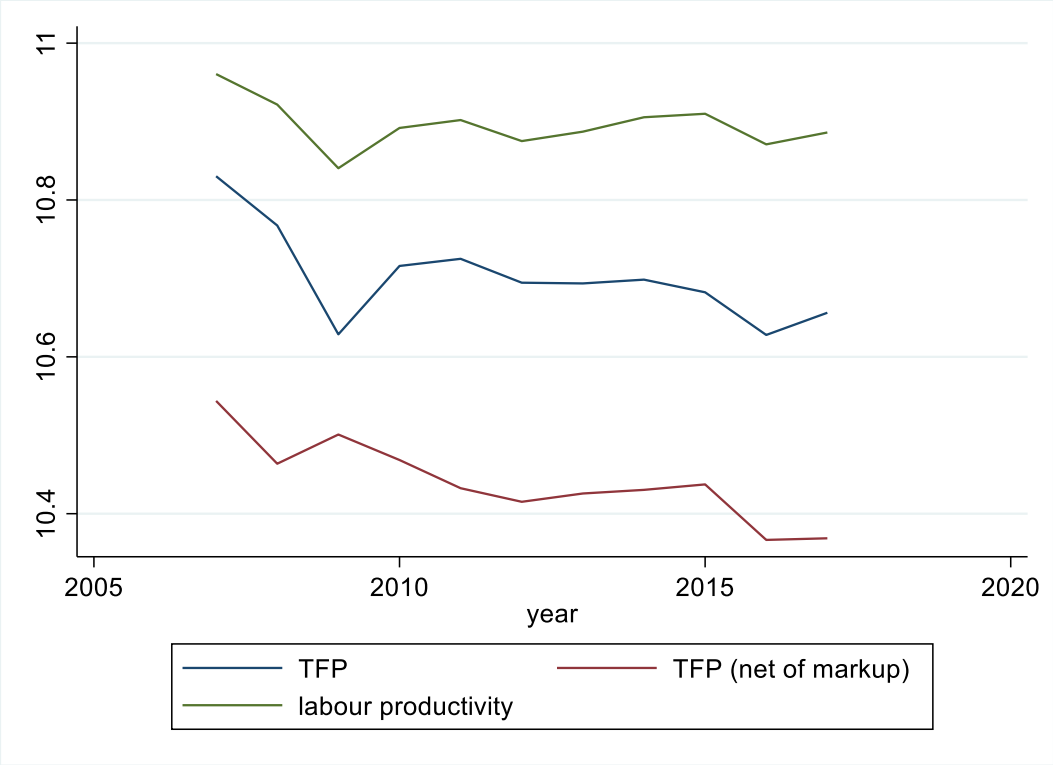
We first compute labour productivity using the information on (real) value added from balance sheet data and the number of employees reported. Because the number of employees reported is missing for a large percentage of firms (57%) we use the same methodology as in Di Giacinto et al (2014) and impute the firm specific number of employees deriving it from total labour costs. In particular, for all firms for which we have information on the number of employees, we computed the median of the distribution of average cost per employee within cells defined by sector (2 digit), region, local labour market (683, see below), percentile of revenues and value added. We use then this information to estimate the number of employees for the remaining firms by dividing their total cost of labour by the median average cost of the cell they belong to.

[4] We report t-tests for differences in observable characteristics (regions and sectors) between our sample of analysis and the initial sample. Despite showing differences, these are observable characteristics we can control for.

As for total factor productivity (TFP), we use a value-added based production function where inputs are the number of employees and real capital. We use the estimation methodology as suggested in Wooldridge (2009) where material inputs are proxied by consumption and general expenses from balance sheet data and labour is one year lagged. We run a total of 24 regressions, separately for each manufacturing 2-digit sector (SIC codes 10 to 33) and we control for year and firm fixed effects. In this way, we have a TFP distribution for each sector with comparable TFP measures across firms and years. As a robustness check we estimate the production function using a simple OLS and firm fixed effects estimation. We also derive TFP measures corrected by firm and time varying markups measured as in De Loecker and Warzynski (2012).

Figure 1 reports average productivity levels in logs between 2007 and 2017. We report three different measures of productivity: labour productivity defined as labour cost over number of employees by firm; TFP and TFP net of mark ups. All measures follow similar trends, with deep dives in 2008, at the start of the financial crisis.

Figure 1 Average TFP, TFP net of markup and labour productivity



Source: Cerved data, years 2007-2017. TFP estimated using methodology by Wooldridge (2009) and markups measured as in De Loecker and Warzynski (2012).

The Cerved data set provides all balance sheet information and several financial indicators. We can therefore observe firms' financial structure and their source of funding. We can compute different measures of leverage, bank dependence and access to financial markets for debt and equity. Leverage is defined as total debt over equity, bank exposure is defined as debt to banks over total debt, finally, access to capital markets is given by the value of the securitized debt issued over total liabilities. In Table C1 of Appendix C we report all the descriptive statistics of the variables used in the analysis.

For each firm we know the municipality where it is based. We can therefore allocate each firm to two different geographical clusters: local labour markets (683) or provinces (107). At the provincial level, we can combine our firm level information with information on local banking activity, as we have data of the number of branches per province and type of bank (joint stock or mutual bank) since 1996, from the statistical portal of the Bank of Italy. [5] We will use provincial information in the second part of the paper.

3. Leaders and laggards

Leaders are defined as those firms at or above the 95th percentile of productivity distributions in each year and sector. From here onward, to avoid selection problems due to sample size increasing over time, we keep the number of leaders at the top constant, despite its composition varies with time[6]. Laggards are all other firms below the 95th percentile.

The leader-laggard patterns emerge clearly from Figure A1 in Appendix A, which shows TFP levels across different percentiles between 2007 and 2017. There is a clear and persistent productivity gap between firms at the 95th percentile (leaders hereafter) and the other firms. Hence leaders are considerably more productive than the rest of the group, including those performing relatively well (80th percentile). Also, starting from 2007, there is no evidence of productivity convergence. In line with what found by Andrews et al (2016) for OECD countries, the gap increases between top performers and firms in other percentiles, especially those at or below the median, even though Italian leaders have not regained the pre-crises productivity level yet in 2017 (Panel B of Figure A1 in Appendix A).[7]

3.1. Leaders and laggards and the North-South divide

What is the geographical distribution of leaders and laggards? We initially analyse the core-periphery divide simply focussing on the three Italian macro-regions: North, Centre and South.[8] We look at the leader-laggard composition within these areas. In Figure 2 we look at the distribution of firms in each area, identifying firms according to the percentile they belong to with respect to the overall national productivity distribution. Data show a dramatic difference between North versus South. Both in 2007 and in 2017, the mode of the distribution in the South corresponds to firms in the lowest 20th percentile of the distribution, whereas in the North to firms between the 50th and the 80th percentiles and in the Centre between the 20th and the 50th. In other words, the production structure in the Southern part of the country is predominantly composed by firms classified among the least productive on a national scale, with very few leaders. Leaders are instead highly polarised in the North. Actual numbers of firms in each area are reported in Table A1 in Appendix A. In the

[5]Data can be found at: https://www.bancaditalia.it/statistiche/tematiche/moneta-intermediari-finanza/intermediari-finanziari/index.html?com.dotmarketing.htmlpage.language=1

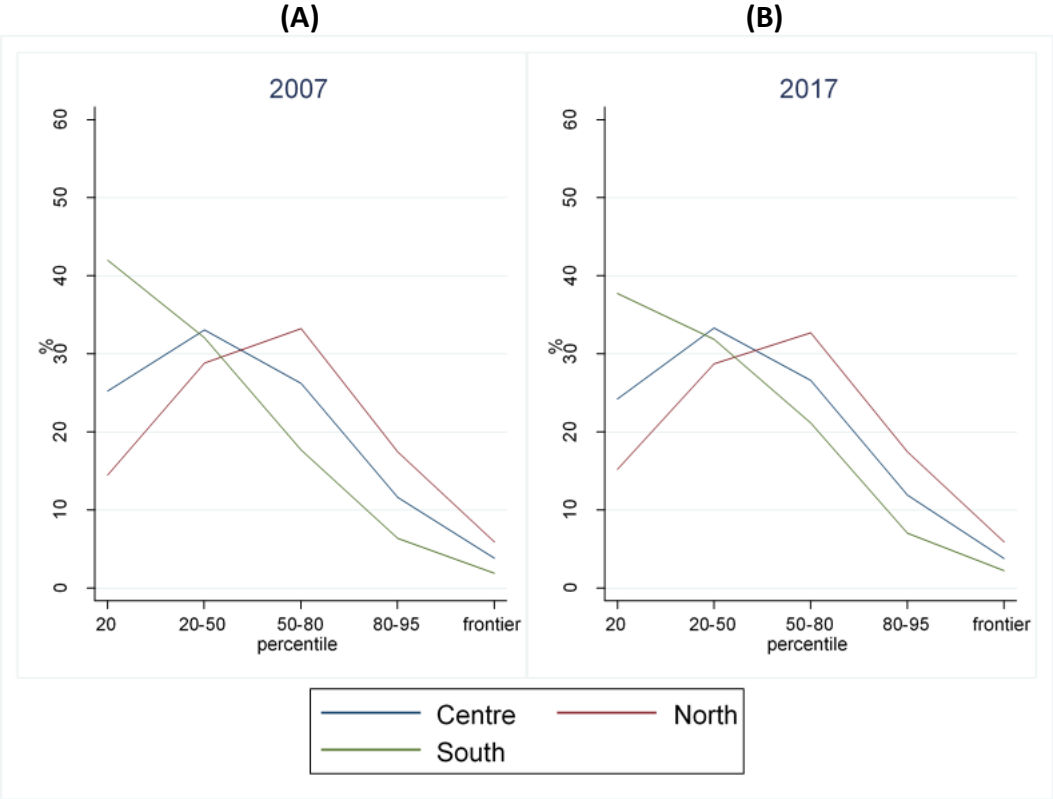
[6] Equal to the median of the distribution of the number of firms at the frontier in the whole period (Andrews et al, 2015).

[7] This is probably due to selection patterns. If we use a balanced panel, the productivity of leaders rises above pre-crisis levels.

[8] We include the following regions in the North category: Piemonte, Valle D'Aosta, Liguria, Lombardia, Trentino Alto Adige, Veneto, Friuli Venezia Giulia, Emilia Romagna; the following in the Centre category: Toscana, Umbria, Marche and Lazio and the following in the South category: Abruzzo, Molise, Campania, Puglia, Basilicata, Calabria, Sicilia and Sardegna

appendix we also report transition matrices showing a higher degree of churning in the North than in the South. A firm in the bottom productivity percentile in the South has a 70% probability of remaining in the same cluster after 5 years, versus a 50% probability for a firm in the North. We report transition matrices, overall and by macro area, in Table A2 in Appendix A.

Figure 2. Regional distribution of firms ranked by national productivity percentiles (2007-17)



Source: Cerved data, years 2007-2017. TFP estimated using methodology by Wooldridge (2009) and markups measured as in De Loecker and Warzynski (2012).

3.2. Finance and Productivity and the North-South divide

How far gaps between leaders and laggards are related to access to and use of finance? According to Andrews et al (2016) and Akcigit and Ates (2019) the lack of convergence between frontier and laggard firms could partly be related to slow patterns of technology diffusion. More generally, productivity growth is frequently linked to investment generating intangible assets like R&D, brand recognition, presence in foreign markets. These investments are very risky, involve large sunk costs and are hard to finance with bank loans. Highly leveraged firms with a high degree of bank dependence are less likely to have access to capital markets for equity finance or long-term loans. The financial structure of firms can be a sign of how much firms have been able to access diversified financial sources. At the same time, it indicates their viability for future access to finance. Nucci et al (2005) provide evidence for Italy that leverage has a negative relationship with innovation and productivity.

As argued in the introduction, despite access to capital markets, the financial structure is also important to increase the probability of obtaining loans from banks when credit allocation is based on hard information rather than long-term relationships. Once more, the North-South divide and core-periphery patterns may be important. In local financial markets, far away from capital markets,

banks may still be the main source of funding and base their credit allocation on relationships and soft information.

In Table 2, we start by descriptively comparing the financial structure of laggard and frontier firms in the three macro regions.[9] The measures of financial structure we look at are leverage (total debts over equity), banks' exposure (total debts to banks over total debt) and a measure of access to capital markets (total bonds over total liabilities). In the three regions, laggards are in general more leveraged (more than twice than leaders), more bank dependent and make less use of market finance, even though this is a marginal funding channel for all groups. Interestingly, within leaders, firms in the North and in the Centre are less bank dependent and those in the North make more use of external finance than in the South.

Table 2. Financial structure

	Laggards			Leaders		
	North	Centre	South	North	Centre	South
Bank exposure	0.30	0.30	0.25	0.21	0.23	0.28
Access to capital markets	0.0042	0.0029	0.0013	0.011	0.0041	0.0067
Leverage	10.54	9.51	10.16	2.35	2.60	2.27
Average Net Assets	2,461,209	1,978,401	1,693,719	11,000,000	14,200,000	11,500,000
Average Total Debts	4,400,000	3,800,000	3,300,000	15,000,000	24,000,000	13,000,000
Observations	225,267	51,563	29,247	18,193	3,086	851
Note: Cerved data, 2007-2017, Authors' calculations						

These results may simply be driven by compositional differences across the two groups, like firm size (on average leaders have higher net assets and total debts than laggards) and industry characteristics. In Table 3 we therefore run OLS and linear probability regressions for the whole country (Panel A) and with macro-area dummies interactions (Panel B) to estimate the relationship between the financial characteristics and productivity outcomes. These correlations provide a clean picture of the characteristics of leaders and laggards in each region. Regressions include controls for firm size at the beginning of the period and are also very restrictive in terms of fixed effects used as we are able to control for local labour markets characteristics that vary over time (Local Labour Markets X Year FE)[10] and, similarly, for industry shocks (Industry X Year FE). In the first two columns of Table 3 the dependent variable is TFP, gross and net of mark-ups respectively, while in the third we report the firm level probability to upgrade as leaders, constructed as a dummy equal to 1 if the firm is in the 95th percentile as previously defined. Overall (Table 3 Panel A), firms with more access to capital markets and less bank dependence have higher TFP, however measured, and a higher probability to upgrade. Comparisons between North and South (Table 3B) provide interesting insights.

[9] In Appendix Table C1, we report the description and sample mean and standard deviations for each variable used in the analysis.

[10] We use the 2001 Istat definition of local labour markets, as described in Appendix C. Figure C1 and C2 of the same Appendix show the firm and leader distribution across local labour markets. The Istat algorithm identifies 683 local labour markets.

Table 3. Finance and TFP performance (A) All country; (B) By macro area

	TFP	TFP (net markup)	Probability to upgrade as leaders
	(1)	(2)	(3)
Panel A			
Bank exposure	-0.123***	-0.071***	-0.107***
	(0.017)	(0.012)	(0.008)
Access to capital markets	0.396***	0.123***	0.149***
	(0.047)	(0.029)	(0.034)
Leverage	-0.000**	-0.000	-0.000**
	(0.000)	(0.000)	(0.000)
Panel B			
Bank exposure	-0.190***	-0.101***	-0.124***
	(0.009)	(0.009)	(0.008)
Bank exposure*Centre	0.142***	0.061***	0.046***
	(0.030)	(0.018)	(0.015)
Bank exposure*South	0.527***	0.234***	0.120***
	(0.036)	(0.027)	(0.011)
Access to capital markets	0.413***	0.117***	0.180***
	(0.053)	(0.033)	(0.041)
Access to capital markets*Centre	-0.242*	-0.038	-0.245***
	(0.124)	(0.069)	(0.054)
Access to capital markets*South	0.110	0.141	-0.008
	(0.297)	(0.168)	(0.191)
Leverage	-0.000**	-0.000	-0.000**
	(0.000)	(0.000)	(0.000)
Leverage*Centre	-0.001***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)
Leverage*South	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)
Centre	-0.162***	-0.054	-0.057***
	(0.031)	(0.046)	(0.022)
South	-0.178	-0.099	-0.053**
	(0.213)	(0.223)	(0.024)
Observations	328,207	328,207	328,207
R-squared	0.531	0.620	0.071
Mean outcome	10.84	10.53	0.067
Local labour market x Year FE	Yes	Yes	Yes
Industry x Year FE	Yes	Yes	Yes

Productive leaders in the North are less bank-exposed and this negative effect decreases in the Centre, reversing for the South. With regards to access to capital markets, their access is positively related to TFP and the probability to be a leader across all firms with this effect being larger for the North, smaller in the Centre but not significantly different in the South. Similarly, higher levels of leverage are linked to lower levels of TFP and lower probabilities to be leaders, with even more

negative effects in the Centre but no significantly different effects in the South.

These results confirm what reported in Table 2, that access to capital markets is positively correlated to TFP and the probability of being a leader, with stronger effects in the North. In the Southern regions bank lending remains the dominant channel of financing and upgrading. The negative relationship between bank credit and productivity in Northern areas, may reflect the fact that highly exposed firms towards the banking system and with limited ability to tap other sources of funding have suffered from credit rationing during the financial crisis. Several papers have shown that this credit rationing curtailed investment and that during the crisis there has been a severe misallocation of bank credit (see Bugamelli et al, 2018, for a review).

4. *Local financial markets and productivity*

It is clear from the previous exercise that the productivity outcomes of firms are related to their financial structure. It is also clear that this relationship is affected by the geographic location of the firm. Only those based in the North, for example, use external financial markets to a sizeable extent, whereas for those in less economically advanced areas, banks remain the key and almost sole source of finance, with positive effects on performance.

In what follows we will explore more carefully both such dimensions of the development of local financial markets in a core-periphery context. Unfortunately, we cannot identify the causal link between financial development and productivity from the exercise reported in Table 3. Even though we control for time varying industry and local labour market specific unobservable factors, nonetheless the relationship between financial structure and productivity is endogenous, as efficient firms are also more likely to have access to capital markets, being less leveraged and less exposed to banks.

According to Guiso et al (2004), the local dimension of financial markets is highly relevant, as distance matters in accessing funds, especially for SMEs. Hence, local conditions considerably affect firms' access to funding[11]. We will then use an exogenous shock in the characteristics of local financial markets at the level of Italian provinces, the liberalization and the privatization of the banking system, which took place in the first half of the 90s, to proxy the change in firms' access to finance and relate it to firm level productivity.

The choice of the unit of analysis is consistent with Guiso et al (2004) who suggest that banking regulation, restricting branch openings until 1990, was based on politically driven provincial schemes. The number of banks' branches per province before the reform was strictly regulated, and it was very difficult to open new branches.

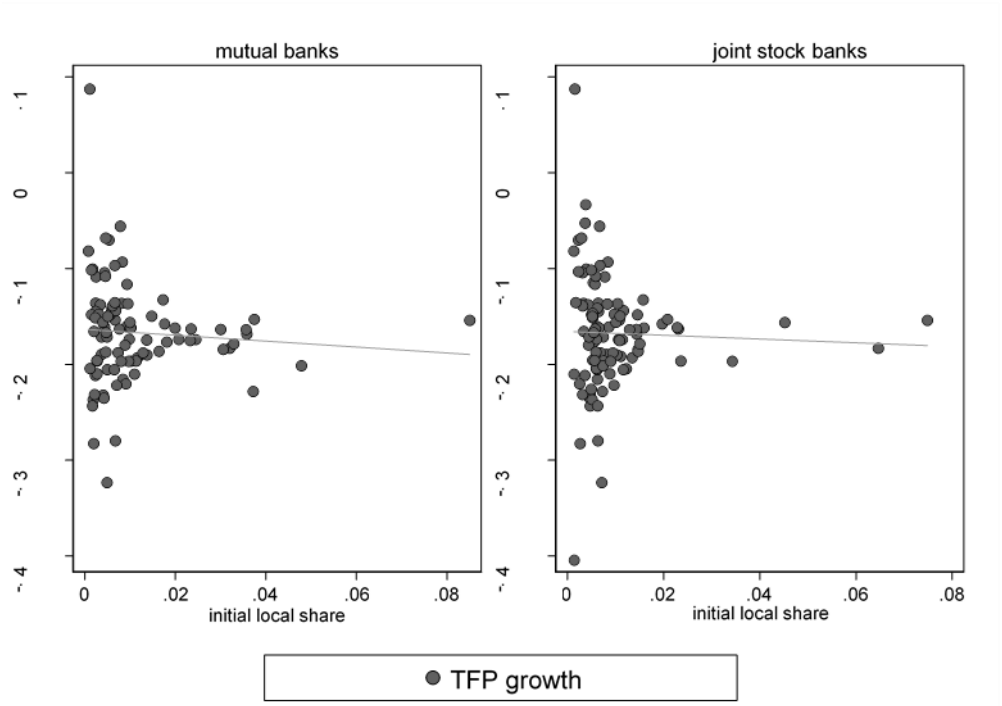
Before privatization almost 80% of total branches belonged to public commercial or saving banks. With privatization most banks were transformed in joint stock companies, although a large number of locally rooted mutual banks persisted in time. Because actual location of types of banks may be correlated with unobservable characteristics related to economic and demographic conditions, we simulate the local growth of bank supply using initial geographic variation in the provincial exposure to different types of banks and national growth of mutual and joint stock banks 10 years before the analysis. The composition of branches by province in 1996-1998, following privatisation but at the

[11] Other earlier studies on the impact of financial development on growth are King and Levine (1993), Jayaratne and Strahan (1996) and Rajan and Zingales (1998).

start of the reform process, was still exogenous to contemporaneous local economic conditions. Figure 3 shows in fact that there is no cross-province correlation between TFP growth between 2007 and 2017 and the local share of banks of each type, averaged between 1996 and 1998.

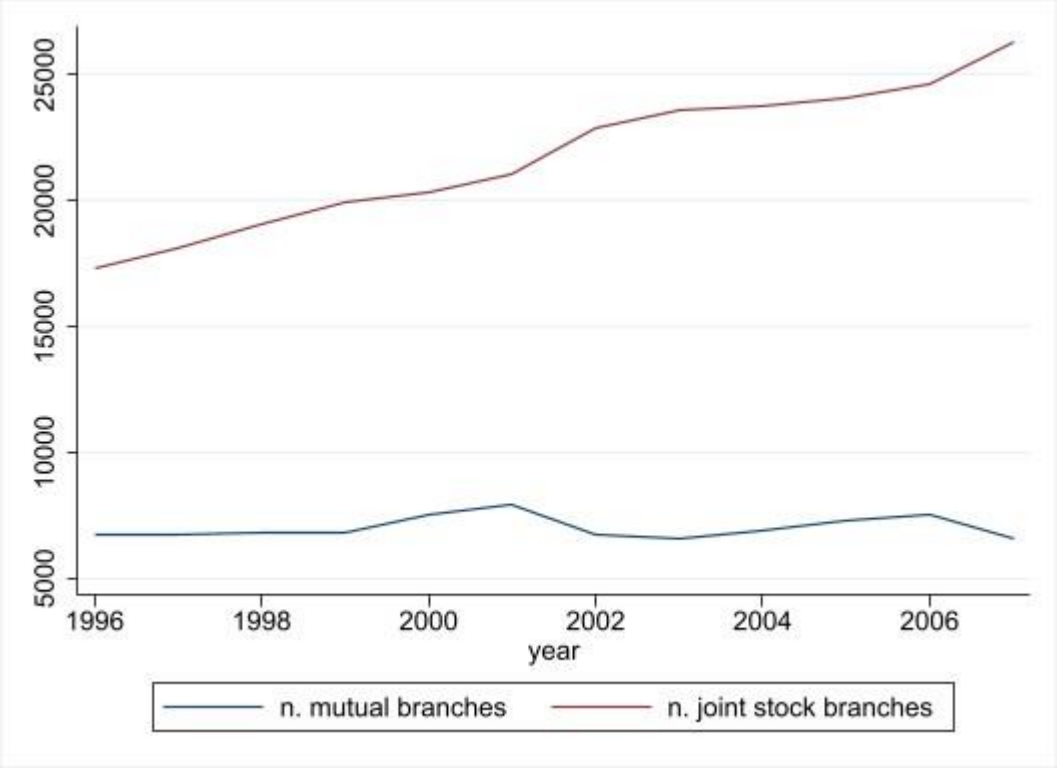
Privatization, which took place gradually in the first half of the Nineties, is more likely to have affected massively the banking system only starting from the second half of the Nineties. In 2006 almost 80% of the branches belonged to private national or foreign commercial banks. Figure 4 shows the rapid expansion of joint stock branches in Italy between 1996 and 2006, compared to the stable number of mutual banks. The post 1996 allocation per province of this rapidly growing number of branches was instead driven by local economic factors. In the appendix we describe in detail the institutional ingredients of the Italian banking reform (Appendix B).

Figure 3. Correlation between TFP growth (2007-2017) and local share of bank branches per type (mutual and joint stock – average 1996-1998) per province



Source: Bank of Italy data on branches in 1996-1998 and Cerved data on TFP growth between 2007 and 2017. Left Panel reports the initial local share of mutual banks while the right panel the joint stock share by province.

Figure 4. Total number of banking branches by type (joint stock and mutual (1996-2007)



Source: Bank of Italy, number of branches by province between 1996 and 2007.

We therefore exploit the initial provincial allocation of branches at the start of privatization, ten years prior to the start of our period of interest, which is unrelated to local unobservable shocks affecting outcomes in our period of analysis. We build a measure of the provincial composition of the types of bank branches, joint stock or mutual banks, averaged between 1996 and 1998.

Specifically, the local share we use in our measure is the average 1996-1998 share of each province *p* in the total number of branches of type *j* in Italy, where *j* refers to branches belonging to either joint stock or mutual banks.

Formally the local share of branches of each type is given by:

$$\overline{Share^{J}_{p,1996-1998}} = \frac{1}{3}\sum_{t=1996}^{1998} \frac{Branches^{J}_{p,t}}{Branches^{J}_{t}}. \quad (1)$$

To compute a time varying shifter, we use (1) to allocate to provinces the national levels and growth of the two types of branches observed between 1997 and 2007, 10 years before our period of analysis. In other words, our shifter will contain lagged time changes at the national level yet allocated locally using the distribution of branches at the beginning of the privatization process. As it takes times for local financial market conditions to influence firm performance and especially the financial culture of firms, we exploit the time depth of our data on branches, and we compute their national growth with a 10-year lag with respect to productivity data.

We therefore simulate the 10-year lagged distribution of branches by type and province in levels as follows:

$$SimulBranches_{pt-10} = \sum_J \overline{Share^J_{p,1996-1998}} \times Branches^J_{t-10} \quad (2)$$

Where $Branches^J_{t-10}$ is the national number of branches of type *j* at *t-10*.

Equally, we simulate the 10-year lagged distribution of the growth rate of branches by type and province as follows:

$$\Delta SimulBranches_{pt-10} = \sum_J \overline{Share^J_{p,1996-1998}} \times \Delta Branches^J_{t-10} \quad (3)$$

$\Delta Branches^J_t$ is defined as either i) $\frac{Branches^J_{p,t-10} - Branches^J_{p,t-9}}{Branches^J_{t-9}}$ or ii) $\frac{Branches^J_{p,t-10} - Branches^J_{p,t-9}}{Branches^J_{2007}}$.

This methodology has been widely used in other contexts to predict local employment growth by interacting local variation in industry employment shares with national industry employment growth rate (Bartik instrument, Goldsmith-Pinkham et al, 2019). The variable $SimulBranches_{pt-10}$ is the total number of branches in year *t-10* allocated to province *c* following the share of branches at the period 1996-1998. The variable $\Delta SimulBranches_{pt-10}$ is the national growth of branches in year *t-10* again allocated to province *c* following the share of branches at the period 1996-1998. We use both measures in the reduced form analysis.

Given that in the period considered the number of joint stock branches increases substantially with respect to mutual branches, we can infer that our measure mostly captures the rapid growth of the former type of banks.

Our aim is to identify the effect of changes in the firms' financial structure as a consequence of the reform on firm level outcomes. We do this by estimating a reduced-form relationship between the simulated level ($SimulBranches_{pt-10}$) or growth ($\Delta SimulBranches_{pt-10}$) of branches in the province and firm productivity. In the analysis we prefer to use a reduced form estimation instead of a two-stage least square (2SLS) for concerns regarding the exclusion restriction. In the context of a 2SLS, it must have been true that the reform, proxied by the simulated branches, impacted subsequent trends in firm performance only through its effects on the financial structure of the firm. Yet, this condition may not be satisfied if the reform affected other factors that ultimately affected firm performance. For our analysis to be informative, we still need to understand the channel through which the reform had an effect on firm performance: in the second part of the empirical section, we estimate the first order effects of the reform on firms' financial structure.

We use a more general measure of distance from the core than the rough Italian regional divide between North, Centre and South (although we will also look at this dimension), by exploiting the firm level weighted distance from airports. Specifically, we rely on the distance of the firm from the nearest airport, within a radius of 150 km. The distance is weighted by the inverse of the share of national passengers in 2007 (Percoco, 2010).

We define d_{ia} of firm *i* from the closest airport *a* (within 150km radius):

$$d_{ia} = (1-k)\min(airport_a) \quad (4)$$

where $k = \frac{passengers_a}{passengersITA(2007)}$.

Our measure of distance does not change over time and it is lower the closer the firm to the core area. By keeping weights fixed over time, our definition of core-periphery is exogenous to any provincial level shock that may affect both firms and airport relevance: airport development decisions can therefore be considered orthogonal to any economic unobservable shocks happening after 2007.[12] We interact the simulated measure of local financial conditions with this measure of core-periphery. Our assumption is that the characteristics of capital markets affect the structure of finance and performance more, the less peripheral the location of the firm.

We estimate the reduced form relationship between simulated number or growth of branches and TFP (net of markups)[13] or the probability to become a leader using the following specifications:

$$y_{ipkt} = aD_{ipk} + \beta SimulBranches_{pt-10} + \mu\,(D_{ipk} * \beta SimulBranches_{pt-10}) + \delta_p + \gamma_k \times \tau_t + \varepsilon_{it} \quad (5)$$

$$y_{ipkt} = aD_{ipk} + \beta \Delta SimulBranches_{pt-10} + \mu\left(D_{ipk} * \beta \Delta SimulBranches_{pt-10}\right) + \delta_p + \gamma_k \times \tau_t + \varepsilon_{it} \quad (6)$$

The outcome variables y_{ipkt} are defined for each firm *i* at time *t* in industry *k* and based in province p. $SimulBranches_{pt-10}$ and $\Delta SimulBranches_{pt-10}$ are measured at the provincial level as reported in (2) and (3). The latter are interacted with the measure of core-periphery D_{ikp} varying for each firm *i*. The model also includes controls for time-invariant province effects δ_p and industry-specific year effects $\gamma_k \times \tau_t$, to account for fixed differences across provinces and time shocks in the outcome variables at the industry level. In all the regression tables that follow *ΔSimulBranches1 and ΔSimulBranches2* will dub the two definitions of the growth rate in the number of branches defined above in equation (3) at points i) and ii).

The main results are reported in Table 4. As expected, we find that distance to a travelling hub and measures of local financial development are negatively and positively correlated to TFP (net of markup), respectively. Finally, in support of our main hypothesis, the effect of financial market development declines with distance, as shown by the interacted term. Focusing on our preferred specification in column 2 that uses the first definition of $\Delta SimulBranches_{pt-10}$ and using descriptive statistics as reported in Table C1 in Appendix C, we quantify these results: being 1 standard deviation away from the main hub in the area (16.4 km) reduces TFP by 1.63% (=100 x (exp(16.4 x -0.001)-1)), while an increase of 1 standard deviation of simulated branches (0.002) increases TFP by 0.21% (=100 x (exp(0.002 x 1.041)-1)). This effect of financial development is lower by lowered by 0.014 percentage points each km away from the main hub.

Consistent results are also reported in Panel B for the estimations of the probability to upgrade to the frontier, where a 1 standard deviation improvement in financial conditions increases the probability to upgrade by 0.22 percentage points (3.3% of the baseline), yet this effect is neutralized by distance.

[12] Campante and Yanagizawa-Drott (2018) show that by increasing (international) interconnectedness more links across firms are created generating more economic activity at the local level, yet they also find that these benefits dissipate with distance from the airport. This study uses data of cities with major international airports around the world, in particular, air links in 819 cities from 200 countries from 1989 to 2014.

[13] See Figure C3 in Appendix C reporting TFP trends by quartile of distance from main hubs between 2007 and 2017. Firms in the lowest quartile are closer to large airports. We see that for all the years TFP is lower the top quartile of distance and that the level of TFP increases the closer to the airport.

In Table 5 we investigate the contribution of mutual and joint stock banks separately. As expected, joint stock banks are the main driver of the aggregate effect observed in Table 4. Even in the case in which both mutual and joint stock banks had grown at the same rate, the coefficients on the effect of joint stock banks on TFP and on the probability to upgrade are much larger.

Interestingly, results also show a larger negative coefficient on the interaction between joint stock growth and distance than for the interaction between mutual banks growth and distance, hinting to the fact that the positive effect of joint stock banks is more sensitive to the distance from the core, i.e., it declines faster as firms are located away from the central hubs. Specifically, an increase of 1 standard deviation in the growth of either mutual (0.002) or joint stock (0.001), increases TFP by 0.39% and 0.80%, respectively. Each km away from the hub decreases the effect of the mutual banks by 0.02 percentage points and that of the joint stock banks by 0.06 percentage points. If computed at the averages of mutual and joint-stock bank growth (see Table C1), it is clear that the contribution of the aggregate effect estimated in Table 4 is driven by joint-stock banks.[14]

Table 4. Effects of 10 years lagged shifter and weighted distance on firm performance

Panel A: TFP (net markup)					
	(1)		(2)		(3)
Distance	-0.001*	Distance	-0.001***	Distance	-0.001***
	(0.000)		(0.000)		(0.000)
SimulBranches	0.034**	ΔSimulBranches1	1.041***	ΔSimulBranches2	0.613***
	(0.015)		(0.245)		(0.175)
Distance* SimulBranches	-0.000	Distance* ΔSimulBranches1	-0.069**	Distance* ΔSimulBranches2	-0.043**
	(0.000)		(0.028)		(0.017)
Panel B: Probability to upgrade as leaders					
Distance	0.000**	Distance	-0.000	Distance	-0.000
	(0.000)		(0.000)		(0.000)
SimulBranches	0.022*	ΔSimulBranches1	1.128***	ΔSimulbranches2	0.648***
	(0.012)		(0.287)		(0.168)
Distance* SimulBranches	-0.000***	Distance* ΔSimulBranches1	-0.066**	Distance* ΔSimulBranches2	-0.039**
	(0.000)		(0.031)		(0.018)
Observations	328,207	Observations	328,207	Observations	328,207
R-squared	0.601	R-squared	0.601	R-squared	0.601

Note: Cerved data 2007-2017, Authors' calculations. All regressions control for the size of the firm at the beginning of the period and include year*sector and province FE. Robust standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1

[14] In Table A3-A4 we report estimate the effect of mutual and joint-stock banks in two separate regressions.

Table 5. Effects of 10 years lagged shifter and weighted distance on firm performance – mutual and joint stock

Panel A: TFP (net markup)					
	(1)		(2)		(3)
Distance	-0.001***	Distance	-0.001***	Distance	-0.001***
	(0.000)		(0.000)		(0.000)
SimulBranches mutual	0.014*	ΔSimulBranches1 mutual	1.963***	ΔSimulBranches2 mutual	1.808***
	(0.007)		(0.464)		(0.540)
Distance* SimulBranches mutual	0.000	Distance* ΔSimulBranches1 mutual	-0.107***	Distance* ΔSimulBranches2 mutual	-0.099**
	(0.000)		(0.037)		(0.039)
SimulBranches joint stock	0.034**	ΔSimulBranches1 joint stock	8.057***	ΔSimulBranches2 joint stock	9.888***
	(0.015)		(2.402)		(3.686)
Distance* SimulBranches joint stock	-0.000**	Distance* ΔSimulBranches1 joint stock	-0.589**	Distance* ΔSimulBranches2 joint stock	-0.722**
	(0.000)		(0.245)		(0.324)
Panel B: Probability to upgrade as leaders					
Distance	0.000	Distance	0.000	Distance	0.000
	(0.000)		(0.000)		(0.000)
SimulBranches mutual	0.008	ΔSimulBranches1 mutual	2.350**	ΔSimulBranches2 mutual	2.175**
	(0.007)		(0.943)		(0.900)
Distance* SimulBranches mutual	-0.000	Distance* ΔSimulBranches1 mutual	-0.113**	Distance* ΔSimulBranches2 mutual	-0.103**
	(0.000)		(0.048)		(0.046)
SimulBranches joint stock	0.010	ΔSimulBranches1 joint stock	9.874**	ΔSimulBranches2 joint stock	11.967**
	(0.013)		(4.225)		(5.258)
Distance* SimulBranches joint stock	-0.000***	Distance* ΔSimulBranches1 joint stock	-0.645***	Distance* ΔSimulBranches2 joint stock	-0.773***
	(0.000)		(0.229)		(0.293)
Observations	328,207	Observations	328,207	Observations	328,207
R-squared	0.601	R-squared	0.601	R-squared	0.601

Note: Cerved data 2007-2017, Authors' calculations. All regressions control for the size of the firm at the beginning of the period and include year*sector and province FE. Robust standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1

In Table 6, we run separate estimations for the three macro-regions of Italy. While the effect of distance is present across areas, financial development has a significant effect on productivity in the North and in the South (this latter more significant in column 3 of the same table). This confirms the results of the previous section, that firms in the South of the country keep being financed by banks, with limited access from capital markets. The negative effect of distance interacted with our measure of bank reform is observed in both the North and the South, but not in the central Italian regions.

Table 6. Effects of 10 years lagged shifter and weighted distance on tfp. Macro-area estimations

TFP (net markup)					
	(1)		(2)		(3)
NORTH					
Distance	0.000	Distance	-0.001***	Distance	-0.001***
	(0.001)		(0.000)		(0.000)
SimulBranches	0.046***	ΔSimulBranches1	0.920***	ΔSimulBranches2	0.484***
	(0.014)		(0.211)		(0.148)
Distance* SimulBranches	-0.001***	Distance* ΔSimulBranches1	-0.071**	Distance* ΔSimulBranches2	-0.041**
	(0.000)		(0.032)		(0.019)
Observations	243,460	Observations	243,460	Observations	243,460
R-squared	0.620	R-squared	0.620	R-squared	0.620
CENTRE					
Distance	-0.002	Distance	-0.002*	Distance	-0.001**
	(0.001)		(0.001)		(0.001)
SimulBranches	0.030	ΔSimulBranches1	0.677	ΔSimulBranches2	0.250
	(0.063)		(4.773)		(3.574)
Distance* SimulBranches	0.000	Distance* ΔSimulBranches1	0.173	Distance* ΔSimulBranches2	0.088
	(0.000)		(0.307)		(0.255)
Observations	54,649	Observations	54,649	Observations	54,649
R-squared	0.510	R-squared	0.510	R-squared	0.510
SOUTH					
Distance	-0.001**	Distance	-0.001***	Distance	-0.001***
	(0.001)		(0.000)		(0.000)
SimulBranches	0.090	ΔSimulBranches1	10.165	ΔSimulBranches2	11.322*
	(0.072)		(7.526)		(6.472)
Distance* SimulBranches	-0.000	Distance* ΔSimulBranches1	-0.484*	Distance* ΔSimulBranches2	-0.421**
	(0.000)		(0.266)		(0.192)
Observations	30,098	Observations	30,098	Observations	30,098
R-squared	0.469	R-squared	0.469	R-squared	0.469

Note: Cerved data 2007-2017, Authors' calculations. All regressions control for the size of the firm at the beginning of the period and include year*sector and province FE. Robust standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1

5. Mechanisms

Finally, even if we have opted for a reduced form estimation, because using the exogenous shock of financial liberalization as an instrument would likely violate exclusion restrictions, we are interested in exploring if our background hypothesis that financial liberalization affects TFP also through its impact on the financial structure of firms holds.

In Table 7, we estimate the relationship between our preferred measure of financial development (*ΔSimulBranches1)*, distance and their interaction on bank dependence and access to capital markets at the firm level.

Results are in the expected direction. Distance *per se* does not have a significant effect on these outcomes, while the reform simulated measure is negatively related to bank exposure and positively to access to capital markets. Interacting the simulated branch growth show different results, in particular the coefficient is positive for bank exposure and negative for access to capital markets.

In Panel B we isolate the effect of the growth of joint stock branches from mutual ones. As expected, the dominant effect is the one of joint stocks which are negatively related to bank exposure and positively to access to capital markets (even if the latter is not significant). Accordingly, the effect of the interaction with distance is positive with respect to bank exposure but negative with respect to capital market access, hinting to the possible interpretation that firms that are far from a core area mostly rely on banks' debt, even in areas where joint-stock banks have increased more.

Table 7. Effects of 10 year lagged shifter on finance

	Bank exposure	Access to capital markets
Panel A		
	(1)	(2)
ΔSimulBranches1	-0.872***	0.146***
	(0.201)	(0.048)
Distance	0.000*	-0.000
	(0.000)	(0.000)
Distance*ΔSimulBranches1	0.047***	-0.006
	(0.014)	(0.005)
Panel B		
ΔSimulBranches1 mutual	-1.720***	0.276*
	(0.527)	(0.146)
Distance	0.000	0.000
	(0.000)	(0.000)
Distance*ΔSimulBranches1 mutual	0.079***	-0.011
	(0.022)	(0.007)
ΔSimulBranches1 joint stock	-6.795***	1.017
	(1.995)	(0.614)
Distance*ΔSimulBranches1 joint stock	0.420***	-0.056*
	(0.110)	(0.031)
Observations	328,207	328,207
R-squared	0.058	0.019

Note: Cerved data 2007-2017, Authors' calculations. All regressions control for the size of the firm at the beginning of the period and include year*sector and province FE. Robust standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1

6. Conclusions

In conclusion, we find a robust descriptive evidence of a strengthening of the leader-laggard patterns between core areas in the North of Italy and peripheral economic areas in the South. This brings along further concerns on the ability of the productive system in Southern regions to converge to the levels of the North. In the North there is a much higher concentration of leaders, whereas the industrial population in the South is to a large extent composed by firms with lower levels of productivity.

This pattern is consistent with the view that firms in peripheral areas are less likely to have access to high quality inputs and especially finance. We find that in general laggards make less use of capital markets, are more bank exposed and more leveraged than leaders. This difference is strengthened for firms based in Southern regions.

The development of local financial markets in Italian provinces, as measured by the share of branches belonging to joint stock banks vs those belonging to mutual banks, affects positively firms' productivity through the quality of their financial structure. The effect of development of financial markets decreases with distance from a core area. Results show that this positive effect of local financial development is likely to be driven by better access to capital markets.

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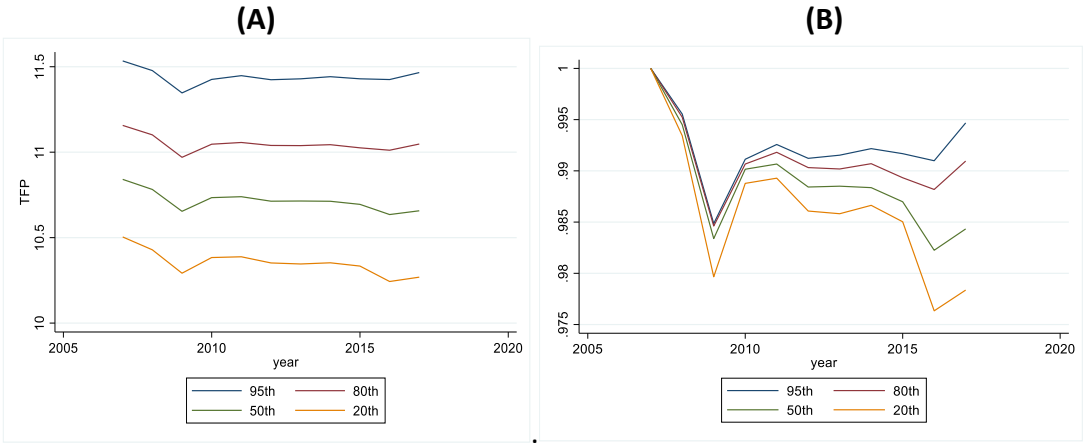
Appendix A

Figure A1. TFP levels (a) and time trends (b) for given percentiles of the TFP distribution (2007-2017)



Note: TFP measured using the Wooldridge estimation procedure (see footnote 3)

Table A1. Number of Laggards and Frontier firms in 2007 and 2017

	2007		2017	
	Laggards	Leaders	Laggards	Leaders
North	18,559	1,688	21,737	1,518
Centre	4,102	250	5,162	273
South	2,232	61	3,205	77
Total	24,893	1,999	30,104	1,868

Table A2 Transition matrices t vs t-5 (t sums at 100)

	ALL REGIONS					
	time t					
		larger 95	80-95	50-80	20-50	smaller 20
5 years before	larger 95	48.17	34.92	12.15	3.46	1.29
	80-95	13.49	45.15	30.46	8.37	2.52
	50-80	2.47	19.07	50.31	23.24	4.90
	20-50	0.72	6.10	31.08	47.88	14.22
	smaller 20	0.55	3.25	13.57	34.90	47.73
	NORTH					
	time t					
		larger 95	80-95	50-80	20-50	smaller 20
5 years before	larger 95	44.40	37.80	12.87	3.47	1.46
	80-95	10.12	42.61	34.61	9.89	2.77
	50-80	1.95	15.33	49.53	27.02	6.17
	20-50	0.68	5.24	28.42	48.17	17.48
	smaller 20	0.60	3.72	13.97	33.74	47.97
	CENTRE					
	time t					
		larger 95	80-95	50-80	20-50	smaller 20
5 years before	larger 95	36.03	39.71	17.37	4.98	1.92
	80-95	10.23	37.80	35.94	12.53	3.50
	50-80	1.67	13.64	45.84	31.37	7.49
	20-50	0.42	3.65	21.70	53.16	21.06
	smaller 20	0.41	2.31	9.52	30.29	57.47
	SOUTH					
	time t					
		larger 95	80-95	50-80	20-50	smaller 20
5 years before	larger 95	33.33	36.94	20.15	6.84	2.74
	80-95	8.96	34.12	36.31	15.23	5.38
	50-80	1.21	10.71	42.90	35.40	9.79
	20-50	0.42	2.83	16.52	52.90	27.34
	smaller 20	0.18	1.31	5.65	23.05	69.80

Table A3. Mutual banks: effects of 10 years lagged shifter on firm performance

Panel A: TFP (net markup)					
	(1)		(2)		(3)
Distance	-0.001***	Distance	-0.001***	Distance	-0.001***
	(0.000)		(0.000)		(0.000)
SimulBranches mutual	0.010*	ΔSimulBranches1 mutual	0.280	ΔSimulBranches2 mutual	0.211
	(0.006)		(0.180)		(0.165)
Distance* SimulBranches mutual	-0.000	Distance* ΔSimulBranches1 mutual	-0.016	Distance* ΔSimulBranches2 mutual	-0.012
	(0.000)		(0.013)		(0.013)
Panel B: Probability to upgrade as leaders					
Distance	-0.000	Distance	-0.000	Distance	-0.000
	(0.000)		(0.000)		(0.000)
SimulBranches mutual	0.009*	ΔSimulBranches1 mutual	0.220	ΔSimulBranches2 mutual	0.177
	(0.005)		(0.143)		(0.132)
Distance* SimulBranches mutual	-0.000*	Distance* ΔSimulBranches1 mutual	-0.009	Distance* ΔSimulBranches2 mutual	-0.006
	(0.000)		(0.008)		(0.008)
Observations	328,207	Observations	328,207	Observations	328,207
R-squared	0.601	R-squared	0.601	R-squared	0.601

Note: Cerved data 2007-2017, Authors' calculations. All regressions control for the size of the firm at the beginning of the period and include year*sector and province FE. Robust standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1

Table A4. Joint stock banks: effects of 10 years lagged shifter on firm performance

Panel A: TFP (net markup)					
	(1)		(2)		(3)
Distance	-0.001***	Distance	-0.001***	Distance	-0.001***
	(0.000)		(0.000)		(0.000)
SimulBranches joint stock	0.013	ΔSimulBranches1 joint stock	3.590***	ΔSimulBranches2 joint stock	3.902**
	(0.010)		(1.331)		(1.834)
Distance* SimulBranches joint stock	-0.000**	Distance* ΔSimulBranches1 joint stock	-0.426**	Distance* ΔSimulBranches2 joint stock	-0.498*
	(0.000)		(0.202)		(0.252)
Panel B: Probability to upgrade as leaders					
Distance	0.000	Distance	0.000	Distance	0.000
	(0.000)		(0.000)		(0.000)
SimulBranches joint stock	0.002	ΔSimulBranches1 joint stock	4.574**	ΔSimulBranches2 joint stock	4.845**
	(0.007)		(1.834)		(1.964)
Distance* SimulBranches joint stock	-0.000***	Distance* ΔSimulBranches1 joint stock	-0.471***	Distance* ΔSimulBranches2 joint stock	-0.536**
	(0.000)		(0.169)		(0.205)
Observations	328,207	Observations	328,207	Observations	328,207
R-squared	0.601	R-squared	0.601	R-squared	0.601

Note: Cerved data 2007-2017, Authors' calculations. All regressions control for the size of the firm at the beginning of the period and include year*sector and province FE. Robust standard errors in parentheses, ***p<0.01, **p<0.05, *p<0.1

Appendix B. The institutional setting of the Italian banking system 1996-2006

In the first half of the Nineties the Italian banking system undergoes a very deep process of restructuring, induced by the major exogenous policy shock of the privatization of the system of public banks. Moreover, between 1990 (Law 218/90, l. Amato) and 1993 (D. lgs. 385/93, Testo Unico Bancario) new banking regulations are issued, allowing banks to become universal, in the sense that they can exert directly or indirectly any banking activity, whereas previously they could only operate as highly specialized entities(eg. Short term vs medium term lending)

Moreover, according to Carletti et al (2005), since 1973, banks had been subject to a "portfolio requirement" and a credit ceiling for loans to the private sector. Banks had to hold a minimum amount of medium-and long-term government or government guaranteed bonds, and also there was an explicit quantitative ceiling on the amount of loans to the private sector. Until the 1990s, the main objective of the Italian banking regulation was to foster local development and to ensure financial stability.

According to the following table from Fiorentino et al (2009), in 1990 57.2% and 18.5% of total assets and 48.5% and 28.6% of total branches were managed by public commercial and saving banks or by cooperative and mutual banks respectively. Just 20.5% of total assets and 22.4% of branches were run by private commercial banks, generally fairly small ones. In 2004, the process of privatization accomplished, 79.3% of total assets and 76% of total branches were managed by private commercial banks and another 5.8% of total assets by private foreign banks. The reminder of banking activities was still in the hands of cooperative and mutual banks in 2004.

Table 9: Structure of the Italian Banking System in 1990 and 2004

	1990					2004			
	No. of Banks	No. of Branches	Assets, million EUR [1]	Assets, share in %		No. of Banks	No. of Branches	Assets, million EUR [1]	Assets, share in %
Public-Sector Banks	6	2,449	134,664	20.1					
Banks of National Interest	3	1,459	86,466	12.9					
Savings Banks	84	4,695	162,427	24.2	Commercial Banks	243	24,045	1,879,945	79.3
Private Commercial Banks	106	3,981	137,362	20.5					
Cooperative Banks	108	3,290	95,004	14.2		36	3,745	228,532	9.6
Mutual Banks	715	1,792	29,096	4.3	Mutual Banks [2]	439	3,603	126,369	5.3
Group central institutions	5	5	15,875	2.4		—	—		
Branches of Foreign Banks	37	50	10.475	1.6		66	108	137,063	5.8
Total	1,064	17,721	671,409	100		784	31,501	2,371,909	100

Source: Banca d'Italia
2. "banche di credito cooperativo"
Public-sector banks ("Istituti di diritto pubblico"), Banks of national interest ("Banche di interesse nazionale"), Savings banks ("Casse di risparmio" and "Monti di credito"), Private commercial banks ("Banche di credito ordinario"), Cooperative banks ("Banche popolari"), Mutual banks ("Casse rurali e artigiane"), Group central institutions ("Istituti centrali di categoria").

Source: Fiorentino et al 2009

In the pre-privatization phase the banking system had limited exposure to competition, as banks were not contestable (besides from other banks within the same institutional category), and credit allocation was highly likely to be captured by local or national political interests. With the start of the process of privatization and the introduction of the new banking law, public banks were gradually transformed into joint stock entities owned by banking foundations and subsequently part of their shares were floated on the market.

The process of privatization was fairly slow and actually implemented between 1993 and 1999. At the same time there followed a major process of concentration of banking assets. According to Saccomanni (2008), between 1997 and 2007, 300 mergers and acquisitions leading to an increased concentration of assets took place and more than 50% of market share in total assets changed hands. The number of banks declined from 935 to 806 and of banking group from 87 to 82. In 2007 the two largest banking groups (Intesa San Paolo and Unicredit) accounted for 35.4% of total banking assets and three other medium-large groups accounted for another 35.4%.

This pattern, to a large extent driven by an exogenous policy shocks, triggered major changes in the banking market: i) an opening up to market forces of a previously highly protected banking system; ii) an increase in banking productivity, especially following subsequent mergers and consolidation (Fiorentino et al, 2009); iii) a pattern of credit allocation less likely to be captured by local and national political interests; iv) the possibility for banks to offer their clients a fairly rich basket of financial products, including access to non-banking markets.

This double pattern of privatization plus consolidation also triggered a very rapid expansion of the banking market and the rise in the market share of joint stock banks. In the period between 1996 and 2006, the number of branches opened by joint stock banks nationally increased from 17,337 to 24,618 (+41%), those of foreign banks from 75 to 128 (+70%). Instead branches of cooperative banks rose only from 6,981 to 7,592 (+8%). Their share on total branches declined from 40% in 1996 to 30% in 2006. The rise in the number of branches came along an expansion of banks' balance sheets: as banking assets rose substantially in total from 671.4 bilion euros in 1990 to 2371.9 in 2004, according to Fiorentino.

Appendix C. Sample construction

Our analysis is based on the population of Italian manufacturing joint stock companies between 2007 and 2017 provided by Cerved from *Centrali dei Bilanci*. This includes an average of 52,916 observations per year varying between 42,089 in 2007 and 65,761 in 2017. For each firm we have

information on balance sheets. The total number of observations in the data for these years is 519,037. When we construct our measure of distance however, our sample is reduced to 453,374 observations, because firms' geographic coordinates are missing for some firms and therefore we cannot compute their distance from the closest airport (the share of companies with no distance information does not change over time, being on average across years 12.6% and 12.5% in both 2007 and 2017). After these cleaning steps that include dropping firms with negative leverage values, we have 328,207 observations. In the table below we report the t-test on the regional and sector distribution between the initial and final samples: results show there are no significant differences across the two samples (Table C2).

We report firm distribution on the Italian territory using the pre-sample local labour markets, following the definition of the Italian Statistical Office (Istat, Sistemi di Lavoro Locali in 2001), where firms are based. Local labour markets are territorial areas, different from the administrative units, corresponding to identifiable economic and social communities, essentially commuting areas. They are generated by an algorithm which identifies 683 local labour markets.[15] Using these geographical entities, we can study the level of dispersion of frontier firms in the Italian territory. In Figure C1 we report the geographical distribution of leaders across Italian local labour markers where in each unit we report the share of firms (*l*) in each year *t,* 2007 or 2017, ($\frac{firms_{l,t}}{firms_t}$) while in Figure C2 we report the same distribution for leaders. The darkest areas are those with the highest share of leaders (above 2%). Note that these areas are concentrated in the North, and in correspondence to large urban centres. There is a clear chromatic divide between the North and the South of the country, which is persistent both in 2007 and in 2017.

[15]A methodological note describing the algorithm can be found here: https://www.istat.it/it/files//2014/12/nota-metodologica_SLL2011_rev20150205.pdf. See also Di Giacinto et al (2013) for an analysis of agglomeration of Italian firms based on local labour markets.

Table C1. Descriptive statistics

Variable	Description	Mean	Std. Dev.	Obs
TFP	Estimated from a value-added based production funcion where inputs are the number of employees and real capital	10.84	0.52	328,207
TFP (net markup)	TFP corrected by time varying markups	10.53	0.43	328,207
Probability to upgrade as leaders	Dummy equal to 1 if the firm is at or above the 95th percentile in each year and 2-digit sector	0.067	0.250	328,207
Bank exposure	Debt to banks over total debt	0.29	0.23	328,207
Access to capital markets	Total bonds over total liabilities	0.004	0.037	328,207
Leverage	Total debt over equity	9.79	302.8	328,207
Average Net Assets	Equity minus profit	2,924,462	13,100,000	328,207
Average Total Debts	Total debt	4,958,187	18,500,000	328,207
SimulBranches	Nationwide yearly number of branches distributed at the provincial level 10 years before the firm's productivity observed, according to the average share of branches in each province in 1996-1998	2.25	1.56	328,207
ΔSimulBranches1	Nationwide yearly growth of branches distributed at the provincial level 10 years lagged with respect to the firm's productivity observed, according to the average share of branches in each province in 1996-1998	0.0008	0.0020	328,207
ΔSimulBranches2	Nationwide yearly growth of branches with respect to 2007 distributed at the provincial level 10 years before the firm's productivity observed, according to the average share of branches in each province in 1996-1998	0.0006	0.0022	328,207
SimulBranches mutual	Nationwide yearly number of mutual branches distributed at the provincial level 10 years before the firm's productivity observed, according to the average share of mutual branches in each province in 1996-1998	0.794	1.877	328,207
ΔSimulBranches1 mutual	Nationwide yearly growth of mutual branches distributed at the provincial level 10 years lagged with respect to the firm's productivity observed, according to the average share of mutual branches in each province in 1996-1998	-0.00002	0.0023	328,207
ΔSimulBranches2 mutual	Nationwide yearly growth of mutual branches with respect to 2007 distributed at the provincial level 10 years before the firm's productivity observed, according to the average share of mutual branches in each province in 1996-1998	-0.00008	0.0026	328,207
SimulBranches joint stock	Nationwide yearly number of joint stock branches distributed at the provincial level 10 years before the firm's productivity observed, according to the average share of joint stock branches in each province in 1996-1998	1.73	1.65	328,207
ΔSimulBranches1 joint stock	Nationwide yearly growth of joint stock branches distributed at the provincial level 10 years lagged with respect to the firm's productivity observed, according to the average share of joint stock branches in each province in 1996-1998	0.0008	0.0011	328,207
ΔSimulBranches2 joint stock	Nationwide yearly growth of joint stock branches with respect to 2007 distributed at the provincial level 10 years before the firm's productivity observed, according to the average share of joint stock branches in each province in 1996-1998	0.0007	0.0009	328,207
Distance	Firms' distance from local airports weighted by the number of passengers in 2007	24.74	16.67	328,207

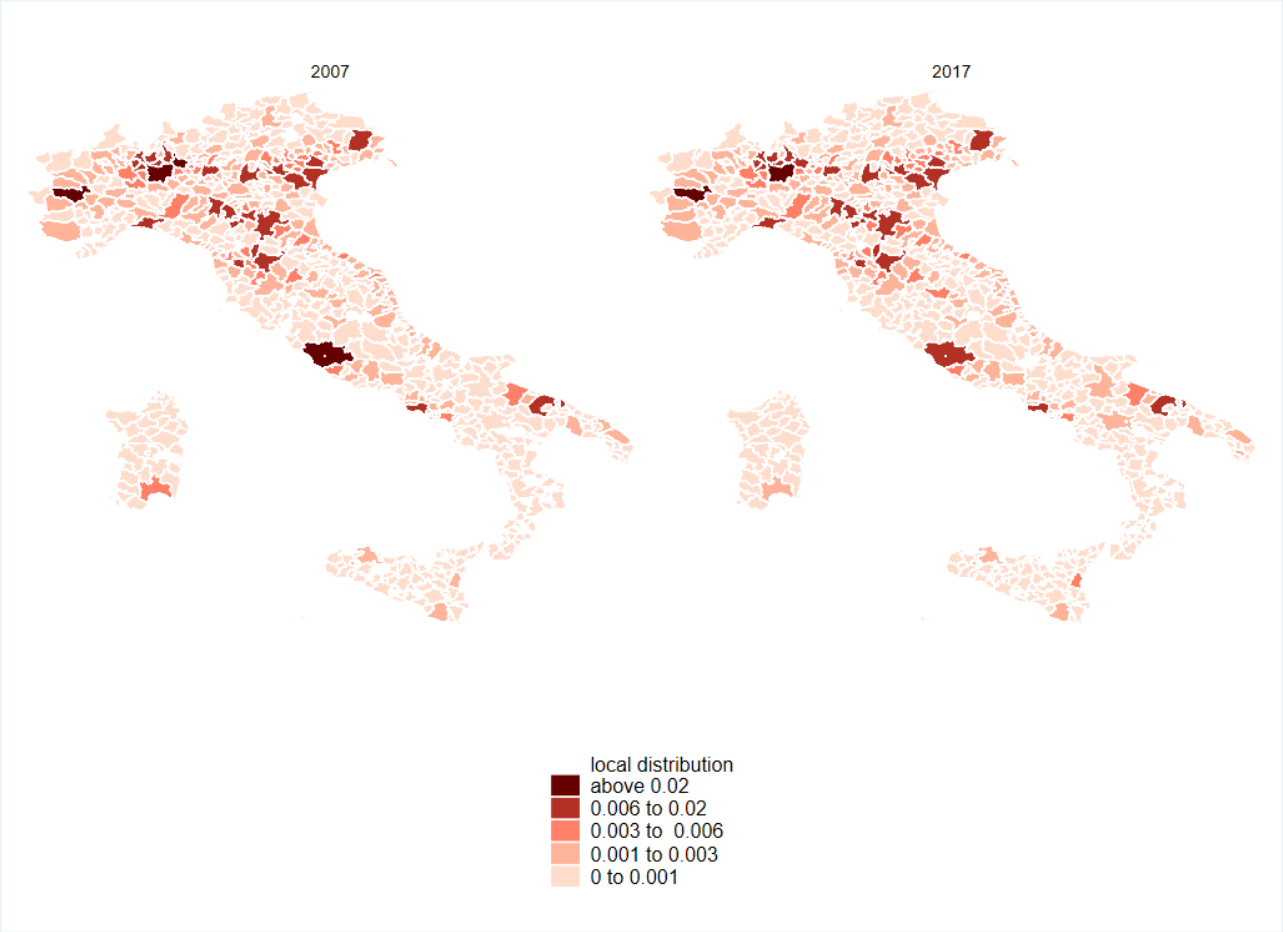
Note: Cerved data, 2007-2017, Authors' calculations

Table C2. T-test on the regional and sector distribution

	Initial sample	Sample of analysis	T-stat of the difference	P-value
Panel A: Regional distribution				
Abruzzo	0.016	0.006	38.06	0.0000
Basilicata	0.003	0.001	14.78	0.0000
Calabria	0.005	0.001	24.26	0.0000
Campania	0.045	0.043	6.26	0.0000
Emilia Romagna	0.118	0.135	-23.21	0.0000
Friuli Venezia Giulia	0.025	0.027	-7.04	0.0000
Lazio	0.038	0.039	-2.99	0.0028
Liguria	0.011	0.003	39.37	0.0000
Lombardia	0.289	0.314	-24.76	0.0000
Marche	0.043	0.034	20.64	0.0000
Molise	0.001	0.000	13.94	0.0000
Piemonte	0.081	0.065	27.17	0.0000
Puglia	0.029	0.021	23.45	0.0000
Sardegna	0.007	0.000	48.47	0.0000
Sicilia	0.019	0.015	11.63	0.0000
Toscana	0.082	0.081	0.25	0.7952
Trentino Alto Adige	0.013	0.013	-0.75	0.4502
Umbria	0.012	0.010	8.83	0.0000
Valle D'Aosta	0.001	0.000	10.24	0.0000
Veneto	0.151	0.179	-33.74	0.0000
Panel B: 2-digit sector distribution				
10	0.079	0.077	4.19	0.0000
11	0.008	0.009	-2.39	0.0168
12	0.000	0.000	-0.31	0.7535
13	0.037	0.037	0.36	0.7170
14	0.038	0.037	2.71	0.0065
15	0.039	0.037	4.58	0.0000
16	0.025	0.023	7.18	0.0000
17	0.020	0.021	-4.20	0.0000
18	0.027	0.028	-2.40	0.0164
19	0.001	0.001	2.80	0.0050
20	0.029	0.033	-9.16	0.0000
21	0.005	0.007	-9.58	0.0000
22	0.057	0.059	-3.95	0.0001
23	0.050	0.045	11.26	0.0000
24	0.018	0.021	-9.69	0.0000
25	0.225	0.223	1.60	0.1081
26	0.027	0.029	-5.75	0.0000
27	0.037	0.038	-3.99	0.0001
28	0.129	0.137	-9.56	0.0000
29	0.016	0.017	-2.78	0.0054
30	0.012	0.012	1.73	0.0832
31	0.040	0.036	9.59	0.0000
32	0.029	0.029	1.50	0.1325
33	0.036	0.032	10.26	0.0000
Observations	519,037	328,207		

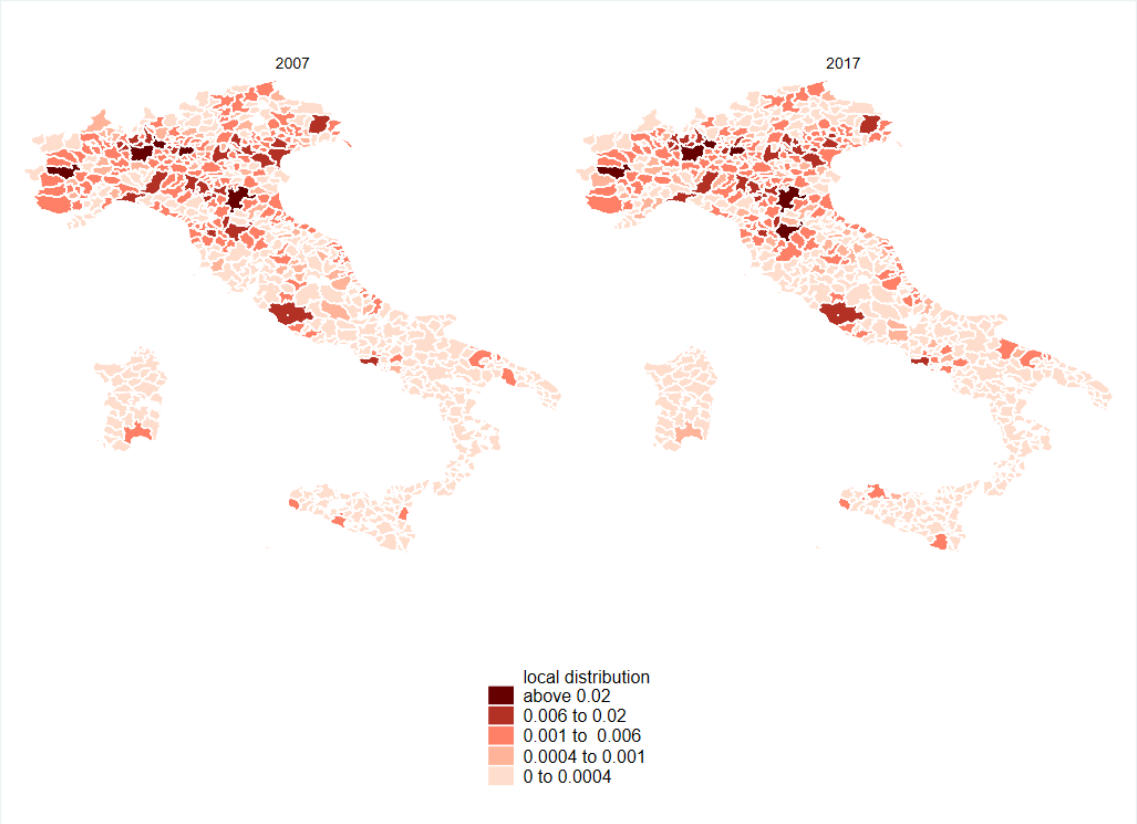
Note: Cerved data, 2007-2017, Authors' calculations

Figure C1. Distribution of all firms across local labour markets



Note: All firms' distribution across labour markets. The unit of analysis is local labour markets, and in each unit we report the share of firms in that market over the total firms in Italy, in 2007 and in 2017 separately.

Figure C2. Distribution of leaders across local labour markets



Note: Leaders' distribution across labour markets. The unit of analysis is local labour markets, and in each unit we report the share of leaders in that market over the total leaders in Italy, in 2007 and in 2017 separately. Leaders defined using the same methodology as Andrews et al (2015), where the number of firms is constant across years and defined as the median number of firms above the 95th percentile. TFP defined using the Wooldridge method.

Figure C3. Trends in average TFP net of mark-up by quartile of weighted distance (2007-17)