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DOES SOCIAL CAPITAL SUBSTITUTE FOR LENDING RELATIONSHIPS? A STUDY ON ITALIAN SMEs

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Abstract

This work investigates to what extent the relevance of close bank-firm ties is affected by the endowment of social capital characterising the environment in which enterprises operate. By estimating the link between the duration of lending relationships and Italian SMEs' productivity, we empirically test whether there is complementarity or substitutability between credit relations and social capital. According to our results, the duration of lending relationships seems to be a positive and significant determinant of SMEs' performance in less civic regions. Additionally, the influence of enduring lending relationships decreases as social capital increases, suggesting that social capital might act as a substitute for lending relationships.

Keywords: financial institutions, social capital, firms

JEL codes: G20, D20, Z13

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1. Introduction

A considerable number of studies have analysed the role of lending relationships in shaping firms' economic performance (e.g., Montoriol Garriga, 2006; Benfratello et al., 2008; Giannetti, 2012; Agostino et at., 2018). In this strand of research, a lending relationship refers to "a long-term implicit contract" (Elsas, 2005) between firms and banks that go beyond the mere execution of financial transactions (e.g. Petersen and Rajan, 1994; Boot, 2000; Ongena and Smith, 2000).[5] Indeed, the characterising ingredient of a lending relationship is the acquisition and the accumulation of *soft information* on firms by banks over time, so that the intensity of a lending relationship is usually proxied by its duration (Udell, 2008).[6]

By mitigating asymmetric information problems and enhancing screening and monitoring mechanisms, the accumulation of soft information might have several beneficial effects for firms, such as increasing credit availability (Berger and Udell, 1995; Hernández-Cánovas and Martínez-Solano, 2010; Kano et al., 2011), decreasing loan interest rate (Petersen and Rajan, 1995; Brick and Palia, 2007), reducing collaterals requirements (Harhoff and Korting, 1998; Jimenez et al., 2006; Brick and Palia, 2007), lessening firms' dependence on trade debt (Petersen and Rajan 1994, 1995), fostering firms' product and process innovations (Herrera and Minetti, 2007; Benfratello et al., 2008; Giannetti, 2012), stimulating firms' foreign direct investment (De Bonis et al., 2010) and promoting firms' efficiency (Agostino et al., 2018).

The banking literature has also shown that close bank-firm ties might have some "dark sides" (Boot, 2000). Indeed, banks might take advantage of the information on borrowers gained over time to charge non-competitive interest rates. Such a *hold-up* mechanism may allow banks to exploit rents from borrowers and bias investment incentives (Rajan, 1992). Besides, by *softening budget* constraints, close banking relationships might induce borrowers to adopt risk-taking behaviour, then increasing firms' default probability (Bolton and Scharfstein, 1996; Dewatripont and Maskin, 1995). These drawbacks might entail an increase in loan rates charged (e.g.,

[5] Boot (2000, p. 10) argues that a lending relationship is "the provision of financial services by a financial intermediary that: (i) invests in obtaining customer-specific information, often proprietary in nature; and (ii) evaluates the profitability of these investments through multiple interactions with the same customer over time and/or across products".

[6] *Soft information* is essentially qualitative and confidential in nature, being other than information acquirable and/or verifiable from (public) written records.

Blackwell and Winters, 1997), lower firms' profitability (e.g. Montoriol Garriga, 2006), and hamper small businesses' growth (e.g., Gambini and Zazzaro, 2013).

A more recent issue is whether the *net* impact of costs and benefits of enduring lending relationships on firms' performance might depend on some characteristics of the environmental context in which both banks and firms operate, that is on *external factors* to the bank-firm relation itself (e.g. De la Torre et al., 2008; Agostino et al., 2012; Giannetti, 2012; Mancusi et al., 2018). The empirical evidence on this topic appears quite scant – and, to the best of our knowledge – there is no attempt to investigate the role that the social capital endowment at the local level may play in affecting costs and benefits of lending relationships.

Why should one ask such a question? According to Putnam et al. (1994), social capital refers to interpersonal trust, civic engagement, norms and features of social organisation that facilitate coordination and cooperation for mutual benefit. Social capital has been claimed to reduce *free-riding* problems and foster the settle of informal *enforcement* mechanisms, thus boosting compliance with contractual agreements and mitigating adverse selection and moral hazard problems in credit markets (Coleman, 1990; Spagnolo, 1999; Guiso et al., 2006). What is more, by favouring *social collateral* creation and peer monitoring activities, social capital might facilitate banks in collecting soft information on borrowers (Stiglitz, 1990; Varian, 1990; Karlan et al., 2009).

Relying on these considerations, it is plausible to assume that social capital might represent a *public good* for lenders, thus facilitating the establishment of close bank-firm ties. However, as an opposite implication of being a public good for banks, social capital might weaken the need for enduring lending relationships, as *social* trust might substitute for *private* trust in firms' financing.

To investigate the role of social capital on the relevance of lending relationships for firms, we adopt the following research strategy. We consider the link between the duration of lending relationships and firms' performance, conditioning the duration's impact on the endowment of social capital at local level, to test the following research hypothesis: if social capital is a substitute of enduring lending relationships, the impact of the latter on firms' performance should be stronger when social capital is low, and this effect should be observed smaller as the level of social capital increases. On the other hand, if lasting lending relationships and social capital interplay as complementary, we should find an increasing effect of close bank-firm relations on firms' performance in high-social capital regions.

The performance profile we consider is the firms' productivity. We focus on it for three reasons. First, the lack of information on the amount of firms' bank debt for each year of the period we consider (2004-2009), prevents us from carrying out the investigation in terms of firms' credit availability. Second, looking at firms' productivity allows us to employ Total Factor Productivity (TFP), a quite refined measure of firms' performance. Finally, to the best of our knowledge, the link between lending relationships and firm productivity has been so far neglected in the literature. Indeed, only a few recent studies have addressed such an issue (e.g., Franklin et al., 2015; Agostino et al., 2018). [7]

We use microdata provided by the EU-EFIGE dataset on manufacturing SMEs operating in Italy between 2004 and 2009.[8] The social capital endowment – gauged by the participation in public elections, associations, social cooperatives and cultural activities – is measured at the regional level by one of the institutional quality dimensions (*Voice and Accountability*) embedded in the IQI index, built by Nifo and Vecchione (2014, 2015).

At least two reasons justify the choice to focus on Italy. First, among other European nations, Italy is a bank-based economy in which relationship lending is a common practice (Demirgüç-Kunt and Levine, 1999). Second, as emerges from the literature on the issue, the social capital endowment is heterogeneous across Italian regions, making Italy particularly appropriate for this analysis (Putnam et al., 1994; Guiso et al., 2004).

On a methodological ground, to estimate TFP, we adopt the system GMM estimator proposed by Blundell and Bond (1998), to address the potential endogeneity of most productivity determinants and control for firms' heterogeneity. The results of our econometric analysis suggest that the (positive) impact of lasting lending relationships on SMEs' productivity is stronger at lower levels of social capital, and tends to decrease as social capital increases. We interpret these findings as evidence that social capital might act as a substitute for lending relationships.

[7] Franklin et al. (2015), exploiting information on lending relationships of UK firms, find that a reduction in credit supply led to a drop in labour productivity in the aftermath of the 2008 financial crisis. Agostino et al. (2018) analysis the connection between the duration of credit relationships and European SMEs' technical efficiency, showing that the impact of close lending relationships on SMEs' efficiency is positive for low levels of firms' debt, and declines as indebtedness increases.

[8] We are precluded from using more recent data, as – to the best of our knowledge – no publicly available dataset provides information on the characteristics of Italian SMEs' lending relationships.

The remainder of this work is organised as follows. The next two sections illustrate the empirical methodology and data used. Section 4 discusses the results obtained and the robustness checks performed. Section 5 concludes.

2. Empirical Methodology

To appraise the influence of our key variables on SMEs' TFP, we employ firm-level data and apply the GMM-SYS estimator of Blundell and Bond (1998), that has been recently advocated to gain a better understanding of the causes of TFP differences (Harris et al., 2005; Harris and Moffat, 2015; Ding et al., 2016). Indeed, this econometric method addresses several issues involved in the estimation of production functions using firm or plant-level data (Van Biesebroeck, 2007). First, it allows controlling for time-invariant firms' heterogeneity. Latent resources – such as managerial skills and know-how – tend to change little through time and can explain why firms tend to occupy the same segment of the TFP distribution over time (Ding et al., 2016). Second, it deals with the potential endogeneity of the explanatory variables, by using as instruments lagged values of the endogenous variables for the equations in first differences, and first-differences of the variables as instruments for the equations in level.[9] Finally, if the production function is specified considering both inputs and other productivity determinants, it allows overcoming the misspecification implied by two-step procedures, that are quite popular in the literature investigating the role of various TFP determinants. Following such procedures, firms' TFP levels are retrieved from a production function, estimated considering only inputs and ignoring other determinants that might affect productivity. Then, in a second step, the measure of TFP is regressed on the aforementioned set of determinants. Estimates of TFP based on this approach are likely biased by an omitted

[9] In our analysis, all explanatory variables are considered endogenous except firm age, which is treated as predetermined. What is more, Arellano and Bond (1991) tests for autocorrelation are used to exclude the presence of second-order autocorrelation in the residuals.

variable(s) problem affecting the first stage estimation. Nevertheless, as a robustness check, and to allow comparison of the GMM results with those of the existing literature, we also adopt a two-stage approach *à la* Levinsohn and Petrin (2003).[10]

We assume a Cobb-Douglas log-linear production function:

$$y_{it} = \alpha_i + \alpha_L l_{it} + \alpha_M m_{it} + \alpha_K k_{it} + \sum \alpha_x X_{it} + \sum \alpha_s S_s + \alpha_T t + \varepsilon_{it} \quad (1)$$

where *y, l, m,* and *k* represent, respectively, the logarithms of real gross output, labour, intermediate inputs, and the capital stock of firm *i* at time *t*;[11] X_{it}, represents a vector of productivity determinants, described in details in the following section; α_i, α_s and t are firms' fixed effects, sector dummies and a time trend, respectively.[12]

By using the system GMM method to estimate equation (1), one directly obtains values of the elasticities of output to inputs $\alpha_L, \alpha_M \; and \; \alpha_K$. Hence, TFP can be calculated as the level of output that is not attributable to inputs. Therefore, this measure of TFP is determined by firm-level fixed effects, the vector of X variables, sector fixed-effects, the time trend and idiosyncratic shocks:[13]

$$\widehat{lnTFP}_{it} = y_{it} - \hat{\alpha}_L l_{it} - \hat{\alpha}_M m_{it} - \hat{\alpha}_K k_{it} = \hat{\alpha}_i + \sum \hat{\alpha}_x X_{it} + \sum \hat{\alpha}_s S_s + \hat{\alpha}_T t + \hat{\varepsilon}_{it} \quad (2)$$

[10] This methodology, considering intermediate inputs levels (e.g., materials or energy) as a proxy of unobserved TFP, allows taking into account the endogeneity of inputs (or simultaneity bias). The latter may occur because of the potential correlation between firms' unobserved productivity and their input decision because more productive firms could allocate more capital and labour given the expected future investment opportunities (De Loecker, 2007). Moreover, it is possible to account for selection issues by using an unbalanced panel (Van Beveren, 2012).

[11] Following Milana et al. (2013), production function variables are deflated by using industry level indexes, taken from the EU KLEMS database, and potential outliers are treated by eliminating the observations lying in the first and last centiles of the distribution of each regressor. For more information on the EU KLEMS database, see www.euklems.net/.

[12] Estimating the benchmark equation separately for each manufacturing sector yields limited samples, implying severe problems in terms of power of the diagnostic tests on which the GMM-SYS estimator is based.

[13] Returns to scale do not directly affect TFP when proportional variations in the inputs yield the same change in output (Harris and Moffat, 2015; Ding et al., 2016).

The vector of productivity determinants (X) includes our variables of interest along with several firms, regional and sectoral characteristics. The key variable of the analysis is the duration of the lending relationship that a firm has with its main bank (DURAT), referring to the last year of the EFIGE survey (2009).[14] Since the period we consider goes from 2004 to 2009, following Agostino et al. (2012), Gambini and Zazzaro (2013) and Agostino and Trivieri (2017 and 2018), the values of DURAT back to 2004 are obtained by subtracting from the original figure a number up to 5, treating as missing values negative numbers.[15] As far as the proxy of social capital endowment is concerned, we employ an indicator of *civicness* based on the work of Putnam et al. (1994).[16] To test our research hypotheses, the interaction term between DURAT and SOCIALCAP is included.

Considering firms' characteristics, age (AGE) is taken into account as productivity may rise for older firms due to the exploitation of *learning by doing* mechanisms and easier access to credit, due to their longer records. On the other hand, younger firms may be characterised by higher absorptive capacity, and thus take advantage of innovative technologies. Whit regard to firms' financial indicators, a standard measure of external funds is the leverage ratio (LEV), which might affect firms' productivity in several ways. On the one hand, high debt level could discipline managers' behaviour, by reducing the discretion of the management and limiting the use of the free cash flow (Jensen, 1986). On the other hand, higher indebtedness might distort the incentives of managers, who can invest in riskier projects, trying to exploit the asymmetry of profits and losses of risky investments at the expense of debtholders. Finally, we include two measures of internal funds: CASHFLOW, computed as the ratio of net income plus depreciation to total assets; WORKCAP, obtained as the currents assets minus current liabilities to total assets. Both these variables might affect TFP by smoothing out the production

[14] In the EFIGE survey, which provides our data on SMEs' characteristics (see section 3), the question about DURAT is formulated as follows: "For how many years has this bank been the firm's main bank?".

[15] It is worth highlighting that the EFIGE survey does not provide the identity of a firm's main bank, and information concerning other lending relationships' characteristics – such as the percentage of a firm's total debt held by the main bank, as well as the number of lending banks – is available for 2009 only.

[16] Our SOCIALCAP indicator is one of the dimensions composing the Institutional Quality Index (IQI) of Nifo and Vecchione (2014, 2015). Further details are provided in the data section.

process and fostering productivity-enhancing activities, such as investments in R&D, new products or processes (Chen and Guariglia, 2013).[17]

As concerns regional characteristics, we include the growth of regional real gross domestic product (GRGDP), exports (over regional gross domestic product, EXPREG), and the economic infrastructure endowment (INFRA).[18] All these controls are expected to have a positive effect on firms' productivity. Moreover, we control for local banking development, by including the regional branch density (number of branches to population, BRANCH).

Furthermore, we proxy the degree of industry concentration by the Herfindahl-Hirschman index based on assets (HHIa), which might have an ambiguous effect on enterprises' performance. On the one hand, following the Structure-Conduct-Performance paradigm, a higher concentration may diminish the competition within the market, encouraging collusive behaviour among firms and, hence, reducing their productivity. On the other hand, a higher concentration may be positively correlated to productivity if it originates from the selection of more efficient firms (Margaritis and Psillaki, 2007). Finally, agglomeration and inter-industry externalities are respectively accounted for considering the percentage of industry output (2-digit level) produced in each region (AGGLO) and the number of sectors (2-digit level) with more than 10 firms in each region in which a firm is located (JACOB).

A description of the variables employed in the estimations and some main summary statistics are reported in Table 1, while Table 2 reports a correlation matrix. Figures 1 and 2 map the mean values of our indicator of social capital across the Italian regions and the regional mean values of the TFP (retrieved from equation 2), respectively. At first glance, an evident gap between Centre-Northern and Southern regions emerges both in

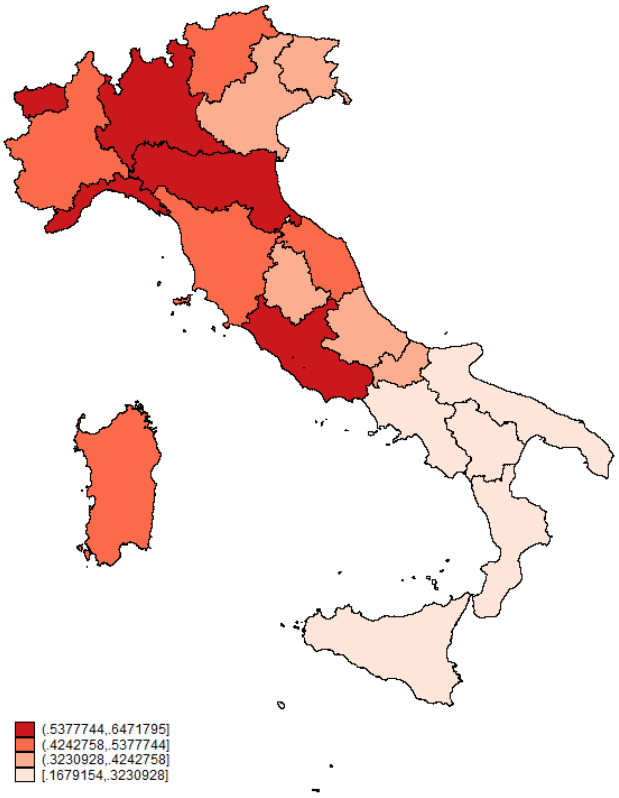
[17] Higher liquidity may smooth the production process, as it helps to avoid inventory shortages and the associated interruptions or inefficiencies in production. Indeed, when financing constraints are introduced in a model of inventory management, firms might fail to manage working capital optimally (Fisman, 2001).

[18] INFRA, defined at the regional level, is obtained using a Principal Component Analysis, which combines different (highly correlated) measures of infrastructure endowment provided by ISTAT (2019). The latter is the use of public and rail transport, and connection to the Internet of firms and families. All the measures considered have been standardised to avoid that the variable with the highest variance dominates the resulting index.

terms of SOCIALCAP and TFP, which confirms the historical (and well-documented) *divide* characterising the two Italian macro-areas.[19]

[TABLES 1 and 2]

FIGURE 1. Average social capital in the Italian regions.



Source: Author's elaboration on Nifo and Vecchione (2014, 2015) data.

[19] Regional differences of social capital endowments in Italy are hypothesized to depend on historical socio-politics conditions which characterised the two macro-areas in the Middle Age (i.e. Municipalities in the Centre-North and the Kingdom of Sicily in the South). Putnam et al. (1994) find that lower levels of social capital in the southern Italian regions are correlated with the slower growth of these areas.

FIGURE 2. Average TFP (SYS-GMM) in the Italian regions.

Source: Author's elaboration.

3. Data

Several sources have been used to retrieve our data. Firms information is drawn from the EFIGE-Bruegel-Unicredit dataset, which includes both survey data (referring to the year 2008, or the period 2007-2009) and balance sheet data (from 2001 to 2009) coming from the Amadeus database.[20]

[20] EFIGE stands for "*European Firms in a Global Economy*". For more information on the EU-EFIGE dataset, see http://bruegel.org/2012/10/the-eu-efigebruegel-unicredit-dataset/. It should be recalled that the EFIGE dataset omits firms with less than 10 employees, thus implying that our results might not be extended to the smallest of firms. Moreover, as Agostino and Trivieri (2018) point out, the findings are conditional on firms' survival since accounting data concerns firms that are surveyed in 2010 and defaulted enterprises are excluded.

As a measure of social capital, we employ the *Voice and Accountability* dimension of the Institutional Quality Index (IQI) proposed by Nifo and Vecchione (2014), available for the period 2004-2009 at the Italian regional level.[21] This dimension catches the involvement in public and social life (in terms of participation in election processes, being members in associations or volunteers, and operating in social cooperatives). It also accounts for cultural activities by considering the number of books published and purchased in bookshops. Indeed, following a concept of social capital *à la* Putnam, it draws a picture of traditional associations among individuals that, thanks to the creation of sharing culture and values, have an impact on the well-being of a community.[22]

Data on regional characteristics employed as control variables come from the Italian National Institute of Statistics (ISTAT) except for BRANCH, obtained on data provided by the Italian Banking Association (ABI).

4. Estimation Results

The benchmark model results are reported in column 1 of Tables 3. Firstly, as the diagnostics show (bottom of Tables 3), the tests for the validity of the instruments used and for auto-correlation in the (first-differenced) residuals support the hypotheses underlying the GMM-SYS estimator.[23] Focusing on our key variables, both DURAT and SOCIALCAP have a positive impact on productivity, while the interaction term coefficient is negative. To assess the effect of DURAT on TFP as SOCIALCAP varies, the analysis is supported by a graph,

[21] The IQI index, inspired by the World Governance Indicator (WGI) proposed by Kaufmann et al. (2011), is an indicator of institutional quality derived from 24 elementary indexes, clustered into five institutional dimensions: Government effectiveness, Regulatory Quality, Rule of Law, Control and Corruption and Voice and Accountability. We refer to Nifo and Vecchione (2014, 2015) for further details on normalisation, attribution of weights and aggregation of indexes. It is worth noticing that all the IQI dimensions are also available at the provincial level. However, the EFIGE dataset we employ provides information only on the regions in which firms operate.

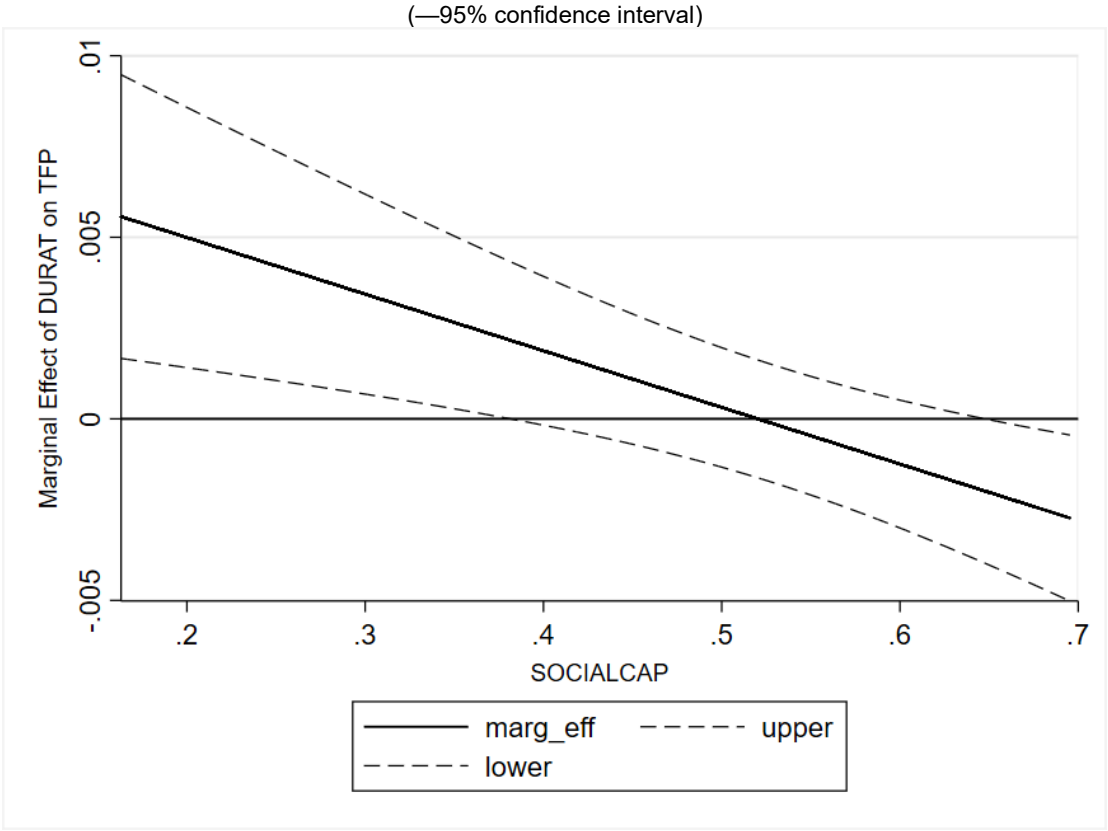
[22] As a robustness check, we use a different measure of social capital obtained using data coming from the National and regional registers of blood and plasma held by the Italian National Institute of Health.

[23] More in detail, the Hansen test of overidentifying restrictions is not significant, indicating the validity of the instruments. Moreover, first-order correlation (in differenced residuals) is verified, while second-order correlation is not significant.

showing the DURAT marginal effect for all the values of SOCIALCAP.[24] According to Figure 3, based on column 1 estimates (Table 3), at low levels of social capital, the zero line is not included in the confidence band meaning that the DURAT marginal effect is positive and statistically significant. At a higher degree of social participation, the influence of DURAT decreases, becoming not significant beyond a threshold of about 0.4. In other words, the (positive) impact of enduring lending relationships on SMEs' productivity is stronger at lower levels of social capital and tends to decrease as social capital increases. We interpret these findings as evidence supporting our hypothesis of substitutability between social capital and lasting lending relationships, which appear to be important for SMEs' performance where shared values and social norms are lacking.

[TABLE 3]

FIGURE 3. Marginal Effect of DURAT on TFP (SYS-GMM) as SOCIALCAP changes.



[24] The y-axis represents the marginal effect of relationship lending for all the values of social capital, while the dashed lines define 95% confidence intervals. The use of a graphical illustration is worthwhile, as the effect of DURAT could change sign and/or become not statistically significant for different levels of SOCIALCAP.

The estimated effect of control variables is also quite informative. According to Table 3, the leverage level (LEV) positively affects TFP, suggesting that higher indebtedness might reinforce managers' motivations to perform well and could help them to smooth the production process. Similarly, internal funds indicators (CASH-FLOW and WORKCAP) positively influence firms' productivity: firms with additional liquidity may invest in R&D, adopt new technologies and, therefore, optimise their real activities. Considering the regional variables, we find that firms' productivity is benefited by higher openness to international trade (EXPREG) and infrastructural development (INFRA). Besides, higher industry concentration (HHIa) seems decreasing firms' productivity. Finally, concerning the local banking development variables, regional branch density (BRANCH) appears to affect firms' productivity positively.

4.1 Robustness analysis

A battery of checks has been performed to verify the robustness of our findings. First, we change the specification of the baseline model in different ways. In column 2 of Table 3, we replace the variable WORKCAP with an alternative indicator of liquidity assets (LIQUI), calculated as the ratio between current assets and current liabilities. Then, we separately introduce additional variables among regressors: TRAIN and R&D (column 3), INNO and HUMCAP (column 4), GVC (column 5), ZSCORE (column 6), NBANK (column 7), BNKLNS (column 8) and SOUTH (column 9). Finally, we replace the conditioning variable (SOCIALCAP) with a different measure of social capital (SOCIALCAP2).

More in detail, both TRAIN and R&D are binary variables which take value one whether employees have participated in formal training programs and firms have undertaken any R&D activities in 2008, respectively. Similar, INNO is equal to one if firms carried out innovation activities (process and/or product) in the period 2007-2009, and the dummy HUMCAP individuates firms with a higher share of graduate employees to the national average share of graduates. GVC accounts for firms involved in a single, or dual, or triple modes of international activity in 2008, while ZSCORE measures the distance from insolvency, representing an indicator of financial health (Houston et al., 2010; Kanagaretnam et al., 2012; Jin et al., 2013; Mihet, 2013, Agostino and

Trivieri, 2018).[25] Moreover, to account for the phenomenon of multiple borrowing and the regional banking credit supply, the number of bank relationships per firm (NBANK) and the amount of regional credit provided by banks over deposits (BNKLNS) are separately included in the model.[26] In column 9 of Table 3, a dummy coded one if a firm is located in South Italy accounts for the geographical divide characterising our country. Finally, in column 10, we change our measure of social capital, employing the regional number of blood donors to 18-65 regional population (SOCIALCAP2), which proxies one of the social capital dimensions *à la* Putnam et al. (1994), that is the generalised cooperative behaviour (Guiso et al., 2004; Bürker and Minerva, 2014; Lozzi and Mistrulli, 2014; Mistrulli and Vacca, 2014; Paccagnella and Sestito, 2014; Crescenzi and Gagliardi, 2015; Ciarrapico et al., 2019). All the findings obtained by amending our benchmark equation are in line with those discussed above.

To conclude, our findings are confirmed even when we change econometric model, carrying out a two-stage procedure (see Table 4): we first obtain TFP measures by the Levinsohn and Petrin (2003) method, and then regress these measures on the vector of productivity determinants described above, in a second step regression. Specifically, both DURAT and SOCIALCAP positively affect SMEs' productivity, while the interaction term coefficient displays a negative sign.[27] According to Figure 4, in line with the previous findings, at a higher level of social capital, the influence of DURAT decreases, becoming not significant beyond a threshold of about 0.45.

[TABLE 4]

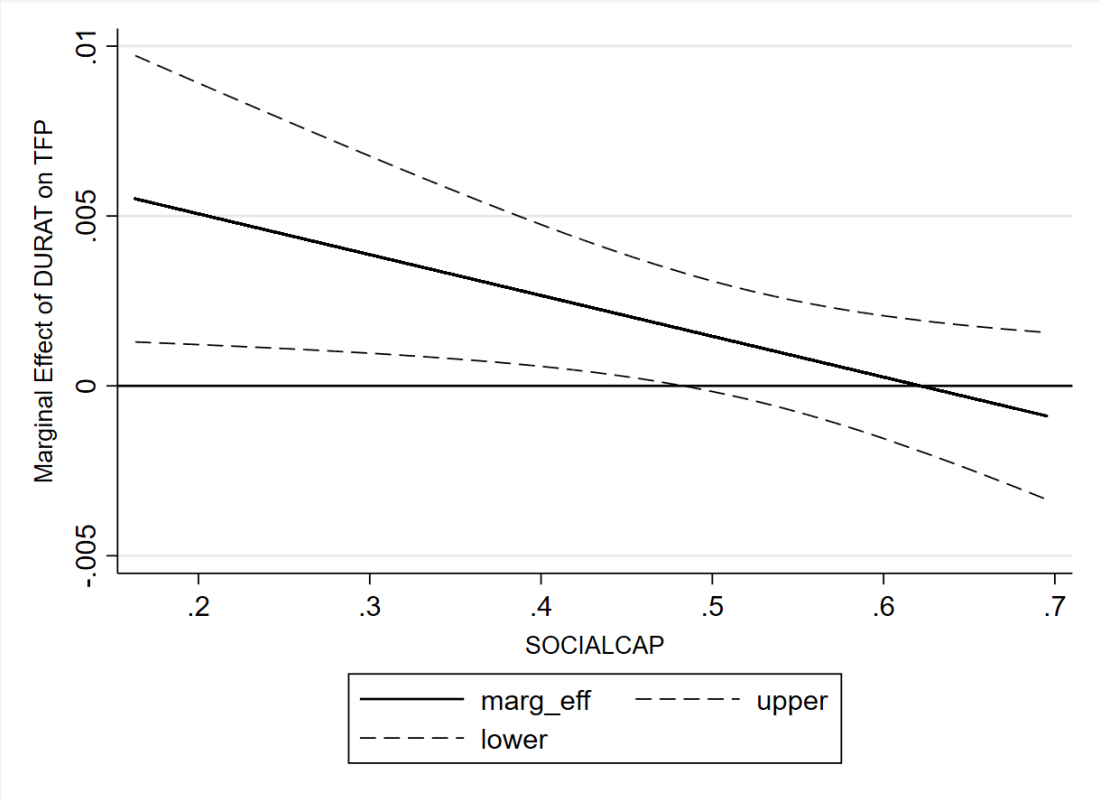
[25] The Z-score is the sum of return on assets plus the capital asset ratio divided by the standard deviation of return on assets, the latter being computed over three-year rolling time windows (Panetta and Pozzolo, 2010; Schaeck et al., 2012). Its inclusion is justified by the evidence about the positive linkage between banking relationships and the efficiency of firms that register higher default probability (Yildirim, 2019).

[26] All the extra variables considered in columns from 2 to 8 (except WORKCAP, ZSCORE and BNKLNS) are not included in the benchmark model, as they are not defined for all years of our estimation sample and, therefore, have been imputed. Banking data at the regional level come from Bank of Italy.

[27] These results are confirmed also using SOCIALCAP2 (Column 10 of Table 4).

FIGURE 4. Marginal Effect of DURAT on TFP (LP method) as SOCIALCAP changes.

(—95% confidence interval)



5. Concluding Remarks

This work investigates to what extent the relevance of close bank-firm ties is affected by the endowment of social capital characterising the environment in which enterprises operate. Considering that social capital, for its own nature, might represent a public good for banks, facilitating lenders in collecting *soft information* on borrowers, we wonder to what extent social trust is complementary to or – as it might replace private trust – a substitute for close lending relationships.

Employing Italian SMEs data – and using measures of Total Factor Productivity obtained by implementing the system GMM estimator proposed by Blundell and Bond (1999) – we evaluate the effect of enduring bank firm-ties on SMEs' productivity while conditioning the duration of lending relationships on the level of social capital.

Our main finding is that the duration of credit relationships positively impacts on firms' productivity for a lower level of social capital, and this effect tends to disappear as the endowment of social capital increases.

Thus, our results suggest that the link between close lending relationships and SMEs' productivity might be shaped by the level of cooperation, trust, reciprocity and civic engagement characterising the environment in which enterprises operate.

In regards to our research hypothesis, the results obtained indicate that social trust might be a substitute for the lack of private trust so that long-lasting credit relationships seem to be of crucial importance for SMEs operating in contexts with low endowments of social capital. In this respect, the evidence we provide appears in line with the theoretical and empirical findings of a broad strand of the banking literature showing the relevance of enduring bank-firm ties for SMEs' financing.

As an implication of our findings, we believe that the restructuring processes in banking industry aiming at consolidating local banks might bring – alongside with the desirable goals the policymakers pursue – the potential drawback of weakening the traditional business model of small credit institutions, typically-based on lending relationships. Such an outcome could lead to negative consequences for the financing of SMEs operating in social capital poor-areas.

References

Agostino, M. and Trivieri, F., 2017. Collateral in lending relationships. A study on European SMEs micro-data. *International Review of Applied Economics*, *31*(3), pp.339-356.

Agostino, M. and Trivieri, F., 2018. Who benefits from longer lending relationships? An analysis on European SMEs. *Journal of Small Business Management*, 56(2), pp.274-293.

Agostino, M., Gagliardi, F. and Trivieri, F., 2012. Bank competition, lending relationships and firm default risk: An investigation of Italian SMEs. *International Small Business Journal*, 30(8), pp.907-943.

Agostino, M., Ruberto, S. and Trivieri, F., 2018. Lasting lending relationships and technical efficiency. Evidence on European SMEs. *Journal of Productivity Analysis*, pp.1-16.

Arellano, M. and Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, 58(2), pp.277-297.

Benfratello, L., Schiantarelli, F. and Sembenelli, A., 2008. Banks and innovation: Microeconometric evidence on Italian firms. *Journal of Financial Economics*, 90(2), pp.197-217.

Berger, A.N. and Udell, G.F., 1995. Relationship lending and lines of credit in small firm finance. *Journal of business*, pp.351-381.

Blundell, R. and Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, 87(1), pp.115-143.

Bolton, P. and Scharfstein, D.S., 1996. Optimal debt structure and the number of creditors. *Journal of political economy*, 104(1), pp.1-25.

Boot, A.W., 2000. Relationship Banking: What Do We Know? *Journal of Financial Intermediation*.

Brick, I.E. and Palia, D., 2007. Evidence of jointness in the terms of relationship lending. *Journal of Financial Intermediation*, 16(3), pp.452-476.

Bürker, M. and Minerva, G.A., 2014. Civic capital and the size distribution of plants: Short-run dynamics and long-run equilibrium. *Journal of Economic Geography*, *14*(4), pp.797-847.

Chen, M. and Guariglia, A., 2013. Internal financial constraints and firm productivity in China: Do liquidity and export behaviour make a difference?. *Journal of Comparative Economics*, 41(4), pp.1123-1140.

Ciarrapico, A.M., Cosci, S. and Mirra, L., 2019. Social Capital and Patients Mobility in Italy. 60ª RSA, Società Italiana degli Economisti, University of Palermo.

Coleman, J.S., 1990. Foundations of social theory. Cambridge, MA: Belknap Press of Harvard University Press.

Crescenzi, R. and Gagliardi, L., 2015. Social capital and the innovative performance of Italian provinces. In *The Economics of Knowledge, Innovation and Systemic Technology Policy* (pp. 188-218). Routledge.

De Bonis, R., Ferri, G. and Rotondi, Z., 2010. Do bank-firm relationships influence firm internationalisation. Unpublished Working Paper. Università Politecnica delle Marche, Department of Economics.

De la Torre, A., Soledad Martinez Peria, M. and Schmukler, S.L., 2008. Bank involvement with SMEs: Beyond relationship lending. The World Bank.

De Loecker, J., 2007. Do exports generate higher productivity? Evidence from Slovenia. *Journal of international economics*, *73*(1), pp.69-98.

Demirgüç-Kunt, A. and Levine, R., 1999. Bank-based and market-based financial systems: Cross-country comparisons. The World Bank.

Dewatripont, M. and Maskin, E., 1995. Credit and efficiency in centralised and decentralised economies. *The Review of Economic Studies*, 62(4), pp.541-555.

Ding, S., Guariglia, A. and Harris, R., 2016. The determinants of productivity in Chinese large and medium-sized industrial firms, 1998–2007. *Journal of Productivity Analysis*, 45(2), pp.131-155.

Elsas, R., 2005. Empirical determinants of relationship lending. *Journal of Financial Intermediation*, 14(1), pp.32-57.

Fisman R. (2001). Trade Credit and Productive Efficiency in Developing Countries. World Development, 29 (2), pp. 311-321.

Franklin, J., Rostom, M. and Thwaites, G., 2015. The banks that said no: banking relationships, credit supply and productivity in the United Kingdom.

Gambini, A. and Zazzaro, A., 2013. Long-lasting bank relationships and growth of firms. *Small Business Economics*, 40(4), pp.977-1007.

Giannetti, C., 2012. Relationship lending and firm innovativeness. *Journal of Empirical Finance*, 19(5), pp.762-781.

Guiso, L., Sapienza, P. and Zingales, L., 2004. The role of social capital in financial development. *American economic review*, 94(3), pp.526-556.
Guiso, L., Sapienza, P. and Zingales, L., 2006. Does culture affect economic outcomes?. *Journal of Economic perspectives*, 20(2), pp.23-48.
Harhoff, D. and Körting, T., 1998. Lending relationships in Germany–Empirical evidence from survey data. *Journal of Banking & Finance*, 22(10-11), pp.1317-1353.
Harris, R. and Moffat, J., 2015. Plant-level determinants of total factor productivity in Great Britain, 1997–2008. *Journal of Productivity Analysis*, 44(1), pp.1-20.
Harris, R., Siegel, D.S. and Wright, M., 2005. Assessing the impact of management buyouts on economic efficiency: Plant-level evidence from the United Kingdom. *Review of Economics and Statistics*, *87*(1), pp.148-153.
Hernández-Cánovas, G. and Martínez-Solano, P., 2010. Relationship lending and SME financing in the continental European bank-based system. *Small Business Economics*, 34(4), pp.465-482.
Herrera, A.M. and Minetti, R., 2007. Informed finance and technological change: Evidence from credit relationships. *Journal of Financial Economics*, 83(1), pp.223-269.
Houston, J.F., Lin, C., Lin, P. and Ma, Y., 2010. Creditor rights, information sharing, and bank risk taking. *Journal of financial Economics*, *96*(3), pp.485-512.
Jensen, M.C., 1986. Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review*, 76(2), pp.323-329.
Jimenez, G., Salas, V. and Saurina, J., 2006. Determinants of collateral. *Journal of financial economics*, 81(2), pp.255-281.
Jin, J.Y., Kanagaretnam, K., Lobo, G.J. and Mathieu, R., 2013. Impact of FDICIA internal controls on bank risk taking. *Journal of Banking & Finance*, *37*(2), pp.614-624.
Kanagaretnam, K., Lim, C.Y. and Lobo, G.J., 2012. Influence of National Culture on Bank Risk Taking. In manuscript presented at American Accounting Association Annual Meeting.
Kano, M., Uchida, H., Udell, G.F. and Watanabe, W., 2011. Information verifiability, bank organisation, bank competition and bank-borrower relationships. *Journal of Banking & Finance*, 35(4), pp.935-954.
Karlan, D., Mobius, M., Rosenblat, T. and Szeidl, A., 2009. Trust and social collateral. *The Quarterly Journal of Economics*, *124*(3), pp.1307-1361.
Kaufmann, D., Kraay, A. and Mastruzzi, M., 2011. The worldwide governance indicators: methodology and analytical issues. *Hague Journal on the Rule of Law*, 3(2), pp.220-246.
Levinsohn, J. and Petrin, A., 2003. Estimating production functions using inputs to control for unobservables. *The review of economic studies*, 70(2), pp.317-341.
Lozzi, M. and Mistrulli, P.E., 2014. Loan applications and social capital in the Great Recession. Banca d'Italia, mimeo.
Mancusi, M.L., Vezzulli, A., Frazzoni, S., Rotondi, Z. and Sobrero, M., 2018. Export and Innovation in Small and Medium Enterprises: The Role of Concentrated Bank Borrowing. *Economica*, 85(337), pp.177-204.
Margaritis, D. and Psillaki, M., 2007. Capital structure and firm efficiency. *Journal of Business Finance & Accounting*, 34(9-10), pp.1447-1469.
Mihet, R., 2013. Effects of culture on firm risk-taking: a cross-country and cross-industry analysis. *Journal of Cultural Economics*, *37*(1), pp.109-151.
Milana, C., Nascia L., Zeli A., 2013. Decomposing multifactor productivity in Italy from 1998 to 2004: evidence from large firms and SMEs using DEA. *Journal of Productivity Analysis*, 40:99–109.
Mistrulli, P.E. and Vacca, V., 2014. Social capital and the cost of credit in a crisis. Bank of Italy. mimeo.
Montoriol Garriga, J., 2006. The Effect of Relationship Lending on Frim Performance (No. 0605). Departament Empresa, Universitat Autònoma de Barcelona.
Nifo, A. and Vecchione, G., 2014. Do institutions play a role in skilled migration? The case of Italy. *Regional Studies*, 48(10), pp.1628-1649.
Nifo, A. and Vecchione, G., 2015. Measuring institutional quality in Italy. *Rivista economica del Mezzogiorno*, 29(1-2), pp.157-182.
Ongena, S. and Smith, D.C., 2000. Bank relationships: a review. Performance of financial institutions: Efficiency, innovation, regulation, 221.
Paccagnella, M. and Sestito, P., 2014. School cheating and social capital. *Education Economics*, *22*(4), pp.367-388.

Panetta, F. and Pozzolo, A.F., 2010. Why do banks securitise their assets? Bank-level evidence from over one hundred countries. *Bank-Level Evidence from Over One Hundred Countries (March 16, 2010)*.
Petersen, M.A. and Rajan, R.G., 1994. The benefits of lending relationships: Evidence from small business data. *The journal of finance*, 49(1), pp.3-37.
Petersen, M.A. and Rajan, R.G., 1995. The effect of credit market competition on lending relationships. *The Quarterly Journal of Economics*, 110(2), pp.407-443.
Putnam, R.D., Leonardi, R. and Nanetti, R.Y., 1994. Making democracy work: Civic traditions in modern Italy. Princeton university press.
Rajan, R.G., 1992. Insiders and outsiders: The choice between informed and arm' s-length debt. *The Journal of finance*, 47(4), pp.1367-1400.
Schaeck, K., Cihak, M., Maechler, A. and Stolz, S., 2012. Who disciplines bank managers?. *Review of Finance*, *16*(1), pp.197-243.
Spagnolo, G., 1999. Social relations and cooperation in organisations. *Journal of Economic Behavior & Organization*, 38(1), pp.1-25.
Stiglitz, J.E., 1990. Peer monitoring and credit markets. *The world bank economic review*, 4(3), pp.351-366.
Udell, G.F., 2008. What's in a relationship? The case of commercial lending. *Business Horizons*, 51(2), pp.93-103.
Van Beveren, I., 2012. Total factor productivity estimation: A practical review. *Journal of economic surveys*, *26*(1), pp.98-128.
Van Biesebroeck, J., 2007. Robustness of productivity estimates. *The Journal of Industrial Economics*, 55(3), pp.529-569.
Varian, H.R., 1990. Monitoring agents with other agents. *Journal of Institutional and Theoretical Economics (JITE)/Zeitschrift Für Die Gesamte Staatswissenschaft*, pp.153-174.
Yang, C.H. and Chen, K.H., 2009. Are small firms less efficient?. *Small Business Economics*, 32(4), pp.375-395.
Yildirim, A., 2019. The effect of relationship banking on firm efficiency and default risk. *Journal of Corporate Finance*, p.101500.

TABLE 1 - Description and summary statistics of the variables used in the estimations

VARIABLE	DESCRIPTION	Mean	StdD	Min	Max	Obs
TFP	Total factor productivity based on Levinsohn-Petrin (2003) method	5.75	2.51	1.02	17.66	13,352
TOTREV [(a)]	Total sales	73.40	123.53	0.10	1,924	14,115
LAB [(c)]	Number of employees	34	30.94	10	248	14,115
RAWM [(a)]	Expenditure for raw materials	39.47	80.39	0.00	1365	14,115
KAP [(a)]	Tangible plus intangible fixed assets plus depreciation	22.19	47.07	0.03	921	14,115
DURAT [(d)]	Duration of the relationships with the main bank	14	10.56	0	50	8,369
SOCIALCAP	Proxy of social capital - item *Voice and Accountability* from IQI proposed by Nifo and Vecchione (2014, 2015)	0.49	0.13	0.16	0.70	13,365
SOCIALCAP2 [(e)]	Number of blood donors for region to 18-65 regional population	4.39	0.82	0.45	6.94	14,115
AGE [(d)]	Current year minus firm's year of establishment	29	18.49	0	154	14,056
SIZE[(a)]	Total assets	69.19	119.13	1.17	2099.05	14,115
LEV [(e)]	(Current plus non-current liabilities) to total assets	73.32	18.21	23.13	97.83	14,115
CASHFLOW [(e)]	Cash flow to total assets	5.36	5.42	-18.84	25.27	14,115
WORKCAP [(e)]	(Currents assets minus current liabilities) to total assets	17.03	21.16	-40.97	71.77	14,115
GRGDP	Growth of regional real gross domestic product	1.81	3.01	-6.33	6.14	11,575
EXPREG [(e)]	Regional export to GDP	25.62	7.93	0.99	36.47	14,115
INFRA	Regional infrastructural endowment	-0.004	1.535	-4.009	3.648	14,115
BRANCH	Number of branches for region to regional population	0.72	0.19	0.26	1.18	14,115
HHIa	Herfindahl-Hirschman index on firms' total assets	0.02	0.02	0	0.29	14,115
AGGLO	Percentage of industry output (2-digit NACE) located in each region in which the firm is located	16.85	13.57	0.02	58.63	14,115
JACOB [(c)]	Jacob index: number of sectors (2-digit level) in each region, with more than 10 firms	9	5.72	0	16	14,115
Robustness checks						
LIQUI	Current assets to current liabilities	1.49	0.76	0.54	23.62	14,114
TRAIN	Dummy = 1 if employees have participated to formal training programs	0.55	0.50	0	1	14,115
R&D	Dummy = 1 if firms undertake any R&D activities	0.54	0.50	0	1	14,109
INNO	Dummy = 1 if firms carry out innovation activities (process and/or product)	0.68	0.47	0	1	14,109
HUMCAP	Dummy = 1 if firm has a higher share of graduate employees with respect to the national average share of graduates	0.32	0.47	0	1	14,115
GVC	Dummy = 1 if a firm is involved in a single, or dual, or triple modes of international activity in 2008	0.79	0.40	0	1	14,115
ZSCORE	(ROA + capital asset ratio) / standard deviation of ROA	0.27	1.10	-0.18	81.29	9,406
NBANK [(c)]	Number of bank relationship per firm	3.97	2.13	1	12	14,109
BNKLNS	Regional total loans to firms to total deposits	0.93	0.23	0.35	1.34	14,115
SOUTH	Dummy = 1 if a firm is located in South Italy	0.31	0.46	0	1	14,115

(a) in thousands of Euros (deflated values); (b) in millions of euro; (c) in unit; (d) in years; (e) in percentage.

TABLE 2 - Correlation matrix

	LAB	RAWM	KAP	DURAT	SOCIALCAP	SOCIALCAP2	AGE	SIZE	LEV	CASHFLOW	WORKCAP	GROWTH	EXPREG	INFRA	BRANCH	HHIa	AGGLO	JACOB	LIQUI	TRAIN	R&D	INNO	HUMCAP	GVC	ZSCORE	NBANK	BNKLNS	SOUTH
LAB	1																											
RAWM	0.5642	1																										
KAP	0.5746	0.6702	1																									
DURAT	0.037	-0.0242	0.0138	1																								
SOCIALCAP	0.0237	0.0188	-0.0114	0.1136	1																							
SOCIALCAP2	-0.0063	-0.0177	-0.0407	0.0404	0.0895	1																						
AGE	0.17	0.1063	0.1599	0.3986	0.1305	0.0308	1																					
SIZE	0.692	0.8417	0.8399	-0.0012	0.0206	-0.0221	0.1658	1																				
LEV	-0.1154	-0.0243	-0.1598	-0.1577	0.0282	0.048	-0.1359	-0.1136	1																			
CASHFLOW	0.0236	0.004	0.013	-0.0356	-0.0033	-0.0463	-0.0756	-0.0119	-0.2218	1																		
WORKCAP	0.0342	0.0018	-0.1546	0.1137	0.0781	0.0263	0.0812	-0.0016	-0.4554	0.124	1																	
GROWTH	0.0011	0.0403	-0.058	-0.0705	0.0386	-0.1208	0.0112	-0.0163	0.1289	0.1715	-0.0192	1																
EXPREG	0.0527	0.0255	-0.0377	0.0708	0.5396	0.3705	0.1082	0.0107	0.0735	0.0764	0.0591	0.1993	1															
INFRA	0.0198	0.0382	0.0392	0.0517	0.442	-0.3986	0.0774	0.0439	-0.0143	-0.0376	0.0256	-0.1653	0.0205	1														
BRANCH	0.0305	0.0128	-0.0177	0.071	0.4546	0.4752	0.0723	0.0047	0.0307	0.0329	0.0401	-0.0422	0.719	-0.1208	1													
HHIa	0.0714	0.0746	0.0457	-0.0442	-0.0732	-0.0369	0.0098	0.0823	-0.0327	-0.0079	0.0254	0.0459	-0.0576	-0.0035	-0.04	1												
AGGLO	0.1043	0.0925	0.0571	0.0625	0.6504	-0.1051	0.0859	0.1176	-0.022	0.0082	0.0898	0.0322	0.4733	0.4403	0.2294	0.0061	1											
JACOB	0.0249	0.0178	-0.0169	0.0804	0.7053	-0.0149	0.1222	0.0208	0.0239	0.0143	0.0761	0.0261	0.6969	0.3732	0.4049	-0.0505	0.7546	1										
LIQUI	0.0251	-0.0259	-0.0904	0.1368	0.068	0.0106	0.0928	-0.0042	-0.5633	0.1432	0.8687	-0.0567	0.0396	0.035	0.0353	0.0072	0.073	0.0588	1									
TRAIN	0.2053	0.1081	0.1269	0.0669	-0.0083	0.026	0.0844	0.1314	-0.0841	0.057	-0.0092	-0.0089	0.0239	-0.0181	0.0359	0.007	-0.0355	-0.035	-0.0129	1								
R&D	0.1681	0.0861	0.0926	-0.0433	0.0423	0.0571	0.0174	0.1258	0.0206	0.0075	-0.0119	-0.016	0.0683	0.0101	0.0547	0.0389	0.0601	0.0538	-0.0253	0.2162	1							
INNO	0.1109	0.0867	0.0713	-0.0256	0.0091	0.0314	0.0172	0.1	0.005	0.0333	0.0083	-0.0059	0.03	-0.0181	0.0425	0.0106	0.0242	0.0349	-0.0081	0.1591	0.412	1						
HUMCAP	-0.0463	0.0548	0.039	-0.029	-0.0565	-0.0287	0.0127	0.0494	-0.0505	0.0125	0.0359	-0.0025	-0.1	-0.0349	-0.0635	0.046	-0.0759	-0.0825	0.0228	0.1342	0.1589	0.0988	1					
GVC	0.1441	0.1283	0.0846	0.0541	0.0894	0.0406	0.0968	0.1309	-0.0143	-0.0475	0.0887	-0.0154	0.1105	0.0856	0.101	0.0271	0.1135	0.1372	0.0436	0.0536	0.2296	0.1884	0.1012	1				
ZSCORE	-0.0063	0.0306	0.0503	0.0352	-0.0049	-0.0251	0.0439	0.0369	-0.0757	0.0036	-0.0011	-0.007	-0.0187	0.0069	-0.0251	0.0057	-0.0114	0.0004	0	-0.0243	-0.0263	-0.0334	-0.0162	0.0046	1			
NBANK	0.3641	0.3377	0.2586	-0.0321	0.1078	0.0722	0.1082	0.3313	0.1106	-0.1116	-0.1019	0.0113	0.099	0.0298	0.0676	0.0565	0.1428	0.1086	-0.138	0.0871	0.1342	0.1199	0.0202	0.1537	0.0073	1		
BNKLNS	0.0123	0.0285	-0.0297	0.0477	0.6299	0.1196	0.081	0.0096	0.051	0.0597	0.0565	0.2172	0.7459	0.0499	0.7119	-0.0289	0.5593	0.7981	0.0351	-0.0278	0.0427	0.0461	-0.0634	0.1144	-0.0146	0.0995	1	
SOUTH	-0.0715	-0.031	-0.0186	-0.0862	-0.5111	-0.1019	-0.1279	-0.042	-0.0175	-0.068	-0.0538	0.055	-0.7027	-0.3344	-0.5483	0.0353	-0.4712	-0.6234	-0.0472	-0.0654	-0.0805	-0.0426	0.0688	-0.1463	0.0055	-0.0322	-0.0322	1

For the description of the variables see Table 1.

TABLE 3 - SYS-GMM results

	Benchmark Model	Replacing LIQUI with WORKCAP	Adding TRAIN and R&D	Adding INNO and HUMCAP	Adding GVC	Adding ZSCORE	Adding NBANK	Adding BNKLNS	Adding SOUTH	Replacing SOCIALCAP with SOCIALCAP2
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
DURAT	0.0081***	0.0077***	0.0069**	0.0081***	0.0077***	0.0088**	0.0079***	0.0074***	0.0082***	0.0094**
	0.003	*0.005*	*0.018*	*0.004*	*0.005*	*0.011*	*0.004*	*0.005*	*0.003*	*0.036*
SOCIALCAP	0.3202***	0.3038***	0.2949***	0.3189***	0.3049***	0.3513***	0.3363***	0.3174***	0.3328***	
	0.002	*0.003*	*0.006*	*0.002*	*0.004*	*0.004*	*0.004*	*0.002*	*0.001*	
DURAT*SOCIALCAP	-0.0156***	-0.0152***	-0.0145***	-0.0154***	-0.0148***	-0.0175***	-0.0154***	-0.0142***	-0.0157***	
	0.002	*0.002*	*0.004*	*0.002*	*0.003*	*0.005*	*0.002*	*0.002*	*0.001*	
SOCIALCAP2										0.0372**
										0.012
DURAT*SOCIALCAP2										-0.0019**
										0.034
LAB	0.1291***	0.1578***	0.1053**	0.1145**	0.1299***	0.1726***	0.1111**	0.1343***	0.1169**	0.0357
	0.010	*0.003*	*0.039*	*0.027*	*0.009*	*0.001*	*0.029*	*0.003*	*0.024*	*0.502*
RAWM	0.6774***	0.6681***	0.6717***	0.6763***	0.6702***	0.6763***	0.6841***	0.6776***	0.6734***	0.6814***
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
KAP	0.0747***	0.0266	0.0710***	0.0718***	0.0768***	0.0931***	0.0753***	0.0767***	0.0783***	0.0652**
	0.005	*0.263*	*0.007*	*0.007*	*0.005*	*0.001*	*0.005*	*0.004*	*0.003*	*0.045*
AGE	-0.0008	-0.0002	-0.0003	-0.0007	-0.0009	-0.0005	-0.0008	-0.0007	-0.0008	-0.0009
	0.482	*0.846*	*0.827*	*0.522*	*0.461*	*0.667*	*0.485*	*0.485*	*0.493*	*0.550*
LEV	0.1806**	0.0886	0.2046**	0.1707**	0.1908**	0.2077**	0.1936**	0.2046***	0.2048**	0.2046**
	0.026	*0.229*	*0.015*	*0.040*	*0.020*	*0.016*	*0.018*	*0.008*	*0.010*	*0.030*
CASHFLOW	0.6271***	0.7113***	0.5497***	0.5415***	0.6047***	0.7913***	0.6064***	0.6326***	0.6523***	0.4427**
	0.001	*0.000*	*0.002*	*0.002*	*0.001*	*0.000*	*0.001*	*0.000*	*0.000*	*0.011*
WORKCAP	0.2477***		0.2428***	0.2468***	0.2490***	0.3182***	0.2467***	0.2498***	0.2438***	0.2357***
	0.000		*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.003*
GRGDP	0.0012	0.0011	0.0015	0.0013	0.0014	0.0014	0.0006	0.0006	0.001	0.0011
	0.352	*0.380*	*0.239*	*0.289*	*0.248*	*0.347*	*0.645*	*0.655*	*0.434*	*0.378*
EXPREG	0.0341*	0.0301	0.0302	0.0379*	0.0350*	0.0276	0.0381*	0.0323*	0.0362*	0.0483**
	0.087	*0.123*	*0.132*	*0.063*	*0.079*	*0.193*	*0.073*	*0.085*	*0.082*	*0.046*
INFRA	0.0079*	0.0079*	0.0084*	0.0079*	0.0074*	0.0079*	0.0068	0.0068*	0.0066*	0.0085*
	0.058	*0.062*	*0.051*	*0.055*	*0.093*	*0.080*	*0.103*	*0.075*	*0.078*	*0.062*
BRANCH	0.0473**	0.0438**	0.0505**	0.0466**	0.0463**	0.0475**	0.0448**	0.0311	0.0405*	0.0579**
	0.030	*0.043*	*0.020*	*0.028*	*0.034*	*0.041*	*0.042*	*0.275*	*0.061*	*0.017*
HHIa	-1.8142**	-1.9717***	-1.6527**	-1.8351**	-1.9228***	-1.9123**	-1.6820**	-1.7736**	-1.8478**	-1.5409**
	0.017	*0.008*	*0.030*	*0.012*	*0.010*	*0.012*	*0.028*	*0.018*	*0.015*	*0.029*
AGGLO	0.0002	0.0004	0.0003	0.0006	0.0003	0.0007	0.0002	0.0003	0.0003	0.0014
	0.890	*0.781*	*0.867*	*0.730*	*0.841*	*0.707*	*0.890*	*0.854*	*0.861*	*0.312*
JACOB	-0.002	-0.0022	-0.0017	-0.0034	-0.0022	-0.0024	-0.0022	-0.003	-0.0026	-0.0028
	0.375	*0.328*	*0.474*	*0.173*	*0.359*	*0.310*	*0.342*	*0.201*	*0.252*	*0.267*

(continued)

TABLE 3 (continued) - SYS-GMM results

	Benchmark Model	Replacing LIQUI with WORKCAP	Adding TRAIN and R&D	Adding INNO and HUMCAP	Adding GVC	Adding ZSCORE	Adding NBANK	Adding BNKLNS	Adding SOUTH	Replacing SOCIALCAP with SOCIALCAP2
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
LIQUI		0.0235								
		0.101								
TRAIN			0.0984*							
			0.067							
R&D			-0.0858							
			0.216							
INNO				0.0624						
				0.269						
HUMCAP				-0.0698						
				0.386						
GVC					0.0196					
					0.762					
ZSCORE						-0.0001				
						0.981				
NBANK							-0.0079			
							0.531			
BNKLNS								0.0264		
								0.487		
SOUTH									-0.0036	
									0.832	
TREND	-0.0028	-0.0022	-0.002	-0.003	-0.0029	-0.001	-0.0035	-0.0031	-0.0028	-0.0045
	0.340	*0.457*	*0.501*	*0.309*	*0.328*	*0.813*	*0.256*	*0.302*	*0.324*	*0.117*
Observations	6,614	6,613	6,614	6,614	6,614	5,399	6,614	6,614	6,614	6,623
Model test	14,677.30	13,217.14	14,190.23	16,126.58	14,275.16	12,006	14,924.23	15,301.25	13,816.37	11,244.82
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Joint significance test(DURAT,SOCIALCAP)	10.86	10.23	8.17	10.71	9.82	8.68	10.62	11.19	11.77	
	0.004	*0.006*	*0.017*	*0.005*	*0.007*	*0.013*	*0.005*	*0.004*	*0.003*	
Joint significance test(DURAT,SOCIALCAP2)										6.36
										0.042
AR(1) z-statistic	-4.08	-3.99	-4.1	-4.04	-4.09	-5.68	-4.1	-4.12	-4.14	-4.22
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
AR(2) z-statistic	1.06	1.16	0.96	0.99	1.06	0.03	1.08	1.11	0.97	0.87
	0.290	*0.245*	*0.337*	*0.323*	*0.291*	*0.980*	*0.282*	*0.265*	*0.334*	*0.385*
Hansen test	233.38	233.42	245.56	240.73	236.16	216.48	241.76	242.04	245.93	226.07
	0.109	*0.109*	*0.177*	*0.239*	*0.177*	*0.151*	*0.119*	*0.158*	*0.086*	*0.199*

For the description of the variables see Table 1. In Italics are reported the p values of the tests. Superscripts ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively. The dependent variable is (the log of) total sales (TOTREV). Constant, sector dummies and lagged values of TOTREV, KAP, LAB and RAWM always included but not reported. RAWM, KAP and EXPREG are in log terms.

TABLE 4 - Second step results on total factor productivity calculated with Levinsohn-Petrin (2003)

	Benchmark Model	Replacing LIQUI with WORKCAP	Adding TRAIN and R&D	Adding INNO and HUMCAP	Adding GVC	Adding ZSCORE	Adding NBANK	Adding BNKLNS	Adding SOUTH	Replacing SOCIALCAP with SOCIALCAP2
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
DURAT	0.0075**	0.0067*	0.0076**	0.0075**	0.0087**	0.0066*	0.0137**	0.0074**	0.0117**	0.0131*
	0.037	*0.059*	*0.039*	*0.043*	*0.019*	*0.064*	*0.012*	*0.038*	*0.019*	*0.062*
SOCIALCAP	0.3396***	0.3225***	0.3495***	0.3410***	0.3471***	0.3197***	0.5697***	0.3510***	0.4928***	
	0.004	*0.005*	*0.005*	*0.005*	*0.003*	*0.006*	*0.004*	*0.003*	*0.003*	
DURAT*SOCIALCAP	-0.0120*	-0.0112*	-0.0129*	-0.0124*	-0.0135**	-0.0111*	-0.0226**	-0.0122*	-0.0185**	
	0.069	*0.084*	*0.06*	*0.073*	*0.047*	*0.088*	*0.019*	*0.06*	*0.035*	
SOCIALCAP2										0.0643***
										0.007
DURAT*SOCIALCAP2										-0.0026*
										0.063
AGE	-0.0018	-0.0015	-0.0019	-0.0018	-0.0022*	-0.0013	-0.0035	-0.0014	-0.0033	-0.0019
	0.135	*0.236*	*0.144*	*0.153*	*0.083*	*0.316*	*0.104*	*0.288*	*0.105*	*0.368*
SIZE	0.0694***	0.0627***	0.0818***	0.0734***	0.0719***	0.0760***	0.1042***	0.0689***	0.0878***	0.0532
	0.001	*0.003*	*0.003*	*0.001*	*0.002*	*0.000*	*0.003*	*0.001*	*0.005*	*0.147*
LEV	0.2961***	0.3162***	0.3306***	0.2992***	0.3275***	0.2974***	0.2471**	0.3107***	0.2494**	0.3005***
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.039*	*0.000*	*0.049*	*0.004*
CASHFLOW	1.3653***	1.4691***	1.2763***	1.1996***	1.3259***	1.3576***	1.4524***	1.3430***	1.4338***	1.0184***
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*
WORKCAP	0.2453***		0.2666***	0.2839***	0.2524***	0.2609***	0.2451***	0.2533***	0.2165**	0.2706***
	0.001		*0.000*	*0.000*	*0.001*	*0.001*	*0.008*	*0.001*	*0.012*	*0.003*
GRGDP	0.0013	0.0011	0.0012	0.0015	0.0011	0.0014	0.0004	-0.0012	0.0007	0.0007
	0.485	*0.541*	*0.515*	*0.409*	*0.540*	*0.430*	*0.823*	*0.613*	*0.724*	*0.717*
EXPREG	0.0358*	0.0345*	0.0356*	0.032	0.0321	0.0355*	0.0499*	0.0332*	0.0518*	0.0146
	0.075	*0.080*	*0.091*	*0.128*	*0.107*	*0.078*	*0.097*	*0.088*	*0.098*	*0.717*
INFRA	0.0091**	0.0093**	0.0091**	0.0088*	0.0103**	0.0092**	0.0118*	0.0103**	0.0116*	0.0149**
	0.042	*0.034*	*0.048*	*0.056*	*0.027*	*0.040*	*0.090*	*0.022*	*0.091*	*0.038*
BRANCH	0.0738**	0.0735**	0.0846**	0.0782**	0.0798**	0.0717**	0.0640*	0.0271	0.0665*	0.1034***
	0.026	*0.023*	*0.011*	*0.018*	*0.014*	*0.032*	*0.078*	*0.548*	*0.061*	*0.003*
HHIa	-2.7848**	-2.5987**	-2.9419**	-2.7889**	-2.6530**	-2.7396**	-4.0242**	-2.8709**	-4.2058**	-2.5730
	0.025	*0.036*	*0.019*	*0.026*	*0.032*	*0.027*	*0.034*	*0.023*	*0.023*	*0.128*
AGGLO	-0.0005	-0.0004	-0.0001	-0.0001	-0.0007	-0.0004	-0.0009	-0.0008	-0.0006	0.0035
	0.795	*0.825*	*0.968*	*0.949*	*0.722*	*0.834*	*0.764*	*0.695*	*0.839*	*0.166*
JACOB	-0.0011	-0.001	-0.0019	-0.0021	0.0005	-0.0014	-0.001	-0.0033	-0.0015	-0.0059
	0.723	*0.724*	*0.539*	*0.512*	*0.875*	*0.641*	*0.835*	*0.340*	*0.758*	*0.213*
LIQUI		0.0608***								
		0.002								
TRAIN			0.0064							
			0.906							
R&D			-0.0556							
			0.478							

(continued)

TABLE 4 (continued) - Second step results on total factor productivity calculated with Levinsohn-Petrin (2003)

	Benchmark Model	Replacing LIQUI with WORKCAP	Adding TRAIN and R&D	Adding INNO and HUMCAP	Adding GVC	Adding ZSCORE	Adding NBANK	Adding BNKLNS	Adding SOUTH	Replacing SOCIALCAP with SOCIALCAP2
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
INNO				0.0489						
				0.469						
HUMCAP				-0.0612						
				0.508						
GVC					-0.0473					
					0.502					
ZSCORE						-0.0109				
						0.536				
NBANK							-0.0018			
							0.940			
BNKLNS								0.0934*		
								0.100		
SOUTH									-0.0093	
									0.806	
TREND	0.0011	0.001	0.0008	0.0003	0.0006	0.0019	-0.0021	-0.003	-0.0022	-0.0069
	0.849	*0.866*	*0.890*	*0.962*	*0.915*	*0.749*	*0.736*	*0.638*	*0.728*	*0.146*
Observations	4,625	4,625	4,625	4,625	4,625	4,625	4,625	4,625	4,625	6,120
Model test	780.94	787.51	693.00	752.42	755.71	786	370.24	744.66	403.34	287.02
	0.000	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Joint significance test(DURAT,SOCIALCAP)	8.45	7.78	8.05	7.8	8.98	7.5	8.75	8.94	9.24	
	0.015	*0.020*	*0.018*	*0.020*	*0.011*	*0.024*	*0.013*	*0.011*	*0.010*	
Joint significance test(DURAT,SOCIALCAP2)										7.64
										0.022

For the description of the variables see Table 1. In Italics are reported the p values of the tests. Superscripts ***, ** and * denote statistical significance at the 1, 5 and 10 percent level, respectively. The dependent variable is (the log of) total factor productivity (TFP) obtained by using Levinshon-Petrin (2003) method. Constant and sector dummies always included but not reported. SIZE, EXPREG are in log terms.