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Three Essays in Civic Capital

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1 Introduction

The topic of this doctoral thesis is to analyze the effect of civic capital on contractual relationships between economic agents, both within and between firms. All three chapters are empirical studies, conducted in the context of Italy. The concept of civic capital is a relatively new research area in the realm of economics. Although Noble Prize winner Kenneth Arrow stated as early as 1972 that "Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time", it is only since the mid 1990s that economics systematically investigate the role of trust in economic interactions.[1]

1.1 Chapter 1

The first chapter of this thesis analyses the role of civic capital in intra firm relationship. The cooperation enhancing effect of civic capital is especially important in this context as relationships within firms take place in situations in which other mechanism that induce cooperative outcomes are ineffective: First, measurement problems of performance and unobservability of actions render third-party contract enforcement unfeasible. Second, interactions do not take place frequently so there is no space for interpersonal trust to evolve. Third, agents typically are not related to their partners by personal bonds. Using Italian census data, the analysis reveals that civic capital increases the size and the dispersion of establishments. Civic capital turns out to have a positive effect on both the average and the standard deviation of the plant size distribution. This effect is stronger in labor-intensive industries. The potential endogeneity of current civic capital is addressed by instrumenting it with historical variables. Moreover, we explicitly address the problem of measurement error of civic capital by extracting the first principal component of three proxies, namely electoral turnout in referenda, blood donation and volunteering. Our interpretation for these results is that civic capital is associated with reduced opportunistic behavior, which improves intra-firm cooperation and hampers the incidence of principal-agent problems, thus allowing plants to operate on a larger scale.

1.2 Chapter 2

The second chapter analysis the effect of civic capital in contractual relationships between firms. the influential transaction costs literature (Williamson, 1979, 1985) stresses that, when faced with the make-or-buy decision, firms choose the form of exchange that minimizes transaction costs. If civic capital decreases opportunistic behavior, contract incompleteness should decrease as well. Therefore, we expect more transaction on the market where civic capital is high. We test this prediction by analyzing the pattern of service outsourcing. The results show that firms tend to outsource more services to external suppliers where civic capital is higher. We estimate that a one standard deviation increase in social capital, according to the measure employed, brings an increase in the share of purchased services over sales between 4% and 6%. The firms that are more heavily influenced are the smaller ones. Again, potential sources of endogeneity are addressed by instrumenting civic capital by historical values and by extracting the first principal component.

[1] See Arrow (1972).

1.3 Chapter 3

The last chapter instead investigates the effect of civic capital for foreign affiliates. While a huge literature has tackled the question of whether foreign affiliates outperform their domestic counterparts, these studies do not reach a consensus on this issue. We complement this literature by arguing that civic capital has a differential impact on firm performance according to whether a firm is domestically or foreign owned. Specifically, we expect that the performance of foreign affiliates hinges on a larger extend on civic capital than purely domestic firms. The reason is that agency problems are exacerbated when a firm operates in different countries. Not only does the production process require an efficient organization, but spatial separation makes monitoring difficult and increases the scope of asymmetric information and the related contractual problems. This question is analyzed in the last chapter by employing a panel dataset of Italian manufacturing firms. Specifically, we first estimate total factor productivity which is then regressed on our variables of interest, namely the stock of civic capital in the province where the firm is located interacted with a dummy identifying a foreign affiliate.

2 Chapter 1: Explaining the Size Distribution of Plants: An Approach Based on Civic Capital

2.1 Introduction

What determines the size distribution of economic organizations in different industries? Oligopoly theory stresses the role of market size: in large markets, competitive pressures are intense and reduce the mark-up of firms. In order to recover the fixed costs of production, each firm has to operate on a larger scale, which increases average size. Similarly, models of monopolistic competition with heterogeneous firms such as Melitz and Ottaviano (2008) predict that market size increases both average size and the standard deviation of size. Empirical evidence has confirmed these theoretical predictions. Employing data on 13 retail industries in the US, Campbell and Hopenhayn (2005) show that market size has a magnifying effect on average establishment size. Moreover, they find that the dispersion in plant size is positively related to the size of the local market in some retail industries, but not in all of them. Similarly, Syverson (2004) shows that, for the concrete industry in the US, market size increases plant size.

In this paper, we empirically identify another fundamental determinant of the size distribution of establishments: the stock of local civic capital.[2] Employing Italian 2001 Census data, we show that civic capital allows economic organizations to operate on a larger scale, leading to higher average plant size. Moreover, our results document an increase in the dispersion of establishment size. We motivate these findings by an important property of civic capital in that it serves as a check against opportunistic behavior and hence increases the likelihood of cooperative outcomes in collective endeavors. Therefore, civic capital plays a crucial role in intra-firm relationships, where a smooth flow of information is required for decision making, where CEOs have to efficiently coordinate a wide variety of tasks, where decisions have to be communicated in a transparent way, and diverging individual interests need to be bridged for the sake of the firm as a whole. In short, the internal efficiency of organizations depends crucially on the extent to which individuals cooperate. In principle, there exist several mechanisms which sustain cooperation, such as relational contracts, external enforcement, or kinship bonds. However, interactions within firms often take place in contexts where (*i*) external enforcement is hampered by unobservability of actions or problems of performance measurement, (*ii*) interactions are not repeated frequently, and (*iii*) agents are not related to their partner by personal bonds. In those situations cooperation among individuals hinges crucially on civic capital and its associated high level of trust. In addition, the importance of civic capital in sustaining cooperation depends on the size of the organization in that the scope for opportunistic defection increases with the number of workers. Standard models of moral hazard predict that the probability of shirking increases with team size (Holmstrom, 1982), as each member gets a lower share of output. Moreover, relational contracting is less feasible because interactions between any two members of an organization become less frequent.

Our choice of focusing on Italian data bears several important advantages. First, the variation in the endowment of civic capital across Italy has received ample interest in social sciences (Banfield, 1958; Putnam, 1993; Guiso et al., 2004, 2008a). This allows us to circumvent the contentious measurement issue, as we

[2] Although conceptually closely related, we avoid using the loaded term of social capital. See section 2.2 for a definition of civic capital and its relationship with trust.

can fall back on a range of well-established proxies which are available at a geographically disaggregated level. Specifically, we build on Guiso et al. (2004) and measure civic capital by the number of blood donations and electoral turnout in referenda.[3] The extent to which individuals engage in volunteering in non-profit organizations completes the set of measures. Second, working on Italy allows us to use data from the 8th Census on Industry and Services (2001) which provides detailed information on the 4.4 millions plants operating in Italy. Hence, our analysis does not suffer from sample selection issues, provided that we are working with the universe of Italian establishments. Third, by focusing on one country, other factors typically affecting plant size like government subsidies, employment regulation or tax regimes are held constant.

In order to claim a causal impact of civic capital on economic outcomes, it is crucial to overcome several potential sources of endogeneity. The first problem concerns measurement error. None of our three proxies accurately reflects the true stock of civic capital. In order to minimize measurement error and the resulting attenuation bias, we extract the first principle component of the three variables of civic capital.

The second problem is the issue of reversed causality. According to the modernization theory, economic development has a direct impact on the formation of cultural and social values, thereby determining the level of civic capital (Inglehart and Baker, 2000). Similarly, trust in others is likely to be triggered by trust in political and legal institutions (Rothstein, 2000). Accordingly, efficient law enforcement both produces high levels of civic capital and favors economic activity, resulting in large plants. Similarly to Buonanno et al. (2009) and de Blasio and Nuzzo (2010), we use historical data to overcome the problem of reversed causality and omitted variables. In particular, we use information on civic capital at the middle of the 19th and beginning of the 20th century. Moreover, relying on Putnam (1993) and Guiso et al. (2008a), a second set of instruments is based on the number of free-city states in the territory of a province during the Middle Age.

Several controls ensure that our results are not driven by confounding factors. To separate civic capital from confounding unobservables related to socio-economic development, we exploit only its variation at the provincial level within the 20 Italian regions, by including a dummy for each region. In addition, we interpret our data set as a panel, where observations pertaining to a given industry are collected repeatedly over different provinces. Industry-specific heterogeneity is accordingly removed by four-digit Nace industry fixed effects. Moreover, based on Input-Output Use tables, we construct a proxy for local final demand. The quality of contract enforcement, human capital, financial development, urbanization rates in 1861, and GDP, all defined at the province level, complete the set of controls.

Results reveal that the variation of civic capital has a magnifying impact on both the mean and the dispersion of the plant size distribution. Consistently with this, we find that the number of large plants is higher in high-civic capital areas. We attribute this increase to the fact that civic capital is associated with a reduction in opportunistic behavior of agents in the local area, which in turn leads to more cooperation in intra-firm relationships, and hampers the incidence of principal-agent problems. We discuss at length these mechanisms below. Empirically, the effect of civic capital is heterogeneous across different industries: we find that the impact is stronger in industries where the capital-labor ratio is low. Concerning the economic magnitude of our results, the model predicts that the difference in the endowment of civic capital between

[3]Other studies which use these measures include Buonanno et al. (2009), and de Blasio and Nuzzo (2010).

the provinces of Naples (low civic capital) and Milan (high civic capital) is associated with a difference in the average size of plants of 25%.

The positive relationship between civic capital and the size of organizations is a priori not straightforward, though. In principle, there are at least two mechanisms why civic capital could actually be associated with a *decrease* in average plant size. On the one hand, the influential transaction costs literature (Williamson, 1979, 1985) stresses that, when faced with the make-or-buy decision, firms choose the form of exchange that minimizes transaction costs. If civic capital decreases opportunistic behavior, contract incompleteness should decrease as well. Consequently, market transactions become more attractive relative to in-house production, and so some activities are outsourced to external suppliers and the average size of plants could decrease.[4] On the other hand, civic capital is positively related to entrepreneurship. Tabellini (2010) shows that the prevailing cultural traits in Southern Italy are such that they discourage individual initiative and effort, which is supposed to hinder the foundation of new firms.[5] Accordingly, de Blasio and Nuzzo (2010) and Percoco (2011) show that in the Italian context civic capital increases entrepreneurship, which could then decrease the average size of plants, provided that newly established firms are smaller.

All in all, the Census data we employ unambiguously reveal that the overall effect of civic capital on the average size of organizations is positive, despite the fact that the mechanisms just mentioned point to a possibile negative effect. This is one contribution of our paper.

Another contribution is that we identify a novel determinant that affects the size distribution of plants, beside local market size. Moreover, while papers like Syverson (2004) and Campbell and Hopenhayn (2005) limit their analysis to a narrow set of industries, our study establishes a regularity which holds for the whole spectrum of economic activity.

Next, whereas the literature on the determinants of firm size has stressed the role of formal institutions such as the quality of contract enforcement or the protection of property rights (Kumar et al., 1999; Laeven and Woodruff, 2007; Lu and Tao, 2009), our analysis implies that informal institutions matter directly in this respect.

Finally, the idea that informal institutions such as trust are important for the functioning of large organizations has been formulated by Fukuyama (1995). However, he does not corroborate his claim with some strong empirical evidence. La Porta et al. (1997) provide a cross-country analysis of the relative importance of large organizations and the level of trust. They analyze the sales of the top twenty largest firms relative to national GDP. Differently from them, our analysis focuses on the absolute size of the universe of plants in Italy. Bloom et al. (2009) are closer to our approach, since they show, in a cross-country analysis, that the average of firm size for manufacturing as a whole, measured at the regional level in terms of NUTS 2 spatial units, is larger in regions where trust is higher. Our paper substantially improves their analysis in terms of precision in at least two ways. First, we are able to assess how the size distribution within each single 4-digit Nace industry in the Italian Census changes according to the variation in the level of trust. Second, we do it at a very detailed spatial scale (provinces, which correspond to NUTS 3 spatial

[4] In a related study (Bürker and Minerva, 2010) we show that civic capital favors outsourcing of business services. Specifically, relative to overall sales, firms acquire more services on the market in areas where civic capital is high.

[5] Similarly, in his illustrative study on social and economic life in a small village in Southern Italy, Banfield (1958) has observed a mentality of the local population characterized by resignation and helplessness.

units).

The rest of the paper is organized as follows. In section 2.2, we provide a definition of civic capital and outline how it relates to opportunistic behavior and trust. In section 2.5, we present the data and describe the construction of the variables. Section 2.9 presents the baseline OLS analysis. Sections 2.13 and 2.16 provide robustness analysis and two-stages least square results, respectively. Finally, section 2.19 concludes.

2.2 Conceptual framework

2.3 The concept of civic capital

Guiso et al. (2010) define civic capital as "those persistent and shared beliefs and values that help a group overcome the free rider problem in the pursuit of socially valuable activities".[6] Two immediate and interrelated predictions of civic capital can be derived from this definition. First, civic capital is associated with a reduction in opportunism. This is an immediate implication from the definition, as free-riding in collective endeavors is a genuine form of opportunistic behavior. Second, areas with more civic capital are expected to have higher levels of trust. The literature has stressed that the decision to trust another group or person depends on both the belief in the trustworthiness of others and on individual preferences (Fehr, 2009; Sapienza et al., 2007). Opportunistic behavior, defined as "self-interest seeking which guile" includes "calculated efforts to mislead, distort, disguise, obfuscate, or otherwise confuse" (Williamson, 1985, p. 47). It is therefore reasonable to assume that in an area in which opportunistic behavior is widespread, individuals form adverse beliefs about the trustworthiness of others, resulting in a distrusting environment. Similarly, to the extent that civic capital is associated with widespread pro-social preferences, this should also lead to high trust (Fehr, 2009). Given the interrelatedness between civic capital and trust, in what follows we will use the two terms interchangeably.[7]

2.4 Civic capital, trust and the size of organizations

The reasoning above suggests that civic capital improves overall organizational efficiency of firms by facilitating cooperation and reducing the scope of agency problems and dilemmas of collective actions, which are centered around opportunism. Arrow (1968) has made this point plainly clear by stating that "one of the characteristics of a successful economic system is that the relations of trust and confidence between

[6] This deviation from strict self-interest can be explained by pro-social attitudes such as altruism (Andreoni and Miller, 2002), inequity aversion (Fehr and Schmidt, 1999), preferences for reciprocal fairness (Falk and Fischbacher, 2006) or more generally by strongly internalized values which constitute a moral obligation not to defect (Portes, 1998). An alternative mechanism stresses the social component of civic capital. Specifically, individuals cooperate in order not to be socially ostracized by their fellows (Portes, 1998).

[7] It is important to stress that in the agency literature trust is usually modelled as an endogenous outcome of firm strategies. The enhancement of trust can be obtained through motivational schemes (Casadesus-Masanell, 2004) or by facilitating social interactions outside the workplace during sport activities, holidays, etc. (Spagnolo, 1999). We abstain from all these aspects and consider trust as exogenously determined by civic capital. Empirical evidence corroborates the validity of this assumption. Employing data on a large Italian bank, Ichino and Maggi (2000) demonstrate that individual background is a chief determinant of cooperative behavior at the workplace. Along these lines, we assume that intra-plant cooperation is exclusively determined by the stock of civic capital in the province where the plant is located, as embodied by the workers.

principal and agent are sufficiently strong so that the agent will not cheat even though it may be 'rational economic behavior' to do so".[8]

In this section we outline three specific mechanisms of how civic capital improves cooperation in intra-firm relationships such that it increases establishment size. However, our analysis does not allow to make a qualitative assessment of their relative importance. Rather, the aim is to show that our empirical findings are well-grounded in the predictions of some theoretical models. First, we look at the decision of the principal to delegate decision rights to the agent. Next, we consider team production, while the third mechanism by which civic capital impacts on plant size relies on the fact that, as organizations get larger, cooperation in one-shot transactions becomes increasingly more important.

2.4.1 Trust and the delegation of authority

The first mechanism of how civic capital translates into larger establishment size works through the delegation of decision authority by CEOs to subordinate managers. In theoretical models of allocation of decision rights, trust makes the objective functions of the principal and the agent more similar. The rationale behind is that a reduction in opportunistic behavior implies that the agent is less likely to take actions which merely serve his private goals rather than the benefit of the organization as a whole. In Aghion and Tirole (1997) these congruence effects increase the agent's willingness to pay for authority relative to the principal which leads to more delegation. Alternatively, in Dessein (2002), higher similarity in objective functions reduces the incurred loss of control by the principal and improves communication. Under standard assumptions on the uncertainty of the environment, the decrease in the loss of control outweighs the communication effect which leads to more delegation. Delegation of tasks and decision rights, in turn, is crucial for the growth of the size of plants. Penrose (1959) stressed that CEOs face resource constraints in terms of time and cognitive abilities if they have a wide span of control. This acts as a stumbling block on establishment growth, as the CEO has to invest costly resources such as time and effort to manage and decide upon complex business operations. Delegation then reduces the overload of CEOs and frees resources necessary for expansion.[9]

2.4.2 Trust and shirking in team work

When individual contributions in team production are unobservable and the team members' remuneration is linked to overall team output, individuals have an incentive to free-ride on their colleagues (Alchian and Demsetz, 1972; Holmstrom, 1982). As suggested by its definition, civic capital plays an important role in reducing individual shirking in collective endeavors. Ichino and Maggi (2000) show in the Italian context that shirking, defined as absenteeism and misconduct, is higher in the low civic capital regions in the South.

Becker and Murphy (1992) illustrate how uncooperative behavior in team work reduces the size of plants. In their model firm output is the cooperative outcome of a team of workers. In order to produce a unit of final output, a given number of complementary tasks has to be performed. As both workers and tasks are assumed to be identical, each worker performs an equally large set of tasks. The working time of each member consists in acquiring task-specific skills and then performing the production tasks. As the

[8] See p. 538.

[9] Chandler (1962) provides historical evidence that the growth of several North-American corporations was spurred by the creation of separated divisions within firms and the corresponding delegation of decision authority to subordinates.

size of the team increases, each worker performs a smaller set of tasks which increases its proficiency in production (for example, due to learning by doing). On the other hand, as specialization increases, so does the probability that the production chain collapses as the demand for coordination increases in the number of workers. Optimal team size is then given by the trade-off between gains from specialization and coordination costs. In a framework like Becker and Murphy (1992), civic capital can be thought to reduce shirking and coordination costs, and to allow for larger teams.

2.4.3 Trust and cooperation in one-shot transactions

Relational contracts play an important role in governing intra-firm relationships (Baker et al., 2002). If employees interact frequently, the threat to terminate the relationship in the case of defection acts as an effective enforcement device. In particular, as long as the discounted gains from future trade outweigh short-run benefits from defection, agents have an incentive to stick to informal agreements. However, the frequency of interactions between two given employees depends on the size of the plant. In large establishments in which production is fragmented into numerous divisions, the probability that agents interfere with "strangers" is much larger than in smaller ones. Hence, the role of reputation and implicit contracts decreases because interactions are less likely to be repeated. Again, if transactions take place in trusting environments, cooperative outcomes can be sustained even if the game is not repeated (Fehr and Fischbacher, 2002).[10]

2.4.4 Testable implications

These considerations allow us to derive our main working hypotheses. First of all, the discussion above makes clear why we expect that, in areas where the stock of civic capital is high, plants should be larger. As to the standard deviation of average size, the way it may react to civic capital is very much in line with the way market size increases the standard deviation in the theoretical model of Melitz and Ottaviano (2008). If in areas where civic capital is high we have a larger average size of plants, this may also bring an increase in the standard deviation due to the direct magnifying effect on the size distribution. We will describe more concretely this issue in the discussion of the empirical results.

The second implication of our framework is that we expect some heterogeneity in the impact of civic capital on the plant size distribution across different industries. Specifically, we expect industries where there is an intense interaction among workers to be more reactive to the stock of local civic capital. The reason simply lies on the fact that the mechanisms of how civic capital affects relationships at the level of plants are firmly grounded in interpersonal contacts. Conversely, we expect plants where the production process is based on standardized routines and automation to be less sensitive to civic capital.[11]

[10] When explaining differences in the size of firms across countries, Fukuyama (1995) stresses this important property of trust.

[11] Automation is the use of control systems and information technologies to reduce the need for the intervention of human work in the production of goods and services.

2.5 Data and variables

In this section, we describe the different data sources used. We then discuss in detail the procedure that we follow to build the variables. First of all, let us describe the industrial and geographic scales we work with. Industries are classified according to the Statistical Classification of Economic Activities in the European Community (NACE), rev. 1. We work with a disaggregation at the 4-digit level, which classifies the entire spectrum of economic activity into 503 different industries. We keep in the sample only establishments which are owned by private entities, and we exclude establishments owned by non-profit organizations and public institutions.[12]

Concerning the geographic disaggregation, we work with the 103 Italian provinces existing in 2001.[13] We work with provinces, and not with smaller spatial units, because data on civic capital are not available at a smaller level of geography. However, working with provinces is particularly convenient provided that it allows us to have a sufficiently large number of observations for each 4-digit industry.[14]

2.6 Plant size distribution

The data on plant size come from the 8th Census of Industry and Services carried out by the Italian national statistic authority (Istat) in 2001, covering the universe of Italian establishments. In the Census, plants are classified into 12 different size bins, according to the size of the plant in terms of workers.[15] For each province and each industry, the data set then provides information on the total number of plants and the total number of workers in a given size bin.[16]

Let us now turn to the description of the dependent variables that we employ in the analysis. Following Kumar et al. (1999) and Laeven and Woodruff (2007), the first dependent variable that we define is the weighted average of plant size in 4-digit industry i and province j. In formal terms we compute average plant size (APS) as:

$$APS_{i,j} = \sum_{b=1}^{n} \left(\frac{N_{b,i,j}^{emp}}{N_{b,i,j}^{estab}} \right) \times \left(\frac{N_{b,i,j}^{emp}}{N_{i,j}^{emp}} \right), \tag{1}$$

where $N_{b,i,j}^{emp}$ is the total number of workers in bin b, industry i, and province j, $N_{b,i,j}^{estab}$ is the total number of plants in a given bin-province-industry, while $N_{i,j}^{emp}$ is the total number of workers in industry i and province j for all size bins. Hence, in this formula we weight the average size per bin, as given by the first fraction in equation (1), by the share of workers working in that bin over the total number of workers in the province-industry. The literature has emphasized that the rationale for this weighting scheme is to put more weight on those plants which carry out the bulk of economic activity in a given province-industry, and to weaken the impact on average plant size of a large number of small plants.

[12] This choice implies that are excluded from the analysis industries where plants are exclusively managed by non-profit or government institutions, like health, social services and public administration.

[13] Italian provinces correspond to the NUTS 3 partitioning.

[14] The average number of observations for each industry is 70, which amounts to say that, on average, a 4-digit industry can be found in 70 provinces out of a total of 103.

[15] The bin categories are the following: bin number 1 (0 workers), 2 (1 worker), 3 (2 workers), 4 (3-5 workers), 5 (6-9), 6 (10-19), 7 (20-49 workers), 8 (50-99), 9 (100-199), 10 (200-499), 11 (500-999), 12 (1000 and more).

[16] The information about plant size in the Istat Census is similar to the one provided in the County Business Patterns for the U.S. County Business Patterns data are used, for example, in Holmes and Stevens (2002).

In the robustness checks, we also consider a simplified version of (1), in which each size bin is weighted by the share of firms in that bin:

$$\overline{APS}_{i,j} = \sum_{b=1}^{n} \left(\frac{N_{b,i,j}^{emp}}{N_{b,i,j}^{estab}} \right) \times \left(\frac{N_{b,i,j}^{estab}}{N_{i,j}^{estab}} \right) = \frac{N_{i,j}^{emp}}{N_{i,j}^{estab}}. \tag{2}$$

This amounts to a simple division of the total number of workers by the total number of plants for each province-industry combination. We refer to $\overline{APS}_{i,j}$ as the simple average plant size. Moreover, we will also look at the effect of civic capital on total employment in the province-industry, $N_{i,j}^{emp}$, on the total number of establishments, $N_{i,j}^{estab}$, and on the number of establishments above or below the 20 employees size threshold.

The other feature of the size distribution of plants in a given province-industry that we want to characterize is the degree of dispersion around the mean. For this reason, we consider a set of regressions where the dependent variable is the standard deviation of weighted plant size in industry i and province j. It is defined as:

$$SDPS_{i,j} = \sqrt{\sum_{b=1}^{n} \left[\left(\frac{N_{b,i,j}^{emp}}{N_{b,i,j}^{estab}} \right) - APS_{i,j} \right]^2 \times \left(\frac{N_{b,i,j}^{emp}}{N_{i,j}^{emp}} \right)}. \tag{3}$$

This variable puts more weight in the computation of dispersion on the size bins that carry out the bulk of economic activity in a given province-industry. The counterpart of (2) which will be employed in the robustness section is:

$$\overline{SDPS}_{i,j} = \sqrt{\sum_{b=1}^{n} \left[\left(\frac{N_{b,i,j}^{emp}}{N_{b,i,j}^{estab}} \right) - \overline{APS}_{i,j} \right]^2 \times \left(\frac{N_{b,i,j}^{estab}}{N_{i,j}^{estab}} \right)}. \tag{4}$$

Finally, notice that in the baseline analysis a given industry in a given province is included in the final sample only if at least three plants are located there.[17]

In order to highlight the difference between the weighting schemes employed, Figure 1 provides a graphical representation of the empirical size distribution of plants. The two graphs show the size distribution for the Manufacture of Tools (Nace rev. 1 code 2862) in two provinces of Tuscany, Siena and Pistoia.

[Insert Figure 1 about here]

Size bins are plotted on the horizontal axis, with the value on top of the bars indicating average plant size in that bin; that is, $N_{b,i,j}^{emp}/N_{b,i,j}^{estab}$. On the vertical axis we measure the value of the weight given to the bins. For each bin, the two bars correspond to the two different weights. The dark gray bars provide the weights based on employees, as in equations (1) and (3). The light gray bars provide the weights based on the number of establishments, as in equations (2) and (4). By putting more weight on large plants, the employee-based weighting scheme increases both the average and standard deviation of plant size. For example, in Siena APS is 18.04, while $\overline{APS}$ is halved in magnitude, taking the value of 9.3. As for the standard deviation, $SDPS$ is 10.42, and $\overline{SDPS}$ is 9.02. The idea behind our paper is to assess whether, for provinces belonging to the same region (say, Tuscany) and the same 4-digit industry (say, Manufacture of Tools) we can establish if part of the change in the plant size distributions like those of Figure 1 can be attributed to the variation in the stock of civic capital at the provincial level.

[17] The rationale for this choice is to exclude observations where the dependent variable is computed from very few plants. In the robustness and sensitivity analysis we also include observations based on one or two plants only.

The maps displayed in Figure 2 and 3 show the geographic variation of APS and $SDPS$ across Italian provinces.

[Insert Figures 2, 3 about here]

Not surprisingly, APS is the highest in the metropolitan areas of Milan, Rome and Turin. Moreover, the map reveals that average plant size is generally larger in the Northern part of the country. This pattern is even more evident in the case of the dispersion in plant size, as shown in Figure 3. The three metropolitan areas just mentioned stand out, and the higher frequency of light-gray-colored provinces in the North reveals a substantial North-South difference in the dispersion of plant size. The only three light-gray-colored provinces in the South pertain to the metropolitan areas of Naples, Bari and Palermo.

2.7 Measurement of civic capital

We employ several proxies to measure the stock of civic capital in a given province. These are blood donations and the number of volunteers in non-profit organizations, both standardized by population, and electoral participation in referenda over the period between 1946 and 1987.[18] Although quite different, all three activities share common properties which make them suitable proxies for the stock of civic capital in a province. First, individuals who donate blood, participate in volunteering or vote incur a non-negligible cost. These costs often exceed the mere opportunity cost of time devoted to each of these activities.[19] Second, and most important, none of these activities provide financial or legal incentives, so individuals do not obtain any economic pay-off. Rather, individuals who donate blood, engage in volunteering, or vote in referenda express a concern for some common good, triggered either by social preferences or by social pressure.[20] As outlined in section 2.2, the diffusion of these traits among the local population accounts for the stock of civic capital in a province.

Figures 4, 5, 6 show the geographic distribution of blood donation, volunteering and electoral turnout, respectively. All three maps reveal that civic capital is higher in the Central and Northern part of the country.

[Insert Figures 4, 5, 6 about here]

Table 1 provides evidence that there exists a pronounced positive correlation between each of the three proxies. The relationships are roughly equally strong in magnitude but nevertheless far from being perfect. Despite broad common patterns, the maps reveal some differences. This indicates that none of the three proxies can be taken as a precise measure of the stock of local civic capital. Rather, each variable is blurred by idiosyncratic factors which induce a certain geographic participation pattern, although they are orthogonal to the prevalence of civic capital.[21]

[18] In Appendix 2.21 we provide a detailed description of the variables and their sources.

[19] For example, donating blood imposes a substantial physical limitation in the short-run, voting requires information gathering and personal evaluation of alternatives.

[20] See Putnam (1993) p. 93 for reasons why turnout referenda is more suitable than participation in "normal" political elections. For a general motivation of the choice of electoral turnout to proxy civic capital see again Putnam (1993).

[21] For example, let us think to the 1987 referenda, dealing with some laws regulating the installation of nuclear plants in Italy, which assumed in the political debate the status of a vote against the use of nuclear energy. It is well known that the

[Insert Table 1 about here]

In order to remove the noise, we look at the common component of the three proxies. The last row in Table 1 shows the correlation of the three proxies with their first principal component.[22] The fact that the correlation with each of the individual trust variables is strong, with only slight differences in magnitude, suggests that all three proxies have a pronounced common dimension. Put differently, the first principal component identifies the behavioral attitude of the local population that simultaneously underlies the choice of whether to donate blood, participate on a voluntary basis in non-profit organizations, or vote in referenda; that is, it identifies the values and beliefs that account for the stock of civic capital.[23]

Figure 7 shows the geographic distribution across Italian provinces of the measure of civic capital based on the first principal component. As before, we find that civic capital is the highest in regions in the Center-North, like Emilia-Romagna, and the lowest in the Southern mainland and Sicily. However, it is important to stress that our identification strategy relies on the variation of civic capital at the provincial level within Italian regions, because we will introduce in the empirical analysis dummy variables at the regional level. Figure 8 illustrates this variation within regions. Specifically, the map shows the residuals from a regression of the principal component of civic capital on a set of regional dummies. The fact that provinces with very high and very low residuals, as evidenced by white and black-colored areas, are dispersed all over the country indicates that the variation of civic capital that we exploit is equally pronounced in all parts of Italy.

[Insert Figures 7, 8 about here]

In the analysis we also use historical variables of civic capital as instruments. The first historical measure is the number of mutual aid societies in 1873, standardized by population. These predominantly urban associations served craftsmen and artisans as a form of insurance against economic and social calamities. The second measure is average electoral turnout in elections during the period 1919-1921. Both variables are available at the regional level.[24] The last historical instrument is related to the type of early political institutions that were prevalent in the territory of a given province in 1300. More specifically, we employ the number of cities in each province that were free city-states in the year 1300. This variable is based on data from Guiso et al. (2008a).[25] In section 2.16 we justify the choice of these variables as instruments for current civic capital.

local population is strongly against the presence of nuclear plants in his own territory (this is sometimes referred to as the 'nimby' syndrome). Then, participation rates in 1987 referenda across Italian provinces could be driven by the presence of nuclear plants in the territory, in addition to the stock of civic capital.

[22] In Appendix 2.22 we briefly review how to derive the first principal component.

[23] Another example where the first principal component is used to summarize common cultural traits at the regional level is Tabellini (2010).

[24] For a detailed description consult the Appendix 2.21 and Putnam (1993).

[25] The authors, in order to reduce the cost of collecting historical data at the town level, analyze the history of only the 400 biggest cities in terms of 1871 population in the area that was under the Holy Roman Empire at the beginning of the second Millennium (basically, the Center-North of Italy). For this reason, in the analysis with this set of instruments we are forced to drop observations from the South Italy and from the Islands (Sicily and Sardinia).

2.8 Other explanatory variables

The size distribution of establishments may be affected by a wide range of factors. For this reason, we control for as many determinants as possible.[26] The first control variable that we consider is the size of the local market. Melitz and Ottaviano (2008) show in a monopolistically competitive model with firm heterogeneity that average firm size (both in terms of output and sales) is larger in bigger markets. This theoretical result is in accordance with the empirical findings for the U.S. (Syverson, 2004; Campbell and Hopenhayn, 2005). In addition, Melitz and Ottaviano (2008) show that the dispersion of the plant size distribution should increase with market size. We use two variables for the dimension of the local market. The first is given by the provincial population, weighted by the relevance of final demand for that particular industry, as derived from the Italian Input-Output Use tables.[27] The second measure is provincial gross domestic product.

The degree of urbanization could be correlated with the plant size distribution: even after controlling for the intensity of final demand, plant size could still be the outcome of the overall degree of urbanization.[28] Correlation between the plant size distribution and urbanization could also go through the different geographic characteristics of the provinces, even within the same region. This translates into nature-given starting or stumbling blocks for economic activity, and might confound our results. Urbanization in 1861 is supposed to capture such time-constant provincial characteristics.[29]

Another possible determinant of the size distribution is the local stock of human capital. We see human capital as an outcome of education. For this reason our regressions control for the share of university graduates in the population of a given province.

Next, we take the efficiency of the legal system into account, understood as the quality of contract enforcement. Working on Mexican regions, Laeven and Woodruff (2007) show that firm size is increasing with the quality of the legal system. We proxy the quality of the legal system computing the average number of days it took to complete first-degree trials in labor-related affairs which ended in 2001, in each of the 165 Italian labor courts.

Apart from the direct link through contract enforcement, formal institutions influence the size of economic organizations through the development of financial markets (Beck and Levine, 2003; La Porta et al., 1997): well-functioning financial markets allow firms to grow and to increase in terms of size.[30] As in Benfratello et al. (2008) we use the number of bank branches per province, normalized by population, as a proxy for the degree of financial development.

Finally, we investigate whether the impact of civic capital on the plant size distribution is heterogeneous across industries. To this end, we characterize the production process of each industry according to the intensity in human interactions. To quantify this dimension we have picked up the capital-labor ratio at the

[26] A detailed description of the data and the corresponding sources is provided in Appendix 2.21

[27] See Appendix 2.21 for further details.

[28] A classical reference linking plant growth and urbanization is Jacobs (1969).

[29] It will be explained below that picking historical urbanization is also particularly convenient for the first stage of our instrumental variables approach, where we regress civic capital on historical instruments and other regressors.

[30] However Rajan and Zingales (1998) point out that developed financial markets not only allow firms to grow faster, but also increase the birth rate of new firms, which are generally quite small. Hence, the overall effect of financial development on firm size is a priori ambiguous.

four-digit industry level. We believe that this is a good proxy to measure the sensitivity of a given industry to human relations, or, symmetrically, the extent to which it depends on standardized routines and process automation.

In Table 2 we provide the full set of descriptive statistics for our data.

[Insert Table 2 about here]

2.9 The effect of civic capital: OLS results

2.10 Average plant size

We begin the regression analysis with the ordinary least squares estimation of the relationship between average plant size and civic capital. The equation that we estimate is the following:

$$\ln APS_{i,j} = \alpha_0 + \alpha_1 \ln CC_j + \ln X_j' \overline{\alpha}_2 + \gamma_r + \gamma_i + \epsilon_{i,j} \tag{5}$$

where $\ln APS_{i,j}$ is the logarithm of employment-weighted average plant size in province j and industry i, $\ln CC_j$ is the log of the measure of civic capital in province j, $\ln X_j$ is the log of a vector of provincial controls, γ_r denotes the region's dummy, γ_i is a 4-digit unobserved industry effect, and $\epsilon_{i,j}$ is the error term.[31] We apply to equation (5) a fixed effect analysis, in the sense that we interpret our data set as a panel, where observations pertaining to a given industry i are collected repeatedly over different provinces. During the statistical inference process, we take into account the potential correlation among the regression error terms using standard errors that are clustered both at the provincial level and at the industry level.[32]

Results confirm our hypothesis that the level of civic capital is positively correlated with average plant size. In columns from (1) to (4) of Table 3 we regress average plant size on four different civic capital variables: blood donations, volunteers, electoral turnout in referenda, and the first principal component of all these three measures. Except for the case of the referenda turnout, the results are always statistically significant. The coefficient is most precisely estimated when the principal component is used. This is what we expected, given that the motivation to extract the first principal component is getting an accurate measure of civic capital out of the three proxy variables. In addition to the region dummy variables, the only control that is added at the provincial level in these estimates is the strength of final demand. Also final demand turns out to affect positively average plant size. The latter result is in accordance with theoretical models such as Melitz and Ottaviano (2008) and empirical analyses such as Syverson (2004), Campbell and Hopenhayn (2005) and Laeven and Woodruff (2007).

[31] When we measure civic capital by the principal component our equation is the following:

$$\ln APS_{i,j} = \alpha_0 + \alpha_1 PC_j + \ln X_j' \overline{\alpha}_2 + \gamma_r + \gamma_i + \epsilon_{i,j}.$$

Here PC_j is the principal component of the log of the three proxy variables, rather than the log of some variable.

[32] The two-way clustering procedure that we adopt tackles two issues. On the one side, the correlation between error terms within provinces could be the result of disturbances at the local level, which could descend, for instance, from unobservable provincial characteristics. On the other side, the correlation in the error terms within industries could still survive the inclusion of the fixed effects γ_i. Think, for example, to some random event that led some big plants in an industry to locate in some province. This could induce correlation in the error terms for observations in that particular industry. On inference with clustered data see Cameron and Miller (2010).

In columns from (5) to (8) of Table 3 we include additional determinants of plant size at the provincial level. In order to claim that civic capital increases plant size by increasing trust and cooperation at the plant level, we have to exclude that results are driven by certain characteristics of the environment in which a plant operates that are correlated with both civic capital and the plant size distribution. These confounding factors are dealt with by including appropriate provincial controls, described in section 2.8.

Turning to the results, they show little sensitivity to the inclusion of controls. This is partially reassuring, though of course it does not completely solve the issue of unobserved heterogeneity. With the exception of referenda turnover, both the number of blood donations and that of volunteers are still statistically significant at the 5% level. The same is true for the first principal component, which is statistically significant at the 1% level. It should be kept in mind that the coefficient α_1 is actually an elasticity, because both the dependent variable and the regressors are logarithms. Then, in the case of blood donations, an estimated elasticity equal to 0.07 means that a 10% increase in the number of blood donations at the provincial level is associated to a 0.7% increase in weighted average size of plants at the level of 4-digit industries. The value is very similar in the case of volunteers. It is only in the case of the referenda turnover that the coefficient is no longer significant. This fact can be taken as evidence that, once the regional effects are washed out by the dummy variables, γ_r, there is not enough variability left in provincial turnout to allow a coefficient estimate which is statistically different from zero.[33] The following example gives an idea of the economic magnitude of the effect of civic capital when the measure is the first principal component. Milan is a high civic capital province (it ranks 21st in Italy), while Naples is the province with the lowest civic capital in Italy. The estimated coefficient equal to 0.05 implies that average plant size would be 25% larger if Naples had the stock of civic capital of Milan.[34] This is a sizeable impact given that the observed difference is such that plants are, on average, 47% larger in Milan.

Among the provincial controls, a coefficient being different from zero in a statistically significant way is the number of bank branches. The fact that we get a negative sign can be explained by a certain prevalence of younger and, for this reason, smaller plants were financial development is higher.[35] In our estimates the role of civic capital seems to outweigh that of formal institutions, since the quality of contract enforcement, expressed by the length of trials, is no longer statistically different from zero.

[33]When the proxy of civic capital is the first principal component of the above mentioned three variables, it is less straightforward to provide an interpretation in terms of elasticity of the coefficient of civic capital. As we outline in Appendix 2.22, the extraction of the principal component is a statistical procedure whose output, starting from the log of our three proxies, is a variable which has no observable counterpart. However, we think that this procedure is particular appropriate in a framework as ours where we want to identify in the most accurate way the common behavioral attitude of the local population toward trusting others, and in view of this a certain artificiality of the measure can be tolerated.

[34]The principal component for Naples is -3.347, while for Milan it is +1.236. The contribution from the difference in civic capital to the difference of average plant size in log terms for the two locations ($\ln APS_{i,Milan} - \ln APS_{i,Naples}$) is then equal to 0.229, which corresponds to a difference of 25% in terms of average size measured in levels.

[35]However, this control variable could be endogenous in equation (5). Guiso et al. (2004) stress the importance of civic capital for the development of financial markets in the Italian context.

2.11 Standard deviation of plant size

Our empirical analysis proceeds with the estimation of the link between the standard deviation of plant size and civic capital. The equation that we estimate is now the following:

$$\ln SDPS_{i,j} = \alpha_0 + \alpha_1 \ln CC_j + \ln X_j' \overline{\alpha}_2 + \gamma_r + \gamma_i + \epsilon_{i,j} \tag{6}$$

where $\ln SDPS_{i,j}$ is the logarithm of the standard deviation of plant size in industry i and province j, computed according to equation (3). As before, we perform a fixed effect analysis where the panel dimension is in terms of 4-digit industries.

The results provided in Table 4, in the columns from (1) to (4), are obtained with just one provincial control (final demand). In columns from (5) to (8) we add the full set of controls. The following results stand out. As before, all proxies of civic capital are statistically significant, with the exception of electoral turnout in referenda. Moreover, there is little sensitivity of the estimates with respect to the inclusion of the full set of provincial controls. The elasticity of the standard deviation with respect to civic capital is 0.08 for blood donations and for volunteers.

The results suggest that the impact of civic capital, although smaller in magnitude, is qualitatively similar to that of market demand: it increases both the first and the second moment of the distribution of plant size. As to the other controls, financial development, measured by the number of bank branches, is associated to a less dispersed distribution in terms of size (probably due to a larger number of small plants in the province-industry, something which makes the distribution more even).

2.12 A graphical discussion of the results

In order to discuss our results, we go back to Figure 1, where the distribution for NACE 2862 in Siena and Pistoia is plotted. We want to provide a stylized graphical interpretation of how civic capital shifts the distribution of plant size. The two provinces are roughly equal in terms of overall size (measured by total GDP) and belong to the same region (Tuscany). However, they differ markedly in the endowment of civic capital. While Pistoia's endowment ranks 42nd in Italy in terms of the first principal component, Siena has the 3rd highest endowment. The figure highlights that civic capital increases the number of plants at the top end of the distribution: comparing the height of the dark gray bar in size bin number 6 reveals that relatively large plants are more frequent in Siena than in Pistoia. Moreover, Siena hosts establishments which have no size counterpart in Pistoia (there is no plant in size bin number 7 in Pistoia). We do not find such a pattern in the left tail: in size bins number 2, 3, and 4 (where the total number of employees is small, ranging from 1 to 5), the distribution is actually fatter in Pistoia than in Siena.[36]

The mechanism we have in mind to explain why civic capital increases both average plant size and the standard deviation of plant size is coherent with this stylized example. Our argument hinges upon a larger mass of big plants being active in the local areas with high civic capital. This happens because of the different channels outlined in the conceptual framework, and gives rise to a magnification of the local plant size distribution which ultimately increases also the standard deviation of size. In the following section we provide further evidence on this.

[36] Qualitatively, we get the same results looking at the light gray bars, where the weights are given by the number of plants that each size bin contains.

2.13 Extensions and robustness of the analysis

2.14 Heterogeneity across industries, and small vs. large plants

In Table 5, we show that the role of civic capital for the first and second moment of the plant size distribution is not homogeneous across industries. In section 2.2 we have stressed the importance of civic capital for team production and cooperative behavior in one-shot interactions. Consequently, we expect civic capital to be more important in industries where the production process is more intensive in human interactions. To test this, we have added an interaction term to our baseline specification where the first principal component of civic capital is interacted with the capital-labor ratio measured at the 4-digit industry level.[37] Accordingly, the equation for APS becomes

$$\ln APS_{i,j} = \alpha_0 + \alpha_1 PC_j + \alpha_2 PC_j \times \ln KL_i + \ln X_j' \overline{\alpha}_3 + \gamma_r + \gamma_i + \epsilon_{i,j} \tag{7}$$

where PC_j is the value of the principal component in province j, and KL_i is the capital-labor ratio of industry i. The corresponding results are shown in columns (1) and (4) of Table 5. The negative estimate for the coefficient α_2 of the interaction between the capital-labor ratio and the measurement of civic capital is in line with our reasoning: the magnitude of the impact of civic capital on the plant size distribution decreases as the industry's capital-labor ratio goes up. The explanation is that problems of coordination and shirking behavior, which civic capital alleviates, are more important for output production in sectors with a low degree of automation and a high intensity of human interactions.

In order to get a more precise picture of the heterogeneous effect of civic capital across industries we evaluate the marginal effects for different values of the capital-labor ratio. The industry with the median value of capital-labor intensity is Manufacture of ceramic tiles and flags ($\ln KL_i = 4.034$). The estimate of the marginal effect of civic capital on APS in this specific industry is positive and equal to 0.052.[38] Performing an F-test on the linear restriction $(\alpha_1 + \alpha_2 \times 4.034) = 0$ reveals that this effect is statistically different from zero at the 1% level. Repeating this exercise, we find that the marginal effect of civic capital is no longer different from zero at the 5% level only in the case of the top 15% industries in terms of the capital-labor ratio. Hence, this exercise shows that civic capital seems to have no impact for the size of plants only in industries which are very intensive in the use of capital.

Another simple partition of 4-digit industries can be obtained by grouping them in two different sets of industries, namely manufacturing (Nace section D) and services (Nace sections from E onward). We then ask whether manufacturing is any different from services. Results are again displayed in Table 5, in columns (2), (3), (5) and (6). For both manufacturing and services, civic capital increases average plant size and the standard deviation. The effect seems to be slightly more pronounced for manufacturing. It is interesting to observe that the coefficients of the control variables such as historical urbanization, university graduates and bank branches display substantial differences in both sign and significance among the two sectors.[39]

[37] See Appendix 2.21 for a description of the way the capital-labor ratio is obtained.

[38] To obtain the estimate of the impact of civic capital in a specific industry one simply needs the value for $\ln KL_i$, and the estimates for α_1 and α_2. The value is then equal $(\alpha_1 + \alpha_2 \times \ln KL_i)$.

[39] Urbanization in 1861 and university graduates have a statistically significant positive coefficient in the regression for services. This makes sense from an economic point of view, as long as larger plants in the service sector are located in more urbanized areas, and service provision is comparatively more intensive in skilled workers, so that larger service providers can

However, we can conclude that the positive effect of civic capital on both APS and SDPS is not driven by a particular sector, be it manufacturing or services.

We then perform another exercise, testing, in two separate regressions, the impact of civic capital on the log of total employment in a province-industry, and on the log of the total number of establishments. The corresponding results, displayed in columns (7) and (8) of Table 5, provide evidence that there is a positive effect on total employment, while the effect on the number of establishments is not statistically different from zero. Taking the last regression as a starting point, we then ask whether there is some difference between small and large plants. Our conceptual framework suggests that the cooperation-enhancing effect of civic capital (working through a facilitation in the delegation of authority, a reduction in shirking, and a higher propensity to cooperate in one-shot transactions) should be more important for the functioning of large plants. On the contrary, in small establishments, cooperation can be sustained by other mechanisms such as direct monitoring or kinship bonds. Moreover, in small plants interactions between workers become more frequent, so that relational contracts are an efficient enforcement device. Therefore, we expect that especially the number of large plants should be raised by civic capital. In order to address this question, we count for each province-industry the number of plants with less than twenty employees (small plants), and those with at least twenty employees (large plants).[40] The results are presented in columns (9) and (10) of Table 5, and point to a positive effect of civic capital which is statistically different from zero in the case of large plants only. The point estimate is larger when the dependent variable is the number of big plants.[41] This is in line with our conceptual framework.

2.15 Further robustness and sensitivity checks

Other robustness checks that we have performed are provided in Table 6. The first five columns present the result for APS, while the last five present the result for SDPS. In columns (1) and (6) the dependent variable is the average plant size of equation (2), and the standard deviation of equation (4), respectively. Although somewhat reduced in magnitude, the effect of civic capital is still positive and significant. We can conclude that our results are not driven by the choice of the weighting scheme in the construction of the dependent variables.

In columns (2) and (7) we check whether results are affected by the number of variables we employ in the computation of the first principal component. Specifically, one may wonder whether excluding referenda turnout (whose coefficient is not statistically significant when we employ it as a measure of civic capital) from the computation of the first principal component affects the results. We prove that this is not the case. Again, the estimated coefficients are just slightly smaller in magnitude than in the baseline regressions.

be expected to locate where many college graduates live. The number of bank branches is negatively related to APS and SDPS only in manufacturing.

[40] The choice of this threshold is arbitrary. We have tried with other size thresholds such as 50 employees and the results do not change.

[41] Since the number of plants above or below a certain size threshold in a province-industry is a count variable, this analysis is suitable for a Poisson regression. In this case, the routine in Stata allows only for one-way clustering in the standard errors (in terms of 4-digit industries). This notwithstanding, the results are qualitatively close to the one presented in the table, and point to an impact of civic capital which is larger in magnitude in the case of large plants, with the coefficient still being statistically different from zero at the 1% level.

In columns (3) and (8) we add yet another provincial control, namely GDP in 2001. The inclusion of GDP reduces the statistical significance of the other controls such as final demand. However, the estimates related to the impact of civic capital are affected in a negligible manner.

In columns (4) and (9) we consider the full set of available observations. We mentioned previously that we exclude from the baseline regressions those observations where the dependent variable is based just on one or two plants. In these columns we check whether adding these observations to the sample changes the results in some manner. The actual change is tiny.

Finally, in columns (5) and (10) we run regressions after excluding the provinces of Rome, Milan and Turin. As we show in Figures 2 and 3, these are the provinces with the highest average size and the highest standard deviation of size. Therefore, it could be that our results are driven by them. Our estimates prove that their exclusion from the sample bears no particular change to our results.

2.16 The effect of civic capital: evidence from 2SLS estimation

2.17 Motivation and identifying assumptions

Apart from problems of measurement error in our main explanatory variable that we have addressed computing the first principal component of three different proxies of civic capital, there are other reasons which might prevent us from interpreting results in Tables 3 and 4 as causal. Consider the case of reverse causation. If a large plant locates in a province average plant size increases, and, arguably, the local population is economically better off. As a consequence of this improvement in material well-being, individuals develop civic virtues, i.e. they donate blood, vote in referenda and engage as volunteers. Moreover, although we control for a range of confounding factors, we cannot completely exclude that other omitted variables bias our estimates.

In order to prove that our results are neither driven by omitted variables nor by reversed causality, we provide evidence from two-stage least square estimates. The first set of instruments are lagged proxy variables of civic capital, namely members of mutual aid societies in 1873, and electoral turnout around the 1920s, similarly to Buonanno et al. (2009) and de Blasio and Nuzzo (2010). The second set of instruments goes even further back in time. It relies on Putnam (1993), who argues that the huge differences in the endowment of civic capital across Italian regions can be traced back to different political regimes prevailing at the beginning of the second millennium. In particular, he stresses the role of free-city states that emerged in the Center-North of the Italian peninsula. Testing Putnam (1993)'s theory, Guiso et al. (2008a) shows that the free-city state experience has a causal effect on the accumulation of civic capital.

We have good reasons to believe that these historical measures are highly correlated with the current stock of civic capital. The literature has stressed the persistence of civic capital over long periods of time, highlighting the crucial role of intergenerational transmission of values and beliefs from parents to their offspring (Tabellini, 2008; Guiso et al., 2008b). Hence, the stock of today's civic capital in a certain local area can be explained to a large extent by historical values of civic capital in that area. The high persistence of civic capital over time translates, as we show below, into a strong first stage relationship.

The other requirement for the validity of our instruments is that they must be uncorrelated with the error term $\epsilon_{i,j}$ in equations (5) and (6) for APS and $SDPS$. This amounts to saying that, conditional on the other

regressors, the historical instrumental variables have had no direct effect on the first and second moment of the plant size distribution. This could be a somewhat strong assumption, as our historical instruments might have affected current economic development and hence current plant size through channels other than the current stock of civic capital. In order to address this threat, we include the log of provincial GDP as an additional regressor in all 2SLS specifications. The rationale is that this variable captures all the possible effects of the historical instrumental variables on the plant size distribution that work through economic development. This makes us more confident that the exclusion restriction is not violated.

2.18 Results

2.18.1 Civic capital in the 19th and early 20th century

The first set of instruments dates back to the middle of the 19th and early 20th century. The 19th century experienced a unusual movement in popular sociability, not only in Italy but in whole Western Europe. As a response to the new economic and social calamities brought about by the process of industrialization, traditional associations like guilds and religious societies were replaced by more civic, charitable and educational organizations. One prominent manifestation of this new collectivism was the creation of mutual aid societies. Their members enjoyed benefits such as medical care, insurance against work accidents and basic instruction. Importantly, the functioning of mutual aid societies relied solely on the principle of reciprocity: absent any kind of formal enforcement and coordination, their members joined individual forces for mutual benefit. Putnam (1993) describes them as "a locally organized, underfunded, self-help version of what the twentieth century would call the welfare state". Therefore, the membership rate in mutual aid societies in an area is a good proxy for the stock of local civic capital. The year to which this information refers to is 1873.

The second measure of civic capital is electoral turnout in the 1920s. Specifically, we average turnout over four political elections: national elections from 1919 and 1921 and provincial and communal elections from 1920. The choice of these elections is dictated by the fact that they were the only elections with universal suffrage before the advent of fascism.

Using lagged proxy variables of civic capital we again have to exclude reverse causation. In other words, the pattern of civic capital in the past should not be the outcome of economic well-being at that time. We address this issue by analyzing the relationship between urbanization rate in 1861, which relates to economic development at that time, and the two instruments.[42] The correlation coefficient between past urbanization and members of mutual aid societies is -0.05. This implies that for the year 1873 we have, if anything, a *negative* relationship between civic capital and material well-being. Consequently, we are confident that this measure of civic capital is exogenous from the point of view of our analysis. As for turnout in the 1920s, the correlation coefficient is -0.24.[43] We also run a robustness check in which we instrument civic capital

[42]It is Tabellini (2010) who argues that past urbanization is a good proxy for past economic development. In any case, we signal that some caution has to be paid when dealing with historical urbanization in the context of Southern Italy. As explained by Malanima (2005), in 1861 many big cities in Southern Italy were actually *agrotowns*, since a large share of inhabitants was employed in agriculture, and not in manufacturing or services.

[43]However, this negative relationship is less reliable for our purposes, as we are comparing urbanization rate in 1861 with the measure of civic capital 60 years later.

only by the membership rate in mutual aid societies in 1873.

Our potentially endogenous variable (the current level of civic capital, as given by the principal component) is expressed in the following way in the first stage regression:

$$PC_j = \omega_0 + \omega_1 \ln CC_r^{Aid} + \omega_2 \ln CC_r^{Turn} + \ln X_j' \overline{\omega}_3 + \gamma_{mr} + \epsilon_j, \tag{8}$$

where $\ln CC_r^{Aid}$ is the stock of civic capital in region r proxied by the log of the membership in mutual aid societies in 1873 (normalized by population), while $\ln CC_r^{Turn}$ is the log of average regional turnout of elections in the 1920s. These two terms are meant to capture the persistent component of civic capital. Since these measures are only available at the regional level we cannot include regional dummy variables. Instead, we replace them with macro-region dummies, γ_{mr}.[44] The vector $\ln X_j'$ contains all provincial covariates, including provincial GDP.

The bottom part of Table 7 (Panel B) contains the results from the first stage. Column (2) refers to APS, while (6) refers to SDPS. The coefficient estimates of both instruments have the expected positive sign and are statistically different from zero. Moreover, the instruments explain a very large share of the variation in current civic capital, as evidenced by the high first-stage R^2. Given the high persistence of civic capital across time, this comes as no surprise. As for the other covariates, it is important to stress the role of urbanization in 1861 in equation (8). As mentioned by Putnam (1993), mutual aid societies predominantly served craftsmen and artisans in cities as a form of insurance against economic and social calamities. As such, they were mostly an urban phenomenon. Hence, including historical urbanization in 1861 among the regressors improves the reliability of the instruments as it controls for the degree of urbanization at that period, something which might confound the results.[45]

Results from the second stage are depicted in Panel A of Table 7. In order to provide comparable OLS results, we have re-estimated equation (5) with macro-region instead of region dummies. The corresponding results are shown in columns (1) and (5). As for the 2SLS estimates, they are qualitatively similar to the OLS results. The coefficient of civic capital is positive and statistically different from zero at the 1% level. For both APS and SDPS the 2SLS estimates for civic capital are larger than their OLS counterparts. Given our concerns of reversed causality and omitted variables, this is not necessarily what we expected. Actually, if results in Tables 3 and 4 were driven by reversed causality, then the 2SLS coefficients should have been lower than the OLS coefficients from columns (1) and (5). Two possible reasons might explain the increase of 2SLS estimates with respect to the OLS ones. First, despite the computation of the principal component, civic capital could still be measured with error. The 2SLS helps removing the attenuation bias. Second, the increase in the estimates may be a sign of violation of the exclusion restriction. Given that we have more than one instrument we can perform a test of overidentification to assess this issue. The p-value of the test statistic is reported at the bottom of Panel A. It is sufficiently high in order to reject the alternative hypothesis, according to which at least one of the two instruments is not exogenous. Hence, the data support the assumption that the exclusion restriction is not violated.[46]

[44] The macro-regions are five: North-West, North-East, Center, South, Islands.

[45] Actually, we get a negative relationship between historical urbanization and the current level of civic capital in the first stage. This mirrors the negative correlations that we have shown above between historical urbanization and past civic capital.

[46] The test statistics have to be interpreted with caution, though. While testing the exogeneity of, say, the number of mutual aid societies in 1873, the overidentification test explicitly *assumes* that the other instrument, turnout in the 1920s, is truly

In columns (3) and (7) we consider an alternative specification where the membership rate in mutual aid societies is the only instrument for our two-stages approach. The first stage relationship remains strong. As for the second stage result, there is hardly any change with respect to columns (2) and (6).

2.18.2 Free-city state experiences during the Middle Age

The second strategy to instrument the current level of civic capital relies on the number of free-city states experiences that were present in the territory of each province in 1300. Putnam (1993) argues that the huge differences in the endowment of civic capital across Italian regions are due to the emergence of free-city states in the Center-North of the country in the Middle Age. Lacking any centralized form of government, their citizens had to collaborate to provide solutions to problems of common interest, first and foremost to defend their cities against foreign invaders. As a consequence, individuals developed a sense of cooperation and concern for common issues resulting in a high stock of civic capital.

We exploit information on free-city states in 1300 provided by Guiso et al. (2008a). More specifically, for each province, we count the number of cities that were a communal republic in the year 1300, which gives a minimum of zero and a maximum of three free-city states per province.[47] Figure 9 shows the number of free-city states per province across Italy. The information is only available for the Center-North, so we exclude the South and the Islands from this exercise.

In the first stage regression we plug three different dummy variables capturing the number of free-city states (be it 1, 2 or 3). We exclude from the regression the dummy variable for the case when there are no free-city states, which becomes our reference group. The specification in the first stage is the following:

$$PC_j = \omega_0 + \omega_1 City_j^1 + \omega_2 City_j^2 + \omega_3 City_j^3 + \ln X_j' \overline{\omega}_4 + \gamma_{mr} + \epsilon_j \tag{9}$$

where $City_j^1$, $City_j^2$, and $City_j^3$ are the dummy variables for 1, 2, or 3 free-city states in the province, respectively. The macro-region dummies and provincial covariates are also included. Columns (4) and (8) in Panel B show that also these instruments are good predictors for the current level of civic capital. As expected, ceteris paribus, provinces with one free-city state in 1300 display a higher level of civic capital than provinces with no free-city states. The impact of having two free-city states in 1300 is even larger. Performing an F-test reveals that the instruments are jointly significant (see the bottom part of Panel B). Compared to the columns (2) and (6) the first-stage R^2 is somewhat reduced.

The second stage results in Panel A show a positive and statistically significant effect of civic capital on both average plant size and the standard deviation of size. Quantitatively, the estimates of civic capital are very close to the OLS results.[48] The p-values of the overidentification tests do not reveal any violation of the exclusion restriction, neither for average size nor for the standard deviation of size.

exogenous. Therefore, the test cannot detect whether both instruments are invalid.

[47] Obviously, one needs to control for the size of the province since the number of free-city states could be a function of the dimension of the province. This is achieved through the inclusion in the first stage of variables such as GDP, final demand, urbanization in 1861. Notice that there are just three provinces with 3 free-city states (Alessandria, Cuneo and Turin) and they are all located in Piedmont.

[48] When we drop the South and the Islands from the sample and re-run the regression specifications of columns (1) and (5) of Table 7, we get a point estimate of 0.081 for APS and 0.105 for $SDPS$. Both estimates are statistically different from zero at the 1% level. The comprehensive results are available upon request.

2.19 Conclusion

Employing census data on establishments in Italy, we have shown how trust, captured by the geography of civic capital, shapes the size distribution of plants. More specifically, our results reveal that trust increases the average and the dispersion of the size distribution in 4-digit industries across provinces. The effect of civic capital holds for both manufacturing and services, and is more important for industries relying more heavily on labor as an input. Our econometric specifications address several potential threats. First, a set of appropriate controls excludes that our results are driven by other determinants of plant size such as market demand, financial development, human capital, judicial inefficiency and past urbanization. Moreover, fixed effects at a highly disaggregated industry and spatial level are included. Third, we explicitly address the sources of endogeneity of trust. On the one hand, extracting the first principal component of three well-established measures of trust minimizes the problem of measurement error. On the other hand, the variation of civic capital in the middle of the 19th and the beginning of the 20th century, and free-city state experiences in 1300 serve as instruments for current trust. We get the conclusion that it is unlikely that our results are driven by reversed causality or omitted variables bias.

Recently, Algan and Cahuc (2010) and Tabellini (2010) have established a causal effect of trust on aggregate economic outcomes, such as per-capita GDP and growth rates. While these studies provide important new insights, they do not suggest specific channels of how trust enhances the growth potential of economies. Our study hints that one mechanism of how trust translates into growth might be that it allows plants to grow large. Indeed, Rajan and Zingales (1998) show that two thirds of industry growth can be attributed to the growth in existing establishments rather than to the formation of new ones.

We think that more evidence is needed on the relation between trust and the growth of organizations. Based on a cross-section, our analysis does not allow to derive dynamic patterns. Moreover, observing shifts over time could uncover the impact of trust with respect to firm entry and exit. Another interesting extension consists in identifying how trust precisely affects firm organization. We have presented several, mutually not exclusive, channels without being able to identify the relative impact of each of them. In order to open this black box, survey data which shed light on the decision making process and internal organization of firms, such as those used in Bloom et al. (2009), are very promising.

2.20 Appendix

2.21 Detailed description of the data

2.21.1 Dependent variables

The construction of the dependent variables is described in detail in the main text. The information is taken from the 8th Istat Census of Industry and Services, corresponding to the year 2001.

2.21.2 Measures or instruments for civic capital

Blood donations: The number of blood donations per 1000 inhabitants, disaggregated by province. The data are collected from the health authorities of Italian regions. In each region, regional health authorities collect data on blood donations and subsequently send this information to the Superior Institute of Health (*Istituto Superiore di Sanità*) which, in turn, maintains a National and Regional Registry of Blood and Plasma. Provincial data on blood donations are not available for Apulia and Lazio. For the provinces of these two regions we take the total regional value. Data refer to the year 2002 and the source is Cartocci (2007) on data from the Superior Institute of Health.

Volunteers: It is the number of volunteers in non-profit organizations. Data refer to the year 2000 and the source is de Blasio and Nuzzo (2010).

Referenda turnout: It is the average provincial electoral turnout for the referenda on the choice between republic and monarchy (1946), divorce (1974), public financing of political parties (1978), public security and anti-terrorism measures (1981), abortion (1981), wage escalator regulations (1985) and nuclear power and hunting regulations (1987). The following eight provinces were created after 1995: Biella, Lecco, Lodi, Rimini, Prato, Crotone, Vibo Valentia, Verbano-Cusio-Ossola. The provinces to which they belonged before 1995 and whose value has been assigned to them appear in parenthesis: Biella (Vercelli), Lecco (simple average of Bergamo and Como), Lodi (Milan), Rimini (Forlì-Cesena), Prato (Firenze), Crotone (Catanzaro), Vibo Valentia (Catanzaro), Verbano-Cusio-Ossola (Novara). The source of data for referendum turnout is the Ministry of the Interior.

Mutual aid societies in 1873: It is the number of the members in mutual aid societies in 1873 at the regional level, standardized by 100,000 inhabitants. Data for Valle d'Aosta, Trentino-Alto Adige and Friuli-Venezia Giulia are missing. We adopt the values of Piedmont for Valle d'Aosta, the region from where it was split off. For the latter two regions, we adopt the values of Veneto, which is socio-geographically the closest one. Additionally, there is no data for Molise, for which we take the value of Abruzzo, the region from where it was split off. The source is Putnam (1993).

Turnout in 1920s: It is the average electoral turnout at the regional level in the national elections of 1919 and 1921, provincial elections in 1920 and communal elections in 1920. There is no data for the regions of Valle d'Aosta, Trentino-Alto Adige and Friuli-Venezia Giulia. We adopt the values of Piedmont for Valle d'Aosta, the region from which it was split off. For the latter two regions, we adopt the values of Veneto, which is socio-geographically the closest one. The source of these data is Putnam (1993).

Number of free-city states in 1300: It is the number of free-city state experiences in the territory of each province in 1300. Data are from Guiso et al. (2008a). In order to reduce the cost of collecting historical data at the town level, the authors analyze the history of only the 400 biggest cities in terms of 1871 population in the area that was under the Holy Roman Empire at the beginning of the second Millennium (basically, the Center-North of Italy).

2.21.3 Other explanatory variables

Final demand: The variable is constructed as follows. First of all, we assign each 4-digit industry to the corresponding 2-digit sector. For each 2-digit industry, we compute from Input-Output Use tables for Italy the share of output being purchased by the final demand coming from households, public institutions and non-profit organizations. This share is then multiplied by total provincial population to get an exact measure of the dimension of the local market in terms of final demand for all the industries belonging to a given 2-digit sector (the variable then varies by 2-digit sector and by province). Both Input-Output Use tables and provincial population are from Istat and are taken with reference to the year 2001.

Urbanization in 1861: This variable is the share of total provincial population living in cities with more than 10,000 inhabitants in 1861. Data on city size come from the "Italian Urban Population Database 1300-1861", provided by Paolo Malanima (http://www.paolomalanima.it/default_file/Page646.htm). The number of total provincial population in 1861 is taken from Populstat (http://www.populstat.info/).

University graduates: It is the number of university graduates per province, divided by total provincial population. The data refer to the year 2001 and are from Istat.

Bank branches: It is the number of bank branches per 1000 inhabitants, disaggregated by province. The data refer to the year 2001 with the exception of the provinces of Vibo Valentia and Verbano-Cusio-Ossola. For those two provinces, the values corresponding to the year 1998 are taken. The source of the data is the Bank of Italy.

Length of labor trials: It is the number of days it takes to complete a first degree trial in labor affairs in each of the 165 Italian labor courts. The data refer to the year 2001 and are provided by Istat in the data base Territorial Information System on Justice (Sistema Informativo Territoriale sulla Giustizia). Since there are more courts than provinces and since in some cases the territory of a court belongs to two different provinces we proceed as follows. First, we assign to each city of the province the value of the court to which the city belongs. This information is then averaged for all the cities belonging to the same province to get a provincial variable.

GDP: It is the provincial nominal gross domestic product in 2001, expressed in thousands of euros. The source is Istat.

Capital-labor ratio: It is calculated at the 4-digit industry level from the balance sheet data of 86,000 firms operating in Italy in 2001. For each firm, we compute the capital-labor ratio as the sum of tangible and intangible assets (measured in thousands of euros) over the total number of employees. We then take

the average value for all the firms belonging to the same industry. The data source is Bureau van Dijk's AIDA data set.

2.22 Derivation of the first principal component

The intuition of principal component analysis (PCA) in our context is the following: given the three proxies of civic capital, each province corresponds to a point in a three dimensional vector space. The idea of PCA is to find a linear combination of the three variables which re-expresses the original data set in such a way that it captures most of the common variance. This linear combination corresponds to the first principal component.

In general terms, the first principal component can be derived as follows (see Jolliffe, 2002): vector $\mathbf{x}$ denominates the data consisting of p random variables (the three proxies of civic capital in our case) and vector $\alpha_{\mathbf{1}}$ consists of p constants, $\alpha_{11}, \alpha_{12}, \ldots \alpha_{1p}$. Consider the linear function $\alpha_{\mathbf{1}}'\mathbf{x}$:

$$\alpha_{\mathbf{1}}'\mathbf{x} = \alpha_{11}x_1 + \alpha_{12}x_2 + \ldots + \alpha_{1p}x_p = \sum_{j=1}^{p} \alpha_{1j}x_j \tag{10}$$

Finding the first principal component amounts to determine the elements of $\alpha_{\mathbf{1}}$ which maximize the variance of $Var[\alpha_{\mathbf{1}}'\mathbf{x}] = \alpha_{\mathbf{1}}'\mathbf{S}\alpha_{\mathbf{1}}$, where $\mathbf{S}$ is the covariance matrix of $\mathbf{x}$. The vector $\alpha_{\mathbf{1}}$ is constrained to have unit length, which implies that $\alpha_{\mathbf{1}}'\alpha_{\mathbf{1}} = 1$. The corresponding Lagrange maximization function takes the following form:

$$\alpha_{\mathbf{1}}'\mathbf{S}\alpha_{\mathbf{1}} - \lambda(\alpha_{\mathbf{1}}'\alpha_{\mathbf{1}} - 1). \tag{11}$$

Maximizing (11) with respect to $\alpha_{\mathbf{1}}$ gives

$$(\mathbf{S} - \lambda I_p)\,\alpha_{\mathbf{1}} = 0, \tag{12}$$

in which the Lagrange multiplier λ is the eigenvalue of $\mathbf{S}$ and the corresponding eigenvector is $\alpha_{\mathbf{1}}$. I_p is the p-dimensional identity matrix. Because the quantity to be maximized is $\alpha_{\mathbf{1}}'\mathbf{S}\alpha_{\mathbf{1}} = \alpha_{\mathbf{1}}'\lambda\alpha_{\mathbf{1}} = \lambda$, the eigenvector with the highest eigenvalue is chosen. The first principal component is then $\alpha_{\mathbf{1}}'\mathbf{x}$. In our data, the highest eigenvalue takes the value of 2.48. The associated eigenvector explains 75% of the total variance.

Table 1: Correlation among the proxy variables of civic capital

	Referenda turnout (log)	Volunteers (log)	Blood donations (log)
Volunteers (log)	0.69	1	
Blood donations (log)	0.61	0.57	1
Principal component	0.89	0.87	0.84

Note: The number of observations is 103. *Blood donations* is the log of the number of blood donations per 100,000 inhabitants inn 2002; *Volunteers* is the log of the number of volunteers in non-profit institutions per 100,000 inhabitants in 2000; *Referenda turnout* is the log of the average electoral turnout in referenda between 1946 and 1987; *Principal component* is the the first principal component of the above mentioned three proxies of civic capital. All correlations are statistically different from zero at the 1% level.

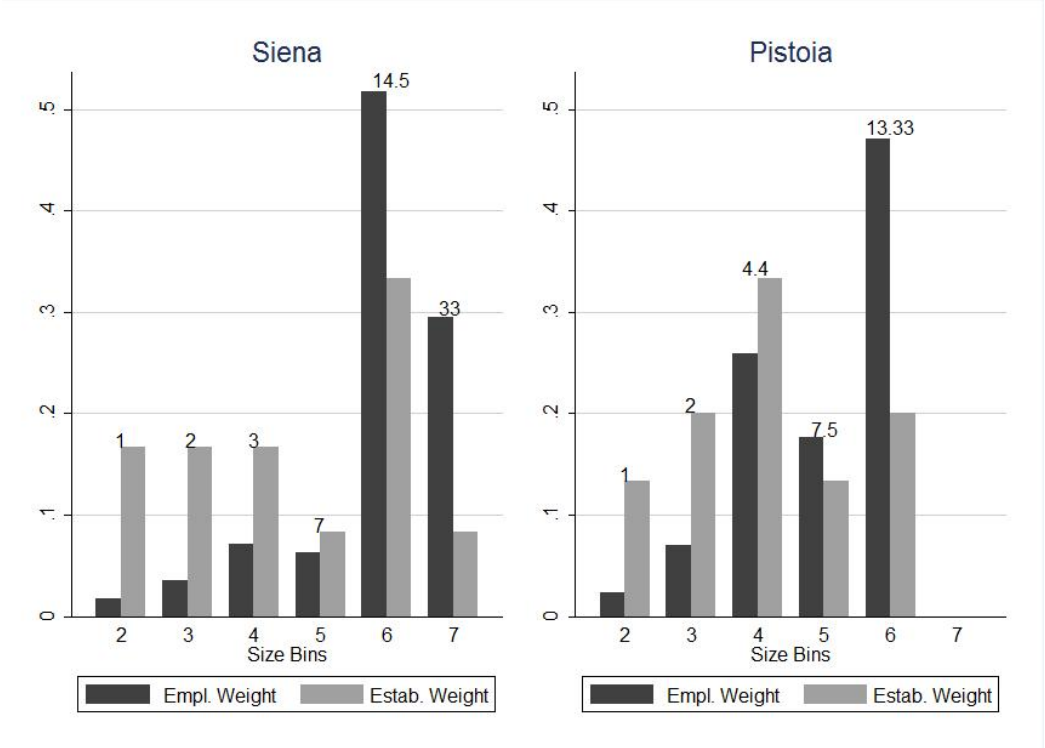

Figure 1: Empirical distribution of plant size in NACE industry 2862 (Manufacture of tools) in two provinces of Tuscany (Siena and Pistoia). On the top of each couple of bars there is the average size of that bin, given by the total amount of employment divided by the total amount of establishments.

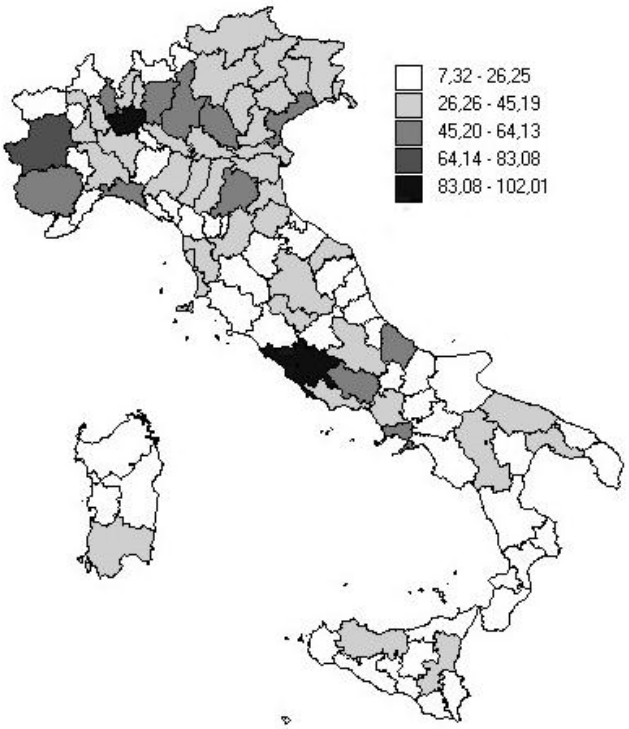

Figure 2: Average plant size, weighted by the number of employees in each size bin. Values are provincial averages over 4-digit industries.

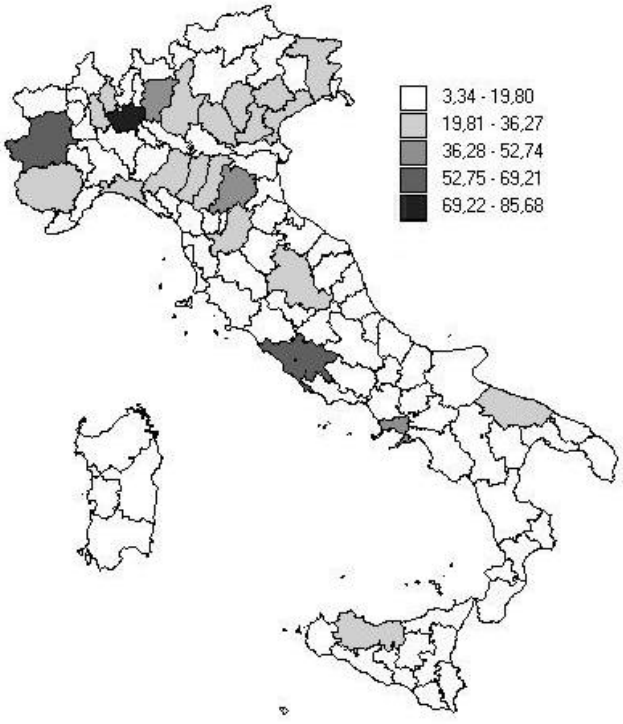

Figure 3: Standard deviation of size, weighted by the number of employees in each size bin. Values are provincial averages over 4-digit industries.

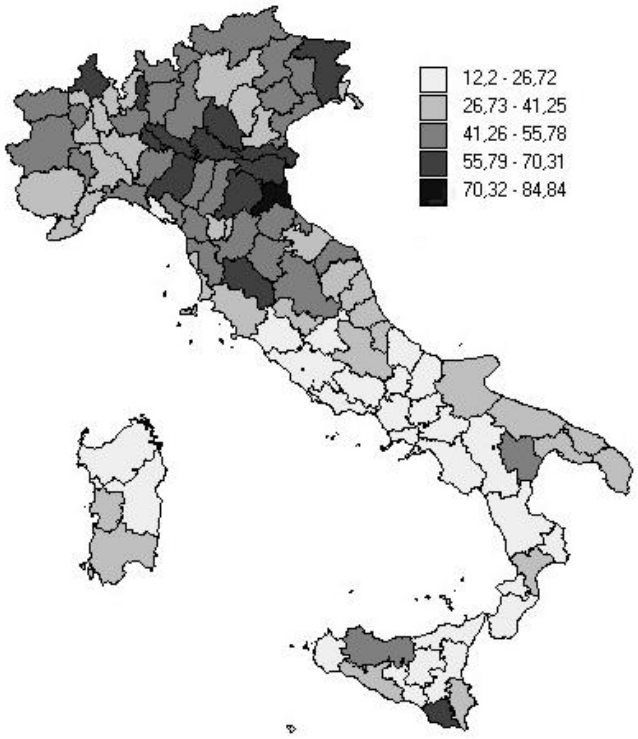

Figure 4: Blood donations per 1000 inhabitants.

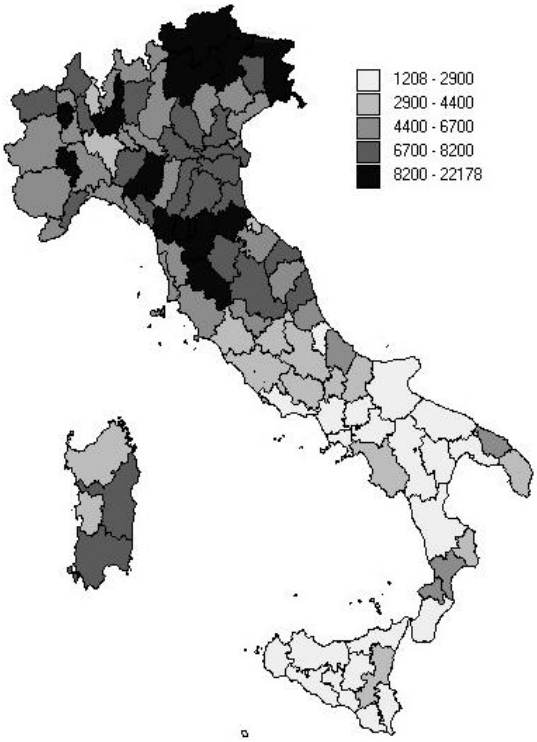

Figure 5: Number of volunteers in non-profit organizations per 100,000 inhabitants.

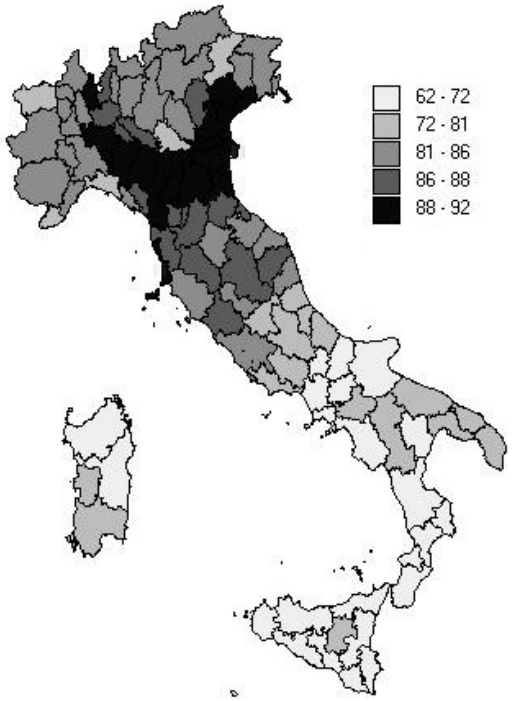

Figure 6: Electoral turnout in referenda, averaged over 7 referenda that took place between 1946 and 1987.

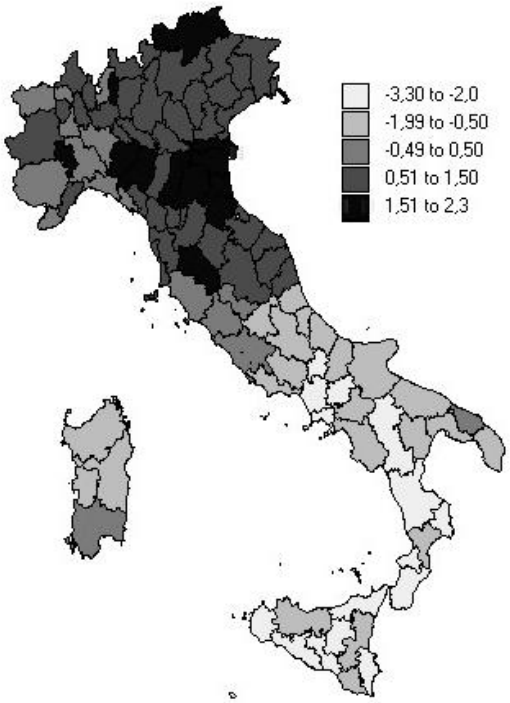

Figure 7: Map of civic capital measured by the first principal component of blood donations, volunteering, and electoral turnout.

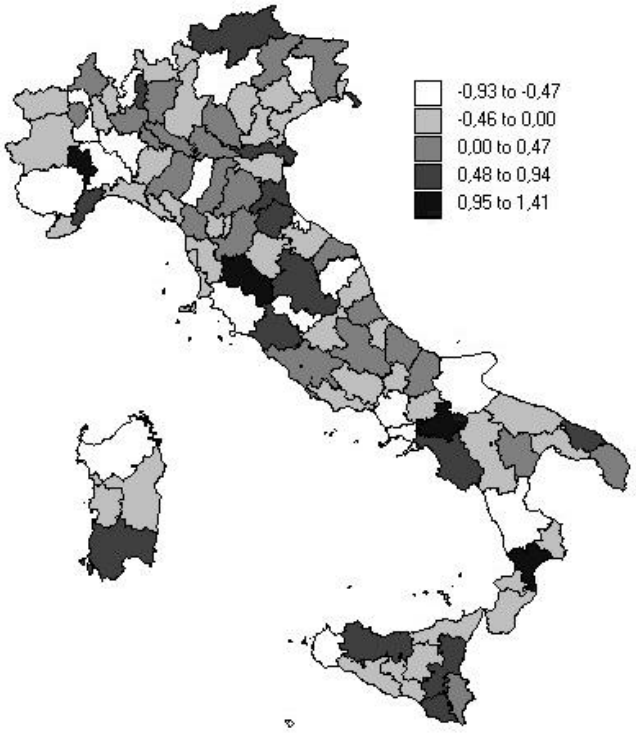

Figure 8: Map of civic capital measured by the variation of the first principal component within regions. The figure plots the residuals of a regression of the provincial principal component on regional dummies.

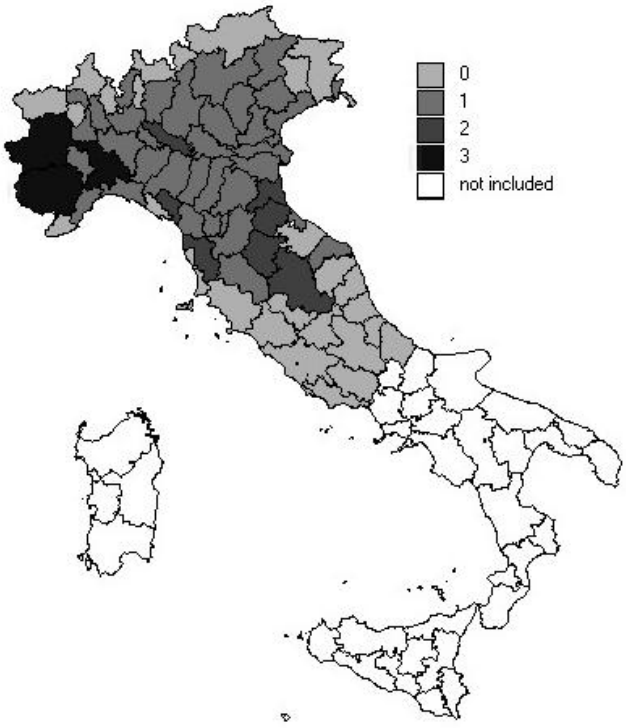

Figure 9: Number of free-city states by province in 1300 (Source: Guiso et al., 2008a). South of Italy and Islands are not included.

Table 2: Descriptive statistics

Variable	Obs.	Mean	S.D.	Min	Max	1st Quartile	Median	3rd Quartile
Dependent variables								
Average Plant Size (log)	32,071	2.212	1.398	0	8.708	1.111	2.011	3.091
Standard Deviation Plant Size (log)	31,410	1.826	1.479	-1.892	7.632	0.754	1.696	2.815
Average Plant Size - Estab. Weight (log)	32,071	1.383	1.015	0	8.303	0.596	1.160	1.946
Standard Deviation Plant Size - Estab. Weight (log)	31,410	1.420	1.368	-2.227	7.956	0.406	1.304	2.292
Total employment (log)	32,071	4.806	1.664	1.099	10.731	3.611	4.779	5.969
Total establishments (log)	32,071	3.422	1.613	1.099	9.782	2.079	3.219	4.522
N. of small plants (less than 20 empl., log)	32,008	3.343	1.669	0	9.778	2.079	3.135	4.477
N. of large plants (at least 20 empl., log)	15,319	1.031	1.049	0	6.004	0	0.693	1.609
Civic capital variables								
Blood donations (log)	103	3.568	0.415	2.501	4.44	3.285	3.635	3.842
Volunteers (log)	103	8.533	0.627	7.097	10.007	8.146	8.599	8.928
Referenda turnout (log)	103	4.378	0.108	4.129	4.516	4.3	4.419	4.466
Principal component (log)	103	0	1.5	-3.347	2.307	-1.231	0.439	1.13
Historical instrumental variables								
Aid societies in 1873 (log)	20	4.03	0.092	3.824	4.208	3.97	4.028	4.08
Turnout in 1920s (log)	20	6.247	0.976	4.159	7.465	5.408	6.54	7.071
Number of free-city states	67	0.85	0.78	0	3	0	1	1
Other explanatory variables								
Final demand (log)	103	10.884	2.971	0	15.098	10.735	11.666	12.387
GDP (log)	103	15.793	0.798	14.051	18.565	15.234	15.709	16.245
Urbanization in 1861 (log)	103	2.366	0.896	0	4.276	1.919	2.245	2.91
University graduates (log)	103	1.854	0.175	1.455	2.453	1.733	1.846	1.935
Bank branches (log)	103	1.594	0.444	-0.661	2.327	1.274	1.722	1.914
Length of labor trials (log)	103	6.595	0.449	4.635	7.437	6.348	6.64	6.853
K-L ratio (log)	481	4.169	0.819	1.177	7.045	3.666	4.034	4.563

Note: The table provides descriptive statistics for the variables used in the regressions. The dependent variables are: *Average Plant Size* is the log of average size at the province-industry level, with each size bin weighted by the corresponding share of employees; *Standard Deviation Plant Size* is the log of the standard deviation of plant size at the province-industry level, with each size bin weighted by the corresponding share of employees; *Average Plant Size - Estab. Weight* is the log of average size, with each size bin weighted by the corresponding share of plants; *Standard Deviation Plant Size - Estab. Weight* is the log of the standard deviation of plant size at the province-industry level, with each size bin weighted by the corresponding share of plants; *Total employment* is the log of the total number of employees; *Total establishments* is the log of the total number of establishments; *N. of small plants* is the log of the number of plants with less than 20 employees; *N. of large plants* is the log of the number of plants with at least 20 employees. We consider the following variables to measure civic capital: *Blood donations* is the log of the number of blood donations per 100,000 inhabitants in 2002; *Volunteers* is the log of the number of volunteers in non-profit institutions per 100,000 inhabitants in 2000; *Referenda turnout* is the log of the average electoral turnout in referenda between 1946 and 1987; *Principal component* is the first principal component of the above mentioned three proxies of civic capital. The historical instruments are: *Aid societies in 1873* is the log of the members of mutual aid societies per 100,000 inhabitants in 1873; *Turnout in 1920s* is the the log of turnout in the elections that took place in Italy in the 1920s; *Number of free-city states* is the number of free-city states in the territory of each province in 1300. The provincial controls are: *Final demand* is the log of weighted population, with weights obtained from Input-Output Use tables; *Urbanization in 1861* is the log of the share of inhabitants living in cities with at least 10,000 people in 1861; *University graduates* is the log of the share of university graduates over total population; *Bank branches* is the log of the number of bank branches per 1000 inhabitants; *Length of labor trials* is the log of the number of days it takes to complete a first-degree trial in labor-related affairs; *K-L ratio* is the log of the average capital-labor ratio at the industry level. Unless otherwise stated, the data refer to the year 2001.

Table 3: Determinants of average plant size: baseline regression

	(1) Blood	(2) Volunteers	(3) Referenda	(4) Principal comp.	(5) Blood	(6) Volunteers	(7) Referenda	(8) Principal comp.
	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se
Blood donations (log)	0.076**				0.071**			
	(0.032)				(0.033)			
Volunteers (log)		0.061**				0.066**		
		(0.027)				(0.027)		
Referenda turnout (log)			-0.067				-0.199	
			(0.279)				(0.283)	
Principal component (log)				0.052***				0.050***
				(0.016)				(0.017)
Final demand (log)	0.394***	0.396***	0.395***	0.395***	0.356***	0.357***	0.354***	0.359***
	(0.022)	(0.021)	(0.022)	(0.021)	(0.023)	(0.022)	(0.022)	(0.022)
Urbanization in 1861 (log)					0.024	0.029**	0.025	0.027*
					(0.015)	(0.015)	(0.015)	(0.015)
University graduates (log)					0.168*	0.169*	0 .191**	0.145
					(0.091)	(0.090)	(0.088)	(0.091)
Bank branches (log)					-0.035**	-0.034**	-0.028*	-0.038**
					(0.016)	(0.016)	(0.016)	(0.016)
Length of labor trials (log)					0.001	0.002	0.006	-0.003
					(0.025)	(0.025)	(0.026)	(0.025)
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (within)	0.121	0.121	0.120	0.121	0.122	0.122	0.121	0.122
Obs.	32,060	32,060	32,060	32,060	32,060	32,060	32,060	32,060

Note: The table provides the results of the fixed effect estimator where the panel variable are 4-digit industries. 20 regional dummies are also included. Standard errors are clustered at the province and industry level. Dependent variable is the log of APS_{ij}, the weighted average plant size. We use the following variables to measure civic capital: *Blood donations* is the log of the number of blood donations per 1000 inhabitants in 2002; *Volunteers* is the log of the number of volunteers in non-profit institutions per 100,000 inhabitants in 2000; *Referenda turnout* is the log of the average electoral turnout in referenda between 1946 and 1987; *Principal component* is the first principal component of the above mentioned three proxies of civic capital. We also include the following provincial controls: *Final demand* is the log of weighted population, with weights obtained from Input-Output Use tables; *Urbanization in 1861* is the log of the share of inhabitants living in cities with at least 10,000 people in 1861; *University graduates* is the log of the share of university graduates over total population; *Bank branches* is the log of the number of bank branches per 1000 inhabitants; *Length of labor trials* is the log of the number of days it takes to complete a first-degree trial in labor-related affairs. Unless otherwise stated, the data refer to the year 2001. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

Table 4: Determinants of the standard deviation of plant size: baseline regression

	(1) Blood Coef./se	(2) Volunteers Coef./se	(3) Referenda Coef./se	(4) Principal comp. Coef./se	(5) Blood Coef./se	(6) Volunteers Coef./se	(7) Referenda Coef./se	(8) Principal comp. Coef./se
Blood donations (log)	0.083**				0.077**			
	(0.037)				(0.039)			
Volunteers (log)		0.078***				0.084***		
		(0.029)				(0.029)		
Referenda turnout (log)			0.146				0.011	
			(0.326)				(0.329)	
Principal component (log)				0.067***				0.066***
				(0.018)				(0.019)
Final demand (log)	0.609***	0.612***	0.610***	0.610***	0.567***	0.568***	0.567***	0.571***
	(0.026)	(0.024)	(0.025)	(0.024)	(0.026)	(0.025)	(0.026)	(0.025)
Urbanization in 1861 (log)					0.027	0.033**	0.028	0.031*
					(0.017)	(0.017)	(0.017)	(0.017)
University graduates (log)					0.185*	0.184*	0 .196**	0.152
					(0.100)	(0.097)	(0.099)	(0.099)
Bank branches (log)					-0.036**	-0.036**	-0.029*	-0.041**
					(0.016)	(0.017)	(0.017)	(0.017)
Length of labor trials (log)					0.000	0.002	0.005	-0.005
					(0.030)	(0.029)	(0.031)	(0.029)
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (within)	0.177	0.177	0.177	0.178	0.178	0.178	0.178	0.178
Obs.	31,398	31,398	31,398	31,398	31,398	31,398	31,398	31,398

Note: The table provides the results of the fixed effect estimator where the panel variable are 4-digit industries. 20 regional dummies are also included. Standard errors are clustered at the province and industry level. Dependent variable is the log of $SDAPS_{ij}$, the weighted standard deviation. We use the following variables to measure social capital: *Blood donations* is the log of the number of blood donations per 100,000 inhabitants in 2002; *Volunteers* is the log of the number of volunteers in non-profit institutions per 100,000 inhabitants in 2000; *Referenda turnout* is the log of the average electoral turnout in referenda between 1946 and 1987; *Principal component* is the first principal component of the above mentioned three proxies of civic capital. We also include the following provincial controls: *Final demand* is the log of weighted population, with weights obtained from Input-Output Use tables; *Urbanization in 1861* is the log of the share of inhabitants living in cities with at least 10,000 people in 1861; *University graduates* is the log of the share of university graduates over total population; *Bank branches* is the log of the number of bank branches per 1000 inhabitants; *Length of labor trials* is the log of the number of days it takes to complete a first-degree trial in labor-related affairs. Unless otherwise stated, the data refer to the year 2001. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

Table 5: Determinants of the size distribution: extensions

	Average size			Standard deviation of size			Total empl. and establ., number of small vs. large plants			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	K-L ratio	Manuf.	Services	K-L ratio	Manuf.	Services	Total Empl.	Total Establ.	N. of small plants	N. of large plants
	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se
Principal component	0.125***	0.067**	0.048**	0.161***	0.087***	0.058**	0.049***	0.020	0.015	0.061***
	(0.041)	(0.029)	(0.020)	(0.046)	(0.031)	(0.023)	(0.018)	(0.013)	(0.013)	(0.023)
Princ. comp. × K-L ratio (log)	-0.018**			-0.023**						
	(0.009)			(0.010)						
Final demand (log)	0.359***	0.365***	0.372***	0.570***	0.551***	0.606***	1.019***	0.917***	0.921***	0.628***
	(0.022)	(0.040)	(0.025)	(0.026)	(0.046)	(0.030)	(0.024)	(0.019)	(0.019)	(0.030)
Urbanization in 1861 (log)	0.027*	0.007	0.050***	0.030*	0.010	0.058***	0.013	-0.000	-0. 004	0.017
	(0.015)	(0.031)	(0.015)	(0.016)	(0.034)	(0.017)	(0.018)	(0.014)	(0.015)	(0.016)
University graduates (log)	0.134	-0.153	0.425***	0.143	-0.196	0.497***	-0.022	-0.041	-0.041	0.019
	(0.094)	(0.176)	(0.096)	(0.102)	(0.189)	(0.107)	(0.092)	(0.071)	(0.075)	(0.112)
Bank branches (log)	-0.038**	-0.074***	0.007	-0.042***	-0.093**	0.013	-0.031	-0.002	0.003	-0.065***
	(0.015)	(0.028)	(0.033)	(0.015)	(0.037)	(0.038)	(0.032)	(0.032)	(0.034)	(0.023)
Length of labor trials (log)	-0.000	-0.019	-0.020	-0.003	-0.027	-0.011	-0.013	-0.014	-0.0 14	-0.003
	(0.025)	(0.043)	(0.023)	(0.029)	(0.050)	(0.029)	(0.028)	(0.022)	(0.022)	(0.029)
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (within)	0.121	0.141	0.170	0.177	0.177	0.240	0.415	0.496	0.486	0.310
Obs.	30,523	12,352	16,779	29,894	12,133	16,411	32,060	32,060	31,998	15,305

Note: The table provides the results of the fixed effect estimator where the panel variable are 4-digit industries. 20 regional dummies are also included. Standard errors are clustered at the province and industry level. The variable employed to measure civic capital is *Principal component*, which is the first principal component of the log of the number of blood donations per 100,000 inhabitants, the log of the number of volunteers in non-profit institutions per 100,000 inhabitants in 2000, the log of the average electoral turnout in referenda between 1946 and 1990. We also include the following provincial controls: *Final demand* is the log of weighted population, with weights obtained from Input-Output Use tables; *Urbanization in 1861* is the log of the share of inhabitants living in cities with at least 10,000 people in 1861; *University graduates* is the log of the share of university graduates over total population; *Bank branches* is the log of the number of bank branches per 1000 inhabitants; *Length of labor trials* is the log of the number of days it takes to complete a first-degree trial in labor-related affairs; *K-L ratio* is the log of the average capital-labor ratio at the industry level. The dependent variable in column (7) is the log of total employment, in column (8) it is the log of the total number of establishments, in column (9) it is the log of the number of plants with less than 20 employees, in column (10) it is the log of the number of plants with at least 20 employees. Unless otherwise stated, the data refer to the year 2001. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

Table 6: Determinants of the plant size distribution: further robustness and sensitivity analysis

	Average size					Standard deviation of size				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	$\ln \overline{APS}$	Two var.	GDP	Full sample	TO, MI, RM	$\ln \overline{SDPS}$	Two var.	GDP	Full sample	TO, MI, RM
	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se
Principal component	0.029**		0.043***	0.050**	0.047***	0.053***		0.056***	0.068***	0.063***
	(0.011)		(0.015)	(0.020)	(0.017)	(0.017)		(0.016)	(0.020)	(0.019)
Principal component (two var, log)		0.045***					0.053***			
		(0.014)					(0.016)			
Final demand (log)	0.102***	0.357***	0.095	0.410***	0.352***	0.327***	0.568***	0.173**	0.592***	0.569* **
	(0.012)	(0.022)	(0.065)	(0.022)	(0.024)	(0.020)	(0.025)	(0.082)	(0.026)	(0.028)
GDP (log)			0.251***					0.379***		
			(0.061)					(0.076)		
Urbanization in 1861 (log)	0.013	0.027*	0.019	0.034**	0.025	0.021	0.030*	0.018	0.034*	0.027
	(0.010)	(0.015)	(0.014)	(0.015)	(0.016)	(0.015)	(0.017)	(0.015)	(0.017)	(0.017)
University graduates (log)	0.019	0.160*	0.096	0.104	0.110	0.102	0.173*	0.076	0.110	0.118
	(0.061)	(0.088)	(0.087)	(0.103)	(0.094)	(0.085)	(0.097)	(0.091)	(0.105)	(0.099)
Bank branches (log)	-0.030***	-0.040**	-0.041*	-0.059**	-0.036**	-0.039**	-0.042**	-0.046*	-0.047**	-0.038* *
	(0.011)	(0.016)	(0.022)	(0.023)	(0.016)	(0.017)	(0.017)	(0.026)	(0.019)	(0.016)
Length of trials (log)	0.001	-0.001	-0.006	0.010	-0.004	-0.002	-0.003	-0.009	-0.001	-0.00 6
	(0.017)	(0.024)	(0.023)	(0.027)	(0.027)	(0.025)	(0.028)	(0.027)	(0.031)	(0.031)
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2r2 (within)	0.073	0.122	0.123	0.119	0.096	0.113	0.178	0.180	0.180	0.139
Obs	32,060	32,060	32,060	39,122	30,810	31,398	31,398	31,398	33,473	30,153

Note: The table provides the results of the fixed effect estimator where the panel variable are 4-digit industries. 20 regional dummies are also included (in columns (5) and (10) we use 5 macro-regional dummies). Dependent variable is the log of $\overline{\text{APS}}$ (column (1)), log of APS (column (2)-(5)), the log of $\overline{\text{SDAPS}}$ (column (6)), log of SDPS (columns (7)-(10)). In each regression, standard errors are clustered at the province and industry level. The variable employed to measure civic capital is *Principal component*, which is the log of the first principal component of the log of the number of blood donations per 100,000 inhabitants, the log of the number of volunteers in non-profit institutions per 100,000 inhabitants in 2000, the log of the average electoral turnout in referenda between 1946 and 1990. We also include the following provincial controls: *Final demand* is the log of weighted population, with weights obtained from Input-Output Use tables; *Urbanization in 1861* is the log of the share of inhabitants living in cities with at least 10,000 people in 1861; *University graduates* is the log of the share of university graduates over total population; *Bank branches* is the log of the number of bank branches per 1000 inhabitants; *Length of labor trials* is the log of the number of days it takes to complete a first-degree trial in labor-related affairs. Unless otherwise stated, the data refer to the year 2001. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

Table 7: Instrumental variables analysis

	Average size				Standard deviation of size			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef ./se	Coef./se
Panel A: Second stage								
Principal component	0.076***	0.112***	0.116**	0.081*	0.094***	0.138***	0.127**	0.116**
	(0.017)	(0.036)	(0.051)	(0.049)	(0.020)	(0.040)	(0.055)	(0.055)
GDP (log)	0.338***	0.310***	0.307***	0.261***	0.462***	0.429***	0 .437***	0.365***
	(0.074)	(0.070)	(0.075)	(0.085)	(0.085)	(0.081)	(0.087)	(0.107)
Final demand (log)	0.009	0.038	0.041	0.123	0.091	0.126	0.117	0.233**
	(0.080)	(0.077)	(0.083)	(0.092)	(0.090)	(0.087)	(0.094)	(0.114)
Urbanization in 1861 (log)	-0.013	-0.007	-0.007	-0.002	-0.018	-0.011	-0.013	-0.003
	(0.015)	(0.016)	(0.016)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
University graduates (log)	0.050	0.050	0.050	-0.011	0.045	0.043	0.044	-0.032
	(0.079)	(0.080)	(0.080)	(0.093)	(0.087)	(0.088)	(0.088)	(0.098)
Bank branches (log)	-0.021	-0.041*	-0.043	-0.023	-0.035	-0.058**	-0.052	-0.038
	(0.018)	(0.023)	(0.028)	(0.029)	(0.022)	(0.028)	(0.032)	(0.034)
Length of labor trials (log)	-0.014	-0.016	-0.016	-0.021	-0.011	-0.012	-0.012	-0.013
	(0.023)	(0.024)	(0.024)	(0.026)	(0.027)	(0.027)	(0.027)	(0.031)
Macro-regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen test of overidentif. (p-value)		0.90		0.52		0.71		0.63
R^2 (within)	0.118	0.118	0.118	0.104	0.177	0.176	0 .176	0.168
Obs.	32,060	32,060	32,060	21,635	31,398	31,398	31 ,398	21,299
Panel B: First stage (Dependent var. is Principal component)								
GDP (log)		0.546	0.509	0.866**		0.535	0.498	0.858**
		(0.364)	(0.424)	(0.363)		(0.364)	(0.424)	(0.363)
Final demand (log)		-0.621	-0.559	-1.026***		-0.616	-0.554	-1.020**
		(0.388)	(0.464)	(0.386)		(0.388)	(0.464)	(0.386)
Urbanization in 1861 (log)		-0.179**	-0.220**	-0.041		-0.178**	-0.219**	-0.039
		(0.077)	(0.088)	(0.071)		(0.077)	(0.088)	(0.071)
University graduates (log)		0.445	0.411	0.174		0.459	0.428	0.176
		(0.366)	(0.394)	(0.388)		(0.364)	(0.391)	(0.387)
Bank branches (log)		0.327*	0.351*	0.434***		0.323	0.346*	0.432***
		(0.196)	(0.188)	(0.159)		(0.195)	(0.186)	(0.158)
Length of labor trials (log)		0.220	0.160	-0.094		0.218	0.159	-0.096
		(0.155)	(0.147)	(0.165)		(0.155)	(0.147)	(0.165)
Aid societies in 1873 (log)		0.540**	0.857***			0.544**	0.861***	
		(0.211)	(0.196)			(0.211)	(0.196)	
Turnout in 1920s (log)		3.690***				3.673***		
		(1.179)				(1.184)		
1 free-city state in 1300				0.318*				0.317*
				(0.173)				(0.173)
2 free-city states in 1300				0.666***				0.664***
				(0.169)				(0.169)
3 free-city states in 1300				-0.035				-0.035
				(0.297)				(0.296)
Macro-regional dummies		Yes	Yes	Yes		Yes	Yes	Yes
F-test of joint signif. (p-value)		0.000		0.002		0.000		0.002
R^2		0.847	0.830	0.513		0.846	0.829	0.512
Obs.		32,060	32,060	21,635		31,398	31,398	21,299

Note: The table provides the results of the fixed effect two-stages least squares estimator where the panel variable are 4-digit industries. 5 macro-regional dummies are also included. Standard errors are clustered at the province and industry level. Panel A shows the second stage, while Panel B shows the first stage. In the first stage we use two sets of instrumental variables. The first set of instrumental variables, available at the regional level, are: *Aid societies in 1873* is the log of the members of mutual aid societies per 100,000 inhabitants in 1873; *Turnout in 1920s* is the the log of turnout in the elections that took place in Italy in the 1920s. The second set of instrumental variables are dummies for the number of free-city states at the provincial level in 1300. Unless otherwise stated, the data refer to the year 2001. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

References

Aghion, P. and J. Tirole, 1997: Formal and real authority in organizations. *Journal of Political Economy*, **105**(1), 1–29.

Akerlof, G. A., 1982: Labor Contracts as Partial Gift Exchange. *The Quarterly Journal of Economics*, **97**(4), 543–69.

Alchian, A. A. and H. Demsetz, 1972: Production, Information Costs, and Economic Organization. *American Economic Review*, **62**(5), 777–795.

Algan, Y. and P. Cahuc, 2010: Inherited Trust and Growth. *American Economic Review*, **100**(5), 2060–92.

Andreoni, J. and J. Miller, 2002: Giving according to garp: An experimental test of the consistency of preferences for altruism. *Econometrica*, **70**(2), 737–753.

Arrow, K., 1972: Gifts and exchanges. *Philosophy and Public Affairs*, **4**(1), 343–62.

Arrow, K. J., 1968: The Economics of Moral Hazard: Further Comment. *American Economic Review*, **58**(3), pp. 537–539.

Baker, G., R. Gibbons, and K. Murphy, 2002: Relational contracts and the theory of the firm. *Quarterly Journal of Economics*, **117**(1), 39–84.

Banfield, E., 1958: *The Moral Basis of a Backward Society*. The Free Press, New York.

Beck, T. and R. Levine, 2003: Legal Institutions and Financial Development. NBER Working Papers 10126, National Bureau of Economic Research.

Becker, G. S. and K. M. Murphy, 1992: The Division of Labor, Coordination Costs, and Knowledge. *Quarterly Journal of Economics*, **107**(4), 1137–1160.

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

Bloom, N., R. Sadun, and J. V. Reenen, 2009: The organization of firms across countries. NBER Working Papers 15129, National Bureau of Economic Research.

Bürker, M. and G. A. Minerva, 2010: Civic Capital, Firms' Size and Purchased Service Intensity in Italy. Paper presented at the 51st Annual Congress of the Italian Economic Association, University of Catania, Italy.

Buonanno, P., D. Montolio, and P. Vanin, 2009: Does Social Capital Reduce Crime? *Journal of Law & Economics*, **52**(1), 145–170.

Camerer, C. and R. Thaler, 1995: Ultimatums, Dictators, and Manners. *Journal of Economic Perspectives*, **9**(2), 209–219.

Cameron, A. C. and D. L. Miller, 2010: Robust Inference with Clustered Data. Working Papers 107, University of California, Davis, Department of Economics.

Campbell, J. and H. Hopenhayn, 2005: Market size matters. *Journal of Industrial Economics*, **53**(1), 1–25.

Cartocci, R., 2007: *Mappe del tesoro: Atlante del capitale sociale in Italia*. Il Mulino, Bologna.

Casadesus-Masanell, R., 2004: Trust in agency. *Journal of Economics & Management Strategy*, **13**(3), 375–404.

Chandler, A., 1962: *Strategy and Structure*. MIT Press, Cambridge, MA.

Chen, Y., 2000: Promises, Trust, and Contracts. *Journal of Law, Economics and Organization*, **16**(1), 209–32.

Coase, R., 1937: The Nature of the Firm. *Economica*, **4**, pp. 386–405.

Coleman, J., 1990: *Foundations of Social Theory*. Cambridge, MA: Harvard University Press, New York.

de Blasio, G. and G. Nuzzo, 2010: Historical traditions of civicness and local economic development. *Journal of Regional Science*, **50**(4), 833–857.

DeBandt, J., 1996: Business services: Markets and transactions. *Review of Industrial Organization*, **11**(1), 19–33.

Dessein, W., 2002: Authority and communication in organizations. *Review of Economic Studies*, **69**(4), 811–838.

Falk, A. and U. Fischbacher, 2006: A theory of reciprocity. *Games and Economic Behavior*, **54**(2), 293–315.

Fehr, E., 2009: On The Economics and Biology of Trust. *Journal of the European Economic Association*, **7**(2-3), 235–266.

Fehr, E. and U. Fischbacher, 2002: Why Social Preferences Matter - The impact of Non-Selfish Motives on Competition, Cooperation and Incentives. *Economic Journal*, **112**(478), 1–33.

Fehr, E. and K. Schmidt, 1999: A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics*, **114**(3), 817–868.

Fukuyama, F., 1995: *Trust: The Social Virtues and the Creation of Prosperity*. Free Press, New York.

Guiso, L., P. Sapienza, and L. Zingales, 2004: The Role of Social Capital in Financial Development. *American Economic Review*, **94**(3), 526–556.

Guiso, L., P. Sapienza, and L. Zingales, 2008a: Long Term Persistence. NBER Working Papers 14278, National Bureau of Economic Research.

Guiso, L., P. Sapienza, and L. Zingales, 2008b: Social capital as good culture. *Journal of the European Economic Association*, **6**(2-3), 295–320.

Guiso, L., P. Sapienza, and L. Zingales, 2010: Civic Capital as the Missing Link. NBER Working Papers 15845, National Bureau of Economic Research.

Helsley, R. W. and W. C. Strange, 2007: Agglomeration, opportunism, and the organization of production. *Journal of Urban Economics*, **62**(1), 55–75.

Holmes, T., 1999: Localization of industry and vertical disintegration. *Review of Economics and Statistics*, **81**(2), 314–325.

Holmes, T. J. and J. J. Stevens, 2002: Geographic Concentration and Establishment Scale. *Review of Economics and Statistics*, **84**(4), 682–690.

Holmstrom, B., 1982: Moral Hazard in Teams. *Bell Journal of Economics*, **13**(2), 324–340.

Ichino, A. and G. Maggi, 2000: Work Environment and Individual Background: Explaining Regional Shirking Differentials in a Large Italian Firm. *Quarterly Journal of Economics*, **115**(3), 1057–1090.

Inglehart, R. and W. Baker, 2000: Modernization, cultural change, and the persistence of traditional values. *American Sociological Review*, **65**(1), 19–51.

Jacobs, J., 1969: *The economy of cities*. Vintage, New York.

Jolliffe, I. T., 2002: *Principal Component Analysis*. Springer, New York.

Joskow, P. L., 1985: Vertical Integration and Long-term Contracts: The Case of Coal-burning Electric Generating Plants. *Journal of Law, Economics and Organization*, **1**(1), 33–80.

Kumar, K. B., R. G. Rajan, and L. Zingales, 1999: What Determines Firm Size? NBER Working Papers 7208, National Bureau of Economic Research.

La Porta, R., F. L. de Silanes, A. Shleifer, and R. W. Vishny, 1997: Legal Determinants of External Finance. *Journal of Finance*, **52**(3), 1131–50.

Laeven, L. and C. Woodruff, 2007: The Quality of the Legal System, Firm Ownership, and Firm Size. *Review of Economics and Statistics*, **89**(4), 601–614.

Lafontaine, F. and M. Slade, 2007: Vertical Integration and Firm Boundaries: The Evidence. *Journal of Economic Literature*, **45**(3), 629–685.

Li, B. and Y. Lu, 2009: Geographic concentration and vertical disintegration: Evidence from China. *Journal of Urban Economics*, **65**(3), 294–304.

Lu, Y. and Z. Tao, 2009: Contract enforcement and family control of business: Evidence from China. *Journal of Comparative Economics*, **37**(4), 597–609.

Malanima, P., 2005: Urbanisation and the Italian economy during the last millenium. *European Review of Economic History*, **9**, 97–122.

Melitz, M. J. and G. I. P. Ottaviano, 2008: Market size, trade, and productivity. *Review of Economic Studies*, **75**(1), 295–316.

Merino, F. and D. Rodrand, 2007: Business services outsourcing by manufacturing firms. *Industrial and Corporate Change*, **16**(6), 1147–1173.

Moulton, B. R., 1990: An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units. *The Review of Economics and Statistics*, **72**(2), 334–338.

Ono, Y., 2003: Outsourcing business services and the role of central administrative offices. *Journal of Urban Economics*, **53**(3), 377–395.

Penrose, E. T., 1959: *The Theory of the Growth of the Firm*. Oxford University Press, Oxford.

Percoco, M., 2011: Entrepreneurship, Social Capital and Institutions: Evidence from Italy. Working paper, Bocconi University, Milan.

Portes, A., 1998: Social Capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, **24**, 1–24.

Putnam, R., 1993: *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton University Press, Princeton.

Rajan, R. G. and L. Zingales, 1998: Financial Dependence and Growth. *American Economic Review*, **88**(3), 559–86.

Rothstein, B., 2000: Trust, social dilemmas and collective memories. *Journal of Theoretical Politics*, **12**(4), 477–501.

Sapienza, P., A. Toldra Simats, and L. Zingales, 2007: Understanding Trust. CEPR Discussion Papers 6462, Centre for Economic Policy Research.

Schwartz, A., 1993: Subservient Suburbia - The Reliance of Large Suburban Companies on Central City Firms for Financial and Professional Services. *Journal of the American Planning Association*, **59**(3), 288–305.

Spagnolo, G., 1999: Social relations and cooperation in organizations. *Journal of Economic Behavior & Organization*, **38**(1), 1–25.

Syverson, C., 2004: Market structure and productivity: A concrete example. *Journal of Political Economy*, **112**(6), 1181–1222.

Tabellini, G., 2008: The scope of cooperation: Values and incentives. *Quarterly Journal of Economics*, **123**(3), 905–950.

Tabellini, G., 2010: Culture and institutions: Economic development in the regions of Europe. *Journal of the European Economic Association*, **8**(4), 677–716.

Williamson, O. E., 1979: Transaction-Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics*, **22**(2), 233–261.

Williamson, O. E., 1985: *The Economic Institutions of Capitalism*. The Free Press, New York.

Williamson, O. E., 1996: *The Mechanisms of Governance*. Oxford University Press, New York.

3 Chapter 2: Civic Capital, Firm Size and Purchased Service Intensity in Italy

3.1 Introduction

Since Coase (1937), the determination of the boundaries of the firm has been studied extensively in the literature. An important theoretical approach is Transaction Cost Economics (Williamson (1979), Williamson (1985), Williamson (1985), Williamson (1996)). Transaction Cost Economics (hereafter TCE) provides testable predictions on whether a transaction takes place within the firm or on the market. Products which require relationship-specific investments (because they are complex or are exchanged under uncertainty) create contractual hazards between the parties when they are traded on the market. These hazards lead to ex-post opportunistic renegotiation of the contract regulating the transaction. Hence, products requiring relationship-specific investment are more likely to be exchanged within the firm. However, as Williamson (1996) points out, not only product characteristics but also the environment in which a transaction takes place determines the make-or-buy decision of firms. Specifically, he stresses the role for societal culture in determining the extent of opportunistic behavior and hence the incidence of contractual hazards.

In this paper, we empirically test the prediction from TCE that a more opportunistic environment leads to more vertical integration in the Italian context. We proxy the level of opportunism by the level of local civic capital (Putnam (1993), Banfield (1958)) in each Italian province.[49] Concerning vertical integration, we focus on the purchase of a specific item, namely services. We analyze the extent to which firms produce services in-house or acquire them on the market. This information is available at the firm level. In a way quite similar to Holmes (1999), we measure vertical integration by the ratio of purchased services over sales.[50] The choice of using services is dictated by several reasons. First, service transactions are strongly subject to contract incompleteness, which make the specification of a well-defined contract ex ante cumbersome. For example, quality is difficult to measure and heterogeneous, and this hampers the comparison of prices and outputs. Moreover, service production is characterized by moral hazard due to asymmetric information (DeBandt (1996)). Hence, according to TCE, the exchange of services is highly sensitive to contractual hazards and opportunistic behavior. Second, services are predominantly acquired on the local market (see Schwartz (1993), Ono (2003), Merino and Rodrand (2007)). Hence, in service transactions both parties are located in the same local area. This is a necessary condition to identify the change in the opportunistic attitude of the service suppliers through local social capital.[51]

Our analysis complements the existing literature in several ways. First, the empirical TCE literature mainly analyzed the effect of product characteristics on vertical integration, and found overwhelming evidence in favor of TCE predictions. In particular, this literature has focused on asset specificity, risk, product

[49] We adopt the terminology of Guiso et al. (2010) who propose the term *civic capital* instead of social capital. See section 3.2 for a definition of civic capital and section 3.3 for a discussion of its measurement.

[50] In Holmes (1999) the degree of vertical integration is Purchased Inputs Intensity; that is, raw materials over sales. Below, we make a case for the use of services in the place of raw material.

[51] This is also the main reason why we prefer services instead of raw materials for the computation of the degree of vertical integration. Differently from services, raw materials are more tradeable, and hence the location of their suppliers is more uncertain.

complexity and uncertainty and their effect on vertical integration.[52] In contrast, we focus on the environment in which a transaction takes place. Hence, we include all sectors of economic activity, as there is no reason to believe that the effect of opportunistic behavior is limited to the purchase of goods belonging to some industries only. Our analysis is also close to Holmes (1999). He studies the effect of industry concentration on the make-or-buy decision of manufacturing firms in the US.[53] He finds a positive correlation between industry concentration and purchased input intensity of raw materials. In contrast to this study, we focus on service inputs of firms from all sectors. Finally, while he works with aggregate data at the county and industry level we work with firm-level data, available at a highly disaggregated geographical and sectoral level.

To the best of our knowledge, we are the first to empirically assess the importance of opportunistic behavior, a behavioral assumption of TCE, for the determination of the boundaries of the firm. We find a significant effect of the level of civic capital on purchased service intensity. On average, a one standard deviation surge in local civic capital increases PSI in between 4% and 6%, according the proxy chosen. We then conclude that firms in environments where people are less opportunistic acquire relatively more services on the market. This effect is robust against the inclusion of both firm-level controls (number of workers, capital stock and overall value added) as well as provincial variables which are supposed to affect the make-or-buy decision (size of the local service market, local GDP, the quality of local formal contract enforcement). Moreover, we find that the effect of civic capital on vertical integration is greater for smaller firms.

The paper is organized as follows: Section 3.2 outlines the theoretical framework out of which we derive our testable implication, section 3.3 describes the data and the variables employed, sections 3.4 and 3.5 provide the empirical analysis. Finally, section 3.6 concludes.

3.2 Conceptual Framework

Our conceptual framework is based on the TCE (Williamson (1979), Williamson (1985), Williamson (1996)). Consider a service provider and a client which enter into a contractual relationship. In this context, asset specificity implies that the provider has to acquire specific physical or human capital to meet the specific needs of the client. Similarly, it might be that the client have to align its work setting or require specific knowledge in order to allow the provision of the service or to assist effectively the provider. In this situation, both parties may be tempted to renegotiate the contract for more favorable terms after the service has been provided by the supplier, or after the client has adapted to receive the service provision (ex post opportunism). Contractual hazards further increase due to measurement difficulties. In the case of services, it may be difficult to measure quality or simply compare it across different suppliers, as service provision often lacks precise technical specifications. Moreover, information asymmetry between the client and the provider, and problems in the monitoring of the providers' performance create principal-agent problems.

Therefore, it is virtually impossible to write a contract which effectively limits the scope for opportunistic behavior: responsibilities and duties for each contracting party are hard to define, penalties for defection difficult to specify, and general clauses, which specify the adaptation to unforeseen contingencies, are ineffec-

[52] See Lafontaine and Slade (2007) for a survey.

[53] For a theoretical model of agglomeration, opportunism and outsourcing see Helsley and Strange (2007).

tive. Consequently, the client (or provider) can unjustifiably question the (objectively unverifiable) quality of the product service or renegotiate contracts after the clients' (or providers') specific investment is sunk.

Importantly, however, Williamson (1996) stresses that not only the characteristics of the transaction per se have an effect on the extent of contractual hazards and hence on the boundaries of the firm, but also the environment in which the transaction is realized. More specifically, he underlines the importance of societal culture for economic organization: "The main import of *societal* culture [...] is that it serves as a check on opportunism".[54] In an environment which tolerates cheating, he claims, contractual hazards are emphasized by weak (or inexistent) social sanctions against opportunistic behavior.

The concept of civic capital captures the extent to which opportunistic behavior is widespread or not in a society. We adopt the definition proposed by Guiso et al. (2010) who specify civic capital as "those persistent shared beliefs and values that help a group overcome the free rider problem in the pursuit of socially valuable activities". In other words, civic capital captures the extent to which individuals cooperate even though they forgo an immediate material benefit. In areas with high social capital, an individual expects his fellow to cooperate, who, in turn, does not defect because he feels a moral obligation not to do so.[55] Alternatively, the fellow might cooperate simply because he fears the proscription of opportunistic behavior by other members of the community (see Coleman (1990), Williamson (1996)).[56]

The high variation of civic capital in Italy can be attributed to historical accidents. According to Putnam (1993) the pattern of civic capital in Italy was determined by different forms of government emerging during the middle age. In the Southern part of the peninsula, the kingdom of Sicily came into power during the 12th century, a highly autocratic regime which oppressed any form of self government and horizontal bonds between individuals. The republican city-states in the central-norther regions, in contrast, emerged autonomously and hence enjoyed a much higher degree self-determination. Cooperation between individuals was essential in those republics, not least to defend their city. This geographic pattern is reflected in figure 10. civic capital is highest in the central Northern regions of Emilia-Romagna and Tuscany and lowest in the Southern mainland and Sicily.

To sum up, high civic capital poses barriers to narrow minded opportunistic behavior which lowers the extent of contractual hazards. Consequently, in an environment where civic capital is high the provision of services is more frequently realized through an arm's length relationship, with respect to an area where civic capital is low. As a consequence, we expect purchased service intensity to be higher where civic capital is higher.[57]

[54] See page 268, italics added

[55] Several motives have been put forward by the literature which explain this seemingly irrational behavior. Cooperative behavior signals trustworthiness and helps to establish a reputation, which is especially important for service products. However, reputation is only an imperfect protection against opportunistic behavior, as firms can strategically exploit their reputation in some circumstances (DeBandt (1996)). Nonstrategic motives for cooperation, independent from sanctions or reward, include gift exchange (Akerlof (1982)) or preference for fairness (Camerer and Thaler (1995)).

[56] For empirical evidence on this neighborhood effect see Ichino and Maggi (2000). They show not only that misconduct in a large Italian bank is higher were civic capital is lower, but also that individuals who move from low to high social capital areas behave more cooperatively.

[57] An alternative argument would rely on the fact that firms can imperfectly substitute a high quality service product, for which only incomplete contracts can be written, with a low quality product, for which complete contracting is possible. See Chen (2000) for a formalization of this idea. Accordingly, the high (low) quality product is exchanged in areas where civic capital is high (low). Assigning to the high quality service a higher market value than the low quality service, this implies that

3.3 Data and variables

3.3.1 Firm Level Variables

The primary source of information is the firm-level dataset AIDA, administered by the Bureau van Dijk. This is a commercial dataset which provides complete balance sheet information for hundreds of thousands of Italian firms. Out of this rich dataset, we keep the information on firm size (in terms of number of workers and sales), total fixed assets, value added, total amount of purchased services, as well as information about geographical localization (in terms of Italian province), industrial activity code (4-digit NACE 1.1.) and information on the structure of shareholders. We work with balance sheet data from the year 2001. Since data are collected at the firm-level, and not at the plant-level, this could be a limitation for our analysis. The crucial point to understand is that, to the extent that decisions about service outsourcing are taken at the central level by the parent company, and are not decentralized to individual plants, the measurement error due to the firm-level aggregation is not an important issue. Under centralization, the degree of outsourcing of the entire firm will be decided by the managers located in the parent company, and it will be then affected by the level of civic capital of that province. However, even in the case of outsourcing decisions made at the individual plant level, when the plants are located in the same province of the parent company, the use of firm-level data is still adequate, since the different units are influenced by the same set of provincial regressors. The only case where firm-level data are problematic is when the decision to outsource services is decentralized at the plant level, and plants are located outside of the province of the parent company.[58] However, given that our sample mean is 21 employees per firm, we are confident that multiplant firms account only for a tiny share of observations.

The choice of carrying out the analysis at the level of provinces (they were 103 in 2001 and correspond to NUTS3 partitioning in terms of European classification) is motivated by the fact that this is the most detailed level of spatial disaggregation for which civic capital measures are available. Our analysis deals with the entire span of economic activity. In the AIDA dataset firms are found that belong to the primary (agricultural, fishing, and mining), secondary (manufacturing), tertiary (services) sectors. However, firms in the following areas are not included in AIDA: Public administration and defense, compulsory social security; Activities of households; Extra-territorial organizations and bodies (2 digit NACE 1.1. sectors 75, 91, 95-99). We further drop the following industries: Education; Health and social work; Other community, social and personal service activities (2 digit NACE 1.1. sectors 80, 85, 90, 92-93). The reason for dropping these activities is that in these sectors government intervention is strong, and this could be confounding for our results. For example, the decision concerning the outsourcing of services could be less dependent on the riskiness of transactions with service suppliers, being set by bureaucrats belonging to public bodies whose behavior are not dictated by high-powered market incentives.[59]

Let us now turn to the description of the variables we employ. For each firm, the profit and loss statement contains an item where the total cost of services paid by each firm is reported.[60] Since items

our measure of service outsourcing is higher in areas where civic capital is higher.

[58] We are not the first to employ firm-level data to investigate the degree of vertical disintegration, and to encounter these problems. See Li and Lu (2009) for a paper about inputs outsourcing in China.

[59] However, those sectors are included in a robustness check.

[60] In Appendix 3.7 we give a detailed description of the kind of services that enter this item.

recorded in the profit and loss statement are collected for accounting purposes, the purchase of specific services is not singled out, and we have only information on the total amount spent on services. This is somewhat unfortunate. Firstly, disaggregated info of service inputs allows to take the differing distance dependency precisely into account. Similarly, contractual hazards are supposed to differ among different service inputs. The statement also has an item with the amount of total sales. We take the ratio of these two items (total service purchases and total sales) in order to retrieve what we call Purchased Service Intensity (PSI hereafter). This is a measure of the degree of service outsourcing at the firm level, relatively to firm i, located in province j, operating in industry s. In order to obtain a percentage number, this ratio is multiplied by 100. After removing outliers and firms with missing values, we end up with more than 93 000 firm level observations.[61] Figure 12 shows the geographic variation of PSI across Italian provinces. Firms in the North acquire relatively more services on the market than firms located in the South. Figure 13 shows that this geographic pattern is not driven by industry characteristics. Removing four digit industry fixed effects reveals that PSI is highest in the region of Emilia-Romagna and Tuscany in the Center-North, but the North-South differences remain.

3.3.2 Measurement of Civic Capital

We employ three variables to quantify the stock of provincial civic capital: electoral turnout in referenda, blood donations and volunteering in non-profit organizations, the latter two standardized by population.[62] The motivation to use them as proxies descends from the following reasoning. All three activities imply individual costs which are not compensated by any material pay-off. Moreover, formal authorities neither provide incentives nor punish these kind of activities. Rather, individuals who pursue these activities are driven by a concern for the common good, either by pro-social preferences, social pressure or because they feel a moral obligation. Consequently, the higher the share of individuals in a given province, the lower is opportunistic behavior and the higher the stock of civic capital. Obviously, each of these proxies is only an imperfect measure of civic capital. In order to purge these proxies of the noise, we extract the first principal component. As expected, we find a strong common pattern in the data. The eigenvalue of the first principal component is 2.48, the associated eigenvector explains 75% of the total variance. The following Table shows the correlation between each of the three variables and the resulting principal component.

[Table 1 about here]

3.3.3 Control Variables

During the estimation process, we consider several potential confounding factors that we address by introducing appropriate control variables. First of all, we have firm-level controls. They encompass firm size, expressed in terms of the total number of employees, capital stock, captured by the value of total tangi-

[61] Concerning the cleaning process, we first remove firms with negative values for sales, workers, purchased services, value added and capital stock. Then, we cut the 1st percentile and the 99th percentile of the distribution of each of those variables. Lastly, the same cutting occurs for the ratio of purchased services over sales.

[62] These proxies have been widely used in the literature. See for example (Guiso et al., 2004; de Blasio and Nuzzo, 2010; Buonanno et al., 2009). The reason for why we use electoral turnout in referenda rather than in normal political elections is explained in (Putnam, 1993), page 93.

ble fixed assets and value added, which, holding firm size and capital stock constant, is a proxy for the productivity of the firm.

In addition to these firm level controls, we employ several controls related to the local area where the firm is located. The first is the size of the local service market, calculated as the total number of service workers employed in each province. Our idea is that the higher it is the size and the number of firms supplying services in a given local area, the easier it is to outsource services, and so the higher should be PSI. Obviously, the eventual size of the local services' market is in turn affected by the propensity of firms to outsource business services. In other terms, local service market is endogenous with firm-level PSI. The coefficient's estimate about the impact of the size of the local market cannot be given a causal interpretation. As in Merino and Rodrand (2007), we consider the relevant services those belonging to the 2-digit sectors 72, 73, and 74 (NACE rev. 1.1).[63] To have an exact measure of service employment, we take this information from the 8th Industrial Census carried out by the Italian national statistic authority (ISTAT) in 2001. Firm size is subtracted from the overall number of service workers when a firm operates in sectors 72-74. Next, we capture the size of the local market by provincial population, weighted by the share of total industry output destined to final demand. The corresponding information is taken from the Input-Output Use table and available at the two digit industry level. Importantly, final demand and the size of the service market control for the effect of thick markets on contractual hazards. For example, in a buyer-supplier relationship, in agglomerated areas the threat of holding-up the contract partner is less severe, due to the high number of potential alternative buyers.[64].

Finally, the other controls that we include at the level of each local area are the quality of formal contracting institutions, local financial development and human capital. The functioning of courts are important determinants of contractual hazards. Well functioning courts decrease contractual uncertainty, as they are better able to precisely specify responsibilities and duties for each contracting party in the case a conflict arises. Performance of courts are proxied by the average number of days it take for a civil proceeding to end in the tribunals located in the province.[65] Consequently, service outsourcing should be higher where proceedings are shorter. As a last control, we include the number of bank branches. As in Benfratello et al. (2008), the number of bank branches is related to the level of financial development achieved in a given province. Financial development, in turn, may be correlated to PSI as it could promote the birth of innovative suppliers providing specialized services to downstream firms, thus increasing serving outsourcing. As service industries tend to be skill-intensive, human capital holds the availability of skilled workers constant. This variable is measured by the share of the provincial population holding a university degree. Data about GDP, length of trials, human capital and the size of the service market come from ISTAT. Data on the number of bank branches come from the Bank of Italy. Table 2 summarizes the data used in the regressions.

[Table 9 about here]

[63] However, in a robustness check we measure the size of the local service market by adding the number of workers employed in all service sectors.

[64] See Helsley and Strange (2007) for a theoretical analysis and Joskow (1985) for empirical evidence

[65] In Italy there were 165 tribunals in 2001, so in some provinces there is more than one tribunal. We calculate the average for each province over all courts located in the province.

3.4 Determinants of PSI: OLS Estimates

3.4.1 Preliminary analysis

This section provides evidence from OLS Estimates. We assess the impact of civic capital on purchased service intensity by estimating the following estimation:

$$\ln PSI_{i,j,s} = \alpha_0 + \alpha_1 PC_j + \ln X_i'\overline{\beta} + \ln Z_j'\overline{\delta} + \gamma_r + \gamma_s + \epsilon_{i,j,s} \tag{13}$$

where $\ln PSI_{i,j,s}$ is the log of purchased service intensity of firm i in province j and four digit industry s. Our variables of interest is PC_j, the stock of civic capital in province j as measured by the principal component. X_i denominates a vector of firm level controls, including the log of the number of workers, the log of the capital stock and the log of value added produced by the firm. The set of controls defined at the provincial level is given by the vector $\ln Z_j$. It contains the log of the number of service workers, the log of GDP, the log of final demand, the quality of contract enforcement, human capital and financial development.[66] We control for unobservables at the regional and four digit industry level, as given by the corresponding dummies γ_r and γ_s. The error term $\epsilon_{i,j,s}$ allows for correlation between observations in the same province and in the same four digit industry. Equation (13) is estimated by fixed effects in order to get rid of unobserved γ_s.

In order to investigate nonlinearities in the effect of civic capital on purchased service intensity, we run a second regression in which we interact civic capital with firm size, as measured by the number of workers. Specifically, we run the specification

$$\ln PSI_{i,j,s} = \alpha_0 + \alpha_1 PC_j + \alpha_2 PC_j \times \ln L_i + \ln X_i'\overline{\beta} + \ln Z_j'\overline{\delta} + \ln L_i \times \ln Z_j'\overline{\delta} + \gamma_r + \gamma_s + \epsilon_{i,j,s}. \tag{14}$$

In this equation, the interaction is captured by $PC_j \times \ln L_i$, where L_i is the number of workers of firm i. Accordingly, the interaction with firm size is repeated with each province level control, as given by the interaction term $\ln L_i \times \ln Z_j$.

We start the discussion of the results by a parsimonious specification in which we regress PSI on civic capital, controlling only for firm size and region fixed effects. The idea of this exercise is to minimize problems of endogeneity, given that we have a range of regressors which are potentially endogenous, such as the firm level productivity or the size of the service market.[67]

[Tables 10 and 11 about here]

Consider first Tables 10 which shows results from the estimation of a parsimonious version of equation (13). In columns (1)-(3) we employ each proxy of civic capital separately. As expected, the coefficient suggests a positive relationship between civic capital and PSI. However, the effect is significant only in the case of electoral turnout. In this case, an 1% increase in electoral turnout increases purchased service intensity by almost 0.5%. In column (4), we introduce all three proxies simultaneously. Performing an F-test of joint significance produces a p-value of 0.09, suggesting that the effect is marginally significant. In column (4), we employ the principal component which produces a coefficient that is statisically different from zero at

[66] For a detailed description see Table 9

[67] The fact that several provincial level controls such as financial development, the quality of contract enforcement human capital are likely to determined by the stock of civic capital further increases endogeneity problems.

the 5% level. The pattern becomes much clearer when we allow for nonlinearities in the relationship between civic capital and PSI. Table 11 shows the results from estimating a parsimonious version of equation (14) which introduces interaction between civic capital and firm size. Both the main effect of civic capital and its interaction are statistically different from zero, suggesting the presence of substantial non-linearities. The F-test that we perform on the three proxies in column (4) produce test statistics of 24.36 for the main effect and 44.71 for the interaction term confirming the pattern of columns (1) until (3). The fact that the coefficient of the interaction term is negative is in line with our expectation. It implies that the effect of civic capital decreases with firm size. As previously outlined, this pattern can be explained by the fact that it is easier for large firms to reach internal economies of scale in service provision, hence they rely less on external services (Merino and Rodrand, 2007; **?**). Consequently, civic capital becomes less relevant.

In Tables 12 and 13 we show the estimation results of equations (13) and (14), respectively. Consider first the case of Tables 12. The fact that we have introduce several controls does has change the picture with respect to Table [1]. The coefficient of civic capital is significant only in the case of electoral turnout. The p-value of the F-test performed on the three proxies in column (4) takes the value 0.057, suggesting that the three variables are jointly marginally significant, the same holds for the principal component in column (5). We therefore cannot convincingly argue that civic capital increases purchased service intensity.

On the other hand firm size, measured in terms of the number of workers, is positively associated with PSI: firms that hire more workers buy more services on the market with respect to a certain level of sales. The amount of fixed assets held, ceteris paribus, is also positively correlated to PSI: firms that are capital-intensive buy more services on the market as a share of sales. In both cases, the rise in service consumption could be due to demand for workers-related or capital-related services. For example, the larger the stock of machinery, the greater the expenditure on maintenance. After controlling for firm size and capital stock, the coefficient of value added reflects the relationship between firm productivity and PSI. The negative sign is explained by the fact that more productive firms are ceteris paribus larger in terms of sales which, in turn, increases the denominator of the PSI share. Concerning the provincial controls, we observe that the coefficients of the size of the local service market, overall market size and final demand all have positive signs but solely final demand is marginally significant. The reason for the unexpected pattern is that GDP and the size of the local service market is highly collinear. Performing an F-test of joint significance gives a test statistic which exceeds 40 in each specification, which implies that the two variables are jointly very significant.

Not surprisingly, the total number of service workers in the same province is positively correlated with PSI: a larger supply of services increases on average PSI. We are aware of an endogeneity problem here, because it could also be the case that it is the larger demand for services (higher PSI) to spur an increase in the average size of the local service market. The same is true for the local market size.

Again, the effect of civic capital becomes clear-cut when we allow for nonlinearities, as shown in table Table 13. This suggest that the results displayed in Table 11 are not driven by these confounding factors. Compared to Table 11, we observe a slight decrease in magnitude of the both the main effect and the interaction. Interestingly, while the quality of contract enforcement is not significantly related to PSI in Table 12, results reveal substantial nonlinearities in the relationship between the quality of contract enforcement and PSI. Specifically, the positive sign of the interaction term implies that the quality of

contract enforcement seems to have no effect on PSI only for large firms. As before, the explanation could be that small firms have to rely more on external service provision because they are unable to reach internal economies of scale. In order to present the results in a more compact way, we use the principal component as the sole measurement of civic capital for the rest of the paper.

[Table 14 about here]

Next, we perform sensitivity analysis. Specifically, in column (1) - (4) of Table 14 we split the sample into manufacturing and service sector firms. The idea is to provide evidence that the effect of civic capital on PSI does not hold for one particular subset of economic activity which then drives the overall results. Columns (1) and (2) show the results for the manufacturing sector. It is interesting to observe that there is no linear effect of civic capital on PSI, as shown by the negative coefficient in column (1). However, results in column (2) show that the effect is robust when we allow for nonlinearities. The magnitude of the effect is roughly unchanged. Columns (3) and (4) exhibit the results for firms which produces services. The linear effect is more pronounced in this case. Combining the evidence of column (1) and (3) suggests that the ambiguous pattern that we obtained in Tables 12 and 13 can be attributed to the fact that civic capital has a linear effect on PSI only for a subset of the sample. Also, the slight increase magnitude of the nonlinear effect of civic capital on PSI, as shown in column (4) reveals that civic capital seems to exert a stronger effect of PSI in the case of service firms. In the last two columns we split the sample according to the quality of contract enforcement. In principal, formal contract enforcement and trust are substitutes, as they both decrease the likelihood of contract breach. As a consequence, we expect the effect of civic capital to be more pronounced in areas where contract enforcement is weak. This reasoning is confirmed in the data. In column (5) we have included only those firms located in provinces whose quality of contract enforcement is better than the median quality, that is were the number of days necessary to end a civil trials is lower than the medium value. In these provinces, civic capital has no effect at all on PSI. Conversely, the effect is more pronounced in provinces with a low quality of contract enforcement, as shown in the last column.

[Table 15 about here]

Finally, we run several minor robustness checks for the the linear and non-linear case. In column (1) and (2) of Table [robust] we include additional firm level controls. These include firm age and the square, as well as an indicator of the shareholder structure. This indicator captures the extent to which firm ownership is dispersed among various shareholders. Specifically, the variable takes eight different values, depending on the number of known shareholders. The lower this indicator, the more dispersed is the ownership of the firm. If the shares are concentrated, the firm is likely to be part of a holding, which in turn could increase the purchased services. Similarly, older firms are likely to have better knowledge of reliable service providers which could introduce a positive relationship between age and However, the corresponding results do not show any variation in the main effect. Next, we include additional provincial controls. First, to the extent that final demand does not appropriately control for market size, we include provincial GDP. Second, we are concerned that our results are driven by the presence of industrial districts. Industrial districts can be described as a geographically limited agglomeration of mainly small scale manufacturing firms. It is likely that the location in these districts makes facilitates service outsourcing. we proxy the prevalence of

industrial districts by the share of industrial district workers over total provincial workforce. As columns (3) and (4) show, our results are not confounded by these variables. Strangely, our proxy for industrial districts is actually negatively correlated with PSI. We have mentioned previously that we have excluded from the sample those industries in which official authorities are very present. In columns (5) and (6) firms operating in these industries are included in the analysis without however affecting our results. Finally, in the last two columns we exclude provinces which host large cities, in particular the provinces of Rome, Milan and Turin. Results remain unchanged. If anything, we observe a slight increase in the effect.

3.5 Determinants of PSI: Instrumental Variables Estimates

In this section we show estimates from two stage least square exercises. The motivation to use instrumental variables stems from the fact that we want to exclude that our results are driven by omitted variables. Consider for example the case for unobservables at the local level. Even though we remove unobserved heterogeneity at the regional level, we cannot completely rule out that our results are driven by omitted factors which vary at a lower geographic scale which contemporaneously increase the stock of civic capital and induce firms to acquire more services on the market. Similarly, despite our firm level covariates we might suffer from unobserved firm heterogeneity which might bias our results. We overcome these problems by instrumenting the current stock of civic capital by historical variables. In particular, we use two sets of instruments. First, we measure the past stock of civic capital that prevailed during the middle of the 19th and beginning of the 20th century. The second set of instrument goes even further back in time and exploits information on the density of free-city states per province that existed before 1300. We are confident that the huge time lag of our instruments makes them immune against the threat of omitted variable bias potentially present in the OLS results.

The choice of using past values of civic capital as instruments is motivated by the fact that civic capital is highly persistent over time. For the case of Italy, (Putnam, 1993) conjectures that different political regimes at the beginning of the second millennium have determined the differences in the contemporaneous endowment of civic capital within the country. In particular, he stresses the role of the free-city states for the accumulation of civic capital. Free-city states lacked any form of centralized government. Rather they were founded by the local population in an attempt to solve problems of common interest, in particular the threat of foreign invasion. Consequently, individuals developed a strong sense of cooperation and concern for the common good which translated into high stocks of civic capital. The persistence over centuries has been confirmed both theoretically and empirically. From a theoretical point of view, models of intergenerational transmission of values show how the set of values and beliefs that account for the stock of civic capital are passed on from generation to generation. On the other hand, (Guiso et al., 2008a) show that the status of a free-city state has increased the stock of civic capital in a causal way. In line with this evidence, we find a strong first stage relationship.

3.5.1 Results

Table 16 shows the two-stage least squares results. In order to provide OLS estimations comparable to the 2SLS results, in columns (1) and (2) we have estimated equations (13) and (14), replacing the regional

dummies γ_r with macro region dummies.[68] Columns (3) and (4) show the results when we use electoral turnout in the 1920s and members in mutual aid societies as instruments. The two columns are two stage least squares counterparts of equations (13) and (14). Consider first column (3) in which we do not incorporate non-linearities. The first stage, shown in Panel B1 confirms the persistence of civic capital, as our instrument has a positive and significant effect on the stock of contemporaneous civic capital. Moreover, the exogenous variables explain a huge share of the total variation in civic capital. The second stage results depicted in Panel A are qualitatively similar to the OLS results in that civic capital has a positive impact on PSI. The magnitude of the effect is substantially higher than in the case of OLS. In contrast to the OLS estimates, however, the effect is now statistically significant. In column (4) we allow for nonlinearities in the effect of civic capital. Specifically, we have interacted both historical variables with firm size to instrument the interaction. Panel B1 and B2 again exhibit a strong relationship between instruments and instrumented variables. In the case of the interaction effect, shown in Panel B2, we have that the interaction of both turnout and members in mutual aid societies are significantly correlated with their current counterpart. Our set of instruments moreover explains a large share of the variations in the instrumented variable. In the case of the main effect the R^2 reaches 84%, in the case of the interaction term the R^2 is 0.81. For both instrumented variables, the F-statistic reveals that the instruments are jointly very significant. The corresponding second stage results are shown in Panel A. They are in line with the OLS results. The interaction term is identical in terms of magnitude to the OLS interaction, the main effect displays a slight increase.

Finally, in the last column we use information on the free-city experience as instruments. A free-city state in a province before 1300 increases significantly the stock of civic capital compared to provinces without free-cities. As expected, the increase is even larger if the province hosts two free-city states. The exogenous variables in this specification explain two thirds of the total variation in current civic capital and the three dummies are jointly very significant. Again, the second stage results underline the importance of civic capital for service outsourcing.

3.6 Conclusion

The focus of this paper is to analyze empirically the extent of opportunism on business outsourcing. TCE predicts that contractual hazards due to asset specificity, complexity or uncertainty are further exacerbated when the exchange takes place in an environment where opportunistic behavior is widespread. In such an environment, more transactions take place within firms than in an arm's length relationship, ceteris paribus. To identify the effect of opportunism, we exploit the high variation of social capital in Italy. By definition, high social capital allows individuals to overcome free rider problems in groups, hence agents are more likely to forgo immediate material gains in favor of socially beneficial outcomes, in our case the realization of a transaction. Consequently, high social capital is associated with low opportunism. social capital is measured at the provincial level and gauged by electoral turnout in referenda, volunteering and blood donation. The extent of business outsourcing is measured by purchased service intensity, the share of the amount spent on services over total sales.

As predicted by the transaction cost literature, social capital turns out to be an effective safeguard against contractual hazards. In particular, a one standard increase in social capital leads to an increase in purchased service intensity by 4%-6%, depending on the measure of social capital. In other words, if Naples had the level of social capital of Belluno (a increase twice the standard deviation), its purchased service intensity increased from 28,4 to 32 percent. This effect is robust against the inclusion of varios firm level covariates, such as firm size, capital stock and value added and province level controls, including quality of contract

[68] This set of geographic controls consists of five areas: North West, North East, Center, South and Islands.

enforcement, the size of the service market, overall market size and financial development. Moreover, we find that the effect of social capital on PSI depends on firm size. In particular, smaller firms are more sensitive to the stock of social capital. We believe that missing internal economies of scale in service provision in small firms and the resulting higher dependency on external service providers drives this result.
Finally, two caveats are in order. Firstly, we limit our interpretation in that we provide theoretically appealing, robust correlations. Indeed, our estimations can't be given a causal relationship as the included covariates are endogenous. Secondly, due to data restrictions we are unable to distinguish different service inputs. For policy reasons, however, it would be desirable to differentiate among the various kinds of services, in order to identify more precisely the contractual difficulties to improve exchange performance and overall welfare.

3.7 Appendix

3.7.1 Definition of Purchased Services

Under the Italian accounting system, the exact amount of purchased services is reported in a specific item in the profit and loss account of each firm in the section dedicated to the costs of production. This item contains all the services expenses coming from ordinary firm activity. The list that follows provides some of the most common services purchases: Electricity, telephone, fax, water, gas etc. - Travel and accommodation expenses - Repairing and maintenance carried out by external firms - Intermediate production stages outsourced to external firms - Advising in the technical, legal, fiscal, administrative, commercial and accounting fields - Advertising and marketing - Commissions and reimbursement of expenses for agents and representatives - Vigilance and security - Cleaning - Remunerations and reimbursements paid to administrators and auditors - Costs for the personnel temporary hired from other firms - Costs for the canteen, nursery school, holiday camps, employees clubs, etc. (these costs are net of the amount of money that is to charged to employees) - Costs for luncheon vouches distributed to employees - Costs for refresher courses for employees. - Costs for board and lodging of employees in secondment. The item B7 also lists costs for services provided by banks and financial agencies different from true financial charges. Those include: rental fees for safe-deposit boxes, service payments for utilization fees, costs for safe-keeping of bonds, commissions for bond bails (if not held to obtain financing), expenses and commissions for factoring (excluding financial charges), expenses for valuation of real estates to obtain loans, expenses for preliminary investigations of real estates and financing (in general, all those expenses different from interests and discounts, commissions of financing and bank charges and their collaterals.)

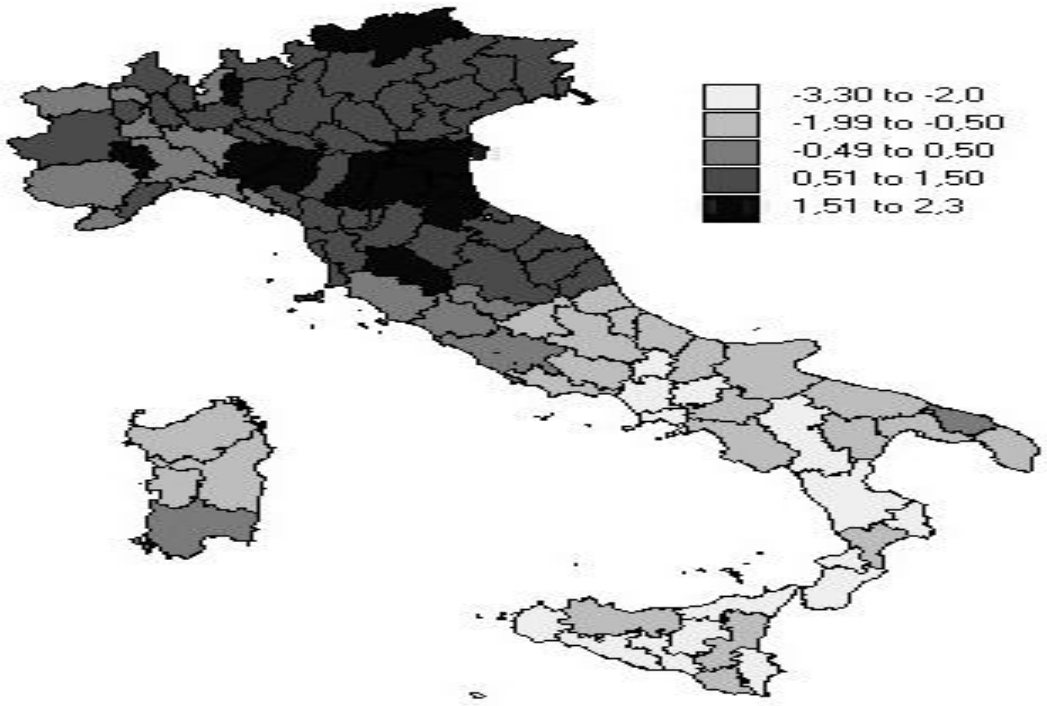

Figure 10: Map of civic capital measured by the first principal component of blood donations, volunteering, and electoral turnout.

Table 8: Correlation among the proxies of civic capital

	Referenda turnout (log)	Volunteers (log)	Blood donations (log)
Volunteers (log)	0.69	1	
Blood donations (log)	0.61	0.57	1
Principle component	0.89	0.87	0.84

Note: The number of observations is 103. *Blood donations* is the log of the number of blood donations per 100,000 inhabitants inn 2002; *Volunteers* is the log of the number of volunteers in non-profit institutions per 100,000 inhabitants in 2000; *Referenda turnout* is the log of the average electoral turnout in referenda between 1946 and 1987; *Principal component* is the the first principal component of the above mentioned three proxies of civic capital. All correlations are statistically different from zero at the 1% level.

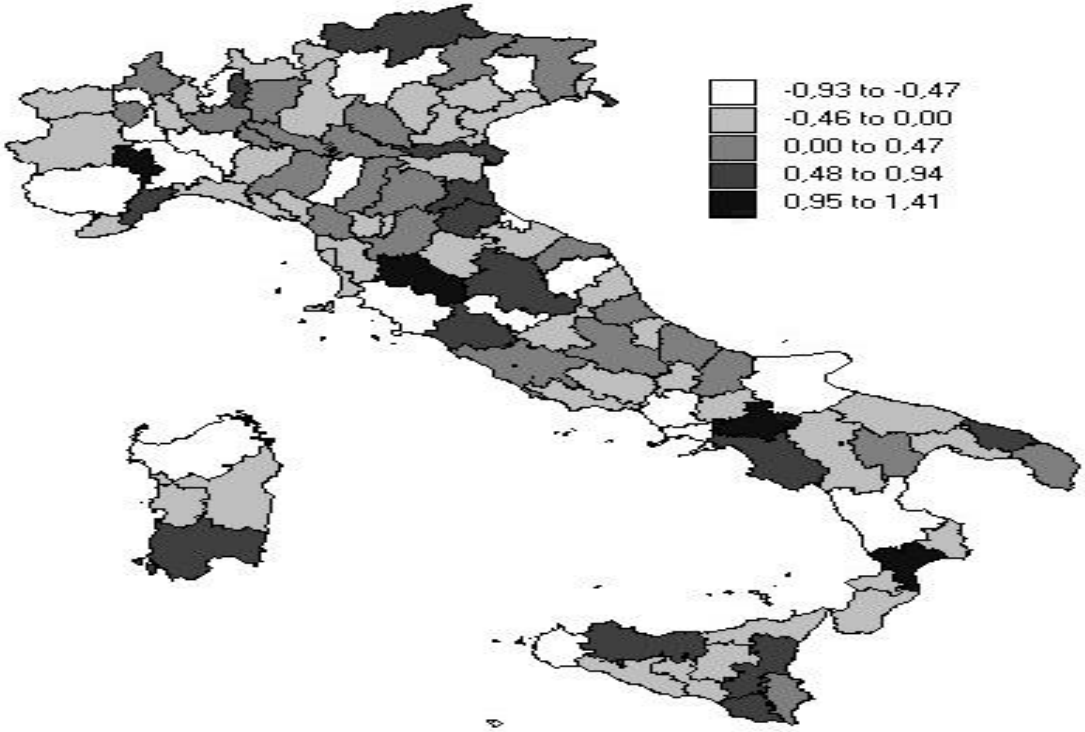

Figure 11: Map of civic capital measured by the variation of the first principal component within regions. The figure plots the residuals of a regression of the provincial principal component on regional dummies.

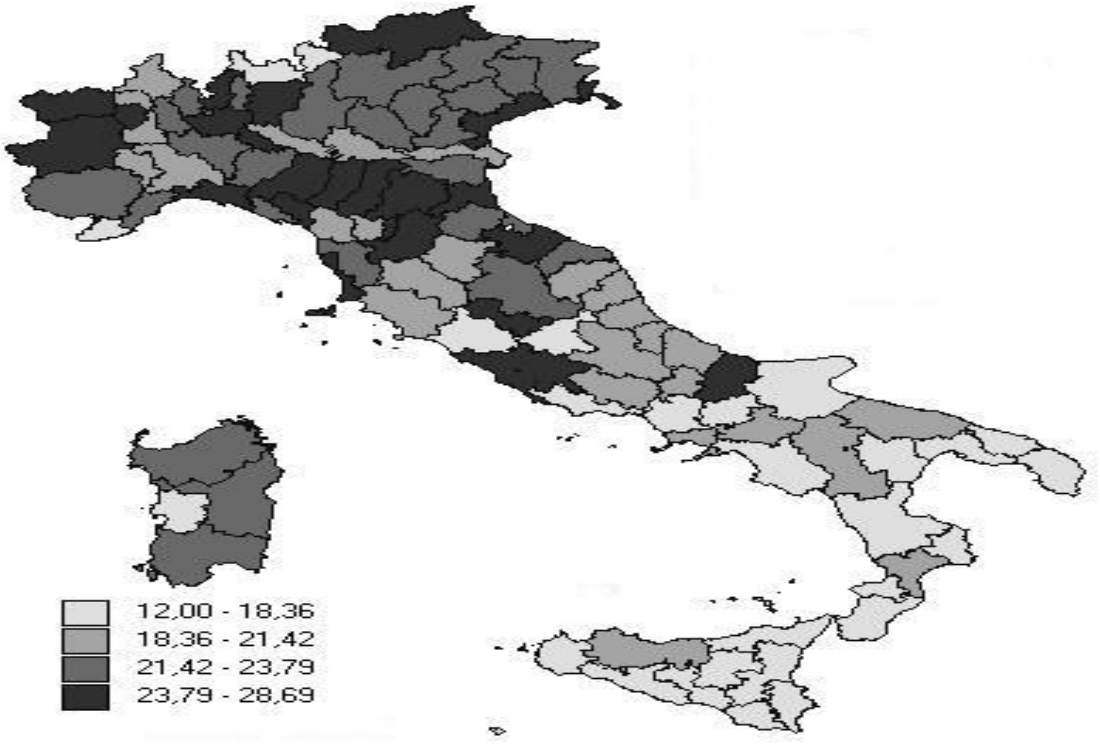

Figure 12: Purchased Service Intensity (Provincial Averages)

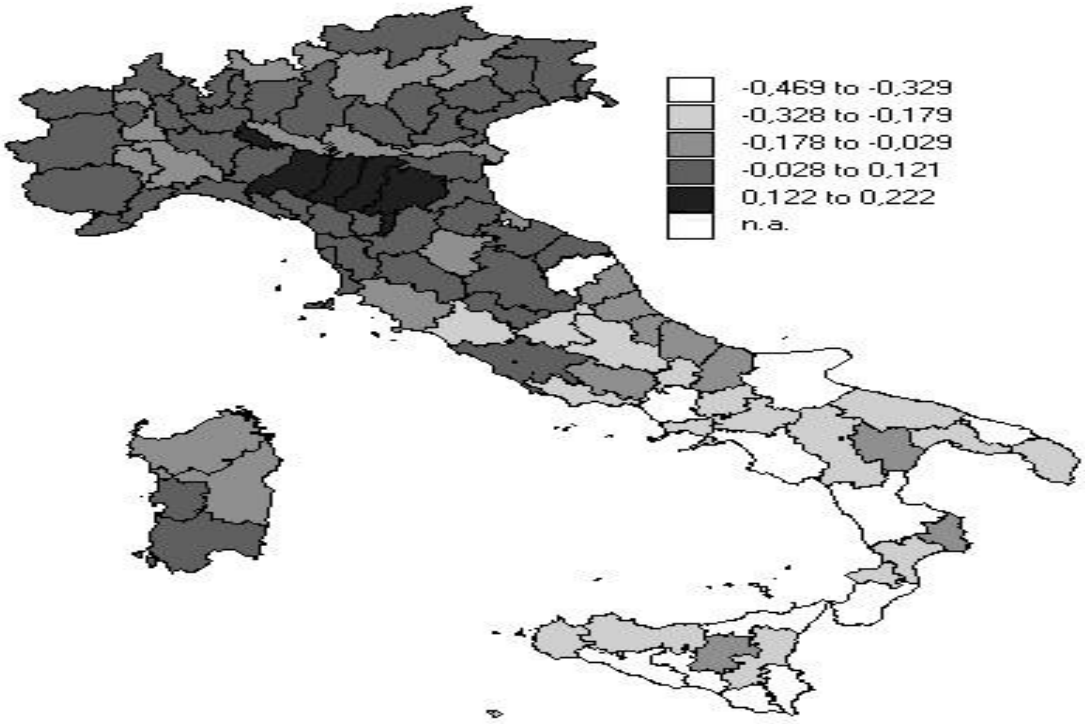

Figure 13: Purchased Service Intensity after removing industry fixed effects. The figure plots the average provincial residuals of a regression of PSI on four digit industry dummies.

Table 9: Descriptive statistics

Variable	Obs.	Mean	S.D.	Min	Max	1st Quartile	Median	3rd Quartile
Dependent variable								
Purchased Service Intensity (log)	93822	2.782	0.912	0.055	4.807	2.18	2.87	3.412
Civic capital variables								
Blood donations (log)	103	3.568	0.415	2.501	4.44	3.285	3.635	3.842
Volunteers (log)	103	8.533	0.627	7.097	10.007	8.146	8.599	8.928
Referenda turnout (log)	103	4.378	0.108	4.129	4.516	4.3	4.419	4.466
Principal component (log)	103	0	1.5	-3.347	2.307	-1.231	0.439	1.13
Historical instrumental variables								
Aid societies in 1873 (log)	20	4.03	0.092	3.824	4.208	3.97	4.028	4.08
Turnout in 1920s (log)	20	6.247	0.976	4.159	7.465	5.408	6.54	7.071
Number of free-city states	67	0.85	0.78	0	3	0	1	1
Firm Level Covariates								
# of Workers (log)	93822	2.377	1.127	0	5.394	1.609	2.398	3.178
Capital Stock (log)	93822	12.006	2.251	0	16.11	10.917	12.182	13.46
Value Added (log)	93822	6.2	1.143	2.447	8.934	5.494	6.24	6.962
Age (log)	93822	2.441	0.969	0	4.625	1.946	2.639	3.045
Province Level Covariates								
# Service Workers (log)	103	9.304	0.898	7.593	12.628	8.734	9.227	9.803
# KIBS Service Workers (log)	103	10.827	0.825	8.97	13.739	10.294	10.718	11.289
Length of Trials (log)	103	6.942	0.345	6.19	7.72	6.724	6.925	7.177
Final Demand (log)	4022	10.101	3.643	2.676	14.414	9.799	11.338	12.271
GDP (log)	103	15.793	0.798	14.051	18.565	15.234	15.709	16.245
Bank Branches (log)	103	1.594	0.444	-0.661	2.327	1.274	1.722	1.914
University Graduates (log)	103	1.854	0.175	1.455	2.453	1.733	1.846	1.935
# Share Industrial District (log)	103	5.168	3.593	0	9.199	0	6.997	8.132

Note: The table provides descriptive statistics for the variables used in the regressions. The dependent variables is: *Purchased Service Intensity* is the log of the ratio of purchased services over sales;
Firm Level Covariates are: *# of Workers* is the log of the number of workers; *Capital Stock* is the log of firm's capital stock, measured as the value of tangible assets in Euros; *Age* is the log of firm age; *Value added* is the log of the firm's value added in 1000 Euros;
We consider the following variables to measure civic capital: *Blood donations* is the log of the number of blood donations per 100,000 inhabitants in 2002; *Volunteers* is the log of the number of volunteers in non-profit institutions per 100,000 inhabitants in 2000; *Referenda turnout* is the log of the average electoral turnout in referenda between 1946 and 1987; *Principal component* is the first principal component of the above mentioned three proxies of social capital.
The historical instruments are: *Aid societies in 1873* is the log of the members of mutual aid societies per 100,000 inhabitants in 1873; *Turnout in 1920s* is the the log of turnout in the elections that took place in Italy in the 1920s.
The provincial controls are: *# Service workers* is the log of the number of workers in service industries (NACE 1.1. Codes 50-74); *# KIBS Service workers* is the log of the number of workers in knowledge intensive business service industries (NACE 1.1. Codes 72-74); *# Share Industrial District* is the log of the number of workers in industrial districts per 100 000 workers (NACE 1.1. Codes 50-74); *Final demand* is the log of weighted population, with weights obtained from Input-Output Use tables; *University graduates* is the log of the share of university graduates over total population; *Bank branches* is the log of the number of bank branches per 1000 inhabitants; *Length of labor trials* is the log of the number of days it takes to complete a first-degree trial in labor-related affairs. Unless otherwise stated, the data refer to the year 2001.

Table 10:

Dep.Var.: Log of PSI

	1	2	3	4	5
	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se
Turnout (log)	0.473**			0.496**	
	(0.23)			(0.25)	
Blood Donations		0.023		0.032	
		(0.03)		(0.03)	
Volunteers (log)			0.041	0.035	
			(0.03)	(0.03)	
Principal Component					0.037**
					(0.02)
Size (log)	0.005	0.005	0.005	0.005	0.005
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Regional dummies	Yes	Yes	Yes	Yes	Yes
r2	0.027	0.026	0.026	0.027	0.027
N	93822	93822	93822	93822	93822

Dependent Variable is the log of Purchased Service Intensity. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

Table 11:

Dep.Var.: Log of PSI

	1	2	3	4	5
	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se
Turnout (log)	1.073***			0.692**	
	(0.25)			(0.29)	
Turnout (log) * Size (log)	-0.264***			-0.101	
	(0.06)			(0.08)	
Blood Donations (log)		0.181***		0.104**	
		(0.04)		(0.04)	
Blood Donations (log) * Size (log)		-0.069***		-0.033***	
		(0.01)		(0.01)	
Volunteers (log)			0.143***	0.078*	
			(0.03)	(0.04)	
Volunteers * Size (log)			-0.043***	-0.019*	
			(0.01)	(0.01)	
Principal Component					0.084***
					(0.02)
Principal Component * Size (log)					-0.021***
					(0.00)
Size (log)	1.170***	0.258***	0.381***	0.735**	0.016*
	(0.27)	(0.05)	(0.07)	(0.29)	(0.01)
Regional dummies	Yes	Yes	Yes	Yes	Yes
F-test of joint sign. (p-value)				0.000	
F-test of joint sign. (p-value) int.				0.000	
r2	0.028	0.027	0.028	0.028	0.028
N	93822	93822	93822	93822	93822

Dependent Variable is the log of Purchased Service Intensity. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

Table 12:

Dep.Var.: Log of PSI

	1	2	3	4	5
	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se
Turnout (log)	0.469**			0.517**	
	(0.22)			(0.21)	
Blood Donations (log)		0.007		0.024	
		(0.02)		(0.02)	
Volunteers (log)			0.013	0.011	
			(0.02)	(0.02)	
Principal Component					0.020*
					(0.01)
Size (log)	0.029**	0.029**	0.029**	0.029**	0.029**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Capital Stock (log)	0.021***	0.021***	0.021***	0.021***	0.021***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Value Added (log)	-0.050***	-0.050***	-0.050***	-0.050***	-0.050***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Service (log)	0.057***	0.053***	0.052***	0.057***	0.053***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Final Demand (log)	0.008**	0.009**	0.009**	0.008**	0.008**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Length of Trials (log)	-0.020	-0.009	-0.010	-0.023	-0.014
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Bank Branches (log)	0.008*	0.008*	0.007*	0.006	0.005
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
University Graduates (log)	-0.080*	-0.048	-0.051	-0.088**	-0.062
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Regional dummies	Yes	Yes	Yes	Yes	Yes
F-test of joint sign. (p-value)				0.057	
r2	0.033	0.032	0.032	0.033	0.032
N	93822	93822	93822	93822	93822

Dependent Variable is the log of Purchased Service Intensity. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

Table 13:

Dep.Var.: Log of PSI

	1	2	3	4	5
	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se
Turnout (log)	0.980***			0.726***	
	(0.24)			(0.27)	
Turnout (log) * Size (log)	-0.220***			-0.103	
	(0.05)			(0.07)	
Blood Donations (log)		0.139***		0.084**	
		(0.04)		(0.04)	
Blood Donations (log) * Size (log)		-0.057***		-0.028**	
		(0.01)		(0.01)	
Volunteers (log)			0.101***	0.056	
			(0.03)	(0.04)	
Volunteers * Size (log)			-0.037***	-0.019	
			(0.01)	(0.01)	
Principal Component					0.065***
					(0.01)
Principal Component * Size (log)					-0.020***
					(0.00)
Size (log)	0.726***	0.060	0.116	0.571***	-0.143*
	(0.22)	(0.11)	(0.14)	(0.21)	(0.08)
Capital Stock (log)	0.022***	0.021***	0.021***	0.022***	0.022***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Value Added (log)	-0.051***	-0.051***	-0.051***	-0.051***	-0.052***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Service (log)	0.057***	0.055***	0.056***	0.059***	0.055***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Service(log) * Size (log)	-0.000	-0.001	-0.002	-0.001	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Final Demand (log)	0.007	0.007	0.007	0.007	0.007
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Final Demand (log) * Size (log)	0.001	0.001	0.001	0.001	0.001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Length of Trials (log)	-0.123***	-0.092**	-0.109**	-0.098**	-0.088**
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Length of Trials (log) * Size (log)	0.042***	0.033**	0.038***	0.029**	0.029**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Bank Branches (log)	-0.019	-0.014	-0.017	-0.031**	-0.032**
	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)
Bank Branches (log) * Size (log)	0.010*	0.009	0.010	0.015**	0.015**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
University Graduates (log)	-0.032	0.021	-0.004	-0.041	-0.015
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
University Graduates (log) * Size (log)	-0.018	-0.027	-0.018	-0.017	-0.017
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Regional dummies	Yes	Yes	Yes	Yes	Yes
F-test of joint sign. (p-value)				0.000	
F-test of joint sign. (p-value) int.				0.000	
r2	0.034	0.034	0.034	0.034	0.034
N	93822	93822	93822	93822	93822

Dependent Variable is the log of Purchased Service Intensity. ***,**,* denote ¿ significance at the 1%, 5%, 10% level, respectively.

Table 14:

Dep.Var.: Log of PSI

	(1) Manuf. Coef./se	(2) Manuf. Coef./se	(3) Services Coef./se	(4) Services Coef./se	(5) Good JQ Coef./se	(6) Bad JQ Coef./se
Principal Component	-0.001	0.066***	0.033**	0.085***	0.045	0.084***
	(0.01)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)
Principal Component * Size (log)		-0.024***		-0.027***	-0.009	-0.033***
		(0.00)		(0.01)	(0.01)	(0.01)
Size (log)	0.078***	-0.113	-0.025	-0.188**	0.035	-0.457**
	(0.01)	(0.13)	(0.02)	(0.08)	(0.17)	(0.23)
Capital Stock (log)	0.016***	0.016***	0.023***	0.023***	0.021***	0.022***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Value Added (log)	-0.074***	-0.075***	-0.027*	-0.030*	-0.068***	-0.028
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)
Service (log)	0.023**	0.028	0.073***	0.058***	0.057***	0.077***
	(0.01)	(0.03)	(0.01)	(0.02)	(0.02)	(0.02)
Service (log) * Size (log)		-0.002		0.006	-0.004	-0.005
		(0.01)		(0.01)	(0.00)	(0.01)
Final Demand (log)	0.003	0.006	0.014**	0.022**	0.010	0.003
	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Final Demand (log) * Size (log)		-0.001		-0.003	0.001	0.002
		(0.00)		(0.00)	(0.00)	(0.00)
Length of Trials (log)	0.001	-0.109	-0.046	-0.078**	-0.035	-0.154
	(0.04)	(0.08)	(0.03)	(0.03)	(0.10)	(0.10)
Length of Trials (log) * Size (log)		0.037*		0.013	0.004	0.066*
		(0.02)		(0.01)	(0.02)	(0.04)
Bank Branches (log)	0.009	-0.025	-0.005	-0.042***	-0.020	-0.033
	(0.01)	(0.02)	(.)	(0.02)	(0.02)	(0.08)
Bank Branches (log) * Size (log)		0.012**		0.018**	0.005	0.073**
		(0.01)		(0.01)	(0.00)	(0.03)
University Graduates (log)	-0.037	0.010	-0.093	-0.102	-0.090	0.025
	(0.06)	(0.18)	(0.06)	(0.08)	(0.10)	(0.12)
University Graduates (log) * Size (log)		-0.015		0.010	0.006	-0.043
		(0.05)		(0.03)	(0.03)	(0.04)
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.035	0.038	0.038	0.041	0.012	0.040
N	35547	35547	46390	46390	57706	36070

Dependent Variable is the log of Purchased Service Intensity. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

Table 15:

Dep.Var.: Log of PSI

	IDall	IDall	Serv2	Serv2	All	All	Suburb	Suburb	City	City
	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se
Principal Component	0.020*	0.065***	0.021*	0.073***	0.020*	0.065***	0.021*	0.062***	0.025**	0.073***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Principal Component * Size (log)		-0.020***		-0.023***		-0.020***		-0.018***		-0.021***
		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
Firm Age (log)	0.019	0.013								
	(0.01)	(0.01)								
Firm Age squared (log)	-0.006**	-0.005*								
	(0.00)	(0.00)								
Share Industr. District (log)	-0.004		-0.004	-0.011**						
	(0.00)		(0.00)	(0.00)						
Share Industr. District (log) * Size (log)				0.003**						
				(0.00)						
GDP (log)			0.058	-0.064						
			(0.06)	(0.07)						
GDP (log) * Size (log)				0.062***						
				(0.02)						
All Services (log) * Size (log)						-0.001				
						(0.00)				
All Services (log)					0.056***	0.057***				
					(0.01)	(0.01)				
Firm Level Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province Covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Interactions	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Regional dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.033	0.035	0.032	0.035	0.032	0.034	0.033	0.035	0.036	0.038
N	93822	93822	93822	93822	93822	93822	97133	97133	72650	72650

Table 16: Instrumental variables analysis

Panel A: Second Stage (Dependent var. is ln PSI)					
	(1)	(2)	(3)	(4)	(5)
	OLS	OLS	2SLS	2SLS	2SLS
	Coef./se	Coef./se	Coef./se	Coef./se	Coef./se
Principal Component	0.045***	0.083***	0.092***	0.138***	0.043**
	(0.01)	(0.01)	(0.02)	(0.03)	(0.02)
Principal Component * Size (log)		-0.019***		-0.022***	
		(0.00)		(0.01)	
Size (log)	0.028**	-0.821***	0.028**	-0.685***	0.028**
	(0.01)	(0.18)	(0.01)	(0.19)	(0.01)
Capital Stock (log)	0.021***	0.021***	0.021***	0.021***	0.021***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Value Added (log)	-0.050***	-0.051***	-0.050***	-0.052***	-0.057***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Macro Region Dummy	Yes	Yes	Yes	Yes	Yes
Province Covariates	Yes	Yes	Yes	Yes	Yes
Interactions	No	No	No	Yes	No
Hansen test of overidentif. (p-value)					0.1075
r2	0.031	0.033	0.029	0.032	0.009
N	93822	93822	93822	93822	77892
Panel B1: First Stage (Dependent var. is Principal Component)					
			Coef./se	Coef./se	
Turnout 1920s (log)			4.752***	5.459***	
			(0.92)	(1.07)	
Turnout 1920s (log) × ln Size				-0.447**	
				(0.22)	
Aid Societies 1873 (log) × ln Size				0.059	
				(0.04)	
1 free-city state in 1300					0.404***
					(0.15)
2 free-city state in 1300					0.728***
					(0.16)
3 free-city state in 1300					-0.178
					(0.23)
Macro Region Dummy	Yes	Yes	Yes	Yes	Yes
F-test of joint sign. (p-value)			0.000	0.000	0.000
r2			0.835	0.84	0.658
Panel B2: First Stage (Dependent var. is Prin.Comp × ln Size)					
Turnout 1920s (log)					-2.958
					(2.75)
Turnout 1920s (log) * Size (log)					4.414***
					(1.25)
Aid Societies 1873 (log) * Size (log)					0.635***
					(0.19)
F-test of joint sign. (p-value)				0.000	
r2				0.804	

Dependent Variable is the log of Purchased Service Intensity. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

References

Aghion, P. and J. Tirole, 1997: Formal and real authority in organizations. *Journal of Political Economy*, **105**(1), 1–29.

Akerlof, G. A., 1982: Labor Contracts as Partial Gift Exchange. *The Quarterly Journal of Economics*, **97**(4), 543–69.

Alchian, A. A. and H. Demsetz, 1972: Production, Information Costs, and Economic Organization. *American Economic Review*, **62**(5), 777–795.

Algan, Y. and P. Cahuc, 2010: Inherited Trust and Growth. *American Economic Review*, **100**(5), 2060–92.

Andreoni, J. and J. Miller, 2002: Giving according to garp: An experimental test of the consistency of preferences for altruism. *Econometrica*, **70**(2), 737–753.

Arrow, K., 1972: Gifts and exchanges. *Philosophy and Public Affairs*, **4**(1), 343–62.

Arrow, K. J., 1968: The Economics of Moral Hazard: Further Comment. *American Economic Review*, **58**(3), pp. 537–539.

Baker, G., R. Gibbons, and K. Murphy, 2002: Relational contracts and the theory of the firm. *Quarterly Journal of Economics*, **117**(1), 39–84.

Banfield, E., 1958: *The Moral Basis of a Backward Society*. The Free Press, New York.

Beck, T. and R. Levine, 2003: Legal Institutions and Financial Development. NBER Working Papers 10126, National Bureau of Economic Research.

Becker, G. S. and K. M. Murphy, 1992: The Division of Labor, Coordination Costs, and Knowledge. *Quarterly Journal of Economics*, **107**(4), 1137–1160.

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

Bloom, N., R. Sadun, and J. V. Reenen, 2009: The organization of firms across countries. NBER Working Papers 15129, National Bureau of Economic Research.

Bürker, M. and G. A. Minerva, 2010: Civic Capital, Firms' Size and Purchased Service Intensity in Italy. Paper presented at the 51st Annual Congress of the Italian Economic Association, University of Catania, Italy.

Buonanno, P., D. Montolio, and P. Vanin, 2009: Does Social Capital Reduce Crime? *Journal of Law & Economics*, **52**(1), 145–170.

Camerer, C. and R. Thaler, 1995: Ultimatums, Dictators, and Manners. *Journal of Economic Perspectives*, **9**(2), 209–219.

Cameron, A. C. and D. L. Miller, 2010: Robust Inference with Clustered Data. Working Papers 107, University of California, Davis, Department of Economics.

Campbell, J. and H. Hopenhayn, 2005: Market size matters. *Journal of Industrial Economics*, **53**(1), 1–25.

Cartocci, R., 2007: *Mappe del tesoro: Atlante del capitale sociale in Italia*. Il Mulino, Bologna.

Casadesus-Masanell, R., 2004: Trust in agency. *Journal of Economics & Management Strategy*, **13**(3), 375–404.

Chandler, A., 1962: *Strategy and Structure*. MIT Press, Cambridge, MA.

Chen, Y., 2000: Promises, Trust, and Contracts. *Journal of Law, Economics and Organization*, **16**(1), 209–32.

Coase, R., 1937: The Nature of the Firm. *Economica*, **4**, pp. 386–405.

Coleman, J., 1990: *Foundations of Social Theory*. Cambridge, MA: Harvard University Press, New York.

de Blasio, G. and G. Nuzzo, 2010: Historical traditions of civicness and local economic development. *Journal of Regional Science*, **50**(4), 833–857.

DeBandt, J., 1996: Business services: Markets and transactions. *Review of Industrial Organization*, **11**(1), 19–33.

Dessein, W., 2002: Authority and communication in organizations. *Review of Economic Studies*, **69**(4), 811–838.

Falk, A. and U. Fischbacher, 2006: A theory of reciprocity. *Games and Economic Behavior*, **54**(2), 293–315.

Fehr, E., 2009: On The Economics and Biology of Trust. *Journal of the European Economic Association*, **7**(2-3), 235–266.

Fehr, E. and U. Fischbacher, 2002: Why Social Preferences Matter - The impact of Non-Selfish Motives on Competition, Cooperation and Incentives. *Economic Journal*, **112**(478), 1–33.

Fehr, E. and K. Schmidt, 1999: A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics*, **114**(3), 817–868.

Fukuyama, F., 1995: *Trust: The Social Virtues and the Creation of Prosperity*. Free Press, New York.

Guiso, L., P. Sapienza, and L. Zingales, 2004: The Role of Social Capital in Financial Development. *American Economic Review*, **94**(3), 526–556.

Guiso, L., P. Sapienza, and L. Zingales, 2008a: Long Term Persistence. NBER Working Papers 14278, National Bureau of Economic Research.

Guiso, L., P. Sapienza, and L. Zingales, 2008b: Social capital as good culture. *Journal of the European Economic Association*, **6**(2-3), 295–320.

Guiso, L., P. Sapienza, and L. Zingales, 2010: Civic Capital as the Missing Link. NBER Working Papers 15845, National Bureau of Economic Research.

Helsley, R. W. and W. C. Strange, 2007: Agglomeration, opportunism, and the organization of production. *Journal of Urban Economics*, **62**(1), 55–75.

Holmes, T., 1999: Localization of industry and vertical disintegration. *Review of Economics and Statistics*, **81**(2), 314–325.

Holmes, T. J. and J. J. Stevens, 2002: Geographic Concentration and Establishment Scale. *Review of Economics and Statistics*, **84**(4), 682–690.

Holmstrom, B., 1982: Moral Hazard in Teams. *Bell Journal of Economics*, **13**(2), 324–340.

Ichino, A. and G. Maggi, 2000: Work Environment and Individual Background: Explaining Regional Shirking Differentials in a Large Italian Firm. *Quarterly Journal of Economics*, **115**(3), 1057–1090.

Inglehart, R. and W. Baker, 2000: Modernization, cultural change, and the persistence of traditional values. *American Sociological Review*, **65**(1), 19–51.

Jacobs, J., 1969: *The economy of cities*. Vintage, New York.

Jolliffe, I. T., 2002: *Principal Component Analysis*. Springer, New York.

Joskow, P. L., 1985: Vertical Integration and Long-term Contracts: The Case of Coal-burning Electric Generating Plants. *Journal of Law, Economics and Organization*, **1**(1), 33–80.

Kumar, K. B., R. G. Rajan, and L. Zingales, 1999: What Determines Firm Size? NBER Working Papers 7208, National Bureau of Economic Research.

La Porta, R., F. L. de Silanes, A. Shleifer, and R. W. Vishny, 1997: Legal Determinants of External Finance. *Journal of Finance*, **52**(3), 1131–50.

Laeven, L. and C. Woodruff, 2007: The Quality of the Legal System, Firm Ownership, and Firm Size. *Review of Economics and Statistics*, **89**(4), 601–614.

Lafontaine, F. and M. Slade, 2007: Vertical Integration and Firm Boundaries: The Evidence. *Journal of Economic Literature*, **45**(3), 629–685.

Li, B. and Y. Lu, 2009: Geographic concentration and vertical disintegration: Evidence from China. *Journal of Urban Economics*, **65**(3), 294–304.

Lu, Y. and Z. Tao, 2009: Contract enforcement and family control of business: Evidence from China. *Journal of Comparative Economics*, **37**(4), 597–609.

Malanima, P., 2005: Urbanisation and the Italian economy during the last millenium. *European Review of Economic History*, **9**, 97–122.

Melitz, M. J. and G. I. P. Ottaviano, 2008: Market size, trade, and productivity. *Review of Economic Studies*, **75**(1), 295–316.

Merino, F. and D. Rodrand, 2007: Business services outsourcing by manufacturing firms. *Industrial and Corporate Change*, **16**(6), 1147–1173.

Moulton, B. R., 1990: An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units. *The Review of Economics and Statistics*, **72**(2), 334–338.

Ono, Y., 2003: Outsourcing business services and the role of central administrative offices. *Journal of Urban Economics*, **53**(3), 377–395.

Penrose, E. T., 1959: *The Theory of the Growth of the Firm*. Oxford University Press, Oxford.

Percoco, M., 2011: Entrepreneurship, Social Capital and Institutions: Evidence from Italy. Working paper, Bocconi University, Milan.

Portes, A., 1998: Social Capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, **24**, 1–24.

Putnam, R., 1993: *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton University Press, Princeton.

Rajan, R. G. and L. Zingales, 1998: Financial Dependence and Growth. *American Economic Review*, **88**(3), 559–86.

Rothstein, B., 2000: Trust, social dilemmas and collective memories. *Journal of Theoretical Politics*, **12**(4), 477–501.

Sapienza, P., A. Toldra Simats, and L. Zingales, 2007: Understanding Trust. CEPR Discussion Papers 6462, Centre for Economic Policy Research.

Schwartz, A., 1993: Subservient Suburbia - The Reliance of Large Suburban Companies on Central City Firms for Financial and Professional Services. *Journal of the American Planning Association*, **59**(3), 288–305.

Spagnolo, G., 1999: Social relations and cooperation in organizations. *Journal of Economic Behavior & Organization*, **38**(1), 1–25.

Syverson, C., 2004: Market structure and productivity: A concrete example. *Journal of Political Economy*, **112**(6), 1181–1222.

Tabellini, G., 2008: The scope of cooperation: Values and incentives. *Quarterly Journal of Economics*, **123**(3), 905–950.

Tabellini, G., 2010: Culture and institutions: Economic development in the regions of Europe. *Journal of the European Economic Association*, **8**(4), 677–716.

Williamson, O. E., 1979: Transaction-Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics*, **22**(2), 233–261.

Williamson, O. E., 1985: *The Economic Institutions of Capitalism*. The Free Press, New York.

Williamson, O. E., 1996: *The Mechanisms of Governance*. Oxford University Press, New York.

4 Chapter 3: Civic Capital and the Performance Differentials between Foreign and Domestic Firms

4.1 Introduction

The question of whether affiliates of multinational firms outperform purely domestic firms has attracted huge attention in the literature. The internalization literature (caves1996) stresses that multinational firms possess sophisticated assets which lack domestic firms, including managerial expertise, process and production technologies or brand names. These assets are then transferred to their local affiliates which increase their performance above that of their domestic counterparts. On the other hand, this literatures stresses the role of assimilation costs that foreign firms have to incur when operating in a foreign country. Accordingly, these costs tend to decrease the performance of foreign affiliates as compared to domestic firms. Empirical evidence which analyze this topic abounds (**?????**). This huge intellectual interest notwithstanding, no clear consensus has been reached in this question.

In this paper, we introduce a new dimension into this discussion. In particular, we allow for geographic heterogeneity in the effect of foreign ownership on firm performance: Employing Italian firm level data, we show that the effect of foreign ownership on firm performance depends on the stock of civic capital prevailing in the area in which the firm is located. The reason is that the foreign firms are plagued by substantial governance costs as they operate in culturally different countries. This increases problems of coordination and information processing. Moreover, managing affiliates from distant headquarters exacerbates the incidence of agency problems (**??**). By reducing the scope of opportunistic behavior, civic capital alleviates agency problems and enhances cooperation in intra-firm interactions. Hence, civic capital reduces governance costs of firms which improves firm performance. Using panel data on Italian manufacturing firms, we take this prediction to the data. Focusing on Italy is particularly convenient for our exercise, as the intense investigation of civic capital in this country (Banfield, 1958; Putnam, 1993; Guiso et al., 2004) has produced a range of indirect measure of civic capital. Specifically, as in Guiso et al. (2004), we proxy civic capital by the number of blood donations and electoral turnout in referenda. The third proxy is the number of volunteers in non-profit organizations per province. In order to minimize problems of measurement error, we extract the first principal component.

Results confirm the hypothesis that civic capital reduces assimilation costs of foreign firms. Our estimation approach rests on a two stage approach. In the first stage we estimate total factor productivity by the semi-parametric approach proposed by **?**. The obtained firm productivity is then regressed on our variables of interest, in particular the interaction between a dummy identifying a foreign firm and the stock of local civic capital, measured at the provincial level. During the estimation process, we explicitly take unobserved heterogeneity at the firm level into account by estimating the regression in first differences. Moreover, we allow for industry, province, and time specific trends. We find that the stock of local civic capital is more important for firms which change ownership, as compared to those firms where no change occurs. When we further disaggregate into firms which become foreign owned and those which become domestically owned, we observe that the interaction with civic capital is significant only for those acquired by a foreign investor.

These findings complement the existing literature along several lines. First, we extend the branch of

studies which has looked at performance differentials between domestic firms and foreign affiliates. This question has been analyzed with data from different countries, including the United Kingdom (**???**), the US **?**, Germany (**?**) and Slovenia (**?**). As for the case of Italy, **?** find that foreign ownership has no effect on firm performance, which is at odds with most of the previous literature. However, each of these studies implicitly assumes that the assimilation costs that foreign affiliates face do not vary geographically. In contrast, our study underlines the importance of local characteristics, in particular the stock of civic capital in that it affects the performance of foreign and domestic firms differently.

Second, the international business literature recently has stressed the role of governance costs in determining the performance of multinational firms (**???**). Analyzing the performance of Norwegian multinationals, **?** find that governance costs (i.e. costs related to bargaining, monitoring and maladaptation) significantly reduce the performance of foreign affiliates. Differently to them, we study the role of governance costs by comparing firms which become foreign affiliates to those where no change in ownership status occurs. Moreover, we take into account the role of the environment in determining governance costs, and hence the performance of multinationals.

The rest of the paper is organized as follows. In section 4.2, we outline the mechanism by which civic capital reduces assimilation costs. Section 4.3 presents the data and the methodological approach, while section section 4.5 describes the results. Finally, section 4.6 concludes.

4.2 Civic Capital and the Governance Costs of Foreign Firms

Relying on Guiso et al. (2010), we define civic capital as "those persistent values and beliefs that help a group overcome the free-rider problem in the pursuit of socially valuable activities".[69] The important characteristic that civic capital entails is its property to hamper narrow-minded self-interested behavior in collective endeavors. Reducing the scope of opportunistic behavior, in turn, reduces governance costs of intra-firm transactions substantially as it removes agency problems and dilemmas of collective action at the root. This important property of civic capital has been proved by **?**. Employing Italian census data, they show that the cooperation-enhancing effect of civic capital allows firms to operate on a larger scale.

More specifically, the business literature has stressed the role of three interrelated determinants of internal transaction costs (**???**). The first concerns information and knowledge. The relevant information for decision making is distributed among individuals within a firm. Firm organization has to be designed in such a way as to facilitate a smooth flow of information and knowledge among its members both within and across hierarchies. Second, the tasks required for production have to be efficiently coordinated. This requires identification of complementarity of action and the corresponding coordination of the production process. Third, firm members often pursue personal goals which are not necessarily congruent with those of the firm as a whole. Therefore, a motivational scheme is necessary which ensures that agents take actions which are consistent with the objective function of the firm.

Importantly, the incidence of intra-firm transaction cost is substantially higher in the case of multinational firms as compared to domestically owned firms (**?**). The increase stems from two interrelated set of factors which affect each of the above mentioned areas. First, operation in different countries implies sub-

[69] See Guiso et al. (2010) on page 7.

stantial spatial separation of production facilities which makes an efficient coordination of the various tasks of the production process more cumbersome. Moreover, asymmetric information between local managers and foreign shareholders as well as the difficulty to effectively monitor distant agents exacerbate agency problems (**?**). The second set of factors are cultural differences among countries. This increases the further complicate the flow of information and knowledge among foreign affiliates and the mother company (**??**). Expectedly, these increased governance costs have a negative effect on firm performance (**?**). Therefore, civic capital has a huge effect in reducing governance costs of foreign firms. Importantly, we expect this effect to be more important for foreign affiliates than for purely domestic firms or firms which become domestically owned. As a consequence, firm performance of firms which are acquired by a foreign investor should benefit more from civic capital than its domestic counterparts.

Note that we deviate from most of the business literature in an important dimension. Several studies have shown that cooperation among firm members is determined by firm policies ((Spagnolo, 1999; **?**)). We deviate from this assumption in that cooperative behavior is exclusively determined by the stock of civic capital in the area in which a firm is located. This assumption is fostered by empirical evidence. Analyzing a dataset from a large Italian bank, Ichino and Maggi (2000) show the cooperative behavior of workers is to a large extent determined by individual background. Similarly, **?** find that national and corporate culture are strongly correlated.

4.3 Data Description

4.3.1 The UniCredit-Capitalia dataset

We work with the 7th, 8th and 9th wave of the UniCredit-Capitalia dataset. Each wave covers a period of three years, which implies that the period under consideration ranges from 1995 until 2003. The dataset encompasses the universe of manufacturing firms with more than 500 employees, as well as a stratified and rotating sample of smaller firms. Half of the firms are replaced by new firms in subsequent waves. The choice of the firms to be dropped is random and tries to maintain the structure of stratification. The minimum size of firms in the three waves are 10 employees. In the survey, firms are asked to provide detailed information about their ownership structure, labor force, R&D activity, internationalization and finance. The information from the survey is then combined with yearly balance sheet data from AIDA, enabling us to work with a rich firm-level data set.

In the survey, firms are asked to report their ownership structure just once in each wave, with reference to the last year of the wave. In order to allow the implementation of panel techniques with an adequate number of observations, we use only those firms which are at least two consecutive waves in the sample. Concerning the definition of a foreign affiliate, we stick to the standard definition whereby a firm is classified as foreign-owned firm (FO) if at least 10% of the equity is hold by one or more foreign persons. Firms are then classified into four groups, according to their ownership status: firms which are always foreign-owned over *(always)*; firms that are never foreign-owned *(never)*; firms that start being foreign-owned *(starters)*, because the equity hold by foreigners reaches the 10% threshold; firms that stop being foreign-owned, because the amount of equity hold by foreigners goes below the threshold *(stoppers)*. After removing outliers we end up with 1600 firms. Calculating first differences gives 1989 observations which split into the four ownership

categories as follows: 74 starters, 51 stoppers, 16 always and 1858 never.

Table 17 provides descriptive statistics for different kinds of firms according to their ownership structure.

[Table 17 about here]

The table confirms the well known result that foreign firms outperform their domestic counterparts in terms of size and productivity. This is especially true for firms which are foreign owned over two consecutive periods (always): they constitute the largest and the most productive firms in our sample. When comparing the relative performance of firms which become foreign owned to those which become domestic, we do not find a clear pattern in terms of productivity. However, starters seem to be larger than stoppers, both in terms of capital stock and the number of workers. Note that for both starters and stoppers the change in ownership is associated with a relative improvement in terms of productivity but with a relative decline in capital stock and workforce.

4.3.2 Measurement of civic capital

As mentioned earlier, we measure the stock of civic capital in a given province by the number of blood donations per 1000 inhabitants, average electoral turnout in referenda held between 1946 and 1987 and the number of volunteers in non profit organization, standardized by population. The choice as proxies for civic capital is governed by the following reasoning. First, all activities are associated with a personal cost. Second, their are neither financial nor legal incentives to pursue one of those activities. Hence, the reasons why individuals vote, donate blood or engage as volunteers is that they have internalized some common good for which they are disposed to incur costs without receiving any material compensation.[70] In section **??**, we have outlined that the stock of civic capital consists of these behavioral characteristics.

As each of our proxies of civic capital is supposed to be measured with error, we extract the first principal component out of the three variables. The following Table shows the correlation coefficient between the proxies and the resulting first principal component.

[Table 18 about here]

As expected, we have a strong positive relationship between each of our three proxies. The fact that the correlation is far from being perfect implies that the proxies are blurred by idiosyncratic factors. The relationship between the first principal component and each of the three proxies is roughly equally strong which means that there is a strong common pattern among the three variables.

4.4 Empirical Strategy

In order to identify the differential impact of civic capital on firm performance according to the firms' ownership, we fall back on a two step procedure.[71] In a first step Total Factor Productivity (hereafter TFP) is estimated by the semi-parametric approach proposed by **?**. The advantage of this methodology is that it takes the potential endogeneity of the input factors into account. In particular, the choice of input quantities might be the outcome of firm productivity. More specifically, TFP is obtained by estimating

[70] Alternatively, it could be social pressure which leads individuals to engage in those activities.

[71] This strategy is common in the literature. See for example **?** in the case of spillovers from FDI or **?** in the case of exporters.

separate production functions for each 2-digit NACE sector.[72] The generic industry s production function is

$$y_{ijst} = \alpha_1^s k_{it} + \alpha_2^s sk_{it} + \alpha_3^s unsk_{it} + \omega_{ijst}, \tag{15}$$

where y_{ijst} labels the log of value added of firm i in province j in industry s at time t. The logarithm of capital stock and the logarithm of the number of skilled and unskilled workers of the firm are denominated k_{it}, sk_{it}, and $unsk_{it}$, respectively.[73] In this way, the logarithm of TFP is represented by ω_{ijst} and computed for each firm in the industry.

In a second step, we regress log TFP on our variables of interest. We assume that log TFP at the firm level is governed by the following linear equation:

$$\omega_{ijst} = \alpha_0 + \alpha_1 FO_{it} + \alpha_2(FO_{it} * CC_j) + \alpha_3(FO_{it} * \ln POP_j) + \gamma_j + \gamma_s + \gamma_t + \gamma_i + \gamma_j t + \gamma_s t + \epsilon_{ijst}. \tag{16}$$

In (16), foreign ownership of firm i is denominated by FO_{it}, a dummy which equals 1 if firm i is foreign-owned at time t. Civic capital in province j where firm i is located is labeled CC_j. In order to capture the differential impact of civic capital on firm performance, we add as a regressor the interaction of foreign ownership and civic capital, $FO_{it} * CC_j$. The log of population in a given province, labeled POP_j, proxies for market size. Population is averaged over the years 1995-2003.

Investment by foreign investors is by no means randomly assigned across firms. We explicitly consider two sources of selection bias. The first source of selection bias is at the firm level. Several studies have shown that foreign investors acquire those domestic firms which display an above-average productivity level (**?**, **?**). Table 17 shows that this pattern also holds in our sample. Both starters and stoppers outperform domestic firms in terms of productivity. Moreover, they are significantly larger in terms of capital stock and number of employees. Hence, in order to construct a valid control group in the regression, we allow for firm specific effects (γ_i). It captures all time constant, unobserved firm characteristics such as managerial skills, sophisticated technologies or brand names which simultaneously attract foreign investors and increase firm performance.[74]

The second source of selection bias concerns the location decision of foreign firms. An extensive literature studying the location decision of foreign firms has found that foreign direct investment is directed into areas with a favorable business environment (**????**). In particular, foreign firms prefer locations with well-functioning institutions, access to large markets and good infrastructure. Accordingly, we include in our regression γ_j, a dummy capturing province fixed effects. We are confident that by controlling for province fixed effects, all unobserved heterogeneity concerning firms' business environments which determine firm performance is removed. Industry and year fixed effects are captured by γ_s and γ_t, respectively. We also include industry and province specific trends, labeled $\gamma_s t$ and $\gamma_j t$, respectively. Finally, the error term ϵ_{ijst} has mean zero and is assumed to be uncorrelated with each of the regressors.

[72] In order to increase precision we use the entire sample for TFP estimation and not just those firms which are at least for two consecutive waves in the sample. The respective trimming procedure is explained in the appendix.

[73] A detailed description of the variables used is provided in the Appendix.

[74] In a robustness check, we include further firm level controls into the regression. These include capital stock, total number of employees and number of skilled workers.

In order to overcome the endogeneity of FO_{it} we run equation 16 with first differences.[75] Hence, all time constant effects at the firm level are wiped out. The change in log TFP between two consecutive waves can then be expressed as

$$\begin{aligned}\Delta\omega_{ijst} = \beta_0 + \alpha_1\Delta(FO_{it}) + \alpha_2\Delta(FO_{it} * CC_j) + \alpha_3\Delta(FO_{it} * \ln POP_j) \\ + \gamma_t + \gamma_j + \gamma_s + \Delta\epsilon_{ijst}\end{aligned} \tag{17}$$

where the terms γ_t, γ_j, γ_s capture year, sector and province specific trends, respectively. The differenced error term is $\Delta\epsilon_{ijst}$. The reference group in equation (17) consists of firms which do not change their ownership status, that is both purely domestic firms and those which are always under foreign ownership.

In the context of our study it is important to carefully assess the type of ownership change that a firm undergoes and its interaction with civic capital. As outlined in section **??** the governance costs that a foreign investor faces when acquiring a firm is supposed to be larger than in the case of an acquisition by a domestic investor.[76] Consequently, we create a dummy variable $START$ which equals one whenever $\Delta FO = +1$ and a dummy variable $STOP$ which equals one in the case that $\Delta FO = -1$. Equation (17) is then transformed into

$$\begin{aligned}\Delta\omega_{ijst} = \alpha_0 + \alpha_1 START_{it} + \alpha_2(START_{it} * CC_j) + \alpha_3 STOP_i + \alpha_4(STOP_{it} * CC_j) \\ + \alpha_5(START_{it} * \ln POP_j) + \alpha_6(STOP_{it} * \ln POP_j) + \gamma_t + \gamma_s + \gamma_j + \Delta\epsilon_{ijst}.\end{aligned} \tag{18}$$

As before, the base group now consists of firms which do not change ownership status. When estimating equations (17) and (18) we cluster standard errors along two dimensions. First, we allow for correlation of observations from the same province. This is necessary because some regressors vary only at the provincial level (Moulton, 1990). Second, as we have some observations which belong to the same firm, standard errors also take serial correlation into account.[77]

4.5 Results

Table 19 shows the results from the estimation of equation (17) with different measures of civic capital.

[Insert Table 19 about here]

In column (1), civic capital is proxied by electoral turnout in referenda, in column (2) volunteering is used whereas in column (3) the number of blood donations is employed. Finally, the last column displays the regression when we use the first principal component of the three variables. In all columns, provincial population, interacted with the foreign ownership dummy, controls for differing effects of local market size on productivity growth, according to whether a firm changes ownership status. Moreover, in each specification we allow for province, industry and a time specific trends by including corresponding dummy variables into the regression. In each specification, the coefficient of the dummy which captures a change in foreign ownership status is negative and significant. This suggests that in the (hypothetical) province in which both population and the stock of civic capital is zero, firms which become foreign owned ($\Delta FO = +1$)

[75] The calculation of first differences is based on the last year of each wave.

[76] This conjecture is fostered by the pattern in Table 17. Starters display a more pronounced relative decline in capital stock and labor force as compared to stoppers.

[77] On two way clustering see Cameron and Miller (2010).

perform on average worse than firms which do not experience a change in ownership. On the other hand, the positive interaction coefficient of foreign ownership and civic capital implies that the effect of civic capital on productivity growth is not homogeneous across firms. As expected, the effect of civic capital seems to be larger for firms which experience a change in ownership status. This pattern holds for each proxy of civic capital. On the other hand, for a firm which ceases to be foreign owned ($\Delta FO = -1$), results suggest that its productivity growth is lower compared to constant ownership firms when civic capital is high.

As we are particularly interested in the effect of civic capital on those firms which are acquired by a foreign investor, we allow for different ownership effects on firm performance, according to whether a firm becomes domestic or foreign owned. Results displayed in Table 20 correspond to the estimation of equation (18).

[Insert Table 20 about here]

As before, each column in Table 20 corresponds to a different proxy of civic capital. The last column shows the estimates when civic capital is measured by the principal component. Consider first the case when a firm becomes foreign owned ($START$) and the interaction with civic capital. As before, in the hypothetical case when both population and civic capital is zero, firms which become foreign owned have a lower productivity growth compared to constant ownership firms as evidenced by the negative and significant coefficient of the dummy identifying a switch into foreign ownership. Importantly, the positive coefficient of the interaction term implies that the effect of civic capital again is higher for firms that become foreign owned. Only when civic capital is measured by volunteering this effect is not significant.

In order to quantify the effect of a switch into foreign ownership on TFP growth more precisely, we evaluate its marginal effect at different points of the distribution of civic capital. Provincial population is fixed at the sample mean. A firm which is located in the province corresponding to the first quartile, the marginal effect becoming foreign owned is negative, reaching -0.21. The effect for the median firm is -0.05. Only starters in provinces with very high stock of civic capital (from the 95th percentile onwards) display a positive effect of ownership on TFP growth.

As for firms which become domestically owned ($STOP$) the pattern is reversed, i.e. the interaction with civic capital is negative. Interestingly, in this case the effect of civic capital is statistically no longer different from that of constant ownership firms. This is in line with our expectation, given that we expect governance costs of starters to be larger than that of stoppers. Consequently, the cooperation enhancing effect of civic capital becomes less relevant.

Finally, in Table 21 we perform some robustness checks. Columns (1)-(3) show several variations of equation (18), while columns (4)-(6) of equation (17). In columns (1) and (4) we include additional firm level controls into the regression, namely the growth rate of size, capital stock and the number of skilled workers. While the specification in first differences eliminates all sorts of time constant unobservables, we cannot exclude that foreign investors base their investment decision on a certain growth pattern of firm characteristics. Results are essentially unaffected.[78] Next, in columns (2) and (4) we measure the size of the local market by provincial gross domestic product instead of population.[79] There is a tiny decrease in

[78]These additional control variables are not available for the whole sample. Therefore, the number of observations increases slightly.

[79]Similarly to provincial population we average gross domestic product for each province over the period 1995-2003.

magnitude but the coefficient is still statistically different from zero. Finally, in columns (3) and (6), we measure firm performance by labor productivity, defined as value added per worker. Results are robust to this change in measurement.

4.6 Conclusion

In this article, we have empirically shown that the effect of foreign ownership on firm performance depends on the stock of civic capital in the area in which the firm is located. More specifically, we have assigned firms into four different groups: firms which become foreign owned, firms which become domestically owned and firms where no ownership change occurs, i.e. purely domestic and foreign firms. When comparing the effect of civic capital for switchers against that of constant ownership firms, we find that civic capital is more important only for firms that become foreign owned. This suggests that civic capital substantially decreases assimilation costs of foreign firms.

The estimation approach took explicitly care of unobserved firm heterogeneity as well as industry, province, and time trends. Firm performance was quantified by total factor productivity, estimated semi-parametrically by the approach suggested by **?**.

This study provides important new insights on the effect of foreign ownership on firm performance. Rather than assuming that assimilation costs of foreign affiliates are constant within a country, we stress the importance of local characteristics, such as the level of local trust which exert a heterogeneous effect on these costs and hence on firm performance. On the other hand, our study shows that future research is needed. For example, we have not analyzed the choice of entry. If, however, civic capital is an important determinant of assimilation costs then multinational firms will choose their mode of entry accordingly, or eventually abstain from an investment.

Table 17: **Performance of Switchers relative to Purely Domestic Firm**

	STARTERS (74)		**STOPPERS (41)**		**ALWAYS (16)**
	After Change	Before Change	After Change	Before Change	
TFP	1.075	1.069	1.054	1.046	1.143
VAW	1.039	1.039	1.056	1.037	1.122
Capital	1.137	1.224	1.096	1.156	1.311
Size	2.110	4.058	1.576	2.288	3.596

Figures show relative performance of the different kind of switchers relative to purely domestic firm. TFP denotes Total Factor Productivity, VAW denotes value added per worker, *Capital* is the firm's capital stock. *Size* is firm size, measured by the number of workers.

Table 18: Correlation among the proxies of civic capital

	Referenda turnout (log)	Volunteers (log)	Blood donations (log)
Volunteers (log)	0.69	1	
Blood donations (log)	0.61	0.57	1
Principle component	0.89	0.87	0.84

Note: The number of observations is 103. *Blood donations* is the log of the number of blood donations per 100,000 inhabitants inn 2002; *Volunteers* is the log of the number of volunteers in non-profit institutions per 100,000 inhabitants in 2000; *Referenda turnout* is the log of the average electoral turnout in referenda between 1946 and 1987; *Principal component* is the the first principal component of the above mentioned three proxies of civic capital. All correlations are statistically different from zero at the 1% level.

Table 19:

Dependent Variable: $\Delta \ln TFP$

	1	2	3	4
	Coef./se	Coef./se	Coef./se	Coef./se
ΔFO	-5.329***	-1.943***	-1.422***	-0.769***
	(1.72)	(0.65)	(0.36)	(0.23)
$\Delta FO * \ln Turn_j$	1.046***			
	(0.39)			
$\Delta FO * \ln Volunt_j$		0.137**		
		(0.06)		
$\Delta FO * \ln Blood_j$			0.210**	
			(0.10)	
$\Delta FO * PC_j$				0.071**
				(0.03)
$\Delta FO * \ln POP_j$	0.100***	0.107***	0.091***	0.104***
	(0.03)	(0.04)	(0.03)	(0.04)
cons	-0.558***	-0.556***	-0.559***	-0.558***
	(0.04)	(0.04)	(0.04)	(0.04)
Industry FE (2 digit)	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0.356	0.355	0.355	0.356
N	1989	1989	1989	1989

Dependent variable is $\Delta \ln TFP$. ΔFO captures changes in ownership and takes two values: $\Delta FO = +1$ ($\Delta FO = -1$) if a firm becomes foreign (domestically) owned. $\ln POP$ is the log of provincial population averaged over the period 1995-2003. We use the following variables to measure civic capital: *Blood* is the log of the number of blood donations per 100,000 inhabitants in 2002; *Volunt* is the log of the number of volunteers in non-profit institutions per 100,000 inhabitants in 2000; *Turn* is the log of the average electoral turnout in referenda between 1946 and 1987; *PC* is the first principal component of the above mentioned three proxies of civic capital. All regressions include industry (2 digit), province and year fixed effects. Standard errors allow for correlation between observations located in the same province and between observations belonging to the same firms. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

Table 20:

Dependent Variable: $\Delta ln\ TFP$

	1	2	3	4
	Coef./se	Coef./se	Coef./se	Coef./se
$START$	-6.084***	-1.618**	-1.595***	-0.757**
	(1.71)	(0.70)	(0.52)	(0.31)
$START * \ln Turn_j$	1.223***			
	(0.38)			
$START * \ln Volunt_j$		0.104		
		(0.07)		
$START * \ln Blood_j$			0.256*	
			(0.14)	
$START * PC_j$				0.074***
				(0.03)
$STOP$	3.750	2.453*	1.075*	0.759**
	(3.34)	(1.37)	(0.64)	(0.30)
$STOP * \ln Turn_j$	-0.692			
	(0.76)			
$STOP * \ln Volunt_j$		-0.191		
		(0.15)		
$STOP * \ln Blood_j$			-0.126	
			(0.18)	
$STOP * PC_j$				-0.063
				(0.07)
$START * \ln POP_j$	0.098**	0.103**	0.093**	0.103**
	(0.05)	(0.05)	(0.04)	(0.05)
$STOP * \ln POP_j$	-0.095*	-0.111**	-0.083*	-0.100**
	(0.05)	(0.05)	(0.05)	(0.05)
cons	-0.559***	-0.559***	-0.564***	-0.560***
	(0.04)	(0.04)	(0.04)	(0.04)
Industry FE (2 digit)	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0.356	0.355	0.355	0.356
N	1989	1989	1989	1989

Dependent variable is $\Delta \ln TFP$. $START$ is a dummy variable which equals one if a firm becomes foreign owned. $STOP$ is a dummy variable which equals one if a firm becomes domestically owned. $\ln POP$ is the log of provincial population averaged over the period 1995-2003. We use the following variables to measure civic capital: *Blood* is the log of the number of blood donations per 100,000 inhabitants in 2002; *Volunt* is the log of the number of volunteers in non-profit institutions per 100,000 inhabitants in 2000; *Turn* is the log of the average electoral turnout in referenda between 1946 and 1987; PC is the first principal component of the above mentioned three proxies of civic capital. All regressions include industry (2 digit), province and year fixed effects. Standard errors allow for correlation between observations located in the same province and between observations belonging to the same firms. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

Table 21: Robustness Analysis

	Firm Cov. Coef./se	GDP Coef./se	VA/worker Coef./se	Firm Cov. Coef./se	GDP Coef./se	VA/worker Coef./se
ΔFO	-0.806***	-0.978***	-0.823***			
	(0.24)	(0.30)	(0.20)			
$\Delta FO * PC_j$	0.072**	0.055*	0.054**			
	(0.03)	(0.03)	(0.02)			
$START$				-0.846**	-0.946**	-0.756***
				(0.34)	(0.40)	(0.28)
$START * CC_j$				0.068**	0.059**	0.069***
				(0.03)	(0.03)	(0.02)
$STOP$				0.697**	0.989***	0.844***
				(0.30)	(0.38)	(0.29)
$STOP * CC_j$				-0.075	-0.047	-0.022
				(0.07)	(0.07)	(0.04)
$\Delta FO * \ln POP_j$	0.110***		0.119***			
	(0.04)		(0.03)			
$\Delta FO * \ln GDP_j$		0.094***				
		(0.03)				
$START * \ln POP_j$				0.121**		0.110***
				(0.05)		(0.04)
$STOP * \ln POP_j$				-0.085*		-0.119***
				(0.05)		(0.04)
$START * \ln GDP_j$					0.092**	
					(0.04)	
$STOP * \ln GDP_j$					-0.094**	
					(0.04)	
$\Delta \ln SIZE$	0.016			0.017		
	(0.05)			(0.05)		
$\Delta \ln CAPITAL$	-0.114***			-0.115***		
	(0.02)			(0.02)		
$\Delta \ln Skill$	-0.032*			-0.032**		
	(0.02)			(0.02)		
cons	-0.078**	-0.064**	-0.041	-0.082**	-0.064**	-0.042
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Industry FE (2 digit)	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.378	0.356	0.491	0.379	0.356	0.492
N	1807	1989	1995	1807	1989	1995

Dependent variable is $\Delta \ln TFP$ in columns (1), (2), (4), (5). Dependent Variable in columns (3) and (6) is $\Delta \ln VA/worker$, where $VA/worker$ stands for value added per worker. ΔFO captures changes in ownership and takes two values: $\Delta FO = +1$ ($\Delta FO = -1$) if a firm becomes foreign (domestically) owned. $START$ is a dummy variable which equals one if a firm becomes foreign owned. $STOP$ is a dummy variable which equals one if a firm becomes domestically owned. $\ln GDP$ and $\ln POP$, respectively, are the log of provincial gross domestic product and the log of provincial population both averaged over the period 1995-2003. The variable employed to measure civic capital is *Principal component*, which is the first principal component of the log of the number of blood donations per 100,000 inhabitants, the log of the number of volunteers in non-profit institutions per 100,000 inhabitants in 2000, the log of the average electoral turnout in referenda between 1946 and 1990. $\Delta \ln SIZE$ is the first difference in firm size, as measured by the log of the number of workers. $\Delta \ln K$ is the first difference in the firm's log of capital stock. $\Delta \ln SKILL$ is the first difference in the log of the number of skilled workers. All regressions include industry (2 digit), province and year fixed effects. Standard errors allow for correlation between observations located in the same province and between observations belonging to the same firms. ***,**,* denote significance at the 1%, 5%, 10% level, respectively.

References

Aghion, P. and J. Tirole, 1997: Formal and real authority in organizations. *Journal of Political Economy*, **105**(1), 1–29.

Akerlof, G. A., 1982: Labor Contracts as Partial Gift Exchange. *The Quarterly Journal of Economics*, **97**(4), 543–69.

Alchian, A. A. and H. Demsetz, 1972: Production, Information Costs, and Economic Organization. *American Economic Review*, **62**(5), 777–795.

Algan, Y. and P. Cahuc, 2010: Inherited Trust and Growth. *American Economic Review*, **100**(5), 2060–92.

Andreoni, J. and J. Miller, 2002: Giving according to garp: An experimental test of the consistency of preferences for altruism. *Econometrica*, **70**(2), 737–753.

Arrow, K., 1972: Gifts and exchanges. *Philosophy and Public Affairs*, **4**(1), 343–62.

Arrow, K. J., 1968: The Economics of Moral Hazard: Further Comment. *American Economic Review*, **58**(3), pp. 537–539.

Baker, G., R. Gibbons, and K. Murphy, 2002: Relational contracts and the theory of the firm. *Quarterly Journal of Economics*, **117**(1), 39–84.

Banfield, E., 1958: *The Moral Basis of a Backward Society*. The Free Press, New York.

Beck, T. and R. Levine, 2003: Legal Institutions and Financial Development. NBER Working Papers 10126, National Bureau of Economic Research.

Becker, G. S. and K. M. Murphy, 1992: The Division of Labor, Coordination Costs, and Knowledge. *Quarterly Journal of Economics*, **107**(4), 1137–1160.

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

Bloom, N., R. Sadun, and J. V. Reenen, 2009: The organization of firms across countries. NBER Working Papers 15129, National Bureau of Economic Research.

Bürker, M. and G. A. Minerva, 2010: Civic Capital, Firms' Size and Purchased Service Intensity in Italy. Paper presented at the 51st Annual Congress of the Italian Economic Association, University of Catania, Italy.

Buonanno, P., D. Montolio, and P. Vanin, 2009: Does Social Capital Reduce Crime? *Journal of Law & Economics*, **52**(1), 145–170.

Camerer, C. and R. Thaler, 1995: Ultimatums, Dictators, and Manners. *Journal of Economic Perspectives*, **9**(2), 209–219.

Cameron, A. C. and D. L. Miller, 2010: Robust Inference with Clustered Data. Working Papers 107, University of California, Davis, Department of Economics.

Campbell, J. and H. Hopenhayn, 2005: Market size matters. *Journal of Industrial Economics*, **53**(1), 1–25.

Cartocci, R., 2007: *Mappe del tesoro: Atlante del capitale sociale in Italia*. Il Mulino, Bologna.

Casadesus-Masanell, R., 2004: Trust in agency. *Journal of Economics & Management Strategy*, **13**(3), 375–404.

Chandler, A., 1962: *Strategy and Structure*. MIT Press, Cambridge, MA.

Chen, Y., 2000: Promises, Trust, and Contracts. *Journal of Law, Economics and Organization*, **16**(1), 209–32.

Coase, R., 1937: The Nature of the Firm. *Economica*, **4**, pp. 386–405.

Coleman, J., 1990: *Foundations of Social Theory*. Cambridge, MA: Harvard University Press, New York.

de Blasio, G. and G. Nuzzo, 2010: Historical traditions of civicness and local economic development. *Journal of Regional Science*, **50**(4), 833–857.

DeBandt, J., 1996: Business services: Markets and transactions. *Review of Industrial Organization*, **11**(1), 19–33.

Dessein, W., 2002: Authority and communication in organizations. *Review of Economic Studies*, **69**(4), 811–838.

Falk, A. and U. Fischbacher, 2006: A theory of reciprocity. *Games and Economic Behavior*, **54**(2), 293–315.

Fehr, E., 2009: On The Economics and Biology of Trust. *Journal of the European Economic Association*, **7**(2-3), 235–266.

Fehr, E. and U. Fischbacher, 2002: Why Social Preferences Matter - The impact of Non-Selfish Motives on Competition, Cooperation and Incentives. *Economic Journal*, **112**(478), 1–33.

Fehr, E. and K. Schmidt, 1999: A theory of fairness, competition, and cooperation. *Quarterly Journal of Economics*, **114**(3), 817–868.

Fukuyama, F., 1995: *Trust: The Social Virtues and the Creation of Prosperity*. Free Press, New York.

Guiso, L., P. Sapienza, and L. Zingales, 2004: The Role of Social Capital in Financial Development. *American Economic Review*, **94**(3), 526–556.

Guiso, L., P. Sapienza, and L. Zingales, 2008a: Long Term Persistence. NBER Working Papers 14278, National Bureau of Economic Research.

Guiso, L., P. Sapienza, and L. Zingales, 2008b: Social capital as good culture. *Journal of the European Economic Association*, **6**(2-3), 295–320.

Guiso, L., P. Sapienza, and L. Zingales, 2010: Civic Capital as the Missing Link. NBER Working Papers 15845, National Bureau of Economic Research.

Helsley, R. W. and W. C. Strange, 2007: Agglomeration, opportunism, and the organization of production. *Journal of Urban Economics*, **62**(1), 55–75.

Holmes, T., 1999: Localization of industry and vertical disintegration. *Review of Economics and Statistics*, **81**(2), 314–325.

Holmes, T. J. and J. J. Stevens, 2002: Geographic Concentration and Establishment Scale. *Review of Economics and Statistics*, **84**(4), 682–690.

Holmstrom, B., 1982: Moral Hazard in Teams. *Bell Journal of Economics*, **13**(2), 324–340.

Ichino, A. and G. Maggi, 2000: Work Environment and Individual Background: Explaining Regional Shirking Differentials in a Large Italian Firm. *Quarterly Journal of Economics*, **115**(3), 1057–1090.

Inglehart, R. and W. Baker, 2000: Modernization, cultural change, and the persistence of traditional values. *American Sociological Review*, **65**(1), 19–51.

Jacobs, J., 1969: *The economy of cities*. Vintage, New York.

Jolliffe, I. T., 2002: *Principal Component Analysis*. Springer, New York.

Joskow, P. L., 1985: Vertical Integration and Long-term Contracts: The Case of Coal-burning Electric Generating Plants. *Journal of Law, Economics and Organization*, **1**(1), 33–80.

Kumar, K. B., R. G. Rajan, and L. Zingales, 1999: What Determines Firm Size? NBER Working Papers 7208, National Bureau of Economic Research.

La Porta, R., F. L. de Silanes, A. Shleifer, and R. W. Vishny, 1997: Legal Determinants of External Finance. *Journal of Finance*, **52**(3), 1131–50.

Laeven, L. and C. Woodruff, 2007: The Quality of the Legal System, Firm Ownership, and Firm Size. *Review of Economics and Statistics*, **89**(4), 601–614.

Lafontaine, F. and M. Slade, 2007: Vertical Integration and Firm Boundaries: The Evidence. *Journal of Economic Literature*, **45**(3), 629–685.

Li, B. and Y. Lu, 2009: Geographic concentration and vertical disintegration: Evidence from China. *Journal of Urban Economics*, **65**(3), 294–304.

Lu, Y. and Z. Tao, 2009: Contract enforcement and family control of business: Evidence from China. *Journal of Comparative Economics*, **37**(4), 597–609.

Malanima, P., 2005: Urbanisation and the Italian economy during the last millenium. *European Review of Economic History*, **9**, 97–122.

Melitz, M. J. and G. I. P. Ottaviano, 2008: Market size, trade, and productivity. *Review of Economic Studies*, **75**(1), 295–316.

Merino, F. and D. Rodrand, 2007: Business services outsourcing by manufacturing firms. *Industrial and Corporate Change*, **16**(6), 1147–1173.

Moulton, B. R., 1990: An Illustration of a Pitfall in Estimating the Effects of Aggregate Variables on Micro Units. *The Review of Economics and Statistics*, **72**(2), 334–338.

Ono, Y., 2003: Outsourcing business services and the role of central administrative offices. *Journal of Urban Economics*, **53**(3), 377–395.

Penrose, E. T., 1959: *The Theory of the Growth of the Firm*. Oxford University Press, Oxford.

Percoco, M., 2011: Entrepreneurship, Social Capital and Institutions: Evidence from Italy. Working paper, Bocconi University, Milan.

Portes, A., 1998: Social Capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, **24**, 1–24.

Putnam, R., 1993: *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton University Press, Princeton.

Rajan, R. G. and L. Zingales, 1998: Financial Dependence and Growth. *American Economic Review*, **88**(3), 559–86.

Rothstein, B., 2000: Trust, social dilemmas and collective memories. *Journal of Theoretical Politics*, **12**(4), 477–501.

Sapienza, P., A. Toldra Simats, and L. Zingales, 2007: Understanding Trust. CEPR Discussion Papers 6462, Centre for Economic Policy Research.

Schwartz, A., 1993: Subservient Suburbia - The Reliance of Large Suburban Companies on Central City Firms for Financial and Professional Services. *Journal of the American Planning Association*, **59**(3), 288–305.

Spagnolo, G., 1999: Social relations and cooperation in organizations. *Journal of Economic Behavior & Organization*, **38**(1), 1–25.

Syverson, C., 2004: Market structure and productivity: A concrete example. *Journal of Political Economy*, **112**(6), 1181–1222.

Tabellini, G., 2008: The scope of cooperation: Values and incentives. *Quarterly Journal of Economics*, **123**(3), 905–950.

Tabellini, G., 2010: Culture and institutions: Economic development in the regions of Europe. *Journal of the European Economic Association*, **8**(4), 677–716.

Williamson, O. E., 1979: Transaction-Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics*, **22**(2), 233–261.

Williamson, O. E., 1985: *The Economic Institutions of Capitalism*. The Free Press, New York.

Williamson, O. E., 1996: *The Mechanisms of Governance*. Oxford University Press, New York.

5 Conclusion

The three chapters of this thesis have underlined the importance of civic capital in governing economic relationships. The results foster the importance of informal institutions for individual behavior which bears huge impact on aggregate economic outcomes. Specifically, it has been empirically shown that civic capital increases the size of economic organizations, induces firms to outsource services and reduces the assimilation costs of foreign affiliates.

While this thesis has revealed important effects of civic capital on aggregate economic outcomes, more research is needed that combines the micro and macro level of analysis. In particular, the thesis has taken the stock of civic capital at the province level as given. In order to understand the functioning of civic capital at the micro level more fully, it would be important to investigate the what exactly induces individuals to cooperate. The literature has established several hypothesis, such as the role of pro-social preferences or risk aversion which might be behind the deviation of narrow-minded self interested behavior. The identification of the precise individual mechanism that induce a certain stock of civic capital still awaits future research.