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Author(s): Fabio Sabatini, Francesca Modena and Ermanno Tortia

Source: *Small Business Economics*, March 2014, Vol. 42, No. 3, Special Issue: Global Entrepreneurship and Institutions (March 2014), pp. 621-641

Published by: Springer

Stable URL: <https://www.jstor.org/stable/43552949>

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Do cooperative enterprises create social trust?

Fabio Sabatini · Francesca Modena ·
Ermanno Tortia

Accepted: 3 June 2013 / Published online: 21 June 2013
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Abstract This article contributes to the literature by carrying out the first empirical investigation into the role of different types of enterprises in the creation of social trust. Drawing on a unique data set collected through the administration of a questionnaire to a representative sample of the population of the Italian Province of Trento in March 2011, we find that cooperatives are the only type of enterprise where the work environment fosters the social trust of workers.

Keywords Cooperative enterprises · Nonprofit organizations · Trust · Social capital · Motivations · Inclusive governance · Work organization

The empirical analysis in this paper is based on data collected within a research project promoted and funded by the European Research Institute on Cooperative and Social Enterprises (Euricse), Trento. The findings, interpretations and conclusions expressed in the paper are solely of the authors and do not necessarily represent the views of Euricse.

F. Sabatini (✉)
Faculty of Economics, Department of Economics
and Law, Sapienza University of Rome,
via del Castro Laurenziano 9,
00161 Rome, Italy
e-mail: fabio.sabatini@uniroma1.it

F. Sabatini · F. Modena · E. Tortia
European Research Institute on Cooperative
and Social Enterprises (Euricse),
Trento, Italy

JEL Classifications L31 · L33 · P13 · Z1 · Z13 · L26

1 Introduction

Cooperative enterprises, understood as membership-based, mutual-benefit entrepreneurial organizations (Stickers 2009), represent a limited but growing phenomenon in contemporary economies. In recent years these businesses have strengthened resilience to the crisis in most economic systems, by increasing organizational diversity and providing proactive answers to worsening economic conditions. While competitive markets and the public sector are experiencing serious difficulties in most countries, cooperatives are showing more stability and reactivity (Stiglitz 2009; Birchall 2013). This is mostly because of their reduced reliance on support from financial markets and the socialized nature of their capital,

F. Sabatini
Laboratory for Comparative Social Research,
National Research University Higher
School of Economics, Moscow, Russia

F. Modena · E. Tortia
Department of Economics and Management,
University of Trento, Trento, Italy
e-mail: francesca.modena@unitn.it

E. Tortia
e-mail: ermanno.tortia@unitn.it

which means they have suffered less pressure in the recent financial crisis.¹

Some theoretical works have claimed that the socially oriented nature of cooperatives and their inclusive governance may have relevant effects in terms of social cohesion and the sustainability of growth (Dow 2003; Stiglitz 2009; Birchall 2010). Empirical testing of the social effects of cooperative firms is being developed in various directions. The impact of cooperatives on sustainable and stable employment has been analyzed in seminal papers by Miyazaki and Neary (1983) and Ben-Ner and Jones (1995), whose claims have found support in various empirical studies (see, for example, Bonin et al. 1993; Craig and Pencavel 1992, 1994; Burdin and Dean 2009; Burdin 2013). More recent works focus on the social impact of cooperatives in terms of income inequality, public health and employment protection (Ben-Ner et al. 2011; Erdal 2011, 2012; Freundlich and Gago 2012; Perotin 2012). Yet, to the best of our knowledge, no result has been presented to date concerning the effects of cooperative firms on the creation and strengthening of social trust and on the related accumulation of social capital.

This article contributes to the literature by carrying out the first empirical investigation into the role of different types of enterprise in the creation of social trust. Our research question has important societal and economic implications because the creation and diffusion of trust is connected to the ability of the economy to

function properly and to reproduce itself over time. As will be outlined in Sect. 2, the economics literature identifies trust as one of the pillars of economic development. Classical and neoclassical economists have argued that well-functioning markets, the resilience of the economic system in times of crisis and, in the long run, the sustainability of growth and development rely on those institutions (whether formal or informal) that foster the sharing and diffusion of feelings of trust and norms of reciprocity (Smith 1759; Mill 1848; Arrow 1972). More recently, the social capital literature has provided evidence that trust supports growth and development through a number of channels, such as the reduction of transaction costs, the enforcement of contracts and the accumulation of human capital (Putnam 1993; Knack and Keefer 1997; Guiso et al. 2008, 2009; Yamamura 2009). A better understanding of how different entrepreneurial models affect the diffusion of trust would thus provide a significant contribution to the literature and important insights for future research on the role of organizational diversity.

Our empirical analysis relies on a unique data set collected through the administration of a questionnaire to a representative sample of the population of the Italian Province of Trento in March 2011 (see Sect. 3 for further details). The dependent variable is given by responses to the question: “Thinking about the difference between the day you started your current work and today, how do you think that the work environment has influenced your trust towards others?” Interviewees were requested to focus exclusively on *changes ascribable to the job they currently hold*.

After controlling for sample selection bias, we use ordered probit models to assess the determinants of work environment-driven changes in the social trust of workers. Our results show that, in our sample, cooperative enterprises create social trust among workers, unlike any other type of enterprise.

More specifically, we find that the status of being employed in a cooperative enterprise increases the probability that work has improved the social trust of workers by 47.5 % relative to employment in public enterprises, by 36.9 % relative to private enterprises and by 48.1 % relative to self-employment. This finding suggests that the development of cooperative enterprises may play an important role in the diffusion of trust and in the accumulation of social capital. This may contribute to increased resilience of the economic system, especially in times of crisis.

¹ Recent data on Italian cooperatives confirm these statements. On the basis of information drawn from the AIDA database (Bureau Van Dijk 2012), 23,146 cooperatives were created in Italy between 2007 and 2011. Among these, 18,822 were active in 2010, 15,097 passed a balance sheet, and 12,555 had net results in the positive in the same year. Given the fact that the total number of active Italian cooperatives rests between 80,000 and 84,000 units, the number of coops has increased by about 15 % during the period of the crisis, employing about 150,000 workers, and made 5 billion euros in revenue in 2010. The total revenues of all Italian cooperatives increased from about 83 billion euros in 2007 to about 97 billion euros in 2011 (an increase of about 17 %). In the same period, however, net revenues decreased from about 850 million euros to 100 million, signaling the severe difficulties that the crisis is imposing on these organizations. On the other hand, between 2007 and 2011 employment in cooperatives increased by about 8 %, reaching 1.34 million, 7.2 % of the total Italian workforce. Cooperatives have been growing, preserving and creating new employment during the crisis, even at the cost of dangerously squeezing margins. This way they are fulfilling a countercyclical role.

The design of the questionnaire allows us to exclude the existence of reverse causality, since changes that have occurred in workers' social trust during their current occupation cannot in any way influence their *past* choice to accept their *current* job. However, even if the way the trust question was posed is conceived to make interviewees focus exclusively on changes related to the environment and experience related to their current job, it may have been difficult for them to distinguish the effect of employment in cooperative enterprises from other individual or local characteristics or shocks that may have influenced the outcome variable. For example, intrinsically motivated individuals may have a higher propensity to trust others and may be more willing to work in organizations characterized by participatory and democratic decision-making processes.

To deal with these issues, we include in the trust equation a wide set of individual and household control variables measuring respondents' values, beliefs, perceptions and behaviors. In particular, we control for workers' intrinsic motivations as a predictor of the propensity to develop trust. In addition, in order to eliminate local-specific heterogeneity, we also run regressions with local fixed effects computed at the level of the "local labor systems."

The outline of the article is as follows. Section 2 presents the motivation for the study and briefly reviews the related literature. Section 3 describes our data and reports some descriptive statistics. The empirical analysis of the role of different types of enterprise in the creation of social trust is presented and discussed in Sect. 4. Concluding remarks and a brief discussion of implications for future research close the article.

2 Motivation for the study and related literature

Since the early 1990s, a growing number of studies have identified social capital—with particular regard to its "cognitive" dimension of social trust—as a factor of economic and social development. Trust has been argued to reduce transactions costs, favor the enforcement of contracts, facilitate credit at the level of individual investors, and encourage innovation and investment in human and physical capital (see among others Putnam 1993; Fukuyama 1995; Knack and Keefer 1997; Zak and Knack 2001; Guiso et al. 2008, 2009).

As stated by Knack (2002), "Where social mechanisms for the efficient resolution of prisoners' dilemma and principal-agent games are weak or absent (i.e. where most potential pairs of economic transactors cannot trust each other) the private returns to predation increase while the private returns to production fall" (p. 171). Individuals in higher-trust societies indeed spend less on protecting themselves from being exploited in economic transactions (Knack and Keefer 1997).

Even if these views have gained credit in the economics debate only recently, it is worth noting that the concept of the social "embeddedness" of the economic action is deeply rooted in the history of economic thought and can also be found in the early work of the classical economists. Typical code words of the social capital literature (e.g., trust, norms, values, altruism, and sympathy) can be found in the work of Adam Smith. In the *Theory of Moral Sentiments*, Smith (1759) argued that there were certain virtues, such as trust and a concern for fairness, that were vital for the functioning of a market economy. He described trust and reciprocity as critical foundations of the early beginnings of the market, allowing reciprocal gift exchange to emerge and leading to trade. In the *Principles of Political Economy*, John Stuart Mill (1848) shared the belief that trust plays a fundamental role in the economic performance of nations. These views were found again in influential works by Arrow (1972) and North (1990). In a famous paper, Arrow (1972) states that: "Virtually every commercial transaction has within itself an element of trust, certainly any transaction conducted over a period of time. It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence" (1972, p. 357). According to North (1990, p. 54) "the inability of societies to develop effective, low-cost enforcement of contracts is the most important source of both historical stagnation and contemporary underdevelopment in the Third World."

In our view, it is reasonable to extend this point by arguing that not only well-functioning markets but also, to a larger extent, the resilience of the economic system rely on those institutions (whether formal or informal) that foster the sharing and diffusion of feelings of trust and norms of reciprocity.

As we will be better explained in the following sections, democratic and socially oriented organizations such as cooperatives may behave differently

from any other type of enterprise in the way they affect workers' values and beliefs. That is, their institutional structure may play a role in building trust inside and outside the organization.

Cooperatives have been described as membership-based entrepreneurial organizations characterized by democratic and inclusive governance (Birchall 2010; Borzaga and Tortia 2010; Negri Zamagni 2012). The ownership of the organization, in terms of residual right of control and residual right of appropriation, is bestowed upon members who have a personal character and are different from investors (Hansmann 1988, 1996). In other words, control over the organization and appropriation of its residual value rests with personal membership rights² that, as a norm, is given in equal terms to all members (the so-called "one member, one vote" rule). Equality in membership rights implies, at a fundamental level, equal decision-making power and equal power in electing representatives in the board of directors. A clear difference can be shown, in this context, relative to investor-owned, for-profit companies. While the latter type of firm is highly compatible with concentrated or even exclusive ownership (one single person or organization can own the whole capital of an investor-owned business), the same is not true in cooperatives where, right from the start, a plurality of members share control rights in equal terms. Equality in membership rights also implies that the governance of the organization is built over an underlying horizontal structure in which decision-making power is evenly distributed across members.

Horizontal relations and procedural fairness can also be related to the emergence of trust (Thibaut and Walker 1975; Lind and Tyler 1988; Putnam 1993, 2000; Dasgupta 2012). This may be due to two main reasons: on the positive side, procedural fairness better distributes burdens and rewards (both monetary and non-monetary) among the involved constituencies, thus creating an expectation of fair future rewards and

representing, in this way, a crucial precondition for the spontaneous (or endogenous) emergence of trust. Some contributions find procedural fairness the most distinguishing organizational feature of cooperative firms (Tortia 2008). Connectedly, on the negative side, the spread of fair decisions can discourage morally hazardous and other opportunistic behaviors or reinforce the social stigma against them. For example, peer pressure, which is the most typical feature of social relations in cooperating teams, has been described as a coordination mechanism that reduces shirking and free riding, therefore increasing team members' trustworthiness (Mohnen et al. 2008; Mas and Moretti 2009; Degli Antoni and Portale 2011). This can also favor or not discourage the endogenous emergence of trust.³ Unfortunately, our data do not allow us to directly test the relation between procedural fairness and the spread of trust in cooperatives *vis à vis* other organizational forms. However, we can test how different entrepreneurial forms—i.e., private, public or cooperative enterprises—affect the diffusion of trust. A response to this question may make a significant contribution to the literature, in that trust represents one of the pillars of well-functioning markets and, in the long run, of growth and development processes.

Several previous contributions have studied the effect of membership in different types of voluntary associations and/or in social cooperatives on trust and other dimensions of social capital. At the individual level, Stolle and Rochon (1998) used World Values Survey cross-sectional data from the US, Germany and Sweden to show that membership of diverse associations affects social capital in different ways. The authors found that the degree of "associational

² Cooperative enterprises can also be small organizations, as happens in producer and agricultural cooperatives. However, this evidence does not fundamentally modify the personal character of membership of cooperatives since, on the one hand, small producers and farmers very often coincide with individual or family firms (Valentinov 2007). On the other hand, in legal terms, membership rights are given to organizations as legal persons and not to the capital invested in or by these legal persons.

³ It is worth noting that the spread of trust inside the organization can help to solve the new-institutionalist dilemma concerning the growth of transaction costs in terms of ownership and governance costs. In principle, horizontal, non-hierarchical decision-making processes can be expected to be less coordinated and more time and resource expensive than hierarchical ones. However, this inefficient outcome may not be observed in reality. Trust relations, tacit knowledge and informal interpersonal relations can work as substitutes of hierarchy in supporting expeditious and effective organizational outcomes; democratic governance can reduce, not inflate, transaction costs. Furthermore, for similar reasons, inclusive organizational relations are also expected to reduce agency costs, that is, the costs associated with asymmetric information and contrasting objectives (Alchian and Demsetz 1972; Jensen and Meckling 1976).

diversity” is positively correlated with “generalized trust and community reciprocity among members” (p. 61). More recently, Griebhaber and Geys (2012) found that the impact of membership on corruption significantly varies according to the association’s characteristics, in terms of inclusiveness and interconnectedness, in a cross section of 20 European democracies. Similar results on the different ways in which diverse types of association affect social capital have been obtained by other authors (see, for example, Paxton 2002; Degli Antoni 2009a, b; Iglič 2010).

Our article adds to the literature discussed above by providing the first contribution that compares the role of different types of enterprises in the creation of social trust, with a special focus on cooperatives, a type of organization that has so far been neglected in the social capital literature. In our study we focus on labor relations, with particular attention to cooperative governance.⁴ Labor relations provide a privileged viewpoint as they allow an in-depth analysis of the impact of inclusive governance on the endogenous emergence of trust. They are deeply rooted and intertwined with the workings of governance structure and the production process.

In his seminal work on Italy, Putnam (1993) advanced the hypothesis—laying the foundation for most of the empirical literature on social capital that followed—that organizations may act as “schools of democracy” from which trust is easily socialized to the entire social context in which the organizations operate. The relationship between membership in associations and social trust is a frequent research finding in sociology (Anheier and Kendall 2002). Following Putnam (1993), it is possible to argue that the knowledge-based (or particularized) trust developed within a cooperative enterprise may also influence the attitudes and behaviors of workers outside the organization. As is highlighted in the discussion of our results, democratic and participatory organizations may allow their members to acquire civic and

relational skills, to learn and appreciate democratic values, and to develop and share norms of trust, cooperation and reciprocity. This learning process may have two fundamental consequences when members of cooperatives deal with non-members. First, citizens who have developed trustful and cooperative attitudes on the job are likely to follow them in all the relations they may have outside the workplace—including transactions—as argued in Putnam’s seminal studies and in previous empirical investigations on the effect of membership in definite types of associations on social trust (Stolle and Rochon 1999; Hooghe 2003; Freitag 2003; Knack 2003). Cooperatives may be viewed as coalitions of stakeholders who have a strong simultaneous interest in both the demand and the supply side of particular services whose markets are often characterized by severe information asymmetries. The possibility that managers and workers have a direct interest in a fair provision of the service and the non-distribution constraint (i.e., the prohibition of distributing profits to owners) lowers the exposure to moral hazard problems (Hansmann 1980; Ben-Ner and Gui 1993; Ben-Ner and Van Hommissen 1993). Nonprofit organizations may thus “shield members from bad experiences, and provide opportunities for trust-building and trust-enhancing experiences” (Anheier and Kendall 2002).

On the other hand, those citizens who have developed trustful and cooperative attitudes through on-the-job relations may also be better able to represent their (and others’) common interests in public life, thereby enhancing the quality of democratic governance. Almond and Verba (1963) argued that citizens may be inactive because they lack resources, such as time, money, civic and relational skills, or the linkages to networks that may help them to mobilize for public action. Several studies have shown that participation in nonprofit associations favors the development of new networks and linkages by their members (Wollebäck and Selle 2002; Prouteau and Wolff 2004; Degli Antoni 2009a, b). In the same way, participation in cooperatives may provide those resources—such as networks, civic and relational skills, and opportunities—that facilitate social and political participation. Unfortunately, our data set does not provide the information required to test these intriguing hypotheses. However, it is worth noting that, as we attempt to explain in Sect. 3, the way the

⁴ We do this by concentrating on two main variables: the condition of being a worker employed in a cooperative firm and the self-evaluated generation of trust toward other people due to working conditions. In doing so, we correlate one objective dummy with one subjective rating. The correlation between objective and subjective variables is usually considered immune to spurious correlation due to common method bias, as evidenced by prominent methodological contributions (Podsakoff et al. 2003).

trust question was posed in the administration of the questionnaire is conceived simply to make respondents focus on the influence of on-the-job interactions on the relations they have outside of the workplace.

3 Data and descriptive findings

As outlined in the Introduction, data were collected through the administration of a questionnaire to a representative sample ($n = 817$) of the Italian Province of Trento in March 2011.⁵ The questionnaire was specifically designed by the authors of this article for the assessment of the impact of cooperative enterprises on various dimensions of social capital. The autonomous Province of Trento shows one of the strongest concentrations of cooperative enterprises in Italy and Europe: cooperatives account for 84 % of the total workforce in agriculture, 6.4 % in manufacturing sectors, and 14 % in the service sector. In terms of financial intermediation, it is interesting to note that Cooperative Credit Banks (BCCs) accounted for 51 % of the total workforce in 2008. Furthermore, cooperatives account for about 84 % of total GDP and value added in the agricultural sector, for 9.4 % of production and for 6.9 % of value added in the manufacturing sector, and for about 13 % of value added and production in the service sector. BCCs account for 63.3 % of GDP and 61.4 % of value added in financial intermediation (Fontanari and Borzaga 2010). In the Italian national context, cooperatives accounted overall for 4.6 % of the total value added in 2006, and this percentage reached 9.2 % in Northeast Italy, where the Province of Trento is located. In the same year active cooperatives employed 1.058 thousand workers,

amounting to 6.2 % of total employment. This percentage grows to 14.6 % when only medium-sized enterprises (between 50 and 500 employees) are considered. Between 2003 and 2006, the overall growth of employment in Italy was 5.1 %, while in cooperatives it was 11.7 %. Italian cooperatives also show a higher propensity for hiring workers belonging to disadvantaged social groups: in 2006, 24 % of newly employed workers in cooperatives were immigrants (in respect to 17 % in the whole economy) and 48 % were women, against 38 % in the whole economy (Gagliardi 2009; Legacoop 2013).

The sample was stratified by age, gender and area of residence. Our dependent variable is given by responses to the question, “Thinking about the difference between the day you started your current work and today, how do you think that the work environment has influenced your trust towards others?”, which was asked of all individuals with work experience, i.e., current workers (53 % of the sample), retired workers (23 %) and temporarily unemployed workers (1.8 %). We thus focus on this sub-sample of people who are currently working or have worked in the past, which is made up of 629 individuals, representing approximately 77 % of the original sample.⁶ As is explained in Sect. 4, we control for sample selection bias in the empirical analysis. The distributions of frequencies across employees in cooperative enterprises, dependent workers and the whole sample are reported in Table 1.⁷ It is worth noting that, in cooperative enterprises, *nobody* reports that the work environment has caused a decrease in social trust, unlike in the other categories of employment status.⁸ Of the workers in cooperatives, 72.9 % report a work-driven increase in social trust.

In order to provide more observations in each category and to the purpose of a more reliable interpretation of marginal effects, we collapse “very

⁵ The questionnaire was administered through computer-assisted telephone interviews by the Technical Unit of the Department of Sociology and Social Research of the University of Trento. The administration of the questionnaire was funded by the European Research Institute on Cooperative and Social Enterprises (Euricse), located in Trento. Since, according to the research design, about 800–900 observations were required, a sample of 8,855 units (i.e., about ten times the number of required observations) was extracted from census data. People included in the selected sample received a letter in advance announcing the possibility of a phone interview and briefly describing the aim and scope of the research. There were 1,587 dropouts, 1,777 people refused to be interviewed, 136 people missed the phone appointment, and 162 phone numbers were not in use at the time of the interview; 4,396 numbers were not used.

⁶ Results do not change if we consider the smaller sample of current workers.

⁷ The sample includes 40 workers who were employed in cooperative enterprises at the moment of the interview. Thirteen (32.5 %) of them were employed in credit cooperatives, 7 in worker cooperatives (17.5 %), 7 in social coops, 6 in agricultural coops (15 %), 3 in consumer coops and 4 in “other types” of coops (e.g., services or housing cooperatives).

⁸ Frequency distributions for public and private enterprises are not reported here for the sake of brevity. Tables are available upon request to the authors.

Table 1 How do you think that the work environment has influenced your trust toward others?

	Full sub-sample (past and present workers)		Present workers		Past and present employees		Present employees		Past and present coop enterprise workers		Current coop enterprise workers	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Very negatively	23	3.66	17	3.99	19	3.48	14	4.03	0	0	0	0
Negatively	44	7.01	30	7.04	37	6.78	23	6.63	0	0	0	0
No effect	226	35.99	160	37.56	198	36.26	133	38.33	13	27.8	12	30
Positively	222	35.35	151	35.45	188	34.43	118	34.01	20	41.67	16	40
Very positively	101	16.8	65	15.26	93	17.03	57	16.43	15	31.25	12	30
Does not know	12	1.91	3	0.70	11	2.01	2	0.58	0	0	0	0
Total	628	100	426	100	546	100	347	100	48	100	40	100

negatively” and “negatively” responses and “positively and very positively” responses into two categories (1 = “the work environment negatively influenced social trust” and 3 = “the work environment positively influenced social trust,” with 2 now meaning “not at all”). For the sake of convenience, hereafter we will apply the label of “workers” to all individuals with work experience.

The main independent variable is employment status, which includes the condition of being employed as a dependent worker in private, public, cooperative or non-profit enterprises, self-employed (as entrepreneur, head of family business, or member of the arts and professions), unemployed with previous work experience and retired with a work pension.

We are aware that there may be some degree of self selection of workers into a specific organizational type. Workers characterized by different attitudes, propensities and preferences are likely to choose different organizational forms in a way that better matches their personal characteristics (Borzaga and Tortia 2006). This implies that individuals with a higher propensity to trust others may be more willing to work in organizations characterized by democratic and participatory governance, such as cooperative enterprises. However, our data set allows us to control for workers’ motivation in the choice of their current job, which can be considered as a proxy for individual preferences about aspirations, moral values and for the propensity to trust co-workers and other people. More specifically, to deal with the self-selection problem, we control for the impact of intrinsic motivations over

and above other standard socio-demographic controls. Given the way in which the question concerning trust is phrased, controlling for motivations allows us to isolate more neatly the organization-specific impact on trust. The hypothesis of a positive linkage between intrinsic motivations and the development of trust in the form of reciprocating behavior was indeed confirmed by previous studies in experimental economics and psychology (Griesinger and Livingston 1973; Frey and Jegen 2001; Degli Antoni 2009a, b) and supported by contributions from law and economics (Blair and Stout 1999).

Individuals were asked to rate which aspects were important in the choice to undertake/accept their current job on a scale from 0 (not important at all) to 5 (very important), with the explicit recommendation to focus on their *ex ante* expectations about the job, not on the actual realization of such expectations.⁹ Nine items were proposed: (1) earnings and other economic incentives, (2) job stability, (3) career perspectives, (4) flexibility in terms of work arrangements (e.g., the ability to choose one’s own working hours), (5) the desire to find a good work environment in terms of relationships with colleagues and superiors, (6) the sharing of values and ideas, (7) the search for social recognition, (8) the opportunity to do an interesting,

⁹ This question was asked of all workers with job experience, i.e. current workers, retired workers and currently unemployed workers.

stimulating or creative job, and (9) the desire to be useful to others or, more generally, to society.

We perform Categorical Principal Components Analysis (CatPCA) on the nine items of motivation. We first perform the CatPCA considering a number of dimensions equal to the number of items (9). Two principal components are extracted with eigenvalues higher than 1. These two components are interpreted as representing intrinsic (component 1) and extrinsic (component 2) work motivations. Hence, we again perform the CatPCA by including only two dimensions in the solution. The CatPCA allows us to convert the ordered Likert items into numerical variables, which are then used to perform exploratory factor analysis (EFA).¹⁰ The EFA confirms the results obtained with the CatPCA since two factors are extracted. As goodness of fit statistics, we consider the generalized Cronbach's alpha index and the variance explained by the first two factors.¹¹ The first factor,

¹⁰ We use the *Categorical Principal Component Analysis* (CatPCA; Meulman et al. 2004) for quantifying ordinal categories, with the number of the components $p = 2$, the number of the assumed subdimensions for the job motivations. The optimal quantifications are assigned to the categories of each item minimizing (by means of an alternating least squares algorithm) the following loss function simultaneously over O and the Y_j s:

$$L(O, Y) = \sum_{j=1}^m \text{tr} \|O - G_j Y_j\|^2$$

with $\text{tr} \| \cdot \|^2$ the trace operator of the squared norm of a matrix, G_j the indicator matrix of item j , O the $n \times p$ matrix of object scores for the n subjects, and Y_j the matrix containing the category quantifications of item j . As goodness of fit statistics, we consider the generalized Cronbach's alpha (GCA) index and the variance accounted for (VAF) index, which are normalized [in the interval (0;100)] indices based on the total eigenvalue of the CatPCA solution. The quantified variables obtained from the CatPCA are then used for the standard *exploratory factor analysis* (EFA) to identify the hypothesized sub-dimensions by inspecting the factor loadings of the rotated solution.

¹¹ In the EFA, the extraction method is principal axis factoring. This allows us to concentrate on the variance shared by the latent dimensions, not on total variance. This clarifies the relatively low percentage of total variance explained by the two factors with eigenvalues higher than one (about 42 %). We also performed factor analysis by using principal components as the extraction method. The results do not change qualitatively but the amount of variance explained by the first two factors is 55 %. We extract the rotated solution using the Varimax method with Kaiser normalization, which is preferred to the Oblimin method because it allows the analysis of the two latent dimensions as independent (orthogonal) dimensions. This assumption eases the analysis though in practice we cannot exclude a non-zero correlation between intrinsic and extrinsic motivations.

which is highly correlated with the items measuring intrinsic motivation (items 5 through 9), explains about 26 % of the total variance in the data in the rotated solution, while the second factor, which refers to the items of extrinsic motivation (items 1 through 4), explains 16 % of the total variance. We then perform the reliability analysis on the two extracted groups of items by calculating Cronbach's alpha. This is done to account for construct validity. The Cronbach alpha for the intrinsic component is high, equaling 0.81, and demonstrates a high degree of internal consistency. The extrinsic component, on the other hand, shows a relatively low alpha value (0.62). The low amount of explained variance and of the alpha leads us to interpret the extrinsic component as a residual one in which all the non-intrinsic items are grouped. These items are perceived by workers as quite heterogeneous (as also testified by the low value of the communalities), though not to the point of constituting more than one latent construct (see the numerical output of CatPCA and EFA in Appendix 1). Finally, we extract factor scores for the two constructs and use them in the econometric model.

We categorize the first factor (items 5–9) as intrinsic motivations and the second factor as extrinsic motivations (items 1–4). In our sample, the results from the CatPCA and the EFA are not consistent with the definition of intrinsic motivations given by the previous literature. As stated by Deci (1971), “one is said to be intrinsically motivated to perform an activity when one receives no apparent reward except the activity itself” (p. 105). However, we preferred to use the results of CatPCA and EFA as they were in the econometric analysis and to perform a robustness check in which motivations are considered separately (see Sect. 5 and Table 6 in Appendix 2). It is also worth noting that, in principle, the intrinsic motivations measured in our questionnaire can be further subdivided into intrinsic self-regarding motivations, which refer to individual non-material utility (items 5, 7 and 8) and intrinsic other-regarding motivations, which reflect the concern for values and the utility of other people (items 6 and 9). As discussed above, factor analysis allows the extraction of only one factor including both self and other-regarding intrinsic motivations. This result provides support for the hypothesis that different types of intrinsic motivations are complementary rather than substitute (Degli Antoni 2009a, b; Becchetti et al. 2012).

It can be expected that organizations matching specific kinds of preference may have been able to develop specific incentive mixes that are particularly able to satisfy those preferences. For example, workers with low intrinsic motivations may be more likely to work in organizations that favor extrinsic or more materialistic motives. Hence, controlling for workers' preferences also entails indirect control of the features of the organization. As our results suggest, organizations that match the expectations of workers with high intrinsic motivations also appear better able to generate trust. Furthermore, as hypothesized, individuals characterized by intrinsic motivations are likely to have a stronger propensity to trust co-workers and other people. Hence, intrinsic motivations are introduced in the econometric model with the additional aim of further addressing possible self-selection phenomena. It is worth remembering that self-selection issues are also addressed through the particular way the trust question is phrased, i.e., with the explicit request to focus on the specific impact of the work environment, which is not related to their pre-existing preferences and attitudes. We also control for the status of being a director of a cooperative enterprise. This is done to account for a possible role of directors of cooperatives in favoring (or halting) the generation of trust. These officers are elected by members on a "one member, one vote" basis and are in charge of defining the main strategic objectives of the organization and of appointing managers. Italian legislation does not require directors to be part of the membership. Indeed, they can be very different types of people, such as professionals, unpaid volunteers or retired ex-members.

Other individual characteristics and behaviors that may influence both workers' attitude to developing social trust and the choice to undertake/accept a job are related to social capital. Social trust is indeed considered as an important, "cognitive" dimension of the broader concept of social capital. Following the seminal contribution by Uphoff (1999), the literature generally distinguishes between structural and cognitive dimensions of the concept (Kawachi et al. 1997; Sabatini 2008, 2009; Degli Antoni and Sacconi 2009). Structural social capital deals with individuals' behaviors and mainly takes the form of informal networks and associations that can be observed and measured through surveys. Cognitive social capital derives from

individuals' perceptions resulting in norms, values and beliefs that may contribute to the adoption of cooperative behaviors (Yamamura 2011; Antoci et al. 2012). These latter aspects involve subjective evaluations of the social and institutional environment in which the individual is embedded, which may affect the individual's propensity to trust others. The complexity of social capital is further stressed by the existence of deep and changeable relations between its sub-dimensions. Social norms of trust and reciprocity prompt cooperative behaviors, in turn fostering the accumulation of durable ties (Carpenter et al. 2004; Fehr 2009).

In this article, following a consolidated praxis in the social capital literature, we measure the structural dimensions of the concept as the informal and formal networks of relationships to which the worker belongs. For informal networks, we use measures of the frequency of meetings with relatives and with friends, as given by two ordinal variables obtained from responses to the questions: "How often do you see your relatives?" and "How often do you see your friends?"¹² Participation in formal networks is measured through two binary variables coded as 1 if the interviewee is a member of at least one organization. Following the literature, we distinguish between "Olsonian" and "Putnam-esque" associations (see for example Knack and Keefer 1997; Yamamura 2012). We define as "Olsonian" those organizations that have redistributive goals and thus lobby for the protection of their members' interests, possibly against the interests of other groups (Olson 1963, 1982). Examples of this type of organization are professional and entrepreneurial associations, trade unions and associations for the protection of consumers' rights. We define as "Putnam-esque" those associations least likely to act as "distributional coalitions but which involve social interactions that

¹² Possible responses to these questions were given on a scale from 1 = "I do not have relatives/friends" to 7 = "every day," with 2 = "never," 3 = "a few times per year," 4 = "a few times per month," 5 = "once per week" and 6 = "more than once per week." As for meetings with relatives, interviewees were explicitly required to refer to non-cohabiting relatives.

can build trust and cooperative habits” (Knack and Keefer 1997, p. 1273). Examples of this type of organization are cultural circles, sport clubs, youth associations (e.g. scouts) and religious organizations.

An individual variable that may significantly influence the workers’ attitude to developing social trust within the work environment is the existence of friendships with colleagues. Friendships often start at the workplace, since work structures are a generator of face-to-face interactions that stimulate the sharing of social norms and the creation of interpersonal ties (Putnam 2000; Antoci et al. 2013). Friendships with colleagues may favor the development of social trust as a consequence of on-the-job interactions. In order to control for this possibility, we include in our regressions an indicator of the frequency of meetings with colleagues, as measured by responses to the question: “How often do you see your colleagues outside of the workplace, in your leisure time?” as given on the same 1–7 scale described in footnote 12.

For the cognitive dimension of social capital, we include in our regressions indicators of vertical trust and tolerance. Vertical trust is measured by the scores from 1 to 10 given by respondents to three questions concerning the extent to which the Parliament, the judicial system and local politicians can be trusted, with 1 meaning “not at all” and 10 meaning “totally.”¹³

Tolerance was measured through the score given by respondents on a 5-point scale to the question: “Would you be willing to have non-EU immigrants as neighbors?”, with 1 meaning “very unwilling” and 5 meaning “very willing.” We chose to use immigrants as the benchmark for respondents’ level of tolerance because immigration and natives’ feelings of fear and intolerance toward non-EU

immigrants have been one of the central issues of the political debate over the last 20 years, especially in the northern regions of Italy.

We also include the following demographic and socioeconomic controls: gender, age, area of residence (urban vs. rural), education and economic well-being. The indicator of economic well-being is given by responses to the question: “Is your household’s income sufficient to see you through to the end of the month?” Fourteen percent of interviewees answered “with great difficulty” or “with difficulty” and we define them as poor.

In addition, we account for some variables measured at the level of local labor systems. Italy’s local labor systems (LLSs) are defined as self-contained labor markets with respect to daily commuting trips. The Italian territory is partitioned by the Italian National Institute of Statistics (ISTAT) into 686 local labor systems using the Population Census of 2001. The Province of Trento includes 17 LLSs.

In particular, we account for: (1) an indicator of the propensity for export by local firms, computed by ISTAT (2010); (2) the share of immigrants on the total population of the LLS; (3) the unemployment rate in the LLS, which may be a determinant of workers’ occupational choices. Table 2 reports descriptive statistics for the independent variables adopted in the analysis. The means of motivation variables and social capital variables by the type of organization individuals have been working in are reported in Table 3.

4 Econometric findings

We model the variation in social trust caused by the work environment as an ordered probit model after having tested the assumption of constancy of effects across categories assumed in this model.

Since we can observe the effect of work in the creation of social trust only for the sample of workers, we estimate an ordered probit with sample selection using a two-step procedure. First, we estimate a probit equation for the probability of working (or of having worked in the past, for retired or unemployed workers) and we derive the inverse Mills ratio (IMR). We then include IMR as a regressor in the ordered probit model. Since we find

¹³ We accounted for local politicians instead of politicians in general, because the Province of Trento has autonomous jurisdiction relative to the Italian state on most social issues. Hence, we consider the provincial rather than the national context as the relevant unit of political analysis.

Table 2 Descriptive statistics of independent variables

Variables	Obs	Mean	SD	Min	Max
Employed in private enterprises	814	.32	.47	0	1
Employed in public enterprises	814	.28	.45	0	1
Employed in cooperative enterprises	814	.06	.24	0	1
Employed in nonprofit enterprises	814	.01	.10	0	1
Self-employed	817	.09	.29	0	1
Temporary employee (<i>interinale, parasubordinato</i>)	817	.01	.10	0	1
Unemployed worker	817	.02	.13	0	1
Retired worker	817	.23	.42	0	1
Director in a coop enterprise	817	.05	.22	0	1
Motivations					
Intrinsic motivations	564	6.75e-10	.89	-3.18	1.28
Extrinsic motivations	564	-1.50e-09	.81	-2.95	.97
Social capital					
Meetings with relatives	816	6.14	1.26	1	7
Meetings with friends	814	5.61	1.23	1	7
Meetings with colleagues	734	3.40	1.79	1	7
Membership of Putnam-esque associations	817	.15	.36	0	1
Membership of Olsonian associations	817	.14	.35	0	1
Trust in the judicial system	817	5.83	2.38	1	10
Trust in the Parliament	817	4.12	2.21	1	10
Trust in local politicians	817	5.30	2.30	1	10
Tolerance	817	2.94	1.19	1	5
Sociodemographic characteristics					
Gender (female)	817	.52	.50	0	1
Age (put categories here)	817	2.47	1.09	1	4
Area of residence (urban vs. rural)	817	.36	.48	0	1
Low education	813	.43	.49	0	1
Mean education	813	.41	.49	0	1
High education	813	.16	.37	0	1
Poor	817	.15	.37	0	1
Macro-level controls					
LLS propensity for export	817	46.24	13.88	.37	65.68
LLS immigrants share of the population	817	.03	.01	.02	.04
LLS unemployment rate	817	4.28	.76	3.32	7.69

no evidence of selection bias, we report estimates without the correction factor.¹⁴

We define three dichotomous variables:

$$y_i^1 = \begin{cases} 1 & \text{if the work negatively influenced social trust} \\ 0 & \text{otherwise} \end{cases}$$

$$y_i^2 = \begin{cases} 1 & \text{if the work did not influence social trust} \\ 0 & \text{otherwise} \end{cases}$$

$$y_i^3 = \begin{cases} 1 & \text{if the work positively influenced social trust} \\ 0 & \text{otherwise} \end{cases}$$

¹⁴ As a further check, we performed all the regressions presented in Sect. 4, including IMRs among regressors. Their coefficients were always not statistically significant. Results of regressions are not presented in the article for the sake of brevity and are available upon request to the authors.

and an index z_i for individual i by $z_i = \beta x_i + e_i$. The model can thus be written as

Table 3 Motivations and social capital in cooperative, private and public enterprises

Type of enterprise	Coop	Private	Public
<i>Motivations^a</i>			
Earnings and other economic incentives	3.21	3.31	2.91
Career prospects	3.17	2.66	2.51
Job stability	4.08	3.81	4.16
Flexibility in terms of work arrangements	3.69	3.33	3.37
The desire to find a good work environment in terms of relationships with colleagues and superiors	4.04	3.89	3.67
The sharing of values and ideas	4.17	3.49	3.64
The search for social recognition	3.42	3.05	2.93
The opportunity to do an interesting, stimulating or creative job	4.06	3.80	3.83
The desire to be useful to others or, more generally, to society	4.12	3.57	4.05
<i>Social capital</i>			
Meetings with relatives ^b	6.23	6.12	5.89
Meetings with friends	5.48	5.56	5.46
Meetings with colleagues	3.94	3.38	3.40
Membership of Putnam-esque associations ^c	0.15	0.14	0.15
Membership of Olsonian associations	0.12	0.15	0.15
Trust in the judicial system ^d	6.04	5.57	5.98
Trust in the Parliament	4.06	3.89	4.15
Trust in local politicians	5.37	5.08	5.36
Tolerance ^e	3.02	2.76	3.04

^a Motivations are measured on a 5-point Likert scale where 1 = not at all to 5 = very much

^b The frequencies of meetings with relatives, friends and colleagues are measured on a 7-point scale from 1 = "I do not have relatives/friends" to 7 = "every day," with 2 = "never," 3 = "a few times per year," 4 = "a few times per month," 5 = "once per week" and 6 = "more than once per week"

^c Membership of Putnam-esque and membership in Olsonian associations are binary variables coded as 1 if the interviewee is a member of at least one organization

^d Trust is measured on a 10-point scale with 1 meaning "not at all" and 10 meaning "totally"

^e Tolerance was measured by the score given by respondents on a 5-point scale with 1 meaning "very unwilling" and 5 meaning "very willing"

$$\begin{aligned}
 y_i^1 &= 1 & \text{if } y_i < c_1 \\
 y_i^2 &= 1 & \text{if } c_1 < y_i < c_2 \\
 y_i^3 &= 1 & \text{if } y_i > c_2
 \end{aligned}$$

where c_1 and c_2 are the thresholds that the latent variable must cross to change the value of z . It follows that, assuming $e_i \in N(0, 1)$:

$$\begin{aligned}
 \text{prob}(y_i^1 = 1) &= \Pr(e_i < c_1 - \beta'x_i) = \Phi(c_1 - \beta'x_i) \\
 \text{prob}(y_i^2 = 1) &= \Pr(c_1 - \beta'x_i \leq e_i < c_2 - \beta'x_i) \\
 &= \Phi(c_2 - \beta'x_i) - \Phi(c_1 - \beta'x_i) \\
 \text{prob}(y_i^3 = 1) &= 1 - \text{prob}(y_i^1 = 1) - \text{prob}(y_i^2 = 1) \\
 &= 1 - \Phi(c_2 - \beta'x_i)
 \end{aligned}$$

where $\Phi(\cdot)$ is the cumulative standard normal density.

Table 4 presents the results of the ordered probit estimates. To compare relative magnitudes of the effects of the independent variables, we report their marginal effects. In model 1 (column 1 of Table 4), we present the base results principally focusing on employment status and on a number of covariates representing individual sociodemographic and economic characteristics. In model 2 (column 2 of Table 4) we include social capital variables. In model 3 (column 3 of Table 4) we include motivations. Column 4 presents the estimates with fixed effects.

Among employment conditions, the status of being employed in a cooperative enterprise is the only significant predictor of the dependent variable. More specifically, workers in cooperative enterprises exhibit

a 27 % point higher likelihood that work has driven an increase in their social trust from 52 %. All of the other employment conditions—i.e., employment in a private or nonprofit enterprise, and self-employment, are not statistically significant.¹⁵

If we include motivations in the trust equation (column 3), we observe a slight decrease in the significance and size of the effect of employment in cooperative enterprises, which is now equal to 25 % points from 52 %. The effect remains striking, in that the status of being employed in a cooperative enterprise increases by 47.5 % the probability that the current job has improved the social trust of workers in respect to the status of being employed in a public enterprise (which is the omitted category in the models presented in Table 4).¹⁶

The replacement of the omitted category does not change the significance and size of the marginal effects and allows us to make further interesting comparisons. Marginal effects of employment statuses are compared in Table 5. Being employed in a cooperative enterprise increases the probability that work has improved the social trust of workers by 36.9 % relative to employment in private enterprise and by 48.1 % relative to self-employment. As stated in the introductory sections, the institutional setup and the features of the working environment may be influential in favoring the emergence of trust. Our result seems to support the hypothesis that the inclusive and democratic features of governance in cooperatives may favor the emergence of trust because

of their inherent participatory, horizontal and fair nature.

Being a director (member of the board—elected by members) of a cooperative enterprise raises the likelihood of developing work-driven social trust by 16 % points from 52 %. This result may signal, again, the positive role of flat (horizontal) and egalitarian governance. Being elected by members with equal decision-making power, elected directors find themselves relating to members in a more horizontal than hierarchical way. Horizontal interaction between directors and members can, again, favor the emergence of trust.

Workers who have been driven by intrinsic motivations in their choice of job exhibit a significant and 16 % point higher likelihood that the work experience has improved their social trust. Being driven by extrinsic motivations decreases the likelihood of developing social trust on the job by 5 % points. As explained in Sect. 3, the inclusion of motivations in the trust equations is intended to allow us to control for the self-selection of workers characterized by a stronger propensity to trust. This result also confirms that intrinsic motivations are likely to represent one of the main preconditions for developing trust.

We attempt to further reduce the bias caused by the possibility that subjects with a more pro-social nature may also have an increased tendency to develop social trust in the workplace and to join cooperatives instead of other enterprise types through the introduction of other controls, such as formal participation in associations and involvement in informal networks. This may help to disentangle the creation of social trust through the work environment from that occurring through other channels.

As a robustness check, we also performed all regressions by considering the items related to motivation separately. Results do not show any significant changes. Being driven by idealistic motivations increases the likelihood that the work experience has improved the social trust of workers by 6 % points. Altruistic motivations have a similar though weaker effect. Results are reported in Appendix 2.

As expected, some dimensions of individuals' social capital are significantly and positively correlated with the dependent variable. Members of one or more Putnam-esque associations have a 15 % point higher probability of having increased their social trust as a consequence of their work experience. There is a

¹⁵ In our study, it appears that democratic governance (characterizing cooperative firms) more than a socially beneficial objective (characterizing nonprofit organizations) is the main factor supporting the development of trust inside the organization. The interactional context defined by the presence of membership rights appears particularly beneficial in this context. On the other hand, the evidence available to us does not allow us to draw clear conclusions about the influence exerted by the social aim and by the not-for-profit nature of nonprofit organizations.

¹⁶ Results do not show any significant change if we perform the regressions in the subsample of current workers. The marginal effect of employment in cooperative enterprises on the work-driven development of trust is 0.24, the *t* value being 2.95. Workers in cooperative enterprises exhibit a 24 % point higher likelihood that work has driven an increase in their social trust from 51 %. The marginal effect of intrinsic motivations is equal to 0.16 (*t* value is equal to 5.36). Full estimates are not presented here for the sake of brevity and are available upon request to the authors.

Table 4 Ordered probit estimates

	Model 1		Model 2		Model 3		Model 4	
	Mg effect	t stat.	Mg effect	t stat.	Mg effect	t stat.	Mg effect	t stat.
<i>Employment status</i>								
Employed in private enterprises	.01	0.15	.02	0.53	.06	1.26	.05	0.70
Employed in cooperative enterprises	.25	4.10	.27	4.41	.25	3.48	.23	2.80
Nonprofit enterprises	-.12	-0.85	-.09	-0.65	-.07	-0.49	-.06	-0.27
Self-employed	.01	0.20	.02	-0.25	-.00	-0.05	-.02	-0.20
Director in a coop enterprise	.16	1.97	.13	1.47	.16	1.83	.14	1.10
<i>Motivations</i>								
Intrinsic motivations					.16	6.36	.16	4.49
Extrinsic motivations					-.05	-1.83	-.04	-2.87
<i>Social capital</i>								
Meetings with relatives			.01	0.47	.01	0.37	.01	0.50
Meetings with friends			.04	2.49	.04	2.27	.04	2.61
Meetings with colleagues			.03	2.26	.03	1.87	.02	1.73
Membership of Putnam-esque associations			.12	2.08	.15	2.61	.14	2.79
Membership of Olsonian associations			.07	1.13	.04	0.54	.04	0.69
Trust in the judicial system			.00	0.53	-.01	-0.66	.00	-0.62
Trust in the Parliament			.00	0.44	.00	0.48	.01	0.93
Trust in local politicians			.01	0.89	.01	0.89	.01	0.51
Tolerance			-.01	-0.62	-.01	-0.53	-.00	-0.20
<i>Demographic, social and economic characteristics</i>								
Gender (female)	.00	0.06	.02	0.58	.01	0.21	.01	0.29
Age	.02	0.98	.04	1.66	.04	1.66	.04	2.06
Area of residence (urban vs. rural)	.03	0.69	.06	1.43	.07	1.53	.05	4.99
Low education	.08	1.39	.06	0.87	.09	1.29	.10	1.67
Mean education	.02	0.45	.01	0.25	.04	0.58	.05	0.68
Poor	-.09	-1.84	-.05	-0.85	-.01	-0.23	-.03	-0.57
<i>Macro-level control variables</i>								
LLS propensity for export			-.00	-0.11	-.00	-0.23		
LLS immigrants share of the population			2.82	0.70	2.36	0.51		
LLS unemployment rate			.04	1.25	.03	0.85		
Observations	609		579		527		525	
Pseudo R ²	0.02		0.05		0.09		0.10	
Wald chi ²	25.93		50.42		111.53		943.13	
Prob > chi ²	0.01		0.00		0.09		0.00	

Omitted categories: employment in a public enterprise/high education

positive but statistically weak correlation between the habit of meeting friends and colleagues and the work-driven increase in social trust. This finding seems to support Putnam's (2000) view of those voluntary associations that do not have redistributive aims as "schools of democracy" from where cooperative values and trust may be "socialized." In the author's words, certain associations "instill in their members habits of cooperation, solidarity, and public-spiritedness" (Putnam 1993, pp. 89–90), which may also benefit

non-members and, to a certain extent, society as a whole.

However, any generalization of this result should be handled with extreme caution for at least two reasons. The ability of interpersonal interactions between members of organizations to create habits and attitudes toward serving the greater good is very likely to vary with culture and institutions. For example, religious organizations—which, in our empirical analysis, are classified as Putnam-esque organizations—may differ

Table 5 Comparative effect of employment in cooperative enterprises on the development of social trust

		Employment in public enterprises		Employment in private enterprises		Self-employment	
		Model 3	Model 4	Model 3	Model 4	Model 3	Model 4
Effect of employment in coop enterprises on social trust of workers	Comparative effect	+47.5 %	+44.6 %	+36.9 %	+36.1 %	+48.1 %	+48.4 %
	Marginal effect and <i>t</i> value	.25 (3.48)	.23 (2.80)	.19 (2.47)	.19 (3.04)	.25 (2.87)	.25 (2.78)

in whether or not they encourage their members to behave altruistically toward strangers (Knack and Keefer 1997; Knack 2002). Second, this result may suffer from endogeneity problems, as both membership of associations and the individual propensity of workers to develop social trust as a consequence of their interaction with the work environment may be influenced by omitted variables.

In order to eliminate local-specific heterogeneity, which may simultaneously affect both workers' employment choices and work-driven changes in their level of trust, we also run regressions with local fixed effects computed at the level of local labor systems. Results are reported in column 4 of Table 4. We do not record significant changes in marginal effects. The status of being employed in a cooperative enterprise now increases the probability that work has improved social trust by 44.6 % in comparison to employment in public enterprises and by 36.6 % in comparison to employment in private enterprises. Workers in cooperative enterprises have a 48.4 % higher likelihood to have developed social trust because of their work experience compared to self-employed workers.

5 Conclusions

This article contributes to the literature by presenting the first econometric investigation into the role of cooperative enterprises in the creation of social trust in a comparative perspective.

Our findings suggest that, unlike any other type of enterprise, cooperatives have a particular ability to foster the development of social trust. This result supports the view that the development of cooperative enterprises—and, more generally, of less hierarchical models of governance and of enterprises that do not aim purely to maximise profit—may play a crucial role in the diffusion of trust and in the accumulation of social capital. Trust reduces uncertainty and

transaction costs, enforces contracts, and facilitates credit at the level of individual investors, thereby enhancing the efficiency of exchanges and encouraging investment in ideas, human capital and physical capital. As argued by classical economists, trust is one of the pillars of well-functioning markets and, in the long run, of economic development. The resilience of the economic system also depends on its ability to foster, or at least to preserve, the diffusion of trust among individuals, especially in times of crisis. Our finding thus suggests that cooperatives may play an important role in strengthening the resilience to crisis in most economic systems.

Though we strived, through the logic of our arguments and through the effectiveness of empirical tests, to demonstrate the existence of a causal connection between the spread of cooperatives and the development of trust, we hasten to add that we have not been able to demonstrate causation in a definitive way (Wright 1934; Pearl 2012). The cross-sectional design of the survey has prevented us from controlling for fixed effects at the individual level. In addition, we did not carry out fully randomized experiments, and we have not been able to isolate suitable instrumental variables. Hence, we cannot exclude the existence of some form of endogeneity leading to inconsistent estimates. Omitted variables and self-selection are the most likely candidates for such inconsistency.

Our analysis can be easily repeated, subject to the availability of data, in every local or national economy showing a “considerable” concentration of cooperative enterprises, i.e., high enough to allow reliable statistical inference on the role of cooperatives in the creation of social capital. However, it must be said that the reliability of any comparison would be affected by the distinctive characteristic of local institutions and of local cooperative, public and private enterprises. In possible future comparative studies, it will be therefore necessary to take into account the cultural,

institutional and organizational features distinguishing the economy (or economies) under investigation.

Despite these limitations, however, our work also shows important strengths in that it is the first study in which trust and the accumulation of social capital have been firmly anchored to the features of labor relations and to one specific organizational form, the cooperative enterprise, which is characterized by inclusive and horizontal governance.

Acknowledgments We are deeply indebted to Carlo Borzaga, whose advice helped to improve the design of the research in a number of ways. Beatrice Valline and Sara Depedri provided excellent assistance in the development of the questionnaire. We are grateful to two anonymous referees whose comments allowed a decisive improvement of the article. Alessandra Gualtieri, Giulia Galera and Matteo Rizzolli also provided useful suggestions.

Appendix 1: Categorical principal component analysis and factor analysis

Categorical principal component analysis

Dimension	Cronbach's alpha	Variance accounted for total (eigenvalue)
<i>Model summary</i>		
1	.789	3.350
2	.357	1.464
Total	.891 ^a	4.814

Total Cronbach's alpha is based on the total eigenvalue

	V3410_1	V3410_2	V3410_3	V3410_4	V3410_5	V3410_6	V3410_7	V3410_8	V3410_9
<i>Correlation transformed variables</i>									
V3410_1 ^a	1.000	.320	.340	.252	.198	.090	.247	.045	.049
V3410_2 ^a	.320	1.000	.258	.209	.216	.080	.209	.047	.158
V3410_3 ^a	.340	.258	1.000	.280	.259	.171	.248	.254	.153
V3410_4 ^a	.252	.209	.280	1.000	.322	.284	.314	.288	.222
V3410_5 ^a	.198	.216	.259	.322	1.000	.440	.395	.445	.386
V3410_6 ^a	.090	.080	.171	.284	.440	1.000	.426	.444	.512
V3410_7 ^a	.247	.209	.248	.314	.395	.426	1.000	.381	.405
V3410_8 ^a	.045	.047	.254	.288	.445	.444	.381	1.000	.458
V3410_9 ^a	.049	.158	.153	.222	.386	.512	.405	.458	1.000
Dimension	1	2	3	4	5	6	7	8	9
Eigenvalue	3.264	1.432	.804	.715	.680	.601	.553	.509	.441

Missing values were imputed with the mode of the quantified variable

	Dimension	
	1	2
<i>Component loadings</i>		
V3410_1	.389	.688
V3410_2	.382	.564
V3410_3	.526	.456
V3410_4	.592	.209
V3410_5	.725	-.093
V3410_6	.707	-.376
V3410_7	.705	-.028
V3410_8	.675	-.356
V3410_9	.669	-.379

Variable principal normalization

Factor Analysis

	Initial	Extraction
<i>Communalities</i>		
V3410_1 quantification	.243	.446
V3410_2 quantification	.203	.271
V3410_3 quantification	.262	.355
V3410_4 quantification	.231	.284
V3410_5 quantification	.402	.470
V3410_6 quantification	.434	.552
V3410_7 quantification	.337	.400
V3410_8 quantification	.409	.498
V3410_9 quantification	.415	.496

Extraction method: principal axis factoring

Factor	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
<i>Total variance explained</i>									
1	3.453	38.371	38.371	2.897	32.184	32.184	2.368	26.310	26.310
2	1.461	16.230	54.601	.874	9.715	41.899	1.403	15.589	41.899
3	.762	8.461	63.063						
4	.703	7.816	70.879						
5	.661	7.340	78.219						
6	.568	6.315	84.534						
7	.538	5.982	90.515						
8	.472	5.250	95.765						
9	.381	4.235	100.000						

Extraction method: principal axis factoring

	Factor	
	1	2

<i>Rotated factor matrix^a</i>		
V3410_1 Quantification		.668
V3410_2 Quantification		.513
V3410_3 Quantification		.551
V3410_4 Quantification	.360	.393
V3410_5 Quantification	.607	.318
V3410_6 Quantification	.738	
V3410_7 Quantification	.537	.334
V3410_8 Quantification	.698	
V3410_9 Quantification	.700	

Extraction method: principal axis factoring

Rotation method: Varimax with Kaiser normalization

^a Rotation converged in three iterations

Appendix 2

See Table 6.

Table 6 Ordered probit estimates when motivations are considered separately

	Mg effect	t stat.
<i>Employment status</i>		
Employed in private enterprises	.07	1.38
Employed in cooperative enterprises	.25	3.23
Nonprofit enterprises	-.07	-0.45
Self-employed	.01	0.17
Director in a coop enterprise	.15	1.66
<i>Motivations</i>		
Earnings and other economic incentives	-.03	-1.38
Job stability	.00	0.22
Career perspectives	-.01	-0.36
Flexibility in terms of work arrangements	-.01	-0.29
Desire to find a good work environment in terms of relationships with colleagues and superiors	.01	0.58
Sharing of values and ideas	.07	3.18
Search for social recognition	.02	0.88
Opportunity to do an interesting, stimulating or creative job	.01	0.70
Desire to be useful to others or, more generally, to society	.03	1.57
<i>Social capital</i>		
Meetings with relatives	.01	0.40
Meetings with friends	.04	2.07
Meetings with colleagues	.03	1.82
Membership of Putnam-esque associations	.14	2.25
Membership of Olsonian associations	.03	0.53
Trust in the judicial system	-.01	-0.71
Trust in the Parliament	.01	0.50
Trust in local politicians	.01	0.90
Tolerance	-.01	-0.50
<i>Demographic, social and economic characteristics</i>		
Gender (female)	.00	0.08
Age	.04	1.57
Area of residence (urban vs. rural)	.08	1.60
Low education	.08	1.08
Mean education	.03	0.53
Poor	-.01	-0.21
<i>Macro-level control variables</i>		
LLS propensity for export	-.00	-0.26
LLS immigrants share of the population	2.43	0.51
LLS unemployment rate	.03	0.85
Observations	527	
Pseudo R^2	0.09	
Wald χ^2	111.67	
Prob > χ^2	0.00	

Omitted categories: employment in a public enterprise/high education

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