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Social Capital, Industrial Districts and Regional Unemployment in Italy

by

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Abstract

We consider the industrial districts "conductors" of social capital. Hence, we use the regional density of industrial districts to measure social capital and we analyse its impact on regional unemployment in Italy. By using regional data from the Italian National Statistical Office (ISTAT), we develop a pooled cross-sectional analysis based on the years 2001 and 2005. For a more robust analysis we divide unemployment into two types: general and youth. Interestingly, contrary to the theory of the "strength of position proposition" (Lin 2000), we find that both youth and general unemployment decreases with social capital only within low-educated individuals. In addition, within the low-educated group, empirical evidence shows that the magnitude of the effect of social capital on unemployment increases with the age.

Keywords: Social capital, industrial districts, regional unemployment disparities, pooled cross sections

JEL Classification: J64, O18, R11, Z13

1. Introduction

In the broader view of social capital theory, communities investing in building cooperation, reciprocity and mutual trust increase the probability of solving collective action and asymmetric information problems. In more "pure" economic terms, these informal institutions should reduce transaction costs and disseminate technical and organizational knowledge (Saxenian 1996). For these reasons, scholars argue that social capital should reduce search and recruiting costs not only for job seekers but also for firms (Marsden 2001; Rebien 2010). In a theoretical framework, Montgomery (1991) shows that social capital should increase the probability of being hired because it reduces the asymmetric information between employers and employees and secures a better matching.

To our knowledge, evidence on the impact of social capital on the labour market in Italy is quite limited to Pistaferri (1999) and Sabatini (2009). The former empirically shows that in Italy informal network increases the probability of receiving a job offer, but it is positively associated with lower earnings. The latter finds that strong and linking ties are likely to reduce labour precariousness.

The aim of the paper is to detect the impact of social capital on regional unemployment disparities. To this purpose we use the regional density of industrial districts as social capital indicator. As Lyon (2005, p.8) underlines "Given the importance of the industrial districts in the Italian economy, the nation's tightly-knit social fabric, and the influential nature of Putnam's (1993) study, Italy is a particularly appropriate place to assess empirically the economic contribution of social capital".

By using regional data from the Italian National Statistical Office (ISTAT) we develop a pooled cross-sectional analysis based on the years 2001 and 2005. The functional forms we adopt state that regional unemployment disparities[1] are function of social capital, besides other socio-economic factors. For a more robust analysis, we divide unemployment into two types: general and youth. We find that both youth and general unemployment decreases with social capital only within low-educated individuals. In addition, within the low-educated group, empirical evidence shows that the magnitude of the effect of social capital on unemployment increases with the age.

The paper is structured as follows

Section 2 illustrates how the clusters of the industrial districts can be considered "social capital conductor". Section 3 present the social capital indicator and provides a general description of the distribution of the industrial districts in Italy. Section 4 presents a descriptive analysis. Section 5 presents and discusses the empirical results.

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[1] The disparity indicators are those proposed by Felice (2009a).

2. The Community Network of the Industrial Districts as "Social Capital Conductor"

Industrial districts are more than a simple reassertion of agglomeration economies (Harrison 1992) .The industrial district (ID) can be defined as a local system characterised by the active co-presence of a human community and a dominant industry[2] consisting of a set of small independent firms specialising in different phases of the same production process (Sforzi 2002). This system is characterised by long-term socio-economic relationships among local firms involving trust, a blend of competition and collaboration and the role of local institutions (Guerrieri and Pietrobelli 2000). These repeated interactions between actors through continual formal and informal contracting and re-contracting facilitate the building of trust and mutual cooperation (Harrison 1992). In the Marshallian view, inside the industrial district, economic relationships are so influenced by social relationships that "the secrets of the industry are in the air"[3] (Markusen 1996). Since Marshall, generalised trust and socially internalised community norms are recognised to be essential elements for the industrial districts to become vital actors in the regional and national economy (Leonardi 1995, Dei Ottati 1994, Sforzi 2002). This main framework drives this work to consider the community of the industrial district a "social capital conductor" where the members tend to build, develop and maintain a high level of civic engagement.

Figure 2.1 Marshallian's Industrial Districts (a la Markusen)
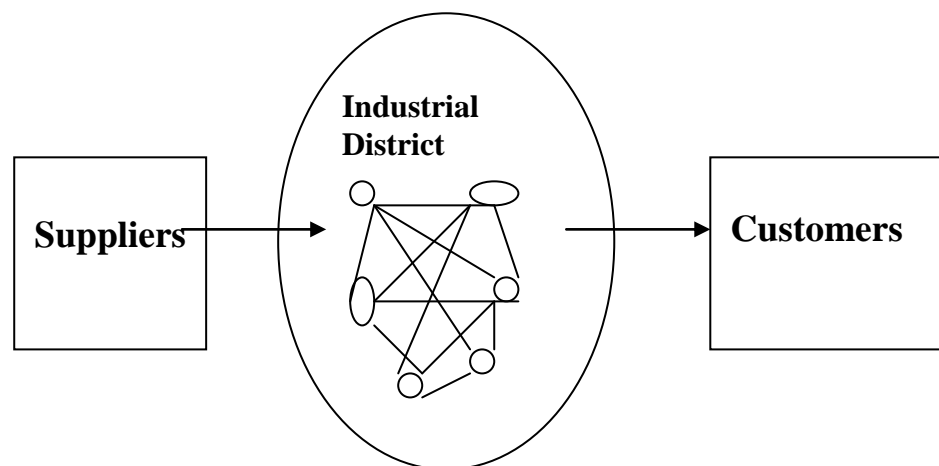
Source: Markusen (1996)

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[2] Notice that the co-participation between the local community and the small firms in the production process is based on a common social culture (Sforzi 1994 p. 97 in Leonardi and Nanetti 1994).
[3] Marshall is considered one of the pioneers who analysed industrial districts (Markusen 1996)

Figure 2.1 depicts the inter-firm linkages inside and outside the district. The ID presents many small companies buying and selling from each other for eventual export outside the region. They need to purchase raw materials and business services from outside the area (on the left) and they sell to external markets (on the right). This mechanism requires the presence of ties between members belonging to different companies inside the district community which cause a system of competition and collaboration. Figure 4.1 easily gives the idea of an industrial district acting as a collective entrepreneur (Pietrobelli 2000 in Bagella and Becchetti 2000): many small independent firms specialised in one or few phases of the production cycle that have well-established relationships among each other.

Table 2.1 shows the features of the Marshallian ID and the Italianate Version. The table indicates that the structure of the ID is based on small local companies that constantly trade among each other and that plan their investments locally. Moreover inside the districts the relationships are based on long-term non paper contracts. This makes the ID as a long-term network that facilitates inter-firm cooperation (Knorringa et al 1998). The labour market inside the district presents two particular characteristics. Firstly, the labour market is very flexible. It is quite common that workers move from a company to another bringing with them, not only the acquired knowledge (human capital), but also the previous connections with ex-colleagues or workmates (capital of connections). Secondly, the workers' commitments are first with the district and second with the firms. This not only indicate the high civic engagement of the workers toward the ID but also explains why there is a very low degree of (out)migration. In other words, the individual considers himself first a member of an embedded community endowed with a particular identity and culture, and only secondly a worker of a firm[4].

Table 2.1 Features of Marshallian and Italianate Industrial Districts (a la Markusen)

Features	Marshallian ID	Italianate Version
Prevailing Mraket Structure	Local SMEs	Local SMEs
Economies of Scale	Low	Low
Intra-district Trade	Highly developed	Highly developed
Key Investments	Local decision	Local decision
Buyer-Producer Cooperation		Important
Regulation of Relationships	Long-term contracts	Long-term (non paper) contracts
Labour Market	Internal to the ID highly flexible	Internal to the ID highly flexible
Relationship External to the District	Low cooperation with firms outside the district	Low cooperation with firms outside the district

[4] Notice that industrial districts are also characterised by a high degree of (in)migration. This makes the industrial district an open network. The characteristic of the ID of being open networks is explained by Sforzi (1994 in Leonardi and Nanetti 1994) in terms of de-agglomeration process. More specifically, the district expands by increasing its territorial allocation of productive units and, hence its members. The de-agglomeration is likely to occur either when the district is still growing or when part of the production process is allocated outside the districts due to lower labour cost.

Workers' Commitment	1st with ID, 2nd with enterprises	1st with ID, 2nd with enterprises
Labour Immigration	High	High
Labour (out)migration	Low	Low
Local Cultural Identity	Developed	Developed
Sources of Financing and Technical Assistance	Internal to the ID	Internal to the ID
Patient Capital*	Exists	Exists
Personnel Exchanges		High
Cooperation among Competitors		High in order to share risk and innovation
Innovation		Disproportionate shares of workers engaged in design and innovation
Local Trade Association		Strong presence
Local Government		Important

Source: Integration between Markusen (1996) and Guerrieri-Pietrobelli (2000)
* Presence of financial institutions willing to take long-term risks, for the confidence and information they possess

A particular characteristic of Marshallian industrial districts is the presence of what is called "patient capital". This indicates local financial institutions, integrated within the ID, willing to take long-term risks because of a high level of inside information and trust in local firms.

The Italianate version presents some extra features. First of all, there is cooperation between buyers and producers and among competitors (Saxenian 1996). This implies on one hand that competitor firms share risks making the market more stable. On the other, the innovation capacity in the area benefits from a constant exchange of information among workers that cooperate and work together (Sexenian 1996). In fact, most of the technological knowledge is tacit, complex and systemic inside the district (Guerrieri et al 2000). Unlike Marshallian IDs, the Italianate version seems to imply a higher level of associational activities through the local trade associations that provide technical support, organise meeting and forums and spread a sense of collective spirit. In conclusion, it seems that both the classical Marshallian and the Italianate version show a system based on strong and weak connections through which cooperation and exchange of information take place.

*2.1 The "Custom of Reciprocal Co-Operation" and the "System of Mutual Information"*

The aim of this section is to shed light on the dynamic that permits high level of trust to be so common within an industrial district. Dei Ottati (1994) describes this dynamic through the "custom of reciprocal co-operation" mechanism. Within a network based on long term relationships, this mechanism helps to reproduce trust,

reducing the demand for substitutes for trust and the need to monitor which, in turn, implies less direct costs (monitoring costs *in primis*) and the possibility to generate distrust. All these functions are possible thanks to three main characteristics. Firstly, the *labour mobility* between firms reinforces the reciprocal interdependence and favours the perception of the human capital at the local industry as a kind of collective property. Secondly, the local agents can easily monitor each other and remember other agents' past behaviours due to the limited geographical dimension of the IDs. Finally, the ability of monitoring at a lower cost gives the possibility to the members to punish those adopting strategies based on opportunistic behaviour (deviators) by withdrawing the willingness to conclude future transactions with them. This reaction along with social disapproval represents a useful grim strategy.

The circulation of inside information, together with the relatively high level of trust, represents another collective resource of the industrial district (figure 2.2). The flow of information is facilitated not only by the high level of workers mobility (Markusen 1996) but also by the different roles that different types of firms have inside the district. In fact, Dei Ottati (1994) shows that there also exists a high level of what we call here "mutual information" among firms. More precisely, two types of firms co-exist within an ID. The first type is represented by the companies that are generally specialised in buying and selling (or "import-export"). This means that they possess the information on end-market conditions. The second type refers to firms ("subcontractors") specialised in different phases of the production process that, therefore, possess information on the conditions of production. This scenario implies different types of information (about the market conditions, and about the production process) hold by different types of actors that, in turn, are responsible for different stages of the same "project". Hence, this system of mutual information favours reciprocal co-operation inside the industrial district network.

Figure 2.2 Networks and embeddedness related to the Industrial Districts
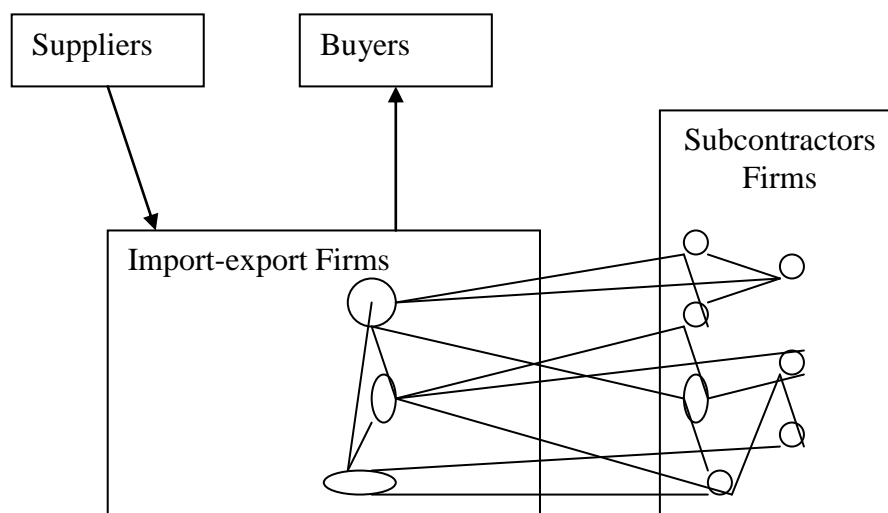
2.2 Social Capital and the Trust-Cooperation Complex

According to Paldam (2000) any social capital indicator needs to hold what he calls the trust-cooperation complex. This particular concept indicates that trust and cooperation are two interlinked elements that any social capital indicator should be able to satisfy somehow[5].

$$Trust \Leftrightarrow \ ease \ of \ voluntary \ cooperation \ \pm \ e \qquad (1)$$

Equation (1) indicates the interlink between the internalised norms of generalised trust[6] (*Trust*) and the ability of individuals of working together inside the community (*ease of voluntary cooperation*) while *e* is a small error.

Our idea is that the "custom of reciprocal co-operation" and the "system of mutual information" theoretically support the relationship between the *dind* and the trust-cooperation complex. This theoretical analysis has been reinforced lately by empirical evidence. A case study developed by Dei Ottati (2004) relative to the industrial district of Prato analyses the sub-contractors relationships and trust. By using the measures of "trust" proposed by Sako (1998), Dei Ottati (2004 p. 7) lists three different levels of trust. Firstly, *competence trust* related to the statement "The information we receive from our sub-contractors is useful to our firm". Secondly, *goodwill trust* related to the statement "Our habitual sub-contractors will help us even if not foreseen by the agreement". Thirdly, *opportunism* related to the statement "Given the chance, our subcontractors might try to take unfair advantage of our business". The results of the survey show that more than 80% of the final firm entrepreneurs[7] are strongly agreed with the first two statements and only about 5% with the opportunistic behaviour, even though the percentage agreed with the goodwill trust is much lower when the sample is made by phase firms. One of the most interesting results in the survey is the fact that 87% of the interviews agreed on the awareness of a local code of business conduct (Dei Ottati 2004 p. 8). These rules have been identified by Brusco (1999 p. 21-24) as the principal rules of the game in industrial districts. The first one is about the importance of trusting, even though cautiously, those who deserve it. The second one recognises that because of their reciprocal interdependence, individuals that work together on a continuous basis will never fully take advantage of the market power that is available to them. Each of them will take into account also the survival needs. The third one recognises as wrong and shameful the use of information, knowledge or a network of relationship for personal gain to the detriment of the firm that has involved them in specific

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[5] Notice that in the literature it is still ambiguous whether these two concepts are causally linked one to each other. In Sonderskov's (2008) impression this link in the literature seems to be treated more as an assumption rather than a theoretical and/or empirical justification.

[6] Notice that "Generalised trust" is defined as the trust between the members of a community. As Sonderskov's (2008) underlines this should not be confused with the trust towards a specific individual in a specific situation. Rather it identifies the belief that the other members of the community in general are trustworthy.

[7] Due to the importance of division of labour inside the district the survey distinguishes between final firms and phase firms. The former indicates the firms specialised in the design and marketing of the district products. The latter refers to the firms specialised in one or more phases of the production process typical of the district (Dei Ottati 2004)

initiatives with good faith. Whether this system of norms or conduct code has been internalised by the ID community for altruism, for community culture (local moral code and community beliefs) or for rational choice is not object of our analysis. It is, instead, a strong signal that a system of values and norms has been internalised with the consequence of facilitating cooperation and spreading, at least, a certain level of trust among the members of that community.

3. The New Social Capital Indicator and the Regional Density of Industrial Districts in Italy

Given the characteristics of the industrial districts, we consider the ID as a particular community and its workers the members of this community. The idea is, therefore, to construct a new index by using the same structure and method applied in the Putnam's one. To construct our index we need to follow three essential steps. The first step implies an empirical definition of the ID. The model that has been used to identify the industrial districts within a particular area is presented in the Appendix C. This is the standard model used not only by the Italian National Institute of Statistics (ISTAT) but also in the academic literature (Russo and Rossi 2001, Baffigi et al 1997, Sforzi 2002). The Italian national territory is divided into twenty regions with their own "regional government" and administration. In socio-economic terms, each region is composed by what are called local labour systems (LLS). The LLS indicates territorial groupings of municipalities (*comuni*) statistically comparable with two main characteristics. Firstly, each grouping may only include neighbouring municipalities belonging to no other territorial group. Secondly, each grouping is self-contained, in the sense that residents in each area mainly work for local firms, whose head-office is in one of the municipality making up the LLS. The second step implies the definition of industrial districts. The IDs are LLS with particular industrial concentration criteria. In particular, the IDs need to satisfy two conditions. Firstly, the level of employment of small firms operating in the LLS specialised in manufacturing activity must be greater than 50% of total employment in the same activity at the LLS level. Secondly, in case there is only one medium sized companies in the clusters, then the number of the workers in the small companies has to be greater than the 50% of the number of the workers in the medium sized company (such that the industrial system is not polarised).
The third step implies the definition of the indicator. To this purpose we consider a population of workers $j = 1, 2,..., m$ which is the sum of all the workers belonging to the Local Labour System of the region. Then we want to know how many workers in the region work for the IDs
d_j industrial district has l_j workers

$$L = \sum_{j=1}^{m} d_j \qquad (2)$$

$$\Rightarrow \frac{L}{m} = dind \qquad\qquad (3)$$

Hence, *dind* indicates the density of industrial districts.

The data used to construct the social capital indicator *dind* derive from the "8th General Census on Industry and Industrial Districts 2001" (ISTAT 2001). Figure 3.1 shows that the distribution of the industrial districts is mainly concentrated on the Centre and on the North of the peninsula.

Figure 3.1 Industrial Districts in Italy 2001
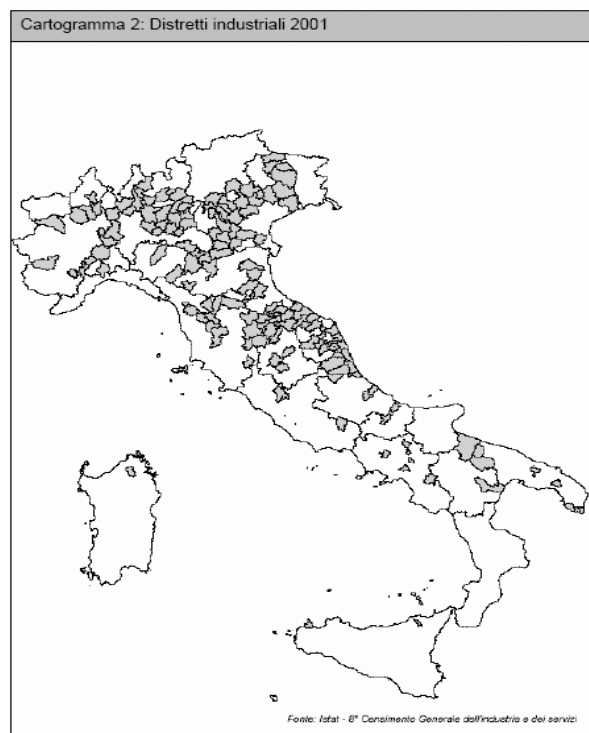
Source "8th General Census on Industry and Services" (2001)

In Italy, according to the last Census, there are 156 industrial districts over 686 local labour systems (Table 3.1). The Italian territory is divided into 20 institutional and physical regions each of them with a "regional government" provided with the right to marginally employ some macroeconomic policies (such as expenditure in public goods, local fiscal policy, expenditure in regional investment on different forms of capital).

We can immediately notice that three out of the 20 regions do not have industrial districts. Two of these regions are located in the North and only one in the South. The two northern regions are located near the borders: Liguria in the North-West coast neighbouring with France, the Valle d'Aosta neighbouring with France and Switzerland. On the other hand, the region in the South where the industrial districts are absent is Calabria, apparently, the poorest economic area of the peninsula. Even though two of the "missing regions" are located in the North, properly that part of Italy presents the highest number of IDs. In terms of geographical concentration

(number of districts per hectares) the first two regions are Veneto (North-East) and Marche (Centre) with respectively values of 0.0354 and 0.0319. The region in the South with the highest density of IDs per hectares is Campania, but the value is quite far from the previous two (Density IDs = 0.0135).

Table 3.1 Industrial Districts and Local labour Systems per regions 2001

Regions	IDs		LLS	
	N. Districts	Labour Units	N. LLS	Labour Units
Piemonte	12	297,034	37	1,652,362
Valle d'Aosta	-	-	3	51,568
Lombardia	27	1,745,042	58	3,920,631
Trentino Alto Adige	4	46,814	33	405,223
Veneto	22	861,546	34	1,896,143
Friuli-Venezia Giulia	3	123,244	11	474,146
Liguria	-	-	16	537,251
Emilia-Romagna	13	574,432	41	1,755,422
Toscana	15	466,494	53	1,375,783
Umbria	5	61,823	17	294,930
Marche	27	435,063	33	592,336
Lazio	2	31,542	25	1,745,432
Abruzzo	6	96,859	19	396,422
Molise	2	4,307	9	88,222
Campania	6	26,177	54	1,267,384
Puglia	8	144,096	44	940,182
Basilicata	1	9,927	19	152,103
Calabria	-	-	58	399,995
Sicilia	2	3,236	77	1,034,949
Sardegna	1	2,085	45	430,072
ITALIA	156	4,929,721	686	19,410,556

Source "8th General Census on Industry and Services" (2001)

Table 3.2 "dind" in the Italian regions (2001)

| Region	Dind	Region	Dind
Piemonte	0.180	Marche	0.734
Valle d'Aosta	0	Lazio	0.018
Lombardia	0.445	Abruzzo	0.244
Trentino Alto Adige	0.116	Molise	0.049
Veneto	0.454	Campania	0.021
Friuli Venezia Giulia	0.260	Puglia	0.153
Liguria	0	Basilicata	0.065
Emilia Romagna	0.327	Calabria	0
Toscana	0.339	Sicilia	0.003
Umbria	0.210	Sardegna	0.005

4. **Social Capital and Labour Market: Still an Open Dispute**

For the last decade, the empirical literature on labour market and social capital has been experiencing a growing trend. In his cross-countries analysis, Contini (2010) shows that the role of the institutional arrangements is crucial in understanding differences in employment rate among EU states. In countries where "institutions help the reconciliation of working time with family duties and child care", women activity rate and youth employment is higher. Where these policies are missing, informal safety net and networks play a crucial role. Another important aspect is related to the labour market efficiency. In labour markets where the formal search-matching mechanism does not work then social connections and informal networks are likely to become a substitute. Pistaferri (1999), by using data from the Bank of Italy, shows that between 1991 and 1993 in Italy, the informal network represented a crucial channel able to raise the probability of receiving job offers, even though it was also associated to lower earnings. Sabatini (2005), in analysing the relationship between different forms of social capital (bonding, bridging and linking) and labour market in Italy, noticed that bonding and linking ties can reduce labour precariousness. In the broader context of United States, through cross-sectional regression models, Casey and Christ (2005), find that social capital positively affects employment stability across American states. Montgomery et al (1991) explains this positive relationship in terms of social monitoring. More precisely, given that a consistent proportion of workers are hired through their direct and indirect connections, such as family and friends (Granovetter, 1973; Holzer, 1987), the employee referrals may work as screening device (Montgomery et al, 1991). However, this mechanism has to be considered with caution. It is quite reasonable arguing that where connections represent the main source of labour demand and supply, the market suffers from inefficiency (Pistaferri, 1999) due to a lack of information. One of the main consequences is that the mechanism is likely to affect the distribution of high/low-skills workers within the labour market. The literature presents quite controversial results regarding the role of social capital for high and low-skills workers. On the supply side, Pistaferri (1999) underlines that informal network is mainly used by low-skill individuals while high-skill workers are likely to rely on the formal job mechanism. Lin (1999) and Marsden (2001), on the contrary, argue that social network is more available for high skills individuals holding a better social position and possessing more social capital. On the demand side, some studies argue that social network is used when the position to be filled does not require particular cognitive skills (Holzer, 2006; Hellerstain et al, 2008). On the other hand, other works show that firms prefer to use their social capital for demanding and leading work positions. This is because they expect to find individuals that are more reliable (Boxmann, 1991; Rebien, 2010). To some extent, social capital might also be considered as an obstacle to enter the job market. Fontaine (2004) underlines that people with fewer social contacts may have lower opportunities than others. This means that a high density of workers embedded in the social networks may have the effect to raise the unemployment rate by consolidating the distance between insiders and outsiders in the labour market.

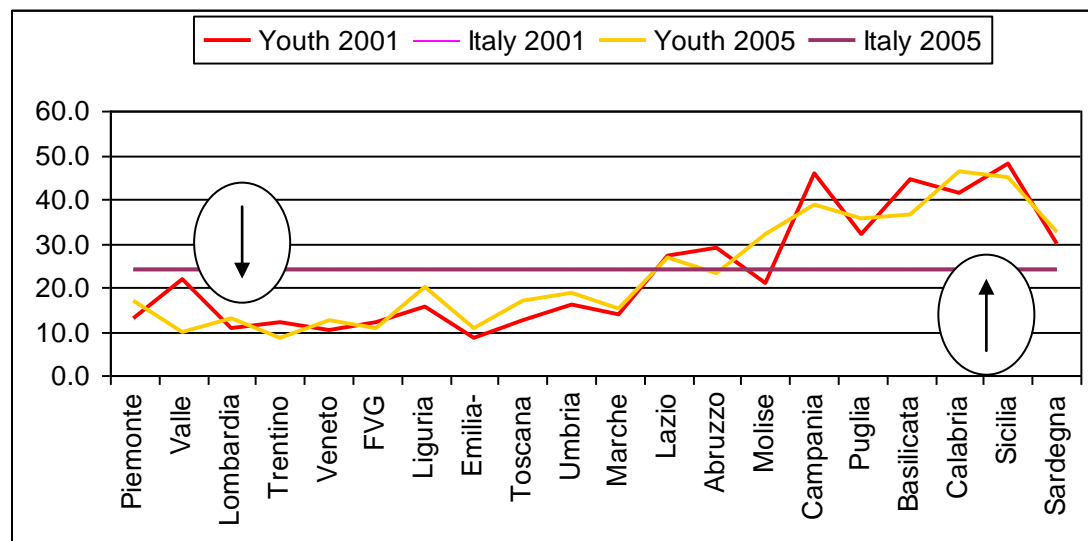*4.1 Youth and General Unemployment Disparities in Italy: Descriptive Analysis*

This section is far for providing a solution to the dispute previously mentioned. However, it certainly contributes to add some empirical evidence by using a different perspective. We apply the index of regional disparity to general and youth unemployment. The aim of this approach is to provide a broader picture of the macro-economic wealth of the country itself.

Figure 4.1 Unemployment in Italy in 2001 and 2005
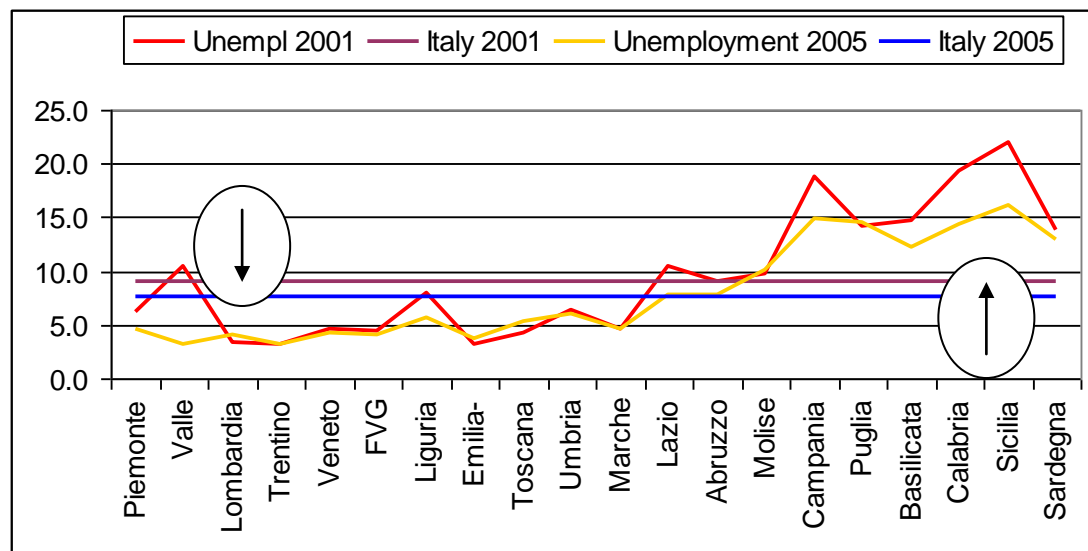
Source: Data from ISTAT www.istat.it

Figure 4.2 Youth Unemployment in Italy in 2001 and 2005

Source: Data from ISTAT www.istat.it

Figure 4.1 and 4.2 show the cross-regional trend of the general and youth unemployment in Italy for the years 2001 and 2005. The cross-regional trend of both

Table 4.2 Regional Youth Unemployment Disparities in Italy in 2001 and 2005 (Italy = 1)

1

Regions	2001	2005	Regions	2001	2005
Piemonte	0.533	0.704	Marche	0.576	0.630
Valle d'Aosta	0.899	0.414	Lazio	1.135	1.106
Lombardia	0.449	0.543	Abruzzo	1.193	0.961
Trentino Alto Adige	0.489	0.359	Molise	0.874	1.329
Veneto	0.428	0.525	Campania	1.901	1.621
Friuli Ven. Giulia	0.507	0.439	Puglia	1.326	1.477
Liguria	0.642	0.834	Basilicata	1.842	1.528
Emilia Romagna	0.360	0.445	Calabria	1.715	1.923
Toscana	0.508	0.699	Sicilia	1.998	1.870
Umbria	0.664	0.771	Sardegna	1.238	1.362

According to table 4.1, in both of the years 2001 and 2005, the general unemployment disparity is greater than 1 in most of the southern regions with the exception of the region Abruzzo (in 2001). While the disparity index is definitively below 1 in all the northern and central regions except in the case of the regions Valle d'Aosta (1.149 in the 2001) and Lazio (1.150 in the 2001 and 1 in the 2005). The regions recording the highest disparity value, hence the highest unemployment rate, are the regions Sicilia, Calabria and Campania; all of them belonging to the southern group. In 2001 all these regions have a disparity value above 2, which means that their level of unemployment rate is more than double of the national average. On the contrary, the regions with the lowest disparity index (below 0.4) are the regions Lombardia (North West), Trentino Alto Adige (North East) and Emilia Romagna (North East), whose unemployment rate is less than half of the national average. From 2001 to 2005 the general unemployment rate shifts down by about 1.5%, from 9.1% to 7.7%. From table 4.1 we might infer that this shift has been caused essentially by the consistent decreasing of unemployment in the regions Valle d'Aosta [9], Sicilia, Calabria and Campania [10]. However, even under these improvements, Sicilia, Calabria and Campania remain in the bottom of the low performing group of regions in 2005 as well. Table 4.2 shows similar patterns in terms of youth unemployment disparities, with some exceptions though. There is no region with a disparity index above 2 which means that no region records a youth unemployment rate that is more than double than the national average. From 2001 to 2005, the youth unemployment rate did not change (from 24.1% in 2001 to 24% in 2005), but we cannot confirm the same about its distribution across the regions. To

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[9] Notice that the disparity index during the period 2001-2005 moves from 1.149 to 0.420. In "real" values this indicates that unemployment rates decreased from 10.5% to 3.2%

[10] For Campania and Calabria the disparity indices shift below 2 in the 2005. The disparity index of Sicilia in the 2005 is still above 2 but it decreased tremendously. Translated into percentage, from 2001 to 2005 the unemployment rate in Sicilia moves from 22% to 16.2%

this purpose, Table 4.3 shows a "cross pattern" description. We select all the regions whose general unemployment has decreased during the period 2001-2005 and we check whether the youth unemployment follows the same pattern. Table 4.3 shows that 8 out of 20 regions has experienced a decline in the general unemployment rate but in three of the eight regions (Piemonte, Liguria and Calabria) the youth unemployment rate went to the opposite direction. This might occur for many different reasons. For instance, it might indicate lower expectations for the category of the youth workers in that regions or it might be related to the average level of education. Alternatively it might be due to the youth dependency rate.

Table 4.3 General Unemployment VS Youth Unemployment in Italy (2001-2005)

Regions	General Unemployment	Youth Unemployment
Piemonte	Decrease	Increase
Valle d'Aosta	Decrease	Decrease
Liguria	Decrease	Increase
Lazio	Decrease	Decrease
Campania	Decrease	Decrease
Basilicata	Decrease	Decrease
Calabria	Decrease	Increase
Sicilia	Decrease	Decrease

In a recent work about youth unemployment, social capital and institution across European countries, Contini (2010) shows that the youth dependency rate, YDR, represents one of the key factors positively influencing the youth employment rate. However, the deriving positive correlation between these two factors (Contini, 2010) appears to be very weak and not supported by strong empirical analysis. By repeating a similar exercise, in our case, we find opposite results (Figure 4.3). The youth dependency rate calculated as the proportion of individuals aged 15-24 to the population in working age 15-64 is positively correlated to the youth unemployment disparity. A possible explanation is related to the demographic effect on the labour market. Where the percentage of young individuals is lower, a larger proportion of youth active people receives a job offer (keeping of course constant productivity and aggregate demand). This might be the case for the region Calabria (Cal) which presents a youth dependency rate above the 20%. Actually, our exercise differs from the one computed by Contini (2010) in three elements. Firstly, while Contini (2010) uses the trend of YDR calculated for the period 1970-2005, our process, due to the lack of data, is focused on the period 2001-2005. Secondly, unlike Contini (2010) that uses employment, we use unemployment. It is not improbable that the two variables might present similar trends especially in countries or regions facing higher population growth rate. Finally, Contini (2010) compares EU countries while our analysis is cross regional.

Figure 4.3 Youth unemployment disparity and YDR across the Italian regions 2001-2005
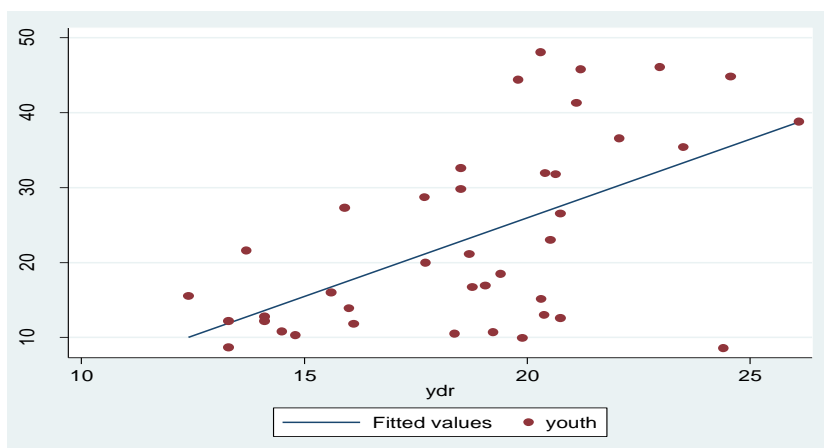
1

What about unemployment and social capital? As we have anticipated at the beginning of this section, empirical evidence shows a positive correlation between social capital and employment. Table 4.4 ranks the regions from the highest value of *dind* to the lowest one (we exclude from the table the regions having *dind* equal to zero).

Table 4.4 dind Ranking by median

Median = 0.2096 (Umbria)
(Ma Ve Lo To ER FVG Abr Tr) > **Um** > (Pie Pu Ba Mo Cam La Sar Sic)

The social capital proxy seems to present a quite similar pattern of the unemployment disparity indices. While, like for the case of unemployment, there is no southern region above the median value region except for Abruzzo (Abr), which is also the only southern region having a disparity index less than 1 in 2001. The regions Piemonte (Pie) and Lazio (La) are the two regions of the north and centre below the median value. The former is one of the three regions whose youth unemployment has increased while the general unemployment has decreased between 2001 and 2005 (table 4.3). The latter has a rate of unemployment above the country level (tables 4.1 and 4.2). Table 4.5 indicates the correlation among the social capital proxies and the unemployment indicators. The variable *dind* seems to be negatively correlated to all the unemployment indicators with a correlation coefficient greater than 0.5 in all the cases.

Table 4.5 Correlation between social capital and unemployment disparity (obs. 40)

	unempl	*Undisp*	*youth*	*youthdisp*	*dind*
Unempl	1.000				
Undisp	0.909	1.000			
Youth	0.882	0.968	1.000		
Youthdisp	0.881	0.968	1.000	1.000	
Dind	-0.521	-0.595	-0.572	-0.572	1.000

Variables
dind: our social capital indicator
unempl: regional unemployment in 2001 and 2005
undisp: regional unemployment disparity index (eq. 4) in 2001 and 2005
youth: regional youth unemployment in 2001 and 2005
youthdisp: regional youth unemployment disparity index (eq. 4) in 2001 and 2005

5. Empirical Analysis

The model we are going to present in this section takes into account the patterns we have underlined in the previous section. The empirical analysis will be developed through a pooled cross section for the years 2001 and 2005. Based on previous empirical and theoretical works in the literature, we will consider general and youth unemployment levels and general and youth unemployment disparities expressed in the following functional form (equation 5).

$$unemp_{it}^{j} = \alpha_0 + \beta_1 dind_{it} + \beta_2 PI_{it} + \beta_3 grad_{it-1} + \beta_4 productivity_{it} + \beta_5 ydr_{it} + u_{it} \quad (5)$$

where the index *j* indicates general and youth unemployment level and general and youth unemployment disparities, the suffix *i* indicates the region and *t* the years 2001 and 2005. The variables of unemployment are controlled by the two proxies of social capital (*dind* and the Putnam's instrument *PI*). We control also for the proportion of individuals holding a graduate diploma (*grad*) since the level of education should theoretically facilitate the access to the job market. Following the economic theory, higher marginal product of labour should increase the employment rate and decrease unemployment. Therefore, we should expect the labour productivity variable (*productivity*) to be negatively related to unemployment disparities. The model considers also the youth dependency rate (*ydr*) as suggested by Contini (2010). As we have anticipated in the previous section, higher *ydr* should be positively associated to unemployment.
Table 5.1 shows the results of the equation (5) for the different variables of unemployment.

Table 5.1 Social capital and unemployment disparity

	Eq. 1 unempl	Eq. 2 undisp	Eq. 3 youth	Eq. 4 youthdisp
Dind	-0.073***	-0.009***	-0.165***	-0.007***
	(0.024)	(0.002)	(0.036)	(0.001)
PI	-0.888***	-0.067***	-1.409***	-0.058***
	(0.096)	(0.008)	(0.190)	(0.008)
Grad	-0.745***	-0.040***	-0.705***	-0.029***
	(0.107)	(0.008)	(0.171)	(0.007)
Productivity	-0.013	-0.009	-0.187	-0.008
	(0.105)	(0.007)	(0.135)	(0.006)
Ydr	0.649***	0.065***	1.362***	0.057***
	(0.176)	(0.012)	(0.252)	(0.010)
Constant	25.571***	2.054***	40.894***	1.692***
	7.317)	(0.483)	(10.486)	(0.435)
Adj. R Squared	0.802	0.842	0.821	0.821
Standard Error	3.041	0.241	5.308	0.221
N. Obs	40	40	40	40

* p<0.1 ** p<0.05 *** p<0.01 Robust standard errors in parenthesis below each coefficient
Variables in the regressions
dind: *dind* in the years 2001 and 2005
PI: Putnam's instrument in 2001 and 2005
grad: regional proportion of individuals holding a university degree in 2000 and 2004
productivity: regional productivity calculated as (regional product) / (total workers) for the years 2001 and 2005
ydr: regional youth dependency ratio calculated as n. youth aged 15-25 over total working population aged 15-65 for the years 2001 and 2005

Empirical evidence seems to confirm that social capital reduces general and youth unemployment and cross regional unemployment disparities. Both of the social capital indicators are significant and 1% level in all the regressions. More precisely, the empirical results show that to a 10% increase of the indicator *dind* follows a reduction of 0.73% of unemployment rate and 1.65% of youth unemployment rate. In terms of unemployment disparity, as *dind* increases by 1% the unemployment disparity index reduces by 0.009 while the youth unemployment disparity index by 0.007. This means that the region facing a 1% increase of social capital would reduce its unemployment and youth unemployment disparity compared to the national level by respectively 0.9% and 0.7%. The impact of the Putnam's instrument is stronger than *dind* regarding to unemployment rate and unemployment disparity.

To this purpose, during our analysis, we have also tested whether the variable "district" can affect the performance of *dind.* More precisely, the high flexibility of the labour market inside a district might condition the power of the social capital proxy. If this is the case, we might expect that if we include the variable district in all the regressions, this should be negatively and significantly correlated with the dependent variable and the variable *dind* should loose its explanatory power. We have found that the variable "district" is negatively related to all the unemployment variables but not significant, while the explanatory power of *dind* remains unaltered

in all the regressions. Like social capital, the level of education is negatively and significantly related to general and youth unemployment and to their disparities indices. People holding a graduate diploma (*grad*) seem to have better access to the labour market. As economic theory predicts, labour productivity is negative correlated to unemployment even though it is not significant. Not surprisingly, the youth dependency ratio is positively and strongly significantly associated to unemployment.

One of the possible elements that can make our analysis more robust is to include the dummy *south* in the regressions. As we have anticipated in the descriptive analysis, the disparities in both general and youth unemployment seem to divide the country into two main geographic areas: better performing North and depressing South. The indices of unemployment disparities *undisp* and *youthdisp* are greater than the unity in all the southern regions (with the exception of the regions Abruzzo and Molise). We test, by including the dummy, whether the social capital indicators are still significant even though the impact is less strong (table 5.2).

According to the table 5.2, the dummy is positively and significantly related to unemployment. However, by including the dummy *south,* the explanatory power of the social capital and human capital indicators is unchanged. This result represents a further support for the social capital theory according to which social capital can represent a social asset able to reduce unemployment due to the imperfections in the labour market regardless the geographical location.

Table 5.2 Social capital and unemployment disparity

	Eq. 1 Undisp	Eq. 2 youthdisp
Dind	-0.007***	-0.005***
	(0.002)	(0.001)
PI	-0.051***	-0.044***
	(0.008)	(0.007)
Grad	-0.032***	-0.021***
	(0.009)	(0.007)
productivity	-0.005	-0.004
	(0.003)	(0.003)
Ydr	0.047***	0.040***
	(0.013)	(0.011)
South	0.357***	0.327***
	(0.139)	(0.109)
constant	1.662***	1.333***
	(0.308)	(0.285)
Adj. R Squared	0.868	0.850
Standard Error	0.221	0.202
N. Obs	40	40

* p<0.1 ** p<0.05 *** p<0.01 Robust standard errors in parenthesis below each coefficient
Variables in the regressions (see table 5.1) - the dummy south indicates the southern regions (see Appendix B)

5.1 Social Capital and "low/high educated" Labour Force

As previously anticipated, dealing with social capital and labour market drives the scholars to deal with one of the still open dilemmas: is social capital a more efficient channel for highly educated or for lowly educated workers? Indeed this issue is likely to be conditioned by the labour market structure. From the demand side, for instance, small firms, where the human resource sector is limited to the person of the firm owner, tend to recruit through their informal networks (Rebein 2010). Hence, for these types of firms and for some job positions (low skill requirements) the formal recruitment channels involving advertisement, assessment centres and screening of enrolees might be too costly. On the other hand, it is also true that occupying an important and leading responsible position is not only a matter of CV. Reputation and trust might play a crucial role in the recruitment process. From the supply side, informal network might represent one of the social resources available to the labour force. Individuals tend to enlarge their initial family network during the years of schooling and they extend it once they enter in the labour market. This process might somehow explain the theory of "the strength of position proposition" proposed by Lin (2001 pp. 75-76). According to this theory, the better the original position of an individual, the more likely this individual will access and use better social capital. In labour market terms, this might be translated into the dualism insider-outsider. Individuals inside the labour market for a longer period had more possibilities to intensify and enlarge their network enough to use it in a more efficient way than outsider. It is clear that under these particular circumstances we cannot say that the labour market is more efficient. It is likely to be the other way round. On the other hand, the strength of the initial position might be characterised by a higher educational level. It is not unpopular among social capital theorists to consider that better educated individuals can have the advantage to be involved into social circles and associations rich in resources (Coleman, 1990). This indicates that human and social capital, are likely to be complementary assets. In our analysis the question is how social capital affects the labour market when we consider high and low educated individuals. To this purpose, table 5.18 presents the results of a series of regressions. We consider three new variables. From the census of the population made by ISTAT in 2001, we consider individuals that do not hold the compulsory years of schooling (*lowed01*) and we interrelate social capital indicator *dind* with the variable *grad,* named *scgrad,* with the variable *lowed0,1* named *sclowed01*[11]. Then, we include the two interactive variables in the regressions alternatively.

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[11] Notice that the variable *lowed01* refers to the year 2001. Unfortunately we do not have the same variable for the year 2005 therefore in our analysis the effect of "low educated" individuals is lagged by 5 years with respect to the year 2005. It is not the first time that educational variables are lagged relative to the dependent variables. In their cross-country analysis Kanck and Keefer (1997) consider the variable of school enrolment lagged by more than 10 years relative to output growth and investment over GDP. Moreover, it is not the first time that social capital variables are interacted with other socio-economic variables. For instance, still Knack and Keefer (1997) interact the variable "trust" with GDP.

Table 5.3 Social capital and "low/high educated" labour force

	Eq. 1 unempl high educated	Eq. 2 unempl low educated	Eq. 3 unempl high educated	Eq. 4 unempl low educated
Dind	-0.343***	0.189	-0.454***	0.384
	(0.118)	(0.142)	(0.152)	(0.237)
PI	-0.581***	-0.571***	-0.822***	-0.808***
	(0.105)	(0.107)	(0.237)	(0.237)
Grad	-0.532***	-0.387***	-0.066	0.097
	(0.158)	(0.106)	(0.219)	(0.180)
Scgrad	0.013**		0.014*	
	(0.005)		(0.007)	
lowed01	1.054***	1.303***	2.432***	2.920***
	(0.201)	(0.298)	(0.376)	(0.418)
sclowed01		-0.030*		-0.062**
		(0.016)		(0.026)
Constant	18.710***	12.991**	13.035	4.501
	(5.651)	(5.128)	(9.400)	(9.547)
Adj. R Squared	0.853	0.845	0.845	0.853
Standard Error	2.623	2.686	4.943	4.802
N. Obs	40	40	40	40

* p<0.1 ** p<0.05 *** p<0.01 Robust standard errors in parenthesis below each coefficient
Variables in the regressions
dind: dind: *dind* in the years 2001 and 2005
PI: Putnam's instrument in 2001 and 2005
grad: regional proportion of individuals holding a university degree in 2000 and 2004
scgrad: dind*grad interactive variable between social capital and high educated individuals
lowed01: individuals that do not hold the compulsory years of schooling at the regional level in the year 2001
sclowed01: dind*lowed01 interactive variable between social capital and low educated individuals

Table 5.3 shows interesting results. When we consider "high-educated" individuals, social capital indicators are still negatively and significantly related to the level of general and youth unemployment, while the interactive variable *scgrad* is significant but positively correlated to the types of unemployment. One possible explanation might be related to the efficiency in labour market. When labour market is inefficient, "high-educated" individuals might rely more on their connections than on their professional abilities. This might increase rather than reduce unemployment[12].
On the other hand, when we consider "low-educated" individuals, the variable *dind* is not significant any longer, but the variable *sclowed01* is negatively and significantly related to the types of unemployment. A 10% increase of low educated individuals holding a social capital asset would decrease the unemployment rate by 0.3% and the youth unemployment rate by 0.62%. On the contrary, regions with

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[12] Notice that the reverse might be also true. In a highly inefficient labour market it is more probable to find a job or to recruit a new worker mostly through connections than via search-matching formal channels. However, the regressions show the positive correlation between the educational level and the unemployment level which finds large support in economic literature. This might provide support to our interpretation even though we cannot avoid reverse causality problems.

higher proportion of "low-educated" individuals, without social asset, face higher levels of general and youth unemployment. Empirical evidence shows that a 1% increase of individuals not holding the compulsory education increases general and youth unemployment rate by 1.05% and 2.43% respectively. This result is coherent with the group of empirical works (Hellerstain et al, 2008; Ioannides and Loury, 2004) that find social network a quite useful instrument for low qualified job offers. Contrary to this position, Lin (2001) argues that higher qualified individuals are more likely to be recruited via social network since they posses "better" social capital than lower qualified individuals. Our empirical analysis goes towards an opposite direction. What can be argued is that while higher qualified individuals might have access to a higher quality social network, they might have higher expectations as well which somehow limits the power of their social network. Moreover, from the demand side, high qualified positions need probably more recruitment tests (that go beyond the informal relationship) in order to verify the reliability of the candidate. By recalling Del Boca et al (1995), Pistaferri (1999) points out that Italy is probably the country, among the OECD group, with highest hiring and firing costs. Hence, due to the very high hiring costs, a formal recruitment process is not worth when a low skill position has to be filled. If lower qualified positions correspond to lower paid job, then these results are also coherent with Pistaferri (1999) who finds that if social network increases the probability of receiving job offers, at the same time is also correlated to a lower salary. Further investigations drive our research towards some conclusions by Pistaferri (1999). More specifically, according to his analysis, informal network is positively related to less years of education and more years of labour market experience. For this reason, we set different variables of low educated individuals, according to age intervals (table 5.4). This new setting allows us to address the more or less efficient use of social capital, depending on the age interval the individual belongs to. For example, the variable *lowed15* indicates the percentage of individuals, aging 15-24, that among their peers did not finish the compulsory years of schooling.

Table 5.4 Proportion of individuals that have not finished the compulsory school

Variable	*Lowed15*	*Lowed25*	*Lowed35*	*Lowed45*
Interval age	15 - 24	25 - 34	35 - 44	45 - 52

Source: ISTAT 2001

More mature and adult individuals are likely to possess a larger informal network and therefore more efficient social resources in order to enter the labour market (or alternatively in order not to exit the labour market). The reasons might be of different nature. In a more positive scenario, constant and more persistent interactions with other "members" of the individual's community might increase the level of individual's reputation and, hence, his/her reliability. The sense of trust and reciprocity, advanced by Putnam et al (1993), are most of the time the result of a relevant investment period on social networking. As with human capital, returns from investment on social capital might increase with its persistent use. Glaeser et al (2002), underlines that lifecycle effects predict that social capital increases and then declines after a certain age. In our specific data set, the last age interval stops at the

age of 52. This does not allow us to deal with a complete lifecycle. Apparently this inverse U shaped relationship between social capital and age should start to reduce under the retirement stage which is one of the last missing intervals in our data set. This missing interval seems to be in our opinion of minor problems. Actually, the 65+ life period, in Italy, corresponds to the period of retirement and it is also excluded by the data on unemployment. In table 5.5 we present the results of the different age interval variables interacted with the social capital variable (*dind*) related to the level of regional unemployment.

In all the regressions, Putnam's instrument and the high educational level are always negatively and significantly correlated to the level of regional unemployment. In any specification, the variable indicating the proportion of "low educated" individuals is positively and significantly correlated to unemployment. As theory predicts, higher level of education facilitates a better access to the job market. Regions with a lower aggregate level of education are likely to face a higher level of unemployment. Our analysis confirms also the social capital and lifecycle theory. Up to the age of 34 the interactive variables *scnoedu15* and *scnoedu25* are not significant. It seems that only after that period of life (35+), social connections and network start to be effective for low-level educated individuals. A 10% increase of individuals between 35 and 44 years, holding social asset, reduces the regional unemployment rate by 0.1%. The same increase of individuals in the interval 45-52 decreases the unemployment rate by 0.06%

Table 5.5 Social capital and "low educated" unemployment

	Eq.1 Unempl age 15-24	Eq.2 Unempl age 25-34	Eq.3 Unempl age 35-44	Eq.4 Unempl age 45-52
Dind	-0.11 (0.116)	0.007 (0.063)	0.099 (0.083)	0.236 (0.168)
PI	-0.698*** (0.138)	-0.617*** (0.116)	-0.539*** (0.096)	-0.655*** (0.112)
Grad	-0.428*** (0.134)	-0.400*** (0.123)	-0.391*** (0.105)	-0.438*** (0.112)
lowed15	1.043*** (0.358)			
sclowed15	0.011 (0.024)			
lowed25		0.633*** (0.184)		
sclowed25		-0.010 (0.009)		
lowed35			0.451*** (0.099)	
sclowed35			-0.010* (0.005)	
lowed45				0.311*** (0.058)
sclowed45				-0.006** (0.003)
Constant	21.955*** (5.441)	20.679*** (4.866)	16.625*** (4.316)	11.606** (5.172)

Adj. R Squared	0.787	0.822	0.859	0.834
Standard Error	3.154	2.881	2.568	2.782
N. Obs	40	40	40	40

* p<0.1 ** p<0.05 *** p<0.01 Robust standard errors in parenthesis below each coefficient
Variables in the regressions
dind, PI grad (see table 5.18*)*
lowed15, lowed25, lowed35, lowed45 (see table 5.19)
sclowed15: interactive variable *dind*lowed15*
sclowed25: interactive variable *dind*lowed25*
sclowed35: interactive variable *dind*lowed35*
sclowed45: interactive variable *dind*lowed45*

6. **Conclusion**

This study investigates whether social capital can represent one of the explanatory factors of the regional unemployment differences in Italy.

Empirical evidence shows at least three crucial results. Firstly, regions with higher level of social capital face lower level of youth and general unemployment. Social capital reduces cross regional unemployment disparities also when we control for the geographical location dummy *south*. Secondly, along to Pistaferri's (1999) conclusions and contrary to the "strength of position proposition" advanced by Lin (2001), we find that in Italy social capital seems to be more "effective" for low-educated individuals than for those highly educated. Finally, within the low-educated group, empirical evidence shows that "better" social capital increases with the age. This seems to follow the lifecycle and social capital theory.

Like other empirical studies on social capital, this analysis suffers from some important weaknesses. The absence of a common and unique definition and the different methods of measurement represent the main weaknesses in the doctrine of social capital and this is something that affects almost all empirical studies (Sabatini, 2005). These weaknesses are also exacerbated by the lack of a generally accepted theoretical framework and the lack of data especially in the form of time series. In empirical studies on social capital, causal relationships are very often, if not always, left to the interpretation of scholars. Association rather than causation represents the dominant outcome in most of the cases. Unfortunately, there is not a good prescription for avoiding these problems completely. More than one aspects of our work presents similar problems.

Firstly, there is a rich debate on whether it is better a single or a composite indicator. On the one hand, even though single indicators are easier to understand, they might not capture the multi-dimensionality of the phenomenon. On the other hand, a composite index is not able to explain which of the dimensions is affecting the dependent variable in that particular empirical context (Franke, 2005). In other words, grouping many dimensions of social capital together into one index might create conflicts among these dimensions. The trade-off between completeness and dimensional conflict is not solved in our study. We try to partially cover this gap by using more than one single social capital indicators in any empirical analysis. This

might provide a more comprehensive perspective even though it does not solve the lack of completeness.

Secondly, reverse causality and endogeneity problems can be addressed in this work. The direction of the causality is not always clear. Does lower unemployment creates better condition to favour the production of social capital or the other way round? A set of social capital measures might capture also some other elements not taken into account in the research but maybe crucial for the interpretation of the results. One of the critiques (Durlauf and Fafchamps, 2004; Lyon 2005) that Helliwell and Putnam (2000) receive is the omission in their regressions of the geographical location of the Italian regions. Does a dummy *south*, for instance, lead to the same results? This work shows that the empirical evidence is not altered by the dummy *south* when this is included in the functional form. With respect to the problems of endogeneity, these can be partially solved by using strong instrumental variables as in Guiso et al (2004) and Kanck and Keefer (1997). However, "the absence of any strong theories of aggregate social capital determination in the social science literature *would create several problems in the choice of* appropriate instruments" (Durlauf and Fafchamps, 2004 p.53). In addition, in small sample sizes (40 observation with only 5 years of time-gap), IV estimators can have a substantial bias which is one of the reasons why large samples are preferred (Wooldridge, 2006).

Thirdly, the number of observations in our analysis is not very large. Furthermore, the lack of time series data on the variables of social capital reduces the possibility of establishing a causal relationship between dependent variables and regressors. We try to overcome this problem by using pooled cross sectional analysis in the form of

$$\Delta t = t_2 - t_1 = 5\,years \qquad (7)$$

Indeed, social capital variables are not very volatile from one year to another and 4-5 years seems a reasonable length of time for them to show some changes in patterns or behaviour. Still, causal relationships cannot be shown empirically. However, with the support of the literature and the comprehensive analysis of the socio-economic context, the direction of the causality can be discussed.

In view of the strengths and the weaknesses just mentioned, there remains space for further interesting research.

At the beginning of 2012 the new Census on industrial districts will be published by the Italian National Statistics Bureau (ISTAT). This will allow us to enlarge the pooled cross section to a 10-year analytical view. Therefore, it will be possible to implement medium-long difference empirical models, as in Helliwell and Putnam (1995), and compare them to one-shot cross–sectional analysis. From this approach, interesting information about the indicator *dind* and PI is likely to be provided. The patterns of such variables and their relationships with other regional economic factors might provide a relevant contribution to the literature.

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Appendix A

Table A1 Variables

Dependent Variables		
Undisp	regional unemployment disparity 2001 and 2005	Author's elaboration by using data from ISTAT
Unempl	regional unemployment rate 2001 and 2005	ISTAT
Youth	regional youth unemployment rate 2001 and 2005	ISTAT
Youthdisp	regional youth unemployment disparity 2001 and 2005	Author's elaboration by using data from ISTAT
Independent variables		
Dind	ratio between workers belonging to the IDs of the region *i* and total workers in the region *i* in the 2001 and 2005	Author's elaboration by using data from ISTAT
District	number of the districts	ISTAT

	per region 2001	
grad	regional proportion of individuals of 25 years old and below holding a degree 2001 and 2005	ISTAT
lowed01	regional proportion of individuals that do not hold the compulsory years of schooling 2001 and 2005	ISTAT
lowed15	proportion of individuals aged 15-24 that have not finished the compulsory years of schooling	ISTAT
lowed25	proportion of individuals aged 25-34 that have not finished the compulsory years of schooling	ISTAT
lowed35	proportion of individuals aged 35-44 that have not finished the compulsory years of schooling	ISTAT
lowed45	proportion of individuals aged 45-52 that have not finished the compulsory years of schooling	ISTAT
PI	Putnam's instrument 2001 and 2005	Author's elaboration by using data from ISTAT
Pop	regional population 2001 and 2005	ISTAT
Productivity	regional productivity calculated as regional product over total workers 2001 and 2005	ISTAT
Scgrad	interaction between dind and grad in the form of dind*grad	Author's elaboration by using data from ISTAT
sclowed01	interaction between dind and lowed01 in the form of dind*lowed01	Author's elaboration by using data from ISTAT
sclowed15	interaction between dind and lowed15 in the form of dind*lowed15	Author's elaboration by using data from ISTAT
sclowed25	interaction between dind and lowed25 in the form of dind*lowed25	Author's elaboration by using data from ISTAT
sclowed35	interaction between dind and lowed35 in the form	Author's elaboration by using data from ISTAT

	of dind*lowed35	
sclowed45	interaction between dind and lowed45 in the form of dind*lowed45	Author's elaboration by using data from ISTAT
South	geographical dummy indicating the southern regions	ISTAT
Ydr	youth dependency ratio calculated as the ration between the number of youth aged 15-25 to the population in working age 15-65 (2001 and 2005)	Author's elaboration by using data from ISTAT

APPENDIX B Geographic Partition of Italy

North - West: Valle d'Aosta (VdA) Piemonte (Pie) Lombardia (Lo), Liguria (Lg),
North - East Friuli-Venezia Giulia (FVG), Trentino Alto Adige (Ta), Veneto (Ve), Emilia Romagna (ER)
Centre: Toscana (To), Marche (Ma), Umbria (Um), Lazio (La)
South: Abruzzo (Ab), Molise (Mo), Campania (Ca), Puglia (Pu), Basilicata (Ba), Calabria (Cal), Sicilia (Sic), Sardegna (Sa)
Islands: Sicilia (Sic), Sardegna (Sa)

APPENDIX C

Census 2001: The Industrial Districts

The industrial district is a local system characterised by the active co-presence of a human community and a dominant industry made up of a set of small independent firms specialised in different phases of the same production process.
This type of industrial system is part of the so called Local Labour System (LLS)

LLS: territorial grouping of municipalities statistically comparable
IDs are LLS that meet particular industrial concentration criteria.

How to identify IDs
The process used in the Census is based on four phases
 1. Identify LLS mainly manufacturing

2. Identify LLS mainly manufacturing whose industrial economy is based on SMEs
3. Identify the main industrial sub-sector (ex. textile) of these LLS
4. Identify the IDs

IDs Identification
1) Identify LLS mainly manufacturing
a) Compute the Concentration coefficient relative to the economic activity for each LLS

$$\frac{LLSn, ateco / ITAn, ateco}{LLSn, tot / ITAn, tot}$$

LLSn,ateco = workers in each economic activity in a LLS
ITAn,ateco = workers in each economic activity in Italy
ateco = economic activity
LLSn,tot = total workers (in the good and service market) in a LLS
ITAn,tot = total workers (in the good and service market) in Italy

b) Compare the LLS with a coefficient in the manufacturing industry higher than the national mean in order to derive the dominant economic activity.

$$[(LLSn, ateco / ITAn, ateco) - (LLSn, tot / ITAn, tot)] * ITAn, ateco$$

If the highest coefficient is related to the manufacturing industry, then the LLS is mainly manufacturing

2) Identify LLS mainly manufacturing whose industrial economy is based on SMEs
Consider three dimensional classes of enterprises
- Small size 0-49 workers
- Medium size 50-249 workers
- Big size over 249 workers

Compute the coefficient for each dimensional class

$$\frac{LLSn(class), man / ITAn(class), man}{LLSn, man / ITAn, man}$$

LLSn(class),man = workers for each dimensional class in the manufacturing sector in the LLS
ITAn(class),man = workers for each dimensional class in the manufacturing sector in Italy
LLSn,man = workers in the manufacturing industry in a LLS
ITAn,man = workers in the manufacturing industry in Italy

3) Identify the main industrial sub-sector (ex. Textile) of these LLS

a)   Compute the coefficient relative to each sub-sector (The census identifies 10 sub-sectors)

$$\frac{LLSn, sub\,/\,ITAn, sub}{LLSn, man\,/\,ITAn, man}$$

LLSn,sub = workers in each sub-sector in a manufacturing LLS
ITAn,sub = workers in each sub-sector in Italy
LLSn,man = workers in the manufacturing sector in a manufacturing LLS
ITAn,man = workers in the manufacturing sector in Italy

b)   Compare the LLS with a coefficient greater than 1 in order to derive the dominant sub-sector.

$$[(LLSn, sub\,/\,ITAn, sub) - (LLSn, man\,/\,ITAn, man)] * ITAn, sub$$

The highest coefficient identifies the sub-sector

4) Identify the IDs
Two conditions need to be satisfied

a)   The level of employment of small firms operating in the LLS specialised manufacturing activity must be greater than 50% of total employment in the same activity at the LLS level

$$\frac{LLSn(sme), sub\_p}{LLSn(tot), sub\_p} > 50\%$$

LLSn(sme),sub_p = workers in the principal sub-sector employed in the SMEs in a manufacturing LLS made by SMEs
LLSn(tot),sub_p = total workers in the principal sub-sector in a manufacturing LLS made by SMEs

b)   In case there is only one medium companies in the clusters, then the number of the workers in the small companies has to be greater than the 50% of the number of the workers in the medium company (such that the industrial system is not polarised)

$$\frac{LLSn(small), sub\_p}{LLSn(medium), sub\_p} > 50\%$$

LLSn(small),sub_p = Workers for small companies in the main sub-sector in a manufacturing LLS made by SMEs
LLSn(medium)sub_p = workers for a medium company (when there is only one medium company in the industrial system) in a manufacturing LLS made by SMEs