Social relations and economic welfare at an individual level[1]

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Abstract

Over the last few years, many studies have shown that social networks are important to the economic progress and the development of societies. In order to explain the determinants of social network formation, it is important to understand the motivations characterising the decisions of single agents with respect to their social behaviour. This paper presents evidence, through Italian microdata representative of the entire Italian population, that the quality and quantity of interpersonal relations of agents can increase their economic welfare. The analysis proposed seems to indicate that individuals also have an economic incentive to invest in social relations. Two proxies of interpersonal relations at an individual level are used. The first one, that is considered as a proxy for formal social relations, reflects the propensity of individuals to participate in different groups. The second one, that is interpreted as a proxy for the informal social relations, reflects the level of satisfaction of personal relationships of single agents with friends. This proxy is very useful to capture the quantitative aspects of informal interpersonal relations and the qualitative ones. Both formal and informal social relations of single agents seem to have a positive effect on their level of household economic welfare. This result proves robust to the inclusion of a variety of control variables and the use of different econometric methods.

Keywords: social interactions, social relations and economic welfare

JEL classification: Z13

1. Introduction

Recently, economists have been devoting more attention to the study of interpersonal relations. In particular, economists are interested in the relationship between: social relations and economic growth[2]; social relations and government performance[3]; social relations and education[4]; and social relations and financial development[5].

For the purpose of this paper, it is important to stress that there are various studies showing a significant correlation between economic performance and the quantity and quality of social ties present in a community. For example, Knack and Keefer (1997) and Zak and Knack (2001) find that the level of trust and the economic performance, at national level, are positively associated. Narayan and Pritchett (1999) show that the level of social capital[6] present in different Tanzanian villages influences household wealth[7]. In general, the papers considering the social relations as an aggregate dimension analyse the characteristics of interpersonal relations present in a community, however they do not investigate the theoretical microfoundations that can explain the presence of these relations. Glaeser, Laibson and Sacerdote (2000) argue that "to identify the determinants of social capital formation, it is necessary to understand the social capital[8]

[2] Knack and Keefer (1997) and Zak and Knack (2001)

[3] Putnam (1993) and Easterly, Levine (1997), Hall and Jones (1999) and La Porta et al.(1999)

[4] Loury (1977), Coleman (1988), Goldin and Katz (1999) and Helliwell and Putnam (1999)

[5] Guiso, Sapienza and Zingales (2000)

[6] The concept of social capital is often used by economists in order to analyse the role of interpersonal relations in economics. In economic literature there are many definitions of social capital. It is possible to identify two principal approaches to the concept of social capital. The first one considers social capital as a variable that mostly produces effects and is developed at an aggregate level. Putnam (1993), Fukuyama (1995, 1999), Narayan and Pritchett (1999), Uphoff (2000), Paldam and Svendsen (2000), the World Bank (2004) are exponents of this approach. The second one considers social capital at an individual level. The authors adopting this approach interpret social capital as a notion that operates at an individual level. Coleman (1988, 1990), DiPasquale and Glaeser (1999), Glaeser, Laibson and Sacerdote (2000) use this approach. The aim of this paper is not to investigate the concept of social capital and its features. However, it is useful for the purposes of this work sometimes to refer to the notion of social capital. In these cases, the definitions of social capital used will always be specified.

[7] They define social capital as the "quantity and quality of associational life and the related social norms" (Narayan and Pritchett 1999, p.872).

[8] In particular, Glaeser, Laibson and Sacerdote (2000) consider the social capital as an individual variable. They define social capital "as a person's social characteristics including social skills, carisma, and the size of his Rolodex – which enables him to reap market and non-market returns from interactions with others." (Glaeser, Laibson and Sacerdote 2000, p.4)

investment decision of individuals". This paper shows, using Italian microdata, that there is a significant positive association between the quality and quantity of interpersonal relations of single agents and their household economic welfare. In particular, the quality and quantity of interpersonal relations of agents can increase their economic welfare. This can represent an individual economic incentive to invest in social relations.

This paper presents two major peculiarities.

The first one is related to the data used for the empirical work. The data are representative for the entire Italian population and concern many different aspects of social life[9].

The second one is related to the approach used to investigate the relationships between the economic welfare and the characteristics of social ties among agents. The analysis follows a microeconomic approach and the results show that social relations have a positive effect on economic welfare at an individual level.

This paper is generally related to the literature on social capital and social interactions. Different papers are important to understand the focus and the particular approach of this one. Alesina and La Ferrara investigate the factors that can determine the propensity to trust (Alesina and La Ferrara, 2000a) and the participation in social activities, in particular in different types of groups (Alesina and La Ferrara, 2000b). They find that trust and social participation are influenced by both individual and social characteristics[10]. Glaeser, Laibson and Sacerdote (2000) investigate the factors that can explain the social capital investment decision of agents. They find that: "(1) the relationship between social capital and age is first increasing and then decreasing, (2) social capital declines with expected mobility, (3) social capital investment is higher in occupations with greater returns to social skills, (4) social capital is higher among homeowners, (5) social connection fall sharply with physical distance, (6) people who invest in human capital also invests in social capital, and (7) social capital appears to have interpersonal complementarities." (Glaeser, Laibson and Sacerdote, 2000, p.1).

These papers show different elements that can justify the propensity to trust or to participate in social activities at an individual level. However, they do not find a direct connection between personal social relation and individual economic welfare. The principal goal of this paper is to highlight

[9] In particular, the data reveal information about both the quality and the quantity of interpersonal relations that characterize the social life of individual agents. The data used are described in section 3.

[10] The factors that reduce the level of trust are: "i) a recent history of traumatic experiences [...]; ii) belonging to a group that historically has been discriminated against [...]; iii) being economically unsuccessful in terms of income and education; iiii) living in a racially mixed community and/or in one with a high degree of income disparity." (Alesina e La Ferrara (2000a, p.1). The principal factors that reduce the propensity to participate in different types of social activities are income inequality and racial and ethnic heterogeneity.

this connection. Do the social relations of single agents have a direct effect on their economic welfare? This question is important to better understand and analyse the social behaviours of agents.

This paper is organized as follows. Section 2 presents a theoretical analysis about the links between interpersonal relations and economic welfare at an individual level. In particular, section 2.1 discusses the kinds of social relations that are considered in this work and introduces the proxies elaborated to capture social ties at an individual level; section 2.2 considers the channels in which interpersonal relations can encourage the household economic welfare. Section 3 presents the data and the variables used in the empirical analysis. Section 4 displays the basic OLS regressions and the sensitivity analysis. Section 5 shows the empirical results obtained by investigating the same relations studied in section 4, but using the discriminant analysis[11]. Section 6 presents the main economic results reached. Section 7 briefly concludes.

2. Social relations and economic welfare: the theoretical links at an individual level

2.1 What kind of social relations?

From an economic perspective, two kinds of social relations seem particularly important to investigate the social behaviour of agents. It is possible to distinguish between formal and informal interpersonal relations. In this paper, the formal social ties are interpreted as those relationships that agents form inside some types of formal institution such as, among others, the non-profit associations and the place of work. Informal social ties are interpreted as the relations that individuals form outside formal institutions. If we wish to investigate the effects of social relations on economic welfare at an individual level, both informal and formal ties must be considered.

One can imagine that the two kinds of interpersonal relations described above are positively correlated. In section 3 two different proxies of social relations are introduced: a proxy of the level of formal and a proxy of the level of informal interpersonal relations. The correlation between these proxies, with reference to single agents, appears high[12]. Probably, the social skills of individuals play a role in the formation of interpersonal relations among agents. One can assume that an individual with particular social skills can easily form both formal and informal social relations. However, at a theoretical level, it appears important to study the impact of both kinds of

[11] As discussed in section 5, discriminant analysis is useful to verify if the procedure adopted to create the dependent variables used in the OLS analysis has produced some distortions in these ones.

[12] This correlation is equal to about 64%.

interpersonal relations on individual economic welfare [13]. Thus one can understand the economic effects of all the different social behaviours of agents.

At an empirical level, when one wants to analyse the behavioural characteristics of agents in terms of interpersonal relations, the first problem one must cope with is to elaborate the representative proxies of behaviours one wants to investigate.

In the economic literature, one finds two major kinds of social relations proxies. On the one hand, some authors use indicators that reflect the propensity to participate in different types of associations[14]. On the other hand, some researchers use an index of trust[15]. This measure of trust is elaborated using a survey question that asks: "Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?". The indicator is the percentage of respondents responding "most people can be trusted".

In this paper, two proxies of interpersonal relations at an individual level are considered[16].

The first one is an indicator of social participation. It reflects the propensity of individuals to participate in different groups and it is used as a proxy for the formal interpersonal relations of single agents. This proxy and the main indicators of social participations existing in the economic literature are essentially the same.

The second proxy presents some original characteristics. It is constructed by using a survey question with regard to satisfaction of relationships with friends. The available responses to this question are: "not satisfied with the relationships with friends", "not very satisfied", "somewhat satisfied" and "very satisfied". This indicator of satisfaction of relationships with friends appears very useful in illustrating the quantity and, in particular, the quality of informal interpersonal relations characterizing the social life of agents. In order to understand the peculiarity and the importance of this proxy, it is useful to introduce the concept of relational output[17].

These outputs can be produced only by the encounters among agents and are characterized by two principal effects. First, they can increase the human capital of the agents that participate in the social interaction, since the agents, for example, can share information. Second, they can generate a

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[13] This decision seems to be correct if one considers that both these kinds of relationships are significant, if introduced in the same regression, to explain the role of social relation to increase the household economic welfare (Section 4).

[14] This kind of index is used, for example, by Putnam (1993, 2000) and Glaeser, Laibson and Sacerdote (2000).

[15] This index is used, for example, by Knack and Keefer (1997) and Zak and Knack (2001).

[16] For a description of these proxies see section 3.

[17] The notion of relational output is linked to the concept of relational good that was introduced to economics by Uhlaner (1989). In particular, the concept of relational output is developed by Guy (2002).

common capital that individuals can use in their successive encounters; for instance, the individuals can produce mutual trust. One can name these kinds of relational outputs: "positive relational outputs", as they typically have a positive connotation. However, an encounter can generate "negative relational outputs" too, such as, among others, rancour and hatred. As will be clarified in the next section, the interpersonal relations producing "positive relational outputs" seem to be, at a theoretical level, the principal channel in which social relations influence the household economic welfare. For this reason, if one is interested in the analysis of channels in which the quality and quantity of interpersonal relations can encourage the household economic welfare, the possibility to use a proxy of informal social relations that allows separation of the encounters producing "positive relational outputs" and "negative ones" is an advantage. The satisfaction measure of the above described relationships with friends has this characteristic and, thus, is very useful.

The next section analyses the channels in which the kinds of interpersonal relations discussed above can encourage the household economic welfare.

2.2 The relationship between social relations and economic welfare at an individual level

There is a crucial channel in which interpersonal relations can increase economic welfare at an individual level. The participation in a rich network of social relationships can foster the accumulation of human capital.

In this context, in order to understand the relations between social networks and human capital accumulation, it is useful to consider a classification of knowledge in four defined categories (*Centre for Educational Research and Innovation*, 2000):

- *know-what*
- *know-why*
- *know-how*
- *know-who*.

Know-what is a kind of knowledge that relates to the possession of information. *Know-what* does not require an elaboration by the agents that acquire the information. It is a purely factual knowledge that can be easily incorporated in information or paper supports.

Know-why concerns the scientific principles such as the physical and chemical laws.

Know-how relates to competence to do activities and it encompasses both single individuals and firms.

Know-who concerns the competences of agents to cooperate and to communicate with other persons. This kind of knowledge presents a dual character.

On the one hand, the competence to cooperate and to communicate with other individuals is an important form of knowledge. The social skills, such

as the ability to participate in team works, are more important in the work place.

On the other hand, *know-who*, promoting the creation of social relations among agents, is a means to increase the other three forms of knowledge. An individual who has a high level of *know-who* can strike numerous interpersonal relations that can foster the accumulation of other forms of knowledge. First, the social relations can facilitate the acquisition of information by other agents (it increases *know-what*). Second, the interpersonal relations with people who have specific scientific knowledge can facilitate the individuals to improve *know-why*. Finally, social relations can promote the transmission of *know-how* that is usually hard to transmit without a direct personal contact[18].

These considerations explain the ways in which interpersonal relations can increase the knowledge of agents. Due to social relations, individuals can increase their personal knowledge and, therefore, they can achieve goals and economic results otherwise not attainable or only attainable at higher costs.

The next section introduces the data and the variables used in the empirical analysis.

3. The data

The data considered in this paper are from the "Indagine Multiscopo sulle Famiglie-Aspetti della Vita Quotidiana", a research published yearly from 1993 by ISTAT (The Italian National Institute of Statistics).

In particular, the present analysis uses the microdata relating to two different years: 1993 and 2001. In these two years, the surveys examined 19.748 and 19.920 households and 55.844 and 53.113 individuals respectively.

The principal goal of the empirical analysis is to investigate the relationships between household economic welfare and the interpersonal relations of single agents. In particular, the association between the level of household economic welfare and the characteristics of social life of head of family is studied. Since there is not a direct measure of household income or household wealth in the data collected in the "Indagine multiscopo", two different household economic welfare indices have been elaborated using these data. These two indices present different information about household

[18] In this context, it is important to refer to the distinction between tacit and explicit knowledge introduced by Polany (1958, 1966). Tacit knowledge is a form of knowledge difficult to transmit from an individual to another. The transmission can be facilitated through direct personal contact. *Know-how* is often a kind of knowledge that has the characteristics of tacit knowledge. For this reason, an individual who has *know-who* and who embarks on new interpersonal relations, without problems, more easily can increase his *know-how*.

economic welfare. The first one can be considered a subjective index of economic welfare (SEW) and the second one an objective index (OEW).

The SEW has been formulated using:

- the responses of head of family about the general economic situation of the family
- the responses of head of family about financial difficulties to meet some expenditures[19].

The responses of head of family about the general economic situation of the family essentially reflect subjective considerations. They reveal the head of family's satisfaction with regard to the economic situation of the family. This satisfaction depends mostly on personal expectations of the relative situation of each household group in respect to other ones belonging to the same social class.

Similar considerations are valid for the responses about financial difficulties in meeting various expenditures. This responses can be determined by objective economic difficulties, but the perception of difficulties depends on the comparison between one's budgetary constraint and one's desired level of expenditure. This is a subjective element that plays an important role in this analysis.

For these reasons, the SEW appears as an index that reflects subjective considerations about household economic welfare.

The OEW has been processed using data regarding:

- the possession of some durable consumer goods
- the characteristics of the physical structure of house[20].

Both these aspects do not reflect subjective considerations of the head of family. The head of family simply lists a series of durable consumer goods and some characteristics of the physical structure of house[21].

The two indices introduced above are the dependent variables in the empirical analysis (section 4) and have been processed with reference to the year 2001.

Conversly, the independent variables have been processed with reference to the year 1993, essentially there are three of them[22].

The first one, named *assput*, reflects the propensity of single agents to participate in "Putnam" associations[23]. Three types of groups are considered:

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[19] Appendix A presents the questions used to formulate this index.

[20] Appendix B presents the questions used to formulate this index.

[21] In order to verify the reliability of these two indices, it has been elaborated a measure both of SEW and of OEW at regional level and this measure has been related to the regional per capita GDP. The correlations between the SEW and the regional per capita GDP is equal to about 83%, the correlations between the OEW and the regional per capita GDP is equal to about 65%.

[22] Appendix C presents the questions used to elaborate the independent variables. Other explanatory variables, used in the sensitivity analysis, are introduced subsequently.

[23] Olson (1982) and Putnam (1993) offer two different explanations for the impact of private associations on economic growth and on social cohesion. Olson stresses

- cultural associations
- voluntary organizations
- ecological groups.

This proxy of formal social participation has been processed by calculating the arithmetic mean of the participation of head of family in these three types of groups over the last year.

The second one, named *satrel*, reflects the satisfaction of the head of family in informal interpersonal relations[24].

The third one, named *edu*, reflects the human capital of agents: it is based on the educational level of the head of family.

As previously highlighted, the dependent variables are determined with reference to the year 2001 while the regressors are determined with reference to the year 1993. This limits the problem of the possible endogeneity of independent variables. This problem characterizes many works investigating the effects of social relations on economic growth[25].

Since the sample has changed over the two considered years, it was not possible to directly associate the variables related to the heads of the families with reference to 1993 and the economic welfare indices of 2001. For this reason, with regard to the age and the region of the heads of the families, different groups of the heads of the families (and of their relative household group) were created, both referring to 1993 and 2001. There are 247 groups. For each variable the arithmetic mean was processed with reference to each group and the regressions were conducted based on these means[26].

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some negative effects of associations. He argues that private associations pursue the special interests of its members and, for this reason, generate social costs and reduce social cohesion. In particular, this is a consequence of the fact that only the smaller associations emerge in the society, and the small associations defend special interests of small groups. On the contrary, larger organizations, representing the interests of numerous individuals, are inefficient because they present many coordination problems and they can not emerge in the society. Putnam emphasizes the propensity of groups to generate trust, social ties and civicness among people. Knack and Keefer (1997) and Knack (2003) investigate, at an empirical level, the different hypotheses of Olson and Putnam. Knack and Keefer (1997) and Knack (2003) distinguish between "Putnam" associations and "Olson" associations considering the different characteristics of groups. The "Putnam" associations considered in this paper to study the impact of social relations on economic welfare are identified following the criteria used by these authors.

[24] The indicator is the percentage of respondents responding "very satisfied with relationships with friends".

[25]For example this problem is highlighted by Knack and Keefer (1997)

[26] The 247 groups were derived by a grouping based on 19 regions (there are 20 Italian regions, but Valle d'Aosta and Piemonte are considered together in the "Indagine multiscopo") and 13 age brackets (the age brackets range 5 years and include the heads of families from 23 to 87 years old). The groups comprise an average of 75 observations. Groups including the heads of the families who are from 18 to 23 years old and above 87 years old were excluded due to insufficient data. Because 21 groups are included in the 247 analysed, comprise less than 20

Section 4 displays the results of the empirical analysis conducted using the OLS method. In particular, section 4.1 presents the empirical results with reference to the associations between subjective household economic welfare index and social relations. Section 4.2 shows the results regarding the relationships between interpersonal relations and the objective household economic welfare index. Section 4.3 presents the sensitivity analysis' conducted introducing changes in terms of control variables in the OLS estimations presented in sections 4.1 and 4.2.

Section 5 shows the results of the discriminant analysis. This section is divided in two parts. Section 5.1 relates to the OEW and the 5.2 refers to the SEW.

4. Social relations and household economic welfare

4.1 Social relations and the subjective household economic welfare index

Table 1 presents the results of the regression in which the dependent variable is the subjective household economic welfare index and the independent variables are: *assput*, *satrel* and *edu*.

INSERT TABLE 1

The R^2 of regression is equal to 13.6%. There is a correlation between all the regressors and the SEW. The variables reflecting the social life of head of family positively affect the SEW. The individuals showing a greater propensity to participate in "Putnam" associations and those that are more satisfied with their relations with friends, reach a higher subjective household economic welfare. The relation between educational qualification and the SEW is negative and statistically significant at the 10 percent level. While the educational qualification increases, the SEW decreases. This is an interesting conclusion if one considers the different economic papers that show a negative correlation between human capital and the satisfaction of individuals with reference to different elements[27].

Over the last few years, many economists stressed that the satisfaction of individuals with regard to income or consumption is not determined only by the absolute level of these variables[28]. Two factors would contribute to increase individual satisfaction with reference to economic condition.

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observations, all the equations that will be proposed in the next section have been newly calculated using only groups larger than 20 observations. The results do not change in the two different situations.

[27] In particular, Clark and Oswald (1996), using British data, show a negative association between education rate and job satisfaction.

[28] In this context, a pioneer research was carried out by Hirsch (1976). Afterwards, many economists stressed the concept that the comparison between the level of individual income or consumption and the level of income and consumption of

First, it is currently accepted that the satisfaction of agents depends also on the comparison between the individual level of income and/or consumption and the level of income and/or consumption reached by others.

Second, individual personal expectations with regard to the possibility to reach some results (in terms of income, consumption etc.) would be relevant to individual satisfaction. It is possible to assume that two individuals with the same level of income but with different personal expectations have dissimilar satisfaction in their situations. This last consideration offers an explanation for the negative correlation resulting from the subjective economic welfare and the level of educational qualification in table 1. It is plausible that a higher level of educational qualification corresponds to major expectations in terms of realizable economic welfare. A higher level of educational qualification corresponds to a larger investment in education. Larger investments are justified by the expectations of greater income in the future. Thus, a higher level of educational qualification can be associated with higher economic expectations. This justifies the negative correlation between the SEW and the educational qualification shown in table 1. The negative association between the educational qualification and the SEW appears to be the principal result of the regression presented in table 1. In fact, it is important to stress the positive correlation between the level of individual interpersonal relations and the SEW. Nevertheless, the particular character of the dependent variable makes it difficult to interpret the correlations between the indices of social relations and the SEW. In order to investigate the effects that interpersonal relations can play on household economic welfare, it is better to analyse the relationships between the two variables: *assput* and *satrel* and the objective index of economic welfare. This is the aim of the next section.

4.2 Social relations and the objective household economic welfare index

In this section the empirical relationships between the social ties characterizing the social life of heads of families and the level of the objective household economic welfare (OEW) is analysed. Table 2 presents the results of the regression estimated using the OLS. These results show a positive and statistically significant association between the three independent variables and the OEW. However, in this case, the OLS method does not appear appropriate because the Ramsey RESET test reveals that

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community matters for the satisfaction of individuals. For example, Neumark and Postlewaite (1998) show that the choice of women to work depends on the comparison between the individual household income and the income of household that are included in their social class. Corneo and Jeanne (1999) show that the wish to reach a high social status is an incentive to accumulate wealth and, for this reason, it can foster the economic growth. Clark and Oswald (1996) and Clark (1997) investigate the relations between the level of income and the job satisfaction. They found that the relative income matters for job satisfaction.

there are some non linear relations between the independent variables and the dependent ones[29].

INSERT TABLE 2

As a result, to study the effects of formal and informal social relations on objective household economic welfare index, a fuzzy method[30] was used. In this way, it was possible to analyse the particular effect of each regressor on the dependent variable. Table 3 reports the results of the regression conducted using the tool of fuzzy logic, figures 1, 2 and 3 show the effects that each dependent variable produces on the objective household economic welfare index.

INSERT TABLE 3
INSERT FIGURES 1,2 AND 3

[29] The Ramsey RESET test reveals that the relation estimated in the equation showed in table 2 is not correctly specified.

[30]The fuzzy logic and the fuzzy set theory were used in many disciplines since Zadeh's pioneering contribution (1965). In economics, these tools have been applied since the nineties. The fuzzy set theory is useful in case the analysis regards some variables characterized by elements that can not be divided into clearly bounded groups. In particular: *"A fuzzy set is a class of objects with a continuum of grades of membership. Such a set is characterized by a membership (characteristic) function which assigns to each object a grade of membership ranging between zero and one."* (Zadeh 1965, p.338). Let's assume that one wants to distinguish between the young and the old inside a group of agents. What does "young" mean exactly? And "old"? The fuzzy set theory suggests the assignment of a "grade of membership" to each agent which is associated with the two different groups of the young and the old. In this case, the grades of membership characterize the agents according to their age. A baby will have, for example, a very high grade of membership associated with the set of_young. In this paper, the fuzzy logic and the related fuzzy set theory were useful to investigate the connections between the interpersonal relations and the OEW. The application of these tools is justified by two reasons. One is the unlinear relationships characterizing the analysis presented in table 2, the latter the "fuzzy" character, in particular, of the variable *satrel*. In order to conduct the fuzzy analysis, each independent variable is partitioned into three fuzzy sets grouping the "high", "medium" and "low" values of the variables. The regression presented in table 3 is a OLS regression in which each regressor is considered three times. Each time the single regressors are so weighted by the grades of membership associated with the three different partitioned sets. The method used in this paper to generate the grade of membership is that reported in Giles and Draeseke (2001). For a discussion about the fuzzy logic and the fuzzy set theory see: Zadeh (1965, 1987) and, from an economic perspective: Lindström (1998) and Giles and Draeseke (2001).

The effect of the variable *assput* on the OEW is positive and linear (figure 1), the other two independent variables (*satrel* and *edu*) appear to present a threshold effect.

A greater satisfaction in relationships with friends and a higher level of education are associated with a greater level of OEW, but this association is confirmed only until a specific value on these two independent variables. In particular, a growing satisfaction of the informal social ties of the heads of the families increases the OEW only for the range of values of satisfaction included between zero and about three (figure 2). Three is the value associated, in the questionnaire filled in by the heads of the families, with the assertion: "somewhat satisfied with relationships with friends"[31]. This result suggests an essential consideration. When individuals reach a fairly high level of satisfaction in the relationships with friends (the proxy of informal social relations), the channels by which the informal social relations reflected by this proxy can promote the OEW are fully exploited by the individuals. The transition from a situation of social exclusion (in which the head of the family is not at all satisfied with the relationships with friends) to a one of a small level of satisfaction or somewhat satisfaction of the relationships with friends, is associated with an increase in the level of OEW. An individual that is not or has a low level of satisfaction with the relationships with friends, extending his network of social ties, can acquire some advantages, in particular in terms of acquiring information by other agents, thus increasing the possibility of reaching a higher level of OEW. The transition from a situation in which individuals are somewhat satisfied with relationships with friends to a situation in which they are very satisfied does not appear to produce positive effects on the OEW. For this reason we can assume that there is a threshold effect related to the variable that captures the level of informal social relations.

A similar effect is associated with the variable *edu*. The educational qualification is associated with a growing OEW but only until the value of educational qualification equal to about four[32] (figure 3).

To study the real presence of these two threshold effects that resulted in the fuzzy analysis, an OLS regression was conducted (table 4) in which two variables *satrel* and *edu* are bounded according to the indications resulting in figures 2 and 3. Compared to the regression in table 2, this bounded regression explains a higher percentage in the variation of the dependent variable (61.4% against 53.6%) and presents a lower standard error. Moreover, the relations estimated in this regression appear correctly specified[33].

The threshold effects seem to be effective next to a value of 3.1, for the variable *satrel*, and a value of 4 for the variable *edu*.

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[31] The other possible responses are: "not satisfied" (value 1), "not very satisfied" (value 2) and "very satisfied" (value 4). See Appendix B.

[32] Four is the value associated with the Junior high School. See appendix C.

[33] The Ramsey RESET test reveals the correct specification.

INSERT TABLE 4

A sensitivity analysis is presented in the next section.

4.3 The sensitivity analysis with control variables on the OLS regressions

Table 5 shows the results of the sensitivity analysis regarding the relationships between the characteristics of the social lives of the head of family and the level of the objective household economic welfare (OEW).

INSERT TABLE 5

The first row reports the coefficients and the standard errors of the two variables *assput* and *satrel* as they are shown in table 4. The following rows report the coefficients and the standard errors of these two independent variables when one or more control variables are introduced in the basic relation analysed in table 4.

The control variables considered in the second and in the third row are two different dummies: the first one reflects the Italian regions (row 2) and the second one refers to the age of the head of the family[34]. Both the regional dummies and the cohort dummies do not eliminate the effects of the variables *assput* and *satrel* on the objective household economic welfare.

The control variable *employed* (row 4) is a dummy assuming a value of 1 if the head of the family has a job, and value of 0 if he is unemployed[35].

The variable *profession* (row 5) assumes three values: a value of 3 is associated with the jobs generating a potential "high income", a value of 2 and a value of 1 are associated with the jobs with a potentially lower income[36].

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[34] The heads of the families were divided into four groups: the heads of the families who are from 23 to 37 years old, from 38 to 52 and from 53 and 67 and from 67 to 87.

[35] As described in section 3, the regressions considered in sections 4 and 5.1 were conducted on values that represent an average value for a group of the heads of the families. The groups were derived by a grouping based on 19 regions and 13 age brackets. The cohort dummies and the region dummies were associated directly with the single groups. Alternatively, the control variables: *employed, source of income* and *profession* were initially referred to as the single heads of the families. Subsequently, for these variables, the group means were calculated as they were for the other independent variables. For this reason, the variable *employed* can assume values between 0 and 1. The value 0 represents the groups in which everyone is unemployed, the value 1 is associated with the groups where each individual has a job. Similarly, the variables *source of income* and *profession*, described below, assume values ranging respectively between 1 and 3 and between 0 and 1.

[36] The profession associated with the value of 3 are: executive, middle-ranking, entrepreneur, self-employed person and professional, value of 2: salaried employee

The variable *source of income* assumes a value of 1 or 0 depending on the main source of household income: if it is income from work (value 1) or not (value 0)[37].

The cohort dummies and the regional dummies are considered simultaneously in row 7.

The variables *employed*, *profession* and *source of income* are considered, at the same time, in row 8.

The variables of social interactions *assput* and *satrel* are statistically significant in all the situation considered except when the cohort dummies and the regional dummies are introduced at the same time and only in regard to the variable *satrel*.

The sensitivity analysis seems to confirm that the participation in formal and informal social relations can increase the level of household economic welfare, and, in particular, this result is robust to the inclusion of a variety of control variables.

The control variables analysed were also considered in the study of relations between the social ties and the subjective household economic welfare index.

INSERT TABLE 6

The first row presents the coefficients and the standard errors of *assput* and *satrel* as they are reported in table 1. The others rows show the coefficient and the standard errors of these two variables when the control variables are considered in the analysis.

Table 6 shows that *assput* and *satrel* remain significant when the cohort dummies and the variables *employed*, *profession* and *source of income* are introduced in the regression. *Assput* and *satrel* are not significant if the region dummies are considered.

For this reason, it is possible to affirm that the relationship between the social relations of head of family and the OEW seem to be more robust than the relationship between the social relations of head of family and the SEW[38].

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and foreman, value of 1: manual worker, partner in a co-operative society and house worker.

[37] The source of income assuming 0 are: pension, benefit payment, estate income and household maintenance.

[38] As stressed in section 4.1, with regard to the characteristics of the two economic welfare indices and of the variables *assput* and *satrel*, in order to investigate the effects of interpersonal relations on the economic welfare it seems more significant to consider the OEW. For this reason, it is essentially possible to affirm that the relationships between the social ties of the heads of the family and the household economic welfare appear positive, statistically significant and robust to the inclusion of different control variables.

5. Social relations and household economic welfare: the discriminant analysis

In this section, the relations between the household economic welfare and the quality and quantity of interpersonal relations of single agents is investigated using the discriminant analysis. In order to adopt this method, two new household economic welfare indices have been elaborated starting from the same data described in section 4. The two new indices have been created by a procedure that avoids some of the distortions that could emerge in the elaboration of the dependent variables considered in the OLS regressions[39].

The new subjective economic welfare index (NSEW) presents only three different values, 19, 20 and 21, reflecting a growing satisfaction of the head of the family in the welfare reached by the household. The new objective economic welfare index (NOEW) assumes thirteen values from 9 to 21. In order to have the same number of values in respect to the two indices, and in order to facilitate the interpretation of the discriminant analysis results, the thirteen values of the NOEW were aggregated in three classes representing household with a high, medium and low NOEW. The discriminant analysis was initially conducted on the two new indices divided into three classes of household economic welfare.

Subsequently, the two new indices were further aggregated. The households were divided into only two different classes of household economic welfare and the discriminant analysis was conducted on the indices obtained[40].

Section 5.1 shows the results of the discriminant analysis referred to the NOEW. Section 5.2 presents the discriminant analysis related to the NSEW.

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[39]The discriminant analysis is applicable only if the dependent variable is constituted by integers. In order to create the indices used in the OLS regressions, the data derived from the questions reported in appendix A and B were before standardized (see appendix A and B for the standardization tecnique) and subsequently aggregated by the arithmetic means. This procedure, aggregating ordinal data derived by survey questions, can generate some distortions in the dependent variables. In order to solve these possible difficulties, the new indices were elaborated using a different method. The data derived by questions were not standardized. They were simply added and, for each individual, two whole values were obtained representing the new SEW and the new OEW. Since the discriminant analysis was conducted on the 247 groups used in the OLS regressions (see note 25), it was necessary to consider a single value of these two indices for each group. This value is the median of the new SEW (NSEW) and the new OEW (NOEW) assumed by the single agents included in the groups.

[40] The class of household that present a low value of NSEW, when this variable is divided into three classes, it has a very small size (in this class there are only two observations). For this reason, a further aggregation is useful to verify the results obtained in the analysis conducted on the NSEW which was divided into three classes.

5.1 The discriminant analysis related to the NOEW

This section presents:

1. the discriminant analysis conducted on the NOEW which is divided into three classes (high, medium and low NOEW)
2. the discriminant analysis conducted on the NOEW which is divided into two classes (high and low NOEW).

Tables 7, 8 and 9 present the results of the first discriminant analysis.

INSERT TABLES 7, 8 AND 9

The first discriminant function explains 96.7% of the variance. The canonical correlation indicating the association between the groups and the groups centroid is high, in particular in regard to the first discriminant function. This result reveals a good discriminant strength of the functions that is confirmed by the Wilks' Lambda Test. (Table 7)

The structure matrix shows that all the three independent variables are positively correlated with the first function. The coefficients of the classification function are substantially consistent with the hypothesis that the formal (*assput*) and informal (*satrel*) relations have a positive effect on the objective household economic welfare. In particular, the coefficients of the variable *satrel* show a behaviour that is similar to the threshold effect illustrated in section 4.2[41]. (Table 8)

Finally, table 9 shows that about the 68% of the cases are correctly classified[42]. (Table 9)

Tables 10, 11 and 12 present the results of the discriminant analysis conducted on the NOEW divided into two classes.

INSERT TABLES 10, 11 AND 12

The canonical correlation and the Wilks' Lambda Test suggest that the discriminant analysis model can be useful in this case too (table 10).

The values of the classification function coefficients are coherent with the theoretical hypothesis of this study (table 11). In particular, it is relevant

[41] See the coefficient related to the medium and the high NOEW. These two coefficients are very similar, it is as if the variables *satrel* did not have any role in distinguishing the observations between the two groups: medium and high NOEW.

[42] In this analysis, the Box's M Test which tests the assumption of equality of covariances across groups is significant. In order to understand whether the results of the discriminant analysis are still consistent, a second analysis should be run using a separate-groups covariance matrix. If the results of the analysis conducted do not give radically different classification results, the first analysis can be accepted. In this case and in all the next discriminant analysis presented, the Box's M Test is significant, but in any case, the classification results do not change if the analyses are conducted using a separate-groups covariance matrix.

to stress that, in this case, the impact of the informal social relations (*satrel*) on the NOEW is positive[43].

The cases correctly classified are greater than in the previous discriminant analysis and are equal to about 81%.

The discriminant analysis seems to confirm the effects that emerged in the OLS regressions, of the interpersonal relations on the objective household economic welfare. This is true both if we consider the dependent variable divided into three classes and in the case that we divide it into two classes.

The next section presents the discriminant analysis with reference to the subjective economic household index (NSEW).

5.2 The discriminant analysis related to the NSEW

This section presents:

1. the discriminant analysis conducted on the NSEW which is divided into three classes (high, medium and low NSEW)
2. the discriminant analysis conducted on the NOEW which is divided into two classes (high and low NSEW).

Tables 13, 14 and 15 show the results of the discriminant analysis when the dependent variable is divided into three classes.

INSERT TABLES 13, 14 AND 15

99% of the variance explained by the model is due to the first discriminant function. The second function contributes little to the model. (Table 13).

The two variables on social relations are positively correlated with the first function and their coefficients of the classification function assume values coherent with the idea that interpersonal relations can increase subjective household economic welfare. The effects of the educational qualification on the NSEW are not easy to interpret considering the values assumed by the coefficients of the classification function of this variables[44]. (Table 14)

Finally, the percentage of cases correctly classified in this analysis is lower than in the similar analysis with reference to the NOEW (the 55.1% against the 68%). (Table 15)

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[43] This consideration appears important in the light of the results with reference to the variable *satrel* shown in the previous discriminant analysis.

[44] In particular, the negative effect of educational qualification on subjective household economic welfare was the most interesting result of the OLS regression conducted in section 4.1, but it is apparently not confirmed in this analysis. However, it should be considered that only two observations are included in the group with low NESW (see note 40). With regard to the discriminant analysis on the NSEW divided into two classes, one finds the negative effect of educational qualification on subjective household economic welfare.

The discriminant analysis conducted on the NSEW divided into two classes confirms the positive effect of the variables of interpersonal relations on subjective household economic welfare and the negative one on educational qualification. In this situation, the number of cases correctly classified increased to 64.8%, with respect to the results presented in table 15.

INSERT TABLES 16, 17 AND 18

6. Major economic results

The major economic results stemming from this paper is that both formal and informal social relations can have a positive effect on the level of household economic welfare. For this reason, the agents can also have an economic incentive to invest in social ties.

As discussed in section 2, one can assume that the interpersonal relations of single agents can increase economic welfare at an individual level mostly by the impact that they have on the accumulation of individual human capital.

Two indices of household economic welfare were considered in the empirical analysis: an objective and a subjective economic welfare index. The propensity of the head of family to participate in different types of associations (the proxy of formal social relations) and his/her level of satisfaction of relationships with friends (the proxy of the informal social relations) are positively associated with the two economic welfare indices elaborated. In particular, social relations seem to play a positive role in increasing economic welfare at an individual level[45]. This result seems robust to the addition of a variety of control variables in the OLS regressions and to the use of different econometric methods[46].

Further interesting evidence stemming from the empirical analysis regards the different correlation emerging between the educational qualification of head of family and the two indices of household economic welfare. The heads of families with a higher degree of education reach a higher level of objective economic welfare, but they are less satisfied in their household economic situation than the heads of families with lower

[45] In this context it is important to stress that, to reduce the possibility of endogeneity, the dependent variable is measured using the year 2001, while the independent variables are elaborated using the year 1993.

[46] To create the dependent variables used in the OLS regressions, ordinal data derived by survey questions have been aggregated, but this can generate some distortions in the variables. In order to solve these possible difficulty, two new dependent variables have been elaborated. They have been originated using the same data considered to create the variables introduced in the OLS regressions, but with a different aggregation method. These two new variables are constituted by integers. For this reason they have been studied using the discriminant analysis.

educational qualification. This result is interesting as it seems to give support to a variety of recent economic studies[47].

6. Conclusion

Over the last few years, many studies have investigated the effects that social relations have on different economic variables. One can distinguish between analyses adopting a macroeconomic approach and a microeconomic one. The first approach, that has been given more attention, studies the origin and the effects of social relations at a community level. The second one considers social relation at an individual level, analysing the effects of social ties in respect to the single agents or households. This paper adopts a microeconomic perspective and analyses the relationship between economic welfare and the characteristics of the social life of agents. Do social relations of single agents have a direct effect on their economic welfare? This is the main question characterizing the analysis presented in this study. In order to explore this topic, an empirical analysis of Italian microdata representative for the entire Italian population was conducted using a variety of econometric methods. The empirical analysis seems to reveal a positive effect of social relations on economic welfare at an individual level.

The investigation proposed in this study can be developed in a few directions.

The social variables elaborated in this paper can be used in order to investigate other aspects of the relations between social ties and economic issues at an individual level. The social ties of single agents could affect, for example, the probability of employment or of finding a job quickly.

The analysis proposed in this paper underlines the economic effects of social relations on household economic welfare. These effects can represent an economic incentive for agents to maintain positive social behaviour. However, no investigations were conducted on the factors that directly facilitate or reduce positive social behaviour of agents. It would be interesting to extend the empirical analysis in order to consider these aspects.

Many studies have shown that social networks in a community play a role in its economic progress and development. This paper shows that the social ties of single agents produce a positive economic effect at an individual level. For this reason, the agents can also have an economic incentive to invest in social relations. This result seems to be important in order to understand better and explain the determinants of the formation of social networks at a community level.

[47] See section 4.1 and, in particular, see notes 26 and 27.

References

Akerlof G.A., Kranton R. (2000), Economics and Identity, in "The Quarterly Journal of Economics", vol.CXV, 3, pp.715-753

Alesina A., La Ferrara E. (2000a), Who Trust Others?, CEPR discussion Paper n°2646

Alesina A., La Ferrara E. (2000b), Partecipation in Heterogeneus Communities, in "The Quarterly Journal of Economics", vol. CXV, 3, pp.847-904

Arrow K. (2000), Observations on social capital, in Dasgupta P., Serageldin I. (a cura di), Social Capital : A Multifaceted Perspective, Washington, The World Bank

Banfield E.C. (1958), The Moral Basis of a Bacward Society, Toronto, The Free Press

Becker G. (1974), A Theory of Social Interaction, in "Journal of Political Economy", 82, pp.1063-1093

Becker G. (1991), A Note on Restaurant Pricing and other Exemples of Social Influence on Prices, in "Journal of Political Economy", 99, 5, pp.1109-1116

Bourdieu P. (1986), The Forms of Capital, in Richardson J. (ed.), Handbook of Theory and Research for the Sociology of Education, Wetsport, CT, Greenword Press

Centre for Educational Research and Innovation (2000), Knowledge Management, in the Learning Society, Oecd, Parigi

Clark A., Oswald A. (1996), Satisfaction and comparison income, in "Journal of Public Economics", 61, 359-381

Clark A. (1997), Job Satisfaction and Gender: Why Are Women so Happy at Work?, in "Labour Economics", 4, 341-372

Coleman J.S. (1988), Social Capital in the Creation of Human Capital, in "American Journal of Sociology", vol. 94, pp. 95-120

Coleman J.S. (1990), Foundations of Social Theory. Cambridg, Harvard University Press

Corneo G., Jeanne O. (1999a), Social Organization in an Endogenous Growth Model, in "International Economic Review", 40(3), 711-725

Dasgupta P. (2000), Economic Progress and the Idea of Social Capital, in Dasgupta P. and Serageldin I. (a cura di), Social Capital : A Multifaceted Perspective, Washington, The World Bank

Degli Antoni G. (2003), Capitale sociale e *knowledge society*: il ruolo del capitale sociale nel processo di creazione della conoscenza, in "Quaderni di Economia del Lavoro/76/77", Milano, FrancoAngeli

DiPasquale D., Glaeser E.L. (1999), Incentives and Social Capital: Are Homeowners Better Citiznes?, in "Journal of Urban Economics", 45, pp.354-384

Durlauf S. (1999), The case against "social capital", Focus 20, pp.1-5

Durlauf S. (2002a), On te Empirics on Social Capital, in "Economic Journal", 112, 483, pp.459-479

Durlauf S. (2002b), Symposium on Social Capital: an introduction, in "Economic Journal", 112, 483, pp.417-418

Durlauf S., Fafchamps M. (2004), Social Capital, mimeo

Easterly W., Levine R. (1997), Africa's growth tragedy: policies and ethnic divisions, in "The Quarterly Journal of Economics", vol. CXII, pp.1203-1250

Fukuyama F. (1995), Trust. The Social Virtues and the Creation of Prosperity, London, Penguin (tr. it. Fukuyama F., Fiducia, Milano, Rizzoli, 1996)

Fukuyama (1999), Social Capital and Civic Society, Paper prepared for delivery at the IMF Conference on Second Generation Reforms

Gambetta D. (1988), Trust: Making and breaking of cooperative relations, in Gambetta (ed.), pp.213-237 Oxford: Blackwell

Giles D., Draeseke R. (2001), Econometrics Modelling Based on Pattern Recognition *via* the Fuzzy e-Means Clustering Alghorithm, Working Paper EW P0101, Department of Economics, University of Victoria

Glaeser E.L., Laibson D., Sacerdote B. (2000), The Economich Approach to Social Capital, NBER (Cambridge MA) Working Paper Series, n. 7728

Glaeser E., Laibson D., Scheinkman J., Soutter C. (2000), Measuring Trust, in "The Quarterly Journal of Economics", vol.CXV, 3, pp.811-846

Gui B. (1994), Interpersonal relations: A ddisregarded theme in the debate on ethics and economics, in Lewis Alan and Karl-Erik Warneryd (a cura di), Ethics and Economic Affairs, London, Routledge

Gui B. (2002), Più che scambi, incontri. La teoria economica alle prese con i fenomeni interpersonali, in Sacco P.L., Zamagni S. (a cura di), Complessità relazionale e comportamento economico, Bologna, Il Mulino

Guiso L., Sapienza P., Zingales L. (2000), The Role of Social Capital in Financial Development, NBER (Cambridge MA) Working Paper Series 7563

Hall R.E., Jones C. (1999), Why do Some Countries Produce So Much More Output Per Worker than Others?, in "The Quarterly Journal of Economics", Vol.CXIV, pp.83-116

Hanifan L.J. (1916), The Rural School Community Centre, in "Annals of the American Academy of Political and Social Sciences", 67, pp.130-138

Hirsch F. (1976), Social Limits to Growth, Cambridge, Mass. Harvard University Press.

Ichino A., Maggi G. (2000), Work Environment and IndividualBackground: Explaining Regional Shirking Diffrentials in a large Italian Firm, in "The Quarterly Journal of Economics", Vol.CXV, 3, pp.1057-1090

Istat (1993), Indagine Multiscopo sulle Famiglie-Aspetti della Vita Quotidiana-Anno 1993

Istat (2001), Indagine Multiscopo sulle Famiglie-Aspetti della Vita Quotidiana-Anno 2001

Knack S., Keefer P. (1997), Does Social capital have an economic payoff? A cross country investigation, in "The Quarterly Journal of Economics", CXII, pp.1251-1287

Knack P. (2003), Groups, growth and trust: Cross-country evidence on the Olson and Putnam Hypotesis, in "Public Choice", 117, pp. 341-355

La Porta R., Lopez-de-Silanes F., Shleifer A., Vishny R. (1997), Trust in Large Organizations, in "The American Economic Review Papers and Proceedings", 87, 2, pp.333-338

La Porta R., Lopez-de-Silanes F., Shleifer A., Vishny R. (1999), The Qualità of Government, in "Journal of Law, in "Economics and Organization", 15(1), pp.222-279

Lindstrom T. (1998), A fuzzy design of the willingness to invest in Sweden, in "Journal of Economic Behaviour and Organization", 36, pp.1-17

Loury G. (1977), A Dynamic Theory of Racial Income Differences, in Wallace P.A., LeMund P.A. (eds.), Women, Minorities and Employment Discrimination, Lexington, M.A., Lexington Books

Mansky C. (2000), Economic Analysis of Social Interactions, in "Journal of Economic Perspectives", 14, pp.114-136

Mas-Colell A., Whinston M., Green J. (1995), Microeconomic theory, New York, Oxford: Oxford University Press

Narayan (1999), Bonds and Bridges: Social Capital and Poverty, Poverty Group, PREM, The World Bank

Narayan D., Pritchett (1999), Cents and Sociability: Housolde Income and Social Capital in Rural Tanzania, in "Economic Developmente and Cultural Change", Vol.47, n.4, pp.871-897

Neumark D., Postlewaite A. (1998), Relative Income Concerns and the Rise in Married Women's Employment, in "Journal of Public Economics", 70, 157-183

Olson M. (1965), The Logic of Collective Action, Cambridge, MA: Harvard University Press

Olson M. (1982), The Rise and Decline of Nations, New Haven: Yale University Press

Paldam M. (2000), Social Capital: one or many? Definition and Measurament, in "Journal of Economic Survay", 14, 5, pp.629-653

Paldam M., Svendsen G.T. (2000), An Essay on Social Capital: Looking for the Fire Behind the Smoke, in "European Journal of Political Economy, 16, pp.339-366

Polanyi M. (1958), Personal Knowledge, University of Chicago Press, Chicago

Polanyi M. (1966), The Tacit Dimension, Routledge & Kegan Paul, Londra

Portes A. (1998) Social Capital: Its Origin and Applications in modern socilogy, in Annual Review of Sociology , 24, pp.1-24

Putnam R. (1993), Making Democracy Work: Civic Traditions in Modern Italy, Princeton University Press, (tr. it. La tradizione civica nelle regioni italiane, Milano, Arnoldo □ondatori Editore, 1994)

Putnam R. (2000), Bowling Alone: The Collapse and Revival of American Community, New York, Simon & Shuster

Rabin M. (1993), Incorporating Fairness into Game Theory and Economics, in "American Economic Review", 83, 5, pp.1281-1302

Richardson G. (1998), The structure of fuzzy preferences: social choice implications, in "Social Choice and Welfare", 15, pp.359-369

Sala-I-Martin Xavier X. (1997), I Just Ran Two Million Regression, in "The American Economic Review" Papers and Proceedings, Vol.87, 2, pp.178-183

Solow R. (2000), Notes on Social Capital and Economic Performances, in Dasgupta P. and Serageldin I. (a cura di), Social Capital : A Multifaceted Perspective, Washington, The World Bank

Temple J., Johnson P. (1998), Social Capability and Economic Growth, in "The Quarterly Journal of Economics", Vol. CXIII, pp.965-990

Tocqueville A. (1840), Democracy in America, Penguin USA, 2003

Uhlaner C.J. (1989), Relational Goods and Partecipation: Incorporating Sociability into a Theory of Rational Action, in "Public Choice", 62, pp.253-285

Uphoff N. (2000), Understanding Social Capital: Learning from the Analysis and Experience of Partecipation, in Dasgupta P., Serageldin I. (a cura di), Social Capital : A Multifaceted Perspective, Washington, The World Bank

Vanin P. (2001), Job Satisfaction and Comparison Income in Germany, Mimeo, University of Bonn

Williamson O. (1975), Markets and Hierarchies, New York, The Free Press

Williamson O. (1993), Calculativeness, Trust, and Economic Organization, in "Journal of Law and Economics",36, 2, pp.453-486

Williamson O. (1996), The Mechanism of Governance, Oxford University Press

World Bank (2004), What Is Social Capital, http://www.worldbank.org/poverty/scapital/whatsc.htm

Woolcock M., Narayan D. (2000), Social Capital: Implications for Development Theory, Research, Policy, The World Bank Research Observer, 15, pp.225-251

Zadeh L.A. (1965), Fuzzy sets, in "Information and Control", 8, pp.338-353

Zak P.J., Knack S. (2001), Trust and Growth, in "Economic Journal",111, pp. 295-321

Tab. 1 Social relations and the subjective economic welfare (OLS)

Dependent variable: the subjective economic welfare index				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.645	0.028	23.285	0.000
Assput	0.172	0.052	3.289	0.001
Satrel	0.037	0.010	3.611	0.000
Edu	-0.004	0.002	-1.829	0.069
R-squared	0.147	Mean dependent var		0.751
Adjusted R-squared	0.136	S.D. dependent var		0.027
S.E. of regression	0.025	Akaike info criterion		-4.500
Sum squared resid	0.156	Schwarz criterion		-4.443
Log likelihood	559.772	F-statistic		13.910
		Prob(F-statistic)		0.000

Sample size is 247

Tab.2 Social relations and the objective economic welfare (OLS)

Dependent variable: the objective economic welfare index				
	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.089	0.055	1.622	0.106
Assput	0.493	0.103	4.780	0.000
Satrel	0.083	0.020	4.117	0.000
Edu	0.030	0.005	6.199	0.000
R-squared	0.542	Mean dependent var		0.489
Adjusted R-squared	0.536	S.D. dependent var		0.073
S.E. of regression	0.050	Akaike info criterion		-3.141
Sum squared resid	0.606	Schwarz criterion		-3.084
Log likelihood	391.884	F-statistic		95.757
		Prob(F-statistic)		0.000

Sample size is 247

Tab.3 Social relations and the objective economic welfare (*Fuzzy logic*)

Dependent variable: the objective economic welfare index

	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.010	0.084	0.113	0.910
Assput	0.443	0.093	4.748	0.000
Usatrel3	0.736	0.188	3.913	0.000
Uedu3	0.285	0.113	2.522	0.012
Satrel	0.086	0.030	2.896	0.004
Usatrel3*Satrel	-0.227	0.059	-3.835	0.000
Uedu1*edu	-0.010	0.005	-1.955	0.052
Edu	0.056	0.012	4.700	0.000
Uedu3*edu	-0.073	0.025	-2.954	0.003

R-squared	0.647	Mean dependent var	0.489
Adjusted R-squared	0.635	S.D. dependent var	0.073
S.E. of regression	0.044	Akaike info criterion	-3.360
Sum squared resid	0.467	Schwarz criterion	-3.232
Log likelihood	423.941	F-statistic	54.411
		Prob(F-statistic)	0.000

Sample size is 247

Fig.1 The effect of formal social participation
on the objective economic welfare index

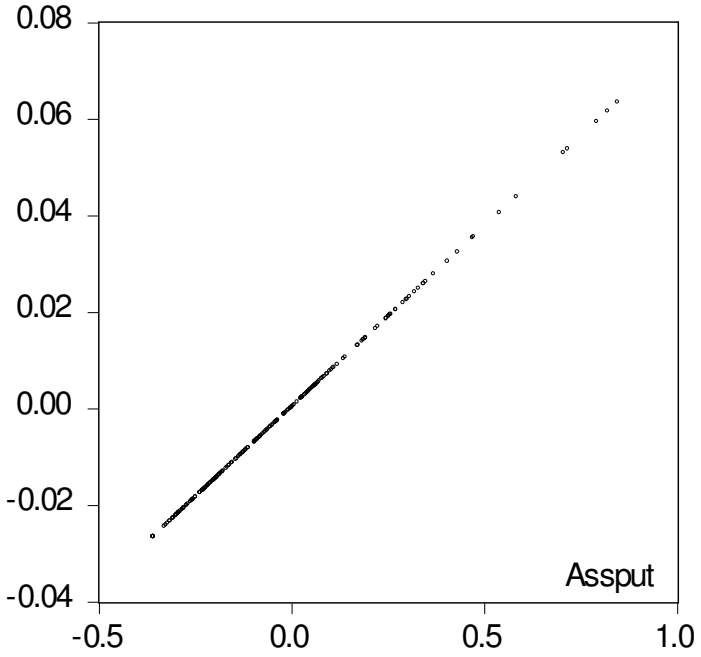


Fig.2 The effect of informal social participation
on the objective economic welfare index

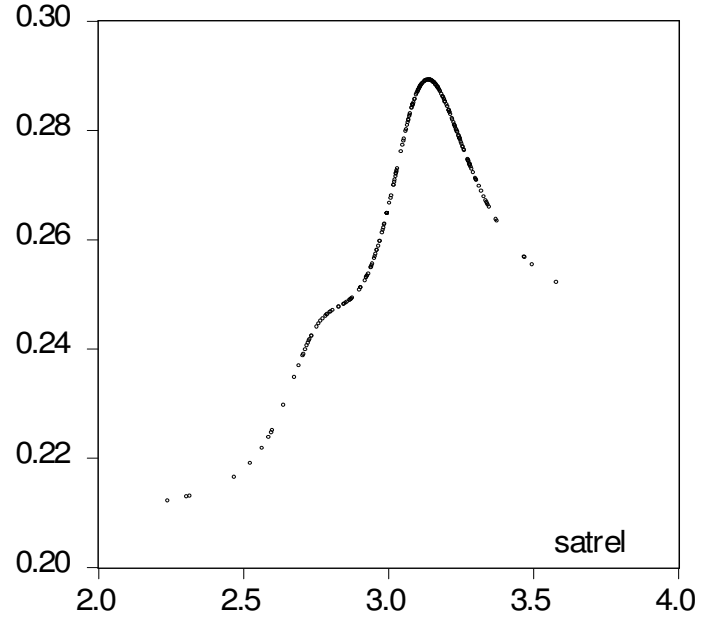
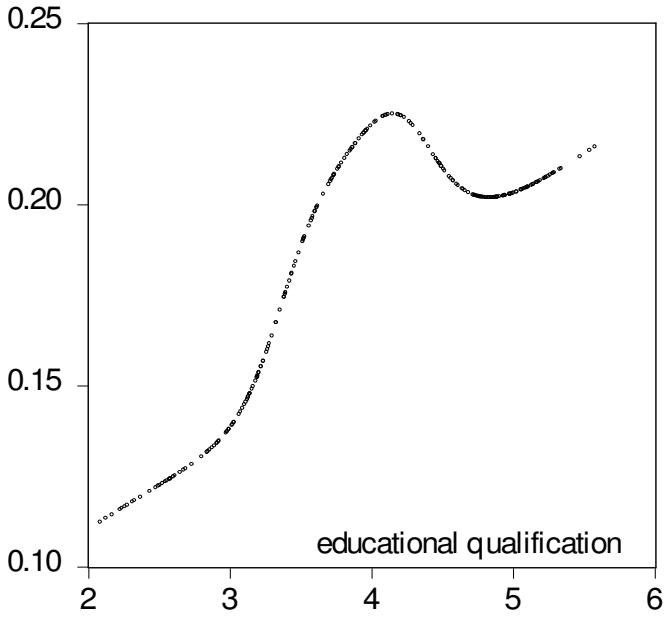


Fig.3 The effect of educational qualification
on the objective economic welfare index



Tab.4 Social relations and the objective economic welfare (bounded OLS)

Dependent variable: the objective economic welfare index				
	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.091	0.063	-1.437	0.152
Assput	0.417	0.092	4.546	0.000
Satrel*(Satrel<=3.1)+(Satrel>3.1)*3.1	0.110	0.024	4.509	0.000
Edu*(Edu<=4.0)+(Edu>4.0)*4.0	0.063	0.008	8.244	0.000
R-squared	0.619	Mean dependent var		0.489
Adjusted R-squared	0.614	S.D. dependent var		0.0733
S.E. of regression	0.046	Akaike info criterion		-3.324
Sum squared resid	0.504	Schwarz criterion		-3.267
Log likelihood	414.544	F-statistic		131.354
		Prob(F-statistic)		0.000

Sample size is 247

Tab. 5 Social relations and the OEW: a sensitivity analysis with control variables (bounded OLS)

Dependent variable	the objective economic welfare index	
Changes in the basic equation .(Tab. 4)	Assput	Satrel
None	0.417 (0.092)	0.110 (0.024)
Cohort dummies	0,328 (0,074)	0,067 (0,020)
Regional dummies	0,622 (0,107)	0,064 (0,025)
Employed	0,304 (0,089)	0,105 (0,023)
Source of income	0,303 (0,089)	0,105 (0,023)
Profession°	0,407 (0,097)	0,134 (0,039)
Cohort dummies, Regional dummies	0,378 (0,084)	0,012 (0,019)
Employed, Source of income, Profession°	0,310 (0,094)	0,126 (0,038)

Standard error are shown in parentheses. The independent variables include educational qualification. Sample size is 247. ° Sample size is 209.

Tab. 6 Social relations and the SEW: a sensitivity analysis with control variables (bounded OLS)

Dependent variable	the subjective economic welfare index	
Changes in the basic equation .(Tab. 1)	Assput	Satrel
None	0.172 (0.052)	0.037 (0.010)
Cohort dummies	0.181 (0.093)	0.093 (0.011)
Regional dummies	-0.012 (0.043)	0.004 (0.007)
Employed	0.191 (0.053)	0.038 (0.010)
Source of income	0.191 (0.053)	0.038 (0,010)
Profession°	0.185 (0.052)	0.042 (0.013)
Cohort dummies, Regional dummies	-0.029 (0,045)	0.000 (0.008)
Employed, Source of income, Profession°	0.200 (0.054)	0.042 (0.013)

Standard error are shown in parentheses. The independent variables include the Educational qualification. Sample size is 247. ° Sample size is 209.

Tab. 7 Eigenvalue, Canonical Correlation and Wilks'Lambda

Function	Eigenvalue	% of Variance	Cumulative %	Canonical cor.	Wilks'Lambda	Chi-Square	Df	Sig.
1	1.714(a)	96.7	96.7	.795	.348	256.418	6	.000
2	.059(a)	3.3	100.0	.235	.945	13.821	2	.001

Tab. 8 Structure Matrix and Classification function

	Structure matrix		Classification function		
	function 1	function 2	low NOEW	med NOEW	high NOEW
Constant			-182.366	-218.059	-219.906
Assput	.518	.750(*)	-185.662	-182.361	-161.229
Satrel	.639(*)	-.388	123.848	131.831	130.956
Edu	.883(*)	.049	3.816	7.005	7.700

Tab.9 Classification Results (b,c)

			Predicted Group Membership			Total
		NOEW	low	medium	high	
Original	Count	Low	70	6	1	77
		Med.	12	60	36	108
		High	0	24	38	62
	%	Low	90.9	7.8	1.3	100.0
		Med.	11.1	55.6	33.3	100.0
		High	.0	38.7	61.3	100.0
Cross-validate(a)	Count	Low	70	6	1	77
		Med.	12	60	36	108
		High	0	25	37	62
	%	Low	90.9	7.8	1.3	100.0
		Med.	11.1	55.6	33.3	100.0
		High	.0	40.3	59.7	100.0

(a) Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.
b 68.0% of original grouped cases correctly classified.
c 67.6% of cross-validated original grouped cases correctly classified.

Tab. 10 Eigenvalue, Canonical Correlation and Wilks'Lambda

Function	Eigenvalue	% of Variance	Cumulative %	Canonical cor.	Wilks'Lambda	Chi-Square	Df	Sig.
1	.703(a)	100.0	100.0	.643	.587	129.662	3	.000

Tab. 11 Structure Matrix and Classification function

	Structure matrix	Classification function	
	function 1	low NOEW	high NOEW
Constant		-185.778	-168.479
Assput	.687	105.121	105.555
Satrel	.563	-2.696	-.871
Edu	.940	-149.504	-158.972

Tab.12 Classification Results (b,c)

			Predicted Group Membership		
		NOWE	low	high	Total
Original	Count	low	98	24	122
		high	21	104	125
	%	low	80.3	19.7	100.0
		high	16.8	83.2	100.0
Cross-validate(a)	Count	low	98	24	122
		high	24	101	125
	%	low	80.3	19.7	100.0
		high	19.2	80.8	100.0

(a) Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.
b 81.8% of original grouped cases correctly classified.
c 80.6% of cross-validated original grouped cases correctly classified.

Tab. 13 Eigenvalue, Canonical Correlation and Wilks'Lambda

Function	Eigenvalue	% of Variance	Cumulative %	Canonical cor.	Wilks'Lambda	Chi-Square	Df	Sig.
1	.137(a)	99.2	99.2	.347	.878	31.501	6	.000
2	.001(a)	.8	100.0	.034	.999	.278	2	.870

Tab. 14 Structure Matrix and Classification function

	Structure matrix		Classification function		
	function 1	function 2	low NOEW	med NOEW	high NOEW
Constant			-139.070	-148.627	-156.509
Assput	.836(*)	.184	-200.620	-190.066	-179.615
Satrel	.890(*)	-.160	103.026	106.842	109.211
Edu	.654	.717(*)	-3.828	-4.348	-4.310

Tab.15 Classification Results (b,c)

			Predicted Group Membership			Total
		NOEW	low	medium	high	
Original	Count	Low	1	0	1	2
		Med.	21	22	31	74
		High	24	34	113	171
	%	Low	50.0	.0	50.0	100.0
		Med.	28.4	29.7	41.9	100.0
		High	14.0	19.9	66.1	100.0
Cross-validate(a)	Count	Low	0	1	1	2
		Med.	21	21	32	74
		High	24	34	113	171
	%	Low	.0	50.0	50.0	100.0
		Med.	28.4	28.4	43.2	100.0
		High	14.0	19.9	66.1	100.0

(a) Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.
b 55.1% of original grouped cases correctly classified.
c 54.3 % of cross-validated original grouped cases correctly classified.

Tab. 16 Eigenvalue, Canonical Correlation and Wilks'Lambda

Function	Eigenvalue	% of Variance	Cumulative %	Canonical cor.	Wilks'Lambda	Chi-Square	Df	Sig.
1	.133(a)	100.0	100.0	.342	.883	30.337	3	.000

Tab. 17 Structure Matrix and Classification function

	Structure matrix	Classification function	
	function 1	low NOEW	high NOEW
Constant		-148.179	-156.308
Assput	.839	-191.953	-181.227
Satrel	.888	106.879	109.342
Edu	.666	-4.311	-4.285

Tab.18 Classification Results (b,c)

			Predicted Group Membership		
		NOWE	low	high	Total
Original	Count	low	44	32	76
		high	55	116	171
	%	low	57.9	42.1	100.0
		high	32.2	67.8	100.0
Cross-validate(a)	Count	low	42	34	76
		high	56	115	171
	%	low	55.3	44.7	100.0
		high	32.7	67.3	100.0

(a) Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.
b 64.8% of original grouped cases correctly classified.
c 63.6% of cross-validated original grouped cases correctly classified.

Appendix A

The subjective household economic welfare index

The subjective household economic welfare index was elaborated by the aggregation[48] of two synthetic indices based on two types of information:

- the responses of the head of family about the general economic situation of the family
- the responses about financial difficulties to meet some expenditures[49].

1. The general economic situation

The index was obtained as an arithmetic mean of three variables:

1.a

Satisfaction about individual household economic welfare

Very satisfied	= 4
Somewhat satisfied	= 3
Not very satisfied	= 2
Not satisfied	= 1

1.b

Assesment regarding the economic resources of household members

Very good	= 4
Satisfactory	= 3
Less than satisfactory	= 2
Inadequate	= 1

1.c

Household economic situation

Very wealthy	= 5
Wealthy	= 4
Neither wealthy, nor poor	= 3
Poor	= 2
Very poor	= 1

2. Financial difficulties to meet some expenditures

The index was obtained as an arithmetic mean of binary variables revealing the presence (value 1) or the absence (value 2) of difficulties in order to realize some household expenses:

Household expenses:

Food

[48] The aggregation was done by calculating arithmetic mean.

[49] The values assumed for these variables are integers. The minimum value of this variables is always 1 but the maximum is different. For this reason, in order to assign the same weight at the different variables it was necessary to compute a standardization that equalizes the different ranges. The value of the single observation was newly calculated according to the formula: (x-min)/(n-1), where x is the value of the single observation, min is the minimum value of the variable and n is the numbers of values that the variable can assume.

Clothes
Expenses for illness
Rent
Loan
Bills
School
Transports
Debts

Appendix B

The objective household economic welfare index

The objective household economic welfare index was created by the aggregation[50] of two synthetic indices based on two types of information

1. the possession of some durable consumer goods
2. the characteristics of wealth of house[51].

1. Possession of some durable consumer goods

The index was obtained as arithmetic mean of binary variables revealing the possession (value 2) or not (value 1) of some durable consumer goods.

durable consumer goods:

Dishwasher
Washing machine
Video recorder
Video camera
Hi-Fi
Console (apart from the computer)
Computer
Modem
Internet
Answerphone
Fax
Colour TV
Dish
Mobile telephone
Air conditioner
Bicycle
Scooter
Motorcycle
Car

[50] The aggregation was done by calculating arithmetic mean.
[51] The values assumed for these variables are integers. The minimum value of this variables is always 1 but the maximum is different. For this reason, in order to assign the same weight at the different variables it was necessary to compute a standardization that equalizes the different ranges. The value of the single observation was newly calculated according to the formula: (x-min)/(n-1), where x is the value of the single observation, min is the minimum value of the variable and n is the numbers of values that the variable can assume.

2. Characteristics of wealth of house

Arithmetic mean of the following variables

1.a
Number of rooms.
A variable assuming a value of 1 if the house has a number of rooms higher than the mean of the variable and assuming a value of 0 if the house has a number of rooms lower than the mean

1.b

Bathroom	
No Bathroom	= 1
One bathroom	= 2
Two bathrooms	= 3
More than two bathrooms	= 4

1.c

House expenses too high	
No	= 2
Yes	= 1

1.d

House in poor condition	
No	= 2
Yes	= 1

1.e

Homeowner	= 2
Not homeowner	= 1

Appendix C

The independent variables,

The three more important independent variables introduced in the regressions are:

1. Assput: the propensity to participation in "Putnam" associations

Arithmetic mean of the following variables:

Participation in cultural associations (in the last 12 months)

Yes	1
No	0

Participation in voluntary organizations (in the last 12 months)

Yes	1
No	0

Participation in ecological groups (in the last 12 months)

Yes	1
No	0

2.Satrela: Satisfaction in the relations with friends

Very satisfied	= 4
Somewhat satisfied	= 3
Not very satisfied	= 2
Not satisfied	= 1

3.Educational qualification

Phd	= 9
Master's degree	= 8
Bachelor's degree	= 7
Secondary-School certificate (4-5 Years)	= 6
Secondary-School certificate (2-3 Years)	= 5
Junior high School (from age 11 to 14)	= 4
Primary School	= 3
No title (literate)	= 2
Illiterate	= 1