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Socio-economic and psychological consequences of the Pandemic for the Great Elderly in Italy: How Much Is It Worth Investing in Relationships as a Factor in Preventing Loneliness?

Federico Comes, Joseph Cooper, Martina Menon and Federico Perali

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The Lonely Elder: How Much Is It Worth Investing in Social Networks? Evidence from Italy

Federico Comes[1], Joseph Cooper[2], Martina Menon[3] and Federico Perali[4]

Abstract: During the COVID -19 pandemic, the Italian welfare system appears to have effectively mitigated the economic impact of the pandemic on the elderly, regardless of income or place of residence. However, in preventing and treating the intangible aspects related to the noncognitive, affective, and relational domains of the elderly, Italian policies were limited. This study analyses the importance of these hidden dimensions of loneliness and frailty in a nationally representative sample of a particularly frail population group - the over 74s. The study also measures the large but latent demand for services as a remedy for loneliness by directly eliciting older people's willingness to pay for access to social networks and relational opportunities. In our sample, willingness to pay is related to both a perceived need for more social contact and a willingness to donate, which is higher among more sociable or confident older people, regardless of financial means. Instead, the decision of how much to donate appears to be dominated by purely economic variables. We estimate that the average willingness of older people to pay for community social services that can strengthen social networks is 94 euros. This estimate suggests that the cohort of older people across Italy may be willing to invest 365 million euros in the creation of effective social networks and neighborhood services. As a lesson for the future, it will be important to understand how communities and philanthropic financial institutions, such as community foundations, can promote the autonomous development of social networks to improve the quality of life of older people without relying on a weak welfare system.

JEL: I31, I14, D1

Keywords: Willingness to pay, elderly, loneliness, social network

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[1] University of Verona (Italy), Department of Economics, federico.comes@studenti.univr.it.
[2]Senior Policy Advisor to the Chief Economist, Office of the Chief Economist, U.S, Department of Agriculture, joseph.cooper@usda.gov.
[3] University of Verona (Italy), Department of Economics, martina.menon@univr.it.
[4] University of Verona (Italy), Department of Economics, federico.perali@univr.it.

1. Introduction

The Covid19 pandemic has had a different impact on the lifestyle and quality of life of different population groups. The elderly has been particularly affected by both the physical and the more indirect and less tangible effects on mental and emotional health. The cohort of the very old over the age of 74 is more economically protected than other populations still in the labor market and probably better equipped in terms of mental health than, for example, the adolescent group (Schinka et al. 2012).

The long periods of enforced isolation during the pandemic significantly reduced opportunities for direct relationships between people. The use of new digital technologies that enable social interactions at a distance is not able to replace the demand for emotionally close relationships or the need to help those in need directly. This dimension of fragility is amplified in people living alone, who in many cases may also suffer from loneliness.

The significant increase in the proportion of older people in the total population since the Industrial Revolution is a great success in the history of civilization, but also a challenge for modern societies. More and more people are reaching old age and inevitably becoming more frail. In 2019, Italy was the European country with the highest proportion of elderly people: 22.8% of the total population was older than 65, an increase of 2.5 percentage points in 10 years.

Loneliness is a subjective condition related to the difference between the desire for social contacts and what they get. People need people. There is a saying that a person can survive three minutes without air, three days without water, three weeks without food, and three months without companionship. Maintaining friendships can be an important factor in well-being, while chronic loneliness and social isolation – distinct but related conditions – have been linked to higher rates of heart disease, Alzheimer's disease, and depression and anxiety, which can also lead to extreme gestures. Many public health studies report that mortality rates associated with loneliness are comparable to obesity and smoking.

In Europe, more and more elderly people live in one-person households, especially women, who represent a particularly vulnerable group in society, at risk of poverty and social exclusion. In Italy, this increase is driven by the rise in the proportion of single people aged 45-64 from 24.2% in 2010 to 31.9% in 2020. Almost half of the population over 65 is single, although the proportion has remained stable over the last decade: 48.5% in 2010, 48.4% in 2020. In 2020, 62% of women over 65 were single, compared to 30.5% of men in the same age group (Eurostat 2020).

Loneliness and social isolation are increasingly recognized as public problems that need to be addressed with effective policies. In 2016, about 12% of EU citizens felt lonely more than half the time. The Covid19 pandemic exacerbated the problem. In the first months after the Covid19 outbreak, the proportion of EU citizens who felt lonely more than half the time doubled to about 25%. Loneliness and social isolation are not only detrimental to mental and physical health but can also have a significant impact on social cohesion and community trust.

In order to capture the complexity of the socioeconomic and psychological consequences of the pandemic in the subpopulation of elderly people over 74 years of age in Italy, a questionnaire was designed based on Bronfenbrenner's (1977, 1979) socio-ecological model, which takes into account, with a holistic approach, the complex interaction between the factors of the individual and his relationships with family, community and society (Bronfenbrenner and Ceci 1994). It allows us to understand the totality of factors that place people at risk of or protect them from loneliness or other

conditions of unhappiness. The model not only helps clarify these factors, but also suggests that preventing loneliness requires acting simultaneously on multiple levels of the model if prevention and treatment goals are to be pursued effectively. The research design is also inspired by the multipurpose survey model of the World Bank's Living Standards Measurement Study (Deaton 2019, Grosh and Glewwe 2000), which collects data on many dimensions of individual, family, community, and social well-being to estimate living standards, understand family behavior in response to external policies or events, and assess the impact of different government policies on people's living conditions. This approach also considers the recommendations on the measurement of well-being made by the Commission chaired by Stiglitz, Fitoussi, and Sen (2009), which have been taken up by the OECD (2018), urging us to go beyond monetary measures such as GDP to measure the progress of society. People's perceptions, valuations, and subjective experiences, as well as the value of unpaid activities performed in the household to produce common goods, are a critical component of overall well-being (Sen, Stiglitz, Fitoussi 2009). This model has also been used in studies to understand the causes of juvenile delinquency in Dalla Chiara and Perali (2022), Menon, Perali, and Veronesi (2017), or the living conditions of families who have suffered a severe brain injury (Menon, Giovanis, and Perali 2022).

The data were collected as part of the REDESIGN project funded by the Fondazione Cariplo. The questionnaire consists of the following sections: (a) personal data and composition of the household, (b) housing situation, (c) family consumption with special attention to consumer goods assignable to individual family members, (d) economic situation (income and savings), (e) time use, how the elderly spend the day and what activities they do together with other family members, f) health status with the EQ5D index, the SELSA loneliness index (Social and Emotional Loneliness Scale for Adults), which has been extended to include the dimension of loneliness due to the use of digital media, quality of life and the value of social networks. In the questionnaire, some questions are asked to specify the response in relation to the critical event before and after the Covid19.

In the paper, therefore, we attempt to document for the elderly the impact of the pandemic on the many social, economic, and psychological dimensions that constitute the standard of living, paying particular attention to loneliness. Considering that in times of stress, social support through the strengthening of relational networks is essential, we also focused on estimating the individual and collective demand for the common good “social network” to explain both the decision whether the elderly is willing to donate an amount to finance the construction and maintenance of new social networks and the amount itself. This information is important to learn about the importance that the elderly attach to social networks as a factor in the prevention and treatment of loneliness and how their implementation can be financed. The socioeconomic and psychological effects, including those in the affective and emotional domains, are documented in the first part. Econometric method and estimates of willingness to pay for social networks are presented in the next part. Conclusions follow.

2. Data: Socioeconomic and Psychological Consequences of the Pandemic of Loneliness

The impact of the pandemic on living standards affects, to varying degrees, different dimensions of lifestyle and quality of life, such as consumption, income and savings, time use, health status, mental health, loneliness, and noncognitive psychological characteristics. Our holistic research design allows

us to measure the characteristics and compare them before and after the critical pandemic event.[5] The description of the scale used to measure loneliness can be found in Appendix 1. The next sections present the socioeconomic and psychological outcomes in turn.

2.1 Socioeconomic Consequences

Let us now analyze the socioeconomic consequences of the pandemic based on the most important aspects of a person's life, especially if it is an elderly person, i.e., consumption of goods, use of time, income, and savings.

2.1.1 Consumption

During the pandemic, the income of the elderly, which is mainly pension income, has remained almost constant, but the long periods of isolation and high health risks have changed the consumption pattern both at the family and intra-family level, as resources are distributed among individual members. The comparison between the period before and after the critical event, illustrated in Figure 1, shows that the elderly donated a share of expenditures of more than 3% of net income to food and housing, about 2.3% to health expenditures, and a slight increase in expenditures on communications and digital technologies (0.5%) caused by the pandemic (Menon and Perali 2022). These higher expenditures were offset by sharp declines of about 6% in the share of spending on meals away from home and in the share of spending on private transportation (0.7%) and clothing (0.5%). Thus, the elderly developed reasonable adjustment strategies aimed at maintaining a constant level of wealth by reallocating resources to the items most in demand during the pandemic.

2.1.2 Time use

Time use was described using a stylized schema (Kan and Pudney 2008; Dalla Chiara and Perali 2022) created by respondents for each family member in relation to a “typical” weekday before and after the critical pandemic event, asking respondents to indicate the average time spent on each daily activity (e.g., sleeping, personal hygiene and grooming, lunch, reading, or physical activity) and the percentage doing each activity in company. Part of the scheme was designed to find out how much time is spent using the phone or PC / tablet in the work or study environment and during leisure time.

To know a person's habits, it is important to reconstruct a typical day of the week. If a person frequently eats and sleeps alone, does not visit family or friends, and does not participate in community activities such as sports or cultural events, it can be assumed that they experience a sense of loneliness. Based on the percentage of each activity that is done in company, the researcher can get an idea of when the person is alone or with others during a day. Excessive use of phones, PCs, and tablets during leisure time can be a sign of shutting oneself off from the outside world and seeking refuge in electronic devices.

2.1.3 Income and savings

To understand how the pandemic trauma may have affected respondents' economic situation, they were asked to report estimated net disposable household income as the sum of net income from paid employment, self-employment, and pension, and to reflect on their economic situation before and

[5] The national sample consists of 609 observations of the very old, which we define as persons over 74 years of age. The survey was conducted by SWG (https://www.swg.it/), which conducted the questionnaire in a panel of respondents using computer assisted web interviews (CAWI). The surveys were conducted between May and June 2021.

after this event. The net income measure was supplemented with information on other monetary transfers or annuities such as unemployment benefits, rental/capital income, and other government transfers (social pension, citizenship income, and more). If economic resources were considered sufficient for a given household income, respondents were asked if they were able to save. In 71% of the cases, this question was answered in the affirmative. After the critical event, the percentage of observations who could afford to save decreased (69%) (Table 1).

Before and after the critical event, family income remained virtually unchanged for both married couples and elderly living alone (average per capita income of elderly married couples €2665.66 and of elderly living alone €1832.27). The pandemic does not seem to have affected the share of income contributed by members of elderly couples (39% for women and 61% for men, which does not change significantly after the critical event). The stable participation of both members of the couple in the formation of the family income has further protected older couples from the risk of poverty.

2.2 Poverty and Income Inequality of the Elderly: Psychological Consequences of Being Alone

The economic poverty of the elderly in Italy is measured by a relative poverty line equal to 50% of the median of the income distribution of the whole sample before the occurrence of the pandemic stressor (1,186 euros). The proportion of elderly families living below the poverty line before the stressor is 9.3%. The poverty level remains almost unchanged after the stressor, at 9.2%. The differences become clear when comparing the subsample of single elderly with those living in couples. Poverty among those living alone is 24.6% compared to 5.9% among couples. This proportion remains unchanged after the stressor.

The level of inequality, as measured by the Gini index, is also the same before and after the stressor, at 0.241. However, for single people, the degree of income polarization is 0.256 compared to 0.214 for couples. Compared to the national Gini index of 0.302 (Istat report on income redistribution in Italy 2021 https://www.istat.it/en/archivio/259887), the degree of inequality is lower for the elderly, providing further evidence that the Italian welfare system takes a piggy bank-like action, redistributing resources along the life cycle, rather than a Robin Hood-like approach, redistributing resources instead to the classes that have less. The productive portion of the working-age population finances the consumption of the less productive elderly and young.

Figure 4 shows the Lorenz curves in terms of stress before and after the pandemic. They are very similar to each other. When the elderly person lives alone, the income distribution is more unequal along the entire curve (Figure 4b). The plots describing the difference between the two Lorenz curves show that for wealthier families, the post-pandemic inequality is more pronounced, especially for lonely people.

Thus, being alone in old age is a key risk factor for poverty, social distancing, and polarization. For very old couples, the risk is low. The comparison between the distributions before and after the stress shows that the welfare system has managed to ensure a stable economic situation, also considering that the very old who are not working did not risk losing their jobs and their main source of income. For this reason, the survey was also designed to measure non-material aspects related to the state of physical, mental, and relational health, as well as perceived well-being in general.

2.3 Income, Happiness, Health, and Loneliness

It is therefore interesting to examine the relationship between income, happiness, perceived health status, and loneliness. On a scale of 0 to 100, the average perceived happiness of the sample of elderly is 52, while the average of health status reported according to the EQ-VAS index is 55.5 and the overall index EQ -5D-3L is 55 (Dolan 1997). In the sample, 22% are in poor health, while 40% report good (29.9%) or excellent (10%) health (Table 2). Of the 5 dimensions of health (ability to move, personal care, habitual activities, pain or discomfort, anxiety, or depression), we describe the dimension of mobility, which makes the elderly particularly vulnerable, and the state of anxiety and depression, an indicator that well represents the state of mental health (Crick et al. 2018), which is directly affected by the pandemic. 62.4% of seniors surveyed have no difficulty getting around, about 35% have some difficulty, and 2.6% are not independent. 44.9% of those who live alone and 29.1% of those who live in pairs say they have difficulty walking. 54.5% of respondents report not being anxious or depressed, while 40.7% are moderately depressed. 4.8% report being very anxious or depressed. About 50.3% of those living alone report being moderately (43.3%) or extremely (7%) anxious or depressed. 39.4% of respondents living in pairs report being moderately anxious or depressed, while the percentage of those who are extremely anxious or depressed is 3%. These two dimensions of general health do not appear to have been significantly affected by the pandemic. In 8.2% of the sample, the situation has improved in terms of walking disability and worsened only in 6.4% of cases. As for the state of anxiety or depression, the situation has improved in about 12% of the elderly, while it has worsened only in 5.6%.[6]

Elderly people living alone have an average income that is 70% of that of a married couple, but 40% higher than the equivalent income of a member of the married couple (1747 euros versus 1250 euros). They have a happiness level of 47 and an almost average health level of 55. Only 19% of seniors living alone have a happiness level higher than 65, while the percentage of seniors living in couples with a happiness level higher than 65 is almost 30%. In accordance with the graphical representation, the correlation between happiness and health is 0.62 and between happiness and loneliness is 0.45, between health and loneliness is 0.27, and between happiness, health and loneliness and income is 0.11, 0.12, and 0.29, respectively. Moreover, there is no significant difference when the elderly person is alone. These relationships are shown in Figure 5. The relationships between happiness, health, and loneliness are positive and significant. Older adults who describe themselves as happier and in better health also feel less lonely. Interestingly, neither the state of happiness, health, nor loneliness has a significant relationship with income.

The quadratic relationship between happiness and health, happiness, and income, shown in Figure 6, and income and health for the total sample of elderly and for the elderly living alone, shown in Figure 6, shows different trends. On average, the elderly living alone has relatively better health and, given the high positive correlation, higher levels of happiness. Happiness levels are in the middle range between 50 and 60, regardless of income. For those living alone, the report shows a slight curvature

[6] The index EQ -5D-3L is an international standard that includes five dimensions: Mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension has 3 levels: no problems, some problems, and extreme problems. The levels of the five dimensions can be combined into a 5-digit number that describes the patient's overall health status. In the present work, the technique of Dolan (1997) was used. The EQ-VAS records the patient's self-assessed health status on a visual analog scale (VAS), with the boundaries of the interval labeled "best imaginable health status" and "worst imaginable health status". The VAS can be used as a quantitative measure of health care outcome that reflects the patient's assessment. This scale has also been validated for Italy by Scalone et al. (2013).

as incomes raise. The level of health status does not vary significantly as a function of income, both for the entire sample and for those living alone (lower graphs).

It would be important to compare these results with those of other age cohorts to understand how people's happiness varies with income at different life stages. Easterlin (1995) finds that as income, and thus economic well-being, increases, happiness increases up to a certain point and then, somewhat paradoxically, decreases, following a parabolic curve with downward concavity. This trend does not occur in the sample of elderly people, as the relationship is linear.

Figure 7 shows the curves representing the relationship between happiness and loneliness (top panel), health and loneliness (middle panel), and income and loneliness (bottom panel) for the entire sample and the very old living alone. The relationship between happiness and loneliness is very similar across the entire sample and among the very old living alone. The relationship between health and loneliness is more curvilinear among those living alone, but notably exhibits much higher variance, suggesting greater vulnerability. The wealthier older adults suffer less from loneliness, but the lower-income older adults living alone appear to be much more exposed to the risk of loneliness, as indicated by the stronger curvature in the lower part of the income distribution.

The differences between states of happiness and health before and after exposure are shown in Figure 8 and Figure 9. For the full sample, both happiness and health states do not vary significantly. Looking at the subsample of the very old living alone, stress leads to a deterioration in health status. The happiness concentration curve for couples and for singles overlaps.

2.5 Loneliness and the Quality of Relationships

While happiness levels remain constant before and after the pandemic, other dimensions of well-being, such as relationships and loneliness, may have been significantly affected. During the pandemic, the social, emotional, and technological components were addressed differently. We examine changes after the critical event in income and living alone.

The social dimension, mainly related to the quality of relationships with friends, deteriorates in about 50% of cases, but is independent of the income range or the condition of living alone. The emotional dimension, studied at the family level, worsened in about 20% of cases and improved in about 15% of cases. While the situation worsened mainly in the first two quintiles (39.9%) and in the last quintile of income (19.8%), the situation improved mainly in the wealthiest families (34.8%). The emotional situation of the family is significantly worse in 31% of cases if they live alone and in 14% if they are a couple. Looking at the emotional dimension at the feeling level, the love relationships between partners (or a loved one for lonely people) have worsened and improved to the same extent, corresponding to about 16%, worsening mainly in the poorest class and improving to the extent of about 40% in the richest class. While the emotional situation remained stable before and after the critical event in couples, affective relations deteriorated in 29% of cases in lonely people. The technological dimension, which aims to capture the importance of social networks and family and friend networks mediated by digital technologies, improves on average in 29% of cases, while it worsens only in about 7.4% of cases, showing the ability to adapt to the new situation of forced isolation, especially in the highest income strata, even among the elderly. When the person is alone, the process of adopting digital technologies is less easy, also because they are relatively older, considering that the situation worsens in 13% of cases compared to 25%.

The frequency and quality of relationships, and thus loneliness (Hawkley et al. 2008), have changed greatly because of the pandemic. The respondent was asked how often he or she meets with friends in his or her free time and whether there are people who live nearby, other than relatives, that he or she can count on in case of emergency. If the answer to the last question was yes, the respondent was also asked how often he spends time with these neighbors. The frequency of meeting with friends decreased at least fourfold, from 44% before the pandemic to 14% during the pandemic. The frequency of visits to the people most likely to be relied on also declined significantly, from 32% to 19%, indicating that a stressor that would have occurred during the pandemic would have exposed the elderly to significant risks due to the lack of help and close contact with friendship networks.

The pandemic has also affected the level of civic participation of a large segment of the elderly population. We constructed an index of political participation, consisting of the aggregation of responses to the question of being a member of a political party, trade union, or professional organization, and an index of participation in volunteering, consisting of participation in voluntary, environmental, or cultural associations. As shown in Figure 10, the civil participation rate among the elderly is generally 23%, including 7% in political activities and 16% in volunteer activities. Before the pandemic, the elderly who feel lonely according to the extended SELSA index do not participate in political activities 74% of the time and report good participation only 6% of the time, while 63% of those who do not feel lonely do not participate in political activities and report good participation 11% of the time. In the post-pandemic period, political participation deteriorates only slightly. Participation in social or environmental or cultural and recreational volunteer activities by older people suffering from loneliness has a very similar distribution to the political participation index, given the general lack of relationship interactions. Among those who are not alone, participation in forms of volunteering is higher than political participation, as more than twice (23%) report having good participation in volunteer activities. Post-pandemic, the distribution of participation in volunteer activities has remained virtually unchanged among both single and non-single respondents.

2.6 Psychological Consequences on Personality Traits

In times of crisis, the relatively best-off people are those who have not only the most material resources, but also the most intangible resources. The character predisposition to respond in difficult situations may depend on the endowment of noncognitive skills. If the crisis further erodes a low initial endowment of skills, the person is particularly at risk of poverty and health vulnerability. The problem is exacerbated when the deterioration in response to the event becomes chronic and does not return to the pre-event situation. This is more common the longer the critical event lasts, as in the case of the pandemic Covid19.

The personality traits were aggregated into a sociability index. This is derived from the sum of the values of personality traits such as the so-called “Big Five” (Openness, Conscientiousness, Extroversion, Agreeableness[7], Neuroticism), and self-confidence, resilience, and locus of control,[8] after assigning a negative sign to the non-positive components of each trait such as neuroticism and

[7] Agreeableness is composed of the tendency to forgive, the tendency to be caring and friendly, and grumpiness using the aggregation procedure described in Appendix 1.

[8] Locus of control defines the personal belief that the outcomes of a particular behavior are determined by one's own actions or by forces beyond one's control. This personality trait appears to influence important social situations such as education, general health, overall life satisfaction, and thus is often used to predict complex phenomena such as social engagement, political participation, unemployment, occupational behavior, well-being or health problems, and in our case of interest, loneliness.

external locus of control. The range of the index is from a minimum of 2 to a maximum of 17. In the sample, 32.3% have a low sociability index, 43.7% have a medium index, and 24% have a high index. The correlation between sociability and loneliness is significant and positive (0.47), suggesting that older people who are more open, conscious, extroverted, agreeable, resilient, self-confident, and have a stronger internal locus of control and are less neurotic are more likely to feel less lonely.[9]

Figure 11 shows the proportion of responses to the critical event of the noncognitive traits known as the "Big Five" as measured by the reduced version of the scale described by Gosling, Rentfrow, and Swann (2003) and Warr, Bartham, and Brown (2005). Depending on whether they have decreased, remained constant, or increased. The responses are consistent with expectations. About 40% of the very old say there has been no change in any of the top five items. The health emergency has made the very old somewhat more open to change (11% vs. 8% of those who experienced a decrease), more conscientious (14% vs. 2%), less extroverted (15% vs. 6%), less amiable (11% vs. 19%), but relatively irritable (19% vs. 10%). Overall, 12 older people (about 2% of the sample) showed changes in all domains.

Figure 12 shows the proportion of responses to the critical event of other personality traits such as trust, resilience (Lockwood et al. 2015), impatience, risk propensity (Albanese et al. 2017), and locus of control (Kovaleva 2012). In general, among the very old, the stress factor led to a loss of confidence in 26% of the cases and an increase in only 8% of the observations. Resilience, on the other hand, increased in 15% of cases, while it decreased in 8% of families. 23% of cases responded with more patience, while 5% became more impatient. Willingness to expose oneself to risk in the face of adversity decreased in 11% of cases, while it increased in 19% of observations. For the place of control, on the other hand, there was a decrease of 8% and an increase of 16%. Some 235 older adults (38%) in the sample reported no changes in any of these personality traits.

The evidence described so far shows the importance of loneliness as a factor that makes the very elderly particularly vulnerable from both socioeconomic and psychological perspectives. Considering that it is difficult in the short term to reduce the feeling of loneliness by psychologically strengthening the person by reinforcing some deficient personality traits through private meetings with psychologists, despite government subsidies for the cost of a visit, it is essential that the community invest in social networks to compensate for structural deficits. Strengthening social networks therefore appears to be a very effective line of intervention to address situations of loneliness and fragility, including economic fragility, in the short term.

For this reason, it is important to learn how the elderly in a community value a "social network" understood as a community asset, i.e., how much the elderly would be willing to contribute financially to activate and sustain services to support relationships in their community or, as respondents were specifically asked, to invest in a nonprofit service center that would implement initiatives to strengthen emotional ties and support mutual aid activities. Neighborhood networks are community assets and as such do not have a market value like private assets. The value or willingness to pay for a social good must therefore be estimated, aiming at recreating a context very similar to a traditional market choice, albeit a hypothetical one. The information described so far is now used as explanatory variables for the willingness to donate (or not donate) an amount of money in favor of social networks, and as potential determinants of the amount of money to be invested for this social purpose.

[9] The semantic labels associated with the response scale are: (1) does not reflect my personality at all; (2) a little; (3) enough; (4) very; (5) reflects my personality completely.

3. Econometric Method and Results: Willingness to Pay for Social Networks

In this study, a direct method is used to estimate the public good. This method attempts to obtain information about the value of a non-market good or service by conducting on-site surveys that directly ask individuals for a subjective valuation of the good. The goal is to obtain a valuation that is as close as possible to the valuation that a hypothetical market would have yielded. These methods include contingent valuation and choice modeling. The direct method we have used is contingent valuation. It consists in asking a sample of the population about their willingness to pay (WTP) for the offer of a particular good or service, in order to elicit a value of the common good contingent to the hypothetical scenario but corresponds to a real context presented to the respondents. It is a method traditionally used to estimate the value of a public environmental good, public policy, or project that is desired but not implemented, and is similar to stated choice methods used in the marketing literature to assess the potential value of goods that have not yet been marketed. The method is also suitable for valuing a community asset such as a social network, although no other applications are known that value social or community assets.

The goal now is to conduct econometric analysis of the data collected in our contingent valuation survey to explain both the decision to donate and the value of the public good. The design of the willingness-to-pay portion of the questionnaire and its application are an essential part of any contingent valuation study. Indeed, the maximum likelihood estimation function reproduces the process of data generation determined by the structure of the questions posed to the respondent.

In general, there are three ways to estimate WTP using contingent valuation (Mitchell and Carson 1993, Carson and Hanemann 2005). The first is with open-ended questions. In this case, the respondent is asked how much he or she is willing to pay for a nonmarket good or service that has been previously described along with a hypothetical scenario. In our case, the hypothetical scenario is re-enacted by asking the respondent to imagine "that the local government organizes a consultation to understand what value relationship networks have for you and asks you how much you would be willing to contribute by paying an annual donation, partially tax- deductible, to a nonprofit service center that conducts initiatives to strengthen your emotional ties and mutual aid activities. Think about your financial ability when responding" Another approach is to use payment cards (Mitchell and Carson 1993) or a list of values in referendum format (Welsh and Poe 1998, Venkatachalam, 2004) that show the respondent a range of amounts for possible payments for a service. The respondent or potential user of the asset selects the card or value that most closely matches his or her individual valuation, given the hypothetical scenario. The third approach, which always contingent on the hypothetical context, is to use dichotomous choice questions such as "Are you willing to pay an amount X, yes or no?" These questions are limited to a certain range, asked twice to refine the estimate and be sure that the stated availability is correct.

The approach used for this application combines the second and third methods. Cooper, Perali, and Veronesi (2005) call it Fair One and One Half Bound (FOOH). The first stage is to present the list of possible donations (Figure 13) to the respondent in a fair manner, i.e., loyal to the citizen, who is free to choose the offer that most closely matches his or her desires and economic means, or to donate nothing. In our case, the value spectrum ranges from 0 to 400 euros, which was determined in a representative pre-test phase. This initial phase is, in our opinion, very important, especially in the case of social public goods, which can take on very different values depending on the intensity of the need. For example, when evaluating a nature park, we usually ask about the willingness to pay for an

entrance ticket, for which we usually know in advance an acceptable interval that is verified in a pre-test phase of the questionnaire. However, it should be emphasized that the visit to the park is not a necessity and is therefore subject to a smaller variation in the interval. In the case of a relational community asset such as a social network that meets a real need of citizens, the "fair" use of a referendum format seems a natural choice.[10]

Based on the determined willingness to pay in the case of a willingness to donate, questions were asked in a closed interval in the second stage to increase the accuracy of the estimate and to verify the truth of the statement. The dichotomous response is equal to zero if the person answers "No" and equal to 1 if he/she answers "Yes" to the question about paying an amount higher than the one determined in the first stage (Figure 13). If the respondent answers yes, the willingness to provide a higher value is checked, and if the answer is negative, a lower offer is suggested (Figure 14). In the case of a double negative, the level indicated in the initial stage is restored. For example, if a willingness to pay of 10 euros was indicated in the first stage, an offer of 15 euros is initially made. If the answer is positive, she is also asked if she is willing to pay 18 euros, if it is negative, she is asked if she is willing to pay 13 euros. If the answer is still negative, we return to the original value of 10 euros.[11]

Before asking the questions to elicit the value of the asset, the questionnaire includes some questions that help recreate a context in which the individual must decide whether and how much to donate in the most realistic, albeit hypothetical, way possible. The answers to these questions are also important in explaining the lack of willingness to pay. To create as truthful a scenario as possible, the surveyed group of elderly people was asked about their opinion of local government in terms of its ability to carry out quality of life improvement projects. Figure 15 shows that about 52% think that local government has done little or nothing, while 38% think that it has done neither much nor little. Only 8% feel that they have done enough, while none feel that much has been done.

The distribution of willingness to pay at the first stage is shown in Figure 16. About 45% of respondents are not willing to donate any amount. The remaining 55 % are evenly distributed by 10 % among the different donation classes (10 euros, 20-40 euros, 50 euros, 60-100 euros and more than 100 euros). Only about 2% of the 45% who would not donate would have been willing to donate before the critical event. 14% of respondents say they would have donated differently before the critical event. Of these, 18% would have donated 100 or more euros. Figure 16 also shows the relationship between willingness to pay and income. As expected, the relationship is positive, showing that those who are less wealthy but often more in need of a social network are less willing to donate than those who are wealthier, but relatively more so compared to their own financial means.

If the respondent declares that he would not be willing to contribute, he is initially asked why he would not be willing to contribute by indicating the order of importance. The set of choices concerns "The efforts of the administration are a due act, they cannot ask me to pay more", This contribution is an extra tax", "I am not willing to incur any expenses for this issue", "I am not interested in donating for this issue", or "I cannot afford to pay such a sum".

[10] The advantages of the "fair" approach with payment cards or referendum lists in the first phase are several. First, respondents' WTP scores can be obtained directly from the original data. Second, respondents tend to transparently declare WTP values they trust (Ready et al., 2001, Cooper, Perali, and Veronesi 2005). Moreover, WTP values estimated by an original PC /referendum approach are more robust than those based on a dichotomous choice approach (Ready et al., 2001). Finally, there is no bias due to the starting point in the PC /referendum approach (Mitchell and Carson, 1986).

11 The specification of the estimated maximum likelihood function can be found in Cooper, Perali, and Veronesi (2005).

As shown in Figure 17, in the sample of the very old, 55% are willing to donate. The 45% who are not willing to donate indicate that they do not do so because they consider the administration's efforts a due act (12%), because they consider it an additional tax (15%), because they are not willing to bear an expense for this issue, or because they are not interested in donating (11%), or because they cannot afford it financially (6%).

We now describe the decision to donate or not with a discrete choice model of logit type and explain it in terms of the variables described in the first part of the paper, summarized for econometric use, as indicated in the descriptive statistics table (Table 3).[12]

The results of the logit estimation of willingness to donate are shown in Table 4. A look at the table shows that willingness to donate is higher among both male and female elders in the Northeast. Interestingly, income per se does not play a role in explaining willingness to donate, but the ability to save, the fact that one frequently eats outside the home, and the fact that the home has a garden seem to be more positively related. Willingness to donate is significantly positively influenced by good health, while negatively influenced by how happy one feels. Those who feel more anxious or depressed tend to be more willing to donate because, probably for opposite reasons, they are more with friends, engage in more social activities, are more sociable, have more trust in others and in the administration, and are more willing to take risks. A look at the coefficient for loneliness shows that it is statistically significantly different from zero and positively influences the willingness to pay, as was to be expected.

Table 5 shows the estimated dichotomous choices regarding the amount of donation. As expected, in the second decision stage, economic variables such as income, savings, and the presence of a second house that is a good proxy for wealth have a positive influence on the willingness to donate. Of the non-economic variables, only involvement in volunteer activities plays a significant role. The very old people of the Northwest are willing to donate a significantly larger amount.

The average level of willingness to pay is 94 euros (with a standard error of 7.4). Considering that in 2019 there are over 7 million people (7,058,755) living in Italy who have reached the age of 75, representing 11.7% of the total population (of which 60% are women), and that 55% of the sample is willing to donate an average WTP of 94 euros, it can be deduced (Song et al. 2019) that the total potential willingness to pay for funding community programs to strengthen social networks that address loneliness among older people in Italy is around 365 million euros.

4. Conclusions

This study illustrates the socioeconomic and psychological consequences of the recent pandemic for the elderly cohort. The “piggy bank” welfare system of the Italian state has been very effective in protecting the elderly in terms of their physical health and economic well-being, regardless of their income and place of residence. However, it has been less effective in preventing and treating the intangible aspects related to the non-cognitive and psychological, affective and relational spheres of older people, especially the most frail and in poor health, who may be particularly sensitive to the material and intangible consequences of loneliness. As a starting point for future research, it would be interesting to compare older people's responses to the pandemic with those of other population

[12] The variable education was not taken into account because it correlates significantly with income.

cohorts. Such a comparison could provide information to help design effective public health policies that take into account the different needs of different populations by conducting case-control studies.

In general, the willingness to donate is related to both the need for relationships and the attitude toward giving. An example of the former is the willingness to donate to activities designed to reduce loneliness and related depression and unhappiness, and an example of the latter is the willingness to donate by those who are more sociable or self-conscious, regardless of their economic means. Instead, the decision of how much to donate appears to be dominated by purely economic variables. The study estimates that the average willingness to pay among the elderly is 94 euros (with a standard error of 7.4). This could generate potential funding for the creation and support of social networks, for which Italian communities can mobilize about 365 million euros. We emphasize that the estimated WTP referring to the population over 74 years old is a lower bound, as it does not take into account the WTP of a broader population of elderly and non-elderly people who would be interested in addressing relationship deficits of the elderly. Another interesting question is what the WTP would have been in a scenario without a pandemic.

Older people's willingness to fund relational community assets, such as social networks, could also be strengthened by the high willingness to pay of younger cohorts who are willing to invest in future wellbeing in relationships, which is essential given the difficulty of addressing loneliness in the short term. Despite government support initiatives such as the psychological help bonus, our results indicate that it appears to be more effective to invest in institutions that improve social interactions by strengthening social networks (Silverstein and Chen 1996).

Relational networks, autonomously established by local communities, can be an effective measure to alleviate loneliness and improve social relations, especially considering the heavy burden of public debt that results in government welfare funding barely sufficient to maintain the pension and health care systems, leaving very little for public support of community welfare programs. For the foreseeable future, it is important to understand how communities can mobilize the estimated potential financial resources without relying on government transfers. Community foundations could play an important role in financial intermediation between citizens and communities to promote the development of autonomous networks that improve the quality of life of older people and create the conditions for effective prevention of health-risk situations.

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Figures and Tables

Figure 1. Redistribution of pre and post pandemic expenses

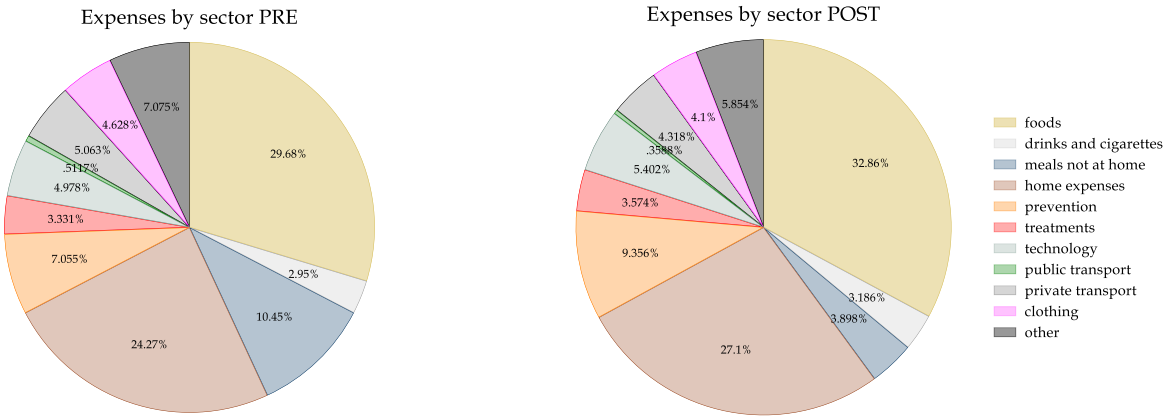


Figure 2. Variation of time use before and after the pandemic

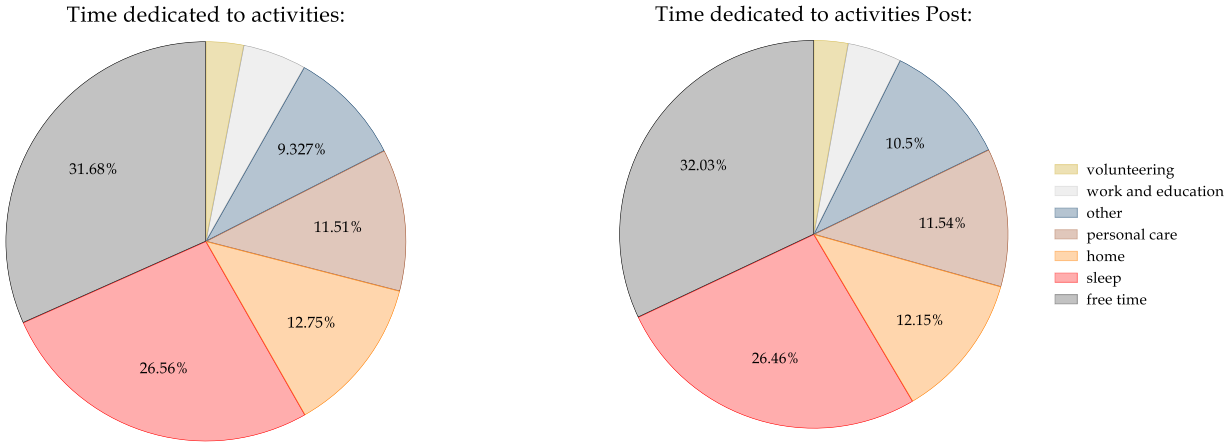


Figure 3. Time use: social activities

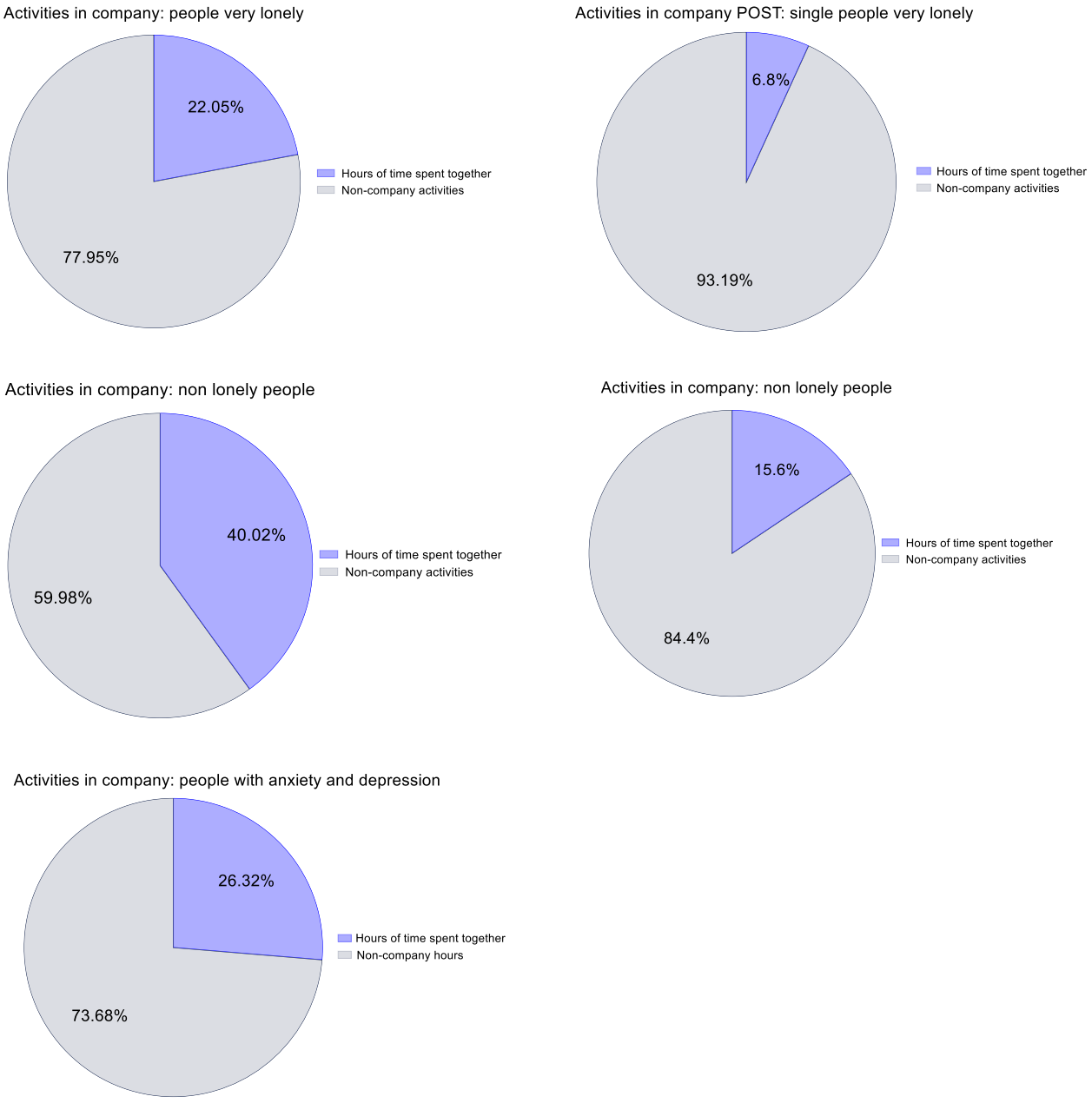


Figure 4a. Distribution of Incomes (Lorenz Curves) before and after the Pandemic - Whole Sample

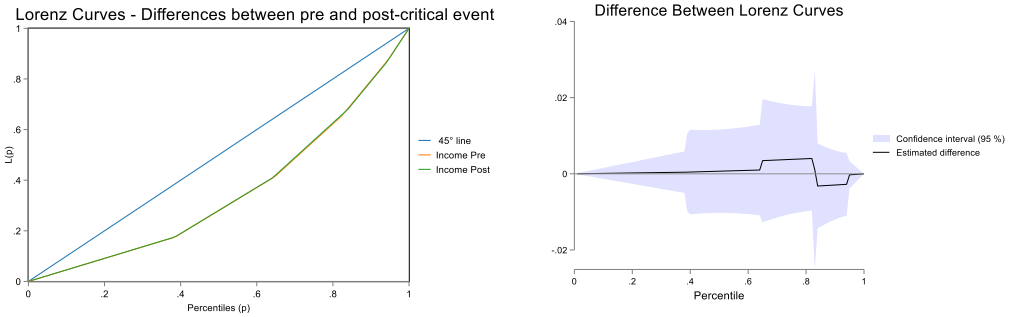


Figure 4b. Income distribution (Lorenz curves) before and after the Pandemic - Couples and Singles

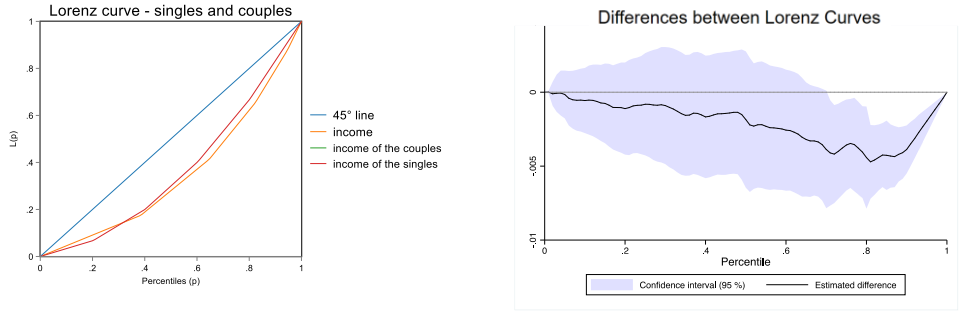
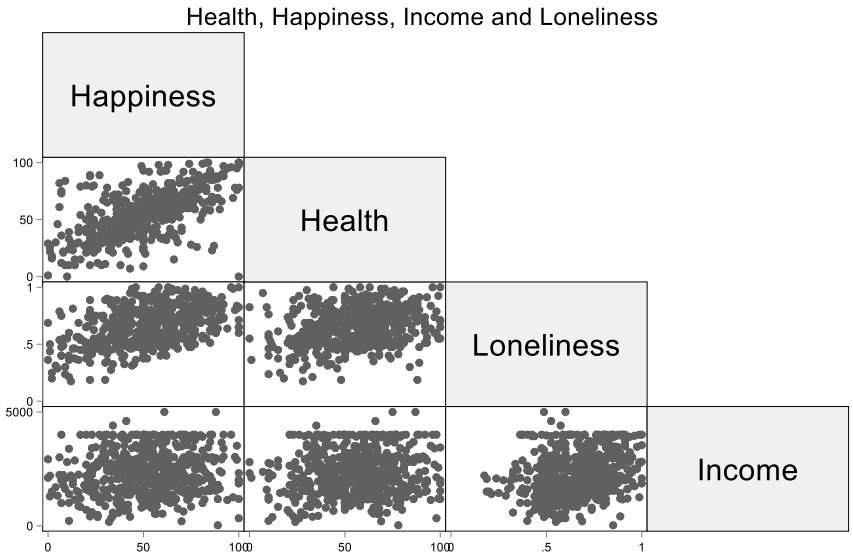


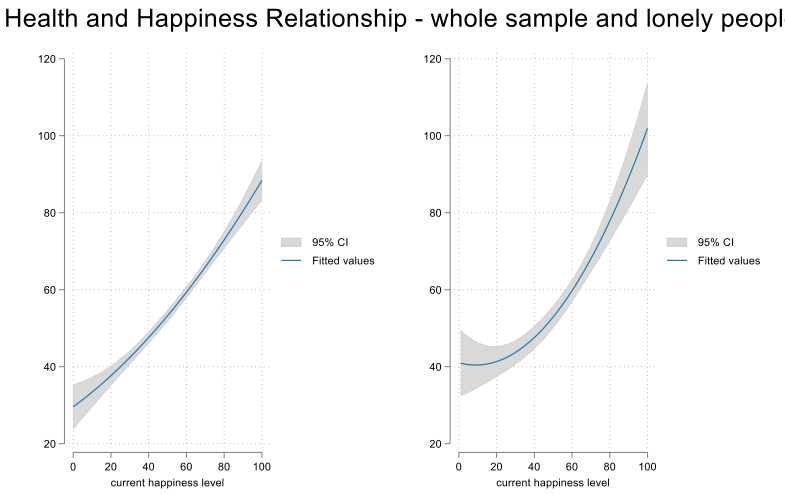
Figure 5. Relationship between Happiness, Health, Loneliness and Income in the Sample of Senior Citizens

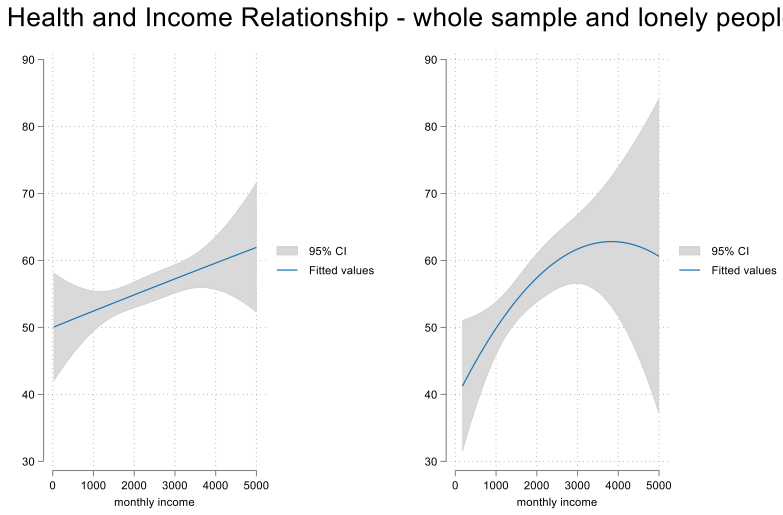


Linear regression of Happiness on Income, Health, and Loneliness, that estimates the value reported in the figure above

Happiness	Coef.	St.Err.	Sig
Income	-1.47	1.14	
Health	0.56	0.03	***
Loneliness	39.65	3.97	***
Constant	6.17	8.48	

Figure 6. Relationship between Health, Happiness, Income – Whole Sample and Senior Singles





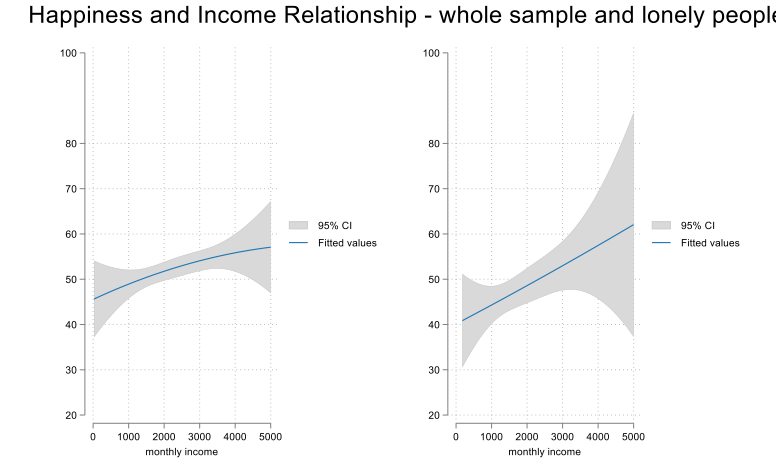
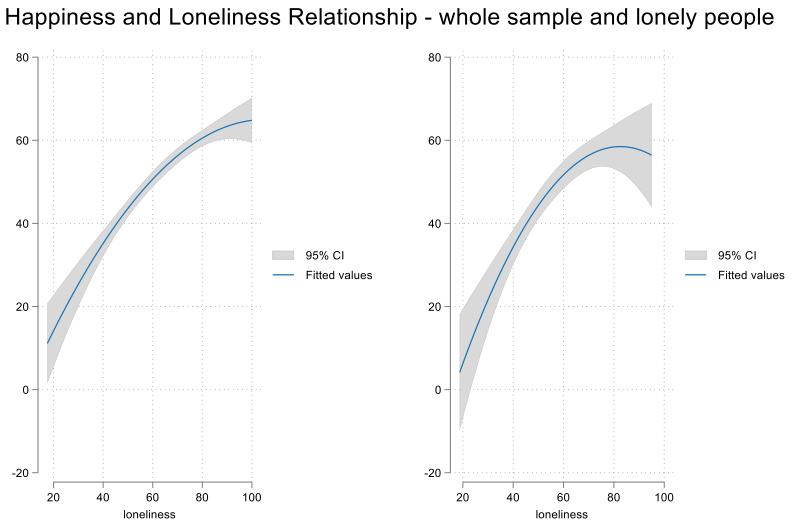
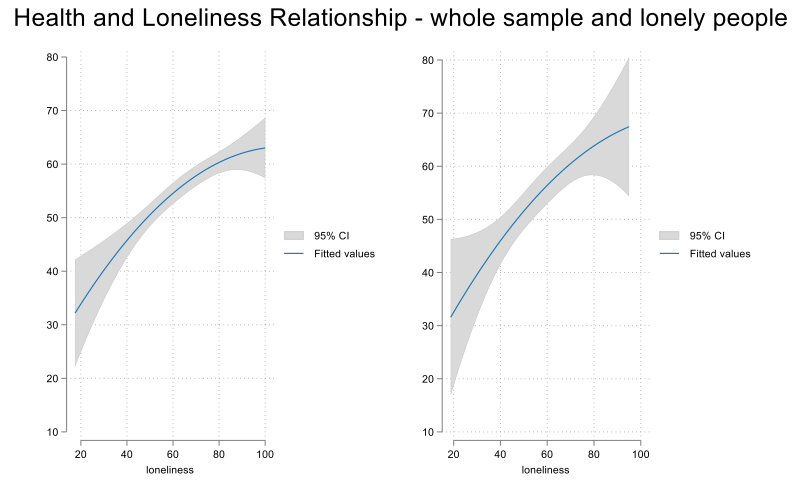


Figure 7. Relationship between Health, Happiness, Income and Loneliness – Whole Sample and Senior Singles





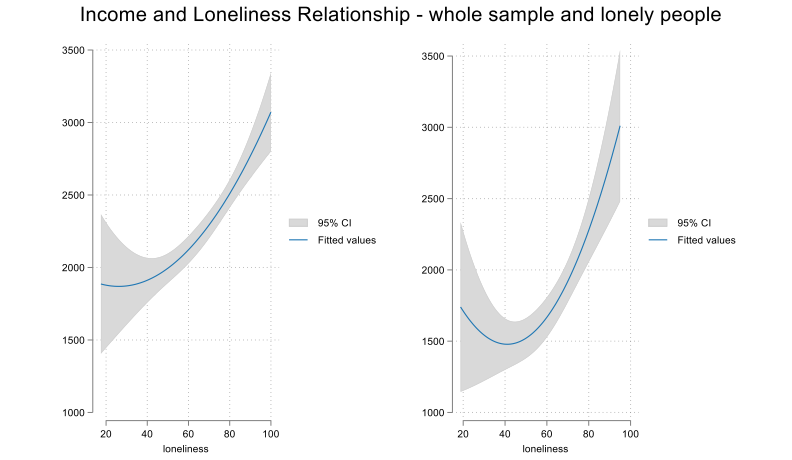
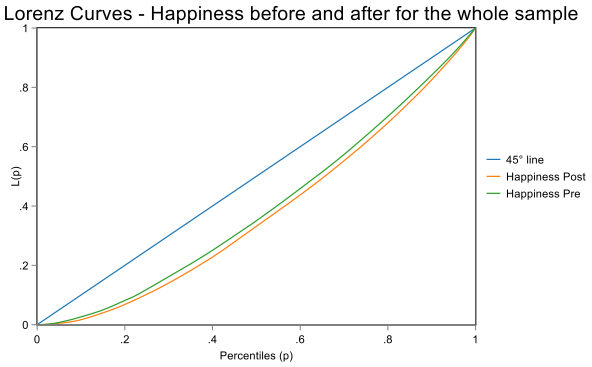


Figure 8. Distribution of Happiness (Lorenz Curves) before and after the Pandemic - Whole Sample (left panel), Pairs and Singles (right panel)



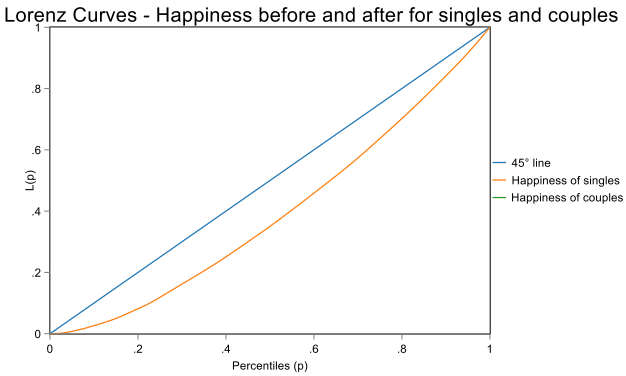
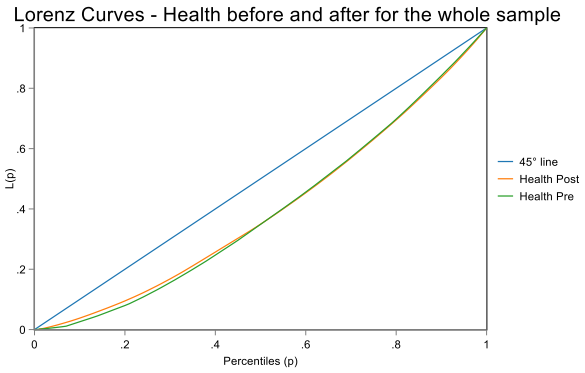


Figure 9: Lorenz curves on health



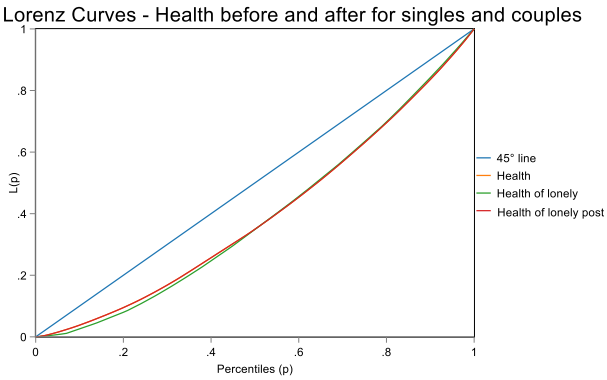
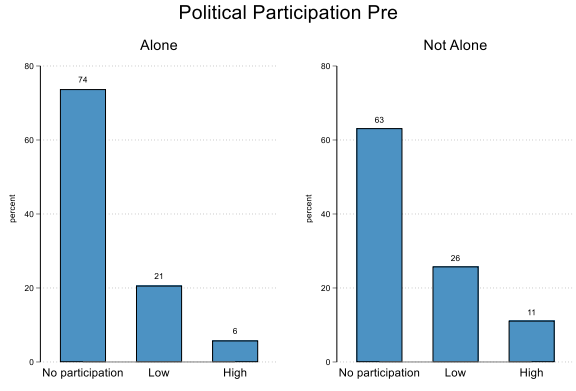
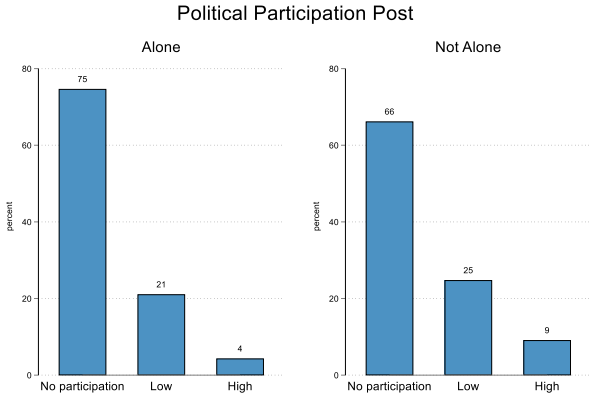


Figure 10: Social Participation of the Interviewee (%)





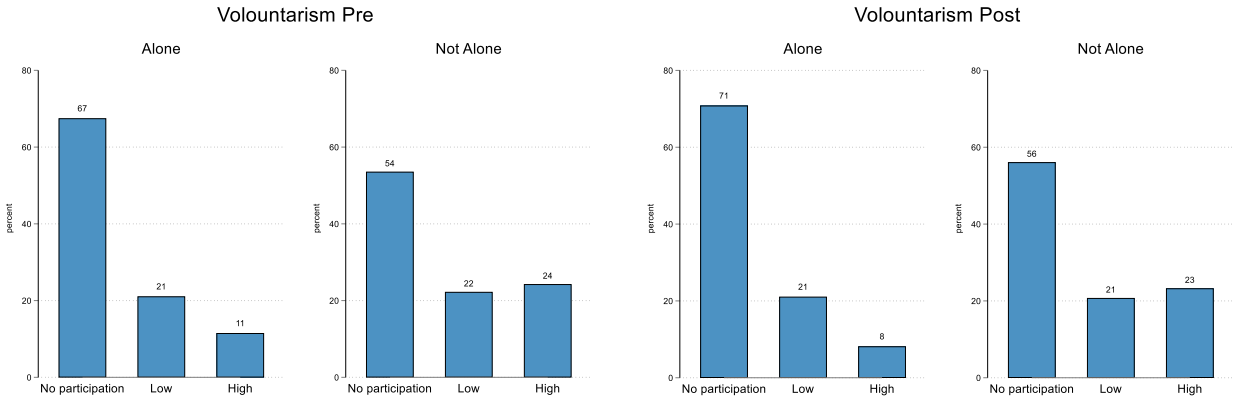
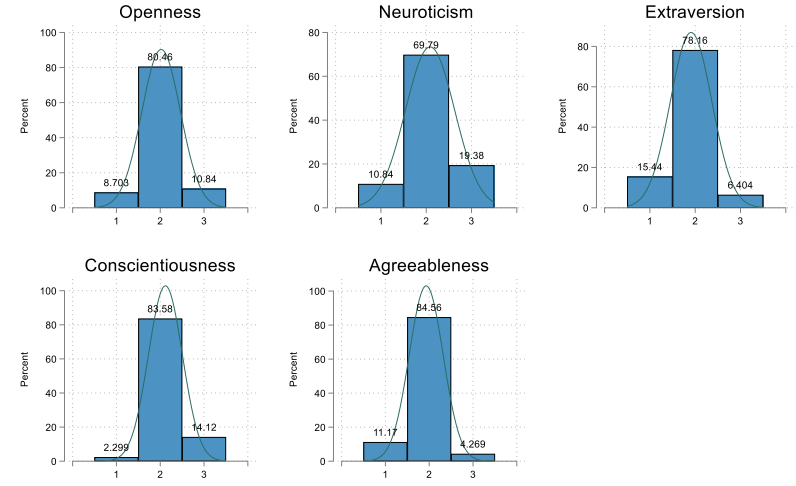
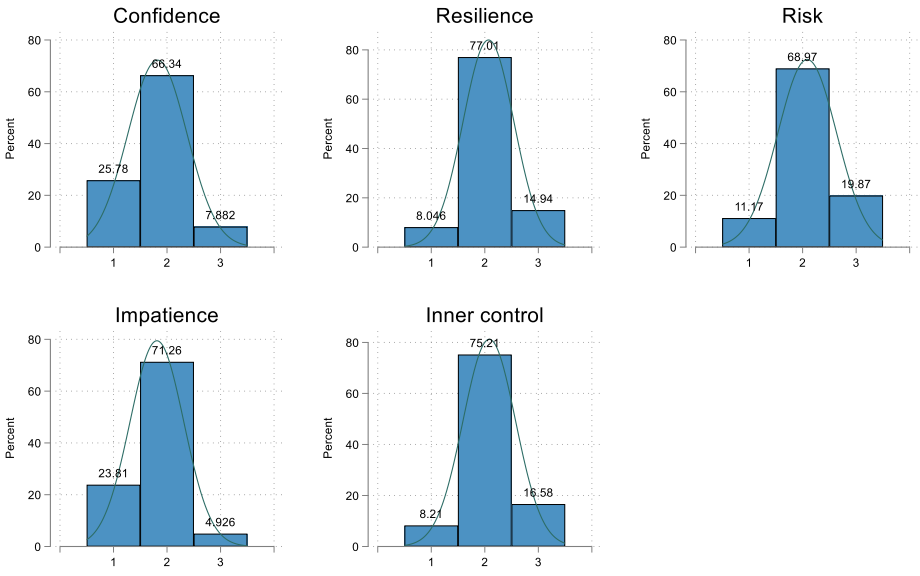


Figure 11: Big Five Critical Event Response



1: Decreased, 2: Constant, 3: Increased

Figure 12: Critical event response to other personality traits



1: Decreased, 2: Constant, 3: Increased

Figure 13. Stage I. Elicitation of the initial willingness to pay with a referendum-type format

Please indicate how much you would be willing to contribute annually to ensure that the services we have discussed are implemented by the administration of your community:

Would you be willing to contribute a donation equal to:	
10	☐
20	☐
30	☐
40	☐
50	☐
60	☐
70	☐
80	☐
90	☐
100	☐
150	☐
200	☐
300	☐
I would not be willing to contribute	☐

Figure 14. Stage II: Questions with a dichotomous structure

If the respondent indicates a contribution among the above, the interviewer takes note of the contribution and asks:

1. Would you be willing to donate a sum of [A] euros? *(here the interviewer will read the middle value)*	Yes 1 No 0
2. [If yes, question 1] Would you be willing to donate a sum of [B] euros? *(here the interviewer will read the value of upper bound)*	Yes 1 No 0
3. [If not, question 1] Would you be willing to donate a sum of [C] euros? *(here the interviewer will read value of the lower bound)*	Yes 1 No 0

Note: The table reporting the bounds for each offer is available upon request.

Figure 15. Opinion of the Local Administration regarding its Ability to Implement Pro Quality of Life Projects

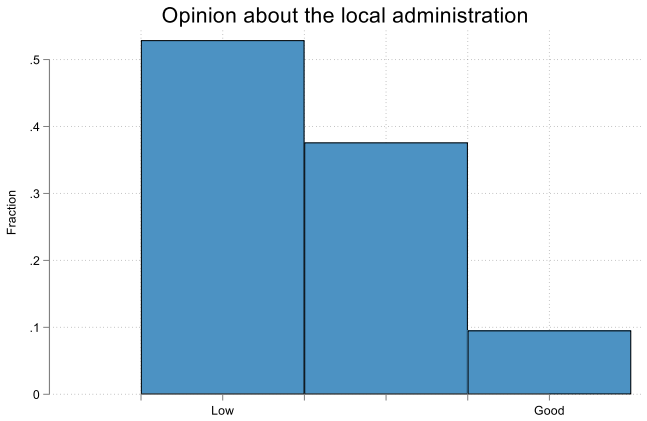


Figure 16. Distribution of Willingness to Pay and Relationship with Income

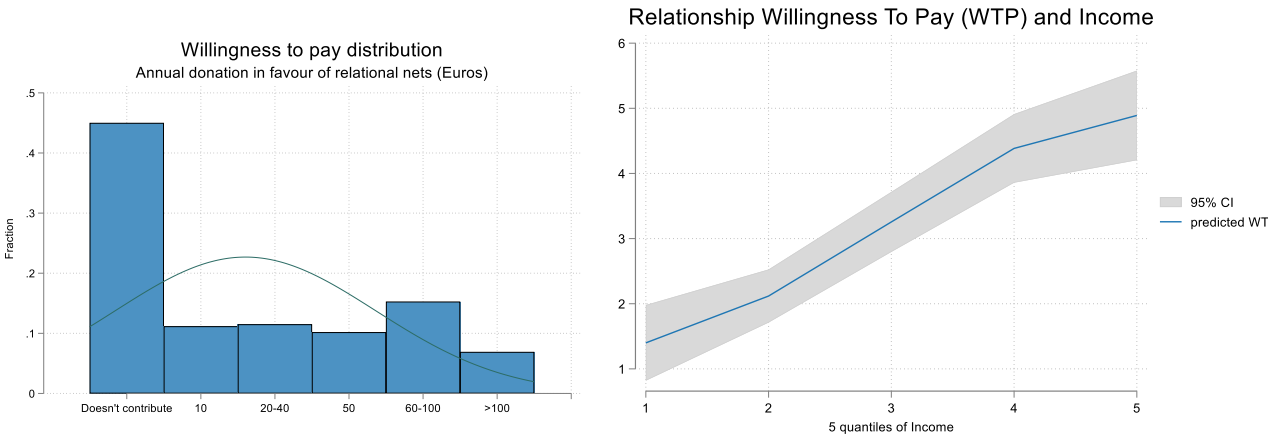


Figure 17. Reasons you are not Willing to Contribute

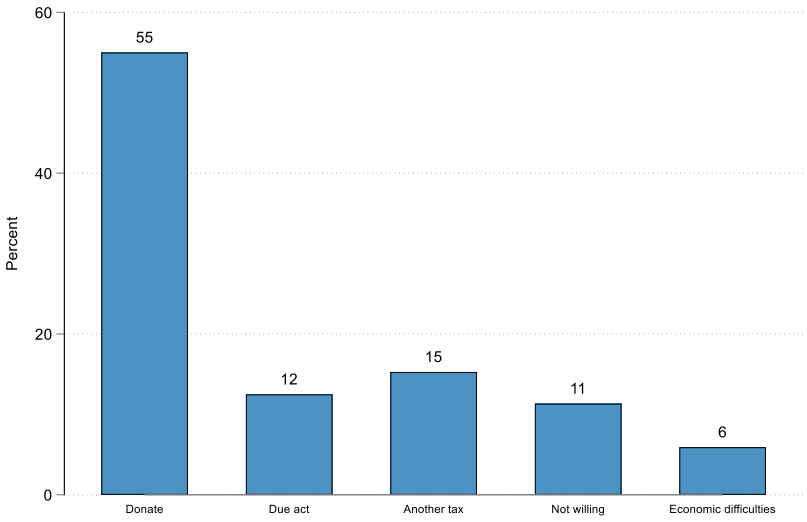


Table 1. Money saving (for those who declare excellent or adequate economic resources)

Table 1a: Does your income allow you to save money (pre pandemic)?

	Frequency	%
No	129	28.99
Yes	316	71.01

Table 1b: Does your income allow you to save money (post pandemic)?

	Frequency	%
No	124	30.85
Yes	278	69.15

Table 2. How do you rate your current health?

	Frequency	%
not good health	21	3.45
poor health	113	18.56
average	232	38.10
good	182	29.89
excellent	61	10.02

Table 3. Descriptive statistics of the variables

Variable	definition	mean	Std. Dev.	min	max
northeast	Dummy 1 if the interviewee lives in the North East	0.23	0.42	0	1
northwest	Dummy 1 if the interviewee lives in the Northwest	0.31	0.46	0	1
center	Dummy 1 if the interviewee lives in the centre	0.17	0.38	0	1
female_d	Dummy 1 if the respondent is female	0.41	0.49	0	1
single_d	Dummy 1 if the respondent lives alone	0.31	0.46	0	1
garden_d	Dummy 1 if the respondent has a garden at home	0.43	0.49	0	1
second_house_d	Dummy 1 if the respondent owns a second home	0.34	0.47	0	1
pastiout_d	Dummy 1 if the respondent spends on meals away from home	0.57	0.49	0	1
qinc_spesatech_r	Tertiles of expenditure on technology and communication	1.93	0.81	1	3
recreation_d	Dummy 1 if the respondent spends on recreational activities	0.29	0.45	0	1
lny	Logarithm of total revenue (euro)	7.67	0.55	3.37	9.01
savings_d	Dummy 1 if the respondent saves indicate over which period of time	0.52	0.5	0	1
visitsfam_d	Dummy 1 if the interviewee visits family members	0.60	0.49	0	1
eqvas	EQVAS general health index	55.51	19.77	0	100
happiness	State of happiness declared	52.20	20.65	0	100
anxiety	Anxiety and depression INDEX?	1.50	0.59	1	3
loneliness	SELSA Loneliness Index	0.66	0.16	0.18	1
friends_d	Dummy 1 if the respondent often (quantify) sees friends	0.44	0.50	0	1
help_others_d	Dummy 1 if the respondent has other people to rely on	0.76	0.42	0	1
social_activity_r	Social activity: political, trade union or professional participation	0.35	0.61	0	2
volunteering_r	Voluntary work: participation assoc. cultural or ecological	0.54	0.76	0	2
sociality_r	Sociability index	1.91	0.74	1	3
confident_r	Level of confidence	2.04	0.74	1	3
impatience_r	Impatience level	1.97	0.77	1	3
risk_r	Risk level	1.91	0.77	1	3
rep_administ_r	Management reputation	1.57	0.66	1	3

Table 4. Determinants of the decision to donate to increase the offer of social networks (logit model)

If WTP>0, WTP=1	Coef.	St. Err .	t value	
northeast	-0.63	0.28	-2.26	**
northwest	-0.25	0.24	-1.04	
center	-0.33	0.28	-1.18	
female_d	-0.48	0.21	-2.31	**
single_d	0.07	0.23	0.31	
garden_d	0.42	0.19	2.17	**
second_house_d	0.05	0.21	0.24	
pastiout_d	0.68	0.19	3.52	***
qinc_spesatech_r	-0.09	0.12	-0.76	
recreation_d	0.38	0.23	1.65	*
lny	-0.06	0.23	-0.27	
savings_d	0.57	0.20	2.75	***
visitsfam_d	0.22	0.19	1.16	
eqvas	0.01	0.01	2.03	**
happiness	-0.01	0.01	-1.72	*
anxiety	0.44	0.18	2.41	**
loneliness	1.47	0.74	1.97	**
friends_d	-0.39	0.20	-1.95	*
help_others_d	0.25	0.22	1.14	
social_activity_r	0.37	0.17	2.11	**
volunteering_r	0.05	0.14	0.38	
sociality_r	0.28	0.15	1.87	*
confident_r	0.33	0.14	2.43	**
impatience_r	-0.18	0.13	-1.42	
risk_r	0.24	0.13	1.89	*
rep_administ_r	0.44	0.15	2.92	***
Constant	-3.67	1.85	-1.99	**
Mean dependent var		0.55		
Pseudo r-squared		0.15		
Number of obs		609		

Note: ***p<.01, **p<.05, *p<.1

Table 5. Dichotomous Estimate of Willingness to Pay (WTP)

	Coef.	Std. Err.	z	P>|z|	
Beta					
northeast	9.60	19.67	0.49	0.62	
northwest	32.15	18.31	1.76	0.08	*
center	15.81	21.27	0.74	0.46	
female_d	-15.54	16.51	0.94	0.35	
single_d	-14.15	17.84	-0.79	0.42	
second_house_d	32.69	15.36	2.13	0.03	**
pastiout_d	23.36	15.37	1.52	0.13	
lny	31.42	16.37	1.92	0.05	**
savings_d	33.53	15.33	2.19	0.03	**
eqvas	0.02	0.45	0.05	0.96	
happiness	0.39	0.46	0.83	0.40	
anxiety	-8.24	13.59	-0.61	0.54	
loneliness	-49.43	53.20	-0.93	0.35	
friends_d	9.82	15.44	0.64	0.52	
social_activity_r	-2.19	11.19	-0.2	0.84	
volunteering_r	17.63	9.52	1.85	0.06	**
sociality_r	14.99	10.90	1.37	0.17	
confident_r	3.54	10.36	0.34	0.73	
_cons	-218.08	126.49	-1.72	0.08	*
Sigma					
_cons	107.23	7.48	14.34	0	
WTP_db_hat	94.52	7.38	12.80	0.000	

Note: ***p<.01, **p<.05, *p<.1

Table 6. Aggregate Loneliness Index and Social, Family, Affective and Technological Components with Related Percentage Weights

Variable	Average	Dev. std	%
Aggregate Loneliness Index (SELSA)	0.66	0.16	
Social component	0.63	0.22	23.78
Family component	0.79	0.22	30.30
affective component	0.65	0.27	24.31
technological component	0.57	0.24	21.59

Table 7. Loneliness - Relationship with the family dimension

Lives alone	very lonely	little lonely	not lonely	Total
pairs	110	146	166	422
	26.07	34.60	39.34	100
single	99	56	32	187
	52.94	29.95	17.11	100
Total	209	202	198	609
	34.32	33.17	32.51	100

The first line shows the frequencies, the second line the percentages of the line.

Appendix I. The measurement of loneliness: methodology for the construction of loneliness indices

The state of loneliness is an often-distressing experience with potentially serious health consequences that is poorly understood, particularly for adulthood (Berg-Weger and Morley 2020), and its frequency and intensity increased greatly during the pandemic emergency. It is estimated that in normal times, one in four people suffers from loneliness (Perlman and Peplau 1981, Peplau and Perlman 1982, Perlman 1988). Loneliness is often associated with lower life satisfaction, higher alcohol consumption, and greater psychological and relationship problems (Dykstra 2009, Fokkema et al. 2012). Therefore, it is important to understand the causes of loneliness and to measure it properly (Dahlberg et al. 2015). Living alone and suffering from loneliness are not the same. Many people can suffer from loneliness regardless of their age, even if they do not live alone.

DiTommaso and Spinner (1993, 1997), Cramer and Berry (1999), DiTommaso et al. (2004) and DiTommaso et al. (2015), Kuznier et al. (2016), Russell (1996) studied a multidimensional measure of loneliness, called Social and Emotional Loneliness Scale for Adults - SELSA[13], which distinguishes the social and emotional dimensions, which in turn are divided into the familial and affective dimensions. In the present study, the technological dimension was also added to better capture the role of social media in determining the state of loneliness.

Table 6[14] contains the extended SELSA loneliness index aggregated using the Chakravarty (2003) procedure described below and the social, family, and affective components index also aggregated using the same procedure. The component with a higher average index is the family member due to a greater agreement of respondents with the questions asked, while the lowest average index is the one related to the technological component, due to a higher incidence of divergent positions. The components that correlate most strongly with the overall SELSA index are the social, family, and affective components (about 0.7), while the technological component correlates less strongly (0.56). The right column shows the relative contribution of each component. The component with the greatest weight is family (30.3%), while the component with the least weight is technology (21.6%).

Those who live alone are not always accompanied by loneliness, but it is certainly more likely (Russell et al. 2012). More than half of the elderly (52.9%) feel very lonely according to the SELSA expanded scale (Table 7). This is twice as many as those living in couples (26%). This information is very important because it identifies a factor of high vulnerability with great precision and allows us to develop targeted interventions.

We use the technique of Chakravarty (2003) to derive a single aggregate index of loneliness and sociability. The author defines a general achievement index of performance as follows:

[13] The questions used to calculate the SELSA index were asked in such a way that the respondent's level of agreement with each statement could be recorded on a scale of 1 to 5, where 1 = strongly disagree and 5 = strongly agree. The order of responses to some questions was reversed to maintain consistency with the other questions, which were already arranged to contribute positively to the index.

[14] The technological component consists of the following statements, which were rated on a response scale of 1 to 5 from completely disagree to completely agree: 1. using the Internet has allowed me to be closer to friends and family, 2. social networking (e.g., Facebook, Twitter) makes me feel connected to friends and family, 3. social networks have helped me stay in touch with friends and family I would otherwise have distanced myself from, 4. I would advise others to use the Internet to improve their social relationships, 5. technology has made it more difficult to spend time in person with friends and family.

$$I = \sum_{i=1}^{k} f((x_i - m_i)/(M_i - m_i)) \quad (1)$$

where x_i is an attribute, k is the number of attributes (dimensions), and m_i and M_i are the lower and upper bounds, respectively. The function is f: $[0,1] \rightarrow R^1$ is twice differentiable, increasing, strictly concave with $f(0) = 0$ and $f(1) = 1$. This index is limited between zero and one, is increasing in each attribute and is globally translation invariant meaning that the achievement index remains the same if all levels and limits of achievement are scaled by the same absolute quantity. The index is homogeneous of degree zero. If we assume that for the function f has exponential form, then the realization index

$$I = \sum_{i=1}^{k} f((x_i - m_i)/(M_i - m_i)) = \sum_{i=1}^{k} ((x_i - m_i)/(M_i - m_i))^r, 0 < r < 1 \quad (2)$$

is decreasing in weights r (Decancq and Lugo 2013; Anand and Sen 1997). When $r = 1$, then we obtain the Human Development Index (HDI)

$$I_{HDI} = \sum_{i=1}^{k} ((x_i - m_i)/(M_i - m_i)\ )/k, \quad (3)$$

which corresponds to the arithmetic mean of the normalized levels of realization. This output index can therefore be broken down into any total contribution of the attribute i to the achievement I as

$$T_i = ((x_i - m_i)/(M_i - m_i))/k \quad (4)$$

and $(Ti \cdot k)/\ I \cdot 100$ is the percentage of contribution of the attribute i. This decomposition (Chakravarty 2003) is important because it measures the relative weight of each dimension for the overall outcome and reveals what attributes policymakers can improve to achieve a higher composite index.