Article

Volunteering and Self-Assessed Health Within EU28 Countries: Evidence From the EWCS

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Abstract

The effects of voluntary activities on individual well-being have been investigated extensively in the literature. In this study, the relationship between self-assessed health and volunteering is examined from a cross-country perspective by considering respondents' characteristics and other voluntary liabilities, employing the Sixth European Working Conditions Survey. This data set allows us to explore, by implementing an Ordered Probit model, the association of self-assessed health status with charity activities performed specifically by workers. Among the working population in the European Union, our results show that, although volunteering—as well as other unpaid tasks, such as informal helping—are statistically significant, voluntary activities do not seem to be strongly associated with individual perceived health status.

Keywords

self-assessed health, volunteering, EWCS, Ordered Probit model

Introduction

Volunteering is a widespread activity in almost all European countries, and the number of people involved has been growing over time (UN Volunteers, 2018). In recent years, several scholars have stimulated an interesting discussion to assess whether voluntary activities have beneficial effects not only on the recipients but also on the volunteers

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themselves (Stukas et al., 2014; Wilson, 2012). Several studies find that people who volunteer are likely to gain work experience (Menchik & Weisbrod, 1987), which would enhance their future employability (when unemployed) and earning power (when employed). Moreover, other empirical researches have revealed the existence of a wage premium for volunteers (Bruno & Fiorillo, 2015; Day & Devlin, 1998; Hackl et al., 2007).

This study investigates the correlation between individual workers' health and volunteering, grounding on the opinion that "volunteering is a public health issue" (Southby & South, 2016, p. 42). For instance, in 2010, the U.K. government launched the "*Building the Big Society*" policy, which promotes low-cost and sustainable interventions, such as volunteering, to help people interact with their communities and increase both social capital and engagement within communities, so that individuals could enjoy improved health. Others suggest that volunteering can reduce health care spending: Gupta (2018) reports that, in the United States, volunteering allowed saving in health care costs for elderly cognitive decline of about US$9.26 to US$15.16 billion in 2010.

Furthermore, the United Nations and some American and European governments encourage volunteering for its potential public health benefits resulting from the engagement of people in local communities. Southby and South (2016) in their report—commissioned by *Volunteering Matters* as part of a British project "Pathways to maximize the contribution of volunteering to public health"—suggest that (a) removing all barriers that could exclude people from volunteering and (b) promoting appropriate actions for broadening volunteering can unlock the potential health and wellbeing benefits of volunteering.

Based on the investment model (Hackl et al., 2007), and contrary to the literature on the determinants of volunteering (see among others Day & Devlin, 1998), following which people volunteer would aim at investing in human capital to access the labor market, it seems that people who work are more likely to volunteer than those who are unemployed.

However, to the best of our knowledge, studies focusing on the relationship between volunteering and European workers' health are not common in the literature because of the shortage of specific and complete data sources for the purpose. Therefore, the availability of a large institutional data set such as that of the European Working Conditions Survey (EWCS) may provide an interesting study opportunity, although reckoning the limitation issues of selection and causation related to the lack of panel data, as it happens in any similar analysis (among others: Bekkers, 2012; Goldman, 1994). As previous studies mainly focus on the whole population, our analysis of the link between volunteering and European Union (EU) workers' health may offer an innovative contribution to the literature. This investigation of workers' response behavior is interesting for at least two reasons: (a) workers have less free time and therefore, when they decide to volunteer, are likely to manifest different motivations compared with those of non-workers and this circumstance could affect health in a different way; (b) workers are likely to be more stressed than non-workers, either because of job-related constraints and duties or for work–life balance reasons, and

volunteering may reduce some possible adverse effects of work on health. As shown by Ramos et al. (2015) who adopted a balanced approach, volunteering, similarly to other activities such as relational pursuits, sports, and participation in cultural and recreational events, could be a way of counteracting the potential negative effects of work on health.

The EWCS does not provide information about the sectors within which people volunteer. However, data help distinguish between formal and informal volunteering because they include few questions referred to unpaid activities (domestic working and cooking, caring for or educating children and grandchildren, and caring for elderly or disabled relatives). These activities, for which the performers are not paid, and which are not coordinated by an organization or institution, are considered proxies of informal volunteering (informal helping). The sixth wave of the EWCS has not been employed so far with this aim.

Next section presents the theoretical framework and a review of the literature on the topic. The "Data of Interest" section depicts the data employed. The "Explanatory Variables for the Analysis: Workers Characteristics and Conditions" section details the sample and workers' characteristics and conditions to be studied as explanatory variables in association with self-assessed health (SAH). The "Model and Empirical Evidence" section describes implemented models and empirical evidence. The "Final Remarks" section provides some concluding remarks.

Theoretical Framework

From a theoretical viewpoint, voluntary activities may exert beneficial effects on volunteers' health because the act of volunteering itself provides access to three types of resources: (a) psychological, (b) social, and (c) informational resources (Detollenaere et al., 2017; Fiorillo & Nappo, 2017; Gupta, 2018). All three kinds of resources have generally positive effect on health (Musick & Wilson, 2003), and the possibility of accessing them may represent the reason why people decide to volunteer. In addition, the evidence shows that there are links between the determinants of volunteering and possible canals through which volunteering benefits health (Anderson et al., 2014). With respect to psychological resources, the awareness to contribute to a good cause makes individuals enjoy volunteering, and such enjoyment endows them with a "warm glow" (Andreoni, 1990). Following this approach, people's motivations to volunteer represent a type of "impure altruism": Volunteering becomes internally self-rewarding and increases self-worth and self-esteem, and these circumstances, in turn, improve volunteers' mental health (Wilson & Musick, 1999). In other words, volunteers may succeed in filling their life with meaning and purpose, with subsequent positive effects on their health. Moreover, voluntary activities make social resources available because such activities are often practiced in groups, a setting in which recurrent interpersonal interactions are possible (Prouteau & Wolff, 2008). Therefore, volunteering provides individuals with the possibility of sharing relationships within social networks. Consequently, volunteers experience opportunities to develop relational contacts, which are likely to aid social integration. Social integration provides social support

(Clotfelter, 1985; Prouteau & Wolff, 2006; Schiff, 1990; Wilson & Musick, 1999), which, in turn, offers several potential benefits (for instance, help with solving problems and managing difficulties). The sense of belonging to a group and the advantages of belongingness itself could positively influence volunteers' health (Li & Ferraro, 2005; Musick & Wilson, 2003). Finally, volunteering may be considered as a provider of informational resources. With respect to people who are not part of groups, volunteers have greater opportunities to acquire information about health education, to converse on cultural norms that may be detrimental (such as smoking and drinking) or beneficial (such as sport and proper eating) for health, practicing prevention, and acquiring good habits (Fiorillo & Nappo, 2017).

Literature Review

Large branches of the socio-medical, epidemiological and, more recently, economic literature conclude that people who volunteer enjoy better health than people who do not. Casiday et al. (2008) conducted a systematic review to identify relevant papers published since 1997 (24,966 identified studies, 87 included in the review) that establish the health effects of volunteering on volunteers and health service users. The authors reached the conclusion that volunteering has a "salubrious effect" on volunteers. A few of the considered studies suggested that volunteering improves self-rated health (Piliavin & Siegel, 2007; K. C. Tang et al., 2005; Thoits & Hewitt, 2001), alleviates depression (Li, 2007; Li & Ferraro, 2005; Thoits & Hewitt, 2001), and decreases mortality (Lum & Lightfoot, 2005; Musick & Wilson, 2003). In addition, volunteering seems to increase life satisfaction (Thoits & Hewitt, 2001; Van Willigen, 2000) and the ability to perform daily living activities without functional impairment (Lum & Lightfoot, 2005; Thoits & Hewitt, 2001). Participation in voluntary activities helps to increase the levels of social support and interaction (Hainsworth & Barlow, 2001; Messias et al., 2005), induces healthy behaviors (Librett et al., 2005; Ramirez-Valles, & Brown, 2003; Weitzman & Kawachi, 2000), and enhances an individual's ability to cope with illnesses (Clark, 2003; Shannon & Bourque, 2005).

Nonetheless, empirical researches on volunteering and health are often characterized by reverse causality, meaning that in the relationship between volunteering and health, it is not always clear whether volunteering improves health or healthier people volunteer more than people with worse health.

Longitudinal studies that address the direction of the relationship between volunteering and health are few. Casiday et al. (2008) review papers published up to 2008; Wilson (2012) and Jenkinson et al. (2013) review papers beyond 2008, and Anderson et al. (2014) focus on the benefits of volunteering for older adults. Borgonovi (2008) attempted to address the reverse causality problem with an instrumental variables model. Using the 2000 Social Capital Community Benchmark Survey data, the degree of religious fragmentation in the country was employed as an instrument of religious volunteering. However, the results did not disclose an association with self-reported health. By contrast, Schultz et al. (2008) employed the 2006 Social Capital Community Survey Data and religious attendance and tenure in the community as instruments of

voluntary activity: They found a positive and statistically significant correlation at 1% with self-reported health. Fiorillo and Nappo (2017) studied the causal relationship between formal volunteering and individual health employing the Income and Living Conditions Survey for the United Kingdom carried out by the EU's Statistics (UK-SILC) in 2006. Their conclusions indicate the positive effect of formal volunteering on self-perceived health. More recently, Nappo and Fiorillo (2020) focused on the simultaneous effect of formal and informal volunteering on self-perceived individual health across nine European countries, employing the 2006 wave of the EU-SILC data set and using instrumental variables. Findings show that formal and informal volunteering are correlated with each other: However, formal volunteering is correlated with higher self-perceived individual health only in case of the Netherlands, whereas informal volunteering is related to lower self-perceived individual health in Austria, Finland, France, the Netherlands, Spain, and Italy.

F. Tang (2009) tested the association between volunteering and physical health using three-wave panel data from the Americans' Changing Lives survey. The results showed that among Americans aged 60 years or more, volunteering was associated with improved self-rated health and decreased functional dependency, but not with the number of chronic conditions. Another longitudinal study is that of Burr et al. (2011). The authors observed the relationship between volunteer activity and hypertension employing data from the Health and Retirement Study. Their results denoted that volunteers exhibit lower hypertension risk and lower systolic and diastolic blood pressure than non-volunteers. Using the Wisconsin Longitudinal Study data, Konrath et al. (2012) investigated the effects of motives for volunteering on respondents' mortality risk 4 years later. Their findings pointed out that respondents who volunteered were at a lower risk of mortality when contacted 4 years later (mainly those who volunteered more regularly and frequently). However, the mortality risk level was similar to that of non-volunteers for interviewees who claimed to volunteer for self-oriented reasons.

With specific regard to European context, an extensive report devoted to the analyses of welfare impacts of participation (De Wit et al., 2015) presents findings from six different panel studies. Four of the considered surveys are directed to the general population (the German Socio-Economic Panel, the British Household Panel Survey, the Swiss Household Panel, and Giving in the Netherlands Panel Survey), whereas two of them concern people aged 50 years or older (Survey on Health, Aging, and Retirement in Europe) and 55 years or older (Longitudinal Aging Study Amsterdam). For most countries, the study finds that volunteering improves health of those actively involved, although the extent of this increase is rather small.

Regarding cross-sectional studies, Haski-Leventhal (2009) examined the relationship between volunteering and physical and psychological well-being. The investigation pointed out how the relationship varies across countries, and that it was seemingly stronger in Northern Europe and in countries where volunteering is encouraged in some way.

Kumar et al. (2012) detected the relationship among social support, volunteering, and health in a cross-national study of 139 low-, middle-, and high-income countries conducted with data from the Gallup World Poll. They found statistically significant

evidence of cross-national variation in the association between social capital variables and self-rated health. Furthermore, the association between volunteering and health seems to be consistent across different cultural, economic, and geographic settings.

Detollenaere et al. (2017) focused on the association among volunteering, income, and health in 29 European countries. Volunteering was found to be positively associated with self-rated health, and household income partially mediated this association.

Data of Interest

Individual responses from the Sixth EWCS, carried out every 5 years by the European Foundation for the Improving of Living and Working Condition (Eurofound) since 1991, were used herein. The EWCS is one of the main tools for monitoring the state and the improvement of working conditions, providing a wide-ranging picture of EU at work across countries, occupations, sectors, and age groups. As stated in the Europe 2020 strategy "for smart sustainable and inclusive growth," a few of the European Commission's goals are focused on improving work quality and working conditions (European Commission, 2010). As a result, the pursuit of decent working conditions and job quality continues to be a significant objective of EU policies. To this end, the EWCS has become one the prominent sources of cross-national data and has been used as a benchmark model to compare working conditions in countries outside Europe as well (Merino-Salazar et al., 2017). Alas, neither at EU28 level nor for different aggregations of European countries, similar or comparably large sample size surveys exist with a focus on voluntary activities. In 2015, Eurofound conducted its sixth Survey by interviewing nearly 44,000 workers in 35 countries: the 28 EU Member[1] States, candidate countries for EU membership (Albania, the Former Yugoslav Republic of Macedonia, Montenegro, Serbia, and Turkey), and Norway and Switzerland. The required sample size was 1,000 at the country level, except in Poland (1,200), Spain (1,300), Italy (1,400), France (1,500), the United Kingdom (1,600), Germany, and Turkey (2,000). A few countries decided to top-up their sample, namely, Belgium, Slovenia, and Spain, which led to sample sizes of 2,500, 1,600, and 3,300, respectively. Finally, the survey considered 43,850 employees and self-employed workers interviewed between February and September 2015.

The data, which were released in 2017 (Eurofound, 2017a), can be accessed at http://discover.ukdataservice.ac.uk. A detailed description of the survey design and a detailed report can be found in Eurofound (2017b). The questionnaire covered a number of topics, including worker characteristics, employment conditions, working time, exposure to physical risks, work organization, work-life balance, health, and well-being.

As pointed out by Eurofound (2015a, 2015b), one of the main features underlined by the survey is the aging of working population in Europe. Consequently, the issue of sustainability over the life course and related policies have become key topics in the current debate on working conditions. The structure of the European workforce shows that 259 million people were employed in 2015, of which 221 million belonged to the EU28 Member States (Eurofound, 2017b). At the EU28 level, the employment rate

stood at 66% among those aged 15 to 64 years, and the female employment rate was approximately 11% lower than the male one. In the EU28 Member States, approximately 31% of the workers were older than 50 years, whereas 40% were of the ages 35 to 49 years. Notably, the number of older workers exceeds the number of workers in the youngest cohort.

These findings have been influenced by the economic and financial crisis started in 2008. The different reactions of each state to the long-term structural challenges are reflected in the figures (Eurofound, 2017b). The dimensions encompassed by the sixth EWCS questionnaire include information on SAH. The response variable under investigation (SAH) stems from Question Q75—"How is your health in general? Would you say it is: 1 Very good; 2 Good; 3 Fair; 4 Bad; 5 Very bad, measured on a 5-point scale?" In the following analysis, this wording scale has been reversed to improve readability of the results.

To control for extreme heterogeneity within the data, this study focuses on the EU as a unique economic and political union[2] of 28 European countries, enlarged to Norway and Switzerland which are strictly linked to the EU28 economic and social system through a number of bilateral agreements[3] and treaties. This country selection procedure is needed in order to take into consideration a more homogeneous data set, in terms of rights and labor regulations (Eurofound, 2003).

Explanatory Variables for the Analysis: Workers Characteristics and Conditions

A large number of factors, as summarized in the World Health Organization (2015) framework, can be associated with the perceived health status of individuals. Considering the information available in our sample, we selected four types of variables as possible explanatory factors for SAH: individual and household characteristics, job features and economic conditions, involvement in volunteering, and participation in informal helping and leisure activities (included because they can exert favorable effects on health; see among others: Fiorillo & Nappo, 2017). In our analysis, common individual covariates are gender, age, household composition, and education level. Specifically, the variable *gender* (Question Q2a) is expressed using the usual dummy variable, where female = 1; *age* is expressed in years (Question Q2b), and household *components* are given by the number of household members (Question Q1). Education level (Question Q106) is described with two dummies: holding a secondary school degree (*high-school*) and a university degree (*tertiary*). With respect to net monthly earnings, given the high number of missing values, we investigated the effect of an individual's economic status by means of Question Q100: "Thinking of your household's total monthly income, is your household able to make ends meet . . ." (*make-ends-meet*) rated on a six point wording scale from "*very easily*" to "*with great difficulty*."

With reference to job characteristics, described by the responses to Questions Q2d and Q11, respectively, we introduced two dummies to distinguish between full-time and part-time jobs (*fulltime*, where full-time = 1) and permanent and non-permanent

jobs (*permjob*, where permanent job = 1). Moreover, information about the number of hours spent at work per week (*whours*) was obtained using Q24.

For the items related to volunteering, informal helping, and leisure activities, question of interest is Q95: "In general, how often are you involved in any of the following activities outside work?" Namely, we checked for the relationships between the variable of interest (SAH) and voluntary or charitable activity (Q95a, *charity*);caring for or educating children or grandchildren (Q95c, *carechildren*); domestic working and cooking (Q95d, *houseworking*); caring for elderly or disabled relatives (Q95e, *caregiving*); and sports, cultural, or leisure activity outside home (Q95g, *leisure*). Respondents' levels of participation were collected through a 5-points Likert-type scale (daily, several times a week, several times a month, less often, and never). To improve the readability of the results, we conveniently reversed the scales of interest to be interpreted from the lowest to the highest level of participation.

For the above selected questions, the original data sets contain several missing values and "*Don't Know*" responses which have been excluded from our analyses. Considering the EU28 Member States (in the following: "target sample"), this study refers to 30,404 individuals. For comparative purposes, it could be of interest to also consider evidence for two other countries, such as Norway and Switzerland, which although not being part of the EU are strongly connected to EU28 for geographical and historical reasons, and because they are quite homogeneous with respect to neighboring countries, as above mentioned. Thus, the enlarged data set refers to 32,207 individuals (Table 1).

Target Sample

Table 2 presents the SAH distribution in the target sample and in the enlarged data set. The proportion of the surveyed individuals claiming bad or very bad condition is lower than 3%. Approximately, 77% individuals self-assessed their SAH as positive or very positive.

Given the nature of the information, to model the responses to SAH, we chose to implement an Ordered Probit model, in which an underlying score is estimated as a linear function of the explanatory variables and a set of cutpoints. This model allows for immediate interpretation of the results in comparison individual and socioeconomic characteristics are described using suitable dummy variables: tertiary education, high school, permanent job, full-time job, and gender. Responses to items of Q95 are articulated through a Likert-type scale and such a categorical (ordinal) variable could indeed enrich the analysis performed in this study. Nonetheless, in our target sample (as well as in the enlarged one), the distribution of responses for some of the categories presents a few numbers of observations. As a matter of fact, the distribution of item Q95a is strongly concentrated in the first two categories of the reversed scale: "*never*" (67.5%) and "*less often*" (21.16%), as reported in Table 3. This very skewed distribution leads us to consider that the use of the original variable may not be fruitful; moreover, the data relating to Question Q96a, concerning the numbers of hours

Table 1. Respondents per Country in the Target Sample (EU28), Plus Norway (NO) and Switzerland (CH).

Country	Frequency	Percent EU28	Percent EU + CH + NO
Austria	972	3.20	3.02
Belgium	2,136	7.03	6.63
Bulgaria	935	3.08	2.9
Croatia	871	2.86	2.7
Cyprus	951	3.13	2.95
Czech Republic	885	2.91	2.75
Denmark	894	2.94	2.78
Estonia	877	2.88	2.72
Finland	953	3.13	2.96
France	1,356	4.46	4.21
Germany	1,986	6.53	6.17
Greece	773	2.54	2.4
Hungary	785	2.58	2.44
Ireland	885	2.91	2.75
Italy	1,047	3.44	3.25
Latvia	786	2.59	2.44
Lithuania	892	2.93	2.77
Luxembourg	861	2.83	2.67
Malta	854	2.81	2.65
Netherlands	859	2.83	2.67
Poland	803	2.64	2.49
Portugal	822	2.70	2.55
Romania	830	2.73	2.58
Slovakia	848	2.79	2.63
Slovenia	1,464	4.82	4.55
Spain	2,755	9.06	8.55
Sweden	915	3.01	2.84
United Kingdom	1,409	4.63	4.37
Total EU28	30,404	100.00	
Norway	898		2.79
Switzerland	905		2.81
Total	32,207		100.00

Source. Authors' elaborations on EWCS 2015 data.
Note. EU = European Union; EWCS = European Working Conditions Survey.

spent per day by respondents in voluntary activities, are not exploitable as they are extremely sparse.

Consequently, to enhance the explanatory meaning of the item, we introduce a dummy variable expressing participation in charity activities (*volunteering*), where volunteering = 0, when Q95a = never; volunteering = 1, otherwise. This solution

Table 2. SAH Distribution in Target Sample (EU28), Plus Norway (NO) and Switzerland (CH).

SAH	Frequency EU28	Percent EU28	Frequency EU28 + NO and CH	Percent EU28 + NO and CH
Very bad	98	0.32	100	0.31
Bad	777	2.56	808	2.51
Fair	6,123	20.14	6,392	19.85
Good	15,733	51.75	16,619	51.60
Very good	7,673	25.24	8,288	25.73
Total	30,404	100.00	32,207	100.00

Source. Authors' elaborations on EWCS 2015 data.
Note. SAH = self-assessed health; EU = European Union; EWCS = European Working Conditions Survey.

Table 3. Q95a Item Distribution in the Target Sample (EU28), Plus Norway (NO) and Switzerland (CH).

Q95a (reversed)	Frequency EU28	Percent EU28	Frequency EU28 + NO and CH	Percent EU28 + NO and CH
Never (1)	20,514	67.47	21,472	66.67
Less often (2)	6,432	21.16	6,937	21.54
Several times a month (3)	2,332	7.67	2,561	7.95
Several times a week (4)	967	3.18	1,062	3.30
Daily (5)	159	0.52	175	0.54
Total	30,404	100.00	32,207	100.00

Source. Authors' elaborations on EWCS 2015 data.
Note. EU = European Union; EWCS = European Working Conditions Survey.

suits more appropriately the purpose of this study and does not produce a serious loss of information. In order to highlight this feature of results, we present empirical results specifying the implemented models using both the original Q95a (*charity*) and the dummy variable (*volunteering*).

The main descriptive statistics of the considered dummy variables are provided with proportions and standard deviations in Table 4, whereas Table 5 summarizes the main descriptive statistics of the remaining variables.

As our main focus is to analyze results referred to EU28 Member States, which share some common regulations and more homogeneous working conditions, main descriptive statistics are discussed here, whereas those referred to the enlarged sample, including Norway and Switzerland, are reported in the tables.

In our target sample, the variable gender is distributed equally; about 30% of the individuals declared they possess a tertiary degree, and 76% of respondents held a permanent job. Only 36% of the individuals stated that they participate in voluntary activities. The average age of the sample is slightly more than 44 years, ranging from

Table 4. Descriptive Statistics for the Dummy Variables in the Target Sample (EU28).

Variable	Proportions	*SD*
tertiary	0.27	0.45
high-school	0.61	0.49
permjob	0.68	0.47
fulltime	0.76	0.43
volunteering	0.33	0.47
gender	0.51	0.50

Source. Authors' elaborations on EWCS 2015 data.
Note. EU = European Union; EWCS = European Working Conditions Survey.

Table 5. Descriptive Statistics for Selected Variables in the Target Sample (EU28).

Variable	*M*	*SD*	Minimum	Maximum
age	44.21	12.16	15	87
components	2.82	1.31	1	10
whours	37.23	12.35	1	120
make-ends-meet	3.83	1.25	1	6
leisure	2.60	1.24	1	5
carechildren	2.95	1.75	1	5
houseworking	3.97	1.33	1	5
caregiving	1.61	1.12	1	5

Source. Authors' elaborations on EWCS 2015 data.
Note. EU = European Union; EWCS = European Working Conditions Survey.

15 to 87. The average number of household members (*components*) is almost 3, and individuals declare that they work for approximately 37 hr per week. A few outliers, not excluded from the information set, reported working for 120 hr per week. The income proxy indicates that on average, respondents claimed to make ends meet *with some difficulties* or *fairly easily*. The most widespread informal helping activity is "domestic working," followed by "caring for children or grandchildren."

Model and Empirical Evidence

Given the nature of the information, to model the responses to SAH, we chose to implement an Ordered Probit model, in which an underlying score is estimated as a linear function of the explanatory variables and a set of cutpoints. This model allows for immediate interpretation of the results in comparison with different and more complex statistical procedures designed for the analysis of the relationships between latent variables and which may imply high data requirements. We focused on a General Linear Model (GLM) and as we restricted the descriptive analysis to the sample used in the model estimation instead of the population, sample weights were not used. The

scales employed are technically ordinal, but because they involve a series of ordered categories, consistent support has been found for using them as approximately continuous (Johnson & Creech, 1983; Norman, 2010) and as proxies of non-observable latent variables (Agresti, 2010).

In the Ordered Probit model, the probability of observing the outcome j corresponds to the probability that the estimated linear function, plus random error, is within the range of the cutpoints estimated for the outcome. The model assumes the following expression:

$$\Pr\left(Y_i = j\right) = \Pr\left(k_{j-1} < \beta_1 x_{1i} + \beta_2 x_{2i} + \cdots + \beta_k x_{ki} + u_i \leq k_j\right) \tag{1}$$

where $u_i \sim N(0, \sigma^2)$, coefficients $(\beta_1 \ldots \beta_k)$, and cutpoints $(k_1 \ldots k_{J-1})$ are the parameters to be estimated; j is the number of possible outcomes; and $i = 1 \ldots n$. k_0 is taken as $-\infty$, and k_j is taken as $+\infty$.

It is well known that if a binary or an ordinal regression model incorrectly assumes a homoskedastic error, the standard errors are wrong, and the parameter estimates are biased (Yatchew & Griliches, 1985). Consequently, the inferential conclusions drawn based on the usual z-test can be misleading. To take into account the possible heteroskedasticity in the data, Williams (2009) and Keele and Park (2006) proposed heteroskedastic ordered models, in which the determinants of heteroskedasticity are specified explicitly to correct for it.

Specifically, heteroskedastic ordered models assume the following variance equation:

$$\sigma_i^2 = \exp\left(\sum_j z_{ij}\gamma_j\right) \tag{2}$$

where Z is the vector of j values of the ith observation that define groups with different error variances in the underlying latent variable. The vector Z might include dummy or continuous variables related to the error variances. For details, see Williams (2009).

Considering the great variety of characteristics and habits registered in different EU countries, it seems reasonable to suppose that the data in our target sample can hardly support the hypothesis of error homoskedasticity. The usual tests of heteroskedasticity—for example, Breusch Pagan or Cook-Weisberg—cannot be run in the current framework because they are based on the model residuals, and it is well known that for GLM there is no unique definition of the residuals. To solve this problem, we implemented Ordinal Generalized Linear Models (OGLM). Because the standard homoskedastic GLMs are nested in the OGLM, the statistical significance of the coefficients in the OGLM variance regression proves the latter model has better specifications.

Various factors can be correlated with the heteroskedastic structure of the data, for example, age of respondents, being in a permanent versus nonpermanent job position, and number of hours spent per week at work. Furthermore, half the sample is

composed of women who, especially in the countries of southern Europe, are more often than men involved in caregiving activities (Crespo & Mira, 2014). Thus, we included this variable among the possible sources of heteroskedasticity.

To account for the possible effects of diverse cultural and country-related attitudes toward volunteering and informal helping activities, we inserted two dummy variables pertaining to geographical features: *Deu12* and *DNorth*. Variable *Deu12* refers to the original EU Member States,[4] since, as founders the EU, they are supposed to share political and socio-economic common features for longer.

The second dummy variable, *DNorth*, is built encompassing Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Slovakia, Sweden, and the United Kingdom. For comparative purposes, we present a model for the enlarged data set which includes Norway and Switzerland. Notice that for this enlarged data set, the *DNorth* variable also considers Norway and Switzerland.

The final models are selected by following the usual stepwise selection strategy (general to specific, considering p-values of the estimated coefficients), taking into account the meaning of the involved variables, their statistical significance, and model fitting.

Estimates of heteroskedastic ordered probit models, given by Equations (1) and (2), were obtained by maximizing the likelihood function with the OGLM package in STATA14 (Williams, 2011). The four model specifications are as follows:

(1) Model 1: EU28, using the original Q95a variable (*charity*) rescaled.
(2) Model 2: EU28, using the volunteering dummy (*volunteering*).
(3) Model 3: EU28 enlarged to Norway and Switzerland using the original Q95a variable (*charity*) rescaled.
(4) Model 4: EU28 enlarged to Norway and Switzerland using the volunteering dummy (*volunteering*).

The estimates are reported in Table 6 (Models 1 and 2) and in Table 7 (Models 3 and 4), along with the correspondent *p* values (the coefficients statistically significant at 1% are reported in bold; those at 5% are in italic).

In all the implemented models the variables *private* and *carechildren* turn out to be not statistically significant. Then, according to the general-to-specific procedure, these latter ones have been excluded from the set of explanatory variables in a restricted estimation for all the models (let these models Mod. 1b, Mod. 2b, Mod. 3b, Mod. 4b), whereas *carechildren* remains significant for the variance equation. From Tables 6 and 7, it can be noticed that the original variable *charity* is not statistically significant (Mod. 1 and Mod. 3), whereas its corresponding dummy variable (*volunteering*) results are statistically significant at 1% (Mod. 2 and Mod. 4), therefore supporting our modeling strategy. All the other explanatory variables, except gender, are statistically significant.

Using the data set enlarged to Norway and Switzerland (Mod. 3 and Mod. 4), just some minor variations in coefficients' significance can be appreciated with respect to those estimated for the EU28 data set (Mod. 1 and Mod. 2). More specifically, the

Table 6. Heteroskedastic Ordered Probit, Item Coefficient Estimates, Variance Equation Coefficient, and Cut Points Estimates for EU28 Countries.

	Mod. 1		Mod. 1b		Mod. 2		Mod. 2b	
SAH	Coef.	*p* value	Coef.	*p* value	Coef.	*p* value	Coef.	*p* value
gender	0.008	.523	0.008	.476	0.008	.511	0.008	.475
age	−0.022	**0**	−0.022	**0**	−0.022	**0**	−0.022	**0**
components	0.022	**0**	0.021	**0**	0.021	**0**	0.021	**0**
tertiary	0.033	**.012**	0.033	**.011**	0.033	**.014**	0.033	**.013**
highschool	0.062	**0**	0.062	**0**	0.062	**0**	0.062	**0**
endsmeet	0.138	**0**	0.138	**0**	0.137	**0**	0.137	**0**
permjob	−0.049	**0**	−0.047	**0**	−0.047	**0**	−0.047	**0**
fulltime	0.068	**0**	0.068	**0**	0.068	**0**	0.068	**0**
private	−0.008	.450			−0.007	.546		
whours	−0.002	**.003**	−0.001	**.002**	−0.001	**.003**	−0.002	**.003**
charity	0.006	.355	0.006	.321				
volunteering					0.031	**.006**	0.032	**.005**
leisure	0.088	**0**	0.088	**0**	0.087	**0**	0.087	**0**
houseworking	−0.018	**0**	−0.018	**0**	−0.018	**0**	−0.018	**0**
caregiving	−0.035	**0**			−0.036	**0**	−0.036	**0**
carechildren	3e–4	.951	−0.034	**0**	1e–5	.997		
EU12	0.068	**0**	0.068	**0**	0.071	**0**	0.071	**0**
DNorth	−0.068	**0**	−0.068	**0**	−0.069	**0**	−0.069	**0**
lnsigma								
age	−0.004	**0**	−0.004	**0**	−0.004	**0**	−0.004	**0**
permjob	−0.056	**0**	−0.055	**0**	−0.055	**0**	−0.055	**0**
whours	−0.001	**.001**	−0.001	**.001**	−0.001	**.001**	−0.001	**.001**
caregiving	0.009	*.050*	0.009	*.051*	0.009	**.046**	0.009	**.046**
carechildren	−0.009	**.006**	−0.009	**.006**	−0.009	**.006**	−0.009	**.005**
houseworking	0.007	*.098*	0.007	*.098*	0.007	*.094*	0.007	*.095*
cut1	−2.584	**0**	−2.575	**0**	−2.590	**0**	−2.621	**0**
cut2	−1.893	**0**	−1.884	**0**	−1.899	**0**	−1.892	**0**
cut3	−0.908	**0**	−0.898	**0**	−0.913	**0**	−0.906	**0**
cut4	0.305	**0**	0.315	**0**	0.300	**0**	0.307	**0**
Obs.	30,404		30,404		30,404		30,404	
Pseudo R^2	.076		.076		.0761		.0761	

Source. Authors' elaborations on EWCS 2015 data.
Note. Bold: significant at 1%; italic: significant at 5%. EU = European Union; SAH = self-assessed health; EWCS = European Working Conditions Survey.

houseworking variable becomes not significant in variance equation. The restricted models Mod. 1b and Mod. 2b show that the significance of coefficients remains unchanged with respect to the corresponding unrestricted models. The same results occur for Mod. 3b and Mod. 4b.

Table 7. Heteroskedastic Ordered Probit, Item Coefficient Estimates, Variance Equation Coefficient, and Cut Points Estimates for EU28 Countries Plus Norway and Switzerland.

	Mod. 3		Mod. 3b		Mod. 4		Mod. 4b	
SAH	Coef.	*p* value	Coef.	*p* value	Coef.	*p* value	Coef.	*p* value
gender	0.007	.632	0.008	.468	0.007	.526	0.008	.467
age	−0.021	**0**	−0.021	**0**	−0.021	**0**	−0.021	**0**
components	0.020	**0**	0.020	**0**	0.020	**0**	0.020	**0**
tertiary	0.041	**0**	0.041	**.001**	0.040	**.001**	0.041	**.001**
highschool	0.064	**0**	0.063	**0**	0.064	**0**	0.064	**0**
endsmeet	0.134	**0**	0.135	**0**	0.134	**0**	0.134	**0**
permjob	−0.044	**0**	−0.043	**0**	−0.043	**0**	−0.042	**0**
fulltime	0.064	**0**	0.054	**0**	0.052	**0**	0.054	**0**
private	−0.013	.207			−0.012	.278		
whours	−0.001	*.032*	−0.001	*.014*	−0.001	*.019*	−0.001	*.015*
charity	0.006	.303	0.007	.276				
volunteering					0.031	**.004**	0.032	**.003**
leisure	0.089	**0**	0.090	**0**	0.088	**0**	0.088	**0**
houseworking	−0.020	**0**	−0.020	**0**	−0.020	**0**	−0.020	**0**
caregiving	−0.037	**0**	−0.037	**0**	−0.038	**0**	−0.038	**0**
carechildren	3e−4	.913			−0.001	.834		
eu12	0.056	**0**	0.055	**0**	0.059	**0**	0.058	**0**
DNorth 28enl	−0.061	**0**	−0.061	**0**	−0.061	**0**	−0.061	**0**
lnsigma								
age	−0.004	**0**	−0.004	**0**	−0.004	**0**	−0.004	**0**
permjob	−0.055	**0**	−0.056	**0**	−0.055	**0**	−0.055	**0**
whours	−0.002	**0**	−0.002	**0**	−0.002	**0**	−0.002	**0**
caregiving	0.007	.135	0.007	.137	0.007	.124	0.007	.125
carechildren	−0.008	**.006**	−0.008	**.007**	−0.008	**.007**	−0.008	**.006**
houseworking	0.006	.154	0.006	.156	0.006	.148	0.006	.151
/cut1	−2.534	**0**	−2.522	**0**	−2.541	**0**	−2.568	**0**
/cut2	−1.847	**0**	−1.834	**0**	−1.854	**0**	−1.843	**0**
/cut3	−0.877	**0**	−0.863	**0**	−0.883	**0**	−0.871	**0**
/cut4	0.315	**0**	0.330	**0**	0.310	**0**	0.322	**0**
Obs.	32,207		32,207		32,207		32,207	
Pseudo R^2	.0733		.0733		.0734		.0734	

Source. Authors' elaborations on EWCS 2015 data.
Note. Bold: significant at 1%; italic significant at 5%. EU = European Union; SAH = self-assessed health; EWCS = European Working Conditions Survey.

As a matter of fact, it is well known that the interpretation of the coefficients in the Ordered Probit model is more complex than in the ordinary regression setting: neither the sign nor the magnitude of the coefficient provides information about the partial effects of a given explanatory variable; therefore, the interpretation of the coefficients

Table 8. SAH Predicted Probabilities From Mod. 2b by Volunteering Participation for a Male With Tertiary Education and Permanent Full-Time Job.

SAH	Pred. prod	*SE*	z-stat	*p* value	95% CI	
Volunteering = 0						
Very bad	0.002	0.0002	6.95	.000	0.001	0.002
Bad	0.018	0.0012	14.74	.000	0.016	0.019
Fair	0.200	0.0060	33.36	.000	0.187	0.210
Good	0.571	0.0035	165.28	.000	0.564	0.578
Very good	0.210	0.0069	30.52	.000	0.197	0.224
Volunteering = 1						
Very bad	0.001	0.0002	6.76	.000	0.001	0.002
Bad	0.017	0.0011	14.00	.000	0.014	0.019
Fair	0.190	0.0060	30.89	.000	0.178	0.203
Good	0.571	0.0035	164.85	.000	0.564	0.578
Very good	0.220	0.0075	29.45	.000	0.206	0.235

Source. Authors' elaborations on EWCS 2015 data.
Note. SAH = self-assessed health; CI = confidence interval; EWCS = European Working Conditions Survey.

is fundamentally ambiguous (see, among others, Daykin & Moffatt, 2002). Consequently, the effect of a change in one of the variables in the model depends on all model parameters, data, and probability of interest. The discussion of the effects of the selected explanatory variables can be supported by an analysis of the predicted probabilities with the estimated Mod. 2b.

Table 8 reports the predicted probabilities for each possible SAH value by volunteering participation, for a given respondent profile: male, with tertiary education and permanent full-time job (with the remaining dummy variables being set to zero and other variables at their mean).

It can be observed that the predicted probabilities obtained from Mod. 2b are very similar across the volunteering categories, and the 95% confidence intervals (CI) for each of the SAH values almost overlap. In general, the Pr(SAH = Good) is approximately 53%, and Pr(SAH = Very Good) is 23%.

These findings are displayed in Figure 1, where the predicted probabilities of SAH = Very Bad and SAH = Very Good, obtained from Mod. 2b, are depicted with respect to age and tertiary education level, for a given respondent profile: male, holding high school degree and a full-time permanent job (remaining variables at the mean). The probabilities show the expected response behavior, implying that elderly respondents are more likely to report a bad SAH. Moreover, voluntary activities do not seem to considerably affect the differences in the predicted probabilities for any age.

In Figure 2, the predicted probabilities of SAH = "Very Bad" and SAH = "Very Good," obtained from Mod. 2b, are illustrated with respect to the values of the income proxy, *make-ends- meet*, for a given respondent profile: a man holding high school education and a full-time permanent job (remaining variables are at the mean). Again,

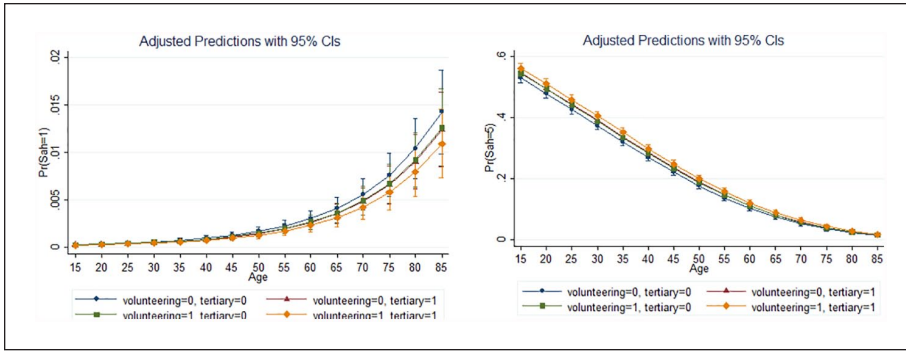

Figure 1. Predicted probabilities from Mod. 2b for age and volunteering and tertiary education level.
Source. Authors' elaborations on EWCS 2015 data.
Note. CI = confidence interval; EWCS = European Working Conditions Survey.

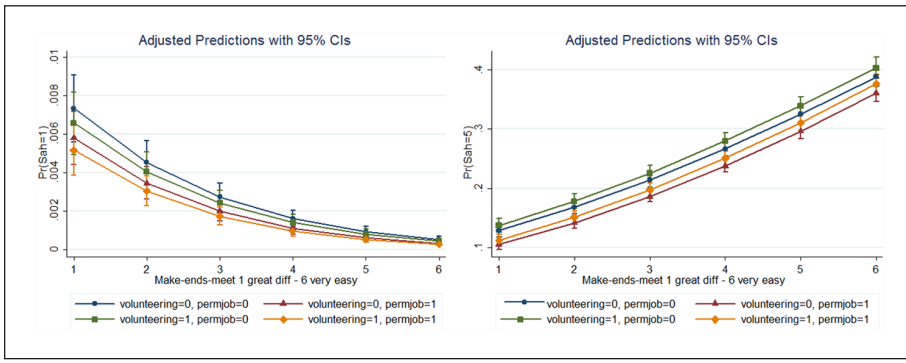

Figure 2. Predicted probabilities from Mod. 2b for make-ends-meet, volunteering, and permanent job.
Source. Authors' elaborations on EWCS 2015 data.
Note. CI = confidence interval; EWCS = European Working Conditions Survey.

the probabilities confirm the expected response patterns, that is: lower-income respondents are more likely to report a bad SAH, and voluntary activities do not considerably influence the differences in the predicted probabilities for any value of make ends meet. Notice that the estimated probabilities range from 0.01 to 0.06 with overlapping CI for a bad SAH, whereas the estimated probabilities range is from 0.10 to 0.40 for a good SAH with no overlapping SAH values. Similarly, the dummy variable effect in the model can be obtained by using the difference of predicted probabilities.

In Tables 9 and 10, the predicted probabilities of SAH = "Very Bad" and SAH = "Very Good," obtained from Mod. 2b, with respect to volunteering choice and type of job for a man with high school education and a full-time job are reported; the

Table 9. Volunteering Activity and SAH: Predicted Probabilities From Mod. 2b for SAH = Very Bad and Job Condition for a Male With Tertiary Education and Full-Time Job.

Permjob	Pred. prob	*SE*	*Z*	*p* value	95% CI	
Volunteering = 0						
0	0.002	0.0003	6.85	.000	0.001	**0.003**
1	0.002	0.0002	6.95	.000	0.001	**0.002**
Volunteering = 1						
0	0.002	0.0003	6.67	.000	0.001	**0.002**
1	**0.001**	**0.0002**	**6.76**	**.000**	**0.001**	**0.002**

Source. Authors' elaborations on EWCS 2015 data.
Note. SAH = self-assessed health; CI = confidence interval; EWCS = European Working Conditions Survey.

Table 10. Volunteering Activity and SAH: Predicted Probabilities From Mod. 2b for SAH = Very Good and Job Condition for a Male With Tertiary Education and Full-Time Job.

Permjob	Pred. prob.	*SE*	*Z*	*p* value	95% CI	
Volunteering = 0						
0	0.248	0.0081	30.55	.000	0.232	**0.264**
1	0.210	0.0069	30.52	.000	0.197	**0.224**
Volunteering = 1						
0	0.258	0.0085	30.21	.000	0.241	**0.274**
1	**0.220**	**0.0075**	**29.45**	**.000**	**0.206**	**0.235**

Source. Authors' elaborations on EWCS 2015 data.
Note. SAH = self-assessed health; CI = confidence interval; EWCS = European Working Conditions Survey.

remaining dummy variables are at 0, and the other variables are at their respective mean. As can be assumed from the tables, there is no clear difference in the estimated probabilities.

These conclusions may be explained based on the fact that, on average, the respondents claimed to make ends meet with some difficulties or fairly easily, and approximately 70% of the individuals in the sample declared holding a full-time permanent job, with only 30% being involved in voluntary activities. Approximately 77% of the individuals in the sample expressed a positive or very positive evaluation of SAH. Then, age is the only variable that seems to influence the SAH response behavior.

Final Remarks

Since some years now, several American and European governments have been wondering whether people engaged in volunteering do experience and declare better health and well-being conditions with respect to non-volunteers, and whether volunteering practice can reduce health inequalities among individuals. Could volunteering be advocated as a "public health intervention" (Jenkinson et al., 2013)?

The results of the Ordered Probit model implemented herein show that the predicted probabilities of declaring a given level of SAH is not strongly related to the practice of volunteering. Involvement in charity does not seem to be a distinctively healthy habit that can compensate for some of the effects on health of several unfavorable circumstances related to bad working conditions, which could generally be detrimental to health. Subjects' characteristics such as economic well-being and age exert prominent effects on the predicted probabilities, as expected.

Similarly, in line with previous research (see, among others, Nappo & Fiorillo, 2020; Post, 2005), informal helping (domestic work and caring for relatives) do not seem to be associated with individual health. This is likely because these informal activities may represent an additional workload (Roth et al., 2015; Schulz & Sherwood, 2008). This result may be ascribed to the fact that, on average, respondents do not report bad economic conditions, and about two thirds of the sample held a permanent full-time job. Moreover, in the EWCS, the volunteering issue was investigated using one simple item in the questionnaire, without considering any specific feature or individual motivation.

Our results, although discrepant with some previous research, which finds a positive relationship between volunteering and health, are in line with few other evidence (Borgonovi, 2008; Nappo & Fiorillo, 2020; Windsor et al., 2008) for which volunteering is not good for health. This is likely to happen since, as stated by Post (2005), altruistic and charitable activities may make people feeling overtaxed by disproportionate demands related with unpaid work, so that their possible health benefits are likely to be lost. Therefore, it is important to identify the type of volunteering under consideration to assess the amount of this activity that may yield health benefits. It is possible that volunteering can become stressful and has negative health effects under specific circumstances that could be related to the sector within which it is performed. For instance, volunteering in the health care sector could be difficult to bear emotionally and could therefore hurt volunteers' health.

In addition, although most of the literature reports a positive association between volunteering and health, it is not clear to what extent a person should volunteer to benefit from this activity. Choi and Kim (2011), using data from the first and second waves of Midlife Development in the United States, showed that 1 to 10 hr volunteering per month were needed to produce benefits for well-being, with no benefits beyond such level. According to Morrow-Howell et al. (2003) and to Van Willigen (2000), positive effects of volunteering on health are likely to start when the hours of volunteering are more than 100 per year. Furthermore, Lum and Lightfoot (2005) stated a threshold of approximately 4 days per week; however, they considered people who volunteered a minimum of 100 hours per year to begin with, reducing hours per year to days per week. Therefore, although people are likely to benefit from performing volunteering, it is not clear what are the lowest and also the highest level, frequency, and duration needed for health benefits. Probably, our results depend also on the lack of threshold at which volunteering should be performed to be good for health.

In our study, we could have maybe said more in this sense if the distribution of the Q95a had been less skewed and if it had been possible for us to consider the hours

actually spent by the respondents in voluntary activities. Unfortunately, the data relating to this aspect are too sparse to be used.

Owing mainly to the lack of a devoted data set, individual job conditions have received scant attention in the extensive literature on the effects of charity activities on SAH. In this article, we have attempted to fill this gap by taking advantage of the Sixth EWCS, this being the main contribution of this article. Analyzing workers responses seems to be remarkable, since the characteristics of this specific population are likely different from those of non-employed ones, therefore volunteering could influence workers and non-workers differently. In addition, employed (as well as self-employed) respondents could be more stressed (due to workload and adverse working conditions) than non-employed ones, and performing voluntary activities could balance work-related stress with a positive impact on health.

Another strength of this article is the sample size of the considered survey, as concerns the large number of countries therefore allowing to generalize the results. As reported in "Theoretical Framework" section, most of the previous studies consider empirical evidence for one or few countries. However, the EWCS does not provide adequate information on the type and duration of the charity activities performed; the lack of information can help to explain why results diverge from some previous findings that employ survey data with proper information on altruistic activities.

In light of the marginal effects, a slight significance does not allow us to affirm that there are important response behavior differences resulting from the covariates used. However, the circumstance of having found a feeble effect should not be interpreted either as an evidence of the lack of such an effect, or should it lead us to a misleading conclusion that this difference does exist.

The fact that the information is insufficient to derive clear policy implications is of course a missed opportunity. In fact, given its sample size and the number of collected variables, the EWCS might be an even more effective tool to gather useful insights for addressing health policies pertaining to workers, with a few more questions on volunteering to be included in it.

To further clarify the causal effects, research should be conducted to identify the types of charity activities that are comparatively more salubrious and to determine the most suitable amount of time to be devoted to volunteering in order to gain from it. Country-based analyses could also be fruitful avenues for research, as well as further investigation referred to job typology, work–life balance, and different welfare systems.

Undoubtedly, the literature has highlighted the beneficial effects of charity activities on health, and the interest displayed by various governments worldwide in designing policy interventions related to volunteering proves the relevance of such effects. However, the main recommendation for policymakers is to be cautious and to avoid generalizations: Different prosocial activities may differently affect dissimilar people, depending on a variety of personal socioeconomic characteristics and on several features of the altruistic activities as well.

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Notes

1. The EU28 countries are the following: Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.
2. Notice that, even though EWCS is a cross-sectional survey, for some of the investigated topics Eurofound provides a sort of "trend" information. In most cases, some comparisons over time are not possible for non-EU28 countries, and especially for Turkey, Albania, Montenegro, or Serbia, as comparable data are not available from the same sources (Eurofound, 2017b).
3. More specifically, with reference to relationships between EU and Switzerland, Bilateral Agreement I (effective since June 2002) refers to traffic, agriculture, free movement of people, technical trade barriers, and public procurement. Many other bilateral agreements apply between Switzerland and the EU, focused on labor regulations, asylum, immigration, and so on. Norway, on the other side, is part of the European Economic Area (EEA), implying free movement of workers and many other regulated relationships in terms of law, trade, and youth policy. As well-known, the EEA Agreement is applicable in the United Kingdom after the "Brexit" procedure, until 2021. For on-going implementations of further agreements with those and other countries, the official websites of the European Union are constantly updated.
4. EU12 countries are Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain.

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