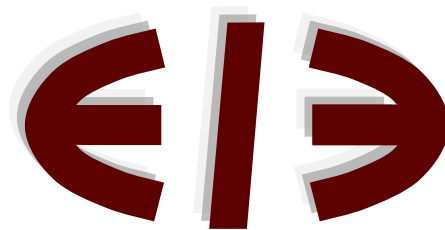


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# Voluntary work and wages

**Bruna Bruno<sup>°</sup>, Damiano Fiorillo\***

## Summary

The effects of voluntary work on earnings have recently been studied for some developed countries such as Canada, France and Austria. This paper extends this line of research to Italy, using data from the European Union Statistics on Income and Living Conditions (EU-SILC) dataset. A double methodological approach is used in order to control for unobserved heterogeneity: Heckman and IV methods are employed to account for unobserved worker heterogeneity and endogeneity bias. Empirical results show that, when the unobserved heterogeneity is taken into account, a wage premium of 2.7 percent emerges, quite small if compared to previous investigations on Canada and Austria. The investigation into the channels of influence of volunteering on wages gives support to the hypotheses that volunteering enables the access to fruitful informal networks, avoids the human capital deterioration and provides a signal for intrinsically motivated individuals.

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## **Abstract**

The paper studies the effect of voluntary work on wages for Italian employees. The Heckman and Instrumental Variables methods are used in order to control for self-selection bias of participation in labour market and endogeneity of volunteering. The results show that a wage premium of 2.7 percent emerges, when selection and endogeneity problems are taken into account.

**Keywords:** voluntary work, wages, Mincer equation, selection bias, instrumental variables, Italy

**JEL Classification** C31, C36, J31

## I. INTRODUCTION

Volunteering has attracted economists' attention mostly because it proves the existence of behaviours that do not respond only to economic incentives. Attempts to explain volunteers' choices in the classical optimization framework recognize two fundamental motives for volunteering: a consumption motive, stressing that 'helping others' is a value in itself, pursued for intrinsic or social motivations (self determination and self respect, reputation, adherence to social norms); and an investment motive, where unpaid or volunteering activities are performed to gain higher future remunerations. Economic models and empirical tests alternatively give prominence to the consumption or to the investment hypothesis (Andreoni 1990; Menchik and Weisbrod 1987). An attempt to reconcile both motivations to volunteering in a unique theoretical framework is outlined in Bruno and Fiorillo (2012), where the simultaneous effect of consumption and investment motives is empirically tested. Results show that both motives interact in shaping regular unpaid labour supply, with consumption motives having a stronger influence and a investment motives having a weaker influence.

The consumption motive is typically tested through correlation between voluntary activities and proxies of intrinsic or social motivation. In comparison, the existence of investment motives can be supported by evidence on the correlation between volunteering and higher wages: volunteers use their available time to invest in future higher wages.

The wage premium for volunteering can be analyzed by answering three different questions: the first is on the existence of a wage premium, the second concerns its size and the third investigates why volunteering determines higher wages. The answer to each question entails addressing some theoretical and empirical problems, which have been variously considered in previous studies.

When testing for the existence of a wage premium, it is important to take into account the potential endogeneity of volunteering. As stated by Day and Devlin (1998, 1184) "Such simultaneity may arise via two channels: first, the wage differential between volunteers and non-volunteers (if it exists) may itself motivate individuals to volunteer; and second, if volunteering is a normal good, then individuals with higher incomes may be more likely to volunteer". In the few empirical existing studies, only Hackl et al. (2008) control for potential endogeneity of volunteering.

The size of the wage premium is important in assessing the relevance of the investment motives in volunteering. Empirical analyses have revealed a wage premium ranging from 7 to 18.5 percent. Day and Devlin (1997) find a significant positive wage premium for male

volunteers of about 11 percent, but not for women. Using the same data set, Day and Devlin (1998) show that, on average, volunteers have about 7 percent higher incomes than non-volunteers. In contrast, Prouteau and Wolff (2006), do not find a statistically wage premium for volunteers in the public sector. Finally, Hackl et al. (2008), using Austrian data, show that on average, the wage premium for volunteers is 18.5 percent. The wide range of values suggests that a selectivity bias related to the labour force participation may be important (Day and Devlin 1997): the wage premium could disappear or be reduced as one controls for selectivity bias, but none of the previous studies consider the selectivity bias related to the labour force. Other biases can influence the wage premium size if the sample is restricted in order to solve problems with data availability. Moreover, in all studies, except Prouteau and Wolff (2006), the income data may not be in the ideal form, as data on income are available on a household basis and in ranges rather than levels. The sample is therefore restricted to households in which the respondent is the sole wage earner, assigning the midpoint of his/her net household income as value.

Answering the third question on wage premium for volunteering means explaining why, if a wage premium exists, volunteers gain a higher income in the labour market. Three channels through which volunteering may affect earnings have been suggested (Day and Devlin 1997, 707-708). First, voluntary work may provide individuals with an alternative means of acquiring skills and experience that make them more productive (the human capital hypothesis). An accurate test of the human capital hypothesis should include as regressors experience in volunteer activities and experience in the labour market. Only in Day and Devlin (1998) is data on volunteering experience available, while labour experience is mentioned in Hackl et al (2007). The second channel of influence of volunteering on income is in the fact that volunteering may provide a signal to employers of otherwise unobservable ability (the screening hypothesis). If the wage premium is associated with unobservable characteristics, it should also emerge when a wide set of individual and labour market variables is employed. An overestimation of the size of the premium can emerge when employing parsimonious sets of regressors. Through the third channel volunteering may provide access to informal networks of contacts that can be useful in job search strategies (the networking hypothesis). Previous studies show mixed evidence on the relevance of this channel.

This paper tries to answer the three questions stated above on the wage premium for volunteers using a sample of Italian employees from the 2006 European Union Statistics on Income and Living Conditions (EU-SILC) dataset. The existence of a wage premium is tested by employing the instrumental variable method to account for the causality of the correlation between voluntary work and income. To prevent overestimation of the size of the wage premium,

we take into account the selectivity bias related to labour force participation. The availability of information about earnings for each worker in the sample allows an analysis that is not restricted to single-earner households. The paper also discusses the three channels of influence of volunteering on wages, considering the role of a wide set of variables, including relational variables, and using participation in organizations and informal help as instruments.

The remainder of the paper is organized as follows. Section 2 surveys previous empirical studies while Section 3 presents the empirical strategy used in this paper to analyze the effect of voluntary work on wages. The data and the variables are presented in Section 4. Empirical results are shown in Section 5. Section 6 is dedicated to the question about the size of the wage premium, whereas Section 7 examines in depth the three channels of influence. Section 8 concludes.

## 2. LITERATURE REVIEW

In economic literature, empirical studies on the impact of voluntary work on earnings are relatively scarce. Since the seminal papers of Day and Devlin (1997, 1998), only a small number of studies have analysed the phenomenon, because of the absence of data sets suitable for testing the hypotheses. Most empirical studies demonstrate a wage premium.

Using a Survey of Volunteer Activity conducted by Statistics Canada, Day and Devlin (1997) examine whether returns to voluntary work in the paid labour market can explain part of the male-female earnings gap. They find a significant positive wage premium for male volunteers of about 11 percent, but not for women. The decomposition of earnings differential between volunteers and non-volunteers shows that the differential is mainly attributable to differences in individual characteristics, both for males and females, in particular because volunteers are better educated than non-volunteers. This evidence indirectly supports the screening hypothesis. As to the additional returns to individual characteristics, mixed evidence emerges for males and females. For males, the wage premium for volunteering is not an additional return of the previous characteristics, because it is largely unexplained. Because education is included in the individual characteristics, this evidence is not in favour of the human capital hypothesis. For females, much of the wage premium for volunteering is associated with a higher return to volunteering experience: volunteers with past experience in volunteer activities are rewarded with an additional return to their experience in comparison to non-volunteers with the same past experience in volunteer activities. This puzzling evidence does not support the human capital hypothesis, if past experience in volunteer activities represents an investment in acquiring skills

both for volunteers and non-volunteers. It could be reasonable that a ‘motivational’ premium is associated with those who constantly continue to volunteer.

Using the same data set, Day and Devlin (1998) test directly the human capital hypothesis, by considering three alternative measures of volunteering, accounting for past and current volunteering. Unfortunately, the experience in volunteering gives no further information on the human capital accumulation and their “empirical model is not capable of discriminating between... competing explanations” (p. 1190). However, they show that, on average, volunteers have about 7 percent higher incomes than non-volunteers.

Prouteau and Wolff (2006) employ a switching regression model on a French survey to control for selectivity bias in the wage equation. Their analysis includes only those who take on responsibilities in associations, but all types of associations are considered (from recreational to professional), leading to mixed evidence of a wage premium: results do not demonstrate a wage premium for volunteers in the public sector, whereas in private sector they find a negative premium. Because of these results, they reject the investment motive for volunteering, claiming that only consumption motives lead individuals to engage in voluntary activities. But the absence of a wage premium can be also the result of some limitations of their analysis. A wide range of associations is considered and therefore associations with explicitly leisure purposes, such as a golf or tennis clubs, are also included. The authors argument that by focusing only on participants with managerial tasks, they implicitly limit the analysis to genuine volunteers, because French law prohibits financial compensation for such tasks in associations, other than the reimbursement of expenses. The argument is not fully convincing for three reasons. First, compensation can be hidden under the label of reimbursement or other benefits and therefore many individuals observed may not in fact be unpaid volunteers. Second, the managerial position in the association can be the output and not the input of the networking activity, when it represents the additional benefit in terms of prestige and social consideration of a working career at the peak of the wage profile<sup>1</sup>. Though it is difficult to think of the president or of the treasurer of a golf club as a volunteer, they are probably engaged in networking activities, with investment purposes, oriented toward social prestige and not toward higher wages. This intuition is indirectly confirmed by the same authors when they find a positive effect of managerial responsibilities in associations on the number of gatherings with friends, which they explain as a relational (consumption) motive for volunteering, but which could also be a networking (investment) motive. Therefore, when

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<sup>1</sup> In the descriptive statistics, a half of associations managers are in the 40-50 age range, which is usually a peak in the wage profile.

focusing on these ‘volunteer managers’ the wage premium disappears. Third, and probably most important, when selecting a subsample of individuals a careful analysis should verify the existence of a selection bias: have the association managers self selected themselves in that status? It could be that the associations’ managers have a weaker investment motive, because of unobservable characteristics, compared to the other association members, and that only for these characteristics are they selected for the position.

Finally, Hackl et al. (2008), using Austrian data, show that on average the wage premium for volunteers is 18.5 percent. Their analysis is devoted to finding support for the investment model, and has the advantage of employing multiple dimensions to measure volunteering (the dichotomous variable, the numbers of hours individuals volunteer and the number of organizations they are engaged in). These multiple dimensions allow the testing of different hypotheses of behaviour and considering at once the three channels of influence of volunteering on earnings. Results show that number of volunteering hours plays an important role in explaining the wage premium, and this evidence is used to confirm the three hypotheses because investing more hours in volunteering has three effects: allows accumulation of human capital might intensify social contacts within the network, and signal the individual’s willingness to perform. Note that self-selection of volunteers is confirmed in the analysis, strengthening the screening hypothesis, whereas the number of organizations one is engaged in has no significant impact on wages, weakening the networking hypothesis.

Summing up, the few studies investigating the wage premium for volunteering give some support to the existence of an investment return to volunteering. When this is demonstrated, the return to volunteering ranges from 7 percent to 18.5 percent, but it is difficult to discern which channel causes the investment return: evidence tends to support the screening hypothesis and to reject the human capital hypothesis.

### 3. EMPIRICAL STRATEGY

In determining the effect of voluntary work on earnings the basic model to be estimated can be written as follows:

$$\ln W_i = X_{1i}\beta_1 + \alpha_1 V_i + \mu_{1i} \quad (1)$$

where  $W_i$  denotes the individual hourly wage,  $X_{1i}$  is a vector of exogenous individual characteristics that are thought to determine earnings,  $V_i$  is a dummy variable that takes the value



of 1 if the individual supplies voluntary work, and 0 otherwise.  $\beta_1$  and  $\alpha_1$  and are parameters to be estimated while  $\mu_{1i}$  is a random error term.

As indicated above, the model may suffer from a type of sample selection problem as it ignores the potential bias introduced by the individual's decision to participate in the labour force. Working individuals may not be a random sub-sample of the population as they may have systematically different characteristics from those without a paid job. These characteristics may exercise an influence not only on the choice to work but also on volunteering and earnings, meaning that labour force participation and volunteering decisions need to be considered when modelling an individual's success in the labour market. Moreover, voluntary work may be endogenous. If volunteers are individuals with above-average ability, they will tend to have higher wages regardless of whether they have acquired any useful skills or contacts through volunteering, and thus volunteers' wages may be higher than those of non-volunteers simply because higher-income individuals are more likely to volunteer (Day and Devlin 1998, 720).

In this paper, a double methodological approach is used to estimate the effect of voluntary work on earnings. First, a self-selection framework of labour market participation is employed in order to correct for potential sample selection bias. Second, the Instrumental Variable (IV) technique is employed to account for the endogeneity bias when estimating the effect of voluntary work on labour income.

We first start with Heckman techniques. The model consists of two equations: a labour force participation equation and a labour income equation.

Suppose that  $L_i^*$  is the continuous latent variable associated with the work decision. This can be expressed as

$$L_i^* = X_{2i}\beta_2 + \mu_{2i} \quad (2)$$

where  $X_{2i}$  is a vector containing individual characteristics that influence the decision to enter the labour market,  $\beta_2$  is a vector of parameters to be estimated and  $\mu_{2i}$  is a random error term. If  $L_i^* > 0$ , the wage market exceeds the reservation wage, and the individual chooses to work. If  $L_i^* \leq 0$ , the individual does not work.  $L_i^*$  is unobservable but depends on the observable binary variable  $L_i$ , which takes the value of 1 if the individual works and 0 if the individual does not work.

$$L_i = \begin{cases} 0 & \text{if } L_i^* \leq 0 \\ 1 & \text{if } L_i^* > 0 \end{cases}$$

Considering the potential bias related to the individual decision to participate in the labour force, the labour income model can be rewritten as

$$\ln W_i = X_{1i}\beta_3 + \alpha_2 V_i + \gamma_1 \lambda_{1i} + \mu_{3i} \quad (3)$$

where  $\beta_3$ ,  $\alpha_2$  and  $\gamma_1$  are parameters to be estimated,  $\mu_{3i}$ , is a random error term and  $\lambda_{1i} = \varphi(X_{2i}\beta_2)/\Phi(X_{2i}\beta_2)$  is the inverse Mills ratio for labour force participation equation where  $\varphi(\cdot)$  is the normal probability distribution and  $\Phi(\cdot)$  is the normal cumulative distribution.

The voluntary work equation is

$$V_i^* = X_{3i}\beta_4 + \mu_{4i} \quad (4)$$

where  $V_i^*$  is the latent variable describing the utility gain from volunteering,  $X_{3i}$  is a vector containing individual characteristics that influence the decision to supply unpaid work,  $\beta_4$  is a vector of parameters to be estimated and  $\mu_{4i}$  is a random error term.  $V_i^*$  is unobservable but linked to the observable dichotomous variable,  $V_i$ , which takes the value of 1 if the individual does voluntary work and 0 otherwise.

$$V_i = \begin{cases} 0 & \text{if } V_i^* \leq 0 \\ 1 & \text{if } V_i^* > 0 \end{cases}$$

The IV technique is a two-step process. The first stage consists of generating the predicted probability for voluntary work by estimating Eq. (4) using a probit model. In the second stage, the predicted probability is used to replace the  $V_i$  variable in Eq. (3) and the model is estimated by ordinary least-squares (OLS).

#### 4. DATA

The data for this study come from the European Union Statistics on Income and Living Conditions (EU-SILC) dataset. The EU-SILC database provides comparable, cross-sectional and longitudinal multidimensional data on income, social exclusion and living conditions performed in Member States (MS) of the European Community. The reference population of EU-SILC is all private households and their current heads residing in the territory of the MS at the time of data

collection. The EU-SILC data is thus a national representative sample of all persons aged 16 and over residing in private households within the country. Four types of data are gathered in EU-SILC: 1) variables measured at the household level; 2) information on household size and composition and basic characteristics of household heads; 3) income and other more complex variables measured at the personal level, but aggregated to construct household-level variables; 4) variables collected at the personal level. The items included in the micro data are related to health, education, childcare, housing, demographic and employment characteristics, and income.

The paper uses the 2006 wave of EU-SILC, which provides information on the labour market characteristics of individuals as well as their social participation. The information on social participation is self-assessed by the individual, who is asked to report participation in informal and formal voluntary activities.

Our attention is restricted to employees who supply voluntary work in formal organizations. The original sample contains 46522 observations. After excluding individuals who were not employees, with missing data on labour income and on the number of months spent at work, we were left with a subsample of 14567 employees, of whom 1184 were volunteers and 13383 were non-volunteers, who were aged between 16 and 64 in 2006. All the variables used in the analysis are described in detail in Appendix A. Weighted summary statistics are reported in Table 1.

The dependent variable is the natural logarithm of hourly wages, defined as the net employee income divided by the number of hours worked in the reference period. Employee income (py010n) is the total remuneration, in cash, payable by an employer to an employee in return for work done by the latter during the reference period. The survey reports after-tax income and no information on the different tax rates.

The micro data contain a question, ps150, in which the individual reports if he/she, during the last twelve months, has participated in the unpaid work of charitable organizations, groups or clubs. The voluntary work dummy takes the value of 1 if the worker has participated in the unpaid work of charitable organizations, groups or clubs and 0 otherwise. The voluntary work dummy includes only respondents who supply unpaid work, and does not include other organisation members who do not perform unpaid work. As in previous studies, the data do not provide any information on the number of hours that the individual spent in formal voluntary activities.

A convincing analysis requires that at least one variable in equations (2) and (4) is excluded from wage equation (3).

In order to find instruments for the voluntary work equation (4), the following questions are used: if the respondent, during the last twelve months, i) has participated in activities of religious

organizations (activities related to churches, religious communions or associations) or other groups (environmental organizations, civil right groups, neighbourhood associations, peace groups, etc.) (Religious or other groups participation);<sup>2</sup> ii) has undertaken (private) voluntary activities to help someone, such as cooking for others, taking care of people in hospitals/at home; taking people for a walk (Informal Help). The dummy variables are set to 1 if the individuals responded “yes”.

While it seems reasonable that these variables increase the likelihood of supplying voluntary work in formal organizations, it is not obvious that they have no effect on earnings. Instrumental variables should satisfy two conditions: highly significant correlation with voluntary work (strength of the instrument) and no correlation with the error term in the structural equation (validity condition). A number of tests can be run in order to check the strength and indirect validity of the instrumental variables used for voluntary work and we present these in the empirical results. The second requirement for reliable instrumental variables cannot be tested directly as it involves a relationship between instruments and the error term. Hence, we rely on the following theoretical considerations and intuitions.

The first variable, religious or other groups participation dummy, concerns participation in organizations pursuing ethical, moral or religious aims. Membership and participation in these kinds of associations promote coordination and civic culture, and it is reasonable to argue that these behaviours affect the probability of engaging in voluntary activities. Furthermore, persons attending relational networks are socially integrated and are more likely to hear about volunteer opportunities or meet other volunteers (Wilson 2012). The same may not be true for political or professional associations and unions: membership in a professional association or union is strictly linked to working status and earning function, the same being true for people attending the meetings of political parties that may be motivated by lobby interests.

Religion deserves further consideration. Existing analyses on religion and income concern both the effect of religion on income and the inverse relationship. Theoretical explanations involve beliefs, opportunity cost of time and network effects. Most studies focus on the differences effect between denominations (Jewish, Catholic, Protestant, etc...), whereas other studies analyse church membership. The results are positive for the Jewish beliefs and mixed for other denominations and for church attendance (Bettendorf and Dijkgraaf 2011). Tomes (1985) shows earning differentials by religion, attributable to different returns to human capital. The

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<sup>2</sup> The variable includes respondents who participated in religious associations or in other groups (environmental organizations, civil right groups, neighborhood associations, peace groups etc). Respondents participating to both associations have been excluded.

higher return to human capital is generated in stronger family backgrounds in terms of values, skills and goals. The same family impact is found in Steen (2004), particularly for Catholics and Jews. Note that both analyses focus on the impact of different religious attitudes (and family religion) and not of the choice of being religious or not, that is church attendance and/or the participation in religious association when one is an adult. It seems that family education is more important than the individual choice to participate in a religion: Cornelissen and Jirjahn (2012) show that “people who are raised religiously and reject religion as adults are economically more successful as they combine a strong internalized work ethic with an increased interest in present consumption (as opposed to afterlife consumption)”. Regarding the inverse relationship, Sawkins et al. (1997) find a positive relationship between labour income and church attendance using micro-data for Great Britain. However, as suggested by Lipford and Tollison (2003), there might be a bicausal relation between religion and income when one would consider the endogeneity of religion. Lepford and Tollison, using macro-data on the US in a system of equations, find that the effect of church membership on income is negative, as is the effect of income on church membership, whereas Bettendorf and Dijkgraaf (2011), using micro-data for the Netherlands, show that the cross-effects between income and church attendance become insignificant in a joint regression model.

Summing up, previous studies on religion and income focus on different denominations and church attendance, and show mixed findings. Our variable of religious participation includes both church attendance and other activities related to churches, religious communions or associations. Having a wider concept of participation in religious associations, we are confident that our variable of “religious participation” is uncorrelated with income, based on the following considerations.

First, religious participation such as church attendance signals an individual preference for afterlife consumption: this implies that religious participants place a relatively lower valuation on market earnings (Lipford and Tollison, 2003), which is confirmed in the joint regression model of Bettendorf and Dijkgraaf (2011).

Second, the family education effects, which are variable among religions, should be less important in Italy where the Catholic religion is clearly prevalent. If family training effects exist, they should be uniform and would be captured by the educational variables, through background effects.

The second instrumental variable concerns the informal help variable, which relates to activities such as cooking, walking and being with others. Intrinsic motivation that incentives to volunteering (Bruno and Fiorillo 2012) also encourages these informal help activities. This

argument is supported by results in Hank and Stuck (2007), which show a complementary and interdependent relationship between volunteering, helping, and caring, supporting notions of the existence of a motivation for engagement. On the other hand, informal help activities do not require expensive material goods, and the relationship with income availability can be ignored. The opportunity cost of time used to accomplish these tasks is equally irrelevant, because the frequency requested is a weekly effort for very easy tasks.

In order to identify the exclusion variables for the labour force participation equation, we use three dummy variables: if the respondent, during the last twelve months, has received a social transfer, a disability transfer or a civil disability transfer. In a standard labour supply model, these income-support schemes discourage labour force participation and are not included in labour income.

A number of variables are included in the wage equation. These variables are standard in empirical applications of the human capital model: demographic characteristics (gender, marital status, age, education, family size, number of children, health, homeownership), working characteristics (experience, permanent job, change job), firm size, occupation, sector of activity and territorial dummies.

Table 1. Descriptive statistics

Variable	All sample		Volunteers		Non volunteers	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Voluntary activities	0.08	0.26				
Hourly wage (ln)	2.22	0.50	2.34	0.48	2.21	0.50
Male	0.58	0.49	0.54	0.50	0.58	0.49
Married	0.61	0.49	0.60	0.49	0.61	0.49
Separated	0.02	0.16	0.03	0.18	0.02	0.15
Divorced	0.03	0.16	0.02	0.15	0.03	0.16
Widowed	0.01	0.12	0.01	0.11	0.01	0.12
Low secondary edu	0.31	0.46	0.21	0.41	0.32	0.47
Secondary edu	0.45	0.50	0.48	0.50	0.45	0.50
University edu	0.16	0.37	0.27	0.44	0.15	0.36
Household size	3.13	1.22	2.99	1.19	3.14	1.22
Children 0 - 2	0.10	0.31	0.05	0.24	0.10	0.32
Children 3 - 5	0.10	0.31	0.07	0.28	0.10	0.31
Children 6 - 15	0.35	0.63	0.35	0.63	0.35	0.63
Children 16 - 24	0.39	0.68	0.38	0.65	0.39	0.70
Good health	0.74	0.44	0.71	0.45	0.74	0.44
Homeowner	0.71	0.45	0.79	0.41	0.70	0.46
Experience	22.93	11.11	23.45	10.72	22.88	11.15
Permanent contract	0.86	0.35	0.89	0.31	0.86	0.35
Firm size						
> 10 and < 20 employees	0.16	0.36	0.15	0.35	0.16	0.36
> 19 and < 50 employees	0.14	0.35	0.17	0.37	0.14	0.35
0.> 49 employees	0.35	0.48	0.44	0.50	0.34	0.47
Job-Professional	0.34	0.47	0.48	0.50	0.32	0.47
Job-Skilled	0.29	0.46	0.27	0.44	0.30	0.46
Change job	0.10	0.30	0.08	0.28	0.10	0.30
Agriculture	0.03	0.18	0.02	0.12	0.04	0.19
Construction	0.07	0.25	0.03	0.17	0.07	0.26
Wholesale	0.10	0.30	0.06	0.23	0.10	0.31
Hotels	0.03	0.16	0.02	0.14	0.03	0.17
Transport	0.05	0.23	0.05	0.22	0.05	0.23
Finance	0.03	0.18	0.04	0.20	0.03	0.18
Real estate	0.05	0.23	0.02	0.15	0.06	0.23
Education	0.09	0.29	0.16	0.37	0.09	0.28
Public administration	0.10	0.30	0.12	0.32	0.10	0.30
Health and social work	0.08	0.27	0.15	0.36	0.08	0.26
Other sectors	0.08	0.27	0.09	0.29	0.08	0.27
Densely populated area	0.44	0.50	0.41	0.49	0.44	0.50
Intermediate area	0.39	0.49	0.39	0.49	0.39	0.49
North East	0.22	0.41	0.28	0.45	0.21	0.41
Centre	0.20	0.40	0.18	0.39	0.20	0.40
South	0.19	0.39	0.17	0.37	0.19	0.39
Islands	0.09	0.29	0.07	0.25	0.09	0.29
Religious or other groups participation	0.18	0.38	0.39	0.49	0.16	0.37
Informal help	0.08	0.27	0.17	0.38	0.07	0.26
Professional participation	0.06	0.24	0.18	0.39	0.05	0.23
Friends	0.50	0.50	0.58	0.49	0.49	0.50
Observation	14567		1184		13383	

In the whole sample, the percentage of working individuals who supply voluntary work in formal organizations is 8%. Table 1 reports characteristics of volunteers and non-volunteers. Volunteers, on average, are older, have higher education, more labour market experience, are employed in professional occupations and in large firms, are employed in the public sector and live in the north of Italy. Finally, it should be also noted that the average hourly labour income (in log) for volunteers is higher than for non-volunteers, i.e. 2.34 and 2.21, respectively.

## 5. EMPIRICAL RESULTS

Column (1) in Table 2 presents the OLS results of the wage function (equation 1) that includes the voluntary work dummy variable and all control variables: gender, marital status, years of educations, family size, number of children, health, homeowner, experience, permanent job, firm size, job professionals and job skilled, change job, sector of activities, municipal and macro-regional dummies. The coefficient on volunteering is not statistically significant and presents a negative sign. Hence, in the wide specification as in Day and Devlin (1998) we do not find a wage premium for voluntary work supplied in formal organizations.

The empirical findings on the other independent variables are generally consistent with previous studies. The hourly labour income of males is higher than that of females, and married employees have higher hourly wages than single workers. The effect of education is in line with expectations: the higher the educational level, the higher the wage premium of an employee. This result is in line with findings of Day and Devlin (1998) and Hackl et al. (2007). Moreover, as found in Hackl et al. (2007), the more experience of paid work an individual has, the higher their hourly wage.

Unlike the results reported in Day and Devlin (1998) and Hackl et al. (2007), household size has a negative effect on hourly wage, statistically significant at 5 percent, while the numbers of children aged between 0 and 15 years old have a positive effect on hourly labour income. As in Prouteau and Wolff (2006) and in studies following Mincerian approach (Di Pietro, 2007; Strauss and de la Maisonneuve, 2009), working for a big firm and in professional/skilled occupations results in a higher hourly labour income. The same positive correlation emerges for permanent contract, homeowners and the self-perceived good health.

An additional comment concerns the variable change job, concerning individuals who left a job or changed from one job to another since last year. Individuals changing job probably face a work interruption, and this circumstance often influences human capital accumulation. Mincer



and Polachek (1974) incorporated in the earning function exogenous discontinuous labour force participation and numerous studies assess the effects of work interruptions<sup>3</sup>, especially referred to the gender wage gap and the childbearing work interruptions. Two arguments support the decline of wage (and of human capital accumulation) after a work interruption: the direct depreciation of skills caused by human capital atrophy and the foregone wage growth caused by lost seniority. Moreover, it is shown that the rate of depreciation of human capital increases with education (Polachek, 2007). If changing job implies a work interruption, the effect of changing job on wages is negative because of human capital deterioration. In Column 1 Table 2, the coefficient for the status of employee who changed his job is negative and statistically significant at 1 percent.

Working in the private sector of transport and finance and in the public sectors entails positive wage effects. Finally, the coefficients on territorial dummy variables, which are included to capture any macro-regional specific differences in hourly labour income, are consistent with the pattern of regional differences in Italy.

Column (2) in Table 2 presents the estimates for OLS wage function (equation 3) with selection correlation on labour force participation<sup>4</sup>. We find that the coefficient on  $\lambda_1$  is negative and statistically significant (1%). This means that there is a self-selection problem. The coefficient on voluntary work is still not statistically significant. On the other hand, the results for the other explanatory variables are stable and unchanged relative to those reported in Column (1).

In Column (3) the Instrumental Variable method is used to account for the endogeneity bias<sup>5</sup>. Let us consider the selection term first. The coefficient on  $\lambda_1$  is still statistically significant at 1 percent with the negative sign. These results corroborate the relevance of accounting for the selectivity bias related to labour market participation. As expected, voluntary work has a positive effect on labour income. The coefficient on *voluntary work* is positive and statistically significant at 1 percent. The estimate shows that the wage premium for volunteering is 3.3 percent. The findings for the other explanatory variables are stable and unchanged compared to those reported in Columns (1-2).

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<sup>3</sup> See Polachek (2008) for a detailed description of mincerian earning function modified for discontinuous labor and evidence about the phenomenon.

<sup>4</sup> The estimates of the selection equation for labour market participation are shown in Appendix B, Table B1.

<sup>5</sup> The estimates of the voluntary work equation are shown in Appendix B, Table B2 Column (1).

Table 2. Estimates of the effect of volunteering on hourly wage

	OLS		OLS		IV	
	(1)		(2)		(3)	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Voluntary work	-0.003	0.012	-0.003	0.012	0.033***	0.012
Male	0.112***	0.008	0.100***	0.009	0.098***	0.009
Married	0.048***	0.009	0.049***	0.009	0.051***	0.009
Separated	0.040	0.029	0.036	0.029	0.037	0.029
Divorced	0.017	0.021	0.013	0.021	0.018	0.021
Widowed	0.015	0.024	0.030	0.024	0.037	0.025
Low secondary edu	0.086***	0.016	0.070***	0.017	0.062***	0.017
Secondary edu	0.206***	0.017	0.180***	0.018	0.166***	0.020
University edu	0.436***	0.021	0.400***	0.024	0.380***	0.026
Household size	-0.009**	0.004	-0.009**	0.004	-0.007*	0.004
Children 0 - 2	0.078***	0.013	0.074***	0.013	0.079***	0.013
Children 3 - 5	0.061***	0.011	0.055***	0.011	0.057***	0.011
Children 6 - 15	0.046***	0.006	0.042***	0.006	0.041***	0.006
Children 16 - 24	0.008	0.006	0.010	0.006	0.009	0.006
Good health	0.020***	0.008	0.012	0.008	0.014*	0.008
Homeowner	0.060***	0.008	0.061***	0.008	0.056***	0.008
Experience	0.010***	0.000	0.010***	0.000	0.009***	0.000
Permanent contract	0.119***	0.015	0.117***	0.014	0.118***	0.015
Firm size						
> 10 and < 20 employees	0.031***	0.010	0.030***	0.010	0.030***	0.011
> 19 and < 50 employees	0.102***	0.011	0.100***	0.011	0.099***	0.011
.> 49 employees	0.127***	0.009	0.127***	0.009	0.124***	0.009
Job-Professional	0.184***	0.010	0.183***	0.010	0.178***	0.010
Job-Skilled	0.119***	0.010	0.120***	0.010	0.117***	0.010
Change job	-0.068***	0.015	-0.067***	0.015	-0.068***	0.015
Agriculture	-0.070**	0.029	-0.070**	0.029	-0.056*	0.030
Construction	-0.005	0.014	-0.004	0.014	-0.000	0.014
Wholesale	-0.049***	0.013	-0.049***	0.013	-0.044***	0.013
Hotels	-0.145***	0.027	-0.144***	0.027	-0.145***	0.027
Transport	0.063***	0.014	0.062***	0.014	0.060***	0.014
Finance	0.202***	0.022	0.201***	0.022	0.198***	0.022
Real estate	-0.059***	0.016	-0.059***	0.016	-0.048***	0.017
Education	0.186***	0.014	0.187***	0.014	0.183***	0.014
Public administration	0.092***	0.012	0.092***	0.012	0.091***	0.012
Health and social work	0.049***	0.014	0.049***	0.014	0.042***	0.014
Other sectors	-0.032**	0.015	-0.032**	0.016	-0.038**	0.016
Densely populated area	0.027***	0.009	0.032***	0.009	0.040***	0.010
Intermediate area	0.002	0.009	0.003	0.009	0.008	0.009
North East	-0.008	0.009	-0.006	0.009	-0.012	0.009
Centre	-0.030***	0.009	-0.029***	0.009	-0.026***	0.009
South	-0.092***	0.011	-0.085***	0.011	-0.081***	0.011
Islands	-0.054***	0.016	-0.045***	0.016	-0.040***	0.016
$\lambda_1$			-0.041***	0.014	-0.042***	0.014
No. of observations	14565		14565		14565	
R-squared	0.316		0.316		0.316	

Note. Standard errors are corrected for heteroscedasticity. The symbols \*\*\*, \*\*, \* denote coefficient statistically different from zero at the 1, 5 and 10 percent.

In order to check the strength of the instrumental dummy variables, we run the following test: we regress, through a probit model, the voluntary work dummy variable on religious or other groups participation dummy variable, informal help dummy variable and all other exogenous variables from the voluntary work equation. The coefficients on the instrumental variables are significantly different from zero at the level of 1 percent (p-values 0.00 and 0.00) with positive signs (see Appendix B, Table B2). The chi-square statistics for joint significance of the instruments is 354.47.

We also test the correlation between our instrumental variables and voluntary work using the F-test suggested by Staiger and Stock (1997). The F-statistic for joint significance of the instruments in the first stage of the endogenous variable on the instruments and all other exogenous variables is 123.63, well above the threshold of 10 suggested by Staiger and Stock (1997). Thus, we can conclude that our instrumental dummy variables are not weak.

The validity condition is indirectly checked using a Sargan test. The residuals from the IV estimate are regressed on the instrumental dummy variables and all other exogenous variables. The R-squared is extremely small in the regression (0.00004205), indicating that the instruments do not explain any significant variations in the residual, suggesting the validity of at least one instrument.

Finally, we also run a Hausman test in order to test the endogeneity of the voluntary work dummy variable. The check is performed by including the residuals of the voluntary work equation in the OLS wage equation. An F-statistic on whether the coefficient on residuals is statistically significant indicates the endogeneity of the voluntary work dummy variable. The result shows that the F-statistic in IV estimate is high (6.14), suggesting that the voluntary work dummy variable is endogenous.

## 6. THE WAGE PREMIUM SIZE

The size of the wage premium is important in assessing the relevance of investment motives in volunteering. Previous studies have found a wage premium ranging from 7 to 18.5 percent. When considering the selection bias problem and the endogeneity issue, the estimate in Column (3) of Table 2 shows that the wage premium of volunteering is 3.3 percent, which is a low premium compared to previous analyses. Some methodological differences among studies have been outlined in the literature review: the availability of data, measures of volunteering and sample selection. Furthermore, institutional differences among countries (labour market and non-profit sector regulations) can partly explain the variability in results. Nevertheless, the results in this paper are in line with the findings of Bruno and Fiorillo (2012), underlining that in volunteers' behaviour the consumption motive prevails on the investment motive, which is relatively less strong in determining choices.

Consequently, the first problem with our estimates is their comparability with previous analyses. The wage *premium* size may be influenced by country-specific characteristics (e.g. in wage structure and productivity), so that it may not be possible to compare the size of the premium found for Italian volunteers to those found for others countries: Austria, Canada and France.

To verify the comparability of our results, we report in Table 3 the estimates of wage premium on tertiary education performed by Strauss and de la Maisonneuve (2009) on 21 OECD countries in the year 2001. We report only the countries of interest: Austria, Canada, France and Italy, together with our findings in Table 2 Column (1).

The coefficients of tertiary education and labour experience show a similar size in all four countries, whereas only Canada has different coefficients for individual characteristics (marital status and gender). Moreover, our results are in line with the corresponding findings for Italy. This comparison seems to suggest that our results can be compared with those from other studies in the literature.

To further test our results on the wage premium size, some considerations about social relations and volunteering can be made. If volunteering works as a proxy of social relations, volunteering captures the effects of many other networks in addition to the volunteering itself. Stylized facts about informal networks show that searching for jobs through friends and relatives is generally productive, not only in finding jobs, but also in improving the quality of the match between firms and workers. On the other hand, the estimated effects of job contacts on wages

vary considerably across studies (Ioannides and Datcher Loury 2004): recent studies show that across many of the countries in the European Union, premiums and penalties present when finding jobs through personal contacts are equally frequent and are of about the same size (Pellizzari, 2010).

Table 3. Results of the wage regressions of Strauss and de la Maisonneuve (2009) and our findings of Table 2

	Strauss and Maisonneuve' results: OLS				Our results: OLS	
	Austria	Canada	France	Italy	Italy	IV
female	-0.160***	-0.247***	-0.073***	-0.114***	0.112*** (male)	0.098*** (male)
married	0.037**	0.157***	0.051***	0.054***	0.048***	0.051***
tertiary	0.433***	0.402***	0.462***	0.411***	0.436***	0.380***
experience	0.007***	0.007***	0.007***	0.007***	0.010***	0.009***

Note. The symbols \*\*\*, \*\* denote coefficient statistically different from zero at the 1, and 5 percent.

To investigate if the wage premium size is overestimated by omitting variables concerning networks we include in the analysis a dummy variable for participation in professional associations, as a proxy of the intensity of social relations. Membership in a professional association is strictly linked to working status and to earning function<sup>6</sup>.

Taking into account the literature on the effect of networks on wages, by adding the professional participation dummy we can investigate if:

H1 Social connections provide a wage premium (penalty);

H2 The wage premium for volunteering is overestimated when relational variables are omitted.

Results are shown in Table 4<sup>7</sup>. In the IV model<sup>8</sup>, Column (3), we find a positive and statistically significant (at 1%) correlation between wages and the variable participation in professional associations. In this framework, the network activities seems to provide a wage

<sup>6</sup> See Appendix A for a description of this dummy variable.

<sup>7</sup> The estimates of the voluntary work equation with professional participation dummy as additional covariate are shown in Appendix B, Table B2 Column (2).

<sup>8</sup> In Table 3 Column (3), the chi-square statistic for joint significance of the instruments in the voluntary work equation is 321.20 (p-value 0.00). The F-statistic for joint significance of the instruments in the first stage of the endogenous variable on the instruments and all other exogenous variables is 112.13 (p-value 0.00). Sargant test: the residuals from the IV estimate are regressed on the instrumental dummy variables and all other exogenous variables. The R-squared is extremely small in the regression (0.00003594). The Hausman test – to test the endogeneity of the voluntary work dummy variable – shows a F-statistic in IV estimate of 4.36 (p-value 0.03).

Table 4. Estimates of the effect of volunteering on hourly wage, with professional participation dummy added.

	OLS (1)		OLS (2)		IV (3)	
	Coeff.	SE	Coeff.	SE	Coeff.	SE
Voluntary work	-0.012	0.012	-0.011	0.012	0.027**	0.013
Professional participation	0.080***	0.015	0.080***	0.015	0.062***	0.017
Male	0.110***	0.008	0.097***	0.008	0.096***	0.009
Married	0.048***	0.009	0.050***	0.009	0.051***	0.009
Separated	0.039	0.029	0.035	0.029	0.036	0.029
Divorced	0.017	0.021	0.013	0.021	0.018	0.021
Widowed	0.017	0.024	0.032	0.024	0.037	0.025
Low secondary edu	0.085***	0.016	0.069***	0.017	0.063***	0.017
Secondary edu	0.205***	0.017	0.179***	0.019	0.167***	0.019
University edu	0.428***	0.021	0.393***	0.024	0.377***	0.025
Household size	-0.009**	0.004	-0.009**	0.004	-0.008**	0.004
Children 0 - 2	0.079***	0.013	0.075***	0.013	0.079***	0.013
Children 3 - 5	0.061***	0.011	0.056***	0.011	0.057***	0.011
Children 6 - 15	0.046***	0.006	0.042***	0.006	0.041***	0.006
Children 16 - 24	0.008	0.006	0.009	0.006	0.008	0.006
Good health	0.018**	0.008	0.011	0.008	0.013	0.008
Homeowner	0.060***	0.008	0.061***	0.008	0.057***	0.008
Experience	0.010***	0.000	0.009**	0.000	0.009***	0.000
Permanent contract	0.119***	0.015	0.117***	0.014	0.118***	0.015
Firm size						
> 10 and < 20 employees	0.030***	0.010	0.029***	0.010	0.030***	0.011
> 19 and < 50 employees	0.101***	0.011	0.100***	0.011	0.099***	0.011
> 49 employees	0.127***	0.009	0.126***	0.009	0.124***	0.009
Job-Professional	0.181***	0.010	0.180***	0.010	0.177***	0.010
Job-Skilled	0.119***	0.010	0.119***	0.010	0.117***	0.010
Change job	-0.068***	0.015	-0.067***	0.015	-0.068***	0.015
Agriculture	-0.072**	0.029	-0.072**	0.029	-0.056*	0.030
Construction	-0.006	0.014	-0.005	0.014	-0.000	0.014
Wholesale	-0.049***	0.013	-0.048***	0.013	-0.045***	0.013
Hotels	-0.148***	0.027	-0.147***	0.027	-0.146***	0.027
Transport	0.061***	0.014	0.061***	0.014	0.060***	0.014
Finance	0.200***	0.022	0.199***	0.022	0.197***	0.022
Real estate	-0.061***	0.016	-0.060***	0.016	-0.051***	0.017
Education	0.183***	0.014	0.184***	0.014	0.181***	0.014
Public administration	0.090**	0.012	0.090***	0.012	0.090**	0.012
Health and social work	0.042***	0.014	0.043***	0.014	0.038***	0.014
Other sectors	-0.035**	0.015	-0.035**	0.016	-0.039**	0.016
Densely populated area	0.028***	0.009	0.032***	0.009	0.039***	0.010
Intermediate area	0.003	0.009	0.004	0.009	0.008	0.009
North East	-0.008	0.009	-0.008	0.009	-0.012	0.009
Centre	-0.031***	0.009	-0.030***	0.009	-0.027***	0.009
South	-0.096***	0.011	-0.089***	0.011	-0.084***	0.012
Islands	-0.055***	0.016	-0.047***	0.016	-0.041***	0.016
$\lambda_1$			-0.041***	0.014	-0.042***	0.014
No. of observations	14565		14565		14565	
R-squared	0.317		0.318		0.318	

Note. Standard errors are corrected for heteroscedasticity. The symbols \*\*\*, \*\*, \* denote coefficient statistically different from zero at the 1, 5 and 10 percent.

premium. However, by adding a social relations variable, the positive impact of volunteering on wages is now statistically significant at 5 percent and reduced in size to 2.7 percent.

Hence, it seems reasonable to affirm that the impact of volunteering on wages is a little overestimated if social relations variables are omitted. It is worth noting that, at this stage, we cannot affirm or exclude that volunteering provides higher wages by extending networks, but only that the size of the eventual premium is overestimated.

## 7. WHY DOES VOLUNTEERING PAY?

To discern among the three different channels of influence of volunteering on wage some further considerations are needed. Three channels through which volunteering may affect earnings have been suggested: the networking, the human capital and the screening hypotheses. These three channels may or may not coexist.

To test each channel of influence of volunteering on wages we use a homogenous approach, based on the effect of volunteering on wages when changing job. As outlined above, the change job variable has a negative impact on wages. If volunteering provides a wage premium, this premium should also hold in the circumstances of changing job. The volunteer who changes job should therefore face a lower (negative) impact on wages, compared to non-volunteers. To test this hypothesis, we use the interaction term between the variable change job and voluntary work, in the OLS model.

Table 5 reports, because of space restrictions, only the findings for the variables relevant in this step. Other covariates are stable and unchanged compared to Table 3. Column (1) shows that the interaction term *change job\*voluntary work* has a positive sign, reversing the negative impact of changing job on wages. This result confirms that a wage premium for volunteering exists, because workers changing job gain a wage premium if they perform voluntary work, whereas workers changing job who do not volunteer suffer a wage penalty. Note that the voluntary work dummy is negative and statistically significant at 10 percent. We interpret this finding as evidence of the reverse causality problem.

This interaction term is also the basis for the analysis in the following section about the channel of influence. It is worthwhile noting that we cannot use the interaction term in the IV model because of the endogeneity of volunteering. Therefore, the analysis on the channel of influence will be conducted in the OLS model, and comments will primarily refer to the sign of the interaction terms.

Table 5. Testing interaction terms and hourly wages

	OLS (1)		OLS (2)		OLS (3)		OLS (4)	
	Coeff.	SE	Coeff.	SE	Coeff.	SE	Coeff.	SE
Voluntary work	-0.021*	0.012	-0.018	0.012	-0.022*	0.012	-0.016	0.012
Professional participation	0.081***	0.015	0.078***	0.015	0.080***	0.015	0.077***	0.015
Change job	-0.075***	0.016	-0.063***	0.023	-0.084***	0.030	-0.059***	0.018
Change job*voluntary work	0.102**	0.049						
Change job*friends			-0.019	0.031				
Change job*Voluntary work*friends			0.122**	0.059				
Friends			0.003	0.007				
Change job*experience					0.089	0.001		
Change job*Voluntary work*experience					0.006**	0.002		
Experience					0.009***	0.000		
Change job*public sector							-0.058	0.037
Change job*Voluntary work*public sector							0.143**	0.066
Public sector							0.107***	0.010
All control variables	Yes		Yes		Yes		Yes	
$\lambda_1$	-0.041***	0.014	-0.040***	0.014	-0.040***	0.014	-0.041***	0.014
No. of observations	14565		14565		14365		14365	
R-squared	0.318		0.320		0.318		0.314	

Note. Standard errors are corrected for heteroscedasticity. The symbols \*\*\*, \*\*, \* denote that the coefficient is statistically different from zero at the 1, 5 and 10 percent.

### 7.1 The networking hypothesis

As shown in the literature, volunteering may provide access to informal networks of contacts, but a double relationship between volunteering and social networks could exist: individuals volunteer to acquire useful networks, gaining opportunities for better jobs (instrumental relations), but individuals may also participate in associations and networks in order to consume relational goods (intrinsically enjoyed relations) and consequently to volunteer, as outlined by Prouteau and Wolff (2004).

To directly check the networking channel of influence of volunteering on wages we can test the following hypothesis.

H3. If volunteering provides higher wages because it enables access to informal networks, and this also happens when changing job, the negative impact of changing job for a volunteer who frequently uses informal networks is lower compared to a non-volunteer.



To test this hypothesis, we use the interaction term between the variables *change job*, *voluntary work* and *friends* in the OLS model. The *friends* variable is a dummy equal to 1 if the worker meets friends every week during a typical year and 0 otherwise.

Table 5 Column (2) shows that the interaction term *change job\*voluntary work\*friends* has a positive sign, reversing the negative impact of changing job on wages, whereas the interaction term *change job\*friends* is not significant. This implies that informal relations arising from meeting friends are not significant for those who change job, unless they are volunteers: informal relations represented by friends provide higher wages only if they are associated with the status of volunteer. This finding seems to support the idea that volunteering provides higher wages because it enables access to informal networks.

### 7.2 The human capital hypothesis

The human capital hypothesis underlines that volunteers acquire skills and experience and become more productive. It is difficult to test directly the human capital hypothesis because, as stated by Day and Devlin (1998, p. 1183-1184), “volunteer work is already incorporated in the basic human capital framework, since it can be viewed as one component of an individual's experience”. Consequently, when individual experience is measured by an individual's age minus years of schooling minus six, as in our estimates, it should still incorporate the human capital accumulation through volunteering. Nevertheless, this measurement of human capital accumulation fails to consider the effects of discontinuous labour force participation. Work interruptions produce human capital deterioration because of the direct depreciation of skills caused by human capital atrophy and the foregone wage growth caused by lost seniority (Polachek 2007).

Individuals changing job probably face a work interruption, and volunteering can provide a chance to reduce (or remove) the disadvantage caused by lost seniority and atrophy by employing herself in volunteering activities in order to acquire new experiences and competences.

To directly check the human capital effect, we test the following hypothesis.

H4. If volunteering also provides human capital accumulation when changing job, the positive effect of one more year of experience is not reduced when volunteers face work interruptions.

To test this hypothesis, we use the interaction term between the variables *change job*, *voluntary work* and *experience* in the OLS model.

Table 5 Column (3) shows that the interaction term *change job\*voluntary work\*experience* has a positive sign, reversing the negative impact of changing job on wages, whereas the interaction term *change job\*experience* is not significant. This implies a small positive effect of one more year of experience for volunteers who change job, supporting the idea that volunteering provides a way to avoid the human capital deterioration.

### 7.3 The screening hypothesis

The third channel of influence of volunteering on wages emphasises that volunteering may influence earnings by providing a signal to employers of otherwise unobservable abilities. This hypothesis implies that the wage premium is associated with unobservable characteristics, which individuals signal to the employer through volunteering.

The literature underlines that the most important unobservable characteristic of volunteers is their intrinsic motivation: people volunteer because they enjoy doing so intrinsically. When considering the role of intrinsic motivation, it is useful to distinguish between intrinsic motivation in the main job and intrinsic motivation in other activities (such as volunteering). The impact of intrinsic motivation in the main job on wages is still debated. The donative-labor hypothesis predicts that wage earners will accept lower pay if they find intrinsic value in their jobs. On the other hand, Becchetti et al. (2013) show that the negative effect on wages is “dominated by the effect by which intrinsic motivations cause or are a signal of higher productivity”. In this second effect, the intrinsic motivation in the main job is an individual characteristic associated with higher productivity. In what follows, we will interpret motivation as a signal of higher productivity, because, when testing the screening hypothesis, it is essential that performance in a specific activity (volunteering) is a good signal for performance in other activities (job).

The literature on Public Service Motivation (PSM) shows that individuals are often attracted to public sector by the intrinsic rewards that the sector offers, as the mission of the sector (Dixit 2002; Besley and Ghatak 2005). The empirical evidence supporting this mechanism (Steijn, 2008; Gregg et al. 2011) has found that this is especially true for the higher education sector and the health service (Georgellis et al. 2011). Furthermore, volunteering in these sectors increases the likelihood of supplying regular unpaid work (Bruno and Fiorillo 2012).

On the one hand, workers in the public sector are intrinsically motivated; on the other hand, intrinsically motivated individuals supply unpaid labour in education and health sectors more frequently. On this basis, the public sectors can be used as proxies of intrinsically motivated

individuals, and volunteering can be the way to signal to an employer this motivation. We will therefore test the following hypothesis.

H5. If volunteering provides a wage premium, also when changing job, because it is a signal for intrinsically motivated (and more productive) individuals, the wage premium for is not reduced for volunteers working in the public sector compared to volunteers working in other sectors, when changing job.

To test this hypothesis, we use the interaction term between the variables *change job*, *voluntary work* and *public sector* in the OLS model. The dummy *public sector* is equal to 1 for those working in education, health and public administration, and 0 otherwise.

Table 5 Column (4) shows that the interaction term *change job\*voluntary work\*public sector* has a positive sign, reversing the negative impact of changing job on wages, whereas the interaction term *change job\*public sector* is not significant. This finding seems to support the idea that volunteering provides a wage premium because it is a signal for intrinsically motivated individuals.

## 8. CONCLUSIONS

The effects of voluntary work on earnings have recently been studied for some developed countries such as Canada, France and Austria. We extend this line of research for Italy, using data from the 2006 wave of European Union Statistics on Income and Living Conditions (EU-SILC) dataset. Three questions about wage premium for volunteers are investigated: whether a wage premium exists, how large it is, and through which channel volunteering determines higher wages. A double methodological approach is used in order to control for unobserved heterogeneity: Heckman and IV methods are employed to account for unobserved worker heterogeneity and endogeneity bias.

Empirical results show that a wage premium of 3.3 percent emerges when the reverse causality problem is taken into account. Consequently, the wage premium in Italy is quite small if compared to previous investigations in Canada and Austria. Methodological differences and country-specific institutional arrangements can partly explain this gap in the results. Further analysis would be welcome on this issue.

The size of the wage premium is important in assessing the relevance of the investment motives in volunteering. We suggest that, if volunteering is a proxy of social relations, volunteering captures the effects of many other networks in addition to volunteering itself. In the Italian data, social connections have a positive correlation with wages (H1), and therefore the

wage premium for volunteering can be overestimated if relational variables are omitted (H2). By adding a social relations variable, the positive impact of volunteering on wages is reduced in size to 2.7 percent.

Finally, our investigation into the three different channels of influence of volunteering on wages gives support to the existence of all three alternatives. We find that workers incurring work interruptions, because of job change, suffer a wage penalty, but this penalty disappears for volunteers. This happens because volunteering enables access to fruitful informal networks (H3), because an individual can reduce (or remove) the disadvantage caused by lost seniority and atrophy by employing herself in volunteering activities to acquire new experience and competences (H4) and because volunteering is a signal for intrinsically motivated (and more productive) individuals (H5).

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## Appendix A. Variable definitions

<i>Variable</i>	<i>Description</i>
<i>Dependent variable</i>	
Hourly wage (ln)	Defined by the net employee income divided by the number of hours worked in the reference period (twelve months).
<i>Key independent variable</i>	
Voluntary work	Dummy, 1 if the respondent, during the last twelve months, participated in the unpaid work of charitable organizations, groups or clubs. It includes unpaid charitable work for churches, religious groups and humanitarian organizations. Attending meetings connected with these activities is included; 0 otherwise
<i>Sample selection and instrumental variables</i>	
Social transfer	Dummy, 1 if the respondent, in 2005, perceived a social pension or a social allowance; 0 otherwise
Disability transfer	Dummy, 1 if the respondent, in 2005, perceived a disability pension or a disability allowance; 0 otherwise
Civil disability transfer	Dummy, 1 if the respondent, in 2005, perceived a civil disability pension ; 0 otherwise
Religious or other groups participation	Dummy, 1 if the respondent, during the last twelve months, participated in activities related to churches, religious communions or associations or other groups (environmental organizations, civil right groups, neighbourhood associations, peace groups, etc.); 0 otherwise
Informal help	Dummy, 1 if the respondent, during the last twelve months, undertook every week (private) voluntary activities to help someone, such as cooking for others; taking care of people in hospitals/at home; taking people for a walk. It excludes any activity that a respondent undertakes for his/her household, in his/her work or within voluntary organizations
<i>Demographic and socio-economic characteristics</i>	
Male	Dummy, 1 if male; 0 otherwise. <b>Reference group: female</b>
Married	Dummy, 1 if married; 0 otherwise; <b>Reference group: single status</b>
Separated	Dummy, 1 if separated; 0 otherwise
Divorced	Dummy, 1 if divorced; 0 otherwise
Widowed	Dummy, 1 if widowed; 0 otherwise
Age	Age of the respondent between 16 and 64
Low secondary edu	Dummy, 1 if the respondent has attained lower secondary school; 0 otherwise. <b>Reference group: No educational attained and primary school degree</b>
Secondary edu	Dummy, 1 if the respondent has attained upper or post secondary school degree; 0 otherwise.
University edu	Dummy, 1 if the respondent has attained tertiary education or higher; 0 otherwise
Household size	Number of household heads
Children 0 -2	Number of own children ages 0 - 2 years old. <b>Reference group: no children</b>
Children 3 -5	Number of own children ages 3 - 5 years old
Children 6 - 15	Number of own children ages 6 - 15 years old
Children 16 -24	Number of own children ages 16 and 24 attending school
Good health	Dummy, 1 if the respondent perceives his/her health as good or very good; 0 otherwise
LADLs	Dummy, 1 if the respondent self-assesses his/her health hampered in daily activity by any health problem; 0 otherwise
Homeowner	Dummy, 1 if the respondent owns the house where he /she lives; 0 otherwise

<i>Variable</i>	<i>Description</i>
<i>Worker characteristics</i>	
Labour experience	Number of years, since starting the first regular job, that the respondent has spent at work
Experience	Age minus the years of educations minus six
Permanent job	Dummy, 1 if the respondent has a work contract of unlimited duration; 0 otherwise
<i>Firm size</i>	
> 10 and <20 employees	Dummy, 1 if the number of persons working at the local unit is between 11 and 19; 0 otherwise. <b>Reference group: = or &lt; 10 employees</b>
>19 and <50 employees	Dummy, 1 if the number of persons working at the local unit is between 20 and 19; 0 otherwise.
> 49 employees	Dummy, 1 if the number of persons working at the local unit is equal or more than 50; 0 otherwise.
<i>Occupation</i>	
Job-Professional	Dummy, 1 if the respondent is employed in professional and/or managerial occupation; 0 otherwise; <b>Reference group: Job-No skilled</b>
Job-Skilled	Dummy, 1 if the respondent is employed in skilled occupation; 0 otherwise;
Change job	Dummy, 1 if the respondent left a job or changed from one job to another in the last 12 months
<i>Sector</i>	
Agriculture	Dummy, 1 if the activity sector is agriculture: 0 otherwise. <b>Reference group: manufacturing</b>
Construction	Dummy, 1 if the activity sector is construction: 0 otherwise
Wholesale	Dummy, 1 if the activity sector is wholesale and : 0 otherwise
Hotels	Dummy, 1 if the activity sector is hotels and restaurants: 0 otherwise
Transport	Dummy, 1 if the activity sector is transport: 0 otherwise
Finance	Dummy, 1 if the activity sector is finance intermediation: 0 otherwise
Real Estate	Dummy, 1 if the activity sector is real estate: 0 otherwise
Education	Dummy, 1 if the activity sector is education: 0 otherwise
Public administration	Dummy, 1 if the activity sector is public administration: 0 otherwise
Health and social work	Dummy, 1 if the activity sector is health and social work: 0 otherwise
Other sectors	Dummy, 1 if the activity sector is another sector: 0 otherwise
<i>Territorial dummies</i>	
Densely populated area	Dummy, 1 it the respondent lives in local areas where the total population for the set is at least 50,000 inhabitants. <b>Reference group: Thinly-populated area</b>
Intermediate area	Dummy, 1 it the respondent lives in local areas, not belonging to a densely-populated area, and either with a total population for the set of at least 50,000 inhabitants or adjacent to a densely-populated area.
North East	Dummy, 1 if the respondent lives in North east regions; 0 otherwise. <b>Reference group: North West</b>
Centre	Dummy, 1 if the respondent lives in Central regions; 0 otherwise
South	Dummy, 1 if the respondent lives in Southern regions; 0 otherwise
Islands	Dummy, 1 if the respondent lives in the Islands; 0 otherwise
<i>Other covariates</i>	
Transfer	Dummy 1. If the respondent receives a transfer; 0 otherwise
Savings	Dummy 1, if the respondent had savings; 0 otherwise
Professional participation	Dummy 1, if the respondent, during the last twelve months, participated in activities related to a professional association. It is also included attending meetings connected with these activities. Receiving training organised by such association is excluded; 0 otherwise
Friends	Dummy 1, if the respondent gets together with friends every week during a usual year; 0 otherwise



## Appendix B

Table B1. Labour force participation equation

Note. Standard errors are corrected for heteroscedasticity. The symbols \*\*\*, \*\* denote that the coefficient is

Variable	dF/dx	SE
Social transfer	-0.252***	0.039
Disability transfer	-0.234***	0.018
Civil disability transfer	-0.281***	0.014
Transfer	-0.090***	0.012
Savings	0.083***	0.006
Male	0.240***	0.005
Married	-0.116***	0.007
Separated	-0.009	0.021
Divorced	0.016	0.021
Widowed	-0.196***	0.011
Age 30-39	0.476***	0.007
Age 40-49	0.556***	0.006
Age 50-59	0.453***	0.007
Age 60-64	0.070***	0.013
Low secondary edu	0.152***	0.009
Secondary edu	0.289***	0.008
University edu	0.401***	0.010
Household size	0.009***	0.003
Children 0 - 2	0.019	0.012
Children 3 - 5	0.045***	0.011
Children 6 - 15	0.002	0.005
Children 16 - 24	-0.011**	0.005
Good health	0.089***	0.006
LADLs	-0.105***	0.008
Homeowner	-0.044***	0.007
Densely populated area	-0.067***	0.007
Intermediate area	-0.017**	0.007
North East	0.003	0.008
Centre	-0.016**	0.008
South	-0.101***	0.008
Islands	-0.127***	0.009
No. of observations	46522	
R-squared	0.348	
Log Likelihood	-20776.55	

statistically different from zero at the 1 and 5.

## Appendix B

Table B2. Voluntary work equations

Variable	(1)		(2)	
	dF/dx	SE	dF/dx	SE
Religious or other groups participation	0.094***	0.007	0.088***	0.007
Informal help	0.067***	0.010	0.064***	0.010
Professional participation			0.094***	0.012
Male	0.009**	0.004	0.006	0.004
Married	-0.006	0.006	-0.006	0.006
Separated	-0.001	0.013	-0.002	0.012
Divorced	-0.016	0.011	-0.015	0.011
Widowed	-0.020	0.013	-0.016	0.013
Age	0.000	0.000	0.000	0.000
Low secondary edu	0.025**	0.012	0.024**	0.012
Secondary edu	0.046***	0.011	0.043***	0.011
University edu	0.081***	0.020	0.068***	0.019
Household size	-0.004*	0.002	-0.004*	0.002
Children 0 - 2	-0.016**	0.008	-0.016**	0.008
Children 3 - 5	-0.010	0.008	-0.008	0.008
Children 6 - 15	0.001	0.004	0.001	0.004
Children 16 - 24	0.002	0.005	0.002	0.003
Good health	-0.007	0.005	-0.008	0.005
Homeowner	0.017***	0.004	0.017***	0.005
Labour experience	0.001*	0.000	0.001	0.000
Permanent contract	-0.004	0.007	-0.004	0.007
Firm size				
> 10 and < 20 employees	-0.001	0.006	-0.002	0.006
> 19 and < 50 employees	0.006	0.007	0.005	0.007
> 49 employees	0.012**	0.005	0.011**	0.005
Job-Professional	0.018***	0.007	0.014**	0.007
Job-Skilled	0.012*	0.006	0.011*	0.006
Change job	0.002	0.007	0.003	0.007
Agriculture	-0.038***	0.009	-0.039***	0.008
Construction	-0.014	0.009	-0.015	0.008
Wholesale	-0.014*	0.007	-0.013	0.007
Hotels	0.003	0.014	-0.000	0.013
Transport	0.009	0.010	0.008	0.010
Finance	0.013	0.013	0.010	0.012
Real estate	-0.031***	0.007	-0.031***	0.007
Education	0.011	0.009	0.007	0.009
Public administration	0.001	0.008	-0.002	0.007
Health and social work	0.031***	0.010	0.022**	0.010
Other sectors	0.026***	0.010	0.021**	0.010
Densely populated area	-0.024***	0.005	-0.023***	0.005
Intermediate area	-0.015***	0.005	-0.014***	0.005
North East	0.013**	0.006	0.013**	0.006
Centre	-0.009*	0.005	-0.010*	0.005
South	-0.017***	0.006	-0.020***	0.006
Islands	-0.021**	0.007	-0.021**	0.007
No. of observations	14565		14565	
R-squared	0.091		0.100	
Log Likelihood	-3733.83		-3681.38	

Note. Standard errors are corrected for heteroscedasticity. The symbols \*\*\*, \*\*, \* denote that the coefficient is statistically different from zero at the 1, 5 and 10 percent.