The Fallacy of the Good Samaritan: Volunteering as a Weird Way of Making Money

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Abstract

This paper explores individual motives for volunteering: The analysis is based on the interpretation of volunteering as a consumption good (consumption model) or as a mean to increase individual's own human capital (investment model). We present an econometric framework taking into account self selection into volunteering and simultaneity between the volunteering decision and the determination of income in order to test these two models and to identify the underlying motives.

We find strong statistical evidence for the investment model with a highly robust and significant impact of volunteering on the wage rate. On average the wage premium as the difference in the wage rate between one person volunteering and not volunteering amounts up to 18.7 percent. Within the framework of the investment model it turns out that the number of volunteering hours plays a major role in explaining this wage premium. This supports the idea of volunteering as a mean to accumulate human capital and signalling willingness to perform. As far as the consumption model is concerned we find no clear statistical evidence for its validity.

The strong evidence for the investment model requires the consideration of voluntary activities in the estimation of wage equations. Moreover, we conclude that the existence of the wage premium is a decisive factor for people to volunteer or not and therefore reflects an important argument in the recruitment process of volunteers for several organisations.

Keywords: volunteering, voluntary labour supply, human capital accumulation, wage premium, altruism.

JEL classification: J22, J24, J31, D64.

1 Introduction

Economists usually assume positively sloped labour supply curves with reservation wages different from zero. In contrast to this view a considerable amount of labour is offered without monetary compensation in return throughout the economy. Neighbourly help or other unpaid help for friends are good examples for the social phenomenon that people donate time and effort in the absence of monetary rewards. Moreover, there is a significant percentage of people who offer voluntary work in numerous organisations worldwide. Important fields of volunteering comprise social and health services, education and youth work, culture and recreation, rescue organisations, politics, environmental and religious services. Undoubtedly, volunteering contributes significantly to the economy's welfare that would otherwise require paid resources – a problem which is aggravated by limited public budgets in most countries.

According to the US Current Population Survey 2003/09 about 25.1 percent of men and 32.2 percent of women are engaged in voluntary activities in 2003 representing a 9 percentage point increase since 1989 (Hayghe, 1991; Bureau of Labor Statistics, 2003). For Canada the National Survey of Giving, Volunteering and Participating reports 27 percent of the whole population engaged in voluntary labour (Hall, McKeown and Roberts, 2001). In Austria the participation rate in volunteering has run up to 51.1 percent in 2000 even though the figures have slightly declined in the last 10 years (Badelt and Hollerweger, 2001). In a survey by Salamon and Sokolowski (2001) participation in volunteering activities for 24 countries is presented. It is reported that voluntary work in these countries contributes to an equivalent of 11 million full time jobs although the authors find lower participation rates on average as compared to country specific studies. The lower figure for unpaid labour can be attributed to varying classifications of voluntary activities (e.g. the survey excludes sports and governmental organisations). The important role of voluntary activities on social and economic life and the high participation rates necessitate a thorough economic analysis of motives for voluntary labour supplied.

Since volunteering cannot be explained by traditional labour market theory we build on a different approach introduced by Menchik and Weisbrod (1987). According to this approach volunteering can be conceived either as a consumption or as an investment good. In the consumption model volunteering reflects a utility-bearing activity. Hence, a utility maximising consumer will choose voluntary activities according to her preference structure under a given income constraint. Within the investment hypothesis voluntary activities cause opportunity cost as time and effort is devoted in order to increase someone's income on the paid labour market. Therefore, the level of income is determined by the amount of voluntary labour supply.

An empirical investigation of these models[1] is confronted at least with the following problems: First, the empirical analysis has to control for potential simultaneity between income and the volunteering decision. Second, self selection of volunteers must be expected in the sense that volunteers differ systematically to non-volunteers in (un)observed characteristics. Third, it is difficult to test comprehensively the underlying motives behind the consumption and investment model.

In this paper we tackle these issues by use of advanced regression and propensity score matching methods and thereby controlling for potential endogeneity caused by simultaneity and self selection. Based on Austrian census data on volunteers in organisations we try to identify evidence in support of the investment and/or the consumption model. Moreover, we test different motives of volunteers in either approach. The proposal is innovative as existing contributions limit their analysis on either the consumption or the investment model and do not account for the potential simultaneity.

2 The Rationale of Volunteering

In this section the motives for volunteering are formally specified: Based on the *consumption model* voluntary activities may appear as an ar-

[1]The following analysis of volunteering concentrates on the supply side. On the demand side we assume a perfectly elastic relationship for volunteers at zero wages.

gument in the following maximisation problem of a utility function U_i subject to an income and time constraint

$$\max \; U_i(t_L, t_V, C) \quad s.t. \quad C + p_V t_V = w(T - t_L - t_V) \tag{1}$$

The fact that voluntary work is time consuming implies that for each offered hour opportunity cost has to be accepted: The variables t_L and t_V represent the hours of leisure activities and the hours spent for voluntary work, respectively. The variable C denotes conventional consumption expenditures (numeraire), and p_V is the price of volunteering (private out of pocket expenses for doing voluntary work). The income constraint is defined by the product of the wage rate w and the working hours $T - t_L - t_V \geq 0$. The variable T stands for the endowment of available time. Hence, by providing an additional hour of volunteering individual income is affected. If the wage rate changes the allocation of time and therefore income will change as well. An increasing (decreasing) wage rate will be associated with a decline (increase) of voluntary work due to the substitutional relationship between paid work and volunteering. If wage has no influence on the amount of volunteering this may either indicate a certain type of preference structure or invalidate the consumption model. Therefore, the conclusion that a missing empirical correlation between wage and volunteering undoubtedly indicates the irrelevance of the consumption model seems premature since substitution and income effects of a change in the wage rate may cancel out.

One branch of literature (Govekar and Govekar, 2002) stresses altruistic motives for voluntary activities. Even though altruism is not explicitly specified in our consumption model the used framework enables this interpretation. In relation to the altruistic motive Frey and Goette (1999) argue that the monetary compensation for voluntary activities would crowd out the intrinsic motivation of volunteers. Thoits and Hewiit (2001) and Meier and Stutzer (2004) emphasise the positive influence of volunteering on physical and mental health.

Based on the consumption model the following suppositions can be derived:

- *Supposition* 1: A significant influence of income on volunteering supports the validity of the consumption model.

- *Supposition* 2: Controlling for income the number of working hours is expected to have a negative effect on volunteering.

In contrast to the consumption model the main purpose of volunteering in the *investment model* is accumulation of human capital. Hence, volunteering will increase future income as voluntary workers acquire certain types of skills and create and develop networks which are useful for their paid job. Whereas the consumption model can be formulated within a static framework, the investment approach necessitates a dynamic setting. Therefore, volunteering within the simplest form of an investment model is expressed as the outcome of the following individual dynamic maximisation problem:

$$\max_{v(t)} \text{NPY} = \int_0^T f\left(v\left(t\right), h\left(t\right)\right) e^{-rt} dt \quad s.t. \ \dot{h}\left(t\right) = g\left(v\left(t\right)\right) - \delta h\left(t\right) \quad (2)$$

$$\text{with } \frac{\partial f(v(t), h(t))}{\partial v(t)} < 0, \ \frac{\partial f(v(t), h(t))}{\partial h(t)} > 0 \text{ and } \frac{\partial g(v(t))}{\partial v(t)} > 0.$$

In this intertemporal optimisation problem an individual maximises her net present income which is the integral of a production function $f(\bullet)$ over the time span $[0, T]$. The variable T can be associated with the age of retirement. In the production function $v(t)$ represents the amount of volunteering activities and $h(t)$ denotes accumulated human capital. Whereas an increase in volunteering will decrease the current income level, an increase in human capital will raise future individual income. As indicated by $g(v(t))$ in the equation of motion volunteering pays off in the sense that investment in volunteering today - although reducing current income - will increase future human capital and therefore future income levels. The depreciation of the human capital stock over time is denoted by $\delta h(t)$. The solution to this standard dynamic optimisation problem[2] is the optimal time path of volunteering which is characterised by high volunteering at the beginning of the time span.

[2]This model is based on education decisions in the theory of human capital. For a good introduction, see Cahuc and Zylberberg (2004).

Thereafter, voluntary labour supply decreases steadily over time. The optimal volunteering time path follows a typical inverse U-shaped human capital curve. However, the model does not necessarily predict that every individual would have an incentive to offer voluntary labour. If the loss in current income through volunteering is expected to be higher than future returns from volunteering the amount of voluntary labour comes down to zero.

The function $g(\bullet)$ in (2) allows the discussion of different investment-based motives how volunteering may augment the stock of human capital. (i) One explanation for $g(\bullet)$ is on-the-job training and the acquisition of useful skills resulting from volunteering in organisations (Mueller, 1975). Volunteering may be used to learn job-specific requirements and acquire insider know-how to be utilised as a comparative advantage in future recruitment. (ii) Volunteering enables the access to networks (Saloner, 1985) through which people obtain better job opportunities, support through lobbying, or access to important information. (iii) The function $g(\bullet)$ can also be motivated by signalling motives: Potential employees use their volunteering activities in order to demonstrate their ability and willingness to perform, which means volunteering is used to 'boost' curricula vitae. (iv) Moreover volunteering may be interpreted as a temporary commitment combined with the idea that monetary compensation will be obtained in the future when unpaid voluntary activities reach a profitable level. Here volunteering is seen as a vehicle for the preparation of lucrative markets (see Cugno and Ferrero (2004)). (v) Given the fact that the stock of human capital will depreciate faster for those who are (temporarily) not on the job, volunteering may be used to compensate this decline of human capital (see Mueller (1975)). In the dynamic setting above the optimal response would therefore lead to higher amounts of voluntary activities over time for those temporarily not on the job.

Based on the investment model the following empirically testable suppositions can be extracted:

- *Supposition* 3: A significant positive impact of volunteering on the level of income is expected. This causal effect allows the estimation of a wage premium the size of which is of primary interest.

- *Supposition* 4: Based on the expectation that investment in human capital decreases over time older people are expected to volunteer less then younger ones.

- *Supposition* 5: Since the acquisition of useful skills requires exercise the wage premium is expected to increase with the number of voluntary hours supplied. This positive influence is also supported by the argument that the number of voluntary hours may express an individual's willingness to perform. However, an optimal number of volunteering hours can be supposed beyond which the engagement in volunteering might appear counterproductive. Too much volunteering might signal too little time for the paid job.

- *Supposition* 6: Based on the network motive the wage premium depends more on the number of organisations for which people volunteer than on the amount of voluntary hours. Again, signalling is another motive in support of a positive influence of the number of organisations as long as this number is below its optimum.

- *Supposition* 7: The more influential and the broader the potential network of a volunteering organisation the higher is the supposed wage premium.

- *Supposition* 8: In order to compensate for the loss of human capital unemployed people and people willing to enter the labour force (again) will volunteer with a higher probability and with a higher intensity than others.

3 Volunteering in the literature

The following empirical contributions with respect to the motives for volunteering can be found in the literature:

Volunteering as consumption: Mueller (1975) analyses voluntary hours of women with special attention on altruistic motives using OLS estimations. Another OLS estimation of voluntary hours is supplied by Dye

(1980). Whereas income remains insignificant in both analyses, empirical results show a significant positive influence of private wealth on the provision of voluntary labour in the later one. Empirical evidence on volunteering based on the estimation of a single equation is also presented by Schram and Dunsig (1981). This paper is restricted to married women, uses an OLS estimation to explain the volunteering decision and finds a negative influence of age on the probability to volunteer. Unger (1991) interprets volunteering as a self sacrifice with no apparent reward and finds empirical support for altruism with volunteering to be motivated by a person's perception of the needs of others in the community.

Andreoni, Gale and Scholz (1996) argue that the determinants of charitable contributions of money have often been examined, however, only few papers existed on voluntary labour. They apply a bivariate Probit model for the simultaneous estimation of spending time and money and find a net wage elasticity of voluntary labour of -0.8. Therefore, changes in the opportunity cost of time can have substantial effects on the provision of volunteer hours. The simultaneity between income and volunteering, however, has not been addressed.

Based on a Probit estimation Schady (2001) finds a positive correlation of income on volunteering. This confirms the results of Freeman (1997) who argues that volunteering is a so-called 'conscience-good' meaning that people feel morally obligated to volunteer if they are asked to do so. He shows that the rich are addressed to volunteer more frequently since they are expected to be more productive than people with lower income.[3] This might explain the empirically measured positive influence of income on volunteering. However, both studies do neither consider self-selection nor simultaneity problems. Bryant, Jeon-Slaughter, Kang and Tax (2003) emphasis in their analysis whether an individual was asked to volunteer or not and control for potential selection bias. The results, however, must be used with caution since the identification of the selection equation and the volunteering equation rely solely on distributional assumptions. Although Carlin (2001) controls for self selection

[3]This argument can either be incorporated in the consumption or the investment model. On the one hand people may therefore try to avoid the loss of reputation or social acceptance (consumption hypothesis), on the other hand they might fear financial losses through e. g. the forfeiture of networks (investment hypothesis).

and finds support for the consumption model, the problem of simultaneity is ignored. Segal and Weisbrod (2002) are the the first stressing the heterogeneity of volunteering in empirical work. They use Probit estimations to explain volunteering in health and education sectors as well as in religious services.

With respect to socio-economic characteristics to be used as independent variables in explaining volunteering most studies find positive effects of higher education. Likewise persons living in partnership, and those with high values of time volunteer ceteris paribus more. However, Gibson (1999) finds in his twin-study a negative impact of education on volunteering if family unobservables are controlled for.

Volunteering as investment: To our knowledge only a few empirical articles attempt to explore the causal effect of voluntary activities on the wage rate. Using Canadian data Day and Devlin (1997) examine whether volunteering generates a return in the paid labour market and whether this may help to explain part of the male-female earnings gap. Their investigation is restricted to sole wage earners since information on income is available on a household basis only. Methodologically Day and Devlin (1997) include a binary variable into the standard wage equation indicating whether a person contributes time for voluntary activities. Not controlling for potential endogeneity of volunteering they find a significant positive wage premium for male volunteers but not for volunteering women. Day and Devlin (1997) explain the difference between men and women by their different types of organisations they volunteer for and activities they pursue. Using the same data Day and Devlin (1998) find that on average volunteers earn about 7 percent higher incomes than non-volunteers. The econometric specification neglects the possible bias due to endogeneity of volunteering and abstains from separate estimations for men and women. Using improved data and a Heckman self selection procedure Devlin (2000) finds a lower wage premium of about 4 percent. The most recent contribution by Prouteau and Wolff (2003) applies an endogenous switching regression model to French data. Thereby, no statistically significant wage premium for volunteers can be found. The data is, however, restricted to volunteers who perform managerial tasks.

A combination of the investment and consumption model: Some papers try to consider *both* the consumption and investment model for volunteering. The empirical analysis in Menchik and Weisbrod (1987) is based on Tobit estimations of voluntary hours supplied. However, the explanation of both consumption and investment motives by one single equation must be criticised from an econometric perspective. Vaillancourt (1994) stresses that both consumption and investment play a role for individuals in their decision to volunteer. However, the employed Probit estimation of the volunteering decision including usual socio-economic variables may again be seen as a shortcoming of this empirical analysis. Day and Devlin (1996) investigate whether government spending and voluntary work are substitutes or complements. They suspect the potential endogeneity of income in the volunteering decision, attempt to control for it, but do not estimate a complete structural model. The empirical results are in line with Menchik and Weisbrod (1987) and Vaillancourt (1994), however, the shortcoming that simultaneity is not adequately addressed still adheres.

Even though single articles do distinguish between consumption and investment motives and also correct for self selection, the potential simultaneity between the decision to volunteer and making income has not been adequately addressed in the literature.

4 Data

The following empirical analysis is based on survey data of the Upper Austrian census conducted in summer 2001. In supplement to the regular census program a sub-sample of 2536 households was confronted with questions about aspects of volunteering.[4] In each household one person was interviewed at her place of residence. In addition data of an accompanying postal survey among 904 Upper Austrian volunteers (mainly volunteering for the Red Cross) have been made available. Income is available on a household basis in seven ranges of €727 length each. Since the empirical tests of *Suppositions* 1-8 necessitate individ-

[4]For a more detailed description of the survey, see Hackl and Pruckner (2003).

ual income we restrict our analysis to employed sole wage earners which reduces the sample size to 650 cases. Since standard labour economics uses hourly wage rates we have divided the interval means of the income variable by the monthly working hours so that we can argue in the traditional wage equation framework. As a consequence we will use solely the wage rate as income variable in the following econometric analysis. Due to missing observations in several variables the sample further diminishes to 421 observations. Out of these 421 observed individuals 161 persons volunteer, they provide on average 29.55 hours per month and work for 1.48 organisations.

Our data set on volunteering is cross sectional. The fact that we do not observe individuals over time and have no data on the hitherto duration of volunteering activities complicates the analysis of the investment motive with its inherent time consuming process of human capital accumulation. Nevertheless, the data allow valuable insights into the investment motive since several effects of volunteering on human capital work immediately (e. g. access to infrastructure of the volunteering organisation, signalling of willingness to perform). Moreover, the typical volunteer has been volunteering for many years and therefore, the human capital accumulation processes can already be observed in our data(e. g. the average number of years volunteering for the Red Cross organisation in Austria is 9 years). Based on these arguments the available data set is appropriate to validate the consumption and investment hypotheses.

5 Estimation strategy and empirical results

In order to test our suppositions we use the following estimation strategy: At first we analyse whether the consumption and/or the investment model may explain voluntary labour supply at all. Subsequently, we identify the respective underlying motives and mechanisms.

We apply the following system of equations:[5]

$$\begin{aligned} volunteering &= \alpha_1 + \beta_1\, wage + \gamma_{\mathbf{1}}\, \mathbf{X_1} + u_1 \\ wage &= \alpha_2 + \beta_2\, volunteering + \gamma_{\mathbf{2}}\, \mathbf{X_2} + u_2 \end{aligned} \tag{3}$$

where *wage* is the hourly wage rate, $\mathbf{X_1}$ and $\mathbf{X_2}$ represent vectors of individual socio-economic characteristics, and α, β, $\gamma_{\mathbf{1}}$, and $\gamma_{\mathbf{2}}$ symbolise the coefficients to be estimated. The variables u_1 and u_2 represent the respective error terms. The variable *volunteering* is captured in three different dimensions: (i) a dichotomous variable *volunteer* is equal to one if the individual volunteers and zero otherwise, (ii) the number of hours individuals' volunteer per month *volunteer hours*, and (iii) the number of organisations they are engaged with *#organizations*.

Since tests for endogeneity strongly indicate the prevalence of simultaneity between volunteering and the wage rate and self selection of volunteers we apply appropriate two-step procedures for the estimation of simultaneous equation models.[6]

The distinctive data type of our volunteering variables requires different methods of estimations. For the joint estimation of the dichotomous variable *volunteer* and *ln(wage)* we employ a Two-Stage Probit Least Squares Estimation (2SPROBITLS) proposed by Maddala (1983, p. 244):

$$\begin{aligned} volunteer^* &= \alpha_{11} + \beta_{11}\, ln(wage) + \gamma_{\mathbf{11}}\, \mathbf{X_{11}} + u_{11} \\ ln(wage) &= \alpha_{21} + \beta_{21}\, volunteer + \gamma_{\mathbf{21}}\, \mathbf{X_{21}} + u_{21} \\ volunteer &= 1[volunteer^* > 0] \end{aligned} \tag{4}$$

Since the latent variable *volunteer hours* is censored at zero hours a Two-Stage Tobit Least Squares Model (2STOBITLS) is used, where we estimate the volunteering equations by an Amemyia generalised least squares (AGLS) estimator (Amemiya, 1978; Newey, 1987) and the wage equations

[5] Subscrtipts denoting individuals are omitted for simplicity.

[6] The empirical results of the corresponding endogeneity tests will be discussed below.

following Maddala (1983, p. 243):

$$\begin{aligned} volunteer\,hours^* &= \alpha_{12} + \beta_{12}\, ln(wage) + \boldsymbol{\gamma_{12}}\, \mathbf{X_{12}} + u_{12} \\ ln(wage) &= \alpha_{22} + \beta_{22}\, volunteer\,hours + \boldsymbol{\gamma_{22}}\, \mathbf{X_{22}} + u_{22} \\ volunteer\,hours &= max[0, volunteer\,hours^*] \end{aligned} \tag{5}$$

The same estimation procedure is applied for the joint estimation for the censored variable *#organizations* and *ln(wage)*:

$$\begin{aligned} \#organizations^* &= \alpha_{13} + \beta_{13}\, ln(wage) + \boldsymbol{\gamma_{13}}\, \mathbf{X_{13}} + u_{13} \\ ln(wage) &= \alpha_{23} + \beta_{23}\, \#organizations + \boldsymbol{\gamma_{23}}\, \mathbf{X_{23}} + u_{23} \\ \#organizations &= max[0, \#organizations^*] \end{aligned} \tag{6}$$

Both the wage and volunteering equations include a set of exogenous socio-economic variables such as education, working experience, sex, family status, place of residence, and working hours in the paid job. In addition the wage equations contain the number of household members, whether a person works in shifts or not and whether she is a blue or white collar worker. The volunteering equation is identified by the following exclusive restrictions: Whether or not an individual has been engaged in a club during childhood and adolescence and whether or not the individual has a volunteering partner or not. Both variables are highly correlated with the individual's decision to volunteer: Joint coordination of (leisure) time or imitation of partner's behaviour could be reasons for the influence of the partner's volunteering. The influence of club membership in childhood can be interpreted as a proxy for the individual's social predisposition. Moreover, they are not correlated with unobserved wage-enhancing characteristics. It is not plausible that individuals deliberately or unconsciously join clubs during childhood and adolescence in order to to find better-paying jobs many years later. In addition, it is not obvious why the volunteering behaviour of the partner should be correlated with the residual in the wage equation of the individual.[7] With

[7] Only if there is a positive assortative mating of unobserved wage enhancing characteristics of cohabiting partners, the usage of our instrument would be problematic. However, we do not find literature supporting the existence of assortative mating of unobserved wage enhancing characteristics. In general, there has been little conclusive evidence favouring the assortative mating hypothesis of observable characteristics (Liu and Zhang, 1999).

the exception of the instruments of wage in the equation estimating the number of organizations, the validity of all our instruments is approved by the overidentification tests with high probabilities (see lower panel in Table 2). For a detailed description and calculation of variables, see Table 1.

Table 2 includes the estimation results for the three different types of estimation models. The lower panel includes the tests for endogeneity and tests for overidentification. The volunteering variables (*volunteer*, *volunteer hours* and *#organizations*) are correlated with the structural error in the wage equation with a probability of 92.8 percent, 99.6 percent and 99.7 percent. Therefore, we have a strong evidence for the prevalence of the theoretically presumed endogeneity of volunteering. Endogeneity of income in the volunteering equation occurs with lower probabilities. However, since income is endogenous at least in the hours equation with a high probability of 51 percent we apply the instrumental variable strategy.

The estimation results show that volunteers receive a wage premium on the paid labour market. Irrespective of the volunteering variable to be used and the applied estimation technique volunteers earn a significantly higher wage as compared to non-volunteers (*Supposition* 3). Whereas the wage premium for participating in voluntary work is on average 18.7 percent based on 2SProbitLS model, the 2STobitLS regression estimates a wage premium of 0.60 percent for one additional hour of voluntary labour per month, and 17.3 percent higher wages if an individual is volunteering for an additional organization. The robust and highly significant impact of volunteering on wages supports the importance of the investment model to explain voluntary work. To illustrate the consequences of neglecting endogeneity we present single equation estimation results in Table 3 which indicate a flawed upward biased wage premium of 23.4 percent. All other coefficients in the wage equations are of reasonable order of magnitude and show theoretically expected signs. Uncommonly we do not observe a significant wage differential between men and women, which might result from observing single earners only.

In contrast we do not find clear evidence for the validity of the con-

sumption model. The coefficient of *ln(wage)* in the volunteering equation remains insignificant in all three variants (*Supposition* 1). The same is true for the variable *work hours* in the volunteering equations (*Supposition* 2). At same time one should also bear in mind that the tests of endogeneity of income in the volunteering equations suggest in two out of three cases the exogeneity of income. Therefore, we present also single equation estimation results for the decision to volunteer in Table 3 neglecting potential endogeneity. This estimation shows a highly significant influence of income on volunteering and would therefore support the consumption motive.[8] Considering the tests of endogeneity of income and the variyng significance of income in the different estimation approaches we get ambigious results concerning the consumption model. Many contributions in the literature based on single equation models of volunteering find a clear-cut positive and significant effect of income on volunteering without testing and/or controlling for potential endogeneity and interpret this result in support of the consumption hypothesis. Given our findings these conclusions seem to be premature.

The impact of increasing age on voluntary labour supply (depicted by *exper* and $exper^2$) shows ambiguous results too: Given that the amount of volunteering decreases with the years of work experience up to an age of about 54 years for the hours supplied and about 59 years for the number of organisations we find evidence in support of the investment motive. The older an individual, the lower is her investment in human capital and the less are the profits from networks provided by volunteering work (*Supposition* 4). On the other hand we measure increasing volunteering activities for people being older than about 54 years, 59 respectively. This result contradicts the investment model and provides evidence for the consumption model. One possible explanation is that the motives for volunteering change in the course of time and if retirement comes into reach people conceive volunteering as investment in their mental and physical health (Thoits and Hewiit, 2001; Meier and Stutzer, 2004) or as pure amusement.

Women, individuals residing in urban areas and people living in a

[8]The same results arise from single equation estimations for *volunteer hours* and *#organisations*.

partnership (irrespective of whether or not they are legally married) are less likely to offer voluntary labour. The fact that women volunteer significantly less according to our data, may be explained by child care responsibilities, since the number of unprovided children cannot be included in the regressions due to defective data. The influence of residing in an urban area can be explained by the different social structure in rural areas as compared to large cities with a stronger corporate attitude to be expected in rural areas. Furthermore, a lack of alternative leisure activities in rural areas makes volunteering more attractive and decreases opportunity cost of volunteering. The negative impact of a cohabiting partner probably reflects tighter time constraints. We do not find statistically significant impact of education.

An alternative method is provided by the 'matching method' where we are interested in the estimation of the causal effect of volunteering on the wage. We setup a counterfactual framework introduced by Rubin (1974): For individual i with $i = 1 \dots N$ let $wage_i(1)$ denote the wage rate for individual i when she is volunteering ($v_i = 1$) and $wage_i(0)$ is the wage if she is not volunteering ($v_i = 0$). If both $wage_i(1)$ and $wage_i(0)$ would be observable, then the wage premium could be calculated as $wage_i(1) - wage_i(0)$. If we could observe both outcomes we would be able to estimate the so-called treatment effect as the expected causal effect of volunteering on the wage rate. Obviously, this situation can never be observed in non-experimental studies and we face the problem of missing data. To overcome this problem matching methods compare two individuals in the data who only differ in their volunteer activity and coincide in their remaining socio-economic variables $\mathbf{X_1}$. Given the matching of these individuals different treatment effects can be investigated: The Average Treatment Effect ATE' calculates the expected effect of volunteering on the wage rate including every individual in the population irrespective whether she volunteers or not:

$$ATE' \equiv \mathbb{E}\left[wage(1) - wage(0)\right] = \frac{1}{N}\sum_{i=1}^{N}\left(wage_i(1) - wage_i(0)\right) \qquad (7)$$

A second quantity of interest represents the Average Treatment Effect on the Treated ATT', which averages the causal effect of the treatment

across the subpopulation of volunteers. This is the average wage premium for those who actually volunteer:

$$ATT' \equiv \mathbb{E}\left[wage(1) - wage(0)|v = 1\right] \tag{8}$$

$$= \frac{1}{N_1} \sum_{i|v_i=1}^{N} \left(wage_i(1) - wage_i(0)\right) \tag{9}$$

For obvious reasons, the procedure suffers from multi-dimensionality which can jeopardise the matching strategy if many explaining variables have to be considered. Rosenbaum and Rubin (1983) propose Propensity Score Matching as an equivalent estimation strategy which reduces the dimensionality problem. The so-called propensity score is the probability of volunteering given the vector of socio-economic variables:

$$p(\mathbf{X_1}) \equiv \mathbf{Pr}(v = 1|\mathbf{X_1}) \tag{10}$$

Any standard probability model can be used to estimate the propensity score which acts as an indicator for the similarity of individuals to be matched. In terms of the propensity score the ATT can be written as[9]:

$$ATT \equiv \mathbb{E}\left[\mathbb{E}[wage(1) - wage(0)|p(\mathbf{X_1}), v = 1]\right] \tag{11}$$

$$= \mathbb{E}[\mathbb{E}[wage(1)|p(\mathbf{X_1}), v = 1] - \mathbb{E}[wage(0)|p(\mathbf{X_1}), v = 0]|v = 1] \tag{12}$$

Obviously, the probability of observing individuals with identical propensity scores tends to be zero. Hence, various methods are suggested for the definition of similarity from which we apply Radius Matching, Kernel Matching, and Nearest Neighbour Matching.[10]

The propensity score estimation for our data on volunteering is shown in Table 4. The explaining variables are similar to the structural variables in Table 2 except the wage which is now the outcome of interest in this counterfactual framework. With a range from 24.6 percent to 26.9 percent the statistically significant ATTs are as expected higher than the wage premia obtained from the regression analysis which represent ATEs. These results again indicate a positive causal effect of volunteering on the

[9]For more details on Propensity Score Matching see Wooldridge (2002, ch. 18).
[10]For details see Becker and Ichino (2002).

wage rate and confirm the validity of the investment model.

Investment motives of volunteering

Subsequently, we explore the underlying motives behind the investment hypothesis in more depth. In particular we are interested in the number of voluntary hours supplied and/or the number of organisations. Whereas the effect of volunteering hours is associated with the acquisition of useful skills and signalling willingness to perform (*Supposition* 5), the number of organisations is attributed to the network motive (*Supposition* 6). Looking at Table 2 volunteering hours and the number of organisations are highly significant in explaining the wage premium. Nevertheless, these estimations do not allow the isolation of the partial influence of $\#organizations$ ($volunteer\,hours$) since the equation does not control for $volunteer\,hours$ ($\#organizations$). In a perfect setting this would require the simultaneous estimation of the decision to volunteer, the number or organisations, the volunteering hours and the wage rate.[11] Since the resulting system of equations seems empirically unmanageable we have chosen the following procedure: After controlling for self selection into volunteering and the potential simultaneity of volunteering and the wage rate we assume the volunteering hours and the number of organisations to be exogenous. Hence, we suppose that once controlling for the decision to volunteer the variables $\#organizations$, $volunteer\,hours$, $(\#organizations)^2$ and $(volunteer\,hours)^2$ do not correlate with the structural error of the wage equation. Therefore, we employ a 2SProbitLS estimation to explain simultaneously $ln(wage)$ and $volunteer$ where we include $volunteer\,hours$, $(volunteer\,hours)^2$, $\#organizations$ and $(\#organizations)^2$ in the second stage regression of the wage equation as exogenous variables.

The positive coefficient for $volunteer\,hours$ and the negative coefficient for $(volunteer\,hours)^2$ in Table 6 indicate a decreasing marginal rate of return of hours on the wage rate. The maximal wage premium is given at 40 hours voluntary work per month. Though not statistically significant we also observe a decreasing marginal return of the number

[11] If we furthermore allow for quadratic terms of volunteering hours and number of organisations the system would extend to six endogenous variables.

of organisations with the maximum wage premium at 3.1 organisations. The coefficients of the other variables in the wage equation show expected signs and are very similar to the estimated models presented in Table 2.

To gain further evidence on the underlying motives of the investment model we again apply Propensity Score Matching. Within the group of volunteers three different treatments are designed: (i) Whether a person volunteers more than the sample median of voluntary hours supplied. (ii) Whether a person volunteers more than the sample mean of voluntary hours supplied. (iii) Wether a person volunteers for more than one organisation. Table 7 shows the Probit estimations to be used for the calculation of propensity scores. As indicated by the ATTs in Table 8 an increase of working hours beyond the sample median raises the wage by 24.4, 19.9 or 17.4 percent depending on the matching estimator with the Kernel and Radius results being statistically significant. With 21.2, 17.8 and 13.1 percent the corresponding values based on the 'mean treatment' are lower as compared to the 'median-treatment'. Given that the median of *volunteer hours* is smaller than the mean we get again a confirmation of a decreasing marginal return of *volunteer hours*. Again the Kernel and Radius methods provide statistically significant ATTs. With a wage premium from 6.1 percent (Nearest Neighbour) to 8.8 percent (Radius) the treatment based on the number of organisations provides lower results. However, these results are statistically insignificant.

Both the 2SPROBITLS results from Table 6 and the matching estimations (Table 8) confirm a significant influence of voluntary hours on the wage rate. Apparently, the acquisition of useful skills and their impact on human capital plays an important role for the explanation of volunteering behaviour (*Supposition* 5).

All other suppositions on the investment model cannot be supported by our data: As far as the network motive is concerned (*Supposition* 6) we have not found a statistical influence of the number of organisations as shown above. A plausible explanation for this result is that volunteering for too many organisations may signal that an individual would have too little time for the paid job. Based on *Supposition* 7 we tested whether more influential and bigger organisations guarantee higher wage premia.

Introducing various dummies for certain types of organisations in our regression analyses we have not found statistical evidence for the validity of *Supposition* 7. The same is true for *Supposition* 8 predicting a higher probability to volunteer for unemployed people or people willing to enter the labour force again - we do not find according evidence.[12]

6 Summary and Conclusions

This paper analyses motives for the decision to volunteer. The analysis is based on the interpretation of volunteering as a normal consumption good (*consumption model*) or as a mean to increase individual's own human capital (*investment model*). Whereas existing literature delivers evidence on the validity of these models, available empirical results are ambiguous. Most of the results in this literature must be questioned at least partly due to methodological difficulties which are not considered adequately.

We present a solid empirical framework to address different hypotheses on volunteering decisions with appropriate econometric methods. The paper differs from previous work by

- empirically controlling for potential simultaneity due to interdependence between income and the volunteering decision.
- accounting for self selection of volunteers since volunteers differ systematically to non volunteers in (un)observed characteristics determining income.
- investigating the underlying motives behind the investment model.

Summarising our results we find statistical evidence for the investment model with a highly robust and significant causal effect of volunteering on the wage rate. On average the wage premium as the difference in the wage rate between one person volunteering and non-volunteering amounts up to 18.7 percent. In the framework of the investment model

[12] Regression results for *Suppositions* 7 and 8 are not reported in the paper.

it turns out that the number of volunteering hours plays an important role in explaining the wage premium. This supports the importance of acquiring skills to accumulate human capital and signalling willingness to perform. However, no evidence is found for other motives associated with the investment model such as networking.

As far as the consumption motive is concerned we do not find clear statistical evidence for its validity. Even within our instrumental variable approach, where income has no significant impacton the volunteering decision, we can not rule out the validity of the consumption model. A certain type of preference structure might explain this outcome as well (e.g. quasi-linear preferences, substitution and income effects might cancel out each other). In addition we find som evidence that people seem to change their motives for volunteering over time: When people grow older and their retirement comes into reach, they seem to offer voluntary labour in order to presere their mental and physical health or to enjoy themselves.

Several conclusions can be drawn from this analysis: The strong evidence for the investment model with its significant influence of volunteering on the wage rate requires the inclusion of voluntary activities in the estimation of wage equations. From an individual's perspective the existence of the wage premium is an important factor in the decision to volunteer or not. Hence, our results can further be exploited as a striking argument in the recruitment process of volunteers for several organisations. Moreover, the results may challenge previous empirical findings on volunteering: Many papers report a positive and significant influence of income on the volunteering decision without adequately taking endogeneity based on self selection and simultaneity into account. Therefore, it remains open whether this positive influence is in support of the consumption model or occurs as a result of econometric misspecification. We offer a promising procedure for the appropriate analysis of unpaid labour and take into account the underlying econometric structure of this type of labour supply.

References

Amemiya, Takeshi (1978), 'The Estimation of a Simultaneous Equation Generalized Probit Model', *Econometrica* **46**(5), 1193–1205.

Andreoni, James, William G. Gale and John K. Scholz (1996), Charitable Contributions of Time and Money, Working paper, Department of Economics, University of Wisconsin-Madison. http://www.ssc.wisc.edu/~andreoni/WorkingPapers/ags-v8.pdf (last download: 11.07.04).

Badelt, Christoph and Eva Hollerweger (2001), Das Volumen ehrenamtlicher Arbeit in Österreich, Working Paper 6, Abteilung für Sozialpolitik, Wirtschaftsuniversität Wien.

Baum, Christopher F., Mark E. Schaffer and Steven Stillman (2003), 'Instrumental Variables and GMM: Estimation and Testing', *Stata Journal* **3**(1), 1–31.

Becker, Sascha O. and Andrea Ichino (2002), 'Estimation of Average Treatment Effects Based on Propensity Scores', *Stata Journal* **2**(4), 358–377.

Bryant, Keith W., Haekyung Jeon-Slaughter, Hyojin Kang and Aaron Tax (2003), 'Participation in Philantropic Activities: Donating Money and Time', *Journal of Consumer Policy* **26**(1), 43–73.

Bureau of Labor Statistics (2003), *Volunteering in the United States, 2003*, Washington, D.C.

Cahuc, Pierre and André Zylberberg (2004), *Labor Economics*, MIT Press, Cambridge, MA.

Carlin, Paul S. (2001), 'Evidence on the Volunteer Labor Supply of Married Women', *Southern Economic Journal* **67**(4), 801–824.

Cugno, Franco and Mario Ferrero (2004), 'Competition Among Volunteers', *European Journal of Political Economy* **20**(3), 637–654.

Day, Kathleen M. and Rose A. Devlin (1996), 'Volunteerism and Crowding Out: Canadian Econometric Evidence', *Canadian Journal of Economics* **29**(1), 37–53.

Day, Kathleen M. and Rose A. Devlin (1997), 'Can Volunteer Work Help Explain the Male-Female Earnings Gap?', *Applied Economics* **29**(6), 707–721.

Day, Kathleen M. and Rose A. Devlin (1998), 'The Payoff to Work Without Pay: Volunteer Work as an Investment in Human Capital', *Canadian Journal of Economics* **31**(5), 1179–1191.

Devlin, Rose A. (2000), Labour-Market Responses to Volunteering – Evidence from the 1997 SGVP, Working Paper R-00-5-1E, Human Resources Development Canada, Strategic Policy, Applied Research Branch, Ottawa.

Dye, Richard F. (1980), 'Contributions of Volunteer Time: Some Evidence on Income Tax Effects', *National Tax Journal* **33**(1), 89–93.

Freeman, Richard B. (1997), 'Working for Nothing: The Supply of Volunteer Labor', *Journal of Labor Economics* **15**(1), S140–S166.

Frey, Bruno S. and Lorenz Goette (1999), Does Pay Motivate Volunteers?, Working Paper Series 7, Institute for Empirical Reasearch in Economics, University of Zurich. http://www.iew.unizh.ch/wp/iewwp007.pdf (last download: 02.03.2004).

Gibson, John (1999), 'Correlation Versus Causation and the Apparent External Benefits of Education', *New Zealand Economic Papers* **33**(1), 51–69.

Govekar, Paul L. and Michele A. Govekar (2002), 'Using Economic Theory and Research to Better Understand Volunteer Behaviour', *Nonprofit Management and Leadership* **13**(1), 33–48.

Hackl, Franz and Gerald J. Pruckner (2003), 'Wertschätzung für Erste Hilfe - eine ökonomische Analyse des Roten Kreuzes', *Journal of Public Health/Zeitschrift für Gesundheitswissenschaften* **1**(12), 50–60.

Hall, Michael, Larry McKeown and Karen Roberts (2001), *Caring Canadians, Involved Canadians: Highlights from the 2000 National Survey of Giving, Volunteering and Participating*, Canadian Centre for Philanthropy.

Hayghe, Howard V. (1991), 'Volunteers in the U.S.: Who Donates the Time?', *Monthly Labour Review* **114**(1), 17–23.

Keshk, Omar M. G. (2003), 'CDSIMEQ: A Program to Implement Two-Stage Probit Least Squares', *The Stata Journal* **3**(2), 1–11.

Liu, Pak-Wai and Junsen Zhang (1999), 'Assortative Mating versus the Cross-Productivity Effect', *Applied Economics Letters* **6**(8), 523–525.

Maddala, G S (1983), *Limited-Dependent and Qualitative Variables in Econometrics*, Cambdridge University Press, Cambdridge.

Meier, Stephan and Alois Stutzer (2004), Is Volunteering Rewarding in Itself?, Working Paper Series 180, Institute for Empirical Research in Economics, University of Zurich. http://www.iew.unizh.ch/wp/iewwp180.pdf (last download: 02.03.2004).

Menchik, Paul L. and Burton A. Weisbrod (1987), 'Volunteer Labour Supply', *Journal of Public Economics* **32**(2), 159–183.

Mueller, Marnie W. (1975), 'Economic Determinants of Volunteer Work by Women', *Signs: Journal of Women in Culture and Society* **1**(2), 325–338.

Newey, Whitney K. (1987), 'Efficient Estimation of Limited Dependent Variable Models with Endogenous Explanatory Variables', *Journal of Econometrics* **36**, 231–250.

Prouteau, Lionel and François-Charles Wolff (2003), Does Voluntary Work Pay Off in the Labor Market? http://www.lameta.univ-montp1.fr/jma2003/Articles/JMA2003_Prouteau.pdf (last download: 24.04.04).

Rivers, Douglas and Quang H. Vuong (1988), 'Limited Information Estimators and Exogeneity Tests for Simultaneous Probit Models', *Journal of Econometrics* **39**(3), 347Ű–366.

Rosenbaum, Paul R. and Donald B. Rubin (1983), 'The Central Role of the Propensity Score in Observational Studies for Causal Effects', *Biometrika* **70**(1), 41–55.

Rubin, Donald B. (1974), 'Estimating Causal Effects of Treatments in Randomized and Nonrandomized Studies', *Journal of Educational Pyschology* **66**(5), 688–701.

Salamon, Lester M. and Wojciech Sokolowski (2001), Volunteering in Cross-National Perspective: Evidence from 24 Countries, Working Papers of the Johns Hopkins Comparative Nonprofit Sector Project 40, The Johns Hopkins Center for Civil Society Studies, Johns Hopkins University. http://www.jhu.edu/~ccss/pubs/pdf/cnpwp401.pdf (last download: 14.05.2004).

Saloner, Garth (1985), 'Old Boy Networks as Screening Mechanisms', *Journal of Labor Economics* **3**(3), 255–267.

Sargan, John D. (1958), 'The Estimation of Economic Relationships Using Instrumental Variables', *Econometrica* **26**(3), 393–415.

Schady, Norbert R. (2001), Who Participates? The Supply of Volunteer Labor and the Distribution of Government Programs in Rural Peru, Working Paper 2671, World Bank, Washington, DC. http://econ.worldbank.org/files/2396_wps2671.pdf (last download: 03.03.2004).

Schram and Dunsig (1981), 'Influences on Married Women's Volunteer Work Participation', *Journal of Consumer Research* **7**(4), 372–379.

Segal, Lewis M. and Burton A. Weisbrod (2002), 'Volunteer Labor Sorting Across Industries', *Journal of Policy Analysis and Management* **21**(3), 427–447.

Smith, Richard J. and Richard W. Blundell (1986), 'An Exogeneity Test for a Simultaneous Equation Tobit Model with an Application to Labor Supply', *Econometrica* **54**(4), 679–686.

Thoits, Peggy A. and Lyndi N. Hewiit (2001), 'Volunteer Work and Well-Being', *Journal of Health and Social Behavior* **42**(2), 115–131.

Unger, Lynette S. (1991), 'Altruism as a Motivation to Volunteer', *Journal of Economic Psychology* **12**(1), 71–100.

Vaillancourt, François (1994), 'To Volunteer or Not: Canada, 1987', *Canadian Journal of Economics* **27**(4), 813–825.

Wooldridge, Jeffrey M. (2002), *Econometric Analysis on Cross Section and Panel Data*, MIT Press, Cambridge, MA.

Table 1: Descriptive Statistics.

Variables	Description	Mean	Standard Deviation
blue collar	One if the individual is a blue collar worker and zero if she is a white collar worker.	0.31	0.46
exper	Age minus the years of schooling minus six.	21.37	10.44
female	One if the individual is female.	0.39	0.49
household members	Number of household members	2.04	1.40
ln(wage)	Ln of the individual hourly wage rate (= monthly income divided by monthly working hours)	2.26	0.48
partner	One if the individual has a partner	0.50	0.50
partner volunteers	One if the individual has a volunteering partner	0.08	0.27
religious	Indicating religiousness on a scale from 0 to 3	1.89	1.00
school	Years of schooling	11.59	1.95
shift worker	One if the individual is a shift worker	0.22	0.41
urban	One if the individual resides in an urban area	0.31	0.46
work hours	Hours of paid work per week	39.31	7.84
youth club	One if the individual was a club member during her adolescence	0.71	0.46
volunteer	One if the individual volunteers	0.39	0.49
volunteer hours	Hours of voluntary work per month	11.57	24.11
#organizations	Number of organizations people volunteer for	0.57	0.86

Table 2: Estimations of the Consumption and Investment Motive.[a]

Methods Of Estimation	2SProbitLS[b]		2STobitLS		2STobitLS	
	ln(wage)	*volunteer*	*ln(wage)*[c]	*volunteer hours*	*ln(wage)*[c]	*#organizations*
volunteer	0.187					
	(0.495)***					
volunteer hours			0.006			
			(0.002)***			
#organizations					0.173	
					(0.053)***	
ln(wage)		0.655		49.745		0.736
		(0.925)		(34.772)		(1.225)
school	0.568	0.022	0.058	-1.125	0.059	0.034
	(0.132)***	(0.078)	(0.017)***	(2.947)	(0.016)***	(0.104)
exper	0.021	-0.080	0.029	-3.897	0.017	-0.063
	(0.009)**	(0.029)***	(0.013)**	(1.045)***	(0.010)*	(0.037)*
(exper)^2	-0.0004	0.002	-0.001	0.072	-0.0003	0.001
	(0.0002)**	(0.0006)***	(0.0003)***	(0.022)***	(0.0002)	(0.0008)
female	-0.009	-0.539	0.063	-22.814	0.050	-0.803
	(0.631)	(0.187)***	(0.083)	(7.293)***	(0.081)	(0.257)***
partner	0.083	-0.310	0.112	-15.772	0.087	-0.380
	(0.050)*	(0.168)*	(0.060)*	(6.540)**	(0.061)	(0.229)*
urban	0.137	-0.751	0.132	-21.633	0.189	-1.095
	(0.063)**	(0.156)***	(0.070)*	(6.104)***	(0.087)**	(0.219)***
workhours	-0.016	0.010	-0.017	0.977	-0.016	0.016
	(0.003)***	(0.017)	(0.004)***	(0.652)	(0.004)***	(0.023)
shift worker	0.104		0.090		0.119	
	(0.053)*		(0.057)		(0.054)**	
household members	0.040		0.032		0.043	
	(0.019)**		(0.022)		(0.023)*	
blue collar	-0.081		-0.040		-0.040	
	(0.055)		(0.061)		(0.065)	
partner volunteers		1.440		31.624		1.391
		(0.402)***		(12.997)**		(0.456)***
youth club		0.379		11.962		0.579
		(0.188)**		(7.374)		(0.258)**
constant	1.903	1.903	1.853	-101.470	1.889	-2.087
	(0.235)***	(0.235)***	(0.294)***	(66.452)	(0.273)***	(2.334)
Test for Endogeneity of (H_0: The variable is exogenous.)						
volunteer	0.072[d]					
volunteer hours			0.004[d]			
#organiations					0.003[d]	
ln(wage)		0.958[e]		0.494[g]		0.904[g]
Overidentification test of all instruments for (H_0: The instruments are valid.)[h]						
volunteer	0.770					
volunteer hours			0.529			
#organizations					0.738	
ln(wage)		0.195		0.595		0.098

[a] In each estimation the number of observations is 421. Standard errors are in parentheses. *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level and 1-percent level. [b] The estimation is carried out by using Keshk (2003). [c] Standard errors are bootstrapped based on 1000 replications. [d] P-value of the Wu-Hausman statistic (Baum, Schaffer and Stillman, 2003). [e] P-value of a test according to (Rivers and Vuong, 1988); see also Wooldridge (2002, Chap. 15, Procedure 15.1). [g] P-value of a test according to (Smith and Blundell, 1986), see also Wooldridge (2002, Chap. 16, Procedure 16.1). [h] P-value of Sargan statistic (Sargan, 1958).

Table 3: Single Equation Results for Volunteering and Income.[a]

Method of Estimation	OLS	PROBIT
	ln(wage)	*volunteer*
volunteer	0.234	
	(0.045)***	
ln(wage)		0.757
		(0.178)***
school	0.068	0.010
	(0.012)***	(0.041)
exper	0.011	-0.084
	(0.008)	(0.028)***
(exper)^2	-0.000	0.002
	(0.000)	(0.001)***
female	-0.093	-0.569
	(0.051)*	(0.16)***
partner	0.095	-0.356
	(0.047)**	(0.154)**
urban	0.038	-0.791
	(0.047)	(0.163)***
work hours	-0.016	0.013
	(0.003)***	(0.010)
shift worker	0.125	
	(0.050)**	
household members	0.029	
	(0.018)	
blue collar	-0.106	
	(0.051)**	
partner volunteers		1.558
		(0.340)***
youth club		0.387
		(0.159)**
constant	1.824	-1.539
	(0.225)***	(0.755)**
Number of Observations	421	421
R^2	0.270	
McFadden's Pseudo R^2		0.214

[a] Standard errors are in parentheses. *, ** and *** indicate a statistical significance at the 10-percent level, 5-percent level and 1-percent level.

Table 4: Estimation of the Propensity Score to Volunteer.[a]

	PROBIT
	volunteer
female	-0.614
	(0.159)***
school	0.072
	(0.037)*
exper	-0.072
	(0.027)***
(exper)^2	0.001
	(0.0006)**
partner	-0.247
	(0.148)*
urban	-0.758
	(0.159)***
work hours	-0.007
	(0.009)
partner volunteers	1.615
	(0.326)***
youth club	0.457
	(0.155)***
constant	-0.251
	(0.684)
McFadden's Pseudo R^2	0.186
Number of Observations	421

[a] Standard errors are in parentheses. *, ** and *** indicate a statistical significance at the 10-percent level, 5-percent level and 1-percent level.

Table 5: ATT of Volunteering on the Hourly Wage Rate.[a]

Method of Matching	ATT	t-value	# of Treated	# of Controls
Kernel[b]	26.9%	4.472	162	259
Radius	25.2%	4.951	162	259
Nearest Neighbour	24.6%	2.751	162	87

[a] The estimation follows Becker and Ichino (2002). [b] The underlying standard errors are bootstrapped.

Table 6: Motives for the Investment Model.[a]

	2SPROBITLS	
	ln(wage)	*volunteer*
volunteer	0.105 (0.046)**	
volunteer hours	0.008 (0.002)***	
(volunteer hours)^2	-0.0001 (0.00002)**	
#organizations	0.055 (0.075)	
(#organizations)^2	-0.009 (0.024)	
ln(wage)		0.655 (0.949)
school	0.059 (0.012)***	0.022 (0.081)
exper	0.022 (0.009)**	-0.080 (0.030)***
(exper)^2	-0.0004 (0.0002)**	0.002 (0.0006)**
female	-0.005 (0.058)	-0.539 (0.192)***
partner	0.083 (0.047)*	-0.310 (0.174)*
urban	0.118 (0.058)**	-0.751 (0.160)***
work hours	-0.016 (0.003)***	0.010 (0.018)
shift worker	0.094 (0.050)*	
household members	0.036 (0.018)**	
blue collar	-0.069 (0.051)	
partner volunteers		1.440 (0.412)***
youth club		0.379 (0.192)**
constant	1.774 (0.223)***	-1.415 (1.820)
Number of Observations	421	421

[a] Bootstrapped standard errors are in parentheses (1000 replications). *, ** and *** indicate statistical significance at the 10-percent level, 5-percent level and 1-percent level. Due to the assumption of conditional exogeneity the variables *volunteer hours*, *(volunteer hours)*^{2}, *#organizations* and *(#organizations)*^{2} are included in the second stage regression only.

Table 7: Propensity Score Estimations for Various Treatments.[a]

	PROBIT		
TREATMENT=1 IF	*volunteer hour* > *median of volunteer hour*[b]	*volunteer hour* > *mean of volunteer hour*[c]	*#organizations* >1[d]
#organizations	0.669 (0.181)***	0.586 (0.169)***	
volunteer hours			0.020 (0.005)***
female	-0.949 (0.317)***	-0.877 (0.316)***	0.063 (0.298)
school	0.027 (0.059)	0.021 (0.059)	-0.015 (0.062)
exper	-0.132 (0.043)***	-0.099 (0.041)	0.176 (0.048)***
(exper)^2	0.002 (0.0009)**	0.002 (0.0009)*	-0.004 (0.001)***
partner	0.048 (0.256)	0.039 (0.256)	-0.040 (0.261)
urban	0.137 (0.288)	0.263 (0.289)	-0.219 (0.309)
work hours	0.001 (0.014)	0.006 (0.138)	0.012 (0.014)
partner volunteers	0.616 (0.334)*	0.559 (0.324)*	0.191 (0.338)
youth club	-0.093 (0.295)	0.172 (0.301)	0.244 (0.314)
constant	0.153 (1.165)	-0.673 (1.027)	-3.157 (1.136)***
McFadden's Pseudo R^2	0.245	0.207	0.183
Number of Obs.	162	162	162

[a] Standard errors are in parentheses. *, ** and *** indicate a statistical significance at the 10-percent level, 5-percent level and 1-percent level. [b] The sample includes 71 individuals with and 91 without treatment. The median of *volunteer hours* is equal to 20. [c] The sample includes 99 individuals with and 63 without treatment. The mean of *volunteer hours* is equal to 29.55. [d] The sample includes 56 individuals with and 106 without treatment. The mean of *#organizations* is equal to 1.48.

Table 8: ATT of Volunteering more Hours than the Sample Median/Mean and of Volunteering for more than one Organization on the Hourly Wage Rate.[a]

Method of Matching	ATT	t-value	# of Treated	# of Controls
volunteer hours > *median*				
Kernel[b]	24.4%	3.473	71	91
Radius	19.9%	2.230	71	91
Nearest Neighbour	17.4%	0.935	71	27
volunteer hours > *mean*				
Kernel[b]	21.2%	2.868	63	99
Radius	17.8%	1.993	63	99
Nearest Neighbour	13.1%	0.846	63	31
#organizations > 1				
Kernel[b]	7.2%	0.823	56	106
Radius	8.8%	0.918	51	104
Nearest Neighbour	6.1%	0.439	56	33

[a] The estimation follows Becker and Ichino (2002). [b] The underlying standard errors are bootstrapped.