

VOLUNTEERING AND LIFE SATISFACTION:  
AN INVESTIGATION OF ENDOGENEITY

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*Abstract*

Based upon the results of a national survey conducted in Taiwan, this study investigates the effects of volunteering on life satisfaction. We used a univariate ordered probit model and a simultaneous bivariate ordered probit model to compare the potential endogeneity between volunteering and life satisfaction. An exogenous military service variable was included in the bivariate model to correct the endogeneity of volunteering on life satisfaction. The results of the univariate ordered probit model suggest that volunteering has no effect on life satisfaction. However, the results from the simultaneous bivariate ordered probit model indicate volunteering has a significant positive effect on life satisfaction. The failure to account for endogeneity appears to underestimate the effect of volunteering on life satisfaction.

*Keywords:* volunteer labor, life satisfaction, endogeneity, ordered probit model

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## I. *Introduction*

Life satisfaction has become a subject of research for economists in recent years. Frey and Stutzer (2002) highlighted three important reasons why happiness is of interest to economists.<sup>1</sup> The first of these was the implication of economic policy dealing with a trade-off for different objectives, such as unemployment and inflation. The second was the impact of institutional conditions, such as the quality of government and the size of social capital on individual well-being. The third reason was to have an in-depth understanding of how subjective well-being can be developed.

Previous literature has focused primarily on exploring the cross-country determinations for life satisfaction. For example, Easterlin (1973, 1995) presented a paradox; average happiness levels have remained relatively constant over time despite large increases in per capita income. In other words, it appears money does not buy happiness. By contrast, other studies have indicated that people living in wealthy countries are happier than those living in poor countries (Diener et al., 1995; Inglehart, 1990). Based on data collected from 12 European countries between 1975 and 1991, Di Tella et al. (2001) showed that inflation and unemployment both lead to a decrease in overall happiness. Stevenson and Wolfers (2008) found a clear and linear correlation between GDP per capita and life satisfaction. From a general survey of previous studies, Bjørnskov (2010) concluded that estimations of life satisfaction will vary with use of different datasets.

Apart from analyzing the typical life satisfaction determinants, we will look at additional factors such as how helping others can affect an individual's happiness. The relationship between donating and happiness has received little attention because donating and happiness tend to be related studies discussed in other more distinct literature. A slogan from the American Red Cross once extolled the relationship between happiness and giving to others: "Feel good about your self- Give Blood!" (Anderoni, 1990). The relationship between donating and happiness was concluded in a study by Sojka and Sojka (2003). They collected a sample of 528 consecutive whole-blood donors and found a positive relationship between blood donation and personal satisfaction levels. Respondents felt better after donating blood. Vohs et al. (2006) indicated that donating money brought self-sufficient orientation which psychologically separated the donor from the donee. The above conclusions implied that donation had a positive effect on life satisfaction. Later, Liu and Aaker (2008) suggested that further research could account for the existence of a simultaneous relationship between happiness and donating; that is, donation and happiness probably affected each other.

Few studies have analyzed the effect helping others has on life satisfaction (Harbaugh et al., 2007; Reed II et al., 2007; Vohs et al., 2006). However, a major drawback of their methodology such as descriptive statistics or ANOVA was the inability to identify the causality between donating and happiness. To the best of our knowledge, none of these studies has empirically investigated the endogeneity of helping and happiness. As this is the first attempt to estimate the effect of helping on life satisfaction using a simultaneous equation model to correct the possible endogeneity of helping, this paper makes a major contribution to the literature.

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<sup>1</sup> The literature regarding happiness studies often uses the term "happiness" and "life satisfaction" interchangeably (Bjørnskov, 2010; Van Praag et al., 2010).

This paper aims to examine the effect of volunteer labor on life satisfaction. The analysis was conducted using data from *The Survey of National Living Conditions* in Taiwan. We used a univariate ordered probit model to regress life satisfaction measured as a Likert scale from 1 to 4 on volunteer labor as a binary variable, as well as a set of individual characteristic covariates. Moreover, a simultaneous bivariate ordered probit model was applied using the instrumental variable (IV) of the volunteer labor decision represented by the data of public servants. Houston (2005) pointed out that employees in the public sector were generally committed to the public good and characterized by an ethic built on benevolence, a life in service of others, and a desire to make an impact on the community. This was expected of public servants, as they tended to exhibit charitable behavior. In this study, a proxy variable for public servants considered those employed in the military. Military service in Taiwan is conscripted, so the military service variable is expected to be exogenous for a suitable IV.<sup>2</sup>

The remainder of the paper is organized as follows. Section 2 describes the theoretical framework of the relationship between donating and happiness. Section 3 discusses the econometric models used in our empirical analysis. Section 4 describes the data and variables used. Section 5 reports our empirical results and Section 6 provides our conclusions.

## II. *Donating and Utility*

A subjective view of utility theory argues that individual happiness can be captured and analyzed (Frey and Stutzer, 2002). Standard economic theory also suggests that donating is related to individual utility. Most prior research focused on the motivation of donors based on altruism (e.g., Anderoni, 1988). Other researchers have questioned the pure altruism theory on various grounds. As indicated by Anderoni (1990), donors may not only donate because of altruism but also to gain utility through their donation. In other words, donors value their own contributions more than those of someone else and receive personal pleasure from donating (warm-glow giving). The impure altruism theoretical model can be briefly shown as follows.

Let  $n$  be the total number of individuals, individuals allocate their consumption between a private good ( $x_i$ ) and their donation to the public good ( $g_i$ ). Let  $G_i = \sum_{i=1}^n g_i$  be the total amount of the public good.

The utility function can be shown as

$$U_i = U_i(x_i, G, g_i) \quad (1)$$

where  $U_i$  is assumed to be strictly quasi-concave.

Obviously, donation affects utility through two channels. Donating once increases utility as the part of public good ( $G$ , altruism) and then again as a private good ( $g$ , warm-glow giving). Therefore, a theoretical prediction reveals the positive effect of charitable giving on happiness.

However, people may have simply felt a rush of happiness from the process of charitable giving (Gilbert, 2006; William and Lee, 2007). Happiness attained by making donations can be short lived. Life satisfaction appears more stable when related to individual subjective well being (Chan, 2008). Moreover, donating may not only produce personal happiness but

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<sup>2</sup> More discussion regarding the validity of the military service variable as an instrument for volunteer labor will be presented in Section 3.

happiness may also result in more donations (Liu and Aaker, 2008), meaning that there is not a unilateral relationship between donating and utility. These arguments were never considered in the formulation of economic theory. To empirically examine whether donating affects life satisfaction is not only interesting, but our findings also provide insightful references for further approaches based on other theoretical models.

### III. Method

There are two possibilities as to why volunteer labor and life satisfaction may be correlated. The first possibility is that volunteer labor produces personal life satisfaction. Blood donation brought donors happiness (Sojka and Sojka, 2003). Charitable giving led to self-sufficiency and psychologically separated the donor from the donee (Vohs, et al., 2006). Therefore, volunteer labor has a psychological impact on increasing life satisfaction. The second possibility is that existing life satisfaction resulted in individuals contributing more volunteer labor. Compared with unhappy individuals, happy people tended to help others more often (Thoits and Hewitt, 2001).<sup>3</sup> Individuals highly satisfied with life were more likely to participate in volunteer labor activities. The aim of this paper was to identify the first effect and to yield an unbiased estimate of life satisfaction. We used two methods: a univariate ordered probit model and a simultaneous bivariate ordered probit model.

#### 1. Univariate Ordered Probit Model

The underlying economic model posits that latent life satisfaction ( $Y_i^*$ ) is a linear function of volunteer labor ( $V_i$ ) and a vector of other exogenous individual characteristics including age, gender, income, education, family size, and employment (all denoted by  $X_i$ ).

$$Y_i^* = \gamma_1 X_i + \gamma_2 V_i + \mu_i \quad (2)$$

$$E(\mu_i) = 0$$

$$\text{Var}(\mu_i) = 1$$

where  $\gamma_1$  is a vector of unknown parameters,  $\gamma_2$  is an unknown coefficient, and  $\mu_i$  is distributed normally as  $N(0, 1)$ . Subscript  $i$  implies cross-sectional observations. The observed variable for the individual's self-assessed life satisfaction status ( $Y_i$ ) and the binary volunteer labor participation ( $V_i$ ) are related to their corresponding latent variables as:

$$Y_i = \begin{cases} 1 - \text{very dissatisfied} & \text{if } Y_i^* \leq \mu_1 \\ 2 - \text{dissatisfied} & \text{if } \mu_1 < Y_i^* \leq \mu_2 \\ 3 - \text{satisfied} & \text{if } \mu_2 < Y_i^* \leq \mu_3 \\ 4 - \text{very satisfied} & \text{if } \mu_3 < Y_i^* \end{cases}$$

<sup>3</sup> Liu and Aaker (2008) took Thoits and Hewitt's approach (2001) as an example and suggested a bi-directional relationship between donating and happiness.

$$V_i = \begin{cases} 0 - \text{No} & \text{if } V_i^* \leq \mu_1 \\ 1 - \text{Yes} & \text{if } \mu_1 < V_i^* \end{cases}$$

Equation (2) can be estimated by a univariate ordered probit model.

## 2. Simultaneous Bivariate Ordered Probit

The univariate ordered probit model assumed that volunteer labor conditional on the covariates is independent of life satisfaction, i.e., that volunteer labor did not depend on life satisfaction. If volunteer labor is endogenous then the conditional independence is violated. The above method will yield a biased estimate. To correct the possible endogeneity of volunteer labor, we used a bivariate ordered probit model to obtain our results. Consider a system of Equation (3) and (4), which links the latent life satisfaction ( $Y_i^*$ ) and latent volunteer labor ( $V_i^*$ ) to individual characteristics ( $X_i$ ).

$$V_i^* = \beta_1 X_i + \alpha Z_i + \varepsilon_{1i} \quad (3)$$

$$Y_i^* = \beta_2 X_i + \delta V_i^* + \varepsilon_{2i} \quad (4)$$

$$E(\varepsilon_{1i}) = 0$$

$$E(\varepsilon_{2i}) = 0$$

$$\text{Var}(\varepsilon_{1i}) = 1$$

$$\text{Var}(\varepsilon_{2i}) = \Sigma$$

$$\text{Cov}(\varepsilon_{1i}, \varepsilon_{2i}) = \rho$$

Where  $Z_i$  represents vectors of instrumental variables that are correlated with  $V_i^*$  but not  $\varepsilon_{2i}$ ,  $\alpha$  is a vector of its coefficients.  $\beta_1$ , and  $\beta_2$  are vectors of unknown parameters, and  $\delta$  is the coefficient of interest.  $\rho$  is the correlation between two error terms in the system of equations. When  $\rho$  is not zero, we refer to this system as a simultaneous bivariate ordered probit model and estimate it with full-information maximum likelihood (Sajaia 2008).<sup>4</sup> Otherwise, the univariate ordered probit was a more appropriate model (i.e., Equation (2)).

The main difficulty with the IV approach is to find suitable instruments for volunteer labor.  $Z$  variables must be non-weak predictors of  $V$  and are orthogonal to  $\varepsilon_1$ . In our empirical model, the instrument was whether the respondent had served in the military. We tested the first requirement by examining the significance of  $Z$  in the volunteer equation; our regression result indicates that military service is a non-weak predictor of volunteer labor. In addition, by assuming that the values of the two categorical dependent variables approximate those of the latent continuous variables in the system, we performed a likelihood-ratio test proposed by Anderson (1984) under the framework of 2SLS to examine the relevance of our instruments. The result suggests the canonical correlations between our instruments  $Z$  and regressors instrumented  $V$  are significantly different from 0, and are therefore relevant. Theoretically, a study by Houston (2005) found a link between public servants and charitable behavior. Military personnel, civil servants, and public-school teachers are all included in the system of

<sup>4</sup> A similar model was used by Morris (2007).

TABLE 1. TESTS OF DIFFERENCES-IN-MEANS IN PROPORTIONS OF MILITARY EMPLOYEES  
(t value)

	Very Satisfied (4)	Satisfied (3)	Dissatisfied (2)	Very Dissatisfied (1)
Very Satisfied (4)				
Satisfied (3)	1.79			
Dissatisfied (2)	0.68	-1.95		
Very Dissatisfied (1)	-0.59	-2.71**	-1.49	

Note: Standard errors are reported in parentheses. \*\* Significance at the 1% level; \* Significance at the 5% level.

government employees sharing the same social insurance and pension programs in Taiwan. A degree of relevancy between volunteer labor and military service was therefore expected. For instrument exogeneity, on the one hand, we were unable to conduct an over-identifying restrictions test since we were using military as the sole instrument for volunteer (Wooldridge, 2002, p.86).<sup>5</sup> However, it is very unlikely that the variable is endogenous in our model as the majority of military service in Taiwan is mandatory. Since 1949, Taiwan (The Republic of China) has in fact required all qualified males to undergo military training. The compulsory service period was one year and ten months at the time of the 2001 survey, which had been shortened from two years service up until 1999. All Taiwanese men reaching the age of 19 have to go through identity investigation and draft inspection including verification of service type, classification of service, and physical examination. The service of each enlisted man is decided and he is drafted to report to a training center after finalizing the aforementioned procedures. Students attending high school or institutions of higher learning may qualify for deferment. After the completion of active duty service, all draftees are considered reservists (backup service) and are discharged at age 36.<sup>6</sup> Due to the mandatory nature of the occupation, we may claim that the instrument is valid. For robustness, we also performed a differences-in-means test to verify the relevancy between military service and satisfaction levels; this indicated that the less satisfied group did not have a higher proportion of military employees (Refer to Table 1).<sup>7</sup>

#### IV. Data and Variables

The empirical work of our study was based on survey data obtained from the *Survey of National Living Conditions* in Taiwan. The 2001 survey is currently regarded as a public opinion poll. The aim of the survey was to understand general life satisfaction, the conscience of future life, and expectations of government services that could be reinforced. The above information provided a key reference for government in formulating administration policies and for additional research. The survey is conducted annually by the Taiwanese Ministry of the

<sup>5</sup> Some empirical studies employed an overidentifying restriction test, but the test was to identify the conditional validity of additional instruments in an overidentified model.

<sup>6</sup> For more details regarding conscription in Taiwan, please refer to the Act of Military Service System, Ministry of National Defense, Republic of China (Taiwan).

<sup>7</sup> That is, we divided our samples into four groups according to their satisfaction levels, and examined whether the means of the military variables (reflecting the proportion of military personnel in each group) were statistically different from one another.

TABLE 2. VARIABLE LISTS

Variable Name	Definition
Age	A respondent age
Female	A respondent gender Female=1 if female; Female=0 if male
Religion	Whether a respondent has a religious preference or not Religion=1 if yes; Religion=0 if no
College	Whether a respondent has at least a college degree or not College=1 if yes; College=0 if no
Family Size	Number of people in the household
Income	Monthly individual income (thousands of NT dollars)
Employ	Whether a respondent is in employed Employed=1 if yes; Employed=0 if no
Military Service	Whether a respondent served in the military Military=1 if yes; Military=0 if no
Volunteer Labor	Whether a respondent did volunteer work within the past year Volunteer=1 if yes; Volunteer=0 if no
Life Satisfaction	Whether a respondent is satisfied with life Very Dissatisfied=1; Dissatisfied=2; Satisfied=3; Very Satisfied=4

TABLE 3. DESCRIPTIVE STATISTICS

Satisfaction Level Variable	Full Sample		Very Satisfied		Satisfied		Dissatisfied		Very Dissatisfied	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Volunteer Labor	0.11	0.31	0.16	0.37	0.10	0.29	0.11	0.32	0.14	0.35
Age	40.04	12.13	38.61	12.84	39.34	12.26	41.55	11.87	40.93	10.66
Female	0.50	0.50	0.55	0.50	0.53	0.50	0.45	0.50	0.41	0.49
Religion	0.64	0.48	0.61	0.49	0.62	0.49	0.68	0.47	0.71	0.46
College	0.18	0.38	0.27	0.44	0.19	0.39	0.14	0.34	0.15	0.36
Family Size	4.45	1.41	4.33	1.45	4.45	1.38	4.47	1.45	4.44	1.48
Income	26.62	23.04	29.96	24.53	27.97	23.57	24.00	21.06	23.12	23.81
Employ	0.64	0.48	0.63	0.48	0.67	0.47	0.62	0.49	0.53	0.50
Military Service	0.36	0.48	0.40	0.49	0.35	0.48	0.38	0.49	0.43	0.50
Sample Size	3836		238		2234		1101		263	

Interior and involves adults above age 20 who reside in Taiwan. This survey is assumed by random sampling and proportioned by level through a computer-assisted telephone (CATI) system. The 2001 sample size was approximately 4,070 persons. The 2001 questionnaire included a model profiling the donating behavior of respondents and their overall satisfaction with life.

All variables used in this analysis are listed and defined in Table 2 and descriptive statistics concerning these variables is reported in Table 3. In the 2001 questionnaire, the question measuring life satisfaction was, "How satisfied with the life you are leading?" The answer to the question ranged from 1 (very dissatisfied) to 4 (very satisfied).<sup>8</sup> In Table 3, out of

<sup>8</sup> A similar question measuring life satisfaction was used in Van Pragg et al. (2010).

TABLE 4. THE ESTIMATIONS OF THE UNIVARIATE ORDERED PROBIT MODEL

Variable	Coefficient
Volunteer Labor	-0.026 (0.058)
Age	-0.005** (0.002)
College	0.149** (0.051)
Family Size	-0.016 (0.013)
Income	0.005** (0.001)
Female	0.229** (0.038)
Religion	-0.105** (0.039)
Employ	0.006 (0.051)
cut1	-1.568** (0.110)
cut2	-0.431** (0.107)
cut3	1.511** (0.110)
Log likelihood	-3893.660

Note: Standard errors are reported in parentheses. \*\* Significance at the 1% level; \* Significance at the 5% level.

the whole sample (n=3,836), the number of respondents indicating they were very satisfied with their life was 238, satisfied was listed at 2,234, dissatisfied at 1,101, and the number very dissatisfied was 263. The main finding was that the mean values for volunteer labor differed very little among the 4 groups. The mean value for volunteer labor within the sample of those satisfied with life was lowest, whereas the value for those very satisfied with their life was the highest (0.10 versus 0.16).

## V. Empirical Results

Table 4 reports the univariate ordered probit estimates of the life satisfaction equation. The primary variable of interest is volunteer labor. The coefficient of volunteer labor exhibited a negative but statistically insignificant effect on life satisfaction. Our empirical evidence fails to support the do-good-feel-good hypothesis. The coefficients regarding college-level education (College), income level (Income), and being female (Female) were statistically significant and positive, whereas age and religion had statistically significant and negative effects. The positive effect of higher levels of education was inconsistent with findings from other past empirical studies. For example, a higher level of education was negatively associated with job satisfaction (Clark, 1997; Ferrer-i-Carbonell, 2005). The positive income effect supported the idea that people with higher incomes had more opportunity to achieve whatever they wanted, as suggested by Frey and Stutzer (2002). Although the social status of women was usually lower than that of men in Eastern societies, our data surprisingly indicated that women reported higher levels of life satisfaction than men did. This was similar to findings regarding the impact of gender on life satisfaction by Ferrer-i-Carbonell (2005).<sup>9</sup> Contrary to the Japanese sample



examined by Roemer (2006), a negative association between religion and life satisfaction was found in our studies.<sup>10</sup>

The estimations from the simultaneous bivariate ordered probit model are shown in Table 5. Before discussing whether the relationship between volunteer labor and life satisfaction was supported by the estimated results, we first examined the fitness of our simultaneous bivariate ordered probit model. In terms of the validity of instruments, even after controlling a full set of covariates, military service was statistically significant at the 1% level. As expected, a positive relationship between military service, volunteer labor and life satisfaction supported Houston's view (2005).  $\rho$  is negative. This implies that the unobservable factors affecting volunteer labor are negatively associated with unobservable factors affecting life satisfaction. In other words, the estimations from the simultaneous bivariate ordered probit model were more reliable.

The estimations of life satisfaction equation reveal that the coefficient of volunteer labor turned out to be positive and statistically significant at the 1% level. Our results indicate that volunteer labor has a significant and positive effect on life satisfaction. If we relied on the estimates of the univariate ordered probit model for reference, we may have underestimated the positive effect volunteer labor has on overall satisfaction with life. Compared with those in the univariate ordered probit model, the estimates of other covariates from the simultaneous bivariate ordered probit model were virtually unchanged. The exceptions were that college education and income were no longer statistically significant factors affecting overall life satisfaction.

## VI. *Concluding Remarks*

In this paper, we investigated the impact of volunteer labor on life satisfaction in Taiwan using two methods: the univariate ordered probit model and the simultaneous bivariate ordered probit model. In terms of the effect of volunteer labor on life satisfaction, the empirical pattern varies with different empirical specifications. In the simultaneous bivariate ordered probit model, we found that volunteer labor had a statistically significant and positive impact on life satisfaction. Conversely, based on estimations from the univariate ordered probit model, the coefficient of volunteer labor were statistically insignificant and negative. The empirical evidence shows that failure to account for the endogeneity of volunteer labor will underestimate the effect volunteer labor has on life satisfaction. This also implies that the nature of the relationship between donating and happiness is bi-directional as suggested by Liu and Aaker (2008).

In considering other covariates, our data indicated that income level was positively associated with life satisfaction whereas region had a negative effect on life satisfaction. Previous studies were generally limited to Western societies, so our Taiwan sample, an Eastern society, constituted a good comparison case.

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<sup>9</sup> Results of a study by Ferrer-i-Carbonell (2005) showed that women were generally happier at work than men in spite of job differences.

<sup>10</sup> Based on a nationally-representative random sample of 2,790 Japanese adults in the 2001 Japanese General Social Survey, Roemer (2006) found significant positive correlations between religious beliefs and membership in a religious group and global life satisfaction and happiness.

TABLE 5. THE ESTIMATIONS OF THE SIMULTANEOUS BIVARIATE ORDERED PROBIT MODEL

Variable	Volunteer Labor	Life Satisfaction
	Coefficient	Coefficient
Volunteer Labor	-	0.812** (0.157)
Age	0.008** (0.002)	-0.009** (0.002)
College	0.250** (0.073)	-0.132 (0.099)
Family Size	0.034 (0.020)	-0.037* (0.018)
Income	0.002 (0.002)	0.002 (0.002)
Female	0.106 (0.057)	0.042 (0.084)
Religion	0.210** (0.060)	-0.231** (0.055)
Employ	0.178 (0.125)	0.014 (0.069)
Military Service	0.237* (0.123)	-
cut11	2.226 (0.205)	-
cut21	-	-0.716 (0.305)
cut22	-	-0.067 (0.086)
cut23	-	1.042 (0.390)
$\rho$		-0.822** (0.153)
Log likelihood		-5175.568

Note: Standard errors are reported in parentheses. \*\* Significance at the 1% level; \* Significance at the 5% level.

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