

**WHO VOLUNTEERS IN JAPAN AND HOW?
– BASIC FINDINGS FROM MICRO DATA**

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Abstract

Previous studies (especially in Japan) of volunteer labor supply have the following three weaknesses. (1) Most rely on extemporary questionnaire surveys of hundreds or thousands of individuals about volunteer activities. This approach induces sample-selection bias to the extent that respondents are those who are most interested in those activities. (2) They neglect qualitative aspects of volunteer activities, which make it difficult to explain how free-rider problems occur and how they might be solved. (3) In married couples, husbands' activities are influenced by wives' activities and vice versa, but previous studies have not examined these mutual relationships. We focus on these three issues by utilizing micro data from the *Survey on Time Use and Leisure Activities*, which is a general survey of approximately 200,000 household members about the allocation of time to various kinds of activities, including volunteering. We find the following. (1) Most previous studies have overestimated individual participation rates in volunteer activities. (2) Married couples tend to participate jointly in volunteer activities. (3) Free-rider problems are more serious in urban areas than in rural areas, especially in activities related to social services. These results suggest that a policy framework for promoting volunteering should be flexibly designed by carefully considering location, the attributes of households and individuals, and the qualitative aspects of activities.

JEL Keywords: H41; J22; J49.

1. Introduction

As Japanese society matures, peoples' demands diversify. However, the public services provided by the Japanese government are standardized and thus unable to satisfy the varied desires of consumers. At the same time, because of the government's cumulative deficit, an expansion of services is impractical. The services provided by volunteers and not-for-profit organizations have filled the gap between demand and supply.

In this paper, we focus on volunteer labor supply and econometrically analyze volunteer activities. Most previous studies rely on extemporary questionnaire surveys of hundreds or thousands of individuals. Thus, they may suffer from sample-selection bias because respondents tend to be those who are most interested in those activities, and they may be based on small samples. To solve these problems, we use micro data from the

Survey on Time Use and Leisure Activities (STULA) conducted by the Statistical Bureau of Japan. We aim to answer the question “Who volunteers what and how?”, which is an original perspective on this area. Is volunteering motivated by altruism or individualism?¹ If it is altruism, the free-rider problem may occur. However, we suggest that whether this problem arises depends on the type of volunteer activity. In other words, if volunteer work has the characteristics of a public good, even if others do the work, then volunteers motivated by altruism may experience an increase in utility.

If service providers expect a non-monetary reward, such as gratitude from recipients, voluntary contributions are motivated by individualism, and the free-rider problem may not be the main concern. With this in mind, we classify volunteer activities into two categories: social activities and individual activities. The former covers voluntary work that generates a public good. One feature of this paper is an analysis of these activities.

A second feature of the paper is that we consider the voluntary work of married couples. Whether people volunteer as individuals or as couples is important. If couples volunteer, policies that encourage spouses to volunteer jointly are needed because, otherwise, neither participates.

Third, we focus on the effect of the residential area on volunteer labor supply. Individuals who have close relationships with their communities may be more motivated to volunteer.

This paper is organized as follows: In the next section, we present an overview of previous studies on volunteer labor supply. In section 3, we explain the model and the data used. In section 4, we use the results to discuss the relationship between individual attributes and participation in volunteer activities.

2. Literature Survey

Previous empirical analysis on volunteer labor supply has two main focuses: one concerns the circumstances under which the free-rider problem occurs and the other concerns why and how people volunteer.

If volunteer work generates public goods, the standard framework for collective goods production of Becker (1974) implies that free-rider problems might arise. As Sugden (1982) has illustrated, the more participants join a community, the lower the number of public goods per capita that are supplied through voluntary donation. This theoretical implication, however, contradicts reality. Sugden’s (1984) “reciprocity” model, Cornes and Sandler’s (1984) joint production system, Andreoni’s (1990) “warm glow” hypothesis and Anderson et al.’s (1998) decision error model were developed to fill the gap between theory and reality.

Because of limited data availability, most feasibility tests have been conducted by performing experiments. Marwell and Ames (1979a, 1979b), Mark and Shetland (1983), Kim and Walker (1984), Andreoni (1993), Andreoni (1995) and Chan et al. (2002) have

¹ The objective of altruism is to increase another’s utility. On the other hand, the objective of individualism is to increase one’s own utility by increasing another’s utility through one’s own volunteer activities.

designed games that theoretically induced free-rider situations and examined their outcomes. They confirmed that the games elicited participants' cooperative behavior and did not necessarily support the theoretical predictions.

However, whether volunteering is motivated by altruism or individualism depends on the type of volunteer activities undertaken. When volunteering is motivated by altruism, there can be a free-rider problem. The models of Sugden (1984), Andreoni (1990) and others are thus inadequate for empirical study of the relationship between volunteer activities and the free-rider problem. Experiments are unlikely to clarify the motivation behind volunteering. We, therefore, divided volunteer activities into those that have the characteristics of public goods and those that do not.

In the context of volunteer labor supply, the free-rider problem has not been the main concern. More research has sought to explain why and how people volunteer. Theoretically, volunteering can be treated in the same way as donating money, although time, rather than money, is given. In terms of resource allocation, while volunteers donate time to directly supply labor to produce services, money can be spent on any useful resource. In this sense, the latter has more flexibility and may cause less resource misallocation.

Clotfelter (1985) (Chapter 4) focused on the relationship between donating time and donating money from the viewpoint of the tax system. The estimated volunteer supply functions imply a positive (marginal) tax effect on volunteering. This suggests that giving money and giving time are complementary. Menchik and Weisbrod's (1987) and Brown and Lankford's (1992) estimated cross-price elasticities between time giving and money giving also suggest a strong complementary relationship.

Menchik and Weisbrod (1987) developed a model that explains volunteer labor supply from the perspective of both consumption and investment. While volunteer activities in the form of consumption merely increase temporal utility levels, activities that constitute investment raise future expected incomes as volunteers accumulate human capital. From empirical studies based on a survey of U.S. citizens, Menchik and Weisbrod (1987) found that volunteers' working hours are negatively correlated with after-tax wage rates, complementary with monetary donations, and have a positive but diminishing correlation with total income.²

Day and Devlin (1997, 1998) examined the effect of volunteering on earnings by estimating income functions. Their results imply significant effects of volunteering on earnings and support the investment model. Segal and Weisbrod (2002), using a survey of volunteers in the U.S., estimated hours supply functions in the health, education and church sectors. Their results did not support the homogeneity hypothesis for volunteer

² Freeman (1997), based on the *Supplement on Volunteer Activity* as a supplement of *The Current Population Survey* in the U.S., empirically analyzed the determinants of volunteer activity hours. According to empirical results showing that volunteer workers have high skills and opportunity costs, he concluded that volunteer activities are hardly explained by the "standard theory of labor supply" but by the '*F-Connection*' (see Ben-Porath, 1980), which is based on human relationships within families, friends and firms.

activities. Therefore, the marginal effects of changing tax rates and individual attributes and the motives behind volunteering – to provide consumption or investment goods – differ between sectors.

The focus of volunteer labor supply analyses has shifted from the properties of volunteer activities themselves to the specific people who undertake volunteer activities. Carlin (2001) considered the volunteer labor supply of married women in the U.S. and estimated participation functions and hours supply functions. The results imply that the number of children has a positive influence on married women's participation in volunteering but a negative effect on the number of hours volunteered. Monetary donations and volunteering are complements at the participation stage but are substitutes in terms of hours supplied. The coefficient of the woman's wage rate was not statistically significant.

Garcia and Marcuello (2002) suggested the family model of labor supply using Spanish data. The family decides the labor supply of both spouses. Their empirical results show that family size and pre-school children have negative influence on the time given over to voluntary work by the wife, but family size has positive on the time given over to voluntary work by the husband. Also, monetary donations by the family are complementary relationship with time donations by the spouses.

Bryant et al. (2003) also estimated the effect of the number of children, as did Carlin (2001), but they did not focus only on women. They found that as marriage helps to increase social capital through the development of social networks, spouses have a positive effect on the decision to participate in volunteer work.

Schady (2001), focusing on rural areas in Peru, and Smith (2004), focusing on middle-aged workers in Missouri in the U.S., estimated volunteer participation functions. Schady (2001) found that in rural areas, volunteer activities that have the characteristics of public goods develop social capital for people in the area, including the volunteers. Hence, regional characteristics must be considered when econometrically analyzing volunteering.

Cappellari and Turati (2004) considered workers' intrinsic and extrinsic motivations. Based on the extemporary questionnaire surveys of Italian employees and the multivariate probit model for endogeneity, they estimated volunteering probability functions in social services, political associations and trade union. The results show extrinsic motivations to lower voluntary labor supply in social services and political associations, whereas the opposite holds for intrinsic motivations in trade union.

In this paper, we adopt ideas from previous studies, such as the relationship between volunteer activities that have the characteristics of consumption goods and those that have the characteristics of investment goods. We also consider the relationship between monetary donations and volunteer activities, and the effect of the number of children on volunteering. We also consider new issues, such as the effects of residential area and marriage. The survey used in previous studies is not sufficient for robust results because of its limited sample size. We estimated volunteer labor supply functions on a large

sample by using micro data from STULA. Because STULA includes a wide range of questions on daily life, including volunteering work, it is unlikely that respondents are only those who are most interested in volunteer activities.

In Japanese research, Yamauchi (1997, 2001), Sanwa Sogo Kenkyusho (2000) and the Osaka School of International Public Policy and the Center for Non-profit Research and Information (2004) applied Becker's (1965) household production activity model to derive a volunteer labor supply function from a household's utility-maximization problem. They used aggregate data from STULA and original questionnaires as their main data sources. They found that volunteer activities have the characteristics of consumption goods, volunteer activities and monetary donations are complementary, and that living in urban areas has a negative effect on participating in volunteer activities.

Fukushige (1999) estimated volunteer participation functions by using macro data from STULA as the main data source, as did Yamauchi (1997). The coefficients of monetary asset balances, proportion of elderly people and proportion of young people were significantly positive.

Atoda and Fukushige (2000) estimated volunteer participation functions and hours supplied functions by using a survey of middle-aged people in the Tokyo metropolitan area and the Oita and Nagano prefectures. They found positive effects for the number of children and educational attainment in all areas. However, in the Tokyo metropolitan area, the wage rate had a negative effect, which suggests that effects on the decision to participate in volunteer work may differ between regions.

The few studies of volunteer activities in Japan may suffer from sample-selection bias because of the surveys on which they are based. In addition, it may be difficult to obtain robust results from surveys that are targeted at particular people and have small samples. In some studies, although macro data from STULA is used, sample sizes are still small. Although Segal and Weisbrod (2002) recommended distinguishing between types of volunteer activities, all are treated equally in these studies. As stated above, Japanese econometric analysis on volunteer work is inadequate.

In this paper, by using STULA, we avoid the sample-selection bias problem. In addition, micro data from STULA ensures a large sample size. STULA's detailed information on the type of volunteer activity enables a detailed analysis of volunteer work. It also enables us to distinguish volunteer activities provided to society, which have the characteristics of public goods, from those that are provided to individuals. Moreover, data on variables hardly used in previous empirical work, such as marital status and region, are used in our analysis. Hence, our econometric analysis is comprehensive, novel and free of data problems.

3. The Model and the Data

To answer the question "Who works as a volunteer and how?", we need a model dealing with the discrete choice of whether an individual is involved in volunteer activities or not. A large amount of data that is free of selection bias and has a positive perspective on

volunteer activities is also desirable. We used STULA, a general survey of national life and the economy, which is unlikely to induce sample-selection bias. The micro data from STULA allows large samples and has information on different categories of volunteer activity.

3.1. *The Model*

A standard model of volunteer labor supply derives a volunteer supply function from an individual's utility-maximization problem, given a time endowment. The model assumes that an individual is given a certain amount of time and decides how to allocate this time between work, leisure (including sleep) and volunteer activities. At the same time, the individual allocates earned income between consumption and monetary donations. As Menchik and Weisbrod (1987) show, whether volunteering takes the form of consumption or investment can be ascertained from the coefficients of the independent variables (as explained in the next subsection.) If the motivation to volunteer has the characteristics of consumption goods, the total income, including the opportunity cost of spending time on volunteer activities, has a positive effect on the time spent on volunteer activities. Wage after tax, which is the opportunity cost of volunteer activities, has a negative effect on time spent volunteering.

This paper investigates the decision-making process relating to volunteering in two stages. (1) What kinds of people volunteer for what kinds of activities? (2) What kinds of individual attributes affect the frequency and patterns of participation?³ To model the first decision, whether to volunteer and what for, we use a multinomial logit model. For the regression analysis, the sample is divided into five groups: unemployed males; unemployed females; employed males; employed females; and the self-employed.⁴

3.2. *The Data*

The data used in this paper are micro data from the *Survey on Time Use and Leisure Activities* (STULA), 1981, 1986, 1991, 1996 and 2001. The dependent variable is involvement in volunteering by type of activity. The independent variables are: age (age); marital status (marry); educational attainment (study); residential status (house); total income (fincome); presence of child under six (child); presence of person over 65 (old); presence of person needing care (care); weekly rest system (holiday); living area (area); and spouse's involvement in volunteer activities (couple).⁵

Dependent variables for involvement in volunteering by kind of activities are as follows: not engaged in volunteer activities = 0; involved in local community = 1;

³ The second decision is not the subject of this paper.

⁴ We tried to estimate some regressions by using the multivariate probit model. However, the results are almost the same as those from the multinomial logit model. Therefore, we suggest that the residual terms of the regressions are not correlated with each other and used the multinomial logit model.

⁵ When we used the spouse's involvement in volunteer activities as an independent variable, we included only married couples in the sample.

involved in social welfare provision = 2; provide activities for children, the elderly, and the handicapped = 3; involved in certain districts = 4; provision to general public = 5; involved in social services = 6; involved in social activities = 7. In 1981 and 2001, the data classification is different from that of the other years; the data were modified as follows: (1) for 1981, involved in local community = 1; involved in social welfare provision = 2; involved in districts affected by disaster = 3; provision to certain groups = 4; other activities = 5; involved in public activities = 6. (2) for 2001, health- and medical care-related activities = 1; services to the elderly = 2; provision for people with disabilities = 3; provision for children = 4; involved in sports and culture = 5; involved in activities related to town planning = 6; involved in safe-living planning = 7; involved in activities related to nature and the environment related = 8; involved in disaster relief = 9; other activities = 10.⁶

In this paper, we estimated the model relating to the decision to choose a type of volunteer activity by dividing activities into those provided for society, which have the characteristics of public goods, and those provided for individuals. For this model: not engaged in volunteer activities = 0; involved in activities related to public goods = 1; others = 2.⁷

For independent variables, the original data were modified as shown in Table 1. Total income (fincome) includes not only labor income but also the opportunity cost of volunteer activities. Although one should consider unearned income additional to those incomes, STULA does not have this information. Since labor income, for which annual household income is used, ranges from 1 million Japanese yen (JPY) to 199 million JPY, from 200 million JPY to 299 million JPY and so on, we used the median of each range.⁸ The opportunity cost of volunteer activities is calculated by multiplying the hourly wage (annual household income divided by annual working hours) by the number of hours spent volunteering.⁹ The cost of making a monetary donation of one JPY (crossp)

⁶ Volunteer activities are defined as social services and social activities in STULA. Social activities were surveyed in 1991 and 1996. They are activities for the whole of society including the respondent: for example, women's activities and citizens' activities.

⁷ We classified volunteer activities as follows: (1) for 1981, "in local community", "others" and "public activities" as volunteer activities for society and "in social welfare facilities", "in districts afflicted by disasters" and "to certain groups" as activities for individuals. (2) for 1986, "in local community", "to general public" and "social service" as activities for society and "in social welfare facilities", "to children, the elderly and the handicapped" and "in certain districts" as activities for individuals. (3) for 1991 and 1996, "in local community", "to general public", "social service" and "social activities" as activities for society and "in social welfare facilities", "to children, the elderly, and the handicapped" and "in certain districts" as activities for individuals. (4) for 2001, "town planning related", "safe living planning related", "nature and environment related" and "others" as activities for society and "health and medical care related", "to the elderly", "to people with disabilities", "to children", "sports and culture related" and "disaster relief" as activities for individuals.

⁸ We should not use household income but individual income. However, because of limited data availability, we used household income.

⁹ Annual working hours were calculated by multiplying weekly working hours (median) by 52 (1 year = 52 weeks). Additionally, we obtained information about the frequency of volunteer activities from STULA.

represents the cross price of volunteer activity, which is defined as $1 - \text{the tax rate}$. If the coefficient of the cross price is positive, volunteer activity and monetary donations are substitutes; otherwise, they are complements. The tax rate used in these calculations is the progressive tax rate on gross income, and we included neither employment income deductions nor personal deductions. To allow for interactions between the living area and monetary donations, the cross product of these variables (*crdum2*) is included as an independent variable.

4. Empirical Results and Discussion

We estimated the volunteer labor supply functions for each of the five years, 1981, 1986, 1991, 1996 and 2001. However, due to limitations on space, we only report results for 2001 (in Tables 2-6).¹⁰

4.1. *Children and Volunteer Activities*

There have been several empirical studies of the relationship between the number of children and volunteering. Carlin's (2001) study for the U.S. showed that a higher number of children encourages married women to participate in volunteer activities but reduces the amount of time they spend doing those activities. Segal and Weisbrod (2002) suggested that the number of children has a positive effect on the amount of time spent on volunteer activities in education and church-related activities. For Japan, Atoda and Fukushige (2000) found that the number of children has a positive effect on participation in volunteer activities in the Tokyo metropolitan area and the Oita prefecture.

Our estimation results indicate that children under six tend to reduce participation in volunteer activities by employed and unemployed women. Children under six reduce participation by married and unmarried women. These results contradict those of previous studies. However, the burden of bringing up children falls unduly on women in Japan. The number of children under six hardly affects participation in volunteer activities by unemployed men. The differences between our results and those of Atoda and Fukushige (2000) could be due to sample-selection bias, a small sample size and the omission of a separate analysis of women.

For employed men, who have not been analyzed in previous studies, children under six tend to increase participation in volunteer activities provided for society but reduce participation in activities provided for individuals. This also applies to married men. Employed men seem to connect with their communities by engaging in volunteer activities for society in their spare time.

Therefore, annual volunteering hours were calculated by multiplying annual volunteering days (median) by eight (we assumed an individual worked an 8-hour day on volunteer activities).

¹⁰ Please refer to Nakajima et al. (2005) for more detailed information.

4.2. *The Aged and Volunteer Activities*

The effect of the elderly over 65 on volunteering depends on whether volunteers have jobs. For unemployed men and women, the elderly has a negative effect on participation in volunteer activities. For employed men and women, the elderly has a positive effect. According to the results of Fukushige (1999) and Sanwa Sogo Kenkyusho (2000), the greater the number of aged persons, the higher is the rate of participation in volunteer activities. However, if the decision to participate depends on whether volunteers are employed, this finding may not be complete.

Employed persons with no spare time need community support or help from welfare and nursing facilities. Because elderly people have close links with their communities, employed people with the elderly build relations with society. Furthermore, given that the aged encourage participation in volunteer activities geared towards not only society but also to specific individuals, such as the aged-care and welfare and nursing facilities, households with elderly people use services provided for the elderly.

4.3. *Those Who Need Nursing and Volunteer Activities*

Those who need nursing have a positive effect on participation in volunteer activities geared towards both society and specific individuals. This is consistent with Atoda and Fukushige's (2000) finding for the Oita prefecture that those who need nursing have a positive effect on participation.

Those who need nursing raise participation in volunteer activities for the same reasons as children and the elderly raise participation in volunteer activities. When the time and money spent on nursing is considered, people with those who need nursing motivate volunteers more than do people with children or the elderly.

4.4. *Living Areas and Volunteer Activities*

Living in one of the three major cities, Tokyo, Osaka or Aichi, has a negative effect on participation in volunteer activities for the unemployed, both men and women. This suggests that unemployed individuals in rural areas tend to participate more actively in volunteer activities.

City dwelling negatively affects participation in all volunteer activities by employed men and women. In many cases, there is a negative effect on the decision to participate in volunteer activities geared towards society. This means that those in employment and those with little leisure time try to link with their communities. This is particularly true for those living in rural areas where more support can be obtained from the community.

For self-employed people living in either rural or urban areas, relations with the community are important, and where people live rarely affects participation in volunteer activities.

Sanwa Sogo Kenkyusho (2000) concluded that living in urban areas has a negative effect on the decision of a householder and a spouse to participate in volunteer activities.

However, as our estimated results show, living in urban areas does not necessarily discourage volunteering.

4.5. *Monetary Donation and Volunteer Activities*

Many studies deal with the relationship between monetary donations and volunteer activities. Notably, in the U.S., Clotfelter (1985), Menchik and Weisbrod (1987), Brown and Lankford (1992), Carlin (2001), Segal and Weisbrod (2002) and others have analyzed the degree of complementarity between monetary donations and volunteer activities. However, Segal and Weisbrod (2002) found that while there is complementarity between monetary donations and time spent on volunteer activities in the education sector, donating and volunteering are substitutes in the church sector. In Japan, Sanwa Sogo Kenkyusho (2000) found that volunteer activities by a householder and a spouse and monetary donations are complementary.

Our results show that complementarity does not always prevail. Relationships vary over time. For employed men and women, when the price of donations increases, there is less participation in volunteer activities. However, over time, the trend shifts towards more participation in volunteer activities. Therefore, monetary donations and volunteer activities have changed from being complements to substitutes.

For the self-employed, the coefficient for volunteer activities geared towards individuals went from positive in 1996 to negative in 2001. Since this is only a change between two points, the finding is not necessarily robust. Nevertheless, monetary donations and volunteer activities have changed from substitutes to complements.

To determine whether preferences between monetary donations and volunteer activities are affected by living areas, which has not been addressed by previous studies, interaction terms in the price of monetary donations and living areas are included. Its coefficient is positive for employed men and women and negative for the self-employed.

4.6. *Married Couples and Volunteer Activities*

In all samples, spouses in general have a positive effect on the decision to participate in all kinds of volunteer activities. Spouses, as opposed to single individuals, tend to deepen relations with society and, at the same time, use time more efficiently to gain leisure time. Consequently, participation in volunteer activities increases.

The negative effect on participation in volunteer activities of the absence of a spouse was found by Bryant et al. (2003). The effect of participation by one spouse in volunteer activities on the participation of the other spouse has not been analyzed. For individuals in the sample with spouses, participation by their spouse in volunteer activities raises their own participation for all volunteer activities. Since this applies to all years, this finding is robust.

The decision to participate in volunteer activities is not necessarily made independently by each individual, but, rather, relates to that of the spouse in the same household. It may be that when one spouse participates in volunteer activities, the other

spouse either extends collaboration or shows an interest to enhance satisfaction within the household. Therefore, an increase in volunteer activities where married couples can participate together could encourage volunteering.

4.7. *Other Characteristics and Volunteer Activities*

Having a high educational attainment, owning one's own home, having a high income (for those in employment) and having two or more days' holiday per week (for those in employment) are characteristics that have a generally positive effect on the decision to participate in all volunteer activities.

Hence, the effect of high educational attainment suggests that education about volunteer activities is often provided, which stimulates interest in volunteer activities. Furthermore, having plenty of time to spare and money to spend promotes volunteering.

Menchik and Weisbrod (1987) and Yamauchi (1997) showed that volunteer activities have the characteristics of consumption goods on the basis of a positive coefficient for total income and a negative coefficient for the wage rate with respect to participation in volunteer activities. Our results not only confirm this, but also show that these characteristics do not depend on volunteer activities or other characteristics.

4.8. *For Promotion of Volunteer Activities*

As Nakajima et al. (2004) report, it is difficult to implement volunteer activities in welfare and nursing facilities. Additional surveys by interview found that these facilities rely heavily on part-time workers, not volunteers, to maintain the quality of services under the budgetary constraints. Since there are such constraints on the demand side that hamper the use of volunteers, unplanned attempts to promote volunteering could be ineffective.

Given that high educational attainment can raise participation in all volunteer activities, providing willing volunteers with opportunities to learn and acquire expertise and knowledge would be an effective way of promoting volunteer activities. In addition, trained volunteers need to be linked to those requiring volunteers.

However, Brudney (1990) and Brudney and Duncombe (1992) report that the costs of training, education and introduction would not only exceed the savings in fiscal payments generated by the use of volunteers, they would increase the fiscal burden. Consequently, when quality of service is important, willing volunteers could contribute to the cost of training themselves.

5. Conclusion

In this paper, by using micro data from the *Survey on Time Use and Leisure Activities* (STULA), which uses a large sample and is free of bias, we have estimated supply functions for volunteer labor. We analyzed the data by grouping volunteer activities into activities geared towards society, which have the characteristics of public goods, and those geared towards specific individuals. We found that participation in activities geared

towards society, as opposed to those geared towards specific individuals, is negatively affected by living in urban areas. This means that volunteer activities geared towards society are heavily influenced by where people live and that free riding is likely to arise in urban areas. However, for the self-employed, the decision to participate in volunteer activities is hardly affected by where they live.

Measures to promote volunteer activities may be divided into two categories: those to promote overall volunteer activities and those to promote activities geared towards specific targets. In the context of overall activities, we recommend reducing the opportunity costs of volunteer activities and applying preferential taxation for monetary donations.

However, individual decisions to participate in volunteer activities may not be synonymous with the characteristics of consumption goods. Thus, reducing the opportunity costs of volunteering would not necessarily promote volunteer activities. Moreover, volunteer activities and monetary donations may change from being complements to substitutes. Therefore, preferential taxation for donations may not necessarily promote volunteer activities.

The fact that the decisions of husbands and wives to participate in volunteer activities are related is useful for considering volunteer activities geared towards specific targets. This suggests that an increase in volunteer activities in which married couples can participate together, rather than as individuals, will promote volunteer activities.

In urban areas, it is better to promote volunteer activities geared towards specific individuals rather than those geared towards society, which are affected by the free-rider problem. Expertise and knowledge are required to provide activities geared towards specific individuals. In this context, it is important to provide opportunities to train and educate volunteers and to match trained volunteers with those in need of their services. Above all, flexibility is needed in mapping out measures to promote volunteer activities.

The estimation results of this paper should be reviewed and the frequency and patterns of participation should be analyzed for all volunteer activities or for specifically targeted volunteer activities. In addition, it must be decided whether the promotion of volunteer activities is necessary. For this, it may be necessary to determine whether the current level of volunteering is appropriate. We recommend that these issues be addressed.

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Table 1. Independent variables.

Age	10s=1, 20s=2, 30s=3, 40s=4, 50s=5, 60s=6, Above 70=7
Marital status	Married=1, Single=0
Educational attainment	In college and above=1, High-school graduate and below=0
Residential status	Homeowner=1, Renter=0
Presence of child under 6	Yes=1, No=0
Presence of person aged over 65	Yes=1, No=0
Presence of person needing care	Yes=1, No=0
Weekly rest system	Above two days=1, Under two days=0
Living areas	Tokyo, Osaka or Aichi=1, Elsewhere=0
Spouse's participation in volunteer activities	Yes=1, No=0

Table 2. Volunteer labor supply functions of unemployed men in 2001.

	All individuals		Married	
	(1) Society	(2) Individual	(1) Society	(2) Individual
ONE	-2.103 *** (-34.401)	-2.086 *** (-31.245)	-2.289 *** (-9.645)	-3.334 *** (-10.899)
AGE	0.051 *** (4.654)	-0.012 (-0.890)	0.068 * (1.921)	0.094 ** (2.086)
MARRY	0.724 *** (13.629)	0.509 *** (7.665)		
STUDY	0.203 *** (4.914)	0.572 *** (12.378)	0.313 *** (5.419)	0.586 *** (8.620)
HOUSE	0.537 *** (9.942)	0.284 *** (4.745)	0.683 *** (7.689)	0.722 *** (6.011)
FINCOME				
CHILD	-0.351 (-1.276)	-0.387 (-1.159)	-0.306 (-0.849)	0.268 (0.653)
OLD	0.131 (1.276)	-0.067 (-0.488)	-0.091 (-0.726)	-0.184 (-1.158)
CARE	-0.064 (-0.681)	0.195 * (1.764)	0.086 (0.699)	0.288 * (1.938)
HOLIDAY				
CROSSP				
AREA	-0.479 *** (-8.031)	-0.330 *** (-4.733)	-0.393 *** (-4.875)	-0.260 *** (-5.96)
COUPLE			1.903 *** (41.340)	1.912 *** (33.032)
CRDUM2				
Number	24161		12275	
Log likelihood	-21354.280		-10851.400	

Note) Values in parentheses are t-statistics.

*** (**, *) denotes rejection of the hypothesis at 1% (5%, 10%) significance level.

Table 3. Volunteer labor supply functions of unemployed women in 2001.

	All individuals		Married	
	(1) Society	(2) Individual	(1) Society	(2) Individual
ONE	-1.280 *** (-31.528)	-0.964 *** (-23.657)	-0.753 *** (-9.475)	-1.167 *** (-13.306)
AGE	-0.063 *** (-10.340)	-0.176 *** (-27.405)	-0.171 *** (-11.954)	-0.153 *** (-9.695)
MARRY	0.677 *** (27.437)	0.502 *** (18.161)		
STUDY	0.385 *** (13.339)	0.765 *** (26.156)	0.386 *** (9.974)	0.717 *** (17.471)
HOUSE	0.353 *** (11.360)	0.353 *** (10.558)	0.410 *** (9.355)	0.385 *** (7.931)
FINCOME				
CHILD	-0.418 *** (-10.130)	-0.862 *** (-18.395)	-0.590 *** (-10.824)	-0.724 *** (-11.958)
OLD	0.278 *** (5.834)	0.262 *** (5.024)	0.076 (1.221)	0.114 * (1.695)
CARE	-0.158 *** (-2.859)	0.024 (0.407)	0.078 (1.078)	0.206 *** (2.673)
HOLIDAY				
CROSSP				
AREA	-0.277 *** (-7.409)	-0.218 *** (-5.440)	-0.118 ** (-2.358)	-0.041 (-0.760)
COUPLE			1.791 *** (57.000)	1.606 *** (46.153)
CRDUM2				
Number	52333		27977	
Log likelihood	-49670.180		-25923.650	

Note) Values in parentheses are t-statistics.

*** (**,*) denotes rejection of the hypothesis at 1% (5%, 10%) significance level.

Table 4. Volunteer labor supply functions of employed men in 2001.

	All samples		Married	
	(1) Society	(2) Individual	(1) Society	(2) Individual
ONE	-2.967 *** (-9.182)	-3.347 *** (-8.682)	-2.584 *** (-6.136)	-2.694 *** (-5.292)
AGE	0.132 *** (13.365)	-0.051 *** (-4.270)	0.062 *** (4.328)	-0.086 *** (-4.982)
MARRY	0.713 *** (22.103)	0.684 *** (18.134)		
STUDY	0.140 *** (6.371)	0.448 *** (17.652)	0.009 (0.298)	0.285 *** (8.511)
HOUSE	0.482 *** (17.242)	0.318 *** (9.921)	0.571 *** (15.592)	0.383 *** (9.028)
FINCOME	0.001 *** (8.624)	0.001 *** (8.658)	0.001 *** (6.991)	0.001 *** (6.409)
CHILD	0.088 ** (2.576)	-0.083 ** (-2.109)	0.103 ** (2.456)	-0.032 (-0.676)
OLD	0.339 *** (11.817)	0.360 *** (10.499)	0.296 *** (7.981)	0.233 *** (5.209)
CARE	0.354 *** (5.349)	0.382 *** (4.916)	0.300 *** (3.482)	0.312 *** (3.029)
HOLIDAY	0.300 *** (13.504)	0.279 *** (10.462)	0.238 *** (8.200)	0.220 *** (6.196)
CROSSP	0.358 (0.987)	1.093 ** (2.528)	0.326 (0.689)	0.580 (1.013)
AREA	-2.415 *** (-4.940)	-2.376 *** (-4.259)	-2.543 *** (-4.028)	-2.237 *** (-2.972)
COUPLE			1.504 *** (57.490)	1.484 *** (47.086)
CRDUM2	2.244 *** (3.568)	2.385 *** (3.327)	2.460 *** (3.014)	2.211 ** (2.269)
Number	56654		35714	
Log likelihood	-53772.500		-33373.890	

Note) Values in parentheses are t-statistics.

*** (**,*) denotes rejection of the hypothesis at 1% (5%, 10%) significance level.

Table 5. Volunteer labor supply functions of employed women in 2001.

	All samples		Married	
	(1) Society	(2) Individual	(1) Society	(2) Individual
ONE	-2.781 *** (-7.464)	-2.476 *** (-6.237)	-1.713 *** (-3.310)	-2.137 *** (-3.674)
AGE	0.128 *** (11.486)	-0.016 (-1.324)	-0.135 *** (-7.231)	-0.159 *** (-7.528)
MARRY	0.865 *** (27.120)	0.493 *** (14.884)		
STUDY	0.384 *** (14.226)	0.649 *** (23.213)	0.287 *** (7.572)	0.553 *** (13.443)
HOUSE	0.133 *** (4.080)	0.072 ** (2.123)	0.289 *** (6.328)	0.226 *** (4.461)
FINCOME	0.000 *** (5.255)	0.000 *** (4.474)	0.000 *** (5.239)	0.000 *** (4.399)
CHILD	-0.009 (-0.194)	-0.151 *** (-2.878)	-0.334 *** (-5.511)	-0.305 *** (-4.594)
OLD	0.185 *** (5.432)	0.193 *** (5.019)	0.019 (0.420)	0.013 (0.258)
CARE	0.279 *** (4.037)	0.503 *** (7.118)	0.273 *** (2.851)	0.433 *** (4.196)
HOLIDAY	0.109 *** (4.472)	-0.035 (-1.363)	0.015 (0.438)	-0.072 * (-1.940)
CROSSP	0.581 (1.400)	0.994 ** (2.248)	0.800 (1.376)	1.054 (1.612)
AREA	-1.869 *** (-3.676)	-0.292 (-0.561)	-1.586 ** (-2.133)	0.757 (0.932)
COUPLE			1.555 *** (47.058)	1.425 *** (38.359)
CRDUM2	1.921 *** (2.979)	0.037 (0.056)	1.814 * (1.904)	-1.039 (-0.990)
Number	43291		23392	
Log likelihood	-42516.790		-22702.340	

Note) Values in parentheses are t-statistics.

*** (**,*) denotes rejection of the hypothesis at 1% (5%, 10%) significance level.

Table 6. Volunteer labor supply function of the self-employed in 2001.

	All individuals		Married	
	(1) Society	(2) Individual	(1) Society	(2) Individual
ONE	-1.146 *** (-2.601)	-0.132 (-0.252)	-1.965 *** (-3.594)	-0.579 (-0.911)
AGE	0.033 ** (2.557)	-0.026 * (-1.707)	0.033 * (1.734)	-0.044 ** (-2.038)
MARRY	0.432 *** (9.581)	0.373 *** (6.920)		
STUDY	0.371 *** (9.253)	0.726 *** (16.504)	0.280 *** (5.406)	0.672 *** (12.062)
HOUSE	0.645 *** (10.916)	0.318 *** (4.956)	0.543 *** (7.315)	0.287 *** (3.563)
FINCOME	0.000 ** (2.381)	0.000 (0.902)	0.000 ** (2.498)	0.000 (0.562)
CHILD	-0.047 (-0.660)	-0.080 (-0.989)	0.013 (0.136)	-0.040 (-0.387)
OLD	0.275 *** (6.482)	0.170 *** (3.376)	0.215 *** (3.868)	0.102 (1.580)
CARE	0.141 ** (2.002)	0.385 *** (4.875)	0.031 (0.336)	0.353 *** (3.484)
HOLIDAY	-0.124 *** (-2.816)	0.000 (-0.008)	-0.067 (-1.212)	0.069 (1.123)
CROSSP	-0.565 (-1.169)	-1.765 *** (-3.056)	0.048 (0.079)	-1.512 ** (-2.158)
AREA	0.534 (0.755)	0.945 (1.214)	0.181 (0.197)	1.361 (1.342)
COUPLE			1.892 *** (49.543)	1.768 *** (39.451)
CRDUM2	-1.375 (-1.555)	-1.608 (-1.643)	-0.915 (-0.797)	-2.171 * (-1.694)
Number	24263		17704	
Log likelihood	-24738.500		-16581.530	

Note) Values in parentheses are t-statistics.

*** (**,*) denotes rejection of the hypothesis at 1% (5%, 10%) significance level.