Who Participates? The Supply of Volunteer Labor and the Distribution of Government Programs in Rural Peru

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Abstract

Numerous analysts have linked volunteering and participation to positive economic and political outcomes. In this paper, I use the 1994 Peru LSMS to analyze volunteering patterns in rural Peru. The basic results of the paper are two. First, volunteers in rural Peru do not appear to have a low opportunity cost of time. They are more educated, and are more likely to hold a job. Other household characteristics, such as gender, marital status, length of residence, and ethnicity, are all important predictors of the probability of volunteering. Second, controlling for household characteristics, there are large differences across communities in aggregate volunteer levels. These differences do not seem to be related to differences in patterns of government expenditure. Many public programs, in rural Peru and elsewhere, ask that the intended beneficiaries "participate" as a means of building trust and social capital, increasing the sustainability of investments, and helping self-target investments to the poor. Volunteering may have important benefits in terms of building social capital, and encouraging greater ownership of development projects. The results in this paper suggest, however, that encouraging participation by potential beneficiaries is unlikely to be an effective form of self-targeting, since people with a higher opportunity cost of time volunteer more. Moreover, social programs which require participation may have difficulty reaching some particularly vulnerable groups, such as women or the illiterate.

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1. Introduction

Numerous analysts have linked volunteering, working without pay, to positive economic and political outcomes. This possibility has been discussed at least since Tocqueville, but the praises of volunteering and other forms of "participation" in community affairs have been sung ever more loudly in the last decade. Under various guises, volunteering has been proposed as an alternative to "inefficient" government activity (see Weisbrod, 1975, as well as much of the recent literature on the "new federalism"); as a means of ensuring the sustainability of public investments (Uphoff, 1992; Isham et. al., 1995); as an explicit attempt to self-target investments to the poor, whose opportunity cost of time is assumed to be lower (for a general discussion, see Besley and Kanbur, 1990; Ravallion, 1991; Besley and Coate, 1992); and as part of a solution to local collective action problems (Ostrom, 1990, pp. 138-41 et. passim; White and Runge, 1994). Volunteering, it is argued, also nurtures civil society, builds trust, and may be a key ingredient in a virtuous cycle of accountable government and high rates of economic growth (Putnam, 1993; Fukuyama, 1995).

The theoretical economics literature on volunteering is extensive (including Tullock, 1971; Arrow, 1974; Becker, 1974; Rose-Ackerman, 1982; Sugden, 1984; Andreoni, 1988). There are also numerous empirical studies which seek to explain the determinants of volunteering in European and North American countries (on Holland, van Jouke, 1993; on the United States, Menchik and Weisbrod, 1987, and Freeman, 1997; on Canada, Vaillancourt, 1994, and Day and Devlin, 1996). In Less Developed Countries (LDCs), much of the empirical work has been qualitative rather than quantitative, or based on much smaller sample sizes (for example, Ostrom; White and Runge).

This paper seeks to identify the determinants of volunteering in rural Peru: in a 1994 survey, almost 10% of working-age adults in rural areas in Peru reported they did unpaid work "for the benefit of the community" in the last week. These men and women performed a multitude of tasks: they constructed and repaired local infrastructure, helped with the upkeep of land, cooked for community soup kitchens, cleaned, picked up trash, and volunteered as teachers, doctors, or social workers. On average, volunteers donated almost seven hours of labor per week, a large amount of time by any standard.

The basic conclusions of the paper are two. First, volunteers in rural Peru do not appear to have a low opportunity cost of time. They are more educated, and are more likely to hold a job. Other household characteristics, such as gender, marital status, length of residence, and ethnicity, are all important predictors of the probability of volunteering. Second, controlling for household characteristics, there are large differences across communities in rural Peru in aggregate volunteer

levels. These differences do not seem to be related to differences in patterns of government expenditure.

The rest of the paper proceeds as follows. Section 2 gives a brief description of conditions in rural Peru. Section 3 outlines the extent to which traditional models of volunteering may be relevant to rural Peru. Section 4 describes the data set used for the analysis. Section 5 reports the amount and types of voluntary activity, and provides estimates of the determinants of volunteering. Section 6 concludes by discussing some of the implications for public policies in Peru.

2. The setting

Peru is divided into three geographic regions--coast, sierra (or highlands), and selva (or jungle).[2] About 30% of Peru's population of 23 million lives in rural areas, 14% of them on the coast, 67% in the sierra, and 19% in the selva.

By virtually any measure of welfare, residents of rural areas appear to be worse off than their urban counterparts. According to the 1994 LSMS, per capita expenditures in rural areas are about half of what they are in urban areas, and the proportion of people who live below the poverty line is about 25 percentile points higher (68.3%, compared to 42.0%). About two-thirds of total expenditures made by rural households are devoted to food, compared to less than 50% for urban households.

Health and nutrition indicators in rural areas are very poor: the 1991-92 Demographic and Health Survey estimated that fully 53.4% of children under the age of five suffer from chronic malnutrition (stunting), one of the worst rates in Latin America. The Total Fertility Rate in rural areas is high, 6.2 children per woman, but infant mortality is also high, about 78 per 1000. Indicators of educational attainment calculated from the LSMS show that about 12% of school-aged children in rural areas are not enrolled in school, and more than 20% of those aged 15 or older are illiterate. In every case, the comparable statistic for urban areas is about half that for rural areas, except for adult illiteracy, which only affects 5% of adults in urban areas.

A large fraction of the population of the rural sierra and the rural selva speaks a native Indian language as their mother tongue. The languages spoken are principally Quechua and Aymara in the sierra, and Shipibo and Campa in the selva. In keeping with the literature (for example, MacIsaac and Patrinos, 1994), I define these people as indigenous. According to the LSMS, 56.3% and 26.4% of households in the rural sierra and rural selva, respectively, are

[2] This section is based on my own calculations from the LSMS, Cuánto (1995), World Bank (1999), and the 1991-92 Peru Demographic and Health Survey (DHS).

headed by an indigenous person, compared to only 7.4% in the rural coast, and 17.7% in urban areas.

Rural Peru shares many features with other traditional, rural societies. In-migration into communities is limited: more than 80% of adults in rural areas report that they were born in their current place of residence. Almost 90% of households are headed by males. Households tend to be slightly larger than those in urban areas (5.3 members, compared to 5.1 members), and to have more children under 16 (2.4, compared to 1.7). Labor market participation in rural areas is high: almost 80% of the population above age 14 reports that they have a job. About three-quarters of the employed work in agriculture. On the coast, the main crops grown are rice, maize, beans and fruit; in the sierra, potatoes, other tubers, wheat, and quinua; and in the selva, rice, yuca, plantains and fruit. Much agriculture is small-scale, with peasant families working small plots with traditional methods, limited use of fertilizer, and simple irrigation methods. One partial exception is the plantation agriculture for sugar, rice, cotton, and asparagus on the coast.

In general, the connection of rural households to many aspects of the "modern", formal economy is still quite limited: for example, the LSMS indicates that less than 2% of households in rural areas earn income from savings or stocks, and only about 5% have access to a pension or social security.

3. Understanding volunteering

There are at least two ways to think of the determinants of volunteering. In one framework, volunteering is primarily decided by an individual's characteristics—for example, his wage and non-wage income. In an alternative framework, it is the characteristics of the community which matter—for example, the degree of "social capital", or the intensity of government activity which could crowd out volunteer efforts.

The simplest, labor-market based model of volunteering assumes that volunteering is a "consumption good".[3] People volunteer because they are altruistic (Arrow; Becker; Rose-Ackerman), or because they derive a "warm glow" from doing good (Tullock; Andreoni). Higher wages have an ambiguous effect on volunteering: they increase income but also raise the opportunity cost of time, making it more expensive to volunteer. By contrast, if volunteering is a normal good, the expected effect of non-wage income on volunteering should be positive.[4] In

[3] In a competing theoretical framework, volunteering is an investment in on-the-job experience and skills, which raises the expected future wage (Menchik and Weisbrod; Freeman). This model does not have much applicability in rural Peru, where volunteering generally involves physical labor, and volunteers are unlikely to "build up their resumes" to command a higher wage.

[4] Wealthier people may also choose to donate cash rather than volunteer time to achieve a certain level of production of "charity". The question of the relationship between donations of cash and labor has received

addition, there may be other household characteristics which affect the implicit cost of volunteering. For example, women in households with a large number of infants might be less likely to volunteer than others because the opportunity cost of their time is higher (see the seminal work by Gronau, 1973). Finally (and obviously), people with a larger taste for volunteering will volunteer more.

The labor market approach assumes that volunteering is "charity". However, if the benefits of volunteering revert primarily to the members of a narrowly-defined "community", it may be more appropriate to conceive of volunteer labor as an input into the production of a local public good (for example, Sugden, 1984).[5] Community characteristics may then be important: Coleman (1988) argues that the degree of "closure" in social relations in a community is an important determinant of the social capital a group has at its disposal (see also Putnam 1993). Ostrom (1990) finds that communities have very different amounts of institutional capacity, and that strong institutions allow communities to surmount the collective action problems which make organization of volunteer labor difficult. Numerous analysts have also linked cooperation, social capital, and the level of provision of public goods by both the public and private sectors to income equality, ethnic homogeneity, and low geographical mobility (for example, van Dijk and van Winden, 1997; Goldin and Katz,1998; Alesina, Baqir and Easterly, 1997; Easterly and Levine, 1997).

Finally, if volunteering is a means of producing a local public good, the extent and nature of government activity could be important. Consider two possibilities: on the one hand, it may be that the government and volunteers provide the same services, so that government activity crowds out the volunteer sector (for example, Steinberg, 1988). Alternatively, government programs may require volunteering as a form of matching grant from the intended beneficiaries, and certain government expenditures could have a positive effect on volunteering.

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some attention in the literature on volunteering in the United States (Menchik and Weisbrod; Freeman). Arguably, it is less of a concern in rural Peru, where donations of cash are very rare. The 1994 LSMS shows that less than 1% of households in rural areas donated money to charities. A 1995 ex-post beneficiary assessment of the Peruvian Social Fund (FONCODES), a government agency which funds small-scale infrastructure projects, suggests that 89% of beneficiaries contributed free labor for the execution of a project in their community, while only 11% and 8% had contributed cash and materials, respectively (Apoyo, 1995, no page number). Had these figures been broken down by rural and urban areas, the fraction of beneficiaries contributing cash in rural areas would almost certainly be much lower. White and Runge (p. 26) report similar findings for rural Haiti.

[5] When the benefits from a local public good are concentrated, those who stand to benefit the most could simply decide to volunteer and produce it on their own (Bilodeau and Slivinski, 1996a and 1996b). If much of the community stands to benefit, however, individuals may attempt to act cooperatively. This would seem to be an invitation to free-riding, but there will be a large premium on finding a workable solution to the free-riding problem when the difference in benefits between the cooperative and non-cooperative strategies is large (Ostrom).

4. The data set

The main data set used for this paper is the 1994 Peru LSMS. This is a nationally representative household survey, funded by the World Bank and UNICEF, and executed by the Peruvian think-tank Cuánto. All household interviews were conducted between June and August, 1994. The sample is stratified by region (Lima, and the urban and rural areas of the coast, sierra and selva). The weights across strata are not constant, and expansion factors have to be used to make accurate calculations. Within each stratum, the probability of selection of every household is constant, but standard errors have to be corrected for clustering.

Like similar surveys, the LSMS gathered a wealth of information on, amongst other things, the demographic characteristics, ethnicity, expenditures, income, education, health status, and migration patterns of household members. In addition, there are two questions on volunteering included in the employment module of the survey. The first question, asked of all adults above the age of 15, asks respondents if they performed any tasks "for the benefit of the community" in the last seven days. The follow-up question asks those who volunteered how many hours they dedicated "to all these community activities". The accompanying Surveyor's Manual specifies that the activities in question are those "which were done to improve the village or neighborhood in which the respondents live, or for the benefit of its inhabitants", and lists the construction of bridges and paths, church-related activities, and soup kitchens as examples. It also makes clear that only activities which were done "without any payment, in cash or in kind" should be taken into account (Cuánto, 1994, p. 50).

The answers to the first question about volunteering were recorded with the same codes used throughout the employment module. For example, if a given respondent answered that (s)he had worked repairing the roof of the local health center, the activity would be given one of the codes for "construction".[6] We therefore have a great deal of information about one aspect of the activity performed—we can distinguish whether "construction" involved woodwork, bricklaying, stone masonry, painting—but very little about another—we cannot tell whether repairs were made to the local school, health center, or community center. This makes it impossible to estimate the net benefits from the goods or services produced with volunteer labor.[7]

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[6] When respondents reported that they had volunteered for more than one task, the task to which they devoted the greatest amount of time was recorded.

[7] To see why this might complicate interpretation of the results, suppose that the poor volunteer more and that local public goods produced with volunteer labor systematically favor poor households. In this case, high rates of volunteering amongst the poor could be a sign of the low opportunity cost of volunteering *or* of the high benefits they expect to receive, and there will be no way of disentangling the two effects. Is it possible to make a set of reasonable assumptions which would eliminate this problem? Consider two assumptions, either one of which would suffice. First, one could assume that people contribute labor for local public goods primarily because they derive moral satisfaction from contributing, rather than because of the economic value of the goods in question. Such an assumption may not be unreasonable, and is

On the basis of the LSMS, I construct a vector of individual and household characteristics which could have an effect on the supply of volunteer labor. These include the demographic composition of the household, age, gender, marital status, education level, ethnicity, and whether or not the respondent was born in his current place of residence. One shortcoming of these data is that it is virtually impossible to disentangle the wage and non-wage components of income because a very large fraction of individuals in the rural sample in the survey are farmers, often working on their own plots of land. A second problem of the data relates to the absence of community measures. The community questionnaire in the 1994 LSMS was not consistently applied in the same communities as the household questionnaire, while the number of households sampled within a given cluster (between 4 and 13) is arguably too small to construct survey-based estimates of measures of ethnic and income dispersion within a cluster.

I use a measure of the expenditures made by the Peruvian Social Fund, FONCODES, in the twelve months before the survey as a partial control for the effect of public expenditures on volunteering. FONCODES finances small-scale infrastructure projects throughout the country, especially in rural areas. Although there is no comprehensive, disaggregated data on public expenditures in Peru, FONCODES is probably the largest single source of funding for the kinds of projects which could affect volunteering in the rural areas of Peru.[8] FONCODES keeps records of monthly expenditures at the district level. Districts are the smallest political unit in Peru, and the sample of rural households drawn for the LSMS includes observations from 103 of Peru's 1812 districts.

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supported by a growing body of experimental research (Palfrey and Prisbey, 1997; Kahneman and Knetsch, 1992). This essentially takes us back to the "charity" framework. Alternatively, given the wide variety of activities which fall under the general rubric of volunteering in rural Peru (see Table 2 below), one could assume that differences in direct benefits from the local public goods produced with volunteer labor wash out: one household with many children benefits most from the construction of an additional classroom, while another household with a plot of land near the river benefits most from repairs to an irrigation ditch but, in the aggregate, benefits are roughly constant across households. In this case, benefits are an omitted variable from the volunteering equation, but they are not systematically correlated with household characteristics and should therefore not bias the estimated coefficients.

[8] A World Bank study on the programs of the Ministry of the Presidency, the Ministry charged specifically with poverty alleviation in Peru, shows that FONCODES' budget was almost 15 times the size of that of COOPOP, the only other program in the Ministry which executed comparable small-scale infrastructure programs in rural areas (World Bank, 1996, p. 22). Data from the Ministry of Economy and Finance, meanwhile, suggest that FONCODES' budget was about eight times the size of the budget of the Rural Roads program of the Ministry of Transportation, and ten times the size of the PRONAMACHS program of the Ministry of Agriculture (Sierra and O' Brien, 1994, p. 13). Peru is an extremely centralized country, and expenditures by local governments on rural infrastructure are generally very small (World Bank, 1995b, pp. 25-37).

5. Results

Who are the volunteers in rural Peru? What do they do? Table 1 compares the demographic and economic characteristics of volunteers and non-volunteers, as well as of the households to which they belong. Table 1 shows that volunteers are no more likely to be poor; are no less educated; and are actually significantly *more* likely to be employed than non-volunteers. Volunteers therefore do not appear to have a lower opportunity cost of time than non-volunteers.[9] Table 1 also points to other significant differences between volunteers and non-volunteers: Volunteers are more likely to be male, married, and indigenous. Volunteering does not seem to be a substitute for or a complement of either cash donations to charity or the likelihood of making a cash transfer to a relative or friend.

Table 2 breaks down volunteer labor by occupational category, and by gender. The values in each cell correspond to the fraction of male and female volunteers who reported they worked on a particular task, so that each column adds to 100%.[10] Two points are worth noting. First, although volunteer labor was used for a multitude of tasks, "construction" and "farming" jointly account for almost two thirds of volunteer activity. The data does not allow for a precise breakdown, but volunteer labor for "construction" probably involves activities like construction and repair of schools, health posts, rural roads, and water and sanitation systems, while "farming" probably involves activities like construction and repair of irrigation ditches, soil conservation, and reforestation. Second, there are differences in the kind of volunteer activity provided by men and women in some categories but, surprisingly, not in others. For example, given that they volunteered, females are just as likely to work on construction as males.

I turn next to regression analysis to estimate a reduced-form volunteer equation. The dependent variable is binary, taking on the value of one if respondents report having volunteered, and zero otherwise, and all specifications are estimated by probit. The regression coefficients can therefore be interpreted as changes in the probability of volunteering associated with a one-unit change in the independent variable in question. The sample size is limited to those aged 16 and over. All reported standard errors are corrected for heteroskedasticity and clustering.

In the first specification, volunteering is regressed on a vector of individual and household characteristics, including variables for age and age squared, years of completed schooling, household size, and dummy variables for gender (male=1; female=0), marital status (married=1; unmarried=0), whether the respondent is a household head (yes=1; no=0), whether or not (s)he was born in the current place of resident (yes=1; no=0), three dummy variables for ethnicity

[9] Unless labor markets work perfectly, one might expect workers to have a higher opportunity cost of time than those who stay at home.

corresponding to respondents whose mother tongue is Quechua, Aymara, and one of the native languages spoken in the selva, as well as dummy variables for the sierra and the selva. The second specification supplements these with district-level measures of population, mean income, and expenditures made by FONCODES in the twelve months prior to the survey.[11] The third specification is a fixed-effects specification which includes dummy variables for every cluster in the survey. Note that the sample sizes in this cluster fixed-effects specification are smaller because all clusters in which no-one (or everyone) reports having volunteered have to be dropped. Also, the regional dummies and the district-level measures have to be excluded from the regression to avoid perfect colinearity.

Table 3 confirms that individuals with more schooling are significantly more likely to volunteer. Every additional year of education increases the probability of volunteering by between .004 and .007—equivalent to between 6.0 and 5.1 percentile points of the predicted probability of volunteering at the means of other variables.[12] Again, this does not seem to be consistent with an explanation in which volunteering is primarily done by individuals with a low opportunity cost of time.[13]

To further explore the relationship between opportunity cost of time and volunteering, I graph the probability of volunteering as a function of the number of hours worked (for a similar graph, see Freeman). A priori, one might expect to find evidence of substitution between work time and the probability of volunteering: working long hours should be an indication of a high opportunity cost of time—both because people who work more are likely to have a high marginal return to work, and because the value of leisure increases as more hours are spent on the job. But Figure 1 shows that the probability of volunteering generally *increases* with the number of hours worked, at least for men. Like the results in Tables 1 and 3, Figure 1 seems to confirm that, if anything, individuals with a high opportunity cost of time volunteer more.[14] Figure 1, finally, shows that men are much more likely to volunteer than women in rural Peru.

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[10] Because the ratio of male to female volunteers is approximately three to one, however, males are actually more likely to volunteer in every category except medical services, social work, and cooking.

[11] This is an imputed measure of income, estimated by combining information from the 1993 census with a 1995 household survey. For a discussion of the general methodology see Hentschel et. al. 2000. For its application in Peru see INEI 1996 and Schady 2000b.

[12] For example, in the first specification the predicted probability of volunteering for those with $\bar{x}$ years of schooling is .0726315, while the predicted probability for those with $\bar{x}$ + 1 years of schooling is (.0726315 + .0043496) = .0769811. The change in probability as a fraction of the predicted probability itself is therefore (.0043496 / .0726315) = .05989 = 6.0%.

[13] When per capita expenditures are included in these regressions the coefficient on per capita expenditures is indistinguishable from zero (z-statistics are -0.54, -0.36, and 0.18), while the coefficient on years of education remains essentially unchanged.

[14] Freeman suggests that motivation is an omitted variable from the volunteering equation (as well as from standard earnings or labor supply equations). More motivated individuals work more in the job market and volunteer more.

What about the effect of other individual and household characteristics? The coefficients on age and age squared show that the probability of volunteering increases with age, albeit at a decreasing rate, and decreases with household size. One possible explanation for the negative coefficient on household size might be that community tasks often require that each household provide a fixed amount of labor—say, one able-bodied worker—regardless of household size. The results in Table 3 also show that men, household heads, those who are married, and those born in their current place of residence are all more likely to volunteer, as are native non-Spanish speakers. Heads of household, married people, and long-term residents may all be more likely to stay in the community in which they currently live and may therefore be more willing to invest in the production of local public goods. Higher volunteering rates among the Quechua, Aymara, and other non-Spanish native speakers are probably an indication of cultural or sociological differences: there is a great deal of anthropological work on patterns of cooperation and reciprocity—volunteering, broadly defined—in indigenous communities in rural Peru, especially in the sierra (see, for example, Alberti and Mayer, 1974; Matos Mar, 1976; Aramburú and Ponce Alegre, 1983; Mossbrucker, 1990).[15] Note that all of these effects are remarkably consistent across specifications, including the fixed-effects specification.

I turn next to geographic variations in volunteer activity, and to the possible relationship between these differences and differences in government activity. Note, first, that volunteering is much more widespread in the rural sierra and especially the rural selva than in the rural coast (the differences become even larger when the variables measuring ethnicity are excluded from the regression because of the high concentration of indigenous people in the sierra and the selva). Second, the very large increase in the pseudo R-squared in specification (iii) suggests that there are important differences in the level of volunteering across communities—differences which may well be related to underlying differences in social capital, institutions, and within-community homogeneity.

Finally, the results in specification (ii) suggest there is no apparent effect of FONCODES expenditures on the decision to volunteer. That is, FONCODES investments do not appear to crowd volunteer efforts in or out. Measurement error and simultaneity bias may both be sources of concern in the estimated impact of FONCODES investment. Measurement error is common in analytical work which combines data from household surveys and administrative sources. This is a peculiar form of measurement error, however, since it does not bias the coefficients on the mis-measured variable(s) towards zero. Rather, the estimated coefficients are unbiased but estimated

[15] Higher volunteering among the indigenous may also be an indication of discrimination in the wage-earning market (MacIsaac and Patrinos), which could lower the opportunity cost of volunteering for indigenous people.

imprecisely (see Deaton, 1997, pp. 100-01). Simultaneity bias may arise because FONCODES encourages beneficiaries to participate in the execution of a project, and may favor areas in which there is a large predisposition for volunteering. The causality would then run, at least in part, from volunteer levels to FONCODES expenditures, and including the level of FONCODES expenditures as a regressor in the volunteer equation would produce biased and inconsistent results. The usual solution for this problem is instrumental variables (IV). I attempted two IV specifications to address the possible endogeneity of FONCODES investments. FONCODES makes allocations to districts on the basis of a formula which includes the population of the district, the fraction rural, and a composite index which is a weighted average of eight variables—the rate of chronic malnutrition, illiteracy, school-aged children not in school, overcrowded housing, inadequate roofing, and the proportion of the population without access to water, sewerage, and electricity. If district-level allocations are uncorrelated with the error term in the volunteer equation, conditional on the log of mean per capita income and the log of population, then the district-level allocation would be a valid instrument for FONCODES expenditures (Paxson and Schady, 1999). Unfortunately, the 2SLS regression which uses allocations as an instrument is quite sensitive to exactly how FONCODES expenditures are specified (in levels, logs, or a per capita basis). In a different approach, I use results reported by Schady (2000), which show that FONCODES expenditures were affected, in part, by the voting record of a province. Specifically, after 1993, FONCODES funded a disproportionate number of projects in provinces which had voted for Fujimori in the 1990 presidential election, but against Fujimori in the 1993 referendum on the new constitution. If the change in the province-level vote is uncorrelated with the error term in the volunteer equation, conditional on the log of mean per capita income and the log of population, then the change in the vote would be a valid instrument for FONCODES expenditures. Unfortunately, the first-stage regression shows that the change in the vote is not a significant predictor of expenditures in the sub-sample of provinces in the rural sample of the 1994 LSMS. Since neither instrument is fully satisfactory, it is not clear to what extent the coefficient on FONCODES expenditures in specification (ii) is biased by endogeneity.

6. Conclusion

This paper makes a contribution to the analysis of volunteering and other forms of unpaid "participation" in community affairs. To the best of the author's knowledge, there is no other *quantitative* analysis of the determinants of volunteering in an LDC. I show that volunteering is widespread in rural Peru, and that there are large, significant differences in the probability of volunteering. Volunteers in rural Peru have a high opportunity cost of time: they are better educated, more likely to head a household, and more likely to be married. Moreover, I find no

evidence of any substitution of volunteer time and work time. Finally, there is no clear effect of public expenditures on voluntary activity.

The analysis in this paper suggests a complementary line of research to the labor market models of volunteering. The results show that gender, age, education, marital status, household headship, long-term residency, and ethnicity consistently predict voluntary activity in rural Peru. Many of these characteristics are arguably correlated with a higher degree of attachment to the community. For example, being married and heading a household may encourage "responsible" behavior. They also foster links of interdependence within the family—links which may extend to the community.

One could also think of volunteering in terms of the accumulation of prestige within a community. This line of reasoning would build on work which attempts to introduce social status considerations into the economic analysis of decision-making in the labor market (for example, Baumol, 1990; Fershtman and Weiss, 1993). Volunteering may help confer or confirm social status—status which males, married people or household heads may be more likely to seek and attain. More educated people could have a better sense of such intangible benefits from volunteering, or be in a position to assume leading roles in the affairs of the community. Whatever relationship exists between volunteering and social status, it is bound to be complex: high-status individuals may volunteer to confirm their status, or they may be responding to social expectations that they engage in volunteer work.

Many public programs, in rural Peru and elsewhere, ask that the intended beneficiaries "participate". Volunteering may have important benefits in terms of building trust and social capital, and of increasing the sustainability of investments. Participation is also proposed as a way of self-targeting investments to the poor. The results in this paper suggest two possible concerns with this approach. First, if people with a higher opportunity cost of time volunteer *more*, encouraging participation by potential beneficiaries is unlikely to be an effective form of self-targeting. Moreover, social programs which require participation may not effectively reach some particularly vulnerable groups, such as women or the illiterate. Second, if volunteering confirms status and vulnerable groups are less likely to volunteer, participatory social programs may have the unintended consequence of reinforcing existing social hierarchies, unless they are explicitly designed to encourage or require the participation of traditionally excluded groups.

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Table 1: Characteristics of individuals who volunteer

	Volunteers		Other
Summary statistics			
Number or observations	336		3,324
Population (adults)	384,659		3,817,178
% volunteering	9.15		
Average hours volunteered (volunteers)	6.72		
Demographics			
Mean age (years)	39.65	***	37.46
# of years of education	5.94	n.s.	5.81
% Males	76.31	***	47.34
% Married	58.01	***	42.76
Mean number of members in HH	5.59	**	6.00
Mean number of children in HH (age <16)	2.83	n.s.	2.68
Mean number of old people in HH (age >59)	0.16	***	0.29
% Indigenous	59.05	***	39.63
% Born in current place of residence	82.92	n.s.	80.58
Economic characteristics			
% people in poverty	62.12	n.s.	60.87
% giving to charity	0.00	n.s.	1.40
% making transfer to “relative” or “friend”	16.48	n.s.	17.53
% Employed	82.47	***	98.03

Notes: Estimated means, taking into account the clustered and weighted nature of the data. Levels of significance for an F-test for difference in the means for volunteers and non-volunteers are reported. * Difference is significant at the 10% level; ** difference is significant at the 5% level; *** difference is significant at the 1% level; n.s.: difference is not significant.

Table 2: Type of volunteer work provided, by gender

	Males		Females
Construction	39.30	n.s.	37.75
Farming	30.39	**	15.70
Teaching	.84	n.s.	1.72
Doctor, nurse, dentist, veterinarian	.48	**	4.85
Social work	0	n.s.	2.53
Cooking	.48	***	12.97
Cleaning, picking up trash	6.60	n.s.	8.90
Other	21.92	n.s.	15.58
Total	100.00		100.00

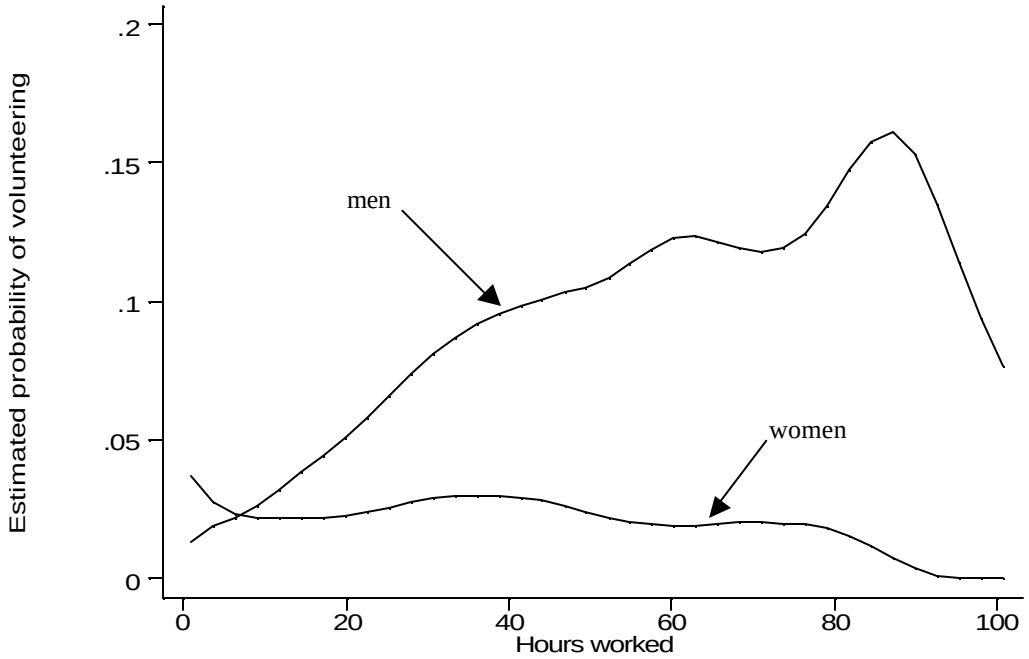
Note: * Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level; n.s.: not significant.

Table 3: Determinants of volunteering, various specifications

	(i)	(ii)	(iii)
Age	.0073 (3.22)***	.0073 (3.28)***	.0097 (3.03)***
Age squared (x10)	-.0001 (3.50)***	-.0001 (3.47)***	-.0011 (3.04)***
Years of education	.0043 (2.11)**	.0051 (2.44)**	.0072 (2.49)**
Household size	-.0039 (1.84)*	-.0043 (2.12)**	-.0051 (1.62)
Male	.0404 (2.39)**	.0393 (2.38)**	.0514 (2.40)**
Married	.0195 (1.64)	.0179 (1.50)	.0292 (1.68)*
Household head	.0695 (3.73)***	.0651 (3.53)***	.0905 (3.86)**
Not born in current residence	-.0242 (2.01)**	-.0213 (1.77)*	-.0267 (1.60)
Quechua	.0502 (2.55)**	.0555 (2.93)***	.0600 (1.72)*
Aymara	.0819 (2.42)**	.0792 (2.18)**	.0190 (0.30)
Other indigenous	.1513 (4.35)***	.1687 (4.50)***	.0375 (0.87)
Sierra	.0260 (1.24)	.0014 (0.70)	--
Selva	.0949 (2.87)***	.0813 (2.65)***	--
Log (population)	--	.0043 (0.40)	--
Mean income	--	-.0002 (1.75)*	--
Foncodes exp. per cap	--	.0000 (1.42)	--
Cluster Dummies	No	No	Yes
Observed probability of volunteering	0.099	0.099	0.141
Predicted probability of volunteering	0.073	0.071	0.086
Pseudo R-Squared	.127	.133	.226
Number of observations	2908	2908	2047

Notes: Dependent variable is the probability of volunteering. Z-statistics corrected for heteroskedasticity and clustering are reported in parentheses.
* Significant at the 10% level; ** significant at the 5% level; *** significant at the 1% level.

Figure 1: Hours worked and probability of volunteering



Note: Fan regressions with a quartic kernel and bandwidth of 20. Sample limited to adults above age 16. Hours worked includes all hours worked on the main job as well as on any secondary jobs. Respondents who claimed to spend more than 100 hours per week on the main and secondary jobs were dropped from the sample.