THE VALUE OF VOLUNTEER LABOR AND THE FACTORS INFLUENCING PARTICIPATION: EVIDENCE FOR THE UNITED STATES FROM 2002 THROUGH 2005

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According to the U.S. Department of Labor, the number of people who volunteered rose from 59.8 million in 2002 to 65.4 million in 2005. Those volunteering benefit from their activity in various ways; however, these benefits are non-pecuniary and are generally not recognized in the national economic accounts used to measure gross domestic product (GDP). This paper uses data from the 2002–05 Current Population Survey Volunteer Supplements to assign a dollar value to volunteering. Different methodologies yield annual estimates from $116 to $153 billion (in 2005 dollars) over the four years (between 0.9 and 1.3 percent of 2005 GDP). Additionally, characteristics of individuals most likely to volunteer are identified. The volunteer rate varies by demographic characteristics in addition to geographic location, labor force participation, and business sector. Furthermore, the data suggest that volunteering is a "normal good" because participation increases with income even after controlling for observables.

1. INTRODUCTION

Volunteers supply unpaid labor that is used to produce economic output for the benefit of others. While the output this labor helps produce is generally under- or un-accounted for in official measures, it is important to certain sectors of the U.S. and world economy. According to the U.S. Department of Labor's Bureau of Labor Statistics (BLS), over 1 in 4 Americans formally volunteered between 2001 and 2005.[1] For the year beginning September 2001, 59 million people, or 27 percent of the U.S. civilian, non-institutional population over 16 years of age, volunteered.[2] Over the following three years, the number of people who volunteered in the U.S. increased at roughly the same rate as the population. The "volunteer industry," as estimated in this study, accounts for 1.3–1.5 percent of U.S. employee compensation in the U.S.; and the value of volunteer labor is larger than employee compensation for both the mining industry and the agriculture, forestry, fishing, and hunting industry. This is illustrated in Figure 1, which shows compensation accruing to different U.S. industries as well as volunteer labor value, each as a

[1]Formal volunteering is done through or for an organization and excludes volunteer activities such as helping a neighbor.

[2]See www.bls.gov/news.release/volun.nr0.htm. This paper uses the BLS definition for volunteers, i.e. persons who perform unpaid work (excluding reimbursement for certain expenses) through or for an established organization.
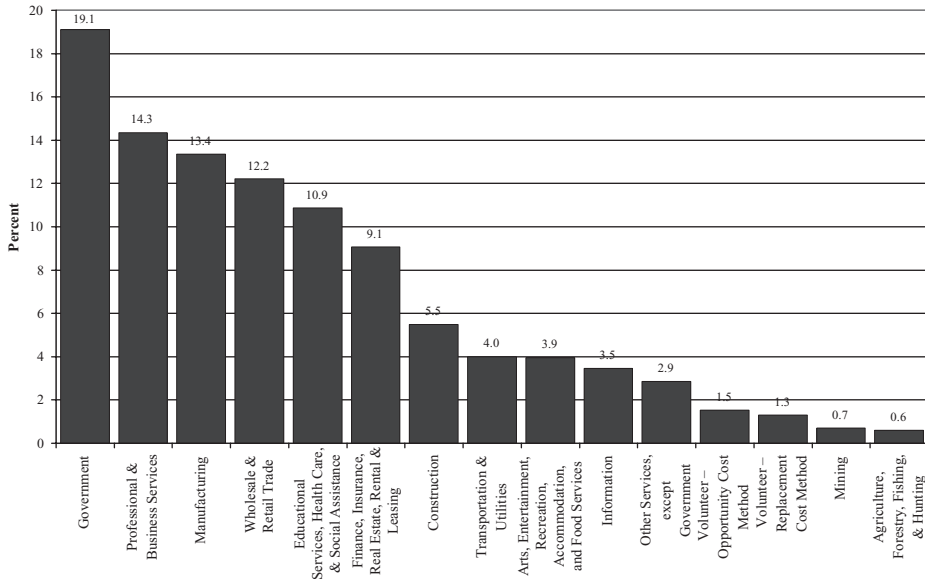
Figure 1. Percentage of Total Employee Compensation, by Major Industry Group and Volunteer Valuation Method for September 2004 to August 2005

share of total U.S. employee compensation.[3] Additionally, volunteer labor is the primary input into government and non-profit sector output that is unmeasured in the U.S. National Income and Product Accounts (see Abraham and Mackie, 2005).

While volunteer work is often recognized as important to society, the value of the labor (used to produce goods and services) is not included in gross domestic product (GDP) because the goods and services produced by volunteers are generally not traded in the traditional market place where money is exchanged. Consequently, assessing the importance of volunteer work is difficult, and values must be determined hedonically. The importance of some non-market activities may be trivial, but that is not the case for volunteer labor.

This paper focuses on formal volunteering and contributes to the existing literature in three important ways.[4] First, it estimates the value of volunteer labor, exploring alternative valuation techniques. The findings are compared to volunteer labor measures estimated by other researchers, including estimates for a number of different countries. For the U.S., the analysis compares the value of volunteer work to both overall and industry-based GDP. Shadow wage rates for volunteer labor are imputed based on the civilian, non-agricultural wage rate and are allowed to vary by individual characteristics in addition to the duties performed by the volunteers. This hedonic technique offers an alternative to applying a static

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[3]This figure is based on formal volunteering that occurs either through or for an organization. The value of volunteer labor provided by all persons over the age of 16 is derived using both the replacement cost and opportunity cost methods, discussed in detail later in the text.

[4]Since informal volunteering is not considered, the estimates in this paper represent only a fraction of total volunteering in the U.S.

wage rate for all volunteer labor.[5] Second, the value of volunteer labor is calculated by occupation and industry. Third, this paper identifies characteristics of individuals most likely to volunteer, building on previous investigations into the propensity for an individual to volunteer.

The remainder of this paper is organized as follows. Section 2 reviews the existing literature on volunteering from the U.S. and other countries; Section 3 provides a brief introduction to the System of National Accounts and explains the methodology used in this study; Section 4 describes the data; Section 5 presents the results; and Section 6 concludes.

2. Evidence on Volunteering in the U.S. and Other Countries

A number of studies have estimated the value of volunteer labor in the U.S. at between 1.9 and 5 percent of GDP. Early work by Murphy (1982) derived a range for the value of volunteer labor of between 3 and 5 percent of GDP.[6] Estimates by Freeman (1997) equaled 3.5 percent of employee compensation in 1991—or 1.9 percent of GDP. Meanwhile, Brown (1999) calculated a value of 3–4 percent of GDP. In another study, the Independent Sector (2001) placed the value at $239 billion, or 2 percent of GDP.[7] That same study reported that 44 percent of Americans 21 years and over volunteered 16 billion hours in 2000. The primary reason for the varying estimates across studies is differences in valuation techniques.

Similar studies have been performed for countries outside the U.S. For Australia, for example, Ironmonger estimated the value of volunteer labor for the country as a whole, as well as for many of its states. For Australia as a whole, Ironmonger (2000) estimated a value of $28.1 billion in 1992 and 47.1 billion in 1997, or 7 and 8 percent of Australian GDP in 1992 and 1997, respectively. In South Australia, Ironmonger (2002) estimated a value of $2,357 million—or 7.8 percent—of Gross State Product (GSP) in 1992 and $4,980 million—or 11.5 percent—in 2000.[8] The gross opportunity cost wage—defined as the wage rate before taxes—was applied to hours volunteered by South Australians, which increased over 50 percent to 229 million over the study period. In Victoria, Soupourmas and Ironmonger (2002) estimated 6.7 percent of GSP in 1992, and 7.6 percent in 1997. In Queensland, Ironmonger (2006) reported values of 8.3 percent of GSP in 1992 to 11.2 percent in 2004.

For Canada, Statistics Canada (2004) reported much smaller estimates, ranging from 1.4 percent to 1.7 percent of Canadian GDP. The volunteer wage applied was the hourly rate for community and social services occupations adjusted to include employer contributions to employment insurance and retirement, and indexed to inflation. Between 1997 and 2000, the number of Canadian

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[5]Valuation in this study is performed on a pre-tax basis.

[6]Murphy's estimate included volunteering along with other household activities.

[7]The hourly value of volunteer time was estimated at 12 percent above the average hourly wage for non-agricultural workers to account for fringe benefits.

[8]These estimates include both formal volunteer work through an organization and informal volunteer work such as helping a neighbor. This likely explains why these estimates are substantially higher than estimates for other industrialized countries that include only formal volunteering. Estimates are reported in Australian current dollars.

volunteers declined 4.3 percentage points to 26.7 percent of the population, and the value of volunteer labor fell slightly from $14.1 billion to $14 billion.[9]

Salamon *et al.* (2004) compiled volunteer labor values as percentages of GDP for 34 countries. The estimates vary greatly. Estimates generally are less than 0.5 percent of GDP for countries of Eastern Europe, Asia, and most of Latin America and Africa. For Australia, the United States, Israel, Scandinavian countries, and most of Western Europe, estimates are generally greater than 1 percent of GDP and often well above 2 percent. Several explanations for the varying range of estimates include estimation techniques used, data reliability, wealth differences, and varying cultural attitudes toward volunteering. Table 1 presents estimates from many of these aforementioned studies.

Studies have also examined other aspects of volunteering, including how participation differs across demographics. Vaillancourt (1994) discovered several interesting results. First, he reported that, for Canada, the highest rates of participation occurred between ages 15 and 16, which may reflect student involvement in school-endorsed service organizations. Second, men volunteered less than women; however, volunteering increased with marriage for men but decreased for women. Third, volunteering was negatively correlated with city size. This appears to be consistent with Brueckner and Largey (2008), who reported lower levels of social interaction and group involvement in more densely populated areas. Finally, volunteering was positively correlated with education and income; and white-collar workers were more likely to participate.

Similar to Vaillancourt, Freeman (1997) noted that volunteers were often high-skilled, implying a high opportunity cost of volunteer time. Additionally, volunteers were more likely to be employed and over 64 years old. The Independent Sector (2001) also reported that volunteers were more likely to be women. Building on the study by Menchik and Weisbrod (1987) on the supply of volunteer labor, Carlin (2001) estimated that married women contributed more than 3 billion hours in 1980. Carlin noted a positive correlation between volunteering (again for married women) and the presence of children. It is likely that some of this volunteering is for activities in which the volunteers' children participate. Brown (1999) examined volunteer participation by sector, and found that most volunteer work was supplied by people working in services- rather than goods-producing sectors.

3. The System of National Accounts and Methodology

The *System of National Accounts* (SNA) is a comprehensive publication produced jointly by five international organizations that establishes international standards for measuring economic activity.[10] It addresses the integration of macroeconomic accounts, production accounts, and balance sheets, and provides guidelines that make meaningful comparisons of economic activity across countries possible. Generally, only market transactions are considered in the SNA. Nonprofit institutions, which rely heavily on volunteer labor, are recognized;

[9]Estimates are reported in Canadian current dollars.
[10]These organizations consist of the United Nations, International Monetary Fund, Commission of the European Communities, Organization for Economic Co-operation and Development, and World Bank.

TABLE 1

VALUE OF VOLUNTEER WORK AS A PERCENTAGE OF GDP (UNLESS OTHERWISE NOTED)

Study	% of GDP	Salamon et al. (2004)	% of GDP	Salamon et al. (2004)	% of GDP	Salamon et al. (2004)	% of GDP
United States		United States	1.48	*Eastern Europe*		*Scandinavia*	
This study	1.0 to 1.3	Australia	1.21	Slovakia	0.04	Finland	2.08
Freeman (1997)	1.9	Israel	1.02	Poland	0.10	Norway	2.76
Independent Sector (2001)	2	*Africa*		Hungary	0.11	Sweden	4.03
Brown (1999)	3 to 4	Uganda	0.47	Czech Republic	0.38	*Western Europe*	
Murphy (1982)	3 to 5	Kenya	0.48	Romania	0.43	Austria	0.61
Australia		South Africa	0.71	*Latin America*		Italy	0.70
Ironmonger (2000)	7 to 8	Tanzania	3.19	Peru	0.06	Ireland	1.12
Soupourmas and Ironmonger (2002)[1]	6.7 to 7.6 (Victoria)	*Asia*		Mexico	0.08	Spain	1.25
Ironmonger (2002)[2]	7.8 to 11.5 (South Australia)	Pakistan	0.11	Brazil	0.10	Belgium	1.54
Ironmonger (2006)[3]	8.3 to 11.2 (Queensland)	India	0.31	Colombia	0.28	United Kingdom	1.96
Canada		Japan	0.49	Argentina	1.03	Germany	1.97
Statistics Canada (2004)[4]	1.4 to 1.7	South Korea	0.51			France	2.66
		Philippines	0.94			Netherlands	4.13

Notes:
[1]Percentage of Victoria's Gross State Product.
[2]Percentage of South Australia's Gross State Product.
[3]Percentage of Queensland's Gross State Product.
[4]Percentage of Canadian Gross Domestic Product.
Source: Author's analysis.

however, the SNA provides little guidance for estimating the value of voluntary labor. The 1993 SNA defines production as "an activity in which an enterprise uses inputs to produce outputs." While volunteer labor is often important in the production process, it is overlooked when measuring nonprofit sector output (United Nations, 1993). The only value attributed to this labor is direct expenses incurred—i.e., the cost of other inputs that are complements to volunteer labor. As it stands, this output-generating resource is unaccounted for in the SNA.

The *Handbook on Nonprofit Institutions in the SNA*, a supplement to the SNA publication, provides more guidance regarding non-market production in the nonprofit sector—including a detailed discussion of valuation techniques for volunteer work (United Nations, 2002). The Handbook recognizes that the value of volunteer employment includes the cost of volunteer labor used by nonprofit institutions along with the household's "labor donation." The recommended hedonic value for volunteer time, then, is the average gross wage for the relevant welfare or social service occupation, including social contributions to the community.

Ideally, one would have records of inputs used by volunteers in addition to volunteer labor hours.[11] Absent this information, one can price inputs using near-market output proxies. For example, the price of a meal sold in a restaurant could serve as an output-based proxy for meals prepared by volunteers in a soup kitchen. Further research might address alternative ways to measure the value of output in the non-market sector; however, since the data used in this analysis identifies only volunteer time and specifies neither other inputs used nor outputs produced, this paper focuses solely on labor as an input to production while using two techniques to value volunteer labor.

One technique—the *opportunity cost approach*—values labor at the wage for the volunteer's primary occupation, which is likely an upper bound. Consider a lawyer volunteering in a soup kitchen preparing meals for the homeless. Assigning the lawyer's wage to this volunteer time overestimates the shadow wage rate because the value of the marginal product (per hour) for the two activities is not equivalent. Another technique—the *replacement cost approach*—assigns a shadow wage rate equal to the market wage for the activity performed.[12] Again, consider a lawyer volunteering at a soup kitchen. This approach assigns a shadow wage based upon the market wage for a cook, instead of for a lawyer. This method may more accurately reflect the value of the volunteer's marginal product, but it also has limitations. Those performing activities for their primary vocation acquire occupation-specific human capital, making them more efficient than a volunteer. A

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[11]Inputs include capital, such as computers, software, and buildings. It is important to include capital services, as well as the associated capital investment, as an input to the volunteer sector.

[12]Abraham and Mackie (2005) provide recommendations for measuring volunteer labor for the purpose of national accounting. The report describes the complexities involved in valuing volunteer labor and proposes two methods. The first method, "modified replacement cost," measures the contribution of volunteer labor to the production of goods and services by the organization utilizing the volunteers. The modified replacement cost is equal to the cost of hiring someone to perform the same tasks, adjusted for the differences in skill and productivity between paid and unpaid work. The second method ascertains the full welfare effect of volunteering. This approach models utility as a function of leisure, paid work, and volunteering. The individual seeks to maximize utility by allocating time among the three uses. The contribution to economic welfare is then achieved through the combination of volunteering as a labor input into production and as a provider of utility to the volunteer.

line cook, for example, has acquired specialized skills, and is likely more efficient in preparing meals than a volunteer in a soup kitchen. In most instances, a professional cook delivers a higher quality product in less time than a volunteer, meaning her wage will be higher than the true shadow wage for a volunteer. Data limitations also pose problems for the replacement cost approach. The lawyer reporting to volunteer preparing meals may also perform other tasks, such as washing dishes or mopping floors. In surveys, these other tasks are typically unrecorded.

Valuing volunteer labor for those who are unemployed or not in the labor force (NILF) is more complicated since there is no primary occupation. For the opportunity cost method, this study applies the state minimum wage rate. For the replacement cost method, these individuals are accounted for since labor is valued at the market activity wage. Each method has its strengths and weaknesses; and this study performs calculations based on both techniques to compare the results.

In addition, this study examines the propensity to volunteer. Using a Probit model, the analysis builds on previous studies, considering an array of factors that may affect the decision to volunteer, such as occupation and sector of employment. The following is the estimating equation:[13]

$$\Pr(\text{VOLUNTEERING} = 1) = \Phi\,(\text{AGE, GENDER, CHILD, MARRIED, RACE CATEGORY,}$$
$$\text{WAGE CATEGORY, OCCUPATION CATEGORY, LABOR FORCE STATUS, EDUCATION}$$
$$\text{CATEGORY, METRO, REGION CATEGORY, GOODS INDUSTRY, SECTOR CATEGORY})$$

where Φ is the standard cumulative normal distribution. Two separate Probit equations are estimated on 2002 to 2005 data.[14] The first equation considers labor force status and includes detail for those individuals in the labor force—such as full-time, part-time, or unemployed—whereas the second equation considers only whether the individual is in the labor force. Additionally, the equations are estimated separately by sex to examine whether the covariates influence men and women differently.

4. Data

The primary data sources are the September 2002 to 2005 Volunteer Supplements to the CPS.[15] While these data are valuable and include details not present in many earlier surveys, some information is missing. For example, the Volunteer Supplements do not report wages for every respondent, but only for those in the outgoing rotation group (ORG), i.e. one-quarter of the sample.[16] Thus, wages are imputed conditional on occupation and industry and wage categorical variables. Table 2 presents average hourly wages for low-, medium- and high-wage

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[13]The variables in the estimating equation include categorical detail for race, wage, education, labor force participation, occupation collar, region, and sector. Dummy variables for gender, presence of children under age 18, marital status, metropolitan area, and employment in a goods- or services-producing sector are also present.

[14]Statistical tests indicated that volunteer participation varies by year, labor force status, and gender. Thus, separate analyses were necessary.

[15]The volunteer supplements are restricted to persons at least 16 years old.

[16]The wage analysis is performed over the same period as the Volunteer Supplement.

TABLE 2

AVERAGE HOURLY WAGE: AGES 18–64, EXCLUDING SELF-EMPLOYED (IN 2005 CONSTANT DOLLARS)

Major Occupation	September 2001–August 2002		September 2002–August 2003		September 2003–August 2004		September 2004–August 2005	
	N	Wage	N	Wage	N	Wage	N	Wage
Low wage								
Farming, forestry, and fishing	2,675	10.53	946	10.87	12,519	0.74	1,224	9.48
Service	24,212	10.84	16,109	11.42	26,667	11.15	26,874	10.98
Office and administrative support	24,882	14.12	13,890	14.41	26,154	14.34	25,755	14.27
Production	13,511	14.33	7,963	14.77	12,424	14.16	12,148	14.1
Transportation and material moving	12,935	13.23	4,895	14.73	10,356	14.09	10,328	13.78
Medium wage								
Construction and extraction	8,635	16.63	966	16.65	9,072	16.59	9,613	16.13
Sales and related	18,661	17.17	10,332	16.94	17,526	16.8	17,555	16.65
Installation, maintenance and repair	6,627	17.88	3,634	16.03	6,502	17.74	6,417	17.47
High wage								
Professional and related	37,086	23.85	22,347	23.44	36,484	23.79	36,737	23.97
Management, business, and financial	25,526	26.16	16,201	25.9	22,172	27.35	22,103	27.29

Source: Author's analysis based on CPS data.

categories for each major occupation group. Unsurprisingly, the low-wage category consists of occupations requiring less skill relative to the medium- and high-wage groups. However, workers in the low-wage category comprise approximately 45 percent of the ORG sample across all years. Average hourly wages for each major occupation and within each major industry are used to impute wages for each annual wave of the CPS ORG sample.[17] The estimated value of volunteering for each individual is the reported annual hours volunteered multiplied by the imputed wage rate. Valuing volunteer labor at replacement cost requires assigning an occupation to a volunteer activity based on detailed descriptions of occupations and activities. Valuing volunteer labor at opportunity cost is based on the self-reported industry data from the volunteer supplements.

The CPS data are supplemented with industry-based GDP estimates from the Bureau of Economic Analysis (BEA) for years 2001 to 2005 in order to measure the contributions of volunteer labor relative to GDP. Since the 2002 Supplement spans four months of 2001 and eight months of 2002, the relevant shares were applied to the 2001 and 2002 annual numbers to arrive at industry-based GDP estimates for supplement year 2002.[18] This same procedure was applied for the other years.

5. RESULTS

This section presents estimates of the value of volunteer labor for two samples using two different methods. The first sample is restricted to employed persons and accounts for the fact that the NILF or unemployed do not have an observed economic opportunity cost whereas employed persons could earn a wage when not volunteering.[19] The second sample consists of all persons at least 16 years old. A value for volunteering is calculated independent of economic opportunity cost since the shadow wage for volunteer labor is assumed to equal each person's primary occupation wage. Figure 2 summarizes the key findings of the valuation analysis. The estimated average annual value of volunteer labor for the employed sample using the opportunity cost method and the replacement cost method is $98.6 billion and $89.2 billion, respectively. The average percent of GDP corresponding to these values is 0.85 percent and 0.77 percent. For the employed sample, the estimated value is larger under the opportunity cost method as opposed to the replacement cost method. However, for the sample of persons at least 16 years old, the converse is true. This pattern holds true across all

[17]CPS respondents are in the survey for a total of 8 months over a 16 month period. They are surveyed for 4 consecutive months, leave the survey for 8 months, and then return for 4 more months. The ORG sample is of respondents who are either temporarily or permanently leaving the survey, and consists of one-quarter of the total CPS monthly sample for each month. Wage and salary questions are asked only to these respondents. In order to obtain average wage data for this analysis, a separate dataset was created for the ORG sample that corresponded with the period of the volunteer supplement.

[18]The study period begins September 1, 2001 and ends August 30, 2002. As a result, one-third of the value for 2001 GDP by industry was summed with two-thirds of the 2002 value for GDP-by-industry to obtain an annual value consistent with the study period. The same process was applied to obtain estimates for 2003 through 2005.

[19]This assumes that employed individuals have the option to work for pay beyond scheduled hours, but not at overtime wage rates.
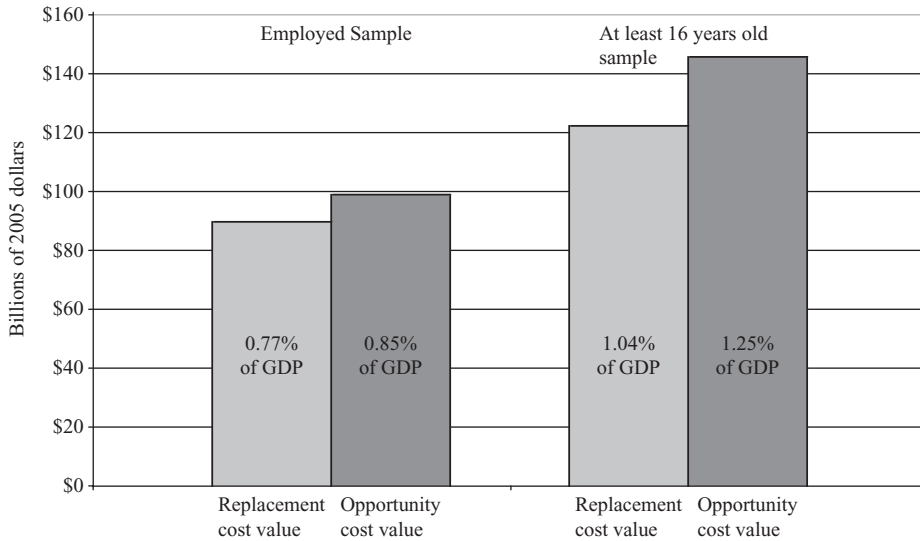
Figure 2. Average Value of Volunteer Labor from September 2001 to August 2005 by Sample and Valuation Method (percentages indicate share of GDP)

Source: Author's analysis.

Supplement years. Estimates based on the replacement cost method are greater than those from the opportunity cost method for the sample of all persons at least 16 years old. This results primarily from the wage rates imputed for the unemployed and NILF persons that are higher than under the opportunity cost approach. Conversely, volunteer labor value under the opportunity cost method is larger for the employed sample. This reflects the fact that employed volunteers are generally volunteering in areas where the wage rate is lower than that for their primary vocation.

The estimated values of volunteer labor under the two methods are decomposed by sector and year in Tables 3 and 4. For the employed sample, Table 3 reports a value of volunteer labor of nearly $94 billion, or 0.84 percent of total GDP from September 2001 to August 2002. By the end of the study period, volunteer labor and GDP both increased by approximately 6 percent, resulting in roughly the same share of total GDP. For the sample of all persons at least 16 years old, volunteer labor value again grew steadily with population, from $117 billion in the first year to $124 billion three years later. The value of volunteer labor as a share of GDP remained relatively constant at 1 percent.

Among those employed, workers in the education services, health care, and social assistance major industry volunteered over 1 billion hours annually (Table 5); their hours represent more than $22 billion a year (Tables 3 and 4).[20] Average hours volunteered by members in this industry, however, is lower than for workers in other industries. As shown in Table 5, workers in "Other Services" and

[20]This industry is also the largest in terms of the number of workers; therefore, it not surprising that workers in this industry are responsible for the largest share of volunteering.

TABLE 3

VOLUNTEER LABOR INPUT USING THE OPPORTUNITY COST METHOD[1]

Major Industry Group	September 2001 to August 2002				September 2002 to August 2003				September 2003 to August 2004				September 2004 to August 2005			
	Employed Persons		All Ages 16 and Up		Employed Persons		All Ages 16 and Up		Employed Persons		All Ages 16 and Up		Employed Persons		All Ages 16 and Up	
	Total Volunteering	% of GDP	Total Volunteering	% of GDP	Total Volunteering	% of GDP	Total Volunteering	% of GDP	Total Volunteering	% of GDP	Total Volunteering	% of GDP	Total Volunteering	% of GDP	Total Volunteering	% of GDP
Private industries																
Private goods-producing industries	14.1	0.13	15.3	0.14	14.9	0.13	16.0	0.14	16.0	0.14	16.8	0.14	16.5	0.13	17.05	0.14
Agriculture, forestry, fishing, & hunting	1.3	0.01	1.3	0.01	1.3	0.01	1.3	0.01	1.6	0.01	1.6	0.01	1.5	0.01	1.60	0.01
Mining	0.4	0.00	0.4	0.00	0.1	0.00	0.1	0.0	0.3	0.00	0.3	0.00	0.4	0.00	0.39	0.00
Construction	4.0	0.04	4.6	0.04	4.6	0.04	4.8	0.04	5.7	0.05	6.0	0.05	5.8	0.05	6.02	0.05
Manufacturing	8.5	0.08	8.9	0.08	9.0	0.08	9.7	0.09	8.5	0.07	8.8	0.07	8.8	0.07	9.05	0.07
Private services-producing industries	72.9	0.65	77.7	0.70	77.7	0.68	82.7	0.73	76.9	0.65	81.1	0.68	79.1	0.65	83.28	0.68
Wholesale & retail trade	10.9	0.10	11.8	0.11	10.0	0.09	10.9	0.10	10.2	0.09	11.2	0.09	9.3	0.08	9.66	0.08
Transportation & utilities	4.3	0.04	4.4	0.04	4.2	0.04	4.4	0.04	3.6	0.03	3.9	0.03	4.4	0.04	4.45	0.04
Information	7.7	0.07	8.5	0.08	3.2	0.03	3.5	0.03	3.6	0.03	4.1	0.03	3.2	0.03	3.38	0.03
Finance, insurance, real estate, rental & leasing	8.0	0.07	8.5	0.08	9.2	0.08	9.6	0.08	9.1	0.08	9.3	0.08	11.3	0.09	11.75	0.10
Professional & business services	9.2	0.08	9.8	0.09	14.3	0.13	15.2	0.13	13.0	0.11	13.8	0.12	14.2	0.12	15.05	0.12
Educational services, health care, & social assistance	26.4	0.24	27.6	0.25	27.3	0.24	28.9	0.25	27.4	0.23	28.4	0.24	27.0	0.22	28.43	0.23
Arts, entertainment, recreation, accommodation, and food services	1.0	0.01	1.2	0.01	3.7	0.03	4.3	0.04	3.9	0.03	4.1	0.03	4.0	0.03	4.51	0.04
Other services, except government	5.4	0.05	5.8	0.05	5.6	0.05	5.9	0.05	5.9	0.05	6.3	0.05	5.7	0.05	6.04	0.05
Government	6.7	0.06	6.8	0.06	6.4	0.06	6.9	0.06	6.6	0.06	6.8	0.06	6.5	0.05	7.18	0.06
Unemployed or NILF[2]			17.0	0.15			17.2	0.15			18.6	0.16			16.51	0.13
Total	93.7	0.84	116.8	1.05	99.0	0.87	122.7	1.08	99.5	0.84	123.3	1.04	102.1	0.83	124.0	1.01

Notes:
[1]Dollar measures are expressed in billions of 2005 dollars.
[2]In cases where the unemployed or those not in the labor force did not indicate a major industry group or major occupation group, the state minimum wage was applied.
Source: Author's analysis.

TABLE 4

VOLUNTEER LABOR INPUT USING THE REPLACEMENT COST METHOD[1]

Major Industry Group	September 2001 to August 2002				September 2002 to August 2003				September 2003 to August 2004				September 2004 to August 2005			
	Employed Persons		All Ages 16 and Up		Employed Persons		All Ages 16 and Up		Employed Persons		All Ages 16 and Up		Employed Persons		All Ages 16 and Up	
	Total Volunteering	% of GDP	Total Volunteering	% of GDP	Total Volunteering	% of GDP	Total Volunteering	% of GDP	Total Volunteering	% of GDP	Total Volunteering	% of GDP	Total Volunteering	% of GDP	Total Volunteering	% of GDP
Private industries																
Private goods-producing industries	13.2	0.12	14.4	0.13	13.5	0.12	14.3	0.13	14.5	0.12	15.3	0.13	13.9	0.11	14.4	0.12
Agriculture, forestry, fishing, & hunting	2.0	0.02	2.1	0.02	1.4	0.01	1.5	0.01	1.6	0.01	1.7	0.01	1.6	0.01	1.7	0.01
Mining	0.3	0.00	0.3	0.00	0.1	0.00	0.1	0.00	0.2	0.00	0.2	0.00	0.2	0.00	0.3	0.00
Construction	3.8	0.03	4.5	0.04	4.5	0.04	4.7	0.04	5.6	0.05	5.9	0.05	5.2	0.04	5.5	0.04
Manufacturing	7.1	0.06	7.5	0.07	7.5	0.07	8.0	0.07	7.1	0.06	7.5	0.06	6.8	0.06	7.1	0.06
Private services-producing industries	67.1	0.60	71.8	0.64	73.5	0.65	78.8	0.69	73.9	0.62	78.2	0.66	68.0	0.56	71.8	0.59
Wholesale & retail trade	13.2	0.12	14.4	0.13	11.7	0.10	12.8	0.11	11.5	0.10	12.7	0.11	10.0	0.07	10.3	0.08
Transportation & utilities	3.9	0.04	4.0	0.04	4.0	0.04	4.1	0.04	3.4	0.03	3.6	0.03	4.0	0.03	4.1	0.03
Information	5.9	0.05	6.4	0.06	2.7	0.03	3.0	0.03	2.9	0.02	3.6	0.03	2.2	0.02	2.3	0.02
Finance, insurance, real estate, rental & leasing	6.1	0.05	6.3	0.06	7.5	0.07	7.9	0.07	7.7	0.07	7.9	0.07	8.5	0.07	8.9	0.07
Professional & business services	6.7	0.06	7.3	0.07	11.2	0.10	12.0	0.10	10.7	0.09	11.3	0.10	10.6	0.09	11.3	0.09
Educational services, health care, & social assistance	24.0	0.21	25.2	0.23	25.2	0.22	26.7	0.23	25.6	0.22	26.6	0.23	22.2	0.18	23.3	0.19
Arts, entertainment, recreation, and food services	1.2	0.01	1.6	0.01	4.7	0.04	5.7	0.05	5.5	0.05	5.8	0.05	4.9	0.04	5.5	0.05
Other services, except government	6.1	0.05	6.6	0.06	6.5	0.06	6.7	0.06	6.6	0.06	7.0	0.06	5.6	0.05	6.1	0.05
Government																
Government	5.6	0.05	5.7	0.05	5.3	0.05	5.7	0.05	5.4	0.05	5.6	0.05	4.9	0.04	5.3	0.04
Unemployed or NILF[2]			49.7	0.44			49.8	0.44			53.5	0.45			46.9	0.38
Total	85.9	0.77	141.5	1.27	92.3	0.81	148.6	1.30	93.9	0.79	152.6	1.29	86.7	0.71	138.5	1.13

Notes:
[1]Dollar measures are expressed in billions of 2005 dollars.
[2]In cases where the unemployed or those not in the labor force did not indicate a major industry group or major occupation group, the state minimum wage was applied.
Source: Author's analysis.

TABLE 5

HOURS VOLUNTEERED BY MAJOR INDUSTRY

Major Industry	Employed Sample For the Year Beginning September				All Ages 16 and Up For the Year Beginning September			
	2001	2002	2003	2004	2001	2002	2003	2004
Total hours (in millions)								
Agriculture, forestry, fishing, & hunting	111.1	77.4	93.0	99.0	117.0	82.3	96.7	103.5
Construction	206.2	245.5	301.3	317.5	244.8	258.8	320.0	331.6
Educational & health Services	1,343.5	1,392.0	1397.0	1,340.1	1,408.1	1,477.2	1,459.1	1,414.8
Financial activities	335.3	395.1	389.9	482.0	351.2	416.5	398.8	504.2
Information	328.3	147.9	153.0	131.9	359.6	164.5	172.1	141.8
Leisure & hospitality	65.4	277.8	302.1	305.8	85.6	330.5	319.7	351.7
Manufacturing	392.5	412.6	384.1	393.4	413.7	449.8	402.2	409.3
Mining	16.8	5.7	12.7	13.7	17.3	5.7	13.2	15.0
Other services	352.0	358.1	366.3	335.1	379.1	375.2	389.7	360.2
Professional & business Services	366.5	598.3	561.4	602.9	396.7	641.4	598.9	646.3
Public administration	307.7	294.3	299.3	298.7	313.0	314.5	313.2	327.8
Transportation & utilities	219.1	218.6	186.3	233.7	225.7	223.9	199.4	229.2
Wholesale & retail trade	737.7	642.9	633.7	598.2	806.1	698.9	699.8	619.6
Unemployed or not in universe					2,851.1	2,906.4	3,107.9	2,782.8
Average hours								
Agriculture, forestry, fishing, & hunting	32	31	39	43	31	31	38	42
Construction	21	23	28	27	23	23	27	27
Educational & health Services	48	49	49	45	48	49	49	46
Financial activities	37	40	39	**47**	37	41	38	48
Information	34	40	43	36	35	41	46	37
Leisure & hospitality	27	25	26	26	32	26	24	27
Manufacturing	25	25	23	24	25	25	23	24
Mining	31	11	24	23	30	10	24	25
Other services	44	**52**	**52**	47	44	**51**	**52**	48
Professional & business Services	46	44	39	42	46	43	39	41
Public administration	**51**	48	46	**47**	**50**	49	47	**49**
Transportation & utilities	29	31	26	30	28	30	27	29
Wholesale & retail trade	27	31	30	28	27	31	31	27
Unemployed or not in universe					41	40	42	37

Note: Highest average hours by year are in bold.
Source: Author's analysis.

"Public Administration" volunteer the most at approximately 50 hours per year. This result has interesting implications. First, although total volunteer hours are highest in the educational services, health care, and social assistance industry, average hours volunteered per worker in this industry is lower than for many other industries. The lower than average hours volunteered per worker in this industry is more than offset by the industry's size. Second, workers, by choosing occupations in this industry grouping, may be signaling a greater interest or ability to volunteer. Additionally, opportunities to volunteer may be more prevalent for people working in this industry.

Table 4 reports that the value of volunteer labor equals 0.77 percent of GDP for employed persons under the replacement cost method in the year beginning September 2001; for all persons at least 16 years old, the analogous estimate is 1.27 percent of GDP. Thus, those who are NILF or unemployed play an important role—since adding this group to the sample increases the total value by more than 60 percent from nearly $86 billion to nearly $142 billion. For the other years, including the NILF and unemployed groups increases the value of volunteering by between 60 and 63 percent. The value of volunteer labor for the employed sample rises and then falls over the entire study period so that by the final period, the value is 0.9 percent higher than the beginning period. As a percentage of total GDP, the only rise occurs between the first two periods for employed persons. For all persons at least 16 years old, the share of volunteer labor to total GDP remains relatively constant at 1.3 percent until the end period where the share falls to 1.1 percent. Across the four years of data and using both techniques, the annual estimated value of volunteer labor ranges from $85 to $102 billion for employed persons and from $116 to $153 billion for all persons at least 16 years old.

Table 6 presents results from the Probit analysis, where the dependent variable is 0 for persons not volunteering and 1 for persons volunteering. Throughout the analyses, age is positively correlated with volunteering. Controlling for other factors, males volunteer less than females.[21] This is consistent with the findings from the Independent Sector (2001), Freeman (1997), and Vaillancourt (1994). Marriage is positively correlated with volunteer participation, which is consistent with the results obtained by Vaillancourt (1994) and Freeman (1997). Furthermore, children increase the likelihood of volunteering, as was found by Carlin (2001). Persons living in metropolitan areas are less likely to volunteer. Recall that Vaillancourt (1994) found a negative correlation between city size and volunteer activity. The data suggest that, conditional on the other covariates, Northeasterners volunteer less than those in other U.S. regions. Employed persons working in services-producing industries are more likely to volunteer than workers in goods-producing industries.[22] Brown (1999) also identified increased participation for workers in services-producing industries. Volunteering patterns differ by race. Minorities are less likely to volunteer, as are persons working in low- to medium-wage occupations. Freeman (1997) and Vaillancourt (1994) also find a positive correlation between volunteering and income. Examining the volunteer decision by occupation reveals that white-collar workers are more likely to volunteer, a finding consistent with Vaillancourt's research (1994).[23] Labor force participants

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[21]Differences in the probability of volunteering by gender are strong. Differences exist not only in the sign of the coefficient, but also in the size of the coefficient. A chi-square test finds that the relationship between many of the covariates and volunteering is different for men than for women, which suggests that the groups are different and should be evaluated separately.

[22]The industry groups comprising the goods-producing sector include agriculture, mining, construction, manufacturing, and forestry and fisheries. The industries in the services-producing group include public administration, armed forces, transportation, communications, utilities, wholesale and retail trade, finance, insurance, real estate, private household, business, auto and repair services, personal services excluding private household, entertainment, hospitals, medical services excluding hospitals, educational services, social services, and other professional services.

[23]"Other" and "pink" collar workers are included separately to capture additional occupation categories. Farmers and unemployed or NIU (not in universe) persons constitute the final category of "other," while pink-collar represents service-type occupations.

TABLE 6

PROBIT ESTIMATES OF VOLUNTEER ACTIVITY, POOLED 2002 THROUGH 2005 VOLUNTEER SUPPLEMENTS

Independent Variables	Dependent Variable: Volunteer Participation = 1					
	Both		By Sex:			
			Male		Female	
Age	0.003	0.003	0.002	0.002	0.003	0.003
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***
Male	−0.054	−0.066				
	(0.002)***	(0.002)***				
Child under 18	0.123	0.119	0.107	0.102	0.134	0.135
	(0.003)***	(0.003)***	(0.004)***	(0.004)***	(0.004)***	(0.004)***
Marital status	0.048	0.045	0.057	0.052	0.038	0.040
	(0.003)***	(0.003)***	(0.004)***	(0.004)***	(0.004)***	(0.004)***
Metropolitan area	−0.040	−0.041	−0.049	−0.050	−0.031	−0.032
	(0.003)***	(0.003)***	(0.004)***	(0.004)***	(0.004)***	(0.004)***
Goods-producing industry	−0.016	−0.021	−0.016	−0.019	−0.017	−0.026
	(0.003)***	(0.003)***	(0.004)**	(0.004)***	(0.006)***	(0.006)***
Year 2003	0.018	0.018	0.019	0.019	0.016	0.016
	(0.003)***	(0.003)***	(0.004)***	(0.004)***	(0.005)***	(0.005)***
Year 2004	0.018	0.018	0.017	0.018	0.018	0.018
	(0.003)***	(0.003)***	(0.004)***	(0.004)***	(0.005)***	(0.005)***
Year 2005	0.021	0.021	0.021	0.021	0.022	0.021
	(0.003)***	(0.003)***	(0.004)***	(0.004)***	(0.005)***	(0.005)***
Race and Hispanic origin dummies						
Black	−0.060	−0.063	−0.044	−0.044	−0.075	−0.081
	(0.004)***	(0.004)***	(0.005)***	(0.005)***	(0.005)***	(0.005)***
Hispanic	−0.111	−0.114	−0.106	−0.107	−0.114	−0.117
	(0.003)***	(0.003)***	(0.004)***	(0.004)***	(0.005)***	(0.005)***
Other	−0.121	−0.122	−0.108	−0.108	−0.133	−0.137
	(0.004)***	(0.004)***	(0.005)***	(0.005)***	(0.006)***	(0.006)***
Wage category dummies						
Low	−0.064	−0.057	−0.064	−0.058	−0.064	−0.056
	(0.003)***	(0.003)***	(0.005)***	(0.005)***	(0.005)***	(0.005)***
Medium	−0.058	−0.051	−0.046	−0.042	−0.085	−0.070
	(0.003)***	(0.003)***	(0.004)***	(0.004)***	(0.005)***	(0.005)***
Occupation collar dummies						
Blue	−0.050	−0.051	−0.045	−0.046	−0.074	−0.072
	(0.004)***	(0.004)***	(0.005)***	(0.005)***	(0.007)***	(0.007)***
Pink	−0.037	−0.027	−0.029	−0.024	−0.054	−0.038
	(0.004)***	(0.004)***	(0.006)***	(0.006)***	(0.005)***	(0.005)***
Other	−0.031	−0.026	−0.021	−0.019	−0.048	−0.036
	(0.010)***	(0.010)**	(0.011)*	(0.011)	(0.020)**	(0.020)*
Labor force participation status						
In the labor force		−0.056		−0.070		−0.045
		(0.011)***		(0.016)***		(0.015)***
Full-time	−0.079		−0.084		−0.078	
	(0.011)***		(0.015)***		(0.015)***	
Part-time	0.009		−0.012		0.025	
	(0.010)		(0.014)		(0.015)*	
Unemployed	−0.037		−0.056		−0.016	
	(0.010)***		(0.013)***		(0.016)	
Education category dummies						
Less than high school	−0.202	−0.204	−0.182	−0.183	−0.224	−0.225
	(0.003)***	(0.003)***	(0.004)***	(0.004)***	(0.006)***	(0.005)***
High school	−0.140	−0.146	−0.124	−0.129	−0.159	−0.165
	(0.003)***	(0.003)***	(0.003)***	(0.003)***	(0.004)***	(0.004)***
Some college	−0.049	−0.055	−0.042	−0.047	−0.061	−0.067
	(0.003)***	(0.003)***	(0.004)***	(0.004)***	(0.004)***	(0.004)***

TABLE 6 (*continued*)

Independent Variables	Dependent Variable: Volunteer Participation = 1					
			By Sex:			
	Both		Male		Female	
Region dummies						
South	0.024	0.021	0.015	0.015	0.034	0.029
	(0.003)***	(0.003)***	(0.004)***	(0.004)***	(0.005)***	(0.005)***
Midwest	0.063	0.064	0.055	0.057	0.073	0.071
	(0.003)***	(0.003)***	(0.004)***	(0.004)***	(0.005)***	(0.005)***
West	0.043	0.043	0.034	0.036	0.052	0.051
	(0.004)***	(0.004)***	(0.005)***	(0.005)***	(0.005)***	(0.005)***
Sector dummies						
Public	0.014	0.001	0.040	0.032	−0.031	−0.048
	(0.004)***	(0.004)	(0.006)***	(0.006)***	(0.007)***	(0.007)***
Private	−0.057	−0.064	−0.035	−0.039	−0.098	−0.109
	(0.004)***	(0.004)***	(0.004)***	(0.004)***	(0.006)***	(0.006)***
N	249,042	249,042	130,111	130,111	118,931	118,931
R-square	0.094	0.091	0.094	0.093	0.082	0.075

Note: Standard errors are in parentheses.
***, **, *represent statistical significance at the 1, 5, and 10 percent levels, respectively.
Source: Author's analysis.

are less likely to volunteer than non-participants. Among those in the labor force, full-time employees are the least likely to volunteer, and part-time female workers are more likely than females not in the labor force. Consistent across all analyses, more educated persons have a higher probability of volunteering. Vaillancourt (1994) and Freeman (1997) also found this result. Finally, individuals working in the private sector are the least likely to volunteer.[24]

6. CONCLUSION

Volunteer work has drawn the attention of policymakers and researchers alike. A considerable amount of time is devoted to it and many organizations rely heavily on volunteers. GDP measures primarily include only market trans-actions; no Gross Domestic Non-market Product indicator exists to assess value generated from non-market activities. This study seeks to advance the literature by employing alternative techniques to appraise the value of volunteer labor in the U.S. The methodologies yield annual estimates ranging from $116 to $153 billion from September 2002 to August 2005 (or between 0.9 and 1.3 percent of GDP). The volunteering decision is also explored to ascertain characteristics important in determining one's likelihood to volunteer. Volunteering is re-warding to participants and benefits recipients on many levels. The giving of time is nontrivial and it is important that the national accounts begin to recognize this.

[24]The referent group is self-employed or persons without pay.

REFERENCES

Abraham, Katharine and Christopher Mackie (eds), *Beyond the Market: Designing Nonmarket Accounts for the United States*, The National Academies Press, Washington DC, 2005.

Brown, Eleanor, "Assessing the Value of Volunteer Activity," *Nonprofit and Voluntary Sector Quarterly*, 28(1), 3–18, 1999.

Brueckner, Jan and Ann Largey, "Social Interaction and Urban Sprawl," *Journal of Urban Economics*, forthcoming 2008.

Carlin, Paul, "Evidence on the Volunteer Labor Supply of Married Women," *Southern Economic Journal*, 67(4), 801–24, April 2001.

Freeman, Richard, "Working for Nothing: The Supply of Volunteer Labor," *Journal of Labor Economics*, 15(1), S140–66, 1997.

Independent Sector, *Giving & Volunteering in the United States, 2001*, Independent Sector, Washington DC, 2001.

Ironmonger, Duncan, "Measuring Volunteering in Economic Terms: 2,200 Million Hours Worth $42 Billion a Year," in J. Warburton and M. Oppenheimer (eds), *Volunteers and Volunteering*, Federation Press, NSW, Australia, 2000.

———, "Valuing Volunteering: The Economic Value of Volunteering in South Australia," Report for the Office for Volunteers and the Department of the Premier and Cabinet, October 2002.

———, "The Economic Value of Volunteering in Queensland," Report for the Department of the Communities, Queensland, October 2006.

Menchik, Paul and Burton Weisbrod, "Volunteer Labor Supply," *Journal of Public Economics*, 32, 159–83, 1987.

Murphy, Martin, "The Value of Household Work in the United States, 1976," Measuring Nonmarket Economic Activity: BEA Working Papers, Government Printing Office, Washington DC, 1982.

Salamon, Lester, S. Wojciech Sokolowski and Associates, *Global Civil Society: Dimensions of the Nonprofit Sector Volume Two*, Kumarian Press, Bloomfield, CT, 2004.

Soupourmas, F. and D. Ironmonger, "Giving Time: The Economic and Social Value of Volunteering in Victoria," A report for the Department of Human Services, Victoria, 2002.

Statistics Canada, *Satellite Account of Nonprofit Institutions and Volunteering*, Minister of Industry, Ottawa, Canada, September 2004.

United Nations, *System of National Accounts 1993*, United Nations, New York, 1993, http://unstats.un.org/unsd/sna1993/toctop.asp.

———, *Handbook on Nonprofit Institutions in the System of National Accounts 2002*, United Nations, New York, 2002.

Vaillancourt, Francois, "To Volunteer or Not: Canada, 1987," *The Canadian Journal of Economics*, 27(4), 813–26, 1994.