Volunteer Output and the National Accounts: An Empirical Analysis

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ABSTRACT

Volunteer activities attempt to promote a sense of community unity and ownership. According to the Bureau of Labor Statistics of the US Department of Labor, approximately 59 million people participated in volunteer activities in the year beginning September 2001. Although utility is derived from participation, no monetary compensation is received. Therefore, the value of volunteer output is generally not recognized in the national economic accounts, as defined by the 1993 System of National Accounts.

This research paper has three primary objectives. The first is to estimate a monetary value for volunteer activities. The second is to identify demographic characteristics of individuals most likely to volunteer. The third and final objective is to explore those industries with the greatest number of volunteer labor hours. Data for this study come from the September 2002 Current Population Survey Volunteer Supplement and are analyzed using a cross-section Probit analysis coupled with supplementary econometric estimation techniques.

Contingent upon the valuation technique, this analysis assesses volunteer labor output to range between $79 to $130 billion. Further, the data suggest that over one-third of total volunteer hours is provided by those not in the labor force and those in the labor force, but unemployed. Examination by industry reveals that the educational services industry within the services sector provides the greatest number of volunteer hours. The data also show that professional specialty workers contribute the most time relative to other occupational groups.

This research contributes to the existing literature in several ways. First, it conceptualizes the issue of volunteerism, and offers an approach to value output generated by volunteer labor based on detailed wage data. Second, it enables the determination of approximately how much volunteer labor output is not covered because of the definitional constraints of GDP as a measure of largely market activities. Finally, identifying characteristics of those individuals who volunteer enables the formulation of targeted initiatives that would promote greater participation.

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INTRODUCTION

The inherent difficulty associated with measuring non-market activities is that no market exists that could signal value. Continuing efforts are made by the Bureau of Economic Analysis (BEA) to recognize non-market activities and include important aspects of the economy not captured fully in the National Income and Product Accounts. The results of these efforts are found in BEA satellite accounts and research papers which cover topics that include travel and tourism, research and development, household production, transportation, environment, consumer durables, government, and ocean-related activities.[1] This paper focuses specifically on volunteer activities, and represents another step towards recognizing the value of non-market production by BEA.

Volunteering is one of those few leisure activities from which the greatest pleasure is often derived upon completion. Most people intend to perform some type of volunteer activity each year and, according to the Bureau of Labor Statistics (BLS) of the US Department of Labor, over one in four Americans do. For the year beginning September 2001, approximately 59 million people, or 28 percent of the civilian, non-institutional population age 16 and over, participated in volunteer activities.[2]

While volunteer work is recognized as being important by society, no related monetary value is assigned to the collective output. Volunteerism is generally considered

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[1] The first two are ongoing BEA endeavors. For more information, see the following: http://www.bea.gov/bea/dn2/home/tourism.htm for travel and tourism, and transportation; http://www.bea.gov/bea/papers/R&D-NIPA.pdf for R&D; Landefeld and McCulla (2000) for household production; Carson (1994) for environment; US Department of Commerce (1982) for consumer durables, household production, and government; and US Department of Commerce (1972) for ocean-related activities.

[2] See http://www.bls.gov/news.release/volun.nr0.htm. Volunteers have been defined by BLS as persons who do unpaid work, excluding expenses, through or for an established organization. This definition has been adopted in this research paper.

to be a non-market activity, which falls outside national economic accounting boundaries. Thus, these activities are essentially given zero value in gross domestic product (GDP).

Persons who perform volunteer work are somewhat analogous to nonprofit institutions in that both are rooted in the principle of non-market gain. Moreover, the latter often relies on the former to provide many of its services. Although related, the national economic accounts include output from nonprofit institutions in GDP, but exclude volunteer output.[3]

This research paper examines alternative valuations of volunteer labor output, and has three primary objectives. The first is to assign a monetary value to volunteer labor output. The second is to identify characteristics of individuals most likely to volunteer. The final objective is to explore which industries are associated with the greatest number of volunteer labor hours.

This paper is divided into four parts. The first contains a review of the literature and an analytical perspective. The second contains an explanation of the data. The final two contain a discussion of the results and concluding remarks, respectively.

LITERATURE REVIEW AND ANALYTICAL PERSPECTIVE

Little research exists on valuing volunteer labor. In some cases, volunteer time has been valued as part of a household production account. Time spent volunteering or in household production can vary substantially depending on the methodology. For volunteer time, early BEA work by Murphy (1982) derived a value of approximately 3 to 5 percent of current dollar GDP. This value is not a direct estimate, however, because data limitations prevented volunteer work to be separately identified. Instead,

[3] An article by Mead et al. (2003) in the April 2003 publication of BEA's *Survey of Current Business* discusses the treatment of nonprofit institutions in the NIPAs.

volunteering was evaluated in conjunction with other household activities.[4] Freeman (1997) was able to estimate the share of volunteer time to be roughly 7 percent of US current dollar national income. Brown (1999) calculated between 3 and 4 percent of current dollar GDP. Finally, The Independent Sector (2001) estimated a value of approximately 2 percent of current dollar GDP.

For household production, Landefeld and Howell (1997) from BEA estimated the value of non-market time spent in total household production to be approximately 42 to 51 percent of current dollar GDP. Eisner (1989) calculated a slightly larger value of roughly 55 percent of GDP. An even larger estimate of 75 percent was produced by Ironmonger (1996, 1997). Finally, Jorgenson and Fraumeni (1992), who included investment in human capital as part of their non-market accounts, derived a value for time spent in non-market activities to be over 300 percent.[5]

The rest of this section will focus on studies that explore the motivation behind volunteer involvement, and alternative ways to measure the value of associated activities. Vaillancourt (1994) investigated the decision to volunteer using a Probit model.[6] Data from the Statistics Canada 1987 Labour Force Survey showed that several factors influence the probability of volunteering. His study found that age has an impact on volunteerism, with the highest levels of participation occurring between ages 15 and 16. This age corresponds with high school, and possibly reflects student involvement in service organizations through the school.

[4] The other household activities included shopping, helping relatives and neighbors, social activities, and miscellaneous work including financial management and recordkeeping.
[5] Size estimates for household or nonmarket accounts as a percent of current dollar GDP come from page 8 of Fraumeni (2000).
[6] The probit model is a widely used statistical model for studying event probability using data with binomial distributions. For more information, see Liao (1994).

By gender, the data suggested that men are less involved than women. For men, volunteer activity increases between 25 and 54 years of age, then decreases from 55 to 69 years of age. After age 69, men increase their participation in volunteer activities. For women, volunteering steadily increases up until age 70.

Vaillancourt's work found a positive correlation between volunteer participation and education and income, but a negative correlation with city size and hours of work. Marriage increases volunteer work for men while the opposite effect exists for women. Occupation affects the volunteer decision in that white-collar workers are the most likely to be involved. Vaillancourt also introduced the notion of volunteerism as an investment in human capital from the learning opportunities inherent in the tasks.

Freeman (1997) investigated motivations behind volunteering using the May 1989 Current Population Survey (CPS) Volunteer Supplement and the 1990 Independent Sector's Gallup Survey of Giving and Volunteering in the United States. The study found that volunteers have both high skills and opportunity cost of time. He asserted that volunteer activity is an outcome driven more out of obligation than charity, and dubs it a "conscience good." This study also calculated a value for volunteer hours equal to roughly $116 billion dollars in 1991.[7]

Evaluating demographic characteristics, Freeman's data suggested that volunteers are more likely to be employed, married, and female. Age also plays a role in that persons over 64 are more involved than their younger counterparts. Additionally, volunteers tend to have higher levels of human capital and wages.

[7] US Bureau of the Census reports 1991 employee compensation equal to $3,291 billion dollars. Freeman took the average of 3 percent of this value (3,291*.03=99) and 4 percent of this value (3,291*.04=132) to obtain his figure of $116 billion ((99+132)/2).

Day and Devlin (1998) further explored Vaillancourt's research regarding volunteer work as an investment in human capital. Their study found that not only does volunteerism have an impact on earnings, but the effect varies by type of volunteer activity. Certain volunteer activities are beneficial to earnings whereas others are detrimental. Using a log-linear earnings equation on the data from the 1987 Survey of Volunteer Activity, the authors estimated the return to volunteering to be roughly 6 to 7 percent of annual earnings.

Brown (1999) suggested that volunteers forego wages because the act of volunteering produces its own intrinsic value. If a volunteer wage is to be estimated, however, Brown assigned a value ranging between 50 to 86 percent of the average hourly wage. Using Independent Sector data, Brown calculated the annual hours volunteered to be between 15.7 and 20.3 billion. The analysis also examined volunteer participation by the business sector, and found that most volunteer work occurs in services- rather than goods-producing sectors.

Frey and Goette (1999) indirectly examined the motivating factors behind volunteer work by evaluating the effect of financial rewards. Applying a 2-Stage Least Squares Regression technique on data from the 1997 Swiss Labor Force Survey, the authors discovered that volunteer hours are crowded-out when a monetary gift is introduced. While an overall positive correlation exists between the size of the reward and volunteer hours, the incidence of recompense reduces volunteer work by approximately four hours per month. They concluded that external rewards undermine the intrinsic motivation for volunteering.

The Independent Sector, a coalition of non-profits, foundations and corporations, publishes a series that provides a comprehensive picture of the giving and volunteering habits of Americans.[8] Based on a telephone survey from May to July 2001, their 2001 study revealed that approximately 44 percent of adults over age 21, or an estimated 84 million, volunteered through a formal organization for the 12 months prior. For the period, volunteers were more likely to be women, and over 60 percent reported regularly volunteering at least once a month.

In terms of hours devoted to volunteer work, the study found that volunteers average roughly 4 hours per week for an annual rate of nearly 188 hours. The total volunteer hours in year 2000 were estimated to be approximately 16 billion with a corresponding value of $239 billion. The hourly value of volunteer time was estimated at the average hourly wage for nonagricultural workers—as published in the *Economic Report of the President* for the corresponding period—increased by 12 percent to account for fringe benefits.

Carlin (2001) expanded upon the Independent Sector study by focusing on the volunteer labor supply of married women using data from the 1975 to 1976 US time diary data. Building on the study conducted by Menchik and Weisbrod (1987) on the supply of volunteer labor, Carlin estimated that married women contributed more than 3 billion hours in 1980. With volunteer hours on the quantity axis and the after-tax wage rate on the price axis, an upward sloping volunteer labor supply curve for married women was found. Carlin also examined factors influencing the volunteering probability, and found a positive correlation between volunteering and the presence of children.

[8] For more information, see http://www.independentsector.org/programs/research/gv01main.html

Additionally, although the incidence of volunteering increases with children, the overall number of hours volunteered is reduced.

This paper contributes to the existing literature in several different ways. First, it utilizes more recent data from the BLS specifically devoted to volunteer work. Second, it estimates the value of volunteer labor output using two different methods, and incorporates a national accounts perspective. Specifically, the treatment of volunteer output in the 1993 System of National Accounts (SNA) is explored to ascertain how this non-market production is addressed by the international community.[9] For the US, the analysis compares volunteer activities to both overall GDP and GDP-by-industry. Third, a dynamic rather than a static percentage adjustment to the reported overall civilian, non-agricultural wage rate is assigned to volunteer labor. The value of volunteer labor in this study is predicated on individual characteristics in addition to volunteer activity. This valuation technique offers an alternative method in that is does not apply a constant wage across all volunteer labor.[10] Moreover, this measure is suitable for comparisons to GDP, which also accounts for all economic activities at their prevailing market value. Fourth, volunteer labor output value estimates are examined across occupation and industry groups to determine which groups provide the most volunteer work. Finally, this research evaluates the likelihood of volunteering based on more detailed demographic characteristics.

Ideally, one would construct a measure of all inputs used in volunteer activity, in addition to an independent measure of output produced by volunteers. The perfect input measure captures both labor and the cost of inputs other than labor—such as computers,

[9] The SNA is a publication jointly undertaken by five international organizations, and will be discussed in detail later in the paper.
[10] Valuation in this study is performed on a pre-tax basis.

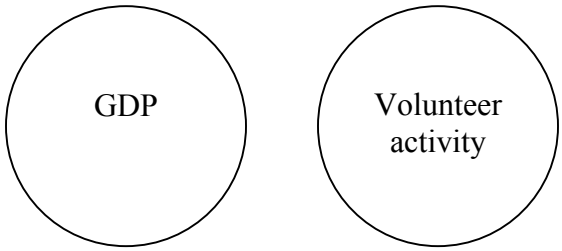
software, and buildings. It is important to include capital services, as well as the associated capital investment, as an input to the volunteer sector. One way to estimate the output of volunteer activity is to use near-market proxies to value volunteer production. Specific to volunteer work, the price of a meal sold in a restaurant would act as an output-based proxy for the meals prepared by volunteers in a soup kitchen. Further research might address the question of how to measure output; however, the focus of this paper is labor input. The payoff to estimating real inputs and output is that the productivity of the volunteer sector is captured.

Prior to describing the two valuation techniques used in this study, a discussion of the appropriateness in comparing volunteer work to GDP is warranted. Evaluating volunteer labor output relative to GDP may seem to be an indirect comparison since the former is a non-market activity whereas the latter measures market transactions.

Illustrated in a Venn diagram, Figure 1 shows volunteer activity outside the definitional constraints for GDP. Two primary reasons exist for this representation. First, volunteering is a non-market activity; GDP is a macroeconomic measure of market activity with the exception of a few non-market activities.[11] The two ideas are incompatible, and therefore should be considered separately. Second, volunteer activity does not fall within the four major components of GDP.[12] For these reasons, volunteering is considered to be appropriately excluded from GDP.

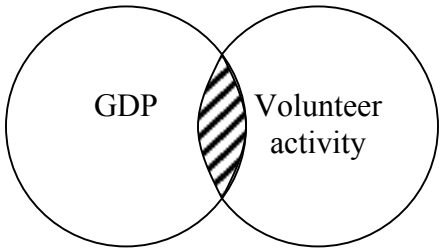
[11] Major exceptions include output of non-profit organizations, imputed bank service charges, and implicit rent of owner-occupied dwellings.
[12] The four components of GDP are consumption, investment, government and net exports.

Figure 1. Volunteer Activity Exclusive of GDP



However, arguments can be made that assert a certain level of volunteer activity is implicitly included in GDP. For instance, the pay-scale for volunteer-based organizations—such as the Red Cross, Peace Corps, and Government service—is often lower than that for profit-driven organizations. These workers receive compensation, which is accounted for in GDP, but at a lower level than that offered for a similar job in the for-profit sector. The individual is implicitly volunteering time to the organization by accepting a lower salary for a job that otherwise would be higher. Figure 2 illustrates these types of situations

Figure 2. Volunteer Activity Inclusive in GDP



Thus, some volunteer activity is indirectly captured in GDP. Although present, these instances are likely to represent a small fraction of both GDP and volunteer activity. Based on the restriction of no monetary compensation for volunteer activity as defined in this study, however, no overlap is assumed.

Valuation techniques for volunteer labor output

The first technique, often referred to as the opportunity cost approach, values volunteer work at the wage received in the volunteer's primary occupation. This measure is likely to be the upper bound in the range that captures the true value of volunteer output. Consider a brain surgeon volunteering in a soup kitchen preparing meals for the homeless. Valuing the hours spent in the soup kitchen at a brain surgeon's wage would overestimate the true output generated by the activities. The skills required to prepare meals in a soup kitchen are not equivalent to those necessary to perform a successful surgery. The two skill levels command different wages in the market, and thus valuing volunteer activities at the primary occupation wage is, admittedly, imprecise.

The second technique, often called the specialist approach, values volunteer labor output at the market wage received for the activity performed. Referring to the aforementioned example, the value would now reflect a line cook's wage. This method appears to more accurately reflect the true value of the volunteer activity, however, upon closer inspection this estimation technique has its limitations.

A line cook has developed specialized job-related skills, and is likely to be both more efficient and effective in performing the task of preparing meals. Assuming the brain surgeon is not also a certified chef, a skilled cook would require less time and deliver a higher quality product than the surgeon working outside of the medical field. The specialized skills and experience command a higher wage that otherwise would not exist.

An added limitation is data availability and reliability. The surgeon volunteering to prepare meals may also perform additional activities, such as washing dishes, cleaning

tables, or mopping floors—all of which command a different wage.[13] In a survey, these tasks would likely fall under the umbrella of preparing meals rather than captured individually. Moreover, volunteers often provide ancillary services as the need arises. This aspect of volunteer work exacerbates the unreliability of surveys in reporting volunteer activities.

Yet another limitation exists in accounting for the unemployed or not in the labor force (NILF).[14] The sample used by BLS is restricted to individuals at least 16 years of age, and this restriction is extended to this research paper for consistency.[15] Restricting the sample in this way creates a problem in valuing the labor input for these individuals.

This complexity is resolved by obtaining state minimum wage rates effective during the study period. Under the first method, which values labor output at the primary occupation wage, volunteer labor for NILF and unemployed individuals is valued at the respondent's state minimum wage rate. This solution provides a conservative estimate for volunteer labor outside of employment. The NILF and unemployed are not problematic to the second method since labor output is valued at the market wage offered to perform the specific activity.

Neither of the techniques provides a panacea to the task of finding an accurate and reliable method to value volunteer output. Each method has its strengths and weaknesses. Rather than choosing a preferred method, this research paper makes calculations based on both techniques, thereby facilitating comparisons between the two estimates.

[13] The generalist approach is used to value the time of individuals who perform multiple tasks.
[14] The NILF category includes students, homemakers and retired persons.
[15] For further information regarding research on volunteer activity published by the BLS, please see the August 2003 issue of the *Monthly Labor Review*.

Volunteer labor output in the System of National Accounts (SNA)

The SNA is a comprehensive publication undertaken jointly by five international organizations: the United Nations (UN), International Monetary Fund, Commission of the European Communities, Organisation for Economic Co-operation and Development, and World Bank. The publication integrates macroeconomic accounts, production accounts, and balance sheets according to internationally agreed-upon presentation formats, standards, concepts, definitions, classifications, and accounting conventions. Adoption of international guidelines enables policy-makers and researchers to perform economic analyses, country comparisons, and data reporting using one consistent framework recognized by the international community. The UN Statistics Division supports this effort of international comparability by collecting, estimating, and disseminating data from the various country-specific national economic accounts.

Generally, only market transactions are measured, however there are instances in which attempts are made to measure non-market transactions. Volunteer labor is discussed in the 1993 SNA, and is valued at the rate of actual compensation paid regardless of the inherently negligible amount.[16] The SNA does not attempt to provide guidance for estimating unpaid or underpaid voluntary labor.

Nonprofit institutions rely heavily on volunteer labor, and have been recognized in the SNA as early as the 1968 publication. Production is defined in the 1993 SNA as "an activity in which an enterprise uses inputs to produce outputs." Yet, production from volunteer labor is not considered when evaluating non-profit sector output. The proxy output measure for these institutions is expenses incurred. This measure does not include

[16] This definition excludes voluntary labor for own use. For instance, parents taking care of their own children or personal home improvement projects would not be included.

or undervalues the contributions to output from volunteer labor since no or minimal expenses are incurred. As it stands, there is a potentially large output-generating resource unaccounted for in the SNA. A change to this measure of output may be warranted to more fully account for volunteer labor expenses.

DATA

The primary data source used in this study is the September 2002 Volunteer Supplement to the Current Population Survey (CPS). The second data source is GDP-by-industry estimates from the BEA within the Department of Commerce. Each data source will be discussed in turn.

Current Population Survey

The CPS is a monthly survey sponsored jointly by the Bureau of the Census and the BLS. The survey contains a scientifically selected sample of approximately 50,000 households, and is administered by the Bureau of the Census. The sample is selected to represent the civilian, non-institutionalized population aged 15 years and over, however, published data are for those aged 16 and over.

The survey has been conducted for more than 50 years and is the primary source of information on labor force characteristics of the US population, providing estimates for the entire nation, in addition to individual states, cities, and regional geographic areas. The CPS provides estimates of numerous indicators, such as employment, unemployment, earnings, and hours of work by a variety of demographic characteristics. Estimates are also available by occupation, industry, and class of worker.[17]

[17] For more information about this data, see www.bls.census.gov/cps/cpsmain.htm.

The CPS is a survey, thus the limitations inherent with surveys in general, such as non-responses, incomplete responses, and false responses, as well as those based on a misunderstanding of the question asked are present. One limitation to the CPS particularly noteworthy to this research project is the self-reporting of occupational title. The respondent may classify himself or herself to be in a certain occupation while another would be more fitting. For instance, in some cases the respondent indicated a labor force status of unemployed or NILF, yet also self-reported a primary occupation and/or major industry. Rather than recoding these individuals as not having a primary occupation or major industry group, the initial response was left intact so that all the available information from the survey would be utilized.

The sub-sample used to conduct the wage analysis includes all wage and salary workers with valid wage and hours data. Additional restrictions were placed on this sub-sample to isolate workers. These restrictions are:

- aged 18-64;
- employed in the public or private sector (excludes unincorporated self-employed);
- hours worked within the valid range in the survey (1-99 per week); and
- wage rate between of $.50 and $100 in 1989 CPI-U-RS-adjusted dollars[18]

Since the Volunteer Supplement survey period extends from September 2001 to August 2002, the wage analysis is for the same period. In order to be consistent with GDP-by-industry data (discussed in the next section), all wages are reported in 2002 current dollars.

Additional problems exist with the data. First, the wage data is incomplete. The data used in this study are from the supplement to the September 2002 survey, therefore

[18] CPI-U-RS refers to the research series of the consumer price index. For more information, see http://www.bls.gov/cpi/cpiurstx.htm

they exclude wage information for all respondents. For this reason, average wages and wage categorical variables are used rather than reported wages.

In order to determine the value of volunteer output as measured by the volunteer's primary occupation, average hourly wages are calculated for each major occupation within each major industry.[19] Average wages are estimated by creating an annual data set for the CPS outgoing rotation group (ORG) for this study period.[20] The ORG sample comprises one-quarter of the total CPS sample for each month. In instances where the number of observations for an occupation within an industry are less than fifty, the average wage for the major occupation for all industries is used. Hours volunteered are obtained and summed over the year to be multiplied with the associated wage for the respondent's primary occupation and industry. This product is the monetary value assigned to volunteer labor output.

The supplement contains the following two questions to determine the volunteer status of a respondent:

Question 1: Since September 1st of last year, have you done any volunteer activities through or for an organization?

Question 2: Sometimes people don't think of activities they do infrequently or activities they do for children's schools or youth organizations as volunteer activities. Since September 1st of last year, have you done any of these types of volunteer activities?

An answer in the affirmative to either of these questions indicates a volunteer.

[19] The CPS industries are based on the Standard Industrial Classification system.

[20] CPS respondents are in the survey for a total of 8 months over a 16 month period. They are surveyed for four consecutive months, leave the survey for 8 months, then return for four more months. The outgoing rotation group, also known as the ORG sample, represents respondents are either temporarily or permanently leaving the survey. Specifically, the ORG sample comprises respondents whose month in survey is either 4 or 8. Wage and salary questions are asked only to these respondents in the CPS. In order to obtain average wage data for this analysis, a separate data set was created for the ORG sample that corresponded with the period under consideration for the volunteer supplement. More precisely, this period spans from September 1, 2001 to August 31, 2002.

Another data problem is the tendency of respondents to overstate the actual number of hours volunteered. There are cases in which the reported annual hours devoted to volunteer work exceed 3,000 with some as high as 4,000. This translates to somewhere between 58 and 77 hours per week.[21] There are some plausible explanations for such claims. First, humans tend to exaggerate—especially when the overstatement reflects positively on the person. Because volunteer work is an activity approved by society, respondents may feel compelled to overstate the true level of their activities.

Second, the hours reported may represent availability for volunteer work rather than actual work performed. For instance, volunteer firefighters may be on-call for several days, but perform active volunteer activities for only a part of that period. Whether the hours on-call should be considered as volunteer hours is subject to individual interpretation.

GDP-by-Industry

Published GDP-by-industry estimates from the BEA is obtained for the years 2001 and 2002. Since the study period spans four months of 2001 and eight months of 2002, these shares were applied to the 2001 and 2002 annual numbers.[22] One primary problem was encountered with this data source. The published GDP-by-industry data for the year 2002 are advance estimates and contain less detail than previous years. Detailed finalized data for the year 2002 will be available in June 2004. Unfortunately, the detail

[21] These outliers were not omitted from the sample.
[22] 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.

will no longer be reported on a Standard Industrial Classification (SIC) basis, but rather using the North American Industrial Classification System (NAICS).[23]

Additionally, a comprehensive revision to GDP-by-industry estimates is performed at roughly 4-year intervals. The latest comprehensive revision affects the 2002 data, with historical adjustments to data from previous years. However due to the conversion, the revised data will be reported in SIC codes only up to the year 2000. The 2002 data used in this study were published by BEA, but are at a higher level of aggregation.[24] The same level of major industry detail contained in the CPS is preferred, but unobtainable due to the conversion from SIC to NAICS.

In summary, two issues arise. The first is that revised, detailed 2002 GDP-by-industry estimates are not reported in SIC codes. The second is that the existing 2001 published estimates are not subject to the comprehensive revision.[25] Thus, while the 2002 GDP-by-industry estimates will be released in June 2004, the revised figures will have undergone substantial revisions and be reported on a NAICS basis. This study avoids these matters by conducting the GDP comparative analysis at a higher level of aggregation where published numbers are available. Table 1 illustrates the detailed industries comprising the aggregated sectors.

Table 1. Detailed Industries Included in GDP-by-industry and CPS Major Aggregates

Detailed industry	GDP-by-industry Aggregate	CPS industry
Farms		Agriculture
Agricultural services, forestry, and fishing		Agriculture
Metal mining		Mining

[23] Currently, the CPS major industry categories closely correspond to 2-digit SIC codes. For further details on the conversion from SIC to NAICS, please visit www.census.gov.
[24] See Table 1 of the May 2003 *Survey of Current Business*.
[25] For details regarding the comprehensive revision, please see http://www.bea.gov/bea/dn/2003benchmark/CR2003content.htm.

Detailed industry	GDP-by-industry Aggregate	CPS industry
Coal mining		Mining
Oil and gas extraction		Mining
Nonmetallic minerals, except fuels		Mining
Construction		Construction
Lumber and wood products		Manufacturing - Durable
Furniture and fixtures		Manufacturing - Durable
Stone, clay, and glass products		Manufacturing - Durable
Primary metal industries		Manufacturing - Durable
Fabricated metal products		Manufacturing - Durable
Industrial machinery and equipment		Manufacturing - Durable
Electronic and other electric equipment		Manufacturing - Durable
Motor vehicles and equipment		Manufacturing - Durable
Other transportation equipment		Manufacturing - Durable
Instruments and related products		Manufacturing - Durable
Miscellaneous manufacturing industries		Manufacturing - Durable
Food and kindred products		Manufacturing - Nondurable
Tobacco products		Manufacturing - Nondurable
Textile mill products		Manufacturing - Nondurable
Apparel and other textile products		Manufacturing - Nondurable
Paper and allied products		Manufacturing - Nondurable
Printing and publishing		Manufacturing - Nondurable
Chemicals and allied products		Manufacturing - Nondurable
Petroleum and coal products		Manufacturing - Nondurable
Rubber and miscellaneous plastics products		Manufacturing - Nondurable
Leather and leather products		Manufacturing - Nondurable
Railroad transportation		Transportation
Local and interurban passenger transit		Transportation
Trucking and warehousing		Transportation
Water transportation		Transportation
Transportation by air		Transportation
Pipelines, except natural gas		Transportation
Transportation services		Transportation
Telephone and telegraph		Communications
Radio and television		Communications
Electric, gas, and sanitary services	Electric, gas, and sanitary services	Utilities and sanitary services
Wholesale trade	Wholesale trade	
Retail trade	Retail trade	
Depository institutions	Finance, insurance, and real estate	
Nondepository institutions	Finance, insurance, and real estate	
Security and commodity brokers	Finance, insurance, and real estate	
Insurance carriers	Finance, insurance, and real estate	
Insurance agents, brokers, and service	Finance, insurance, and real estate	
Nonfarm housing services	Finance, insurance, and real estate	
Other real estate	Finance, insurance, and real estate	
Holding and other investment offices	Finance, insurance, and real estate	
Hotels and other lodging places	Services	Personal services, except private households

Detailed industry	GDP-by-industry Aggregate	CPS industry
Personal services	Services	Personal services, except private households
Business services	Services	Business, Auto and Repair Services
Auto repair, services, and parking	Services	Business, Auto and Repair Services
Miscellaneous repair services	Services	Business, Auto and Repair Services
Motion pictures	Services	Entertainment and recreation services
Amusement and recreation services	Services	Entertainment and recreation services
Health services	Services	Hospitals
Health services	Services	Medical Services, excluding hospitals
Educational services	Services	Educational services
Social services	Services	Social services
Legal services	Services	Other professional services
Membership organizations	Services	Other professional services
Other services	Services	Other professional services
Private households	Services	Private households
General government	Government	Public administration
Government enterprises	Government	Public administration

Source: Author's analysis.

RESULTS

As explained previously, the calculation of volunteer output is conducted several different ways. The ideal output estimation method depends on which theory is embraced. The two opposing views place different price tags on volunteer labor. The first view values volunteer labor at the wage of the volunteer's primary occupation. The second bases valuation on the market wage received to perform that particular activity. This analysis calculates volunteer output for two samples using both methods.

The different samples estimate volunteer output based on the applicable opportunity costs that exist. The first sample consists of employed persons. The intuition underlying this sample is that the NILF or unemployed do not have an economic opportunity cost, because no opportunity currently exists to earn a wage in the labor

market. Employed persons, on the other hand, have the potential to earn a wage when not in a volunteer state. This analysis assumes that employed individuals have the option to work for pay beyond scheduled hours, but not at overtime wage rates.

The second sample consists of all persons 16 years and older. A monetary value for voluntary output is calculated regardless of economic opportunity cost. All volunteer labor is valued at the primary occupation wage, and, in instances where no occupation exists, the state minimum wage rate is applied. Therefore, in cases where the volunteer is NILF or unemployed with no self-reported occupation, the value of volunteer output is the product of hours volunteered and the state minimum wage rate effective during the study period.[26]

The second level of analysis uses a Probit model to examine the likelihood of volunteer participation. The universe for the analysis consists of all persons ages 16 and up, regardless of labor force status. The Probit estimation technique is chosen to accommodate for the nature of the dependent variable. Rather than being continuous, the dependent variable is a binomial dummy variable indicating the respondent's volunteer status (yes=1 or no=0). The following is the estimating equation:

$$\Pr(\text{VOLUNTEERING}=1) = \Phi(\text{AGE, SEX, CHILD, MARRIED, BLACK, HISPANIC, OTHER, LOWWAGE, MEDWAGE, BLUE\_COLLAR, PINK\_COLLAR, OTH\_COLLAR, FULL\_TIME, PART\_TIME, UNEMP, LESS\_THAN\_HS, HS, SOMECOLLEGE, METRO, SOUTH, MIDWEST, WEST, GOODS\_INDUSTRY, PUBLIC, PRIVATE})$$

where Φ is the standard cumulative normal distribution.

The variables in the estimating equation include categorical detail for race, wage, education, labor force participation, occupation collar, region, and sector. Dummy

[26] In cases where the person is unemployed or NILF but reports an occupation, the average wage for the occupation across all industries is used.

variables for sex, presence of children under age 18, marital status, metropolitan area, and employment in a goods- or services-producing sector are also present. Descriptive statistics of the data are in Table 2.

Table 2. Descriptive Statistics for the Volunteer Supplement to the September 2002 CPS

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Volunteer	109,907	0.257	0.437	0	1
Annual hours volunteered	109,907	34.440	152.166	0	4,000
Age	109,907	44.892	17.730	16	80
Male	109,907	0.475	0.499	0	1
Married	109,907	0.565	0.496	0	1
Child under 18	109,907	0.297	0.457	0	1
Metropolitan area	109,907	0.751	0.432	0	1
Race Category Dummies:					
White	109,907	0.766	0.424	0	1
Black	109,907	0.093	0.290	0	1
Hispanic	109,907	0.091	0.288	0	1
Other	109,907	0.050	0.219	0	1
Wage Category Dummies:					
Low	109,907	0.132	0.338	0	1
Medium	109,907	0.312	0.463	0	1
High	109,907	0.557	0.497	0	1
Occupation Collar Dummies:					
White	109,907	0.398	0.490	0	1
Blue	109,907	0.159	0.366	0	1
Pink	109,907	0.095	0.294	0	1
Other	109,907	0.347	0.476	0	1
Labor Force Participation Status Dummies:					
NILF	109,907	0.333	0.471	0	1
ILF	109,907	0.667	0.471	0	1
Full-time	109,907	0.520	0.500	0	1
Part-time	109,907	0.114	0.318	0	1
Employed	109,907	0.634	0.482	0	1
Unemployed	109,907	0.034	0.180	0	1
Education categories:					
Less than high school	109,907	0.120	0.325	0	1
High school	109,907	0.280	0.449	0	1
Some college	109,907	0.219	0.414	0	1
BA or more	109,907	0.231	0.422	0	1
Region Dummies:					
Northeast	109,907	0.221	0.415	0	1
Midwest	109,907	0.250	0.433	0	1
South	109,907	0.285	0.451	0	1
West	109,907	0.245	0.430	0	1
Sector Dummies:					
Public	109,907	0.099	0.299	0	1
Profit	109,907	0.459	0.498	0	1
Nonprofit	109,907	0.041	0.198	0	1
Private	109,907	0.500	0.500	0	1
Self-employed or without pay	109,907	0.401	0.490	0	1

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Dummy industries producing:					
Goods	109,907	0.158	0.365	0	1
Services	109,907	0.515	0.500	0	1
No major industry or unemployed	109,907	0.327	0.469	0	1

Source: Author's analysis.

Two separate Probit equations are estimated. The first delineates by labor force status with detail for those individuals in the labor force—such as full-time, part-time, or unemployed—whereas the second equation examines only whether the individual is in or out of the labor force. Additionally, the equations are estimated separately by sex to ascertain whether the probability of volunteering varies by gender.

From the average hourly wage calculations, a natural clustering emerges. Three broad categories of low-, medium-, and high-wage workers appear in the data. Table 3 illustrates average hourly wages by these categories for each major occupation group for both the study period and 2002 calendar year.

Table 3. Average Hourly Wage by Major Occupation for Ages 18-64, excluding Self-Employed, September 2001 to August 2002 unless otherwise noted

Major Occupation	Number	Study Period	Calendar Year 2002	Difference
Low wage:				
Private household	857	8.15	8.71	0.56
Service, except protective and household	19,888	9.05	9.03	-0.01
Farming, forestry and fishing	2,675	9.76	9.81	0.05
Handlers, equipment cleaners, helpers, laborers	7,014	10.67	10.73	0.07
Medium wage:				
Machine operators, assemblers and inspectors	8,810	12.10	12.32	0.22
Administrative support, including clerical	26,129	12.96	13.11	0.15

Major Occupation	Number	Study Period	Calendar Year 2002	Difference
Transportation and material moving	7,603	13.69	13.79	0.10
Protective service	3,467	15.76	15.88	0.11
Sales	18,661	15.92	16.05	0.13
Precision production, craft and repair	18,281	16.22	16.27	0.05
High wage:				
Technicians and related support	6,581	18.68	18.80	0.12
Professional specialty	29,258	23.36	23.59	0.23
Executive, administrative and managerial	25,526	24.25	24.37	0.12

Source: Author's analysis of CPS data.

Valuing volunteer output at the wage of the activity performed requires assigning volunteer activities into occupations based on occupational detail within the major categories. Table 4 lists the assignments made between volunteer activities and major occupation groups. No occupation assignment is made for the category of "Any other type of activity." Consequently, the associated wage rate is the overall average of the 13 major occupation category wages.

The wage associated with the major occupation category is applied to all persons performing that same volunteer activity. When performing the industry analysis, the designations are based on the self-reported primary industry. Maintaining a consistent industry designation enables accurate comparisons between the two techniques. The number of hours is held constant while the wage is allowed to vary. Table 5 shows average wages for each major occupation category by industry group.

Table 4. Volunteer Activities and their Assigned Major Occupational Category and Average Hourly Wage Rate

Volunteering Activity	Major Occupation	Average Wage

Build, maintain, or repair buildings or other physical structures	Handlers, equipment cleaners, helpers, laborers	$10.67
Canvass, campaign, or fund raise	Professional specialty	$23.36
Collect, make, serve, or deliver food, clothing or other goods	Service, except protective and household	$9.05
Do unpaid consulting or administrative work	Administrative support, including clerical	$12.96
Engage in activities to protect the environment or animals	Professional specialty	$23.36
Engage in activities to support emergency preparedness or relief	Protective service	$15.76
Engage in activities to support public health or safety	Protective service	$15.76
Organize, supervise, or help with events or activities	Administrative support, including clerical *	$12.96
Provide care or transportation	Service, except protective and household	$9.05
Serve as an unpaid member of a board, committee, or neighborhood association	Executive, administrative and managerial	$24.25
Teach or coach	Professional specialty	$23.36
Any other type of activity	Average of all wages	$14.66

* Occupation detail for this category includes managers of administrative support staff
Source: Author's analysis of CPS data.

In instances that respondents reported performing more than one volunteer activity, equal participation is assumed. For example, if a respondent volunteered an annual total of 60 hours across three different activities, it is assumed that each activity received 20 hours of volunteer work. Three increments of 20 hours are multiplied by the wage associated with each of the three activities. These totals are then summed for the total monetary value of volunteer output for that individual.

Table 5. Average Wages of Employees by Major Occupation and Industry for Ages 18-64, from September 2001 to August 2002

Major Industry	Admin. Support inc. Clerical	Exec., Admin., & Mgrial	Farmers	Laborers	Machine Ops & Assemblers	Other Services	Private HH	Prod-uction	Prof. Spec-ialty	Pro-tective Services	Sales	Tech-nicians & Rel. Supp.	Trans-port-ation
Agriculture	10.63	17.40	9.33	12.95*	7.86*	9.76*	--	14.85	21.05	8.35*	18.71*	12.34	12.29
Business, auto and repair services	12.25	25.99	9.22*	8.89	11.90	9.39	--	14.61	27.45	11.35	18.06	23.25	11.25
Communications	14.26	28.21	11.83*	13.17*	19.39*	8.36*	--	19.36	25.55	15.08*	19.21	19.79	12.75*
Construction	13.37	24.03	11.30*	11.84	14.46	10.07*	--	16.14	23.89	12.75*	24.68	18.61	15.15
Education services	11.37	22.97	11.13	10.26*	11.66*	9.87	--	15.65	20.96	12.10	12.75	15.43	12.44
Entertainment	12.35	20.93	10.63	10.97	13.68*	9.69	--	15.38	20.02	10.61	9.51	20.13*	12.16*
Finance, insurance, and real estate	13.18	26.06	10.04	10.72*	12.32*	10.68	--	15.71	27.03	13.03	25.74	22.86	14.65*
Forestry and fisheries	13.87*	17.76*	12.54	8.94*	12.89*	10.26	--	19.00*	25.08	13.93*	27.56*	16.21*	17.32*
Hospitals	12.94	23.81	11.35*	12.28*	10.75	10.82	--	17.06	24.65	13.64*	15.46*	16.13	10.33*
Manufacturing	14.02	28.36	12.60	10.94	12.34	9.61	--	16.33	27.40	14.98	21.41	19.25	13.48
Medical services, excluding hospitals	11.91	20.68	9.53*	8.40*	8.40	14.12	--	14.53	25.27	12.02*	29.40*	15.80	14.72*
Mining	13.64	25.51	11.00*	13.76*	13.53*	9.17*	--	17.36	31.78	20.01*	25.82*	22.31*	14.06
Other professional services	13.15	27.19	11.20*	10.39*	14.75*	9.60	--	18.57	26.06	14.01*	20.31	19.04	13.22*
Personal services, excluding private household	10.13	18.52	9.09*	8.69*	8.70	7.76	--	13.07	13.86	10.96*	10.85	17.89*	11.04
Private household	11.56*	28.12*	10.05*	7.84*	--	10.96*	8.15	18.04*	18.32*	--	39.80*	14.90*	9.59*
Public administration	14.56	23.52	13.24	10.74	14.17*	7.55	--	18.64	24.02	17.98	14.88*	21.00	14.79
Retail trade	11.52	18.18	9.21	9.44	9.89	8.83	--	14.21	20.41	11.71	11.81	13.96	11.27
Social services	12.51	18.27	5.93*	6.22*	4.05	16.26	--	12.51*	14.75	11.00*	14.76*	16.09*	8.92
Transportation	15.02	23.29	8.68*	12.03	13.20	12.23	--	18.56	25.75	14.87*	18.38	29.43	14.71
Utilities	15.77	27.21	13.80*	14.26	16.63	10.94*	--	19.62	28.61	19.03*	24.20*	23.01	15.29
Wholesale trade	12.29	23.02	8.21	10.36	10.67	8.15	--	15.47	27.95	13.71*	21.78	20.26	13.08

Source: Author's analysis of CPS data.
Note: Analysis excludes self-employed.
* Less than 50 observations.

Valuation estimates

Estimates of volunteer output measured by the wage of the volunteer's primary occupation and the wage of the volunteer activity performed are shown in Tables 6 and 7, respectively. Estimates are shown by industry sector in 2002 billion dollars as a percentage of total volunteerism output, total GDP, and industry GDP. Tables 6 and 7 do not contain the same level of industry detail as other tables in this study because of the data limitation resulting from the SIC to NAICS conversion mentioned previously.[27]

According to Table 6, the monetary value of volunteer labor output for employed volunteers is nearly $89 billion, or roughly 0.86 percent of total GDP. Examining all volunteers regardless of labor force participation status, volunteer output is much higher—a value of nearly $110 billion. Volunteer work from the unemployed or NILF comprises the second largest percentage share in terms of both total volunteerism output and overall GDP. The share of total volunteer labor to GDP for volunteers 16 years-of-age and over is approximately 1.06 percent. It is unsurprising that the second largest share of volunteer labor output is provided by the unemployed or NILF since these individuals have more time available to participate in leisure activities.

Using the volunteer activity wage as the measure, the share of volunteer labor to GDP decreases for employed persons, but increases for all persons. As seen in Table 7, volunteer output comprises 0.77 percent of GDP for employed persons—down from 0.86 percent obtained previously—and 1.26 percent for all persons 16 years-of-age and up—compared to 1.06 percent. The total value of volunteer labor output ranges from

[27] The statistical discrepancy for the study period was weighted by the industry totals to GDP at the detailed level. Some industries are not affected so that consistency with the published National Income and Product Accounts could be maintained. Specifically, these industries include farms, non-farm housing services, private household, and government.

Table 6. Value of Volunteer Output as Measured by the Volunteer's Primary Occupational Wage, for the period September 2001 to August 2002 (in millions of 2002 dollars unless otherwise noted)

		Universe: Employed Persons				Universe: All ages 16 and up			
		Total	Percentage of Output			Total	Percentage of Output		
	Nominal	Volun-	Volun-	GDP		Volun-	Volun-	GDP	
Major Industry Group	GDP	teerism	teerism	Industry	Total	teerism	teerism	Industry	Total
Private industries									
Private goods-producing industries									
Agriculture	140,753.5	1,194.8	1.35	0.85	0.01	1,253.5	1.14	0.89	0.01
Mining	126,640.3	308.8	0.35	0.24	0.00	316.2	0.29	0.25	0.00
Construction	479,907.6	3,742.3	4.22	0.78	0.04	4,298.0	3.92	0.90	0.04
Manufacturing	1,419,279.4	8,876.5	10.01	0.63	0.09	9,466.2	8.63	0.67	0.09
Private services-producing industries									
Transportation	304,521.6	3,041.2	3.43	1.00	0.03	3,156.0	2.88	1.04	0.03
Communications	294,467.9	1,487.1	1.68	0.51	0.01	1,598.4	1.46	0.54	0.02
Electric, gas, and sanitary services	221,797.1	924.8	1.04	0.42	0.01	928.7	0.85	0.42	0.01
Wholesale trade	688,656.5	4,114.9	4.64	0.60	0.04	4,245.8	3.87	0.62	0.04
Retail trade	944,054.3	6,785.5	7.65	0.72	0.07	7,466.2	6.80	0.79	0.07
Finance, insurance and real estate	2,129,808.8	7,455.3	8.41	0.35	0.07	7,852.0	7.16	0.37	0.08
Services	2,251,107.5	44,560.5	50.25	1.98	0.43	47,189.2	43.01	2.10	0.46
Government	1,323,882.3	6,193.7	6.98	0.47	0.06	6,287.2	5.73	0.47	0.06
Unemployed or NILF [1]						15,666.2	14.28		0.15
Total	10,324,876.8	88,685.5	100.00		0.86	109,723.5	100.00		1.06

[1] 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.

approximately $80 billion (2002 dollars) for employed persons to $130 billion (2002 dollars) for all persons 16 years and over. The value of volunteer output from unemployed or NILF persons is much larger when a wage appropriate to the volunteer activity is used in contrast to the minimum wage rate. The difference between the two

measures is nearly $30 billion, however, the true value is likely to be somewhere in between.

Table 7. Value of Volunteer Output as Measured by the Wage Related to the Activity, for the period September 2001 to August 2002 (in millions of 2002 dollars unless otherwise noted)

		Universe: Employed Persons				Universe: All ages 16 and up			
		Total	Percentage of Output			Total	Percentage of Output		
	Nominal	Volun-	Volun-	GDP		Volun-	Volun-	GDP	
Major Industry Group	GDP	teerism	teerism	Industry	Total	teerism	teerism	Industry	Total
Private industries									
Private goods-producing industries									
Agriculture	140,753.5	1,821.0	2.29	1.29	0.02	1,905.9	1.46	1.35	0.02
Mining	126,640.3	290.9	0.37	0.23	0.00	296.1	0.23	0.23	0.00
Construction	479,907.6	3,464.4	4.35	0.72	0.03	4,112.7	3.15	0.86	0.04
Manufacturing	1,419,279.4	7,348.1	9.23	0.52	0.07	7,833.3	6.00	0.55	0.08
Private services-producing industries									
Transportation	304,521.6	2,885.9	3.63	0.95	0.03	2,989.9	2.29	0.98	0.03
Communications	294,467.9	1,175.3	1.48	0.40	0.01	1,252.9	0.96	0.43	0.01
Electric, gas, and sanitary services	221,797.1	755.4	0.95	0.34	0.01	760.3	0.58	0.34	0.01
Wholesale trade	688,656.5	3,472.7	4.36	0.50	0.03	3,605.1	2.76	0.52	0.03
Retail trade	944,054.3	8,879.2	11.16	0.94	0.09	9,962.8	7.64	1.06	0.10
Finance, insurance and real estate	2,129,808.8	5,543.4	6.97	0.26	0.05	5,797.8	4.44	0.27	0.06
Services	2,251,107.5	38,731.3	48.68	1.72	0.38	41,273.2	31.64	1.83	0.40
Government	1,323,882.3	5,201.0	6.54	0.39	0.05	5,277.3	4.05	0.40	0.05
Unemployed or NILF [1]						45,384.3	34.79		0.44
Total	10,324,876.8	79,568.7	100.00		0.77	130,451.7	100.00		1.26

[1] 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.

Employed volunteers

Employed persons provided nearly 4.8 billion volunteer hours for the year examined, as shown in Table 8. By occupation, professional specialty workers contribute the most with more than 1.2 billion hours or over one-quarter of the total. This group also comprises the high-wage worker category. Alternatively, the occupational group contributing the smallest number of volunteer hours is private household, which is in the low-wage worker category.

Regardless of the method used, the largest monetary value and percentage share of total volunteerism, total GDP, and industry GDP occur in the services sector. Table 8 further shows that the largest number of hours volunteered appears in the educational services industry within the services sector. Within educational services, professional specialty workers contribute nearly 400 million volunteer hours, the largest among all occupations.

In contrast, Tables 6 and 7 show that the mining industry has the smallest monetary value and percentage share of volunteer output. This goods-producing industry is also the second smallest in terms of total hours volunteered, as seen in Table 8.[28] Within the mining industry, it is interesting to note that the occupations volunteering the least are in the low-wage category.

Valuing output by the wage assigned to the volunteer activity results in a smaller dollar value than by the primary occupation of the volunteer. This result has two interesting implications. First, volunteer work tends to require less skill and, therefore,

[28] A discussion of which industries are considered to be goods- as opposed to services-producing follows later in the paper.

commands a lower market wage. Second, volunteers are employed in relatively higher wage occupations and perform lower skill tasks as a volunteer.

Volunteers 16 years-of-age and over

Expanding the sample of volunteers to include all persons 16 years and older, regardless of labor force participation leads to a much different result. Regardless of valuation method used, the unemployed or NILF group generates the largest amount of volunteer output in terms of monetary value and percentage share of total GDP. This group also contributes the greatest number of hours—nearly 2.9 billion, or over one-third of total volunteer hours—as shown in Table 9. Recall from Table 7, this group generates about the same share of total monetary value of volunteer output. Both valuation methods show the highest contributing industry sector to be services. This is consistent with the findings for employed volunteers.

Probit Estimates

The results from the Probit analysis are shown in Table 10. As mentioned previously, the probability of volunteering is estimated for both sexes combined and then separately. Across sexes, Table 10 reveals age as having a negligible effect on the probability of volunteering. Gender, however, does matter as males are found to volunteer less frequently than females. This is consistent with findings from the Independent Sector (2001), Freeman (1997), and Vaillancourt (1994). One possible explanation for this gender differential is the stronger attachment to the labor force experienced by males compared to females, which translates to reduced leisure hours available for volunteer work.

Table 8. Hours Volunteered by Major Occupation and Industry for Employed Persons, for the period September 2001 to August 2002, (thousands of hours)

Major Industry	Admin. Support inc. Clerical	Exec., Admin., & Managerial	Farm-ers	Labor-ers	Machine Ops & Assemblers	Other Services	Private HH	Prod-uction	Prof. Spec-ialty	Pro-tective Services	Sales	Tech-nicians & Rel. Supp.	Trans-port-ation	Total
Agriculture	16,423	5,801	77,945	--	481	--	--	134	2,958	--	62	845	555	105,204
Business, auto and repair services	50,270	79,370	48	7,318	9,567	28,698	--	40,038	59,172	9,637	17,752	6,924	6,748	315,542
Communications	21,037	18,887	--	152	70	--	--	8,979	7,430	--	6,423	8,325	3	71,306
Construction	16,700	59,183	63	9,336	782	122	--	101,706	5,311	90	2,089	1,577	9,259	206,218
Education services	108,036	86,152	5,465	19	2,319	42,886	--	6,644	399,409	3,177	3,193	7,645	14,211	679,156
Entertainment	5,498	21,975	3,013	758	1,500	16,306	--	2,008	22,175	783	4,314	226	121	78,677
Finance, insurance, and real estate	77,932	130,515	2,033	629	69	4,249	--	4,453	11,007	2,269	90,284	9,760	294	333,494
Forestry and fisheries	680	372	2,818	--	--	--	--	69	1,653	280	--	--	18	5,890
Hospitals	32,282	18,322	--	--	--	18,729	--	1,515	118,561	235	506	31,401	57	221,608
Manufacturing	36,790	115,541	1,254	18,652	70,750	2,183	--	74,202	59,286	605	30,766	16,938	10,180	437,147
Medical services, excluding hospitals	25,826	30,788	705	--	932	41,004	--	4,406	117,810	--	29	47,843	350	269,693
Mining	904	4,454	--	1,095	1,055	--	--	5,155	702	--	2,608	82	715	16,770
Other professional services	59,912	108,990	590	610	616	12,186	--	1,652	255,153	100	6,854	11,133	491	458,287
Personal services, excluding private household	5,645	22,539	92	--	1,520	27,573	--	9,577	11,617	944	3,286	29	673	83,495
Private household	94	2,265	332	93	--	1,124	39,472	1,100	2,349	--	--	--	272	47,101
Public administration	43,982	89,061	2,227	481	327	13,421	--	5,510	65,965	73,794	295	12,229	396	307,688
Retail trade	39,379	76,588	81	31,393	3,162	70,960	--	41,183	20,479	3,628	239,529	4,193	11,375	541,950
Social services	13,384	47,325	--	145	21	42,650	--	473	60,592	1,019	1,879	390	12,438	180,316
Transportation	59,874	22,340	--	4,469	2,490	7,697	--	13,628	7,847	103	651	8,674	46,947	174,720
Utilities	3,747	10,171	361	1,253	1,107	--	--	13,289	5,007	201	348	2,844	6,075	44,403
Wholesale trade	18,300	18,716	--	3,453	538	194	--	4,179	7,931	--	133,328	899	16,014	203,552
Total	636,695	969,355	97,027	79,856	97,306	329,982	39,472	339,900	1,242,414	96,865	544,196	171,957	137,192	4,782,217

Source: Author's analysis of CPS data.

Table 9. Hours Volunteered by Major Occupation and Industry for Ages 16 and up from September 2001 to August 2002, (thousands of hours)

Major Industry	Admin. Support inc. Clerical	Exec., Admin., & Managerial	Farm-ers	Labor-ers	Machine Ops & Assemblers	Other Services	Private HH	Prod-uction	Prof. Spec-ialty	Pro-tective Services	Sales	Tech-nicians & Rel. Supp.	Trans-port-Ation	Total
Agriculture	16,423	5,990	83,320	--	481	15	--	134	2,958	--	67	845	563	110,796
Business, auto and repair services	61,005	81,942	133	7,515	9,981	31,490	--	41,173	65,174	10,719	20,608	7,047	6,748	343,535
Communications	22,857	21,241	--	248	70	--	--	9,207	7,487	--	6,968	8,405	3	76,486
Construction	17,496	62,470	63	29,560	803	122	--	111,679	5,311	90	2,089	1,577	13,564	244,824
Education services	113,225	91,805	5,482	532	2,319	46,211	--	7,487	421,332	3,614	3,193	7,900	14,211	717,311
Entertainment	6,137	25,348	3,084	873	2,419	27,940	--	2,063	23,464	1,257	4,691	226	121	97,623
Finance, insurance, and real estate	78,876	143,429	2,146	650	69	4,324	--	4,453	11,483	2,269	91,436	9,895	294	349,324
Forestry and fisheries	680	372	2,863	--	--	--	--	69	1,653	553	--	--	18	6,208
Hospitals	32,621	18,322	--	--	--	19,100	--	1,515	120,277	235	506	31,401	57	224,034
Manufacturing	38,264	122,049	1,340	20,189	77,509	2,329	--	75,749	66,414	605	32,646	17,038	11,575	465,707
Medical services, excluding hospitals	28,771	33,005	705	--	932	42,610	--	4,406	124,749	--	29	49,535	350	285,092
Mining	904	4,453	--	1,118	1,055	--	--	5,155	746	--	2,608	82	1,152	17,273
Other professional services	65,401	121,619	590	646	617	12,291	--	1,716	271,930	100	7,077	11,354	491	493,832
Personal services, excluding private household	5,645	23,240	92	--	1,560	29,020	--	9,613	16,305	1,175	3,519	29	673	90,871
Private household	94	2,265	332	251	--	1,263	41,310	1,100	2,349	--	--	--	272	49,236
Public administration	45,912	90,468	2,227	481	327	14,551	--	5,510	66,672	73,951	295	12,229	396	313,019
Retail trade	47,067	78,255	91	38,436	3,162	93,093	--	41,401	21,487	3,930	262,387	5,894	11,907	607,110
Social services	13,385	48,275	--	266	21	45,988	--	791	64,785	1,019	1,879	390	12,438	189,237
Transportation	62,906	24,703	--	4,846	2490	7,922	--	13,648	7,847	103	683	8,674	47,297	181,119
Utilities	3,747	10,174	361	1,253	1,107	--	--	13,289	5,007	201	348	3,051	6,075	44,613
Wholesale trade	18,390	19,922	149	3,582	648	194	--	6,386	8,411	--	135,026	899	17,050	210,657
Unemployed or NILF														2,851,103
Total	679,806	1,029,347	102,978	110,446	105,570	378,463	41,310	356,544	1,315,841	99,821	576,055	176,471	145,255	7,969,010

Source: Author's analysis of CPS data.

Table 10. Probit Estimates of Volunteer Activity

Independent Variables:	***Dependent Variable: Probability of Volunteering***											
	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	-0.058		-0.067									
	(0.000)	***	(0.005)	***								
Child Under 18	0.129		0.125		0.114		0.110		0.141		0.141	
	(0.005)	***	(0.005)	***	(0.007)	***	(0.007)	***	(0.007)	***	(0.007)	***
Marital status	0.045		0.044		0.046		0.043		0.042		0.044	
	(0.005)	***	(0.005)	***	(0.007)	***	(0.007)	***	(0.007)	***	(0.007)	***
Metropolitan	-0.034		-0.035		-0.047		-0.047		-0.019		-0.021	
area	(0.006)	***	(0.006)	***	(0.007)	***	(0.007)	***	(0.008)	**	(0.008)	**
Goods-producing	-0.022		-0.027		-0.016		-0.018		-0.031		-0.040	
industry	(0.006)	***	(0.006)	***	(0.007)	**	(0.007)	***	(0.011)	***	(0.011)	***
Race and Hispanic origin dummies:												
Black	-0.067		-0.070		-0.043		-0.043		-0.089		-0.096	
	(0.007)	***	(0.007)	***	(0.010)	***	(0.010)	***	(0.010)	***	(0.010)	***
Hispanic	-0.088		-0.091		-0.075		-0.076		-0.102		-0.107	
	(0.007)	***	(0.007)	***	(0.009)	***	(0.009)	***	(0.011)	***	(0.011)	***
Other	-0.139		-0.140		-0.124		-0.124		-0.154		-0.157	
	(0.008)	***	(0.008)	***	(0.010)	***	(0.010)	***	(0.013)	***	(0.013)	***
Wage category dummies:												
Low	-0.095		-0.078		-0.075		-0.067		-0.103		-0.082	
	(0.011)	***	(0.011)	***	(0.013)	***	(0.013)	***	(0.023)	***	(0.023)	***
Medium	-0.059		-0.051		-0.044		-0.041		-0.072		-0.060	
	(0.006)	***	(0.006)	***	(0.008)	***	(0.008)	***	(0.008)	***	(0.008)	***
Occupation collar dummies:												
Blue	-0.042		-0.046		-0.042		-0.044		-0.061		-0.065	
	(0.007)	***	(0.007)	***	(0.009)	***	(0.009)	***	(0.014)	***	(0.014)	***
Pink	-0.009		-0.009		-0.014		-0.013		-0.021		-0.021	
	(0.012)		(0.012)		(0.014)		(0.014)		(0.024)		(0.024)	
Other	0.019		0.012		-0.003		-0.006		0.057		0.055	
	(0.019)		(0.019)		(0.020)		(0.020)		(0.041)		(0.041)	
Labor force participation status:												
In the labor			-0.077				-0.074				-0.080	
force			(0.022)	***			(0.033)	**			(0.030)	***
Full-time	-0.097				-0.084				-0.109			
	(0.021)	***			(0.032)	***			(0.029)	***		
Part-time	-0.018				-0.033				-0.013			
	(0.020)				(0.028)				(0.028)			
Unemployed	-0.053				-0.052				-0.053			
	(0.020)	**			(0.028)	*			(0.029)	*		
Education category dummies:												
Less than	-0.186		-0.188		-0.171		-0.172		-0.201		-0.204	
high school	(0.006)	***	(0.006)	***	(0.007)	***	(0.007)	***	(0.011)	***	(0.011)	***
High school	-0.130		-0.135		-0.122		-0.125		-0.139		-0.146	
	(0.005)	***	(0.005)	***	(0.007)	***	(0.006)	***	(0.008)	***	(0.008)	***
Some college	-0.044		-0.050		-0.046		-0.049		-0.045		-0.052	
	(0.005)	***	(0.005)	***	(0.007)	***	(0.007)	***	(0.008)	***	(0.008)	***
Region dummies:												
South	0.023		0.021		0.012		0.012		0.036		0.031	
	(0.006)	***	(0.006)	***	(0.008)		(0.008)		(0.009)	***	(0.009)	***
Midwest	0.065		0.065		0.051		0.052		0.080		0.078	
	(0.006)	***	(0.006)	***	(0.008)	***	(0.008)	***	(0.010)	***	(0.010)	***
West	0.034		0.035		0.025		0.026		0.044		0.043	
	(0.007)	***	(0.007)	***	(0.009)	***	(0.009)	***	(0.010)	***	(0.010)	***
Sector dummies:												
Public	0.013		0.003		0.040		0.037		-0.029		-0.045	
	(0.009)		(0.008)		(0.012)	***	(0.012)	***	(0.014)	*	(0.013)	***
Private	-0.057		-0.062		-0.035		-0.037		-0.098		-0.108	
	(0.007)	***	(0.007)	***	(0.009)	***	(0.009)	***	(0.013)	***	(0.013)	***
N	64,499		64,499		33,714		33,714		30,785		30,785	
R-square	0.090		0.090		0.087		0.086		0.081		0.076	

Source: Author's analysis.

Note: Standard errors are in parentheses.

***, **, * represent statistical significance at the 1, 5, and 10 percent levels, respectively.

Marital status also influences the decision to volunteer. Consistent with the results obtained by Vaillancourt (1994) and Freeman (1997), the data suggest that married persons are more likely to volunteer. Furthermore, young children increase the likelihood of volunteering, as was proven in Carlin's (2001) research. In fact, the survey used in this study specifically addresses and regards activities for children's schools or youth organizations as volunteer work. Respondents with children are much more inclined to participate in such activities.

Geographic location affects the decision to volunteer such that individuals living in a metropolitan area, as defined by the US Census, are less likely to volunteer.[29] Recall, Vaillancourt (1994) found a negative correlation between city size and volunteer activity. A possible explanation for this result is that big cities have a more difficult time creating a community atmosphere. People tend to feel more isolated despite the dense population, and consequently become more removed from the community. Enlarging the geographical area to include regions, the data suggest that persons living in the Northeast volunteer comparatively less than other US regions.

Analyzing by industry, employed persons working in the services-producing sectors are more likely to volunteer than those working in goods-producing sectors.[30] This outcome is consistent with Brown's (1999) findings.

Numerous studies have examined the correlation between race and wages, each concluding that minorities tend to be concentrated in low-wage jobs.[31] The data from this

[29] For detailed metropolitan statistical area definitions, see http://www.census.gov/population/www/estimates/metrodef.html.

[30] The major industry groups comprising the goods-producing sector include: agriculture, mining, construction, manufacturing, and forestry and fisheries. The list of industries in the services-producing group includes: public administration, armed forces, transportation, communications, utilities, wholesale and retail trade, finance, insurance, and 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.

study expand upon these analyses by suggesting that the correlation extends beyond race and wages to include volunteer participation. Table 10 demonstrates that 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 volunteer activity and income, which supports the existing notion that volunteering is ultimately a normal good.

Examining volunteerism by occupation reveals that white-collar workers are more likely to volunteer relative to others.[32] This outcome corroborates Vaillancourt's (1994) findings. The continuous progression towards a global business environment has forced corporate firms to become increasingly aware of their responsibilities to society. Consequently, more firms now encourage their employees to participate in volunteer organizations, with some even permitting participation on company time. These types of opportunities are often available to white-collar workers.

"Pink" and "Other" are included in the collar collage separately to capture additional occupational categories. Pink-collar represents service-type occupations such as private household, protective service, and other services. Farmers and armed forces constitute the final category of "Other."

Labor force participants are less likely to volunteer than non-participants, regardless of the extent of labor force participation—full-time, part-time, or unemployed. Again, this result is likely due to less leisure time available for volunteer work. This outcome is not entirely contradictory to Freeman's (1997) finding of a higher likelihood of involvement among employed persons, because specification by labor force status was

[31] A few noteworthy studies include Strauss and Horvath (1976) and Dickens and Lang (1985).
[32] The 'Other' collar category, defined in the next paragraph, is statistically insignificant.

not considered in his research. Unemployed persons are classified as in the labor force, and would be less likely to volunteer in both studies.

Persons with more education have a greater probability of volunteering. This correlation was previously established by Vaillancourt (1994) and Freeman (1997). Finally, individuals working in the private sector are least likely to volunteer. The excluded category are the self-employed or persons without pay. This result is not surprising since the private sector has a reputation for requiring long hours of work.

The probability of volunteering separated by gender shows little variation from the analysis that includes both genders. The one instance in which a different outcome prevails occurs in the business sector analysis. Whereas previously the likelihood of volunteering is lower in the private sector relative to all others, the same is not true for females. Self-employed or without pay are more likely to volunteer. This result is reasonable since this group includes homemakers and retired females.

CONCLUDING REMARKS

Volunteer work has drawn the attention of policymakers and researchers alike. This topic is the subject of many research studies, and is of interest because a considerable amount of output is generated. While GDP serves as a check on the pulse of market transactions throughout the economy, currently no GDNP (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 output, in addition to introducing a national accounts perspective to the analysis. The volunteering decision is also explored to ascertain whether specific characteristics increase the likelihood of volunteer involvement.

Volunteer labor output is acknowledged by the international community through the SNA, however no official recommendation is provided to determine value outside of actual monetary compensation received. Consequently, many studies have developed creative methods to value volunteer output. This study assesses the value of volunteer output to range between $79 and $130 billion a year in 2002 dollars.

Analysis of the data demonstrates that the services sector accounts for both the largest monetary value and share of total volunteer labor output, total GDP and industry GDP for employed volunteers. The hours volunteered by the educational services industry within this sector is also the highest relative to others. Examining across occupations, professional specialty workers represent the most active volunteers. In total, output from employed volunteers comprises approximately 0.77 to 0.86 percent of GDP.

Expanding the universe to all volunteers at least 16 years-of-age yields a different result. Under this scenario, unemployed or NILF volunteers are the highest contributing group across all analysis levels. Volunteer output generated by all volunteers including the unemployed or NILF constitutes roughly 1.06 to 1.26 percent of GDP.

The data also suggest that selected factors influence the volunteering decision. Variables such as gender, race, education, wage, marital status, children, occupation, industry, geographic location, labor force participation, and business sector all play a role. The analysis finds evidence supporting the notion that volunteering is a normal good since participation increases with wage. This relationship and others had been established in previous studies. This analysis, therefore, confirms the robustness of prior results.

This research project spawns several possible future research endeavors. One endeavor is to compare the results from this study to the Time-Use Survey scheduled for

release by BLS in Summer 2004. Further, the Time-Use Survey can be exploited to examine other leisure activities in which volunteers engage outside of volunteering as well as aid in constructing a household production account. Still another is to compare volunteer labor output estimates to the employee compensation component of value added. Finally, a closer examination of the industry and occupation groups accounting for the largest share of volunteer labor output and hours is warranted. Specifically, what is it about the services sector and workers in professional specialty occupations that engender such high participation? The act of volunteering is rewarding to both participants and recipients on many levels. The output created from generous giving of time and effort provides value and merits recognition. This study illustrates continuing efforts at BEA to recognize activities outside the scope of the core GDP accounts, including non-market activities, and to provide greater detail on activities within the scope of the core GDP accounts, including nonprofit institutions.

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