

The Supply of Volunteer Labor: Focusing on Board Members

By John A Larkin

A thesis presented in fulfillment of the requirements for completion of the Bachelor of
Arts Degree in Economics
Sally McDonnell Barksdale Honors College
The University of Mississippi

University, Mississippi
May 2015

Approved by

Advisor: Dr. Mark Van Boening

Reader: Dr. Natalie Kolesnikova

Reader: Dr. Albert Nylander

© 2016
Johnathan Allen Larkin
ALL RIGHTS RESERVED

Abstract

Johnathan Allen Larkin: The Supply of Volunteer Labor: Focusing on Board Members
(Under the direction of Dr. Mark Van Boening)

Understanding the types of people who volunteer is an important part of understanding why people volunteer and the indications of what could make others volunteer. First, understanding the types of volunteers, specifically board members, provides the needed background and overall understanding of volunteering. This information could lead to a stronger idea of how to recruit volunteers. I will also update R. B. Freeman's results which used 1989 CPS data compared to 2014 CPS data. I find that the 2014 CPS provides similar results compared to Freeman's. We both found individuals are more likely to volunteer if their characteristics are associated with high values of time. I extend the regression model to focus my study on board volunteers. I find that individuals are more likely to board volunteer, if their characteristics are associated with high values of time.

Table of Contents

1. Introduction.....	1
2. Literature Review.....	3
2.1 Overview.....	3
2.2 Freeman’s Study	4
3. Cobb-Douglas Example.....	10
4. Research Methods.....	13
4.1. Descriptive Statistics.....	13
4.2. Dependent Variables.....	18
4.3. Independent Variables.....	19
5. Volunteer Regressions	22
6. Board Volunteer Regressions	28
7. Conclusion	31

List of Tables

Table 1. The Characteristics of Volunteers and Nonvolunteers in the Working-Age Population.....	14
Table 2. Linear Probability Regression in the Relation of Volunteering to Demographic Factors and Family Income in May 1989 CPS and September 2014 CPS	23
Table 3. Regression in the Relation of Volunteering to Demographic Factors and Family Income in May 1989 CPS and September 2014 CPS	26
Table 4. Linear Probability Regression in the Relation of Board Volunteering to Demographic Factors and Family Income in September 2014 CPS.....	29

1. Introduction

Volunteering is the act offering oneself for a service or undertaking. Millions of Americans and millions more across the world volunteer annually. While the perception of volunteers is often of the elderly or youth, diverse groups of people volunteer their time for a variety of different causes. According to Wilson and Rotolo's research, the value of the services provided by American volunteers in 2004 has been estimated at \$272 billion.¹ Many service-providing organizations could not function without the help of volunteers.

In this study, I attempt to understand why individuals volunteer their time as well as what types of persons are more likely to volunteer. I place specific emphasis on board volunteering. Board members are especially important because they make decisions that affect the entire organization. Like regular volunteers, board volunteers are a diverse group of people who serve for different reasons. However, they often have some common traits. For example, board volunteers are often highly successful professionals who have high opportunity costs.

My research is based on R.B. Freeman's "The Supply of Volunteer Labor: Working for Nothing" (1997), and I utilize much of his methodology. Freeman's study is based on the 1989 U.S. Census Bureau Current Population Survey (CPS) supplemental portion on volunteering. The details of Freeman's work are described in Section 2 below. I make two main contributions. First, I update his results using the 2014 CPS volunteer supplemental portion and analyze if any changes have occurred over the 25-

¹ Rotolo and Wilson-21

year period. Second, I use subset of the respondents who identified themselves as board volunteers, and I apply Freeman's methodology to that subset to examine whether or not board volunteers differ from non-board volunteers. In Section 2, I survey the literature, with emphasis on Freeman's study. In Section 3, I derive the volunteer labor supply function for Cobb-Douglas utility. It is a specific example of the supply function that Freeman and I use to interpret the results from the regressions. In Section 4, I include a table to illustrate the common characteristics of the current population and explain the dependent and independent variables. In Section 5, I include an analysis of the regressions from the 2014 CPS. The analysis includes a comparison to Freeman's results from the 1989 CPS. My analysis in Section 6 focuses on Board volunteers and their specific characteristics. I offer concluding remarks in Section 7.

2. Literature Review

2.1 Overview

Richard Freeman published “Working for Nothing: The Supply of Volunteer Labor,” in the Journal of Labor Economics in 1997. Freeman conducted research on volunteering throughout the early 1990s. He focuses on what induces an individual to volunteer, and on the income and substitution effects that affect the supply of volunteer labor. He uses data from the 1989 CPS Supplemental survey on volunteering and the 1990 Independent Sector’s Gallup Survey of Giving and Volunteering to run regressions analyzing the factors that affect the decision to volunteer. Overall, Freeman illustrates the substantial-impact that volunteering has on the U.S. economy. He finds, somewhat surprisingly, that individuals with a higher time value volunteer more than those with a lower time value. He also illustrates the power of “being asked” to volunteer and how the “conscience good” can account for the likelihood of someone to volunteer. Freeman also discovered some evidence for the labor supply substitution effects in hours volunteered. He concludes by stating how volunteer behavior requires more analysis on the demand side of the market. He thinks more research should focus on how charities seek volunteers. As my study makes extensive use of Freeman’s methodology, I describe his study in more detail later in this section.

In 2008, Stephan Meier and Alois Stulzer wrote an article called “Is Volunteering Rewarding in Itself?” Wiley Publishing Company published the article on behalf of the London School of Economics and Political Science. Meier and Stulzer discuss the more general motives behind peoples’ volunteering. They use survey data from the 1985-1999 German Socioeconomic Panel in which roughly 22,000 individuals were interviewed.

Meier and Stulzer focus primarily on the differences between self-interested and self-giving people. They conclude that helping others increases an individual's well-being. In particular, their empirical analysis finds that people who volunteer more were more likely to report greater life satisfaction than non-volunteers. This result does not apply to every individual to the same extent. Meier and Stulzer find that people who place more importance on extrinsic relative to intrinsic life goals benefit less from volunteering.

Thomas Rotolo and John Wilson coauthored "Employment Sector and Volunteering: The Contribution of Nonprofit and Public Sector workers to the Volunteer Labor Force." Rotolo and Wilson use the 2002 CPS supplemental file to conduct their research. They research the correlations between individuals who volunteer and their employment sector. They concluded that job rank and employment sector does impact volunteering. They also find that individuals in the public sector and nonprofit employees are more likely to volunteer than individuals in the private sector.² Rotolo and Wilson suggest that the welfare state of the 20th century could be crowding out some private charitable work like "...child welfare, unemployment insurance social housing, education..."³ Their research provides additional understanding of why certain people volunteer more than others.

2.2 Freeman's Study

In his 1997 paper "Working for Nothing: The Supply of Volunteer Labor," Freeman used data from two different surveys in his analysis of yearly and weekly volunteering. The first is May 1989 CPS on volunteering. The second is the 1990 Independent Sector's Gallup Survey of Giving and Volunteering in the United States,

² Rotolo and Wilson-37

³ Rotolo and Wilson-36

which contains questions on volunteering and charitable activity. He uses both surveys to draw conclusions about yearly and weekly volunteering. His regressions using the CPS data measure how many hours individuals volunteer and work within a week. His regressions using the Gallup survey measure the effect of “being asked to volunteer” to better understand “tastes for charity.” In his analysis, Freeman subcategorizes his results by variables such as work status (full-time, part-time, unemployed), gender, full-time student status, age 64+, etc.

One might expect individuals with higher opportunity costs to volunteer less. Their time could be more valuable due to a high paying job, family, or personal obligations, social or professional obligations. Similarly, individuals who make less money at their job and/or have less time obligations could be expected to volunteer more. That is, individuals with high opportunity costs sacrifice more to volunteer for a given time period than do individuals with lower opportunity costs, so opportunity cost and volunteering should be inversely related. Contrary to this reasoning, Freeman finds that volunteers tend to be people with high potential earnings and/or greater demands on their time. His regression analysis finds that people who volunteer have (on average) higher potential earnings and are employed, married, highly educated, in their peak earning years, and have larger families. Surprisingly, he finds that people holding two jobs are more likely to be volunteers than those with one job. He does find that women tend to volunteer slightly more than men, which is consistent with the opportunity cost story only if one assumes that women tend to have lower opportunity costs than men. Additionally, Freeman’s analysis of the Gallup data finds a strong positive correlation between charitable contributions and time volunteered. Freeman suggests that

“...volunteer behavior raises questions about tastes and social pressures that do not arise in standard analyses of work for pay in equilibrium, [volunteers] equate the marginal utility from the last hour of volunteering with the marginal gain from work or leisure.”⁴ The “standard analysis of work for pay” that Freeman refers to is the opportunity cost reasoning.

Freeman models the supply of volunteer time using a variation of the standard labor-leisure utility maximization framework. (My exposition is based closely on Freeman’s presentation.) An individual receives utility U from consuming goods G , leisure L , and charity C . The individual’s preferences over these three items are represented by the utility function $U(G, L, C)$.

The individual faces three constraints on the choice of G , L , and C . The first is what Freeman refers to as the “charitable production function.” The amount of charity provided is a function of volunteer time T_v and donations D , written formally as $C(T_v, D)$. The second is the income constraint: total spending cannot exceed total income. The individual’s total spending on goods G and donations D is $P_g G + D$, where P_g is the price of goods. For simplicity, prices are normalized to $P_g = 1$, so that total spending is $G + D$. Total income is the sum of wage income and nonwage income. Wage income in the per-hour wage W times the number of hours worked T_w , or $W \times T_w$. Nonwage income is represented by Y , so that total income is $W \times T_w + Y$. The income constraint is written as $G + D = W \times T_w + Y$. The third constraint is the individual’s time constraint: total time spent on work, volunteering, and leisure cannot exceed the total available time. The total time spent working, volunteering, and enjoying leisure is $T_w + T_v + L$. For simplicity, the

⁴ Freeman-S141

total available time is normalized to 1 (e.g., one day). The time constraint is written as $T_w + T_v + L = 1$.

A utility maximizing individual will maximize U subject the constraints.

Formally, this is written as:

$$\max U(G, L, C) \tag{1}$$

subject to the constraints

$$C = C(D, Tv) \tag{2}$$

$$G + D = W \times T_w + Y \tag{3}$$

$$T_w + T_v + L = 1. \tag{4}$$

Before proceeding with the solution to this problem and the empirical application, I note that Freeman uses Ben Porath's (1967) model of production of human capital. Freeman considers two different versions of the charity production function. One is where time volunteered is not affected by an individual's wages, and the other where an individual's professional qualifications affect his time volunteered. These yield separate specifications of equation (2):

$$C = C(D, Tv), \tag{2a}$$

and

$$C = C(D, WTv). \tag{2b}$$

In (2a), the productivity of any two workers would be the same. This model suggests that individuals with higher opportunity costs should volunteer less than those with lower opportunity costs. It would be more appropriate for those individuals to focus on other tasks with higher time values. For example, their time could be more valuable at work where they earn a higher wage. In (2b), an individual's productivity from

volunteering depends on his or her human capital. This change can mitigate the degree to which an individual's wage impacts the amount of time he or she spends volunteering. For example, a high-wage manager's organizational skills may help a non-profit fundraiser generate more money in an hour than the manager could earn working for an hour. If so, the manager would get more utility from volunteering an hour of her time than she would by donating an hour's worth of pay. Although equation (2b) is arguably more realistic, for simplicity both Freeman and I use equation (2a).

The solution to the constrained utility maximization problem given by equations (1) through (4) yields the optimal values G^* , L^* , and $C^* = C(D^*, T_v^*)$. Given L^* and T_v^* , equation (4) gives T_w^* , the amount of time spent working. Each of these optimal values will depend (in part) on W and Y . That is, G^* , L^* , and C^* are "demand functions" for goods G , leisure L , and charity C , respectively. In Section 3 below, I provide a specific example of the solution using a Cobb-Douglas utility function.

By way of the charitable production function $C^* = C(D^*, T_v^*)$, the "derived demand functions" D^* and T_v^* can be computed. Freeman refers to T_v^* as the "derived demand for volunteer time" but it also represents the individual's supply of volunteer labor. That is, T_v^* is how much time the individual will choose to spend volunteering. Freeman expresses $T_v^* = T_v(W, Y)$ with a general linear form:

$$T_v = a + bW + cY + v \tag{5}$$

Equation (5) can be estimated with linear regression. The v term captures individual-specific characteristics. In a regression, these could include variables like education, marital status, or family size.

Freeman claims that “the substitution effect in response to a change in W is $b - cT_w$ ” in equation (5). By equation (3), $G + D = W \times T_w + Y$, I can solve for Y , non-wage income:

$$Y = G + D - W \times T_w \quad (6)$$

I then use equation (6) to substitute for Y in equation (5) to get:

$$T_v = a + bW + cG + cD - cW \times T_w + v \quad (7)$$

By finding the partial derivative $\partial T_v / \partial W$, I can find the change in the time volunteered for a given change in wages. If this derivative is negative, then when the wages rise individuals work more and volunteer less. That is, individuals substitute work for volunteering, because the opportunity cost of volunteering has risen. When I differentiate (7) with respect to W , I obtain:

$$\frac{\partial T_v}{\partial W} = b - cT_w. \quad (8)$$

This is the same expression as Freeman obtains. In equation (8), if $b > cT_w$ then the substitution effect is negative.

Freeman uses the May 1986 CPS data to estimate variants of equation (5). These are given in Section 4, where I replicate his estimates using 2014 CPS data from the same supplemental survey and compare my results to his. Before getting to those results, I give an example of the utility maximization problem using a Cobb-Douglas utility function and a Cobb-Douglas charitable production function.

3. Cobb-Douglas Example

Cobb-Douglas utility functions and Cobb-Douglas production functions are often used in economic analysis. The utility maximization problem represented above in equations (1)-(4) is restated below with a Cobb-Douglas utility function replacing the general utility function $U(G, L, C)$ in equation (1'). Additionally, the general charitable production function is also replaced by a Cobb-Douglas function in equation (2'). The utility maximization problem is:

$$\max U(G, L, C) = G^\alpha L^\beta C^\sigma \quad (1')$$

subject to the constraints

$$C = C(D, T_v) = D^a T_v^b \quad (2')$$

$$G + D = W \times T_w + Y \quad (3)$$

$$T_w + T_v + L = 1. \quad (4)$$

The problem can be stated as a two-equation problem by using some substitutions. I substitute (2') into (1') to get:

$$U(G, L, C(D, T_v)) = G^\alpha L^\beta (D^a T_v^b)^\sigma = G^\alpha L^\beta D^d T_v^e \quad \text{with } d = a\sigma \text{ and } e = b\sigma. \quad (9)$$

In solving (4) for T_w and get $T_w = 1 - T_v - L$. I then substitute this into (3) and rearrange terms to get:

$$G + D - W + WT_v + WL - Y = 0. \quad (10)$$

The constrained utility maximization problem represented by (1')-(4) is now summarized by equations (9) and (10). That is, utility equation (9) is maximized subject to the constraint equation (10).

In economics, the standard method for solving a constrained maximization problem is to use the Lagrangian method. For this problem, the Lagrangian equation is:

$$K(G, L, D, T_v, \lambda) = G^\alpha L^\beta D^d T_v^e - \lambda(G + D - W + WT_v + WL - Y). \quad (11)$$

The parameter λ is the ‘‘Lagrangian multiplier’’ and it represents the degree to which the constraint limits the maximization problem. The solution method involves taking the partial derivatives of K and setting them all equal to zero. These are called the ‘‘first order conditions.’’ This method yields five equations and the five unknowns $G, L, D, T_v,$ and λ , so a unique solution can be found. This method assumes the maximizing values G^*, L^*, D^*, T_v^* and λ^* are all non-zero. This is known as an interior solution.

When I take the derivatives, I get the first order conditions shown in equations (12)-(16):

$$\frac{\partial K}{\partial G} = \alpha G^{\alpha-1} L^\beta D^d T_v^e - \lambda = 0 \quad (12)$$

$$\frac{\partial K}{\partial L} = \beta G^\alpha L^{\beta-1} D^d T_v^e - \lambda W = 0 \quad (13)$$

$$\frac{\partial K}{\partial D} = d G^\alpha L^\beta D^{d-1} T_v^e - \lambda = 0 \quad (14)$$

$$\frac{\partial K}{\partial T_v} = e G^\alpha L^\beta D^d T_v^{e-1} - \lambda W = 0 \quad (15)$$

$$\frac{\partial K}{\partial \lambda} = G + D - W + WT_v + WL - Y = 0 \quad (16)$$

I express (13) as $\beta G^\alpha L^{\beta-1} D^d T_v^e = \lambda W$ and (15) as $e G^\alpha L^\beta D^d T_v^{e-1} = \lambda W$, and then I take the ratio of these two expressions and get:

$$L = \frac{\beta}{e} T_v. \quad (17)$$

Similarly, I express (12) as $\alpha G^{\alpha-1} L^\beta D^d T_v^e = \lambda$ and (15) as $e G^\alpha L^\beta D^d T_v^{e-1} = \lambda W$, and then take the ratio of these two expressions to get:

$$G = \frac{\alpha}{e} W T_v. \quad (18)$$

Next, I express (12) as $\alpha G^{\alpha-1} L^\beta D^d T_v^e = \lambda$ and (14) as $d G^\alpha L^\beta D^{d-1} T_v^e = \lambda$, take the ratio of these two expressions and simplify, and then use (18) to get:

$$D = \frac{d}{e} W T_v. \quad (19)$$

Finally, I use (17), (18), and (19) to substitute for L , G , and D in equation (16) and I solve for T_v to get $T_v^* = T_v(W, Y)$, which is the individual's supply function for volunteer labor:

$$T_v(W, Y) = \frac{e}{\alpha + \beta + d + e} \left(1 + \frac{Y}{W} \right) = \frac{e}{\alpha + \beta + d + e} + \frac{e}{\alpha + \beta + d + e} \frac{Y}{W}. \quad (20)$$

Equation (20) has the same general form as Freeman's linear expression as shown above in equation (5). For example, if I ignore the constant term in (20) and then take the natural logarithm of both sides I get the following version of Freeman's equation (5):

$$\ln(T_v) = \ln\left(\frac{e}{\alpha + \beta + d + e}\right) - \ln W + \ln Y. \quad (21)$$

Substituting the T_v^* expression in (21) back into equations (17), (18), and (19) will give $L^* = L(W, Y)$, $G^* = G(W, Y)$, and $D^* = D(W, Y)$. The first two are the individual's demand functions for leisure and goods. The last one is the individual's supply function for donations. The individual's volunteer supply function (20) and donation supply function can be put into the charitable production function (2') to get the individual's supply function for charitable goods $C^* = C(W, Y)$.

4. Research Methods

4.1. Descriptive Statistics

The CPS is a survey conducted monthly in the United States by US Bureau of Census and is used as a source of statistics for the government. I acquired the data from the CPS website under CPS supplement. I use the September 2014 data, which includes approximately 56,000 interviewed households across the country. Overall 152,485 respondents were interviewed for the 2014 Volunteer Supplement. There are a total of 461 variables in this data file. I accessed the data file January 2016 from http://thedataweb.rm.census.gov/ftp/cps_ftp.html.

I analyze the 2014 CPS data set and compare it to Freemans' regressions and analysis on the 1989 CPS data set. The change in data sets may cause differences in the regression results. I will acknowledge any differences and try to explain different possible causes. I create a variable named Volunteer. This variable will be used as the volunteer variable throughout the data and regressions. I calculate this variable by using the following two questions on the 2014 CPS supplemental portion. PES1 and PES2 are the two questions in regards to whether or not a respondent volunteered in the past year:

PES1- "Since September 1st of last year, have you done any volunteer activities through or for an organization?" (Yes/No response)

PES2- "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?" (Yes/No response)

If respondents answered "No" to PES1, they would be asked PES2 as the follow up question. If respondents answered, "yes" to one of these questions, I categorize them as a volunteer with Volunteer = 1. If respondents answered, "no" for both questions, they

would be categorized as nonvolunteers with Volunteer = 0. I mentioned above how there were 152,485 respondents in the data file. Of those 152,485 respondents, 89,825 responded yes or no to PES1 and PES2. 24,105 of the 89,825 had volunteered in the past or said yes to either of the questions. 65,720 had not volunteered in the past year and said no to both PES1 and PES2.

Table 1 is an updated replication of Freeman’s Table 1, and it shows some characteristics of the survey respondents that were of working age 16-64 and nonstudents. These data are shown separately for volunteers and nonvolunteers. Column 1 and 3 are my results from the 2014 CPS, and column 2 and 4 are taken from Freeman’s Table 1.⁵ I will use Table 1 to make comparisons. One is a comparison of my results with those of Freeman. The second is to compare volunteers and nonvolunteers.

Table 1.
The Characteristics of Volunteers and Nonvolunteers in the Working-Age Population

	Volunteer		Nonvolunteer	
	2014	1989	2014	1989
	(1)	(2)	(3)	(4)
Percentage white	85	92	79	85
Percentage male	42	44	50	49
Percentage aged 35-54	52	61	44	53
Percentage married	69	77	53	62
Percentage employed	79	80	72	75
Percentage professional or managerial	10	41	6	21
Mean years of school	15.2	14.0	12.4	12.4
Mean family size	2.38	3.30	2.08	3.10
Mean family income (\$)	55,000	41,696	39,000	32,148
Mean hourly wages (#)	...	11.81	...	9.8

Note: Data limited to 16-64 year olds that are nonstudent volunteers

⁵ Freeman S146

Both data sets produce similar numbers. The vast majority of the working-age respondents are white, in the 80-90% range, and the percentage is slightly higher (6-7%) for volunteers than for nonvolunteers. However, the 2014 percentages are about 7-8% lower than in 1989 both for volunteers and nonvolunteers. The percentage of males is roughly the same as well. Forty-two percent of volunteers in 2014 were male, while 44% of volunteers were male in 1989. In both surveys, about 50% of the nonvolunteers were male. The percentage of respondents between the ages of 35-54 changed a little. It seems that fewer respondents were between the ages of 35-54 for the 2014 CPS as the 1989 data has 61% while the 2014 data has 52%. A similar pattern holds for nonvolunteers (44% vs. 53%) This change could be due to the aging baby boomer generations. However, in both surveys, the percent aged 35-54 is about 8% higher for volunteers than for nonvolunteers. The percentage married has decreased for both volunteers and nonvolunteers in the 2014 data set compared to the 1989 results (69% vs. 77%, and 53% vs. 62%, respectively). The percentage employed is nearly the same in both surveys at about 70-80%, and in both, the percentage is a little higher for volunteers. The percentage of professional or managerial is the largest difference between the two data sets. This could be due to a change in the population, but it is more likely due to different methods being used to calculate the percentages. I explain this in more detail below. The mean years of school for the 2014 volunteers increased slightly compared to 1989, and stayed the same for nonvolunteers. The mean for volunteers is roughly two years beyond high school, while the mean for nonvolunteers is roughly a half-year beyond high school. The mean family size decreased slightly compared to the 1989 data, from about 3 people to about 2. Volunteers' families average about one more person

than do nonvolunteers. This could be due to a difference in how I calculate the mean family size (discussed below) or it could be due to the changing demographic towards smaller families in the United States. The mean family income has risen by about \$13,000 for volunteers and about \$7,000 for nonvolunteers from 1989 to 2014. In column 2, \$41,696 in 1989 has the same buying power \$79,604 in 2014. In column 4, \$32,148 in 1989 has the same buying power as \$61,375 in 2014. The mean 2014 incomes of \$55,000 for volunteers and \$39,000 for nonvolunteers imply a substantial decrease in real income. This could be due to a growing income disparity in the U.S., or it could be due to a difference in how I calculate mean income. I explain my computations below.

Both the 2014 and the 1989 data are inconsistent with the opportunity cost story. Under that scenario, individuals with greater demands on their time and/or higher earnings would volunteer less. The data imply that those volunteering have larger percentages or means for married, employed, family size, years of schooling, and family income which all indicate high values of time compared to nonvolunteers. Overall, the 2014 data and 1989 data appear to be very similar. For the most part, there are no systematic differences across the 25-year period, and both sets appear to contradict an opportunity cost explanation of volunteering.

Despite the similarity, it is important that I note some of my calculation methods, as they might account for some differences in Table 1 between my 2014 values and Freeman's 1989 values. Freeman does not say how he obtains his values. For some, it is fairly straight forward, but for the variables professional or managerial, mean years of school, mean family size, and mean family income, it is difficult to interpret how he

calculated the values. I will explain how I calculated these variables to obtain my 2014 figures.

Percentage professional or managerial is the largest difference between the 2014 and 1989 data sets. This difference could be due to how I calculated the “percentage of professional or managerial” compared to Freeman. The 2014 survey question PRDTIND1 provides 46 “detailed industry codes” for the respondent. I decided to use professional and technical services (36) and management of companies and enterprises (37) to identify those respondents who were employed in a managerial or professional position. I found that 10% of the 2014 volunteers and 6% of the 2014 nonvolunteers chose one of these two responses. Freeman reports 1989 figures of 41% and 21% respectively, for the percentage of professional or managerial. Freeman could have included other responses like Finance (32) or Insurance (33).

The 2014 CPS includes a question about the amount of education a respondent has received (PEEDUCA). There are 16 possible responses. The data has responses coded as 31-46, with 31 for “less than first grade” and 46 for “Doctorate Degree.” I subtracted 30 from all the responses so they became 01-16. I then calculated the mean of this recoded variable for the 2014 volunteers and nonvolunteers. I calculated a mean response of 11.6 for volunteers and 10.2 for nonvolunteers. A response of 11 corresponds to an “associate’s degree-occupational or vocational.” An associate’s degree would be roughly 14-16 years of school so I interpreted the mean of 11.6 as 15.2 mean years of school for volunteers. I repeated the process for nonvolunteers and interpreted the mean of 10.2 as 12.4 years of schooling, as a response of 10 corresponds to “some college but no degree.”

Regarding family size, the 2014 CPS includes a question on the number of children in the household (PRNMCHLD). The mean of this variable for 2014 was 0.88 for volunteers, and 0.38 for nonvolunteers. I assume that the average family has 1.5 parents so I added 1.5 to the means. Thus I calculated a mean family size of 2.38 for volunteers and 2.08 for nonvolunteers. I am not sure how Freeman calculated his family size since the 2014 CPS did not include a specific question for family size.

The 2014 CPS also includes a question on family income (HEFAMINC). Respondents could indicate their family income by one of 16 responses, where a response was a range of income. These responses are coded in the data file as 1-16. For example, a family income equaling “\$25,000 to \$29,999” is coded as an 8. I calculated the mean of the responses and obtained 12.5 for volunteers and 10.8 for nonvolunteers. Category 12 corresponds to “\$50,000 to \$59,999”. I interpreted a mean of 12.5 as the midpoint of this interval so I obtained an average family income of roughly \$55,000. I repeated the process for nonvolunteers to obtain an average of roughly \$39,000.

4.2. Dependent Variables

I use the following equation to estimate the impact of selected variables on volunteering. Volunteer is measured two ways. One is whether or not a person volunteered. In the first estimation, I use the dummy variable Volunteer. The second measure is hours volunteered. In the second estimation, I use the natural log of yearly hours volunteered. In Section 5, I give the results of the following regression equation:

$$\text{Dependent Variable} = \beta_0 + \beta_1(\ln \text{family income}) + \beta_2(\text{employed}) + \beta_3(\text{grade completed}) + \beta_4(\text{age}) + \beta_5(\text{age}^2 * 100) + \beta_6(\text{white} (= 1)) + \beta_7(\text{married} (= 1)) + \beta_8(\text{no. of children}) + \beta_9(\text{INCMSA} (= 1)) + \varepsilon.$$

This regression model is a variant of equation (5) in Section 2 above.

As I described in Section 4.1, the 2014 CPS includes two questions in regards to whether or not respondents volunteered (PES1 and PES2), and I used these to create the dummy variable Volunteer. This variable = 1 for volunteers and = 0 for nonvolunteers. The CPS also asks how many different organizations an individual volunteered for and then asks how many hours the individual volunteered for each organization annually. The hours volunteered are covered by questions PTS7A-PTS7G. After adding the values together for PTS7A-PTS7G to compute the yearly hours volunteered for each respondent, I take the natural log of these values to create the variable Ln (Yearly Hours Volunteered).

4.3. Independent Variables

The regression equation above shows the independent variables I used in the regressions. I described each of these in turn. As I described in Section 4.1, the CPS includes a question on family income where respondents indicate an income range (HEFAMINC). For example, if respondents had a family income of \$17,000, they would select \$15,000-\$19,999. I take the natural logarithm of these responses and create the variable Ln (family income).

Respondents also indicate their employment in the CPS question PREMPNOT. Individuals have four response options: employed, not employed, not in the labor force (discouraged), or not in the labor force (other). I used the data to create the dummy variable Employed. If respondents selected employed, Employed = 1. If respondents selected any of the other three responses, Employed = 0.

The CPS includes a question that indicates respondents' Grade Completed (PEEDUCA). CPS labels the question as "highest level of school completed or degree received." The data file codes the responses as 31-46 so I subtract 30 from all the responses so that the recoded entries are 1-16. For example, bachelor's degree would be 13 instead of 43. I used the recoded data.

The 2014 CPS also includes a question that indicates a person's age (PRTAGE). Respondents have the option to enter their age 00-79 (age in years), 80 (80-84 years old), and 85 (85+ years old). I renamed PRTAGE as Age. I also generated $\text{Age}^2 * 100$ by prtage^2 then multiplied it by 100. Following Freedman, I model the relationship between age and volunteering as nonlinear. This is the reason for the Age^2 term.

Respondents identify race in the 2014 CPS (PRDTIND1). Respondents have 26 options with which to indicate their race. The data set codes these as 01-26. For example if the respondent was coded as 02, then he or she indicated their race to be "all black." I generated the dummy variable White. If respondents are coded as 01, then $\text{White} = 1$. If respondents selected any other race, $\text{White} = 0$.

The 2014 CPS includes a question indicating the respondents' marital status (PEMARITL). Respondents have 6 response options: married-spouse present, married-spouse absent, widowed, divorced, separated, and never married. I used the data to create the dummy variable Married. If respondents selected either married-spouse present or married-spouse absent, then $\text{Married} = 1$. For all other options, $\text{Married} = 0$.

The number of children in the respondent's household is also asked on the 2014 CPS (PNRMCHLD). The question is "number of children <18 years of age." In the regressions I refer to this variable as No. of Children.

The 2014 CPS asked respondents to indicate whether or not they lived in a metropolitan area (GTMETSTA). Respondents have options metropolitan, nonmetropolitan, or not identified. I used the data to create the dummy variable INCMSA. If respondents choose metropolitan, $INCMSA = 1$. For all other options, $INCMSA = 0$.

Freeman also included dummy variables to control for regional effects, which I did not include when estimating the regressions. He included three dummy variables for four regions. He did not specify the regions so I could not replicate the variables. Consequently, I did not include regional dummy variables. The omission of this dummy variable does not seem to have a large impact on the results.

5. Volunteer Regressions

Below I present two tables from both Freemans' 1989 and my 2014 regressions. Each table has a different dependent variable and the same independent variables. As I noted in section 4.2, the two dependent variables are the dummy variable Volunteer and the variable Ln (Yearly Hours Volunteered). The regressions are estimated separately for males and females. Like Table 1, I show my results in columns 1 and 3, and Freeman's results in columns 2 and 4. Freeman also includes the number of household earners as an independent variable. I did not include number of household earners because the 2014 CPS did not include a question for the amount of household earners. Of the 89,825 observations from above, 42,671 were males and 47,154 were females. 10,049 of the 42,671 males volunteered so 10,049 males were $\text{Volunteered} = 1$. 14,056 of the 47,056 females volunteered so 14,056 females were $\text{Volunteered} = 1$. Respondents must have answered all 11 variables for their responses to be included in the regression. 42,232 males had an observation for all 11 variables in the regression, and 46,671 females had an observation for all 11 variables. This explains why there are fewer males and females in the recorded observations of Table 2 compared to those that answered the volunteer questions.

Table 2 is a linear probability model with the dummy variable Volunteer as the dependent variable. Both Freeman and I use linear probability model: analyses with logistics and other functional forms to give comparable results. In a linear probability model, variables with positive coefficients are associated with a higher probability of volunteering, while variables with negative coefficients are associated with a lower probability of volunteering. Table 2 is divided into two separate categories, male and

female, and then further divided into 2014 and 1989. I obtained the 1989 results from Freeman's Table 3.⁶ I include coefficients and standard errors in the table. I note that the 2014 CPS has 13,106 more male respondents and 13,543 more female respondents than does the 1989 CPS. Both surveys have more female respondents than male respondents.

Table 2.
Linear Probability Regression in the Relation of Volunteering to Demographic Factors and Family Income in May 1989 CPS and September 2014 CPS

Independent Variables	Dependent Variable: Volunteering (=1)			
	Males		Females	
	2014 (1)	1989 (2)	2014 (3)	1989 (4)
Ln (family income)	.050* (.003)	.029* (.003)	.062* (.004)	.047* (.003)
Employed (=1)	-.001 (.005)	.039* (.008)	-.003 (.005)	-.010 (.006)
Grade Completed	.029* (.001)	.032* (.001)	.033* (.001)	.036* (.001)
Age	-.004* (.001)	.006* (.001)	-.003* (.001)	.014* (.001)
Age ² * 100	4.45E-07* (6.85E-08)	-.003 (.002)	2.67E-07* (6.72E-08)	-.012* (.001)
White (=1)	.045* (.005)	.049* (.007)	.060* (.005)	.082* (.007)
Married (=1)	.045* (.005)	.034* (.007)	.027* (.005)	.042* (.006)
No. Household Earners	...	-.005 (.003)	...	-.015* (.003)
No. of Children	.034* (.002)	.040* (.002)	.038* (.002)	.056* (.002)
INCMSA (=1)	-.040* (.005)	-.071* (.005)	-.036* (.005)	-.075* (.005)
N	42,232	29,126	46,671	33,128
R ²	0.0646	0.11	0.0725	0.13

Note: Standard errors shown in parentheses. * = 5% significance. Although Freeman did not include whether his data was statistically significant in his tables, I used his coefficients and standard errors to calculate *t*-values and levels of significance.

⁶ Freeman, S151

My results and Freemans' results have some differences and similarities. For the family income variable, the coefficient is statistically significant and positive in each of the four columns. This illustrates that individuals with higher incomes are more likely to volunteer. Both males and females in my 2014 results have a slightly higher coefficient than his 1989 results. In column 2, Employed is statistically significant and positive, while the columns 1, 3, and 4 all have negative coefficients but none are statistically significant. Grade Completed is statistically significant and positive (and of roughly the same magnitude) in all four columns, which suggests that if individuals have a higher level of schooling, then these individuals are more likely to volunteer. Age and Age² *100 have a few differences. Age is negative for both 2014 male and females. A possible explanation could be the rising age of the baby boomer generation. All Age and Age² *100 variable are statistically significant except column 2's Age² *100. Variables White, Married, and Number of Children all have positive and statistically significant coefficients. If individuals are white, they are more likely to volunteer according to the results. Similarly if individuals are married, they are more likely to volunteer. The 2014 CPS did not contain a question on number of household earners so that variable is not included in my regressions. Number of Children also has positive coefficients and statistically significant results in all four columns. These coefficients suggest that the larger the individuals' family size is, the more likely these individuals are to volunteer. The dummy variable for living in a metropolitan area (INCMSA) is significant and negative for all four columns. This means if individuals live in a metropolitan area, they are less likely to volunteer.

In Table 2, the characteristics positively associated with the likelihood of volunteering are also associated with high time values. Individuals with these characteristics like income, more years of schooling, marriage, and more children are more likely to volunteer. Similarly, higher family income, more years of schooling, marriage, and more children are associated with high opportunity costs. These are similar results to those found in Table 1. Collectively, the regressions imply that individuals with high opportunity costs are more likely to volunteer their time than those with lower opportunity costs.

Table 3's dependent variable is the natural log of yearly hours volunteered. Coefficients with positive signs are associated with higher amounts of hours volunteered. Coefficients with negative signs are associated with lower amounts of hours volunteered. Table 3, similar to Table 2, is divided into two separate categories, male and female, and then further divided into 2014 and 1989 CPS data sets. I obtained the 1989 results from Freeman's Table 3.⁷

Freeman had 15,016 total responses to the question about hours volunteered while the 2014 September CPS file only had 1,570 responses. Freeman has 6,495 male and 8,521 female responses. (*He has two samples: CPS and Gallup.*) About 24% of individuals who indicated they volunteered in the past year answered this question on the 1989 CPS. I only have 651 male and 933 female responses, so roughly 2% of the individuals who indicated they volunteered in the past year on the 2014 CPS also answered how many hours they volunteered. The slim amount of observations takes away from the statistical significance of my second regression of yearly volunteer hours.

⁷ Freeman, S151

For the 2014 males (column 1), the variables are not statistically significant for income, employed, grade completed, age, age²*100, married, number of children and INCMISA.

For the 2014 females (column 3), employment, grade completed, age, age²*100, white, married and INCSMA are not statistically significant variables.

Table 3.
Regression in the Relation of Volunteering to Demographic Factors and Family Income in May 1989 CPS and September 2014 CPS

Independent Variables	Dependent Variable: Ln (Yearly Hours Volunteered)			
	Males		Females	
	2014	1989	2014	1989
	(1)	(2)	(3)	(4)
Ln (family income)	.132 (.124)	-.066* (.031)	.222* (.103)	-.012 (.026)
Employed (=1)	.011 (.159)	-.154 (.083)	-.084 (.111)	-.277* (.042)
Grade Completed	.034 (.025)	.029* (.008)	.006 (.021)	0.05* (.008)
Age	-.014 (.022)	-.005 (0.01)	.021 (.017)	.048* (.012)
Age ² *100	2.14E-06 (2.24E-06)	.023 (.017)	-1.79E-06 (1.75E-06)	-.032* (.014)
White (=1)	.322 (.178)	-.262* (.076)	.281 (.137)	-.156* (.065)
Married (=1)	-.014 (.155)	-.212* (.077)	.219 (.111)	.045 (.053)
No. Household Earners026 (.022)	...	-.008 (.021)
No. of Children	-.004 (.066)	.073* (.018)	-.121* (.052)	.074* (.016)
INCMISA (=1)	-.202 (.133)	0.113* (.047)	6.72E-06 (.113)	.151* (.041)
N	646	6,495	924	8,521
R ²	.026	.020	.035	.040

Note: Standard errors shown in parentheses. * = 5% significance. Although Freeman did not include which sections of his data were statistically significant in his tables, I used his coefficients and standard errors to calculate *t*-values and levels of significance.

According to Freeman's data, those with a high opportunity cost volunteer fewer hours than those with low opportunity costs. His data also indicate that working reduces volunteer hours for both males and females. Freeman concludes that while people with higher earnings capacities are more likely to volunteer, they will volunteer fewer hours. My regressions have very few significant variables so I am unable to draw a similar conclusion.

6. Board Volunteer Regressions

Board members make important decisions that usually have large impacts on their organization. They have an extremely high values of time because board members usually have extensive experience and expertise within their given fields. These characteristics are also associated with high values of time. I created a dummy variable named BoardAid. I created this variable by using the following question in the 2014 CPS. PES810 indicates whether or not individuals volunteered for a board in the past year:

PES810- Did you provide professional or management assistance including serving on a board or committee. (Yes/No response).

If the respondents answered, “yes” to PES810, then BoardAid = 1. If the respondents answered “no” to the question, BoardAid = 0. Respondents had to be a volunteer in order to be a board volunteer so all board volunteers were categorized as Volunteer = 1 in Table 2. 23,430 of the 88,925 respondents who volunteered in the past year answered the board volunteer question. Of the 23,430 that answered the board volunteer question, 3,841 actually provided professional assistance on a board. 1,801 of the 9,767 males that answered the question served on a board, while 2,040 of the 13,663 females that answered the question served on a board. Both the 9,650 males and 13,482 in Table 4 females had an observation for all 11 variables in Table 4 which explains why there are fewer males and females compared to those that answered the board question.

The dependent variable in Table 4 is BoardAid. I will use the regression results to determine the effect of my independent variables on board volunteering versus regular volunteering. Freeman does not include any information specific to board volunteering.

His analysis only focuses on regular volunteering, while my analysis furthers the research on board volunteers. Like Table 2, Table 4 is a linear probability model so if a coefficient is positive, volunteers are more likely to be a board volunteer than a regular volunteer. If a coefficient is negative, volunteers are more likely to be board volunteers than regular volunteers. I display the estimates separately for males and females in Table 4. I also include coefficients and standard errors in the table. I discuss the results for males first and then those for females.

Table 4.
Linear Probability Regression in the Relation of Board Volunteering to Demographic Factors and Family Income in September 2014 CPS

Independent Variables	Dependent Variable: BoardAid (=1)	
	Male (1)	Female (2)
Ln (family income)	.014 (.009)	.027* (.006)
Employed (=1)	.036* (.011)	.020* (.007)
Grade Completed	.022* (.002)	.021* (.001)
Age	.001 (.001)	.000 (.001)
Age ² *100	1.17E-07 (1.47E-07)	1.16E-07 (1.12 E-07)
White (=1)	.040* (.012)	.010 (.009)
Married (=1)	.033* (.010)	.014* (.007)
No. of Children	-.012* (.004)	-.004 (.003)
INCM5A (=1)	-.045* (.009)	-.033* (.007)
N	9,650	13,482
R2	.061	.041

Note: Standard errors shown in parentheses. * = 5% significance.

Male volunteers have positive and statistically significant coefficients for Employed, Grade Completed, White, and Married. Thus they are more likely to volunteer as a board member than as a regular volunteer if they have a higher income, are employed, have completed a higher grade level, are white, or are married. For males, the only change compared to Table 2 is the statistical significance of Number of Children. According to Table 4, the larger the family size, the less likely males are to volunteer as a board member versus a regular volunteer. It is interesting that the Number of Children has a negative impact on board volunteering compared to other volunteering. The variable INCSMA is negative and statistically significant, as it is for males in Table 2. Age appears to have no effect on a male's choice of board versus regular volunteering.

For females, the variables Ln (family income), Employed, Grade Completed, and Married all have positive and statistically significant coefficients. If females have a higher income, are employed, have completed a higher grade level, or are married, then they are more likely to volunteer on a board versus regular volunteering. Number of Children has a negative coefficient, but it is not statistically significant. Likewise, Age is not statistically significant. The variable INCSMA is negative and statistically significant, as it is for females in Table 2.

I summarize the comparison between males and females as follows. For both, being employed, completing a higher grade, being married is associated with a higher likelihood that a volunteer is a board volunteer rather than a regular volunteer. For both, living in a metropolitan area is associated with a relatively lower likelihood. For male volunteers, being white makes it more likely that volunteers are board volunteers, while

having more children makes it less likely. Neither of these variables seems to affect whether or not female volunteers are board volunteers. Higher income raises the chance that a female volunteer is a board volunteer, but income seems to have no effect for males. Neither gender shows an age-related effect. This may be because both male and female board members tend to be older.

While there are some differences between males and females, the variables that affect the likelihood that individuals who volunteer serve as board volunteers versus just regular volunteering tend to be characteristics associated with a high value of time. These include being employed, a higher level of education, and being married. The extent that board volunteering is more time consuming than regular volunteering, these results are contrary to the simple substitution effect based on opportunity cost. It appears that volunteers' higher value of time characteristics are more likely to be board volunteer. This once again confirms that something else is needed to explain how and why people volunteer.

7. Conclusion

Volunteering is the act offering oneself for a service or undertaking. Millions of Americans and millions more across the world volunteer annually. Stutzer and Meier concluded that helping others increases an individual's well-being. In particular, their empirical analysis found that people who volunteer more were more likely to report greater life satisfaction than non-volunteers. Rotolo and Wilson researched the correlations between individuals who volunteer and their employment sector. They concluded that job rank and employment sector does impact volunteering. Freeman

focused on what induces an individual to volunteer, and on the income and substitution effects that affect the supply of volunteer labor. He made the most substantial progress within in his research.

I first applied Freeman's theoretical model and empirical models to the 2014 CPS. I also provided a Cobb-Douglas to illustrate the theory. After Cobb-Douglas, I replicated his 1989 regressions, using 2014 data and largely replicated his findings, but found a few exceptions. I then extended his empirical model on the likelihood of board volunteering. I found that if individuals display characteristics associated with high values of time except family size, individuals are more likely to board volunteer.

This thesis has shown the importance and effects of volunteering within the United States while displaying that individuals with higher opportunity cost of time volunteer more than others. This statement also holds for board volunteers who are an extreme case of high value of time. I suggest that something more is needed to understand why individuals volunteer and board volunteer. My original idea of interviewing individuals to find a more qualitative reasoning behind volunteering might have yielded more explanation about this concept, especially for board volunteers. I originally wanted to combine a qualitative analysis of board volunteers by conducting interviews in addition to my quantitative analysis, but I was unable to complete the interviews.

My research also some limitations. The regressions don't fully explain the story behind volunteering in the United States. The R^2 is fairly small for all regression tables, which means there may be other independent variables affecting the data. It is possible that national or community policies have changed how society views volunteering and

how that emphasis has changed. For example, the changing dynamic of service in high school, and the focus of University applications to include a section for service in high school could be a sign of the changing dynamic of volunteering. There also can be other explanations of why the age changed or how regular volunteering and board volunteer has changed over the past 25 years. Something else must be explaining volunteering. A qualitative analysis could potentially provide insights into what to search for while looking for other independent variables affecting the data.

Although Tables 2 and 4 yielded significant coefficients for most of the variables for volunteers and board volunteers, it is difficult to provide definitive conclusions for yearly volunteer hours. According to the results, if individuals have a high value of time including earnings, employment, grade completed, age, married and number of children, they are more likely to volunteer. This contradicts the simple substitution effect explain above. The only difference between regular volunteers and board volunteers is the negative effect of the number of children. According to Table 4, the more children individuals have, the less likely they are to board volunteer. More research is needed to draw conclusions about how individuals' tastes for charities are developed. My research could be used as information for what types of individuals' charities should focus upon when trying to recruit volunteers.

Works Cited

- Freeman, Richard B.. “Working for Nothing: The Supply of Volunteer Labor”. *Journal of Labor Economics* 15.1 (1997): S140–S166. Web.
- Meier, Stephan, and Alois Stutzer. “Is Volunteering Rewarding in Itself?”. *Economica* 75.297 (2008): 39–59. Web.
- Rotolo, Thomas, and John Wilson. “Employment Sector and Volunteering: The Contribution of Nonprofit and Public Sector Workers to the Volunteer Labor Force”. *The Sociological Quarterly* 47.1 (2006): 21–40. Web.