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ECONOMETRIC ANALYSIS ON CHARITY DONATIONS IN THE USA

Abstract. This research project conducts econometric analysis on determinants of charity donations in the US taking into account the following years 2002, 2004, 2012 and 2014. Total giving comprised around 2% of the US GDP in 2009, 2010 and 2011. Although charitable giving declined dramatically as a result of the 2008 Great Recession from \$326.6 billion to \$298 billion in 2011, Americans are still giving at high levels and nearly the same proportion of total dollars as before the crisis. This paper mainly focuses on determining the effect of age, income and education of individual on the frequency of volunteering and giving. We found that income and education levels are positively related to the likelihood of making donations. Also, elder people prefer more than younger generation to make donations. The total number of observations is equal to 3283. As the sample is obtained randomly from the same population during the given period of time, it is a pooled cross section dataset, logit and probit regression analysis were employed to the econometric model.

Key Words: charity donations, econometric analysis, USA.

Introduction

One of the modern representations of altruistic behavior in humans is charity donation. Charity donations play a prominent role in bridging different parts of community and enhancing civic engagement. Moreover, recent studies revealed that it significantly contributed to the country's overall economic output. For time and money donated add to labor and capital inputs of the economy. Huge benefits that charitable giving generate motivated psychologists, sociologists and economists to study them extensively. Most scholars focused their research on defining who donates and why they donate. Conclusions they came up with disagree in many ways. In addition, as time passes, scholars see considerable changes in people's behavior and incentives. Therefore, although literature on these subjects is rich and substantial, studying them is still relevant. This particular research paper will aim to identify sociodemographic profiles of donators and the reasons that motivate them to donate. Specifically, the paper will examine social and demographic factors that can affect people's decision to engage in charitable giving using econometric models. Furthermore, the paper will discuss some of the motivations that induce people to donate

Firstly, this paper will give a brief on history and scope of charitable giving. Secondly, it will go through relevant literature written previously. Finally, it will discuss the methodology of the study and results of logit and probit regression analysis.

Americans have been and still are a prominently charitable people. As Peter Hall points out, the bequests of John Harvard to the colony towards initiating a College in 1638 and of Robert Keayne to the town of Boston towards developing the city infrastructure in 1656 indicate that charitable giving existed even in colonial America and that government was its primary recipient more than any other private entity (Hall, 2006). Although philanthropic giving began to appear in urban areas as Boston and Philadelphia in the late 1600s and early 1700s, rural areas also experienced changes due to economic growth, and subsequently, the Great Awakening fueled political engagement and communal activity (ibid). Unlike

other countries, the United States was able to adopt a new approach to meet social needs. It relied less on direct government spending and taxation and more on voluntary provision (Clotfelter in Fack and Landais, 2012). In 2007, the government spent 16.2% of its GDP on social needs, while in France and Germany this ratio equaled to 28.4% and 25.2% respectively (ibid). The scope of giving market is huge. Total giving comprised around 2% of the US GDP in 2009, 2010 and 2011 (Reich, Wimer, 2012). Although charitable giving declined dramatically as a result of the 2008 Great Recession from \$326.6 billion to \$298 billion in 2011, Americans are still giving at high levels and nearly the same proportion of total dollars as before the crisis (ibid).

One of the first pioneers researching charity donations, Orley Amos (1982), researched direct and indirect motives of people to engage in charity donations. His theory behind states that people are more inclined to have 'Kantian' motives, meaning that people donate with truly philanthropic motives. However, his study does not exclude the presence of personal benefits while donating such as condition-of-employment, income and social pressure motives. More recent research findings by professor of developmental economics Steven Yen, who wrote several research articles on charity donations, show that income, age, and education are contributing factors of donation, regardless of whether it is to charity, religious organizations, or other organizations (Yen, 2002). Education is positively correlated with the amount people give to charity, the same can be observed with income level (ibid.). It estimates a censored system of donation equations, using data from the 1995 Consumer Expenditure Survey. Not only this research is beneficial in terms of focus on particular case of the US, but also it supports our hypothesis number three showing positive correlation between education and charity donations; as well as income and charity donations.

Other large-scaled research studies such as telephone survey, where overall 730 interviews, were performed in Taiwan in 2005 also tend to demonstrate that people donating to charity are more or less motivated by extrinsic factors such as demographics and labor force participation variables (Lee and Chun-Tuan, 2007). Logistic regression analysis was the main methodology of this research, which also shows its relevance to the analysis of our project. Speaking about extrinsic variables, the recent study conducted by Yen et al., provides very comprehensive analysis of charity donations with emphasis on the roles of political ideology, religiosity, political and social involvement, and diversity in personal relationships while controlling for other factors commonly identified. They propose that political conservatives are more inclined to donate than political liberals. However, in terms of volunteering political liberals have more active role than political conservatives. Religious faith also significantly influences on people's decision to donate and volunteer (Yen and Zampelli, 2014).

Several research articles focus on the relationship between charity donations and gender differences. According to Willer et al., the gender gap in charity donations can be explained by empathy. Specifically, the authors suggest that men are less willing to contribute to poverty relief than women are; partly because of different levels of empathy. One of the limitations of this study is that it relies on self-reported behavioral intentions of the respondents. Intentions may be different from the actual behavior (Willer et al., 2015). Another interesting study examined how marriage affects volunteering and charitable giving, using longitudinal data from the 2001 to 2009 waves of the Panel Study of Income Dynamics (Einolf and Philbrick, 2014). The results of this study show that newly married women tend to volunteer less after marriage, while men tend to donate more after marriage. However, researchers have found that religion also plays a significant role, meaning that there is a positive effect of marriage on religious women to donating. There are also differences between women and men in donating and participating charity activities: women being more inclined to donate, and donate to various charity activities, while men donate less (but they have higher income) and donate to particular organizations. All of the abovementioned studies conclude that individuals act on self-interest rather than altruistic impulse and were more motivated when they expected rewards. Yet, the nature of rewards differ across studies. Moreover, people's motivations to volunteer are susceptive to changes in response to social, economic and political changes in society. Therefore, studies on motivation need to be constantly updated.

Hypotheses

After conducting a literature review and observing different models, we came up with two hypotheses.

Hypothesis number one focuses on age and its relationship with volunteering and donations. We plan to analyze the relationship of four age groups with respect to charity donations. We suggest that older generation prefers to donate to charity. Therefore, it is expected to observe a positive relationship between age groups and charity donations.

In the second hypothesis, income and education are considered to be main variables of interest. We state that there is a positive relationship between income level and the frequency of charity donations, and education level and the frequency of charity donations.

Methodology

There are several data sets, which would be analyzed throughout the research project. The first dataset is obtained from the surveys conducted in 2002-2004 and 2012-2014 by the General Social Survey. GSS is a national resource, studying social changes of American society since 1972. The total number of observations is equal to 3283. As the sample is obtained randomly from the same population during the given period of time, it is a pooled cross section dataset. The second dataset was retrieved from the Roper center databases. It is one of the largest archives focusing on the social science data, founded in 1947. The overall sample size is 1002 respondents. The study was conducted in 2012 through bulletin polls and includes 92 variables such as important reasons to volunteer and volunteering hours. The third dataset was accessed from the Roper centre databases too. It is a telephone survey, which includes both sampling using landline telephones and cellular phones. The data was collected in September 2008 with 994 total amount of observations. The last two samples are very useful while analyzing the motivations leading people to donate or volunteer.

We run several econometric models with dependent variables: frequency of charity donations within one year. In order to explain these dependent variables, probit and logit methods will be applied. We set dependent variables as dummy variables (taking the value of 0 or 1) and use probit and logit models to predict individual's likelihood of making charitable donation and volunteering. Two donation behaviours are dichotomous variables: whether or not donated within the last 12 months. In order to correctly interpret the magnitude of coefficients, we applied marginal effect at the means of variables. We also used command mfx to determine whether we obtain the same results. In the regression models, there are 21 variables in total.

There are overall 2924 observations. The data included responses such as "don't know", "no answer", "not applicable", "refused". Such responses had to be dropped in order to prevent biased outcomes.

The variable *donat* is the dependent variable which determines whether an individual had given money to charity during the past 12 months. It is a dummy variable, 1 indicating donation made, 0 otherwise. The variable was created based on *charity* variable, which demonstrates the frequency of donation to charity in the past year. It was determined by answering the question "During the past 12 months, how often have you given money to charity?" Provided answer options and categorizing it for a dummy variable are similar to volunteering variable.

The variable *labor* is an independent variable which determines whether a respondent is working full-time or not. It is a dummy variable, indicating working full-time condition as 1, while all other labor force status, such as temporarily not working, unemployed, retired, working part-time as 0.

The variable *marit* is an independent variable which states the marital status of a respondent. It is a dummy variable, indicating married respondents as 1, while widowed, divorced, separated and never married status as 0.

The variable *race* is an independent variable which determines the race of respondent. It is a dummy variable, 1 for belonging to black race, and 0 otherwise.

The variable *happ* is an independent variable, which defines the level of happiness of a respondent. Respondents had to determine their general condition on the scale from 1 till 3, "not too happy" to "very happy" accordingly. The variable *health* is an independent variable which describes the overall health state of a respondent. Respondent had to answer how healthy they feel themselves in general. The variable of health placed on the scale from 1 to 4 for answers "poor" to "excellent", accordingly.

The variable *gender* is an independent variable, which indicates gender of a respondent. This is a dummy variable, indicating female as 1, male as 0.

The variables *flowinc, favginc and fhighinc* are independent variables and they define whether the family income is in the category of low family income, average family income or high family income. These are dummy variables, 1 indicating positive answer, 0 otherwise. These variables are created on the basis of *finc* variable, which determines overall family income before taxes and deductions. Respondents were given 12 answer options with range of income and had to choose in which group earnings for the last year they fall. Having divided family income variable into three groups, answers from 0 to 10.000\$ were counted as low income; answers above 10.000\$ till 25.000\$ were counted as average income; answer above 25.000\$ fell under high income variable.

The variables *rlowinc*, *ravging*, *rhighinc* are independent variables and they define whether a respondent is in the category of people with low income, average income, or high income. These are dummy variables, 1 indicating a positive answer, 0 otherwise. The scale for dividing respondent income is similar to family income.

The variable *heduc* is an independent variable and determines the highest year of school completed. The variable spreads and takes value from 0 to 20 years of education.

The variable *childr* is an independent variable, indicating if a respondent has children or not. It is a new variable generated on the basis of original *child* variable, which stated a number of children. It is a dummy variable, 1 for positive answer, 0 itherwise.

The variable *age* is an independent variable which defines the age of an individual. Respondents' age varies and limits between 18 and 86.

The variables *young*, *youngadt*, *midage and elder* are generated based on the age variable and determine the age group a respondent belongs to. These are dummy variables, 1 indicating positive answer, 0 otherwise. The age variable was divided into four groups: group of young people which covers respondents from 18 to 24; people between 25 and 39 are included into young adult category; 40 to 63 years old respondents fall into middle age category; elder group includes retired people between 64 and 86 years.

The variable *relgn* is an independent variable and determines whether the respondent belongs to any religion or not. It originates from *relig* variable which determines respondent's affiliation to a particular religion by listing them. The *relgn* variable is a dummy variable, 1 indicating acceptance of religion thus assuming them more religious, 0 otherwise.

Variables *year2002*, *year2004*, *year2012*, *year2014* are independent variables which indicate the time period, year. These are dummy variables which take options of 0 or 1. These variables are new and based on the original *year* variable, which specifies the date of an interview.

Results and discussion Hypothesis 1

The first hypothesis examines how age is related to donations. To prove this hypothesis we need to run regression on a model. To have a better understanding of the donation activities that people engage in certain periods of their lifetime, we decided to use four different age categories. Having limited dependent variable encourages us to run logit and probit regression analysis for the model. Additionally, in order to see magnitude of "likelihood" or magnitude of probability we have conducted marginal effects analysis (.mfx). Taking group *young* as a base group, we obtain quite significant results for all other three age groups. The regression analysis for hypothesis one includes determining relationship between donations and age. According to Table 1, we can see that while taking *midage* group as a base, we get significant numbers for *young*, *youngadult* and *elder* groups. The results for *young** are statistically significant with p-value being less than 10%, and coefficient equals to -0.061. Coefficient for *youngadult** (p-value~0) equals to -0.096 and for *elder** equals to 0.108 (p-value~0). The same as volunteering, interpretation for donations explains likelihood of an individual to donate or not. Young and *youngadults* are less likely to donate by 6.1% and 9.6% respectively, while probability of making donations for elder people equals to 10.8%.

Table 1 - Regressing donations on age groups by controlling for other factors (midage as a base group)

quietly logit donat labor marit race happ health gender ravgine rhighine favgine fhighine hedue childr year2012 year2014 relgn year2004 young youngadt elder

margins, dydx(*) atmeans

Conditional marginal effects 2,919 Number of obs

Model VCE : OIM

Expression : Pr(donat), predict() dy/dx w.r.t. : labor marit race happ health gender ravginc rhighinc favginc fhighinc heduc childr year2012 year2014 relgn year2004 young youngadt elder

at : labor marit race happ health gender ravginc rhighinc favginc	= .7194245 (mean) = .4922919 (mean) = .1291538 (mean) = 2.211716 (mean) = 3.101747 (mean) = .3991093 (mean) = .2487153 (mean) = .5947242 (mean) = .1634121 (mean) = .7872559 (mean)	heduc = 14.08153 (mean) childr = .6875642 (mean) year2012 = .315519 (mean) year2014 = .2905104 (mean) relgn = .9181226 (mean) year2004 = .1682083 (mean) young = .0746831 (mean) youngadt = .3535457 (mean) elder = .0698869 (mean)
favgine fhighine	= .1634121 (mean) = .7872559 (mean)	elder = .0698869 (mean)

dy/dx Std. Err. z P> $ z $ [95% Conf. Inter

labor	.0137461	.0187737	0.73	0.464	0230496	.0505419
marit	.0786233	.0178	4.42 0	.000	.043736 .1	135106
race	0323394	.0214464	-1.51	0.132	0743735	.0096948
happ	0068681	.0126848	-0.54	0.588	0317298	.0179937
health	.0268556	.0106734	2.52	0.012	.005936	.0477752
gender	.0545453	.0161381	3.38	0.001	.0229153	.0861753
ravgine	0337958	.0259559	-1.30	0.193	0846684	.0170767
rhighine	.0624082	.0289263	2.16	0.031	.0057136	.1191028
favginc	.1192416	.0373886	3.19	0.001	.0459613	.192522
fhighine	.1395765	.0369506	3.78	0.000	.0671545	.2119984
heduc	.0204705	.0028597	7.16	0.000	.0148656	.0260754
childr	004852	.0182215	-0.27	0.790	0405656	.0308616
year2012	0585001	.0213485	-2.74	0.006	1003424	0166579
year2014	11119	.0215413	-5.16	0.000	1534102	0689699
relgn	.0146618	.0265937	0.55	0.581	037461	.0667846
year2004	0145373	.025704	-0.57	0.572	0649161	.0358416
young	0557168	.0301751	-1.85	0.065	114859	.0034253
youngadt	0913188	.0166563	-5.48	0.000	1239645	058673
elder	.137013	.0388578	3.53	0.000	.0608531	.2131728

. mfx

Marginal effects after logit

y = Pr(donat) (predict) = .80146898

variable	dy/dx	Std. Err.	\mathbf{Z}	P> z	[95%	% C.I.]	X
+							
labor*	.0139035	.0192	0.72	0.469 -	023735	.051542	.719424
marit*	.0784789	.01774	4.42	0.000	.043705	.113252	.492292
race*	033812	.0234	-1.45	0.148 -	079672	.012048	.129154
happ	0068681	.01268	-0.54	0.588	03173	.017994	2.21172
health	.0268556	.01067	2.52	0.012	.005936	.047775	3.10175
gender*	.0534264	.01548	3.45	0.001	.023077	.083775	.399109
ravginc*	034886	.02763	-1.26	0.207	089039	.019268	.248715
rhighinc*	.0638171	.03023	2.11	0.035	.004563	.123072	.594724
favginc*	.1018702	.02692	3.78	0.000	.049106	.154635	.163412
fhighine*	.1602262	.04734	3.38	0.001	.067447	.253006	.787256
heduc	.0204705	.00286	7.16	0.000	.014866	.026075	14.0815

```
childr* | -.0048353
                     .0181 -0.27 0.789 -.040303 .030632
year2012*| -.0608986
                     02309 -2.64
                                0.008 -.10616 -.015637
                                                      315519
vear2014*| -.1209195
                     .02523 -4.79
                                0.000 -.170364 -.071475
          .015003
                    relgn*
year2004*|
         -.0148034
                     .02665 -0.56 0.579 -.067028 .037421
                                                       .168208
 young*
         -.0607175
                     .03556 -1.71
                                 0.088 -.130415 .00898
                                                      074683
youngadt*| -.0959484
                     .01832
                           -5.24 0.000 -.131856 -.060041
 elder*
                           4.65 0.000 .062553 .153861 .069887
         .1082069
                     02329
```

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Source: Authors calculations according to data of GSS

From these results, we can observe a hypothesized pattern that older people are more likely to make donations than younger ones. Therefore, we can conclude that the first hypothesis is supported by statistically significant results.

Hypothesis 2

The second hypothesis focuses on the relationships of charity donations with education and income levels. We predict that there must be a positive relationship between these variables. To analyze the relationships we can use logit regression for donations, which we have already run in hypothesis 1. By looking at Table 1, we can clearly observe statistically significant results for both average and high family income, while taking low family income as a base group. People with average family income (favgine*) are more likely to donate by 10.1%, while people from very affluent families (fhighine*) are more likely to donate by 16.01%. Therefore, it seems that the probability of engaging in charitable donations increases as individual's family income gets higher. This is similar to what Hypothesis 2 suggests.

Speaking about the relationship between education level and donations, from the same Table 1, we can see that education is positively related with donations with p-value being almost equal to zero. The coefficient 0.0204 can be interpreted as one more year of schooling increases probability of donations by 2.4%. Overall, the third hypothesis was proved by the statistically significant results demonstrating positive relationship between family income and probability of making donations, as well as the relationship between education level and donations.

Discussion of Motivations for Donating

Motivation to donate is a complex subject to study. This complexity comes from difficulties in generating comprehensive reliable data and transforming collected data into measurable variables for further analysis. Despite these difficulties, research on motivation has identified a number of motivations that include but not limited to altruistic inducement, personal interest, responding to a direct request, religious concerns, and/or experience relevant to education or work. This paper examined datasets accessed from the Roper Center for Public Opinion Research, University of Connecticut, each studying charitable giving.

This paper plotted a contingency table for motivations to donate to charity (see *Table 3*). The dataset on charitable giving is also based on telephone interviews with 994 adults. The survey was conducted by Gallup Organization/USA Today on September, 2008. Questions asked respondents to assess influence of each motivation on their decision to give as either *major* influence or *no* influence. It is important to note that this survey questions give some inside of respondents' reactive behavior to an external force, while respondents' proactive behavior, in terms of intrinsic motivations, are omitted. As a result, the survey results do a poor job in differentiating between people's willingness to donate from their inability to refuse the external force. Moreover, as the numbers presented in *Table 2* indicate, motivations suggested to respondents seem to have little influence on their decisions. Nevertheless, the table shows that an invitation to donate from a friend or family member has quite significant influence. Sixty seven percent of respondents are inclined to donate when asked by a friend or family member. Within this group, young adults (aged between 18 and 34) tend to be more receptive to invitation to give. In contrast, only 55% of people aged 55 and above feel friends or family members have an influence on their decision to donate.

The two datasets and the results they present include subjectivity of respondents' assessment of motivations, and thus do a poor job <u>in</u> determining people's true incentive. Nonetheless, they emphasize importance and relevance of studying motivation to donate in more depth and adopting new approaches to deal with highly biased self-reported data.

Table 2 - Cross-Tabulation of motives to donate with respect to age, income and education level Question asked: For each of the following, please say if it has ever been a major influence on your decision to give to a charity, or not. Source: Authors calculations according to data of GSS

	Influence	Total	Age		Education				
			18-34	35-54	55+	H.S	S.C.	Coll	Coll Post
A friend or family member asked	Major	67	79	72	55	63	69	75	70
you to give	No	32	21	27	43	36	31	25	30
A celebrity or other well-known	Major	9	10	11	6	6	5	10	8
person endorsed a charity	No	91	88	89	93	93	95	90	92
A religious leader endorsed a	Major	23	21	23	25	26	23	21	24
charity	No	75	76	77	72	72	77	78	75
Someone you did not know	Major	24	26	23	23	28	22	23	24
contacted you on behalf of a charity and persuaded you to give	No	76	74	77	75	72	77	77	76
A commercial for a charity made you want to give	Major	26	29	30	20	20	29	26	24
	No	74	71	70	78	78	71	74	76
Your personal financial situation	Major	87	90	89	82	85	88	93	91
	No	12	10	11	14	13	12	7	9

CONCLUSION

This project has analyzed determinants of donations in the US for 2002, 2004, 2012 and 2014 years. The main objective of this paper was to test two hypotheses related to age, income and education levels. Hypothesis 1 looked at the variable *age* in relation to both volunteering and charitable giving. It suggested that older generation are more likely to give to charities. Hypothesis 1 appeared to be consistent with the results of two regression models. The second hypothesis stated that education level and charity donation as well as income level and charity donation are positively related. Hypothesis 2 was also proven right by statistically significant results of the logit regression. In addition, having compared margins and mfx during the research, we conclude that the results are very similar. The qualitative part of this paper discussed some of the motivations that could potentially induce people to donate through cross-tabulation analysis. This part of the study has emphasized further need to research the question of motivations. For, survey-based datasets are highly subjective and thus contain significant bias.

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АҚШ-ТАҒЫ ҚАЙЫРЫМДЫЛЫҚҚА БЕРІЛГЕН КАРАЖАТТЫ ЭКОНОМЕТРИЯЛЫҚ ТАЛДАУ

Аннотация. Бұл зерттеу жұмысында АҚШ-та 2002, 2004, 2012 және 2014 жылдардағы қайырымдылық детерминаторларына арналған эконометрикалық талдау жүргізілді. 2009, 2010 және 2011 жылдары АҚШ-та қайырымдылыққа берілген қаражаты ЖІӨ-нің 2% -н құрады. 2008 жылғы үлкен құлдыраудың кезінде қайырымдылық беру айтарлықтай төмендеді. Нәтижесінде 326,6 миллиард доллардан 2011 жылы 298 миллиард долларға дейін азайды. Бұл мақала негізінен қайырымдылық беру жиілігіне жасы, кірісі мен білім денгейінің әсері анықтауға бағытталған. Біз табыстың және білім беру деңгейінің қайырымдылық жасаудың ықтималдылығымен байланысты екендігін анықтадық. Сондай-ақ, ақсақалдар қайырымдылық жасау үшін жас ұрпақтан көп артық көреді. Бақылаудың жалпы саны 3283-ге теңол біріктірілген көлденең қима деректер жиынтығы болып табылады. Logit және ргоbіt регрессиялық талдау эконометриялық модельге қолданылды.

Түйін сөздер: қайырымдылық, эконометрикалық талдау, АҚШ.

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ЭКОНОМЕТРИЧЕСКИЙ АНАЛИЗ БЛАГОТВОРИТЕЛЬНЫХ ПОЖЕРТВОВАНИЙ В США

Аннотация. В данном исследовании проводится эконометрический анализ детерминант благотворительных пожертвований в США в 2002, 2004, 2012 и 2014 годах. В 2009, 2010 и 2011 годах общая сумма отданных средств для благотворительных целей составляла около 2% ВВП США, хотя благотворительная помощь в годы великой рецессии 2008 года резко сократилась с 326,6 млрд. долл. США до 298 млрд. долл. США. В 2011 году американцы по-прежнему находятся в числе первых стран, приносящих пожертвования на благотворительные цели. В этой статье основное внимание уделяется определению влияния возраста, дохода и образования человека на частоту волонтерства и предоставления финансовой помощи. Мы обнаружили, что уровень доходов и образования положительно связан с вероятностью внесения пожертвований. Кроме того, пожилые люди предпочитают больше делать пожертвования, чем молодое поколение. Общее количество наблюдений равно 3283 - это совокупный набор данных поперечного сечения. Logit и probit -регрессионный анализ были использованы для построения эконометрической модели.

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