An assessment of Canadian Tax Policy for Charitable Giving: Addressing Methodological Challenges

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Abstract:

This research examines the effectiveness of the tax incentive while attempting to deal with two persistent methodological problems in past research. The two-stage Heckman selection model and the ordered probit model are employed to examine the Canadian tax incentive system for charitable giving. The results demonstrate that the current tax policy is effective at promoting donations. While the results imply that the current tax policy is successful, a few socio-economic characteristics appear to play a larger role in influencing an individual's donation expenditure. Among the socio-economic characteristic, wealth has the largest impact on an individual's donation, followed by household income level, and then university education. It is important for policy makers to recognize the comparatively important influence of the socio-economic characteristics on the donation decision and the potential constraints they have on the tax credit policy. Further, the effect of tax credit systematically increases with an increase in donation expenditure suggesting that the higher tax credit for donations over $200 is more effective than the lower tax credit for donations up to $200.

Introduction

The Canadian government, like most governments of developed countries, provides a tax incentive to promote charitable giving. While several studies have focused on assessing the effectiveness of the Canadian tax incentive system (Hood, Martin and Osberg (1977), Kitchen and Dalton (1990), Kitchen (1992)), challenging methodological issues associated with empirical research on this topic suggest further research is required. This research is timely given the Canadian government's recent review of the charitable giving tax incentive system. In this paper, three aspects of the Canadian tax incentive system for charitable giving are examined

using a novel method of assessing the tax incentive. First, the effectiveness of the current tax credit system for encouraging larger charitable donations is assessed. Second, the relative significance of the tax incentive compared to other socio-economic variables thought to affect donation expenditures is evaluated. Third, the relative effectiveness of each of the two tiers of the Canadian tax credit system is examined.

Tax incentives for charitable donations are intended to encourage support for the provision of needed goods and services by charitable and non-profit organizations or at least to eliminate the disincentive to give created by the impact of income tax on disposable income (Brooks, 2007). In essence, the tax incentive can be viewed as an indirect form of charitable support as governments forgo tax revenue in exchange for charitable donations. For the donor, the tax incentive reduces the price of the charitable donation. Since tax reform in 1988, the incentive has been provided through a tax credit system, different from the more common tax deduction system. Under a deduction system, the value of the tax benefit depends on the donor's level of income and the amount of the donation whereas under the credit system, the value of the benefit depends solely on the amount of the donation (Duff, 2001). The Canadian tax credit system is a two-tier system such that there are two levels of tax credits at both the federal and provincial levels, a lower tax credit for annual donation expenditures of up to $200 and a higher tax credit for the amount in excess of $200. The two-tier tax credit was developed to be more equitable than a tax deduction, although some research has found that its distributional impact differs little from a deduction (Duff, 2001).

Hood, Martin, and Osberg (1977) were the first to research the determinants of charitable donations in Canada. They used an ordinary least squares model and group taxation data from 1968 to 1973 and found that price (tax incentive), income and wealth all affected individual donations. Glenday, Gupta, and Pawlak (1985) employed a maximum likelihood technique to individual Canadian taxation data from 1978 to 1980. Their results suggest that price, income, and age are determinants of donations, but the effect of price decreases for income levels over $30,000.

Kitchen and Dalton (1990) and Kitchen (1992) researched the determinants of charitable donations of Canadian households under the tax deduction system with data from the Survey of Family Expenditures. Kitchen and Dalton (1990) used a Tobit regression estimation technique to measure the responsiveness of donations to changes in several independent variables. With 1982 survey data they found that price, income, wealth, and age all explain donation expenditures. Kitchen (1992) used the same methodology as Kitchen and Dalton (1990), to examine the determinants of donations over time using 1982 and 1986 data from the Survey of Family Expenditures. The results confirm the previous findings and show that price has a greater effect in 1986 compared to 1982.

Under the tax credit system, Apinunmakakul & Devlin (2008), with use of the 1997 Canadian National Survey of Giving, Volunteering, and Participating (NSGVP), do not find the tax incentive to be effective for encouraging larger donations. Apinunmakakul, Barham & Devlin (2008) find that employment status affects the effectiveness of tax incentives on donations. Their results suggest that employed men are more responsive to the tax credit than both unemployed men and women. Hossain and Lamb (2012a,b) examine the effectiveness of tax incentives on chartiable giving at the individual level with a Heckman selection model using data from the 2007 Canadian Survey of Giving, Volunteering, and Participating (CSGVP). They find that price has the largest impact on charitable donations. Other significant variables affecting donations include age, education, income, religious attendance, employment status, marital status, gender, and volunteer status.

The vast majority of past empirical research on tax incentives for charitable donations focuses on the price variable given that its estimated value reveals the effectiveness of the tax policy. The price of donation is a measure of the price per dollar of donation after the tax incentive has been taken into account, referred to as the last-dollar price. For each donor, the price is equal to one minus the amount of the tax benefit, determined by their donation expenditure and the federal and provincial tax credit rates. Table 1 summarizes the Canadian federal and provincial tax credit rates for 2010. For instance, a British Columbia resident who donates $300 in 2012

receives a federal tax credit of $59 and a provincial tax credit of $24.82, reflecting a price of donation equal to $216.18 ($300 - $59 - $24.82) or 72 cents per dollar of donation.

Table 1: Canadian Tax Credit Rates for Charitable Donations

Province	Tax credit rate for donations up to $200	Marginal tax credit rate for donations over $200
British Columbia	5.06%	14.7%
Alberta	10%	21%
Saskatchewan	11%	15%
Manitoba	10.8%	17.4%
Ontario	5.05%	11.16%
Quebec	20%	24%
New Brunswick	9.3%	17.95%
Nova Scotia	8.79%	21%
Prince Edward Island	9.8%	16.7%
Newfoundland	7.7%	14.4%
Federal	15%	29%

Source: Revenue Canada and Revenue Quebec[1]

This research examines the effectiveness of the tax incentive while attempting to deal with two persistent methodological problems in past research. The first methodological problem is that the price variable may result in endogeneity bias leading to inconsistent estimates. This is a problem of potential reverse causality because the size of the donation may be affected by the price variable, and the price variable will be affected by the size of the donation. Various methods have been used to address this problem (Clofelter, 1985), although use of the first-dollar price of the donation as an instrument for the last-dollar price is the most common (Brooks (2007), Chang (2005), Apinunmakakul & Devlin (2008), Apinunmakakul, Barham & Devlin (2008)). This method has been successfully used in research on tax deduction systems[2], but raises concerns when used for a tax credit system, such as Canada's. Under the Canadian tax credit system the first-dollar price translates to the lowest tax credit rate for each province

[1] http://www.cra-arc.gc.ca/formspubs/t1gnrl/llyrs-eng.html

[2] Under the deduction system, the tax benefit is determined by the donor's income tax bracket. The first-dollar price of donating is equal to one minus the marginal income tax rate on gross income, whereas the last-dollar price of donating is equal to one minus the income tax rate at the stated level of the donation.

which results in only ten different values for price solely determined by a donor's province of residence[3]. In other words, the first-dollar price varies only with the province of residence and not with the individual donor. Nevertheless, some research on the Canadian tax credit system has used this method while acknowledging its shortcomings (Apinunmakakul & Devlin, 2008, Apinunmakakul, Barham & Devlin, 2008). Hossain and Lamb (2012a, b & c) took a different approach by developing a proxy variable for the last-dollar price equal to one minus the marginal income tax rate to deal with the issues of endogeneity and limited variance.[4]

A second methodological issue in past Canadian research using data from the NSGVP and CSGVP is the underlying assumption that all donors claim the tax benefit, contrary to what the data suggests. Although these survey data sets are rich with information about donation behaviour at the individual level, the price variable is calculated for all donors without knowing if they actually claimed the tax credit. For instance, while it is not too unexpected to discover that only 11% of those donating between $1 and $61 intended to claim the tax credit, it is surprising to find out that only 39% of those donating more than $500 intended to claim the tax credit (2010 CSGVP). Whereas a donation of $60 by a BC resident results in a moderate tax credit of $12.04 in absolute terms, a donation of $500 yields a tax credit of $171.22, which is 34% of the donation. This methodological issue results in an over- estimation of the effectiveness of the tax incentive.

The current research uses a different approach to assess the role of the tax credit on Canadian donations in order to address the two methodological challenges described above. Using the 2010 CSGVP, the role of the tax credit is assessed with a variable representing a sample member's affirmative response to the question: "People make financial donations to charitable or non-profit organizations for a number of reasons. In the past 12 months, please tell me

[3] As explained by Apinunmakakul & Devlin (2008), the variables that do not vary across individuals may have standard errors with a downward bias if estimated with an ordinary least squares (OLS) regression (Mouton, 1990). While our models are not estimated with OLS, there is reason to believe that this bias may be present.
[4] See Hossain & Lamb (2012c) for a full explanation and rationale for their proxy variable for price of donation. http://onlinelibrary.wiley.com/doi/10.1111/j.1759-3441.2012.00177.x/full p. 273

whether the following reasons were important to you… The government will give you a credit on your income taxes." (Statistics Canada, 2010 CSGVP). The credibility of this variable is supported by the statistically significant correlation (74%, $p<0.05$) between those who stated the tax credit as a reason for donating and those indicating that they or someone in their household will claim the tax credit.

Other reasons for giving include: 1) you or someone you know has been personally affected by the cause the organization supports; 2) to fulfill religious obligations or other beliefs; 3) to help a cause in which you personally believed; 4) you felt compassion towards people in need; and 5) you wanted to make a contribution to the community (Statistics Canada, 2010 CSGVP). Note that survey respondents can answer affirmatively to none, several or all of the six stated reasons for giving.

Table 2 summarizes the data on reasons for giving of respondents who made a donation in 2010, by levels of donations. The proportion of sample members who report the tax credit as a reason for giving generally rises with the size of the donation. The proportion increased from 17% to almost 36% (a rise of 112%) for those who gave less than $61 compared to those who gave over $500, the second largest increase next to religion as a reason for giving which increased from 14% to close to 42% (a rise of 194%). Compassion is the most frequently cited reason by those who gave less than $61, while belief in the cause and making a contribution to the community are the most cited reasons by those donating between $60 and $201. The tax credit is the most cited reason for those giving between $200 and $501, corresponding to the threshold for the higher tax credit. And religious beliefs and other obligations is the most frequently cited reason for those donating more than $500.

Table 2 Percent distribution of reasons for giving by level of donation expenditure

Donation expenditure	Tax credit	Compassion	Religion	Belief in cause	Community	Affected
$1 - 60	16.96	25.78	14.39	24.42	24.32	22.10
$61 – 200	23.83	26.92	20.63	27.02	27.07	26.87
$201 – 500	23.32	21.66	22.72	22.27	22.08	21.34
>$500	35.89	25.64	42.26	26.29	26.53	24.35

Data source: 2010 CSGVP, n = 12,580

The "tax credit as a reason for giving" variable does not have the methodological concerns of the price of donation variable. The main limitation of this proxy is that it does not provide information necessary to compute price elasticities. Similar to the past research using the NSGVP and CSGVP, this research examines the donation decision at the individual level rather than the household level. Based on past research, the key socioeconomic variables thought to most influence charitable donations include income, wealth, price, and education (Hood et al (1977), Gupta & Pawlak (1985), Kitchen & Dalton (1990), Kitchen (1992), Apinunmakakul et al (2008), Hossain & Lamb (2012c)).

This research contributes to the literature on tax incentives for charitable giving by attempting to address some methodological concerns in past research. Specifically, the use of a proxy variable for the tax effect addresses the endogeneity issue associated with a tax credit incentive system and deals with the issue of identifying those who actually claim the credit when using survey data. In addition, an ordered probit model is used to see if and how the effects of price and socio-economic factors change over different levels of donation expenditures, which has not been done in previous studies of the Canadian tax incentive system.

This article is organized as follows. First, the methodology section includes a discussion of econometric issues and techniques, a description of the empirical models for testing, followed by an explanation of the data, and a description of the variables. Then, a discussion of the results, policy implications and conclusions will follow.

Methodology

Econometric Issues and Techniques

Two econometric issues affect the choice of appropriate techniques for estimating the models. The first is selectivity bias which arises in the models due to the fact that not all survey respondents are donors. If we exclude the non-donors, our estimations will be biased and inconsistent because donors are self-selected and thereby do not comprise a random sample. In addition, the donation expenditure behaviors of non-donors are not observed. Therefore, all respondents should be taken into account irrespective of their donation status. It is assumed that respondents sequentially make two decisions; the first is whether or not to make a charitable donation, and the second is how much to donate (García and Marcuello (2001), Chang (2005), Brooks (2007)). The Heckman sample selection model is appropriate for modeling the two-stage decision process (Heckman (1979), Blaylock and Blisarde (1992), Huang, Kan, and Fu (1999), Blend and Van Ravenswaay (1999)) and will mitigate the selectivity bias. The maximum likelihood approach is used with observations weighted for different sampling probabilities.

The second econometric issue is the ordinal and categorical nature of the dependent variable in Model 2, as described below, which requires the use of an ordered probit model (Maddala, 1983). In sum, the following section describes the Heckman sample selection model to be used for Model 1 and the ordered probit selection model to be used to estimate Model 2.

Empirical Models

Two models are developed to address the following four questions: Is the tax incentive effective at encouraging larger charitable donations in Canada? What are the other determinants of charitable donation expenditures in Canada? Which variables have the largest impact on charitable donation expenditures? Is the higher tax credit for donations over $200 more effective than the lower tax credit for donations up to $200? Model 1 is developed to address the first three questions and Model 2 is developed to address the fourth question.

Model 1: The two-stage Heckman selection model (1979) is appropriate for modeling the zero responses, as was done by Garcia & Marcuello (2001).

(1) $\boldsymbol{AD} \begin{cases} = \boldsymbol{\delta}'\boldsymbol{Z} + \boldsymbol{\varepsilon}, \;\; if \;\; DS = \boldsymbol{\gamma}'\boldsymbol{X} + \boldsymbol{u} > 0 \\ = 0 \quad otherwise \end{cases}$

Where DS is the donation status of the respondent (1 for donor and zero for non-donor);

AD is the amount of donation made by each respondent;

Z is the vector of explanatory variables influencing the amount of charitable giving;

X is a vector of variables determining the decision to give;

δ and γ are the vectors of parameters to be estimated;

ε and u are the vectors of random error term, which are assumed to be independently, independently and normally distributed.

Model 2: Determinants of an individual's donation expenditure category are summarized in this model. Donation expenditures are grouped into four categories; DC1 ($1 to $60), DC2 ($61 to $200), DC3 ($201 to $500) and DC4 (more than $500). The categories are determined so that there is an approximately equal number of observations in each category. An ordered probit model is used to see if the effects of explanatory variables including the tax credit vary across the four donation expenditure categories. Let C^* be a continuous unobserved latent response variable related to the category of expenditure indicating the level of donation expenditure. The latent regression model can be stated as,

$(\mathbf{1})$ $\boldsymbol{C}^* = \boldsymbol{\beta}'\boldsymbol{Z} + \boldsymbol{e}$

Where **Z** is the vector of explanatory variables that are hypothesized to influence the level of donation expenditure;

$\boldsymbol{\beta}$ is the vector of parameters associated with the **Z;** and

e is the vector of random error terms which are assumed to be identically, independently and normally distributed.

While the latent variable, $\mathbf{C}^*$ is not observed, the category (C) selected by the respondent is known, the probability that a respondent would choose the jth category of level of donation is given by,

(2) $$Prob(C = J \;/\; Z) = Prob\left(e < K_j - \beta' \;/\; Z\right) - Prob\left(e > \; K_{j-1} - \beta' \;/\; Z\right)$$

$$= \; \varphi\left(K_j - \beta' Z\right) - \; \varphi\left(K_{j-1} - \beta' Z\right) \qquad \text{j= 1, 2, 3, 4}$$

Where $K_1, K_2\ and\ K_3$ are unknown parameters to be estimated along withβ; φ indicates the standard normal cumulative distribution function and j denotes the number of the categories of the level of donation expenditure.

Model 2 can be specified to incorporate the zero responses of the non-donors as follows:

$$(\mathbf{3}) \quad \boldsymbol{C}^* = \boldsymbol{\beta}'\boldsymbol{Z} + \boldsymbol{\varepsilon}, \quad \boldsymbol{DS} = \boldsymbol{\gamma}'\boldsymbol{X} + \boldsymbol{u},$$

$$\boldsymbol{C} \begin{cases} = \boldsymbol{C}^* \; if \; \boldsymbol{DS} > 0, \\ 0 \; if \; \boldsymbol{DS} = 0 \end{cases}$$

The following three hypotheses are tested:

Hypothesis 1: Those who state the tax credit as a reason for giving are more likely to make larger donations than those who do not, suggesting the tax credit policy is effective.

Hypothesis 2: The socio-economic variables of household income, wealth, and education have a relatively larger impact on total donation expenditures than the tax credit.

Hypothesis 3: The higher tax credit for donations over $200 is more effective than the lower tax credit for donations up to $200.

Data

The data is from the public use micro data files of the 2010 Canada Survey of Giving, Volunteering and Participating (CSGVP), published by Statistics Canada. The objective of the survey is to collect data on charitable giving, unpaid volunteer activities and participation in Canada. The target population for the 10 provinces is all persons 15 years of age and over, excluding full-time residents of institutions. Approximately 14,059 randomly selected respondents were interviewed between September and December, 2010 in all 10 provinces.

Variables

Dependent variables

Model 1: Total donation is a continuous variable with a value ranging from $1 to $31,050 if the sample member indicates participation in charitable giving. The natural log of the donation expenditure is used in the model.

Model 2: Donation categories (DC) is an ordinal variable with four groups consisting of donations of $1 to $60 (DC1), $61 to $200 (DC2), $201 to $500 (DC3), and over $500 (DC4).

Independent variables

The independent variables consist of a proxy for the tax credit, income, education, age as a proxy for wealth, a set of regional variables, and a set of other socio-economic variables thought to influence donations. The independent variables are described in Table 3.

Table 3 Description of independent variables

Variable	*Name*	*Description*
Tax Credit	credit	Respondents who state the tax credit as a reason for donating (yes=1; no=0).
Household income (4 variables)	$20,000 - 39,999 $40,000 - 59,999 $60,000 - 99,999 $100,000 +	Respondents for whom annual household income was in the stated range (1=yes; 0= no). Default is less than $20.000.
Education (3 variables)	some post-secondary post-secondary diploma post-secondary degree	Respondents whose highest level of educational attainment is as stated (1=yes; 0= no). Default is maximum high school graduation.
Age (wealth) (3 variables)	25-44 years of age 45-64 65+	Respondents in the stated age range (1=yes; 0= no). Default is age 15- 24.
Volunteer	volunteer	Respondent has volunteered time in the past 12 months (1=yes; 0= no).
Religiosity	religious	Respondent has attended a religious meeting or service at least weekly in the past 12 months (1=yes; 0= no).
Gender	male	Gender of the respondent (male=1; female=0).
Marital status	married	Respondent is married (1=yes; 0= no).
Pre-school children	pre-school	Respondent has at least one pre-school child in the household (1=yes; 0= no).
School age children	School-age	Respondent has at least one school-age child in the household (1=yes; 0= no).
Geographic residence (4 variables)	British Columbia Prairies Quebec Atlantic	Respondent lives in the stated province or region (1=yes; 0= no). Default is Ontario.

Results

Table 4 Frequency Distribution by Donor Status and Donation Expenditure Category

		Non-donor	$1 – $60	$61 – $200	$201 - $500	>$500	Total
Total sample		10.52	24.56	24.04	19.09	21.79	100
Reason for giving: tax credit		n/a	16.96	23.83	23.32	35.89	100
Income	< $20,000	23.83	35.35	18.36	12.30	10.16	100
	$20,000-$39,999	12.53	29.54	23.95	16.35	17.63	100
	$40,000-$59,999	9.55	25.75	25.45	17.82	21.43	100
	$60,000-$99,999	7.19	23.18	26.49	20.89	22.25	100
	≥$100,000	6.35	15.44	23.35	23.97	30.90	100
Education	Maximum high school	16.34	32.08	22.67	14.20	14.72	100
	Some post-secondary	12.67	28.04	22.22	16.61	20.46	100
	Post sec. diploma	8.39	23.74	26.64	21.43	19.80	100
	University degree	5.15	15.05	22.85	23.09	33.87	100
Age	15-24	24.08	46.56	16.28	7.89	5.20	100
	25-44	9.92	28.08	27.40	18.37	16.22	100
	45-64	9.36	20.61	24.64	20.82	24.50	100
	65+	8.23	18.51	21.53	21.21	30.52	100
Volunteer	Volunteer status	6.15	19.45	24.43	21.50	28.48	100
Religious	Attend ≥ weekly	4.35	10.81	16.45	20.38	48.02	100
Gender	Female	9.34	23.95	25.40	19.76	21.55	100
	Male	12.05	25.35	22.29	18.23	22.09	100
Marital	Married	7.09	22.10	25.68	21.07	24.07	100
Children	Preschool	10.68	23.89	23.55	19.29	22.59	100
	Children age 6-17	10.33	23.25	23.74	19.65	23.03	100

Table 4 presents the frequency distribution of the respondents by donor status and donation category. As mentioned in the introduction, the proportion of respondents who state the tax credit as a reason for giving rises with the amount of the donation. Nearly 89% of the sample is comprised of donors who are somewhat evenly distributed across the four donation categories with 25% giving between $1 and $60, 24% giving between $61 and $200, 19% giving between

$201 and $500, and 22% giving more than $500. The proportion of non-donors decreases systematically with an increase in household income, education level and age. Among all of the respondents, the proportion of those donating more than $200 consistently increases with income brackets. For instance, only 10% of those with income less than $20,000 donate more than $500 compared to nearly 31% with an income over $100,000. Similar patterns are observed for education and age.

Results for Model 1

The estimation of the Heckman selection model (Model 1) is robust as evidenced by the Wald statistic. The marginal effects of the independent variables for Model 1 are presented in Table 5[5]. All independent variables are statistically significant ($p<0.05$), except marital status, pre-school children, high school education level (education1), and living in British Columbia and the Prairies.

The results indicate that three of the key variables of interest have statistically significant and positive impacts on charitable donations, namely the tax credit, age and income. The statistically significant and positive marginal effect of the tax credit variable provides support for hypothesis 1, implying that those who state the tax credit as a reason for donating are more likely to make larger donations than those who do not, thereby suggesting the tax credit policy is effective. Age, as a proxy for wealth, has the greatest impact on donations, as evidenced by the relatively large and increasing marginal effects of the three age variables. The marginal effect of income on donating increases systematically with an increase in the income category, from Income1 through to Income4. The marginal effects of the education variables show a similar rising trend, except that some post-secondary is not statistically significant. The marginal effects suggest wealth and income have a larger impact on the donation expenditure decision, offering support for hypothesis 2. There is some support for the contention that education has a larger impact than the tax credit, as evidenced by the relatively large marginal effect of the completion of a university degree (Educ3) compared to the tax credit.

[5] The results of the full model are available upon request.

The socio-economic variables of religious attendance and volunteer status are both statistically significant with a positive impact on charitable donations, while being male has a negative impact implying that females are more likely to make larger donations. Of the regional variables, living in Quebec and the Atlantic provinces have a statistically significant and negative impact on the amount of giving, suggesting that the level of giving is lower in those regions relative to Ontario.

Table 5 Average marginal effects of Model 1 (Heckman Selection Model)

Explanatory Variables	Coefficient	Robust St. Error	Test Statistics	P-value
Credit as reason	0.338	0.049	6.90	0.000
Income1	0.233	0.092	2.52	0.012
Income2	0.653	0.092	7.08	0.000
Income3	0.800	0.093	8.63	0.000
Income4	1.239	0.095	13.06	0.000
Education1	0.128	0.087	1.47	0.141
Education2	0.100	0.052	1.92	0.055
Education3	0.453	0.059	7.70	0.000
Age1	0.983	0.100	9.87	0.000
Age2	1.420	0.095	14.98	0.000
Age3	1.900	0.105	18.10	0.000
Volunteer	0.521	0.045	11.52	0.000
Religious Attendance	0.916	0.062	14.83	0.000
Male	-0.092	0.044	-2.10	0.035
Married	-0.021	0.058	-0.36	0.722
Pre-School Children	0.011	0.074	0.15	0.883
School Age Children	0.132	0.054	2.42	0.015
British Columbia	-0.117	0.066	-1.78	0.074
Prairie	0.069	0.055	1.25	0.210
Quebec	-0.514	0.060	-8.54	0.000
Atlantic	-0.183	0.053	-3.47	0.001
Wald Statistic	2220			
No. of Observation	14059			

Results for Model 2

Overall, Model 2 fits the data and the specifications of the model are robust, as implied by the Wald Statistic. The marginal effects of the independent variables for each of the four donation

categories are presented in Table 6[6]. Similar to the results for Model 1, the results for Model 2 suggest the significance of the tax credit, income, age, and education on donation expenditures. In addition, the Model 2 results provide additional information by demonstrating how the marginal effects of each independent variable varies across the four donation expenditure categories.

Table 6 Estimated marginal effects of the Ordered Probit Selection model

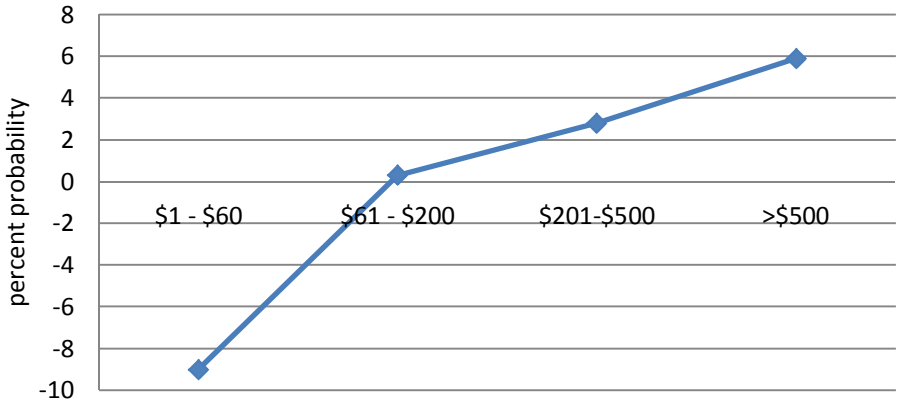
Explanatory variables	DC1 ($1 - $60)	DC 2 ($61 -$200)	DC3 ($201 - $500)	DC4 (more than $500)
Credit as reason	-0.090*** (0.011)	0.003*** (0.001)	0.028*** (0.003)	0.059*** (0.007)
Income1	-0.085*** (0.023)	0.003*** (0.001)	0.026*** (0.007)	0.055*** (0.015)
Income2	-0.174*** (0.024)	0.006*** (0.002)	0.055*** (0.008)	0.113*** (0.015)
Income3	-0.221*** (0.023)	0.008*** (0.003)	0.069*** (0.008)	0.144*** (0.015)
Income4	-0.325*** (0.023)	0.012*** (0.004)	0.101*** (0.008)	0.211*** (0.016)
Education1	-0.035* (0.020)	0.001 (0.001)	0.011* (0.006)	0.023* (0.013)
Educatiion2	-0.025** (0.012)	0.001 (0.001)	0.008** (0.004)	0.016** (0.008)
Education3	-0.097*** (0.014)	0.004*** (0.001)	0.030*** (0.004)	0.063*** (0.009)
Age1	-0.213*** (0.024)	0.008*** (0.003)	0.067*** (0.008)	0.139*** (0.016)
Age2	-0.320*** (0.022)	0.012*** (0.004)	0.100*** (0.007)	0.208*** (0.015)
Age3	-0.438*** (0.024)	0.016*** (0.005)	0.137*** (0.008)	0.285*** (0.017)
Volunteer	-0.118*** (0.011)	0.004*** (0.002)	0.037*** (0.003)	0.077*** (0.006)
Religious Attendance	-0.230*** (0.014)	0.008*** (0.003)	0.072*** (0.005)	0.150*** (0.010)
Male	0.018* (0.010)	-0.001 (0.0004)	-0.006* (0.003)	-0.012* (0.007)
Married	0.011 (0.013)	-0.0004 (0.0005)	-0.004 (0.004)	-0.007 (0.009)
Pre-School Children	0.002 (0.017)	-0.00007 (0.0006)	-0.001 (0.005)	-0.001 (0.011)
School Age Children	-0.028** (0.013)	0.001* (0.0006)	0.009** (0.004)	0.018** (0.008)
British Columbia	0.023 (0.014)	-0.001 (0.0005)	-0.007 (0.004)	-0.015 (0.009)
Prairie	-0.010 (0.013)	0.0004 (0.0005)	0.003 (0.004)	0.007 (0.008)
Quebec	0.112*** (0.014)	-0.004*** (0.001)	-0.035*** (0.004)	-0.073*** (0.009)
Atlantic	0.036*** (0.012)	-0.001*** (0.0005)	-0.011*** (0.004)	-0.024*** (0.008)
Wald Statistics	1400			
No. of Observation	12580			

Notes:

1. Robust standard errors are reported in parentheses.
2. *** indicates the level of significance at less than 0.01; ** indicates the level of significance at less than 0.05 levels and * indicates the level of significance at less than 0.1 levels.
3. The marginal effects for each variable sum to zero across the four donation categories.

[6] The full results of the ordered probit selection model are available upon request.

Figure 1: Marginal effect of the tax credit on donation



The marginal effect of the tax credit is negative for the first donation category and then is positive and increases for each of the subsequent donation categories, as illustrated in Figure 1. These marginal effects imply that those who state the tax credit as a reason for giving are 9% less likely to donate between $1 and $60 than those who do not state the credit as a reason. While the marginal effect of the credit for the second category ($61 - $200) is positive, it is very close to zero. The marginal effects for the third and fourth categories (DC3 & DC4) suggest that if respondents cited credit as a reason for donating they have a 3% and 6% higher probability of donating between $201 and $500 (DC3) and more than $500 (DC 4), respectively, than those who did not state the credit as a reason. While the marginal effects of the tax credit are significant, they do not appear to have the largest impact on the donation expenditure decision when compared to the impacts of income, wealth, and education. Furthermore, the impact of the tax credit systematically increases with an increase in donation expenditure, particularly for donations greater than $200. These results provide support for hypothesis three that the higher tax credit for donations over $200 is more effective than the lower tax credit for donations up to $200. In sum, the results of Model 2 complement results of Model 1 and provide support for hypothesis 1 and hypothesis 3.

Figure 2: Marginal effect of income on donations

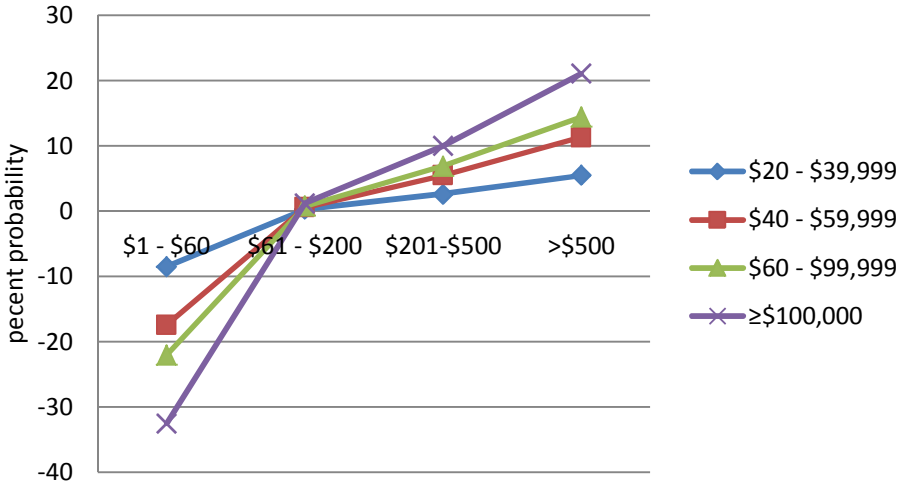
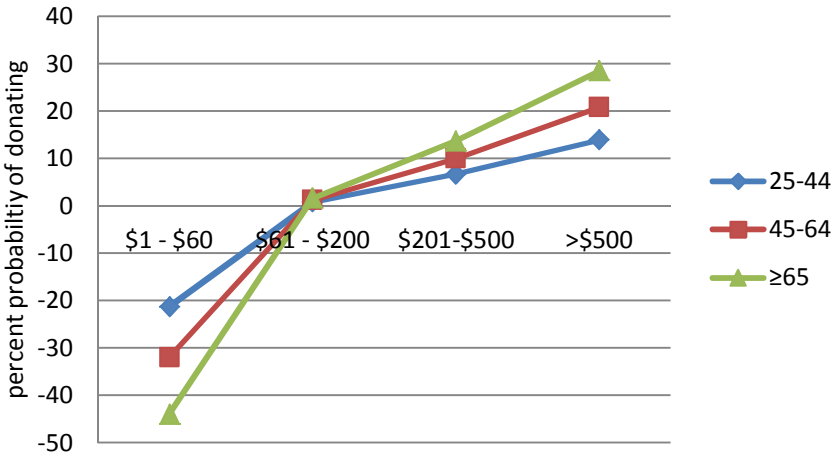


Figure 2 illustrates the marginal effect of income on donations. The marginal effect of each income variable is negative for donations between $1 and $60 and positive for donations greater than $60. The results suggest that respondents with incomes of more than $20,000 are less likely to donate less than $61 and more likely to donate more than $60 than those with incomes of less than $20,000. For example, the marginal effect is -0.325 for donation category 1 and 0.211 for donation category 4 for those with an income of $100,000 or higher, suggesting that they have a 32.5% lower probability of donating between $1 and $60 and a 21% higher probability of donating more than $500 compared to a respondent with an income of $20,000 or less. Note that the marginal effects across all income levels are negative for donations between $1 and $60. The marginal effects of income rise both across the four donation categories and with each income category. For instance, the likelihood of donating more than $500 rises with each successive level of income, such that those with incomes between $20,000 and $39,999 are 5.5% more likely, those with incomes between $40,000 and $59,000 are 11% more likely, those with incomes between $60,000 and $99,999 are 14% more likely, and those with incomes over $100,000 are 21% more likely to make a donation larger than $500, compared to those with income less than $20,000. These results offer further support for hypothesis 2 for respondents with incomes of $40,000 and higher. In other words, for those

with incomes of $40,000 and higher, an increase in income has a larger impact on donation expenditure than the tax credit.

Figure 3: Marginal effect of age on donations



The marginal effects of wealth, proxied by age, have similar trends to those of the income variables, as illustrated in Figure 3, however the age variables have the largest impact on donations. Like income, the marginal effects of all three age variables are negative for donations up to $60 and positive for donations of $61 or greater. For example, the marginal effects of the highest age group (Age3) are -0.438 for donation category 1 and gradually increase to 0.285 for donation category 4, implying that those in the age group 65 and over are 44% less likely to make a donation less than $61 and 28.5% more likely to make a donation over $500 compared to a donor between the ages of 15 and 24. These results complement the results of Model 1 and provide additional support for hypothesis 2. Furthermore they suggest that level of wealth, as measured by age, has the largest impact on the donation expenditure decision.

Among the education variables, the impact of having a post-secondary diploma (Education2) or a university degree (Education3) is statistically significant, although the magnitude of the marginal effects are very small and in some cases close to zero. The largest impact is from those

with a university degree who have a 3% higher probability of making a donation between $201 and $500 and a 6% higher probability of making a donation over $500 compared to those with a maximum education of high school completion. These results complement the results of Model 1 and provide some support for hypothesis 2 for those with university degrees.

Of the other socio-economic variables, volunteering, religious attendance, gender and having school-age children also impact donation expenditures. Donor respondents who volunteer their time are 1.8% less likely to make donations less than $61 and close to 8% more likely to donate more than $500 than those who do not volunteer. Donors who attend religious meetings or services at least once a week are 2.3% less likely to make donations less than $61 and 15% more likely to make donations over $500. The marginal effects of the gender variable suggest that males are 1.8% more likely than females to donate less than $60, and that females are 1.2% more likely than males to make donations over $500. Donors with school-age children are statistically more likely to make larger donations compared to those without, although the marginal effects are close to zero.

The marginal effects of the regional variables imply that donors who live in Quebec and the Atlantic region have higher probability of donating less than $61 and a lower probability of donating more than $60 in comparison to donors in Ontario.

Policy Implications and Conclusion

The empirical results offer support for all three hypotheses. The results imply that the current tax policy is effective at promoting donations, particularly donations over $200 which coincides with the second tax credit tier. While the results imply that the current tax policy is successful, a few socio-economic characteristics appear to play a larger role in influencing an individual's donation expenditure. The donor's level of wealth has the largest impact on donation expenditures. The household income level of the donor also has a relatively large impact on an individual's donation, particularly for those with household income levels greater than $40,000. Of the education variables, having a university degree has a significant impact on an individual's

donation expenditure, which is slightly larger than the impact of the tax credit. In sum, the socio-economic characteristic of wealth has the largest impact on an individual's donation, followed by household income level, and then university education. While the tax credit has a significant impact on donations expenditures, it is not as large as that of wealth, income and a university degree. It is important for policy makers to recognize the comparatively important influence of the socio-economic characteristics on the donation decision and the potential constraints they have on the tax credit policy.

The measurement of the tax credit impact presents some limitations in this study. For instance, survey bias may be a factor influencing how survey participants respond to the question about their reasons for giving. Specifically, the response bias of social desirability may be an issue in that the participant's response may be biased toward what they consider to be socially desirable. In this case, respondents may be less likely to choose the tax credit as a reason for giving and more likely to choose the other reasons. On the other hand, respondents can choose as many reasons as they like and are not asked to rank them in order of important. The existence of this bias will lead the effectiveness of the tax credit to be underestimated, thus the marginal effect of the credit variable would be conservative and may actually be much stronger. Another limitation is the inability to compute a price elasticity which is commonly done in most other studies.

This research contributes to the literature on assessing the effectiveness of tax policy on charitable donations by attempting to address methodological challenges in past research with the introduction of a variable to measure the tax incentive. Use of the proxy variable overcomes the endogeneity problem of assessing a tax credit incentive system and addresses the issue of identifying those who claim the credit when using survey data. In addition, the results of the ordered probit selection model provide some insight into how the impacts of the tax incentive and socio-economic variables vary across the different donation levels.

Bibliography

Apinunmakakul, A. and R. A. Devlin (2008) Social Networks and private philanthropy, *Journal of Public Economics*, 92, 309- 328.

Apinunmakakul, A., V. Barham and R. A. Devlin (2008) Charitable Giving, Volunteering, and the Paid Labor Market, *Nonprofit and Voluntary Sector Quarterly*, 38, 77-94.

Blaylock, J. R. and W. N. Blisard (1992). US Cigarette Consumption: The Case of Low-Income Women, *American Journal of Agricultural Economics,* 74(3), 698-705

Blend, J. R. and E. O. Van Ravenswaay (1999) Measuring Consumer Demand for Eco-labeled Apples: Results from Econometric Estimation. *American Journal of Agricultural Economics,* 81:1072- 1077.

Brooks, A. C. (2007) Income Tax Policy and Charitable Giving*, Journal of Policy Analysis*, 26, 599-612.

Chang, W. (2005) Determinants of Donations: Empirical Evidence from Taiwan, *The Developing Economics,* 43**,** 217-34.

Clotfelter, C. T. (1985) *Federal Tax Policy and Charitable Giving*, University of Chicago Press.

Duff, D.G. (2001) Charitable Contribution and the Personal Income Tax: Evaluating the Canadian Credit, in *Between State and Market: Essay on Charities Law and Policy in Canada,* (Eds). Phillips, J., B. Chapman, and D. Stevens, McGill-Queen's University Press.

García, I. and C. Marcuello (2001) A Household Model of Charitable Contributions and Tax Incentives, *Annals of Public and Cooperative Economics*, 72,159-181.

Glenday, G, A. Gupta, and H. Pawlak (1985) Tax incentives for personal charitable donations, Mimeograph, Department of Finance, Ottawa. A paper presented at the Canadian Economic Association meetings at the Université de Montreal, 29-31, May.

Heckman, J. J. (1979) Sample selection bias as a specification error. *Econometrica* 47 (1): 153-161.

Hood, R.D., S.A. Martin, and L.S. Osberg (1977) Economic determinants of individual charitable donations in Canada, *Canadian Journal of Economics,* X, 4, 653-669.

Hossain, B. and L. Lamb (2012a), "Price Elasticities of Charitable Giving across Donation Sectors in Canada?" *ISRN Economics,* vol. 2012, Article ID 421789.

Hossain, B. and L. Lamb (2012b), "Does the Effectiveness of Tax Incentives on the Decision to Give Charitable Donations Vary Across Donation Sectors in Canada?" *Applied Economics Letters*, 19(15): 1487-1491.

Hossain, B. and L. Lamb (2012c), "The Dynamics of Environmental Giving in Canada: Evidence of Rising Demand for Environmental Quality?" *Economic Papers: A journal of applied economics and policy,* 31(2): 265-273.

Huang, C. L., K. Kan, and T.T. Fu. 1999. "Consumer Willingness to Pay for Food Safety in Taiwan: A Binary-Ordinal Probit Model of Analysis." Journal of Consumer Affairs 33 (Summer):76-91.

Heckman, J. J. 1979. Sample selection bias as a specification error. *Econometrica* 47 (1): 153-161.

Kitchen, H. (1992) Determinants of charitable donations in Canada: a comparison over time, *Applied Economics,* 24, 709-13.

Kitchen, H., and R. Dalton (1990) Determinants of charitable donations by families in Canada: a regional analysis, *Applied Economics,* 22, 285-99.

Maddala, G. (1983) Limited-Dependent and Qualitative Variables in Econometrics. Cambridge University Press, Cambridge.

Mouton, B.R. (1990) An illustration of a pitfall in estimating the effects of aggregate variables on micro units. *Review of Economics and Statistics,* 72, 334-338.

Statistics Canada (2010) *Canada Survey of Giving, Volunteering and Participating* (CSGVP), Public Use Microdata File.