

The Effect of Tax Price on Donations: Evidence from Canada

Ross Hickey¹ Bradley Minaker² Joanne Roberts³ Abigail Payne⁴
Justin Smith⁵

¹Melbourne Institute of Applied Economic and Social Research
University of Melbourne
University of British Columbia Okanagan

²University of Guelph

³Yale-NUS College

⁴Melbourne Institute of Applied Economic and Social Research
University of Melbourne
McMaster University

⁵Wilfrid Laurier University

Background

- Charities support provide wide variety of important goods
 - Social services
 - Health care
 - Education
 - etc...
- Mainly funded through voluntary individual giving
- Tax system incentivizes individual donations
 - USA/Germany/UK/Aus: deduction
 - Canada/France: non-refundable tax credit
- These incentives lower “price” of giving
 - Cost of giving \$1 is one minus tax rebate on donation

- Forgone tax revenue is significant
 - USA: USD 51 billion \rightarrow 0.29% of GDP
 - Canada: CAD 2.5 billion \rightarrow 0.14% of GDP
- Governments are interested in whether tax incentives work
 - Do they encourage donations?
 - Do they encourage *enough* donations?
- Key parameter for policy is tax price elasticity ϵ
 - If $\epsilon = -1$, entire tax rebate donated
 - If $\epsilon > -1$, part of tax rebate donated
 - If $\epsilon < -1$, more than rebate donated

- Estimate tax price elasticity with taxfiler panels from Canada
- Several key contributions
 - Cleaner estimates
 - Tax price independent of income
 - Tax credit rate set at federal and provincial level exogenously
 - Produce estimates across income distribution
 - Credit is available to anyone with taxes owing
 - Estimate extensive margin
- Find average elasticity of -1
 - Highest for low income filers
 - Some evidence of extensive margin response

- Early studies
 - Single year filer data
 - Variation in tax price from income differences
 - Larger elasticities of -1.1 to -1.5
- Recent work
 - Long panels of taxfilers
 - Variation in tax price from rate changes
 - Separate permanent from transitory
 - Results mixed
 - Randolph (1995), Bakija (2000): strong transitory effect
 - Auten et. al. (2002), Bakija & Heim (2011): strong permanent effect

- European studies
 - Fack and Landais (2016): France elasticity about -0.4
 - Almunia et al. (2017): UK elasticity = -1, with big extensive margin
 - Adena (2014): German elasticity about -1, larger for high incomes
- Other work
 - Duquette (2016): estimates elasticity with charity revenues
 - Health care most tax sensitive; education least
 - Hungerman & Ottoni-Wilhelm (2016): tax filer elasticity matches estimates from experiments
- Experiments
 - Price variation from donation matching
 - Tighter range of results
 - External validity issues

Outstanding Empirical Issues

- Itemization
 - U.S. tax code allows standard deduction
 - Only claim donations if exceed this standard
 - Consequence is data excludes low income filers
- Exogenous variation
 - Deduction scheme means tax price is a function of income
 - Even with tax code changes, variation may not be exogenous
- Canadian context/data not subject to these issues
 - Everyone faces same tax price
 - Observe full income distribution
 - Tax credit changed at province level often

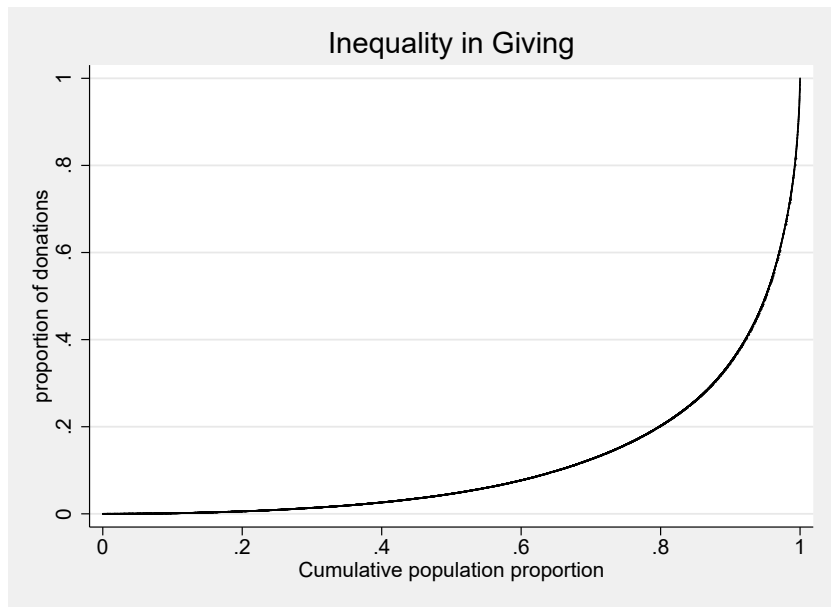
Donation Tax Credit in Canada

- Canada has a 2-tier non-refundable credit for donations
 - One rate for donations $< \$200$
 - *Higher* rate for donations $> \$200$
 - Generally set at lowest and highest marginal tax rate
- Since 2001, separate federal and provincial rates
- Tax price of donating \$1 is therefore

$$price_{pt} = 1 - (cred_{pt} + cred_{ft})$$

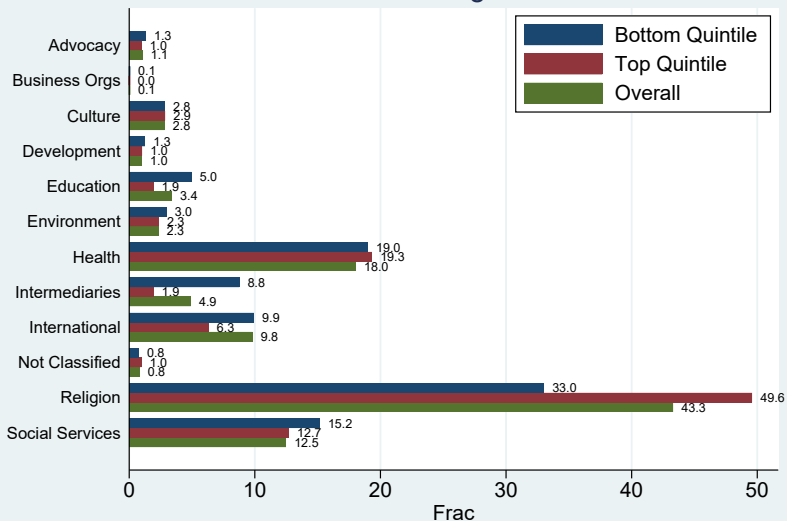
- Because credit is larger above \$200, price falls with more donations
 - Makes tax price endogenous, which we solve with instrument

Distribution of Giving

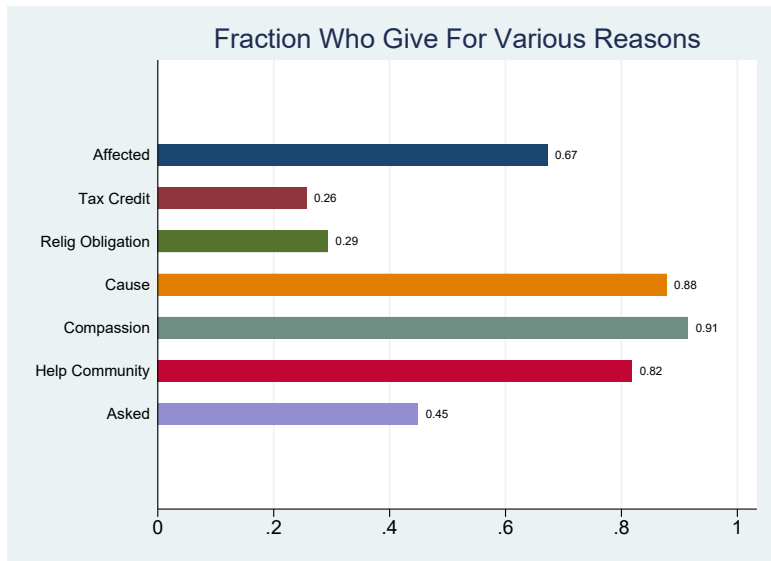


Where do donations go?

Distribution of Giving Across Causes

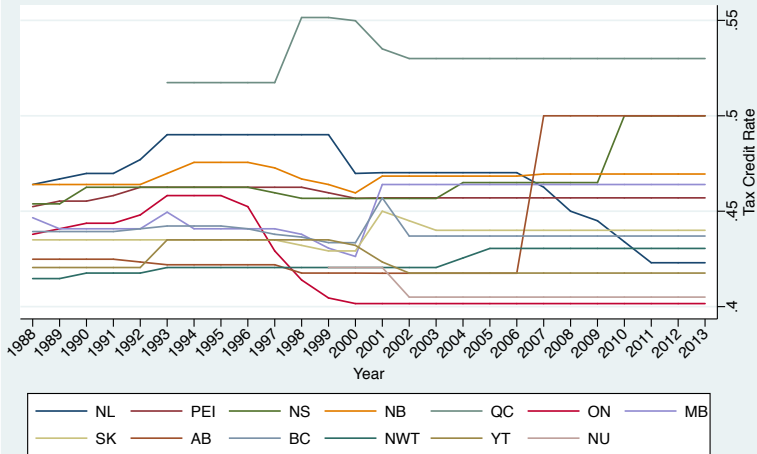


Why do people give



Tax Credits and Donations Over Time

Combined Tax Credit for Donations Above Threshold Rate



Other Details on Donation Tax Credit

- Taxable unit is the individual
 - Donation credit is claimed by the individual
- But, credit is transferable between spouses
 - Optimal for one spouse to claim all donations
 - We therefore study combined spousal donations
- Credit is non-refundable
 - Collect only if taxes owing
 - Price set to \$1 for filers with no tax liability
- Can carry forward donations for credit for up to 5 years
 - Do not know when donation is actually made

- Longitudinal Administrative Databank (LAD)
 - 20% simple random sample of taxfilers in Canada 1983-2013
 - Contains full tax records for all filers
 - Once in sample, kept until deceased or leave country
- Key information
 - Donations claimed for tax credit
 - Income
 - Detailed location information
 - Spousal information
- Other features
 - Can identify families
 - Linked with detailed immigrant database

- Adult filers between 2001-2013
 - Time period with “tax on income” system
- Exclude Quebec, interprovincial movers, duplicate spouses, deceased filers
 - Moves may be endogenous
 - Duplicate spouses occur because random sampling
 - Deceased filers complicated
- 50% random sample of LAD
 - Reduces computation time
 - Helps avoid residual disclosure issues
- Roughly 19.3 million obs (weighted)

- Main estimating equation

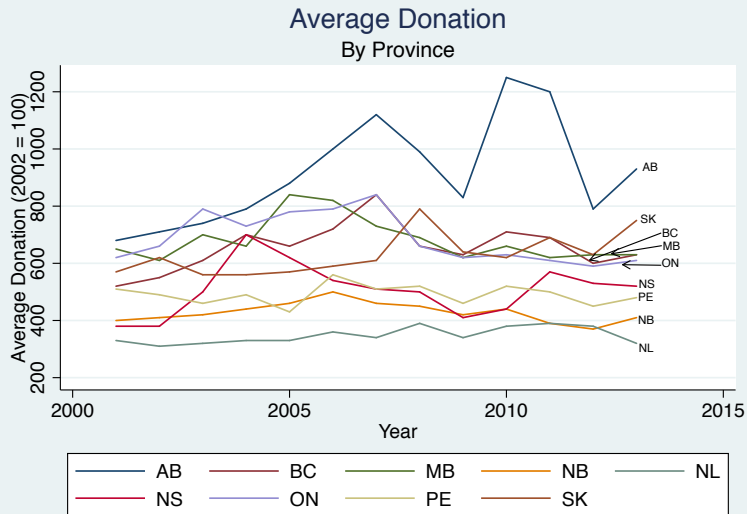
$$don_{it} = \beta_0 + \beta_1 pr_{p(i,t)t} + \beta_2 x_{it} + \omega_i + \gamma_t + \delta_{p(i,t)} \times trend_t + \varepsilon_{it}$$

- β_1 is tax price elasticity
- Key issue: feedback from donations to price
 - Instrument $pr_{p(i,t)t}$ with legislated credit rates
 - Neither depends on donation amount

- First stage

$$pr_{p(i,t)t} = \alpha_0 + \alpha_1 cred_{p(i,t)t}^L + \alpha_2 cred_{p(i,t)t}^H + \alpha_2 x_{it} \\ + \theta_i + \mu_t + \pi_{p(i,t)} \times trend_t + \xi_{it}$$

Average Donations Over Time



Donors Over Time

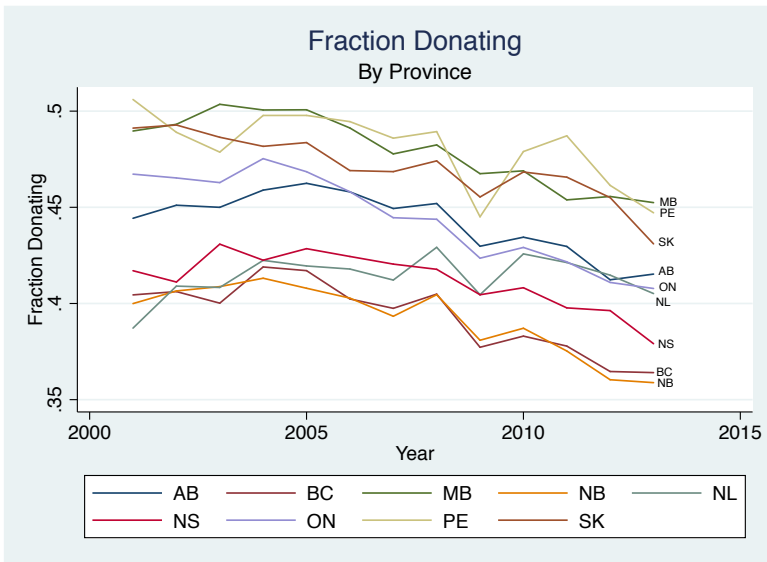


Table 2: Summary Statistics for Additional Variables

Mean Age	45
Mean Number of children per adult	1.04
Mean Pre-Tax Income (2015\$)	87100
Median Pre-Tax Income (2015\$)	67800
Mean Capital Gain/Loss (\$)	2400
Mean Claim for Federal Tax Credits (\$)	25000
Mean Federal Tax Credit Received (\$)	4200
Mean Federal Charity Tax Credits Received (\$)	180
Fraction Married	0.71

Table 3 - Estimates of Tax Price Elasticity of Donations

	OLSFE (1)	IVFE (2)	IVFECS (3)	IVFECS (4)
Log Tax Price	-9.26 (0.40)	-1.30 (0.56)	-1.08 (0.35)	-1.08 (0.57)
Age	0.01 (0.00)	0.02 (0.00)	0.03 (0.00)	0.03 (0.00)
Age Squared	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Log Pre-Tax Income	-0.09 (0.01)	0.25 (0.02)	0.25 (0.02)	0.25 (0.02)
Capital Gains/Losses	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
N (weighted)	227062725	227062725	227062725	227062725
R-Squared	0.71	0.72	0.71	0.71

All regressions include individual Fixed Effects, Time trends, number of children, indicator for marital status. Standard errors in parentheses. All standard errors estimated using CSD clusters in columns 1-3, column 4 estimates standard errors using provincial clusters

Results: First Stage

Table A2 - First Stage and Reduced Form for Preferred IV Specification

	First Stage (1)	Reduced Form (2)
Low Credit Rate	-0.82 (0.03)	0.71 (0.46)
High Credit Rate	-0.48 (0.02)	0.53 (0.19)
Age	0.00 (0.00)	0.02 (0.00)
Age Squared	0.00 (0.00)	0.00 (0.00)
Income	-0.04 (0.00)	0.30 (0.01)
Capital Gains	0.00 (0.00)	0.00 (0.00)
N	227,062,725	227,062,725
R ²	0.71	0.69
F-Stat on Excluded Instruments	777	

All regressions include individual Fixed Effects, Time trends, number of children, indicator for marital status. Standard errors in parentheses. All standard errors estimated using CSD clusters in columns 1-3, column 4 estimates standard errors using provincial clusters

Summary Statistics

Table 1: Summary Statistics on Donations

	Full	Pre-tax Income Quintile					Top Income Group		
	Sample	1st	2nd	3rd	4th	5th	Top 10%	Top 1%	Top 0.1%
Panel A: All Tax filers									
Fraction of sample who donate	0.40	0.07	0.26	0.41	0.54	0.72	0.78	0.87	0.89
Mean Donation	650	50	210	420	620	1900	3000	14200	69200
10th Percentile of Donations	0	0	0	0	0	0	0	0	0
25th Percentile of Donations	0	0	0	0	0	0	20	280	690
50th Percentile of Donations	0	0	0	0	20	160	300	1600	5000
75th Percentile of Donations	140	0	20	120	250	780	1200	5800	23600
90th Percentile of Donations	910	0	350	750	1100	2900	4300	18800	85100
Standard dev. of donations	14282	2050	1275	1726	2506	31662	44589	138634	420627
Panel B: Donating Tax filers									
Mean Donation in 2015 CAD	1600	680	800	1000	1200	2700	3900	16200	77700
10th Percentile of Donations	30	20	20	20	30	50	60	170	350
25th Percentile of Donations	80	50	50	60	60	120	180	620	1500
50th Percentile of Donations	260	170	190	200	210	410	570	2200	7100
75th Percentile of Donations	910	600	680	710	720	1300	1800	7000	28300
90th Percentile of Donations	3100	1600	2200	2700	2700	4400	5900	21800	100200

Results: Income Distribution

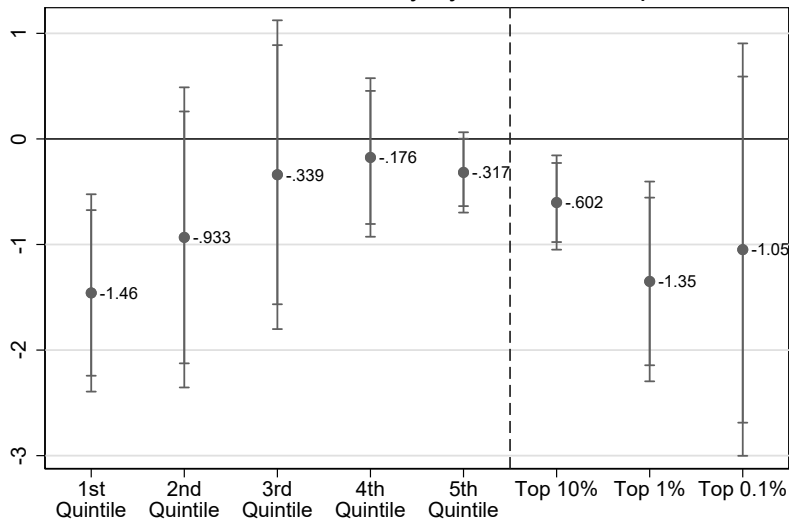
Table 5 - Elasticity Estimates by Pre-Tax Income Quintile

	Quintile 1 (1)	Quintile 2 (2)	Quintile 3 (3)	Quintile 4 (4)	Quintile 5 (5)	Top 10% (6)	Top 1% (7)	Top 0.1% (8)
Panel A: Tax Price Elasticity of Giving, Full Sample								
Log Tax Price	-1.46 (0.48)	-0.93 (0.73)	-0.34 (0.75)	-0.18 (0.38)	-0.32 (0.19)	-0.60 (0.23)	-1.35 (0.48)	-1.05 (1.00)
Log Income	0.03 (0.01)	1.07 (0.08)	0.85 (0.02)	0.99 (0.02)	0.63 (0.02)	0.52 (0.02)	0.32 (0.03)	0.24 (0.05)
N	45,408,620	45,398,850	45,412,950	45,416,350	45,418,920	22,712,660	2,272,700	226,780
R2	0.65	0.72	0.74	0.73	0.71	0.73	0.78	0.80
Panel B: Tax Price Elasticity of Giving, Donors								
Log Tax Price	0.58 (0.32)	-0.36 (0.29)	-0.58 (0.35)	-0.66 (0.28)	-0.58 (0.13)	-0.59 (0.11)	-0.61 (0.13)	-0.43 (0.17)
Log Income	0.03 (0.00)	0.47 (0.01)	0.42 (0.02)	0.46 (0.01)	0.42 (0.01)	0.39 (0.02)	0.30 (0.02)	0.29 (0.05)
N	3,012,195	12,025,625	18,772,335	24,521,975	32,514,000	17,605,360	1,985,980	202,200
R2	0.87	0.86	0.86	0.84	0.80	0.81	0.82	0.00
Panel C: Extensive Margin Effect, Full Sample								
Log Tax Price	-0.27 (0.08)	-0.12 (0.11)	0.05 (0.10)	0.14 (0.08)	0.07 (0.03)	0.01 (0.04)	-0.13 (0.05)	-0.12 (0.12)
Log Income	0.01 (0.00)	0.19 (0.01)	0.15 (0.00)	0.16 (0.00)	0.05 (0.00)	0.03 (0.00)	0.01 (0.00)	0.00 (0.00)
Fraction Donors	0.07	0.26	0.41	0.54	0.72	0.78	0.87	0.89
Implied Elasticity (Coefficient/Fraction Donors)	-4.07	-0.45	0.12	0.26	0.10	0.01	-0.15	-0.13
N	45,408,620	45,398,850	45,412,950	45,416,350	45,418,920	22,712,660	2,272,700	226,780
R2	0.61	0.64	0.63	0.60	0.55	0.57	0.64	0.71

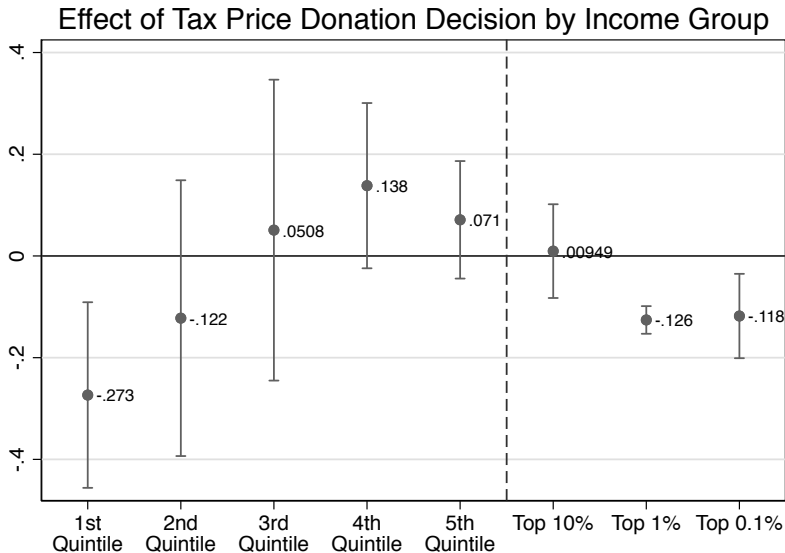
All regressions include individual Fixed Effects, Time trends, number of children, indicator for marital status. Standard errors in parentheses. All standard errors estimated using CSD clusters in columns 1-3, column 4 estimates standard errors using provincial clusters

Results: Income Distribution

Tax Price Elasticity by Income Group

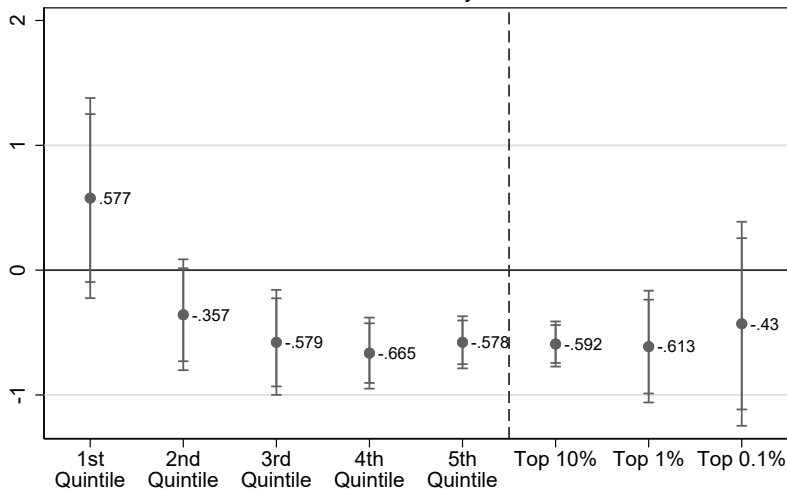


Results: Extensive Margin



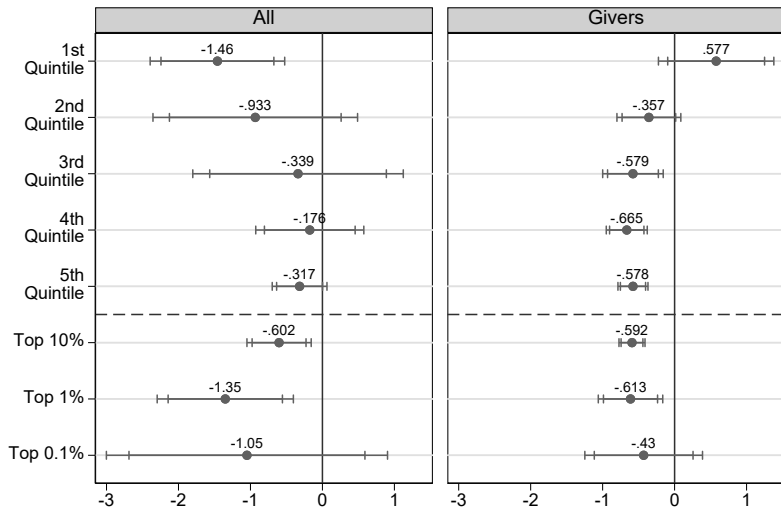
Results: Intensive Margin

Tax Price Elasticity by Income Group Givers Only



Results: Comparing Margins

Tax Price Elasticity by Income Group



Results: Age Distribution

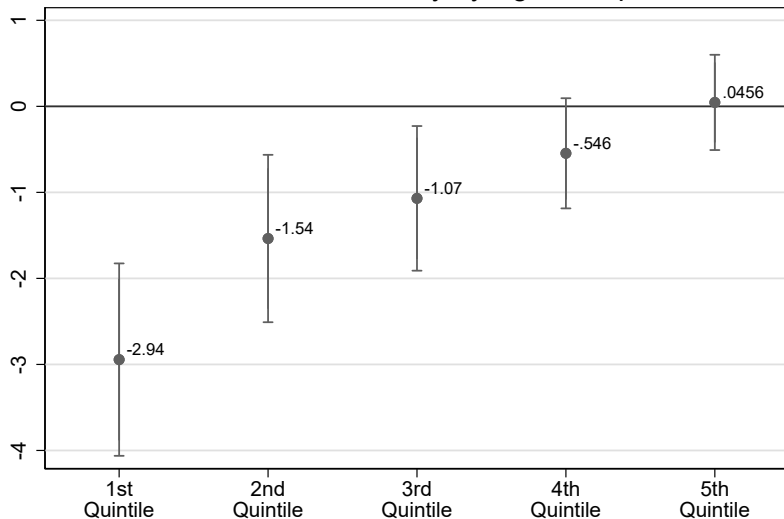
Table 6 - Estimates of Tax Price Elasticity by Age Quintile

	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile
	(1)	(2)	(3)	(4)	(5)
Log Tax Price	-2.94	-1.54	-1.07	-0.55	0.05
	(0.57)	(0.50)	(0.43)	(0.33)	(0.28)
Age	0.05	0.03	0.03	0.02	0.00
	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)
Age Squared	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Log Pre-Tax Income	0.11	0.19	0.21	0.25	0.31
	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)
Capital Gains/Losses	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
N (weighted)	50,559,370	40,579,230	45,707,810	50,260,140	39,949,140
R-Squared	0.69	0.76	0.78	0.79	0.80

All regressions include individual Fixed Effects, Time trends, number of children, indicator for marital status. Standard errors in parentheses. All standard errors estimated using CSD clusters in columns 1-3, column 4 estimates standard errors using provincial clusters

Results: Age Distribution

Tax Price Elasticity by Age Group



Robustness: One at a time IV

Table A3 - Estimates of Tax Price Elasticity with Instruments Individually

	Low Credit Rate Instrument	High Credit Rate Instrument
	(1)	(2)
Log Tax Price	-0.86 (0.87)	-1.11 (0.75)
Age	0.03 (0.00)	0.03 (0.00)
Age Squared	0.00 (0.00)	0.00 (0.00)
Log Pre-Tax Income	0.27 (0.04)	0.26 (0.03)
Capital Gains/Losses	0.00 (0.00)	0.00 (0.00)
N (weighted)	227,055,690	227,055,690
R-Squared	0.71	0.71

All regressions include individual Fixed Effects, Time trends, number of children, indicator for marital status. Standard errors in parentheses. All standard errors estimated using CSD clusters in columns 1-3, column 4 estimates standard errors using provincial clusters

Robustness: With Movers

Table A4 - Estimates of Tax Price Elasticity Including Movers

	Tax Price Elasticity	Extensive Margin
	(1)	(2)
Log Tax Price	-0.93 (0.35)	-0.02 (0.05)
Age	0.03 (0.00)	0.00 (0.00)
Age Squared	0.00 (0.00)	0.00 (0.00)
Log Pre-Tax Income	0.27 (0.02)	0.05 (0.00)
Capital Gains/Losses	0.00 (0.00)	0.00 (0.00)
N (weighted)	247,559,930	247,559,930
R-Squared	0.71	0.59

All regressions include individual Fixed Effects, Time trends, number of children, indicator for marital status. Standard errors in parentheses. All standard errors estimated using CSD clusters in columns 1-3, column 4 estimates standard errors using provincial clusters

Robustness: Other Definitions of Income

Table A5 - Estimates of Taxprice Elasticity using Alternative Income Concepts

	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile	Top 10%	Top 1%	Top 0.1%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: After Tax Income Quintiles								
Log Tax Price	-1.38 (0.56)	-0.96 (1.03)	-0.22 (0.89)	0.11 (0.56)	-0.44 (0.40)	-0.74 (0.34)	-1.20 (0.15)	-1.16 (0.37)
N	42,197,680	42,022,600	42,351,420	43,106,700	44,020,240	21,617,100	2,053,800	189,330
R2	0.63	0.70	0.72	0.71	0.71	0.72	0.75	0.76
Panel B: Market Income Quintiles								
Log Tax Price	-1.22 (0.66)	-0.89 (1.08)	-0.32 (0.92)	-0.28 (0.49)	-0.31 (0.44)	-0.74 (0.34)	-1.20 (0.15)	-1.16 (0.37)
N	42,334,280	42,146,650	42,439,290	43,192,890	44,123,420	21,617,100	2,053,800	189,330
R2	0.61	0.70	0.72	0.71	0.70	0.72	0.75	0.76
Panel C: Ever in Pre-Tax Income Quintile								
Log Tax Price	-1.46 (0.66)	-1.04 (0.84)	-0.98 (0.75)	-0.77 (0.59)	-0.60 (0.54)	-0.51 (0.54)	-1.11 (0.23)	-0.68 (0.40)
N	96,859,900	123,922,330	131,804,200	122,333,380	89,112,540	53,106,680	7,139,850	982,440
R2	0.61	0.63	0.65	0.66	0.67	0.66	0.69	0.68

All regressions include individual Fixed Effects, Time trends, number of children, indicator for marital status. Standard errors in parentheses. All standard errors estimated using CSD clusters in columns 1-3, column 4 estimates standard errors using provincial clusters

- Is the tax treatment of donations revenue efficient?
 - On the whole it appears that the answer is yes
- Is the structure optimal?
 - Saez (2004), Diamond (2006) and earlier work suggest that tax expenditures for donations relax the ICC
- Other normative perspectives:
 - Heterogeneity of tax price (across incomes/age) response combined with heterogeneity over distribution of donations (across incomes/age) suggests some charities benefit more than others.
 - Future work on heterogeneity of crowd out would be very useful.

- Tax price elasticity of charitable donations in Canada is about **-1**
 - In line with rest of literature w.r.t. treasury efficiency
 - But substantial heterogeneity masked in terms of age and income
- Strongest effects for lowest income quintile
- Credit issued for donations $> \$200$ has biggest impact
- Some evidence of extensive margin effect