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The effect of tax price on donations: evidence from Canada*

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Abstract

Using a large administrative dataset from Canada we estimate that the tax price elasticity of charitable donations is -1.9. When we allow for heterogeneity of this parameter across the income distribution, we observe a large elasticity at the bottom of the distribution between -3 and -4, and an elasticity closer to -1 at the top. We find evidence that the response to tax price occurs on both the intensive margin of how much to give, and the extensive margin of whether to give or not.

JEL classification: H31, H24, H40

Keywords: donations, charity, tax price elasticity

1 Introduction

Charity is an important feature of civil society, and many governments provide support to the organizations that facilitate acts of generosity through tax concessions. For example, Australia, Germany, and the United States each allow donors to deduct the dollar value of their eligible donations from their taxable income. Other countries like Canada, France, and New Zealand provide a tax credit that is equal to a fraction of the total dollar value of their donations to registered charities. Under both above scenarios, the foregone consumption of a one-dollar donation is less than one dollar: this "tax price" of a one-dollar donation to an eligible charity is $1 - t, where t is the discount provided when the donation is claimed on a tax return.

In this paper we estimate the responsiveness of donations to the tax price. Having a well-identified and precise estimate of the tax price elasticity of giving is important for two reasons. First, it offers policy makers and researchers direct quantitative evidence of donor responsiveness to tax incentives to promote giving. With a precise measure of the tax price elasticity of donations, government treasuries can more accurately forecast tax revenues and the cost of the charitable donations tax expenditure. For example, a tax price elasticity estimate of -1 indicates that a charitable giving tax expenditure is revenue neutral: for each dollar of tax revenue returned to donors, eligible charities receive an additional dollar of donations (Andreoni (2006)). Second, understanding how taxpayers react to changes in the tax price of giving can inform decisions about how best to support the charitable sector, especially the trade-off between direct government provision of goods and services and government support of the private provision of public goods (see, e.g., Andreoni and Payne (2013)).

We estimate the tax price elasticity of giving by studying a random sample of tax filers in Canada for the period 2001 to 2016. Our preferred estimate of the tax price elasticity is roughly -1.9, which implies that the tax incentive for giving is more than treasury efficient, meaning that the tax credit is passed on to charities as donations and then some. We also separately estimate the tax price elasticity of giving for

quintiles of the distribution of household income and find a large tax price elasticity of -2.9 in the lowest income quintile, and an even larger elasticity of -4 in the second lowest income quintile. The estimates then rise towards -1 as we move upward through the third, fourth and fifth quintiles. Narrowing our focus on the very top of the income distribution, we estimate elasticities between -1 and -1.4 among the top 1% and top 0.1% of income earners, though for the latter group the estimates are noisier.

To understand whether the pattern of our elasticity estimates through the household income distribution are driven by an increase in the number of households donating or an increase in the value of donations by previously donating households, we separately estimate these elasticities on the intensive margin (the level of giving) and extensive margin (the decision to give). Overall, we find a large extensive margin effect that is more than double the size of the intensive margin effect. Along the income distribution the extensive margin effect is very large and appears to drive all of the effect of tax price on giving. For the richest tax filers, we find an intensive margin effect near -0.4, which appears to drive the overall response to changes in the tax price for this group.

Our research complements the many estimates of the tax price elasticity in the United States. Among those estimates, Hungerman and Ottoni-Wilhelm (2021) use a kink-based estimator, while Randolph (1995) uses a two-stage least squares algorithm with four first stages, to find that giving responds to tax prices but that the elasticity is smaller than -0.5 in absolute value. Bakija and Heim (2014) use the first dollar tax price as an instrument for the last dollar price and Auten et al. (2002) use a dynamic structural model find that the elasticity of giving is closer to -1. More recently, estimates suggest that the elasticity of giving might be more responsive, and additionally that some types of donors may be more responsive than others. For instance, Duquette (2016) estimates a tax price elasticity of charity revenues of -4 using US charity information returns and variation in state marginal tax rates, where the most sensitive donations to the tax price are in the health and home care sectors. While Backus and Grant (2018) estimate a tax price elasticity that is close to 0 for the average American using information gathered

from respondents to the Panel Survey of Income Dynamics and a synthetic tax rate instrumental variables estimator, they find a much more elastic response for income earners in the top decile of -2.[1]

Our study also complements several studies on the tax price of charitable giving around the world. Fack and Landais (2010) use a difference in differences estimator that exploits differences in the tax treatment of French households based on their number of members and report estimates of the elasticity between -0.2 to -0.6. In a follow-up paper Fack and Landais (2016) show that this elasticity would be estimated to be much higher under a regime with less enforcement of reporting. Almunia et. al (2020) exploit a 2010 U.K. tax reform and estimate the tax price elasticity to be approximately -0.3 using lagged measures of taxable income as an instrument for changes in the first dollar price of giving. Almunia et. al (2020) also provide structural estimates that suggest that the cost of reporting donations is about forty-seven pounds. U.S. estimates of the tax price elasticity using tax data rely on a sample of itemizers, because only itemizers can claim the deduction for charitable giving. As non-itemizers tend to have lower incomes U.S. tax data misses the lower tail of the income distribution.[2] Similarly, studies relying on the PSID may also miss small donations below $25, which may be made by low-income earners if giving is a normal good.

The remainder of the paper proceeds as follows. The next section describes the empirical context and data. Section 3 describes our data and descriptive statistics and then in section 4 our empirical strategy.

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[1] These U.S. estimates have ranged from: -0.5 to -0.08 (Randolph, 1995); -1.26 (Auten et al. (2002)); -1.76 for individuals whose income exceeds of $1 million to -0.61 for the average itemizing tax filer (Bakija and Heim (2014)). Hungerman and Ottoni-Wilhelm (2021) use both a regression-kink research design exploiting a state tax credit, and a match to estimate the tax price elasticity of giving and each yields an estimate of -0.2.

[2] Historically, the key drivers of itemized deductions for most Americans are owning a home with a mortgage (mortgage interest is deductible) and/or residing in a high state income tax state.

Section 4 presents our results, section 5 discusses of our results and policy recommendations, and section 6 concludes.

2 Charitable Giving in the Canadian Tax System

2.1 Overview of the Canadian Tax System

Canada operates a self-assessment tax system, where the taxable unit is the individual. It is administered by the Canada Revenue Agency (CRA), which collects taxes on behalf of the federal and all provincial governments except Québec. Everyone who owes taxes must file a return by April 30, and while those who owe no taxes are not required to do so, the only way to receive a tax refund or access several other social programs is to file. For example, one must file to obtain the Canada Child Benefit, the General or Harmonized Sales Tax (GST/HST) credit, and the Guaranteed Income Supplement (GIS). Because of the many incentives, the share of the population that files lies between 88% and 96% for those aged 25+ (Statistics Canada, 2011).

Filers complete separate federal and provincial returns. At the federal level, individuals report their total income, the main sources of which are employment, self-employment, interest and investment, dividends, and capital gains. They compute their taxable income after accounting for a series of deductions including: Registered Retirement Savings Plan (RRSP) contributions; pension contributions; childcare expenses; union dues; and business losses. At the federal level taxes are computed on a progressive scale, and currently there are five brackets: the lowest at 15% and the highest at 33%. Once taxes are computed from taxable income, filers calculate their "basic federal tax," by subtracting non-refundable tax credits from taxes owed. The list of such credits is long and includes such items as Canada Pension Plan (CPP) contributions, adoption expenses, and charitable giving. The federal and provincial credit rates for all non-refundable credits *except charitable giving* is equal to the lowest

federal marginal tax rate for federal taxes, and provincial marginal tax rate for provincial taxes.[3] Finally, filers then subtract refundable tax credits to arrive at their "net federal tax," which is value of taxes the filer pays. Note that this can be negative, in which case the government sends the filer a refund. While individuals file taxes independently, some tax credits may be transferred within households including: the amount for tuition, education and textbooks, the age amount; Canadian caregiver amount; pension income amount; and disability amount. Provincial taxes are filed separately and follow the exact same process, except that the number of brackets, the tax rates, credit rates, and some of the tax credits are independently selected by each provincial legislature.[4]

Charitable donations are eligible for a non-refundable tax credit in Canada, and as noted the credit rate is different from other non-refundable tax credits. There are separate federal and provincial credit rates, and within each it is two tiered: a lower credit is available for all donations below $200, and a higher rate for donations above it.[5] For example, the federal the credit rate in the most recent year in our sample is 15% for donations up to $200, and 29% for donations above $200. Generally speaking, the low credit rate is equal to the lowest marginal tax rate and the high credit rate is the highest marginal tax rate both federally and provincially, with one exception: in Alberta, which has a flat 10% tax rate on all income for our sample period, the lower credit rate is 10%, but the upper donation credit is 21%.

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[3] One noteworthy non-refundable credit is the "basic personal amount." This amount is automatically claimed for credit by everyone and represents roughly the value below which the government thinks individuals should not pay tax – currently about $12,000. Because the credit rate is equal to the lowest marginal tax rate, claiming this credit means individual taxes are automatically reduced to zero for anyone earning at or below the basic personal amount.

[4] Prior to 2001, Canada used a "tax on tax" system, where provinces collected a fraction of federal taxes owing from each filer. For example, in 1999 Ontario collected 39.5% of the federal basic tax. The key implication of the past system is that provinces adopted the tax brackets of the federal government.

[5] The $200 kink in the tax credit rate structure has been a feature of the "tax on income" system that has been in place since 2001.

There are rules governing what qualifies as a charitable donation, and limits to what filers are allowed to claim. Canadians can claim a credit for gifts of cash and some property made to registered Canadian charities and other qualified donees like Canadian amateur athletic associations, municipalities, the United Nations, and the federal or provincial governments.[6] Generally speaking, claims are limited to 75% of net income, though there are exceptions depending on the gift. Filers can increase this limit by 25% of the value of any gifts of capital or depreciable property (e.g., shares, bonds, land buildings) up to a maximum of 100% of net income. For gifts of cultural property or ecologically sensitive land, there is no limit.[7] For gifts of capital property, the filer avoids paying tax on any realized capital gains.

Finally, filers can carry forward donations for up to five years from the year of the donation. In practice, filers hold the receipt until the year the gift is claimed, rather than claiming in the year the donation is made and carrying the credit forward. Gifts are also transferrable between spouses, and because the credit rate rises with donations, it many cases it makes sense for one spouse to claim all gifts. We discuss the implications of these facts on our estimates in Section 4.

2.2 Simplicity of tax treatment of donations

Given the details of the tax system discussed above, the tax price is therefore a nationally meaningful price for all Canadians residing in households that may contain net payers to either the provincial or federal governments. The Canadian context enables us to exploit exogenous variation in the tax price that is unrelated to changes in the expected enforcement of the tax code. Complexities in tax enforcement can influence behavior and affect responses to changes in the tax code (Kopczuk and Slemrod (2002)). Fack and Landais (2016) demonstrated that a tax elasticity captures the behavioral

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[6] For the complete list, see P113 – Gifts and Income, which is published by the CRA.

[7] For the specific definitions of these terms, see P113 – Gifts and Income.

response of the individual to a change in tax only when all other features of the tax system remain unchanged. Kopczuk (2005) demonstrated that it is quite uncommon for an assumption of no other changes in the tax system at the time of a tax change to hold true in practice because reforms of tax systems tend to be lumpy. In another example, Gillitzer and Skov (2018) demonstrate that the introduction of third-party reporting in Denmark resulted in the near doubling of the number of individuals claiming the charitable subsidy. By using a tax setting that is the same across all jurisdictions, we can exploit the same exogenous variation facing people throughout the income and donation distributions.

3 Data and Summary Statistics

3.1 Data and Analysis Sample

We use the Longitudinal Administrative Databank (LAD) from 2001 to 2015. The LAD is a 20% random sample of tax filers that is specifically designed as longitudinal, meaning that once a person is sampled for the first time in a particular year, they remain in the dataset until they are no longer able to be followed by the tax authority - due to death, for example. To ensure that the LAD contains 20% of taxfilers in each year, it is topped up annually with randomly sampled tax filers using a Bernoulli sampling scheme. The LAD contains a wide variety of variables reported on an individual's tax record, including income, taxes payable, tax credits claimed, deductions, contributions to retirement plans, and government benefits received. There are also many demographic and location characteristics, including age, sex, marital status, family size, family type, number of children, immigrant status, and postal code where the person resides. These data include information from the tax forms of all other adult tax filers from a sampled individual's household. To the LAD we add information about the tax credits available to filers in each province in each year. These values were collected directly from federal and provincial tax forms and made available to the research team through Kevin Milligan's CTaCS program (Milligan (2016)).

While the unit of observation in the data is the individual taxfiler, for the analysis we combine them into households, where a household is either a single individual or a married couple. With respect to how we code households, each time a coupling or decoupling of tax filers occurs we use a distinct household identifier. We combine individuals into households because spouses can transfer donations to each other to file for credit, and as such in many cases one spouse is likely to claim most or all donations.

We draw a 50% subsample from the LAD of filers aged 25-64, who live in one of the 10 provinces (excluding the territories), who were not deceased and did not file for a deceased person during the time 2001-2015.[8] From this sample, we exclude all observations from tax-filers if they moved provinces at any time while they are observed. This exclusion isolates all variation in the tax price to legislated changes. In sensitivity checks of our regression results we include the movers and show that the tax price effect is slightly smaller in magnitude. Removing the movers reduces our sample size by 8.3%.

A key feature of our study is estimating the tax price elasticity across the five quintiles of the household income distribution, along with the top 10%, 1%, and 0.1%. We compute income quintiles by pooling all observations in the sample, thus constructing a distribution over 14 years of household income. A household is in a quintile of the 14-year income distribution when their household income falls between the lower and upper bounds for that income quintile in year t. Using this definition of income distribution allows households to be present in different quintiles at different years in our sample, and makes our definition of membership to quantiles of the income distribution independent of intertemporal variation in incomes.

There are several different income measures available in the LAD. We focus on total household pre-tax income, a measure derived by Statistics Canada that effectively equals market income plus government

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[8] We use a 50% sample to reduce computational time given the very large size of our dataset. Note that all sample sizes are weighted to population level totals.

transfer payments.[9] Importantly, this measure removes capital gains/losses from income, which we add as a separate measure in the analysis. We separated capital gains/losses from income because this has the effect of occasionally making a person with high employment income, but a big capital loss, appear in the data as a low-income earning person. This tended to include otherwise high earning households in the lowest income quintile. We present evidence of the robustness of our results by using after-tax income as a control in our regressions, and separating households into income groups using different income measures and different ways of creating the groups in Section 5.3.

3.2 Summary Statistics

Figure 1 presents a time series for the lower tier of the combined federal/provincial charity tax credit rate for all provinces since 2001. All provinces lowered this rate early in our sample period and have stayed roughly constant since then. Once exception is Ontario, which has raised and lowered their rate several times over the 15 years in our sample. The biggest change is in Newfoundland, which lowered its rate from roughly 26% to 23%. Figure 2 produces a similar time series for the upper tier of the tax credit. Here we observe more substantial variation in the rates, particularly in Alberta, Nova Scotia, Newfoundland, and to some extent British Columbia and Saskatchewan. Unlike the lower tier credit, which is mostly lowered over time, there are some large increases and decreases in the upper tier. Alberta increased its credit from about 42% to 50%.

Figure 3 shows provincial average donations per household over time in constant 2015 dollars. Donations in 2015 are below their peak for every province in Canada, and provinces experienced a peak

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[9] The LAD documentation outlines the specific components of this variable (called XTIRC). Summarizing information from that table, this income measure includes all types of employment income, dividends and rental income, and government transfers such as old age security, refundable tax credits, social assistance payments, child benefits, and the working income tax benefit.

in average donations at different points in time. Much of the variation in donations appears to be associated with the business cycle, and the range for average donations over time is quite different across provinces. The largest variance in donations occurs in Alberta and Nova Scotia. Figure 4 shows that in every province the fraction of filers who donate has been falling monotonically since roughly 2007-08. There is evidence from these graphs that the absence of a recovery in reported giving following the Global Financial Crisis is in part due to a decrease in the share of households that report donations in each year and not simply a decline in the level of giving conditional on reporting donations.

Table 1 presents summary statistics on donation behaviour for the full sample and stratified by different quantiles of the pre-tax income distribution. Panel A of Table 1 focuses on all households. Looking first at the propensity to give, approximately 40% of households claim donations on their tax return in any given year. Across the sample period, 66% of households claim the charity tax credit at least once.

Across the income distribution, the fraction of tax filers that report donations increases monotonically by income quintile, with 7% of the bottom 20%, and 72% of the top 20% of households reporting donations. Looking more narrowly at high income households, we see that 78% of the top 10% report donations, 87% of the top 1%, and 89% of the top 0.1% of households by income. This indicates the obvious, which is that income is an important determinant of charitable giving.

The mean annual donation across all households is roughly $650. The average donation within quintiles increases monotonically from $50 to $620 across the first four income quintiles, and then jumps more substantially to $1900 for the top income quintile. This is driven by very large giving among top income earners: the highest 0.1% give over $69,000 per year on average. These magnitudes tell us that our estimates of the overall elasticity of giving with respect to the tax price are likely to be greatly influenced by high earning households.

Looking within income quintiles, some interesting patterns emerge. It is only as we enter the 4th income quintile that donations are reported by more than 50% of tax filers in a quintile. Many of the households that do not claim donations are in the bottom 60% of the income distribution. We also observe that even among households in the second- and third-income quintiles, the 90th percentile gift is relatively substantial, at $350 and $750 respectively. This tells us that conditional on giving some low-income households will typically face the lower tax price associated with the high credit rate. Finally, among top income households, there is a very wide distribution of gifts. Within the top 0.1% of households by income 75% give $690 or more and 10% give $85,100 or more.

Panel B of Table 1 shows donation activity for households, conditional on donating. Here it is striking that for donors in the bottom 20% of household income the 90th percentile of donations ($1,600) exceeds the 75th percentile of donations ($1,300) for the top 20% of households. While donations are clearly increasing in income, there are very generous households throughout the distribution of income. Still, the donation activity of the top 1% of households by income is of an order of magnitude larger than that of the bottom 20% of households by income. We also note that a significant fraction of people within each quintile that face the high credit rate, low tax-price when deciding on the last dollar donated.

Table 2 presents summary statistics for the covariates used in our regression analysis. The average age of tax-filers in our sample is 45. Looking at other demographics, 70% of our sample is married and the average number of children in a household is about 1. The median total pre-tax income per household in 2015 dollars in $67,800, and the mean is $87,000 reflecting the right skew in earnings. The mean of capital gains/losses is $2,400. Finally, the ratio of the number of household-years to households says that on average they are observed in 10 years of the panel.

4 Estimation

4.1 Estimating the Tax Price of Giving

Our empirical specification for estimating the tax price elasticity for giving is:

$$\ln(Don_{ht}) = \beta_0 + \beta_1 \ln(taxprice_{ht}) + x_{ht}\beta_2 + \omega_h + \gamma_t + \delta_{p(h,t)} + \delta_{p(h,t)} * trend_t + \varepsilon_{ht} \quad (1)$$

where h and p index households and provinces, and t indexes time. As noted in Section 3.1, even though in the data the unit of observation is the tax filer, for the analysis we combine them into households. The subscript *p(h,t)* refers to the province where household h resides at time t. Don_{ht} captures the total dollar value of donations as reported by the tax filer's household, h, in year t. If \$0 donations are reported, we add \$1 to the total so that the natural log exists.[10]

The variable of interest is the last-dollar tax price faced by the household, and it enters equation 1 in log form. This last dollar tax price is the price that a donor faces for the last dollar donated to charity, which might be different from the price they pay on the first dollar if the credit rate changes with donations. With credits available at both federal and provincial levels, the total tax price is one minus the sum of these credits.

As discussed, Canada has a two-tiered tax credit system, and so the relevant tax credit used to compute the tax price will vary with the total amount donated, year, and the province of residence. The tax price for the *household* is the price that applies to the sum of their reported donations. For households who donate zero dollars and owe no federal or provincial taxes, we assign a tax price of 1, because if they were to donate, they would get no tax credit. For non-donors who owe taxes, we assign the tax price as one minus the lower credit rate.

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[10] Table 6 shows the results of using an inverse hyperbolic sine transformation of donations as the dependent variable. Comparing these to Table 3, the results are very similar.

Equation 1 includes a vector of time-varying household characteristics (x_{ht}), which include marital status, average age of the main taxfiler, number of children, capital gains/losses accrued in the tax year, and a fifth-order polynomial in log pre-tax income to account for any non-linear relationship between donations and income. Also included in the model are a household fixed effect (ω_h), and a set of year effects (γ_t) that capture annual factors that affect giving equally for everyone across time, provincial effects ($\delta_{p(h,t)}$), and province-specific linear time trends ($\delta_{p(h,t)} * trend_t$) to account for differential trends in donations across provinces. As outlined in Section 3.1, when households couple or decouple over the sample period, we treat them as different households, and as such each separate combination of filers into households is given its own fixed effect.

A major issue in estimating equation 1 by OLS is simultaneous equation bias, because the tax credit for the last dollar donated depends mechanically on the total amount donated (the credit rate rises when donations exceed $200). To eliminate this bias, we use an instrumental variable estimator, with the legislated donation credit rates as instruments for the last dollar tax price, in a process we describe below.

Our first stage estimates the price of giving as follows:

$$\ln(taxprice_{ht}) = \alpha_0 + \alpha_1 simprice_{p(h,t)t} + x_{ht}\alpha_3 + \theta_h + \mu_t + \pi_{p(h,t)} + \pi_{p(h,t)} * trend_t + \xi_{ht} \quad (2)$$

where x_{ht} is the vector of household characteristics, θ_h are household fixed effects, μ_t are year effects, $\pi_{p(h,t)}$ are province effects, and $\pi_{p(h,t)} * trend_t$ province-specific linear trends. The excluded instrument in equation (2) is based on Currie and Gruber (1996). We construct it by randomly drawing 1000 households from the pooled sample, computing the tax price for each of them – equal to one minus the combined federal-provincial tax credit rate – separately for every province/year combination in our sample, and then averaging across the 1000 in each province and year. Because we are following the same group of people across both time and space, the variation in this instrument should come only from

changes in legislated charitable tax credit rates, which we contend below is exogenous. It is important to note that the group we are following represents the average household in the pooled sample, so our instrument tracks their tax price in different parts of the country at different times. We argue that this breaks the feedback between donations and the tax price that causes a significant bias in OLS estimates of equation (1) because the legislated rates are not a function of donations.

The tax credit rates that underlie our instrument are set to the highest and lowest marginal tax rate in the province for all provinces except Alberta. One threat to identification is that the instrument might be endogenous if marginal tax rates respond to donations. Federal and provincial tax rates are chosen for a wide variety of political and policy reasons, but not trends in giving. For example, the discussion around changing the highest federal marginal tax rates in Canada in the recent past has been more about the current government's strategy to tax the rich more and the middle class less. In Alberta, where the charity tax credits are decoupled from the marginal tax rates as part of the "Community Spirit Program," the credits were increased to encourage donations by lowering the tax price, but there is no evidence to suggest that this was in response to giving. Furthermore, according to Burrows (2009), the motivation behind this program was related to government finances and political factors.[11]

A second potential threat to identification - also based on marginal tax rates - is that a household's income may depend on marginal tax rates, and because the credit rates are mostly set at the highest and lowest marginal tax rates in each province, the instrument could be correlated with the error if income is misspecified in the regression. This may take the form of labor supply responses to changes in effective marginal tax rates or changes in the incentives to realize capital gains. To alleviate these concerns, we include a 5th order polynomial in log pre-tax income, which flexibly controls for a non-linear function of

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[11] Burrows (2009) says specifically: "Alberta's large fiscal surplus, the inability to lower taxes any further due to backlash from other provinces, and the desire to redistribute tax revenue without reverting to `Ralph Bucks' (cheques to taxpayers)."

income, and hopefully any labor supply response to changing tax rates. In addition to the controls for income, for several reasons we believe the correlations between the legislated credit rates and income is not very strong. As noted above, Kopczuk (2005) documents that changes to parameters of the tax code do not often take place in isolation and rather are lumpy – with each year seeing many changes that may affect the effective marginal tax rates facing tax filers. The effective marginal tax rate is a complex function of individual behavior and the parameters of the tax code. It is unclear for example how much tax filers may be "schmeduling" or misperceiving the effective marginal tax rates they face by application of "ironing" marginal taxes or other heuristics (see Rees-Jones and Taubinsky (2020) for an enlightening discussion in the US context). Furthermore, unlike in the U.S. where the tax price is a function of each *individual's* marginal tax rate, the tax credit is a function of either the highest or lowest rate *in the province*, depending on how much a person donates. For people whose actual marginal tax rate lies below the highest rate, changes in the highest rate should have no impact on their labour supply decisions because they do not face that rate for income taxation. Likewise, while a high-income earner would be affected by a change in the lowest marginal tax rate, this would likely be a relatively small income effect with no substitution effect. The point is that the structure of the donation tax credit in Canada substantially weakens the correlation between changes in the legislated rates and a household's own marginal tax rate and makes this source of bias less of a concern.

Finally, in issue with estimation is that filers can carry forward donations for up to five years from the year of the donation. As a non-refundable tax credit, any value unused from one tax year can be carried forward and applied to future taxes owed. To interpret the elasticity estimates presented below as the response of giving to the change in the tax price one must assume that the donations are claimed in the year that they are given, otherwise what we are measuring is a combination of a giving and reporting response. We do not observe the timing of donations, only reported donations. To the extent that donors are very responsive to the tax price of giving they have an incentive to delay reporting donations until

they would be able to access the higher credit rate. The cost of doing so is their impatience and cost of record keeping. Our assumption that donors report in the year that they give is an assumption that the cost of delay and record keeping exceeds the gain from claiming in subsequent years.

5 Results

5.1 Baseline Results

In Table 3 we present the results of our regression analysis. Column 1 displays estimates equation 1 by OLS. Columns 2 to 4 report the results from separate IV specifications with and without household fixed effects using the simulated tax price to instrument for the actual tax price. For columns 1 to 3, we compute the standard errors based on a clustering of the census subdivision (CSD) in which the household is located. The clustering at this level of geography captures the variation that is associated with community characteristics. For column 4, we report the estimates if we cluster the standard errors at the province level. For all specifications except column 2 we include a household fixed effect, a province-specific linear time trend, and measures to capture the number of children in the household and whether the unit of observation is for a married couple or a single tax filer. Columns 5-6 show the relevant first stages for the three IV specifications.

Starting with OLS, the estimated elasticity of donations with respect to tax price is -12.7, highlighting the significant simultaneity bias owing to the discrete drop in the tax price at the $200 giving threshold. Using an instrumental variable specification, but excluding household fixed effects, the magnitude shrinks by a factor of 10 down to -1.7. Including household fixed effects and instrumenting for the tax price brings the tax price elasticity slightly lower to -1.9. This result is in line with some of the larger magnitude estimates in the literature and is evidence that the Canadian tax credits for charitable donations induce more donations than they cost in terms of the tax expenditure.

Clustering for standard error calculations in columns 3 (CSD) and 4 (province) illustrate that precision of the estimate drops if we cluster at a higher level of aggregation. In line with Cameron and Miller (2018) we wish to cluster our standard errors at the level associated with the variation in our instrument: the province. However, there is an argument for clustering at the CSD level to allow for heterogeneity in the responses of charities to the changes in the tax price. Andreoni (2006) highlights the power of the ask, and Duquette (2014) demonstrates that some charities benefit more by reductions in tax price than others. Since fundraising responses are likely geographically concentrated, we cluster by CSD to allow for differences in the structure of the error-variance associated with different responses at the community level.

The first stages for the IV specifications (with and without household fixed effects) illustrate a roughly unit elasticity between the instrument and the tax price. This makes sense given that the simulated tax price is computed using the average tax price paid for a hypothetical household in the sample. The table also includes the first-stage F-statistic, which is more than 300. Based on this, we are confident that our estimates do not suffer from weak instrument problems.

Table 3 highlights the total response in giving to changes in its price but ignores that those changes could occur along intensive extensive margins. Table 4 reports the results from an analysis that separately estimates these effects. In column 1 we report the results for the intensive margin by including only those households observed donating positive amounts in year t. The tax price elasticity along the intensive margin is -0.34, which is significantly smaller than the total elasticity. On the extensive margin, columns 2 shows that increasing the tax price by 1% lowers giving by 0.33 percentage points. We can translate this coefficient into an implied elasticity of -0.84 (the ratio of the coefficient estimate to the fraction of donors). Putting the estimate in these terms highlights a large extensive margin effect, more than double the intensive margin effect. On average, this means that a big part of

increasing the tax credit is drawing in new donors, which as we will see below is concentrated largely in the bottom of the income distribution.

5.2 Estimates Across Income Distribution

Table 5 examines the tax price elasticity of giving across quintiles of the income distribution, and at the very top of the distribution.[12] The three panels of the table show the overall tax price elasticity, the intensive margin effect, and the extensive margin effect. Each column in each panel is a separate IV regression with its own first stage, which we report in Appendix Table A1. In Panel A we find that the strongest reaction to the tax price elasticity happens in the lowest quintiles: for people in the bottom two quintiles, the elasticity ranges from -4 to -3 overall. Separating the intensive from the extensive margins, we find a minimal intensive margin effect and a very elastic extensive margin effect. For the lowest quintile, a 1% increase in the tax price lowers the share who donate by 0.53 percentage points, which amounts to about an 8% change when compared to the share of people in that quintile who donate. The implied elasticity for the second quintile is also large, but relatively smaller at -2.76. While these results are quite large, it is important to consider that in the lowest quintile only about 7% of filers donate, so even relatively small absolute swings will appear proportionately large.

Moving up the income distribution, Panel A shows that the total elasticity shrinks in magnitude towards -1 for the top 20%, top 10%, top 1%, and top 0.1%. Remember that the average donation for people in the upper part of the distribution is significantly higher than at the bottom, so these roughly equal proportional responses imply a much larger dollar donation increase for wealthier Canadians. In contrast to the bottom of the income distribution, Panels B and C show that for those at the top the response

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[12] With a large sample size, we could theoretically look at finer cuts of the income distribution. We focus on quintiles because of computational time: with a large dataset and limited computer power available at the data centre where we work with the data, each regression takes long amounts of time.

along the intensive margin response is generally larger than the extensive margin. The exception is for the top 0.1% where we find that the intensive response is effectively zero (but also statistically insignificant) and the response is driven by the intensive margin.

Taken together, the results show a very strong response in donation to price at the bottom of the distribution, where donations fall proportionately more than an increase in price. The response is more proportionate in the upper part of the distribution, and across all quintiles the additional donations driven by the tax price change are more than the tax expenditures that create them. Our results contrast with the findings of Bakija and Heim (2011) who find a stronger response among wealthier tax filers.

Why do low-income filers react so strongly on the extensive margin? One explanation is that we only observe *reported* donations, which may differ from actual donations if filers do not claim them for credit. Many wealthier filers may have a greater incentive to claim most or all their donations given the relative benefit from the tax credit. Lower-income filers, on the other hand, may not report to the same degree, but a lower tax price might draw many of them into claiming the credit. Thus, one explanation for the large extensive margin elasticity might be the combination of a strong reporting effect plus an increase in donors for low-income filers that we do not see for wealthier filers because they are already reporting. What might drive this reporting effect is changes in the salience of the tax credit as the credit varies. When tax credit rates change, charities capitalizing on the event may inform current and prospective donors. If the price of giving increases, charities can plead that giving is more necessary to support their cause as they anticipate a negative price response. If the price of giving goes down, charities remind donors of the great deal at tax time that they can get when making donations. As noted above, if wealthier donors are already reporting, the additional salience would mainly encourage low-income filers to donate/report. For a discussion of the salience of the tax price of giving in Canada see Hickey et al. (2019).

Overall, what we learn from Table 5 is that there is substantial heterogeneity in the tax price response of charitable giving across the income distribution. The overall elasticity at each quintile also masks the heterogeneity in responses with respect to the intensive and extensive margins. For lower income households much of the response is on the extensive margin, while for higher incomes it is coming from the intensive margin. The robustness of our estimates to the choice of income definition used to assign households to income quantiles is discussed in the next section.

5.3 Robustness

One issue with using the natural logarithm of charitable giving as a dependent variable is the large number of zeroes, which in our case exceeds half of the observations. It is standard in the literature to solve this problem by using one plus donations to ensure that the log of giving is defined for everyone. Another option is to use the inverse hyperbolic sine transformation, which is defined even when donations are zero.[13] We report our main results using this latter transformation of the dependent variable in Table 6. The estimates are all consistent with using the natural logarithm, though the magnitudes are slightly higher.

Our main results use pre-tax income as the main control for income, which as we note in detail, we expect not to be related strongly to the tax price. To the extent that for most provinces the tax credit changes with the top and bottom marginal tax rate, a change might have a direct impact on after-tax income, which could itself affect giving. In Table 7 we check the robustness of our results to using after-tax income instead of pre-tax income in the regressions, and we see that the results are almost

[13] See Burbidge et. al. (1988) for a description, and Bellemare (2020) for a more recent analysis of this technique when it comes to elasticities.

identical to Table 3, which makes us confident that we do not have bias resulting from misspecification of the relationship with income.

Our final robustness exercise replicates the results across the income distribution using different methods of computing the distribution. The method we used in Table 5 creates the quintiles using the pooled sample and pre-tax income. In Panel A of Table 8, we instead use after-tax income to compute the income groupings and find slightly smaller elasticity estimates. In Panel B we create the quintiles separately for each year using pre-tax income, and again find very similar estimates to Table 5. Finally, in Panel C we put form the quintiles using the distribution of income of each household averaged across time, and the placing an observation from year t into that distribution. With this method the results are broadly consistent with Table 5, though the magnitudes are stronger.

6 Conclusion

We document that the tax price elasticity of charitable giving in Canada is roughly -1.9. There is substantial heterogeneity across the income distribution; the strongest response to the tax incentive is from low-income households, in particular along the extensive margin. Credible estimates of the tax price elasticity of charitable giving for the average tax filer and across the income distribution are difficult to achieve in many countries – the U.S. in particular - since the tax price is a function of income, and because samples are sometimes limited to higher income individuals. Fortunately, in the context of Canada, the tax price depends only on donations and on legislated tax credit rates that vary frequently over time within provinces– allowing us to identify the tax price elasticity of charitable giving by instrumenting with the tax credit rates.

While we provided an analysis of heterogeneity of the tax price elasticity of charitable donations there is ample scope for future research in this area. First, we neglected heterogeneity through the distribution of donations itself. Indeed, an exploration of quantile regression methods would be interesting. Our

instrumental variable approach could be modified and applied in that context. In addition, the kink in the price schedule at the $200 donation threshold could be exploited using a bunching estimation framework as employed by Benzarti (2020). Finally, an exploration of intertemporal giving and credit claiming and how these activities relate to tax price would be an exciting new direction of study. Such endeavours would complement the existing literature.

References

Almunia, M., Guceri, I., Lockwood, B., and K. Scharf (2020). "More Giving or More Givers? The Effects of Tax Incentives on Charitable Donations in the UK." *Journal of Public Economics*, 183, 104-114.

Andreoni, J. (2006). "Philanthropy." In Kolm, S.-C., Mercier Ythier, J. (Eds.), Handbook of Giving, Reciprocity and Altruism (pp. 1201–1269). Amsterdam: North Holland.

Andreoni, J. and A. A. Payne. "Charitable giving." Handbook of public economics. Vol. 5. Elsevier, 2013. 1-50.

Auten, G., Sieg, H and Clotfelter, C (2002). "Charitable giving, income, and taxes: an analysis of panel data." *American Economic Review*, 371-382.

Backus, P.G. and N.L. Grant (2018). "How sensitive is the average taxpayer to changes in the tax-price of giving?" *International Tax and public Finance*, 26(2). 317-356.

Bakija, J. and Heim, B.T. (2011). "How does charitable giving respond to incentives and income? New estimates from panel data." *National Tax Journal*, 64(2), 615-50.

Bellemare, M.F., and Wichman, C.J. (2020). "Elasticities and the Inverse Hyperbolic Sine Transformation." Oxford Bulletin of Economics and Statistics, 82 (1), 50-61.

Benzarti, Y. (2020). "How taxing is tax filing? Using revealed preferences to estimate compliance costs." *American Economic Review*, 12(4), 38-57.

Boskin, M. J., and Feldstein, M. (1977). "Effects of the charitable deduction on contributions by low income and middle income households: evidence from the national survey of philanthropy." *The Review of Economics and Statistics*, 351-354.

Burrows, M.D. (2009). "Charitable Tax Incentives in Canada: Overview and Opportunities for Expansion." *The Philanthropist*, 22, 3-23.

Burbidge, J.B., and Magee, L., and Robb, A.L. (1988). "Alternative Transformations to Handle Extreme Values of the Dependent Variable." *Journal of the American Statistical Association*, 83 (401), 123-27.

Cameron, A. C., and Miller, D. L. (2015). A practitioner's guide to cluster-robust inference. *Journal of Human Resources*, *50*(2), 317-372.

Currie, J., and Gruber, J. (1996). "Health Insurance Eligibility, Utilization of Medical Care, and Child Health." The Quarterly Journal of Economics, 111 (2), 431-466.

Duquette, N. J. (2016). "Do tax incentives affect charitable contributions? Evidence from public charities' reported revenues." *Journal of Public Economics*, 137, 51-69.

Fack, G., and Landais, C. (2010). "Are tax incentives for charitable giving efficient? Evidence from France." *American Economic Journal: Economic Policy* 2(2), 117-141.

Feldstein, M., and Clotfelter, C.T. (1976). "Tax Incentives and Charitable Contributions in the United States: A Microeconometric Analysis." *Journal of Public Economics*, 5:1-26.

Feldstein, M., and Taylor, A. (1976). "The Income Tax and Charitable Contributions." *Econometrica*, 44:1201-22.

Finance Canada. (2014). Tax Expenditures and Evaluations 2014. http://www.fin.gc.ca/taxexp-depfisc/2014/taxexp1402-eng.asp

Gillitzer, C., and Skov, P. E. (2018). "The Use of Third-Party Information Reporting for Tax Deductions: Evidence and Implications from Charitable Deductions in Denmark." *Oxford Economic Papers*, 70(3), 892-916.

Government of Canada (2017). "Canada at a Glance 2017: Population". https://www150.statcan.gc.ca/n1/pub/12-581-x/2017000/pop-eng.htm. Accessed on May 15, 2019.

Government of Canada (2019). "Individual Income Tax Return Statistics for the 2019 tax-filing system". https://www.canada.ca/en/revenue-agency/corporate/about-canada-revenue-agency-cra/individual-income-tax-return-statistics.html. Accessed on May 15, 2019.

Hickey, R., Minaker, B. and A.A. Payne (2019). "The Sensitivity of Charitable Giving to the Timing and Salience of Tax Credits," *National Tax Journal*, 72(1), 79-110.

Hungerman, D. M., & Ottoni-Wilhelm, M. (2021). Impure impact giving: Theory and evidence. *Journal of Political Economy*, *129*(5), 1553-1614.

Kopczuk, W. (2005). "Tax bases, tax rates and the elasticity of reported income," *Journal of Public Economics*, 89(11-12), 2093-2119.

Milligan, K. (2016). Canadian Tax and Credit Simulator. Database, software and documentation, *Version* 2016-2.

Randolph, W. C. (1995). "Dynamic income, progressive taxes, and the timing of charitable contributions." *Journal of Political Economy*, 709-738.

Rees-Jones, A., & Taubinsky, D. (2020). Measuring "schmeduling". *The Review of Economic Studies*, *87*(5), 2399-2438.

Slemrod, J., & Kopczuk, W. (2002). The optimal elasticity of taxable income. *Journal of Public Economics*, *84*(1), 91-112.

Statistics Canada. (2011, November). Financial and Charitable Donors Databank of the Income Statistics Division User's Guide. https://www.statcan.gc.ca/eng/statistical-programs/document/4106_D4_T1_V10#a7

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 Households									
Fraction of households observed donating	40.0%	6.6%	26.5%	41.3%	54.0%	71.6%	77.5%	87.5%	89.0%
Mean Donation	$650	$50	$210	$420	$620	$1,900	$3,000	$14,200	$69,200
Standard dev. of donations	(14,282)	(2,050)	(1,275)	(1,726)	(2,506)	(31,662)	(44,589)	(138,634)	(420,627)
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	$1,600	$5,000
75th Percentile of Donations	$140	$0	$20	$120	$250	$780	$1,200	$5,800	$23,600
90th Percentile of Donations	$910	$0	$350	$750	$1,100	$2,900	$4,300	$18,800	$85,100
Panel B: Donating Households									
Mean Donation	$1,600	$680	$800	$1,000	$1,200	$2,700	$3,900	$16,200	$77,700
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	$1,500
50th Percentile of Donations	$260	$170	$190	$200	$210	$410	$570	$2,200	$7,100
75th Percentile of Donations	$910	$600	$680	$710	$720	$1,300	$1,800	$7,000	$28,300
90th Percentile of Donations	$3,100	$1,600	$2,200	$2,700	$2,700	$4,400	$5,900	$21,800	$100,200

Notes: All dollars reported in 2015 constant dollars; see text for description of sample. Due to Statistics Canada rules, all dollar values under $1000 are rounded to the nearest $10, and all values above $1000 are rounded to the nearest $100.

Table 2: Summary Statistics for Additional Variables

	Mean	Standard Deviation
Mean Age of Primary Filer in Household	45	10.96
Mean Number of children per household	1.04	1.14
Mean Pre-Tax Income	$87,100	$154,902
Mean Capital Gain/Loss	$2,400	$69,256
Mean Total Dollars Claimed as Federal Tax Credits	$25,000	$12,179
Mean Federal Tax Credit Received	$4,200	$4,455
Mean Federal Charity Tax Credits Received	$180	$4,142
Share of Households Married in year t	71.0%	
Number of Household-years	227,062,725	
Number of Unique Households	22,485,445	

Notes: Due to Statistics Canada rules, all dollar values under $1000 are rounded to the nearest $10, and all values above $1000 are rounded to the nearest $100. The number of observations N refers to household-years. The LAD is structured so that spousal information is attached to each filer where available. The age variable refers to the age of the filer and not the attached spouse.

Table 3 - Estimates of Tax Price Elasticity of Donations

	Dependent Variable: Log Donations				Dependent Variable: Log Tax Price	
	OLS	IV	IV	IV	FS	FS
	(1)	(2)	(3)	(4)	(5)	(6)
Log Tax Price	**-12.70**	**-1.67**	**-1.88**	**-1.88**		
	(0.42)	(0.31)	(0.31)	(0.54)		
Log Simulated Tax Price					**1.11**	**1.09**
					(0.06)	(0.06)
Household FE	Yes	No	Yes	Yes	No	Yes
Cluster level	CSD	CSD	CSD	Prov	CSD	CSD
First-Stage F-Stat					316.4	325.4
Household-years	227,062,725	227,062,725	227,062,725	227,062,725	227,062,725	227,062,725
R2	0.60				0.45	0.73

Notes: All regressions include household fixed effects, province-specific linear time trends, a 5th order polynomial in income, dummies for number of children in the household, and an indicator for marital status. Standard errors in parentheses clustered at the level indicated in the table. Coefficient in bold statistically significant $p<0.05$; Coefficient in italics statistically significant $p<0.10$. N is the number of household-years.

Table 4 - Estimates of Tax Price Elasticity of Donations for Donors and Extensive Margin Effects

	Total Effect	Extensive Margin
	(1)	(2)
Log Tax Price	**-0.34**	**-0.33**
	(0.09)	(0.05)
Fraction Donors		0.40
Implied Elasticity (Log Tax Price Coefficient/Fraction Donors)		-0.84
Household-years	90,846,130	227,062,725

Notes: All regressions include household fixed effects, province-specific linear time trends, a 5th order polynomial in income, dummies for number of children in the household, and an indicator for marital status. Standard errors in parentheses. Standard errors clustered by CSD. Coefficient in bold statistically significant $p<0.05$; Coefficient in italics statistically significant $p<0.10$. The number of observations in column 1 is all households who donate in year t, and in column 2 it is all household-years.

Table 5 - Elasticity Estimates by Pre-Tax Income Quantile

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Top 10%	Top 1%	Top 0.1%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Tax Price Elasticity of Giving, Full Sample								
Log Tax Price	**-2.93**	**-4.02**	**-1.80**	**-1.47**	**-0.96**	**-0.75**	**-0.94**	***-1.44***
	(0.38)	(0.80)	(0.49)	(0.28)	(0.13)	(0.12)	(0.33)	(0.98)
Household-years	45,412,765	45,412,380	45,412,505	45,412,535	45,412,540	22,706,295	2,270,635	227,065
Panel B: Tax Price Elasticity of Giving, Donors (Intensive Margin)								
Log Tax Price	0.23	***-0.28***	-0.16	**-0.26**	**-0.35**	**-0.40**	**-0.63**	0.00
	(0.22)	(0.16)	(0.15)	(0.10)	(0.06)	(0.06)	(0.22)	(0.55)
Household-years	3,012,195	12,025,625	18,772,335	24,521,975	32,514,000	17,605,360	1,985,980	202,200
Panel C: Extensive Margin Effect, Full Sample								
Log Tax Price	**-0.53**	**-0.73**	**-0.39**	**-0.31**	**-0.11**	**-0.07**	***-0.06***	***-0.18***
	(0.07)	(0.11)	(0.07)	(0.05)	(0.02)	(0.02)	(0.04)	(0.13)
Fraction Donors	0.07	0.26	0.41	0.54	0.72	0.78	0.87	0.89
Implied Elasticity (Coefficient/Fraction Donors)	-7.99	-2.76	-0.93	-0.58	-0.16	-0.09	-0.07	-0.20
Household-years	45,412,765	45,412,380	45,412,505	45,412,535	45,412,540	22,706,295	2,270,635	227,065

Notes: All regressions include household fixed effects, province-specific linear time trends, a 5th order polynomial in income, dummies for number of children in the household, and an indicator for marital status. Standard errors in parentheses. Standard errors are clustered by CSD. Coefficient in bold statistically significant $p<0.05$; Coefficient in italics statistically significant $p<0.10$. The number of observations in Panel B is all households who donate in year t, and in Panel A and C it is all household-years.

Table 6 - Estimates of Tax Price Elasticity of Donations using Inverse Hyperbolic Sine Transform

	Dependent Variable: Inverse Hyperbolic Sine Donations			
	OLS	IV	IV	IV
	(1)	(2)	(3)	(4)
Log Tax Price	**-13.80**	**-1.88**	**-2.10**	**-2.10**
	(0.45)	(0.34)	(0.34)	(0.61)
Household Fixed Effects	Yes	No	Yes	Yes
Cluster for Standard Error	CSD	CSD	CSD	Prov
Household-years	227,062,725	227,062,725	227,062,725	227,062,725
R2	0.58			

Notes: All regressions include household fixed effects, province-specific linear time trends, a 5th order polynomial in income, dummies for number of children in the household, and an indicator for marital status. Standard errors in parentheses. Coefficient in bold statistically significant $p<0.05$; Coefficient in italics statistically significant $p<0.10$. The number of observations equals household-years.

Table 7 - Estimates of Tax Price Elasticity of Donations with After-Tax Income Control

	Dependent Variable: Log Donations			
	OLS	IV	IV	IV
	(1)	(2)	(3)	(4)
Log Tax Price	**-12.48**	**-1.81**	**-1.91**	**-1.91**
	(0.43)	(0.30)	(0.30)	(0.54)
Household Fixed Effects	Yes	No	Yes	Yes
Cluster for Standard Error	CSD	CSD	CSD	Prov
Household-years	227,062,725	227,062,725	227,062,725	227,062,725
R2	0.59			

Notes: All regressions include household fixed effects, province-specific linear time trends, a 5th order polynomial in income, dummies for number of children in the household, and an indicator for marital status. Standard errors in parentheses. Coefficient in bold statistically significant $p<0.05$; Coefficient in italics statistically significant $p<0.10$. The number of observations equals household-years.

Table 8 - 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	**-2.67**	**-2.26**	**-1.73**	**-1.39**	**-0.77**	**-0.71**	**-0.86**	-0.53
	(0.70)	(0.87)	(0.82)	(0.54)	(0.21)	(0.24)	(0.15)	(0.53)
Household-years	45,412,655	45,412,595	45,412,470	45,412,530	45,412,475	22,706,275	2,270,635	227,065
R2	0.70	0.74	0.75	0.74	0.72	0.74	0.78	0.81
Panel B: Annual Pre-Tax Income Quintiles								
Log Tax Price	**-2.51**	**-3.92**	**-1.69**	**-1.46**	**-1.34**	**-0.75**	**-0.94**	***-1.44***
	(0.71)	(1.76)	(0.82)	(0.43)	(0.25)	(0.24)	(0.11)	(0.89)
Household-years	45,413,585	45,412,605	45,412,295	45,412,140	45,412,100	22,706,295	2,270,635	227,065
R2	0.68	0.76	0.76	0.74	0.73	0.73	0.77	0.81
Panel C: Ever in Pre-Tax Income Quintile								
Log Tax Price	**-3.56**	**-2.87**	**-2.09**	**-1.58**	**-1.17**	**-1.07**	**-1.12**	**-1.07**
	(1.43)	(1.14)	(0.76)	(0.49)	(0.35)	(0.33)	(0.21)	(0.46)
Household-years	97,628,345	124,248,275	131,985,170	122,423,170	89,148,710	53,120,465	7,140,585	982,210
R2	0.67	0.68	0.68	0.68	0.68	0.68	0.69	0.69

Notes: All regressions include household fixed effects, province-specific linear time trends, a 5th order polynomial in income, dummies for number of children in the household, and an indicator for marital status. Standard errors in parentheses. Standard errors are clustered by CSD. Coefficient in bold statistically significant p<0.05; Coefficient in italics statistically significant p<0.10. The number of observations is household-years

Figures

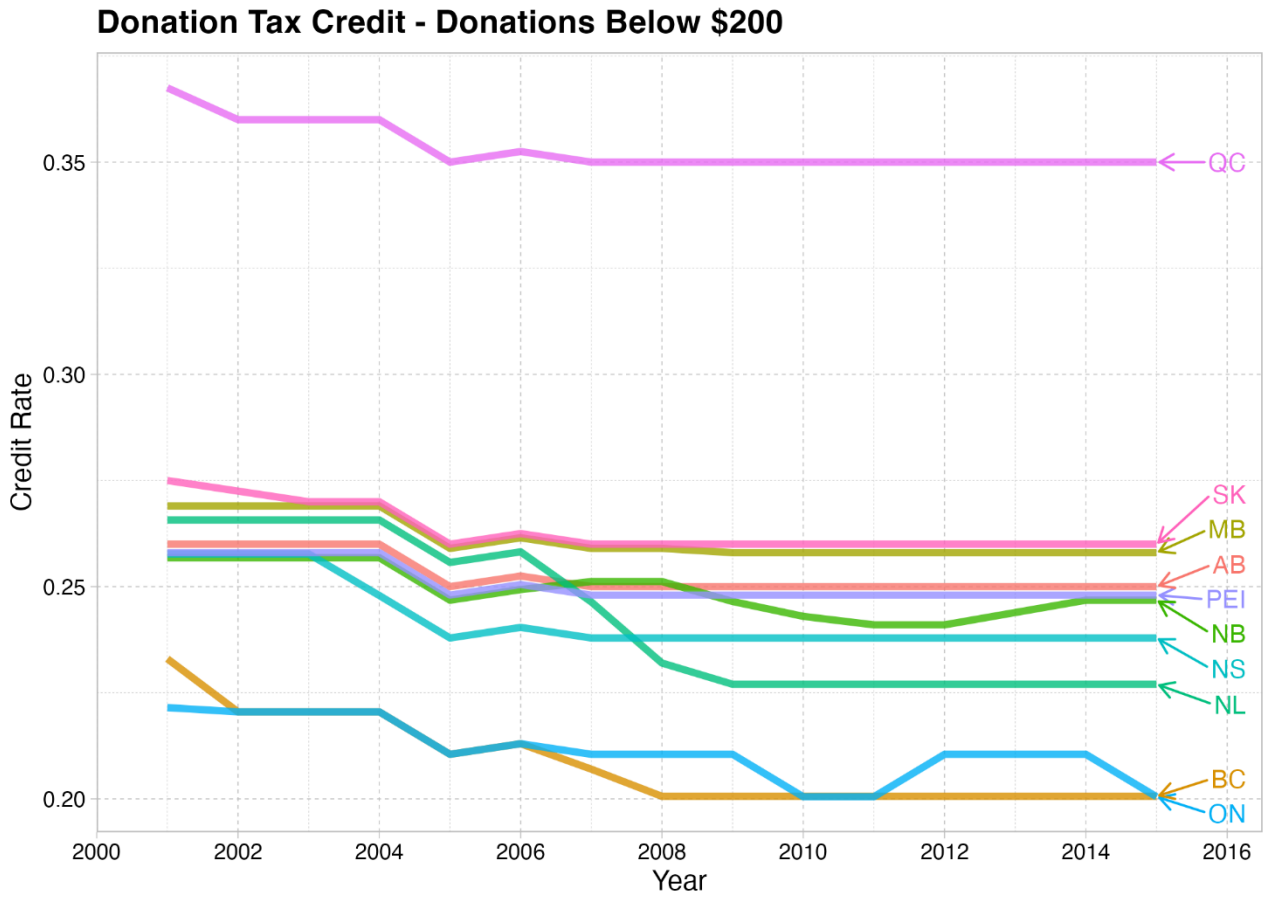

Figure 1 – Tax Credit Levels for Donations Below $200

Notes: Figure plots the combined federal/provincial legislated tax credit rate for donations below $200 in each province in each year

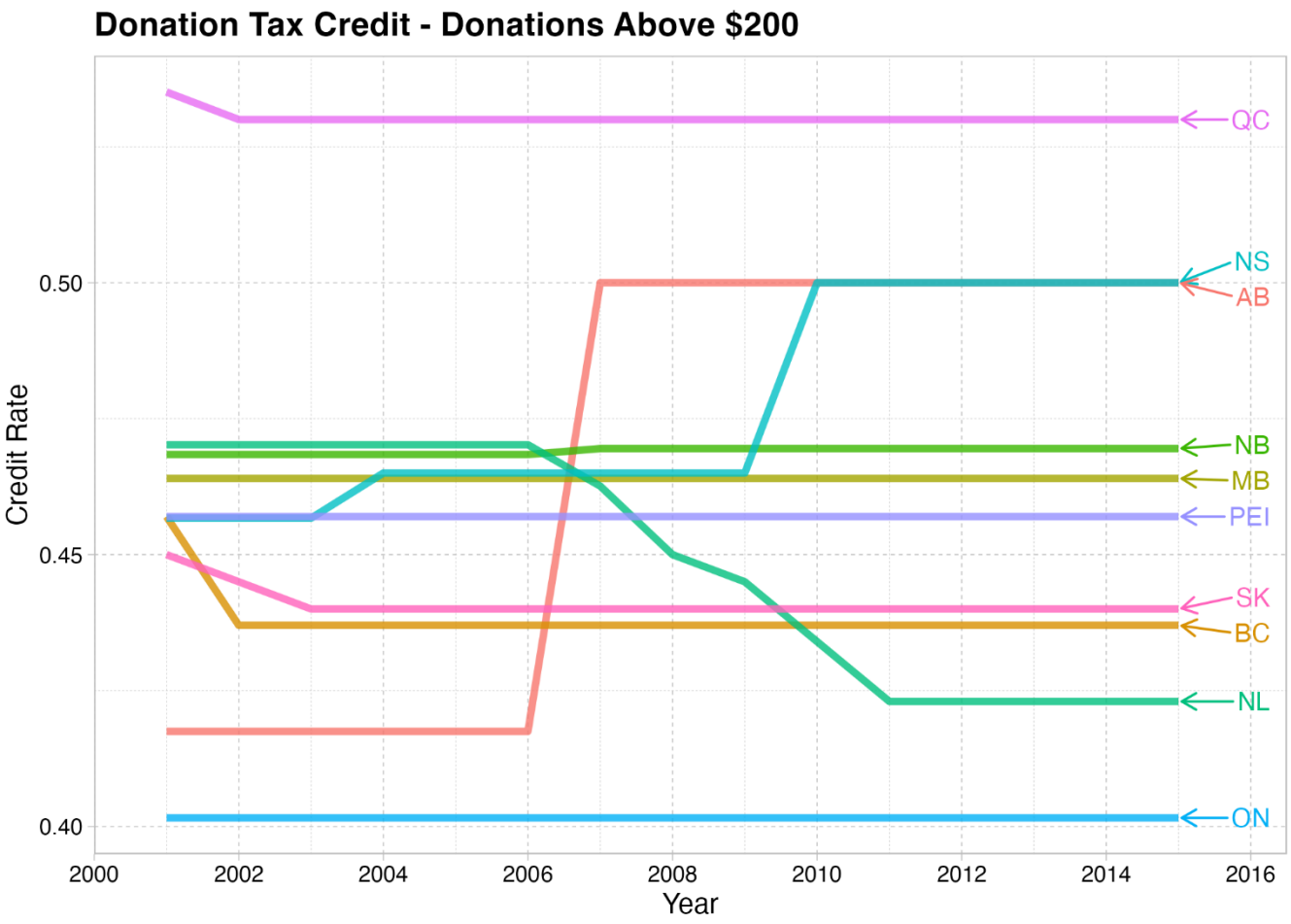

Figure 2 – Tax Credit Levels for Donations Above $200

Notes: Figure plots the combined federal/provincial legislated tax credit rate for donations above $200 in each province in each year.

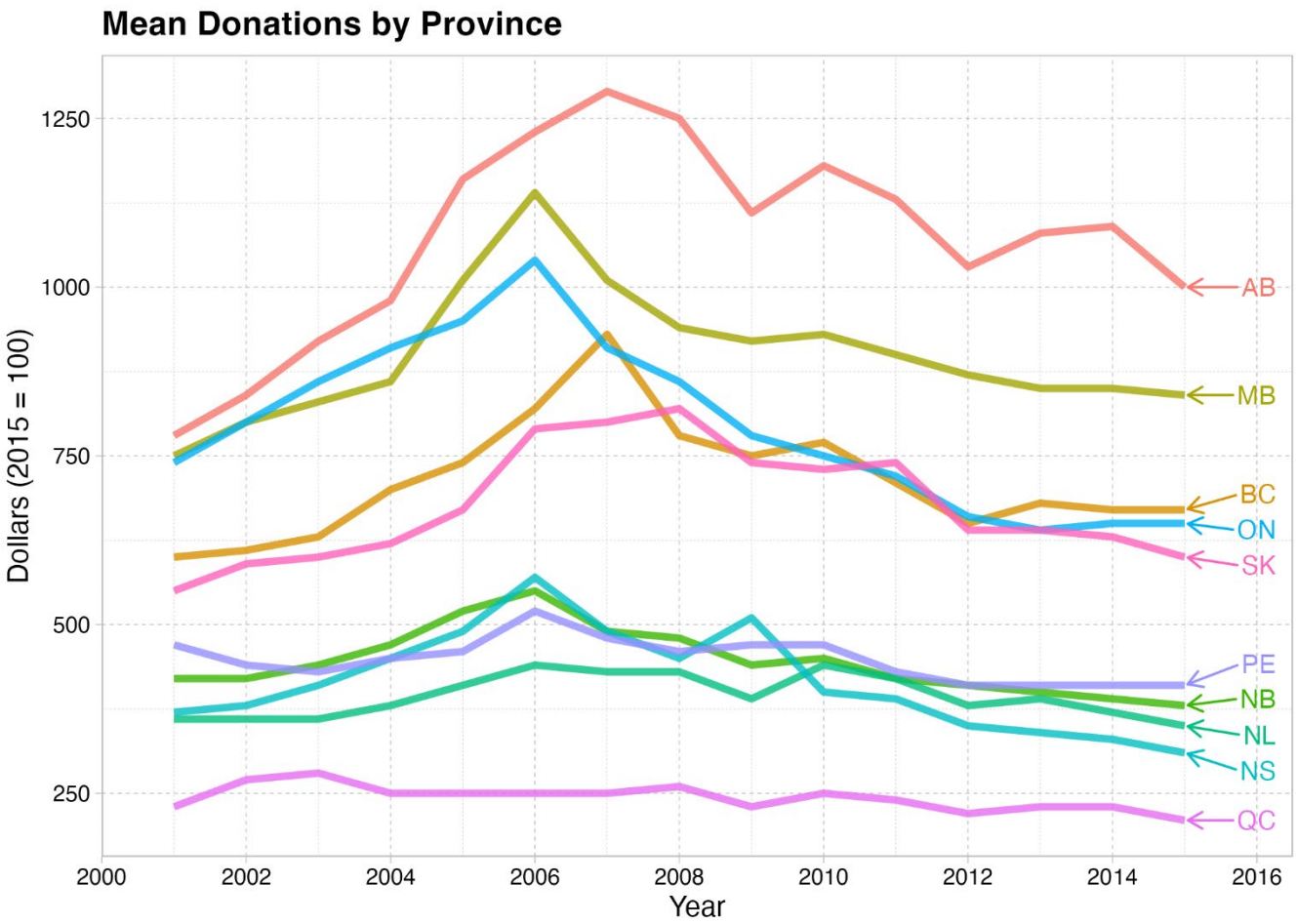

Figure 3 – Average Donations by Province over Time

Notes: Figure plots the average donation in each province in each year. The mean is computed over all filers, including those who donate zero. Due to Statistics Canada rules, values are rounded to the nearest $10 for values below $100, and the nearest $100 for values above $1000.

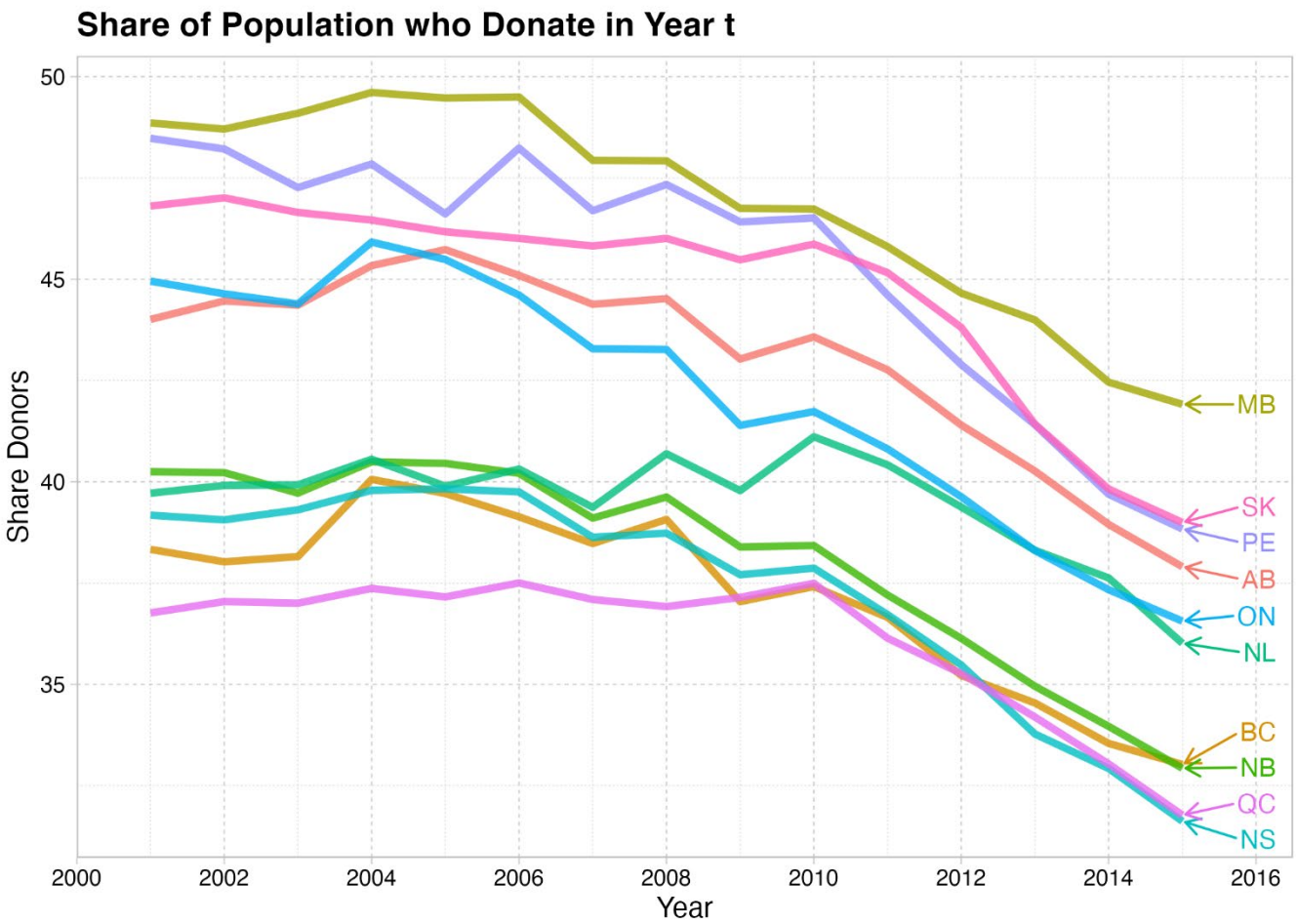

Figure 4 – Share of Population who Donate in Each Year

Notes: Figure plots the share of filers observed donating in each province in each year. The share is computed separately for each year, so if a filer donates in one year they are counted as a donor in that year, and if they do not donate in another year, they are a non-donor for that year.

Appendix

The first stage for the instrumental variables regressions across the income distribution are in Table A1. There is a wide range of estimate of the elasticity of the actual tax price with respect to the simulated tax price. Estimates in the middle are closer to 1, those at the bottom of the distribution are below 1, and those at the top are above 1. To understand these estimates it is important to remember that the instrument represents the tax price faced by the average family under the tax credit regime in each province and time period. It therefore makes sense that changes in the simulated tax price have a proportional effect on the actual tax price near the middle of the income distribution. Filers at the bottom of the distribution respond less to the tax price face by the average household, and those at the top respond more than proportionately. Note that if we had made separate instruments for each income group then all the first stage coefficients in Table A1 would be closer to 1, but because we are using the tax price for the average family as the only instrument, we get different coefficients in different parts of the distribution.

Consistent with the above, the F-statistics on the first stage are strongest in the middle of the distribution where the simulated tax price corresponds more closely to the actual tax price. At either end of the distribution, that F-statistic falls. The value of this statistic ranges from 150-800 in all regressions except at the top 0.1% of the distribution, where it is around 50. All these values are high enough that we are not concerned about weak instrument problems.

Finally, filers can carry donations forward for up to 5 years to claim them for tax credits. Unfortunately, there is no information in the tax returns that tells us when a donation is made, or whether it is a carry-forward from a prior year. For the purposes of our study, we assume that all donations are being reported in the year in which they were made. This is likely a good assumption for some types of donors, but not necessarily others. Table A2 simulates two hypothetical donors who live in Nova Scotia in 2015, which

has a low combined federal/provincial rate of 23.79%, and a high combined rate of 50%. For each hypothetical donor, we compare giving equal amounts annually to saving up across 5 years and giving in one lump sum. If a hypothetical donor gives $200 per year, they earn a tax credit of $47.58 each year, which adds up to $237.90 across all five years. If that same person instead saves up all their donations and gives $1000 in year five, they get a tax credit of $447.58, an 88% gain over annual giving scenario. For this person, it might seem worthwhile to save up donations, though it is still not clear whether it is worth saving the tax credit for such a long time for a $200 gain. A larger donor, on the other hand, faces a very small proportional gain to saving up donations. if a person gives $10,000 per year, they receive a credit of $4,947.58 annually, for a total of $24,737.90 over five years. Claiming all donations instead at the end of year five, the credit is $24,947.58, a gain of 0.85%. For this person, it seems clearer that saving up donations is likely not worthwhile. Therefore, while we acknowledge that treating donations as being made in the year they are claimed might introduce error into our dependent variable, the incentives to save donations does not seem strong.

Table A1 - First Stage Estimates by Pre-Tax Income Quantile

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Top 10%	Top 1%	Top 0.1%
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log Simulated Tax Price	**0.36**	**0.61**	**0.98**	**1.37**	**2.69**	**3.33**	**3.64**	**3.59**
	(0.02)	(0.04)	(0.03)	(0.05)	(0.10)	(0.12)	(0.30)	(0.47)
Household-years	45,412,765	45,412,380	45,412,505	45,412,535	45,412,540	22,706,295	2,270,635	227,065
R2	0.69	0.71	0.75	0.73	0.67	0.68	0.71	0.78
First-Stage F-Stat	283.42	231.14	831.39	872.58	792.03	821.04	150.31	58.14

Notes: All regressions include household fixed effects, province-specific linear time trends, a 5th order polynomial in income, dummies for number of children in the household, and an indicator for marital status. Standard errors in parentheses. Standard errors are clustered by CSD. Coefficient in bold statistically significant p<0.05; Coefficient in italics statistically significant p<0.10. The number of observations is all household-years.

Table A2 - Example of Donation Optimization Behaviour

	Poor				Rich			
	Yearly		Every 5 Years		Yearly		Every 5 Years	
year	Donation	Credit	Donation	Credit	Donation	Credit	Donation	Credit
1	200	47.58	0	0	10000	4947.58	0	0
2	200	47.58	0	0	10000	4947.58	0	0
3	200	47.58	0	0	10000	4947.58	0	0
4	200	47.58	0	0	10000	4947.58	0	0
5	200	47.58	1000	447.58	10000	4947.58	50000	24947.58
Total	1000	237.9	1000	447.58	50000	24737.9	50000	24947.58
Proportional Gain by Filing Every 5 years				88.14%				0.85%

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