The Effect of Tax Price on Donations: Evidence from Canada

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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 → 0.29% of GDP
- Canada: CAD 2.5 billion → 0.14% of GDP

Governments are interested in whether tax incentives work
- Do they encourage donations?
- Do they encourage *enough* donations?

Key parameter to measure efficiency is tax price elasticity $\epsilon$
- If $\epsilon = -1$, entire tax rebate donated
- If $\epsilon > -1$, part of tax rebate donated
- If $\epsilon < -1$, more than rebate donated
Our Study

- 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 -0.9

- Highest for low income filers
- Some evidence of extensive margin response
U.S. Taxfiler Literature

- 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
    - Auten et. al. (2002), Bakija & Heim (2011): strong permanent effect
Other Literature

- European studies
  - Fack and Landais (2010): 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
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
Combined Tax Credit for Donations

Above Threshold Rate

Year


NL  PEI  NS  NB  QC  ON  MB  SK  AB  BC  NWT  YT  NU

Above Threshold Rate

Combined Tax Credit for Donations

Tax Price
• 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
Data

- 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
Sample

- Adult filers between 2001-2013
  - Time period with “tax on income” system (for now)
- Exclude Quebec (for now), 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)
Methodology

- Main estimating equation

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

- \( \beta_1 \) 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

\[ pr_{p(i,t)t} = \alpha_0 + \alpha_1 cred^L_{p(i,t)t} + \alpha_2 cred^H_{p(i,t)t} + \alpha_2 x_{it} \]

\[ + \theta_i + \mu_t + \pi_{p(i,t)} \times trend_t + \xi_{it} \]
### Summary Statistics

#### Table: Summary Statistics on Donations

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th>Bottom Quintile</th>
<th>Top Quintile</th>
<th>Top 1%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full Sample</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>690</td>
<td>50</td>
<td>2,000</td>
<td>15,000</td>
</tr>
<tr>
<td>10th Percentile</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>25th Percentile</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>270</td>
</tr>
<tr>
<td>50th Percentile</td>
<td>0</td>
<td>0</td>
<td>170</td>
<td>1,600</td>
</tr>
<tr>
<td>75th Percentile</td>
<td>220</td>
<td>0</td>
<td>860</td>
<td>6,300</td>
</tr>
<tr>
<td>90th Percentile</td>
<td>1,200</td>
<td>0</td>
<td>3,200</td>
<td>20,600</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>10,978</td>
<td>323</td>
<td>24,343</td>
<td>105,716</td>
</tr>
<tr>
<td>Fraction who donate</td>
<td>0.43</td>
<td>0.09</td>
<td>0.73</td>
<td>0.88</td>
</tr>
<tr>
<td><strong>Donors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1,600</td>
<td>540</td>
<td>2,700</td>
<td>17,100</td>
</tr>
<tr>
<td>10th Percentile</td>
<td>30</td>
<td>20</td>
<td>40</td>
<td>160</td>
</tr>
<tr>
<td>25th Percentile</td>
<td>90</td>
<td>60</td>
<td>120</td>
<td>610</td>
</tr>
<tr>
<td>50th Percentile</td>
<td>310</td>
<td>240</td>
<td>410</td>
<td>2,200</td>
</tr>
<tr>
<td>75th Percentile</td>
<td>1,100</td>
<td>620</td>
<td>1,400</td>
<td>7,700</td>
</tr>
<tr>
<td>90th Percentile</td>
<td>3,200</td>
<td>1,400</td>
<td>4,700</td>
<td>23,900</td>
</tr>
</tbody>
</table>
Table: Regression Estimates of Taxprice Elasticity

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>IV</th>
<th>FEIV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Tax Price</td>
<td>-13.225</td>
<td>-0.827</td>
<td>-0.886</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.211)</td>
<td>(0.196)</td>
</tr>
<tr>
<td>Log Pre-Tax Income</td>
<td>-0.126</td>
<td>0.785</td>
<td>0.283</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.017)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>N (weighted)</td>
<td>19,341,095</td>
<td>19,341,095</td>
<td>19,341,095</td>
</tr>
</tbody>
</table>
# Results

Table: First Stage and Reduced Forms for Baseline Regressions

<table>
<thead>
<tr>
<th></th>
<th>IV First Stage</th>
<th>IV Reduced Form</th>
<th>FEIV First Stage</th>
<th>FEIV Reduced Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Credit</td>
<td>-0.659 (0.038)</td>
<td>0.410 (0.566)</td>
<td>-0.631 (0.036)</td>
<td>0.372 (0.527)</td>
</tr>
<tr>
<td>High Credit</td>
<td>-0.611 (0.019)</td>
<td>0.577 (0.299)</td>
<td>-0.619 (0.018)</td>
<td>0.646 (0.279)</td>
</tr>
<tr>
<td>First Stage F stat</td>
<td>2117.24</td>
<td></td>
<td>2345.70</td>
<td></td>
</tr>
<tr>
<td>N (weighted)</td>
<td>19,341,095</td>
<td>19,341,095</td>
<td>19,341,095</td>
<td>19,341,095</td>
</tr>
</tbody>
</table>
### Table: IV Estimates with Variation From Single Instrument

<table>
<thead>
<tr>
<th></th>
<th>IV</th>
<th>FEIV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Credit</td>
<td>High Credit</td>
</tr>
<tr>
<td>Log Tax Price</td>
<td>-0.601</td>
<td>-0.952</td>
</tr>
<tr>
<td></td>
<td>(0.838)</td>
<td>(0.472)</td>
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<tr>
<td>Log Pre-Tax Income</td>
<td>0.802</td>
<td>0.776</td>
</tr>
<tr>
<td></td>
<td>(0.062)</td>
<td>(0.035)</td>
</tr>
<tr>
<td>N (weighted)</td>
<td>19,341,095</td>
<td>19,341,095</td>
</tr>
</tbody>
</table>
Table: FEIV Regression Estimates of Taxprice Elasticity by Income Quintile

<table>
<thead>
<tr>
<th>Income Quintile</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Top 10%</th>
<th>Top 1%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Tax Price</td>
<td>-2.028</td>
<td>-1.123</td>
<td>-0.563</td>
<td>-0.344</td>
<td>-0.380</td>
<td>-0.518</td>
<td>-1.658</td>
</tr>
<tr>
<td></td>
<td>(1.067)</td>
<td>(0.656)</td>
<td>(0.458)</td>
<td>(0.405)</td>
<td>(0.305)</td>
<td>(0.383)</td>
<td>(1.007)</td>
</tr>
<tr>
<td>Log Pre-Tax Income</td>
<td>0.019</td>
<td>1.285</td>
<td>0.862</td>
<td>0.950</td>
<td>0.523</td>
<td>0.441</td>
<td>0.260</td>
</tr>
<tr>
<td></td>
<td>(0.016)</td>
<td>(0.117)</td>
<td>(0.041)</td>
<td>(0.041)</td>
<td>(0.019)</td>
<td>(0.023)</td>
<td>(0.049)</td>
</tr>
</tbody>
</table>
## Results

### Table: FEIV Regression Estimates of Taxprice Elasticity by Age Quintile

<table>
<thead>
<tr>
<th></th>
<th>Age Quintile</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Log Tax Price</td>
<td>-0.637</td>
<td>0.477</td>
<td>-0.632</td>
<td>-0.711</td>
<td>-0.711</td>
</tr>
<tr>
<td></td>
<td>(0.515)</td>
<td>(0.656)</td>
<td>(0.409)</td>
<td>(0.436)</td>
<td>(0.436)</td>
</tr>
<tr>
<td>Log Pre-Tax Income</td>
<td><strong>0.255</strong></td>
<td><strong>0.221</strong></td>
<td><strong>0.263</strong></td>
<td><strong>0.292</strong></td>
<td><strong>0.483</strong></td>
</tr>
<tr>
<td></td>
<td>(0.024)</td>
<td>(0.017)</td>
<td>(0.015)</td>
<td>(0.017)</td>
<td>(0.027)</td>
</tr>
</tbody>
</table>
### Table: Regression Estimates of Taxprice on Extensive Margin

<table>
<thead>
<tr>
<th></th>
<th>OLS</th>
<th>IV</th>
<th>FEIV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Tax Price</td>
<td>-1.767</td>
<td>-0.061</td>
<td>-0.070</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.039)</td>
<td>(0.037)</td>
</tr>
<tr>
<td>Log Pre-Tax Income</td>
<td>0.007</td>
<td>0.132</td>
<td>0.050</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.003)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>N (weighted)</td>
<td>19,341,095</td>
<td>19,341,095</td>
<td>19,341,095</td>
</tr>
</tbody>
</table>
### Table: Robustness of Estimates of Taxprice Elasticity

<table>
<thead>
<tr>
<th></th>
<th>Including Movers</th>
<th>Including Duplicates</th>
<th>Alternative Tax Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Donations</td>
<td>Donors</td>
<td>Donations</td>
</tr>
<tr>
<td>Log Tax Price</td>
<td>-0.709</td>
<td>-0.040</td>
<td>-0.884</td>
</tr>
<tr>
<td></td>
<td>(0.189)</td>
<td>(0.036)</td>
<td>(0.196)</td>
</tr>
<tr>
<td>Log Pre-Tax Income</td>
<td><strong>0.291</strong></td>
<td><strong>0.051</strong></td>
<td><strong>0.283</strong></td>
</tr>
<tr>
<td></td>
<td>(0.008)</td>
<td>(0.001)</td>
<td>(0.008)</td>
</tr>
<tr>
<td>N (weighted)</td>
<td>20,994,015</td>
<td>20,994,015</td>
<td>19,429,610</td>
</tr>
</tbody>
</table>
Still To Do

- Account for excessive zeroes
  - < 50% claim donations
  - Reestimate with Tobit or two-step estimator
- Quanile estimates
  - Do biggest donors respond differently?
- Estimate over longer time horizon
  - Income tax rules more complicated pre-2001
Conclusions

- Tax price elasticity of charitable donations in Canada is $-0.9$
  - In line with rest of literature
  - Not treasury efficient
- Strongest effects for lowest income quintile
- Credit issued for donations $> $200 has biggest impact
- Some evidence of extensive margin effect