Charitable Giving, Tax Reform, and Self-selection of Tax Report: Evidence from South Korea

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Introduction

Charitable Giving and Taxiation

In many countries, governments set a tax relief for charitable giving.

To evaluate the effect of tax relief, many papers investigate the elasticity of charitable donations with respect to their tax price (Almunia et al., 2020; Auten et al., 2002; Bakija and Heim, 2011; Fack and Landais, 2010; Randolph, 1995).

Focusing on the tax deduction or tax credit on the charity, they show that the price elasticity of giving is about -1 or more in terms of absolute value.

Charitable Giving and Taxiation

In addition to the tax price charitable donations, the donations may be affected by people's perception towards the government.

This is because the works and missions of private charity often mirror or overlap with one of governments, and the charity is not needed if the government adequately satisfies the needs of society.

Thus, the different perception towards the government may make the different behavior for charitable giving.

We investigate the relation between tax price elasticity of charitable donations and the different perception towards the government using the South Korean dataset.

Summary in short

Our result classifies that:

▶ the price elasticity of giving in Korea is -1.07 ~ -1.26, which is within the range of the extant research.

▶ the amount of donation is not different between those who regard government as inefficient and the others.

▶ the giving price elasticity of those who regard government as inefficient is more elastic than the others. This means that those who think of government as inefficient have more willingness to donate for 1% reduction of giving price.

South Korean tax reform

We can utilize the effect of the 2014 tax reform in the South Korea.

▶ Before 2014, tax deduction was adopted to subsidize charitable donation behavior.
▶ After 2014, tax credit have been adopted.

The main difference is that tax credits reduce taxes directly, while tax deductions indirectly lower the tax burden by decreasing the marginal tax rate, which increases with gross income.

In addition, the dataset contains the information about perception towards the government.

Related Literature

This study mainly relates to the two strands of studies.

1. Research about tax price elasticity of charitable donations
2. Research about perception towards the government and donation/tax payment.

Research about tax price elasticity of charitable donations

Papers in this strand examines the price and income elasticity of charitable donations using the tax deduction applied for donation. The estimated price elasticities vary, but the typical one is said as -1 (Andreoni and Payne, 2013).

- ▶ Auten et al.(2002): -0.79~-1.26 (the U.S.)
- ▶ Fack and Landais(2010): -0.15~0.57 (France)
- ▶ Bakija and Heim (2011): -0.61~-1.1 (the U.S.)
- ▶ Duquette (2016): -2.15~-5.01 (the U.S.)
- ▶ Almunia et al.(2020): -0.24~−1.5 (the U.K.)

The study in non-Western country, where the culture of donation may be different, is few. Thus, we firstly examine the elasticity of giving in Korea.

Research about perception towards the government and donation/tax payment.

Experimental studies show that the giving behavior may be affected by perception towards the government.

▶ Li et al.(2011) suggest that governmental organizations collect less donation than private charities though they have the same mission and work.

▶ Sheremeta and Uler(2020) show that individuals provide public good reacting the wasteful spending of government.

This may be because people with distrust in government think that

1. the direct donation is more efficient than public service provision or
2. people can directly allocate and control their funds by donation, unlike public service provision.

Thus, people having the different trust in the government would have different elasticities of giving.

Institutional background

Tax relief for charitable giving by tax deduction and tax credit

In the South Korea, the tax policy about charitable giving drastically changed in 2014. Before then, tax relief of charitable giving was provided by tax deduction while, from 2014, tax relief by tax credit was introduced instead of tax deduction.

The tax deduction and tax credit may have different effects on giving behavior. This section summarize the difference of tax deduction and tax credit.

Budget Set

Consider that a household has a choice between private consumptions (x_i) and charitable giving (g_i). Let y_i be pre-tax total income. Then, the budget constraint is

$$x_i + g_i = y_i - T_i(y_i, g_i).$$

T_i is tax amount which depends on the pre-tax income and charitable giving.

Tax Deduction

Tax deduction reduces taxable income by giving, that is,

$$T_i = \tau(y_i - g_i) \cdot (y_i - g_i),$$

where $\tau(\cdot)$ is the marginal income tax rate which is determined by $y_i - g_i$. The budget constraint will be

$$x_i + [1 - \tau(y_i - g_i)]g_i = [1 - \tau(y_i - g_i)]y_i.$$

The relative price of giving is $p_i^d \equiv 1 - \tau(y_i - g_i)$. Since the giving price in tax deduction scheme varies depending on (1) the income level and (2) the amount of charitable giving, it is endogenous to them.

Tax Credit

Tax credit reduces tax amount directly, that is,

$$T_i = \tau(y_i) \cdot y_i - mg_i,$$

where $m \in [0,1]$ is the tax credit rate. Under the tax credit system, the budget constraint is

$$x_i + (1-m)g_i = [1 - \tau(y_i)]y_i.$$

The relative price of giving is $p_i^c = 1 - m$, which is only dependent on the tax credit rate m, which is exogenously determined by the government.

Korean tax reform in 2014

▶ The tax incentives for charitable giving in Korea stared in 2000 and the market of charitable giving in Korea totaled 10.9 trillion KRW (approximately 1.09 bilion USD, 0.761% of GDP) in 2012 according to the national tax statistics.

▶ Since the income tax deduction was initially used as a tax incentive and the marginal income tax rate was determined as Table 1, the minimum giving price before 2014 was 0.62.

Marginal income tax rate

Table 1: Marginal Income Tax Rate

Income/Year	2008	2009	2010 ~ 2011	2012 ~ 2013	2014 ~ 2016	2017	2018
(A) ~ 1200	8%	6%	6%	6%	6%	6%	6%
(B) 1200 ~ 4600	17%	16%	15%	15%	15%	15%	15%
(C) 4600 ~ 8800	26%	25%	24%	24%	24%	24%	24%
(D) 8800 ~ 15000	35%	35%	35%	35%	35%	35%	35%
(E) 15000 ~ 30000	35%	35%	35%	35%	38%	35%	38%
(F) 30000 ~ 50000	35%	35%	35%	38%	38%	38%	40%
(G) 50000 ~	35%	35%	35%	38%	38%	40%	42%

Notes: Marginal income tax rates applied from 2008 to 2018 are summarized. The income level is shown in terms of 10,000 KRW, which is approximately 10 United States dollars (USD) at an exchange rate of 1,000 KRW to one USD.

Data

National Survey of Tax and Benefit (NaSTaB)

▶ An annual financial panel survey implemented by The Korea Institute of Taxation and Finance implements to study the tax burden of households and the benefits that households receive from government.

▶ The subjects of this survey are general household and household members living in 15 cities and provinces nationwide.

▶ This survey is based on a face-to-face interview. If it is difficult for investigators to meet subjects, another family member answers on behalf of him.

▶ We use data from 2012 to 2018 **since the items of the value survey which we focused is not available before 2012 (**ここは違いま**???)**. In addition, we exclude the subject of the sample, whose age is under 23, since they are not likely to have income or asset.

Summary Statistics

Table 2: Descriptive Statistics

	N	Mean	Std.Dev.	Min	Median	Max
Charitable Donations						
Annual charitable giving (unit: 10,000KRW)	67848	29.52	132.91	0.00	0.00	10000.00
Dummy of Donation > 0	67848	0.20	0.40	0.00	0.00	1.00
Income, giving price, and tax report						
Annual taxable income (unit: 10,000KRW)	53269	1876.12	2700.97	0.00	900.00	91772.00
First giving price	62877	0.86	0.04	0.62	0.85	0.94
Dummy of tax report	12172	0.48	0.50	0.00	0.00	1.00
Individual Characteristics						
Age	67848	51.35	15.81	24.00	50.00	104.00
Female dummy	67848	0.53	0.50	0.00	1.00	1.00
Employee dummy	42362	0.53	0.50	0.00	1.00	1.00
University graduate	67842	0.41	0.49	0.00	0.00	1.00
High school graduate dummy	67842	0.35	0.48	0.00	0.00	1.00
Junior high school graduate dummy	67842	0.24	0.43	0.00	0.00	1.00

Charitable Giving
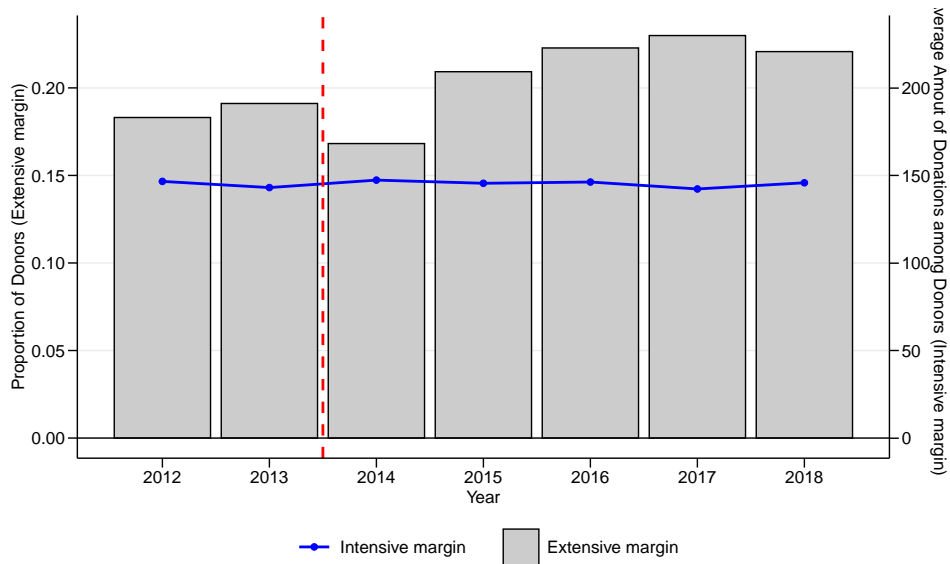
Figure 1: Proportion of Donors and Average Donations among Donors. Notes: The left and

Income and Giving Price

▶ Figure 2 shows the giving price after 2012 and income distribution in 2013.
  ▶ Blue line shows the giving price in 2012 and 2013, which depends on income
  ▶ Red dashed line shows the giving price after 2014, which is not a function of income.
▶ We can make three groups in terms of the benefit from the 2014 tax reform.
  ▶ Benefit group: Final taxable income is less than 1200×10^4KRW.
  ▶ Neutral group: Final taxable income lies between $(1200 \times 10^4, 4600 \times 10^4)$.
  ▶ Loss group: Final taxable income is more than 4600×10^4KRW.

Giving Price and Income Distribution (Cont'd)
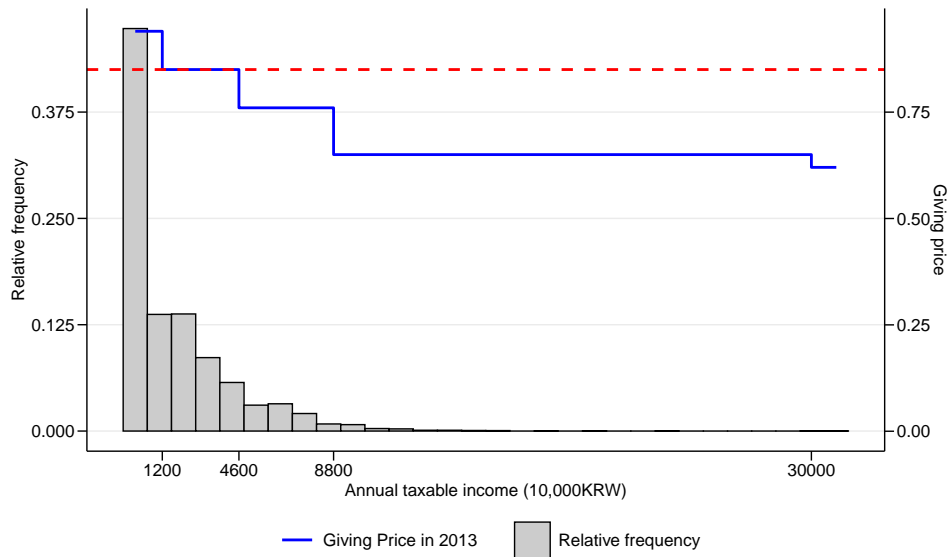
Figure 2: Income Distribution and Giving Price in 2013

Estimation

Estimation

Following Almunia et al. (2020), we estimate giving price elasticity for intensive margin and extensive margin.

▶ The elasticity of intensive margin shows how much donors additionally donates reacting to the marginal increase of giving price

▶ The elasticity of extensive margin shows how much the probability to donate changes reacting to marginal increase of giving price.

Elasticitiy of Intensive Margin

$$\ln g_{it} = \varepsilon_{INT} \ln p_{it} + g_{INT} \ln y_{it} + X_{it}\beta + \mu_i + \iota_t + u_{it}.$$

▶ g_{it}, p_{it} and y_{it} respectively indicates the amount of giving, the giving price, and income of i in year t

▶ μ_i, ι_t and u_{it} are individual fixed effect, year fixed effect and error term

▶ X_{it} is a vector of covariates which include variables about education and gender. Moreover, we add some interaction terms between year fixed effect and control variables into X_{it} (following Zeldow and Hatfield (2019)).

Elasticitiy of Extensive Margin

$$D_{it} = \delta \ln p_{it} + \gamma \ln y_{it} + X_{it}\beta + \mu_i + \iota_t + v_i t.$$

▶ D_{it} is a dummy variable taking 1 if individual i donates at year t and 0 otherwise.
▶ Since we use linear probability model, $\delta = \frac{\partial D_{it}}{\partial p_{it}} p_{it}$. The extensive-margin price elasticity is $\varepsilon_{EXT} = \hat{\delta}/D_{it}$. Thus, we evaluate it at sample mean of D_{it}.

Identification Strategy

Our identification assumption is **the within price variation is exogenous**.

▶ This is because we use the fixed effect model to obtain elasticities.
▶ Our identification assumption may hold because the major *within* price variation depends on the 2014 tax reform.
  ▶ After tax reform, the giving price is constant across individuals and there is no room for manipulation by donations and income.
  ▶ Before tax reform (2012 and 2013), the giving price depends on (A) endogeneity of giving price and (B) simultaneous determination of income and donations. For these two reasons, the *within* price is partly endogenous.

Obstacles for Identification

Our identification assumption may violate due to two endogenous problems under the tax deduction system.

1. Endogeneity of giving price:
   ▶ The tax payer can reduce their giving price by increasing their amount of donation and shifting themselves to the lower tax bracket in the tax deduction system.
   ▶ Since this issue does not happen for the first one unit of donation, whose price ("first price") cannot be changed by adjusting the donation, we use this first price as the giving price in the estimation.

Obstacles for Identification (Cont'd)

Our identification assumption may violate due to two endogenous problems under the tax deduction system.

2. Simultaneous determination of income and donations:
   - ▶ The change of income caused by the tax reform have effects on both donations through the income effect and the giving price through the marginal tax rate.
   - ▶ We employ lagged values of taxable income and construct an instrument variable, $\ln(p_{it}(y_{it-k} - g_{it-k})/p_{it-k}(y_{it-k} - g_{it-k}))$ where $g_{it-k} = 0$.
   - ▶ By fixing income at year $t - k$, the instrument isolates changes in price from income responses to the tax reform.

Main Results

Price and Income Elasticity

We found the **price effect** of giving (1% price increase leads to about 1.1% giving decrease), and the **income effect** of giving(1% income increase leads to about 5% giving increase).

Table 3: Main Results: Overall Elasticity of First Price

	(1)	(2)	(3)	(4)	(5)
ln(giving price)	-1.072***	-1.264***	-1.291***	-1.114***	-1.241***
	(0.202)	(0.213)	(0.230)	(0.229)	(0.227)
ln(annual taxable income)	5.393***	5.080***	5.047***	5.116***	4.946***
	(0.970)	(0.964)	(0.964)	(0.966)	(0.949)
Individual FE	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Age	N	Y	Y	Y	Y
Year × Education	N	N	Y	Y	Y
Year × Gender	N	N	N	Y	Y
Year × Resident Area	N	N	N	N	Y
N	53269	53269	53267	53267	53267
Adjusted R-squared	0.526	0.526	0.526	0.527	0.530

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at individual level. When controlling age, we alson include its squared term.

Intensive and Extensive Margin: Estimation Results

The intensive-margin price elasticity is -0.5 ~ -1%.

Table 4: Main Results: Intensive-Margin Elasticity of First Price

	(1)	(2)	(3)	(4)	(5)
ln(giving price)	-0.593***	-0.838***	-1.016***	-0.893***	-0.904***
	(0.203)	(0.212)	(0.232)	(0.243)	(0.249)
ln(annual taxable income)	2.015***	1.562**	1.445**	1.528**	1.571**
	(0.675)	(0.655)	(0.647)	(0.651)	(0.653)
Individual FE	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Age	N	Y	Y	Y	Y
Year × Education	N	N	Y	Y	Y
Year × Gender	N	N	N	Y	Y
Year × Resident Area	N	N	N	N	Y
N	11637	11637	11637	11637	11637
Adjusted R-squared	0.675	0.675	0.676	0.676	0.678

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at individual level. When controlling age, we alson include its squared term.

Intensive and Extensive Margin: Estimation Results

The extensive-margin price elasticity is -1.2 ~ -1.4%.

Table 5: Main Results: Extensive-Margin Elasticity of First Price

	(1)	(2)	(3)	(4)	(5)
ln(giving price)	-0.257***	-0.288***	-0.273***	-0.237***	-0.267***
	(0.046)	(0.048)	(0.052)	(0.052)	(0.051)
ln(annual taxable income)	1.175***	1.124***	1.125***	1.139***	1.102***
	(0.223)	(0.223)	(0.223)	(0.224)	(0.220)
Implied price elasticity	-1.176***	-1.320***	-1.250***	-1.086***	-1.221***
	(0.210)	(0.221)	(0.239)	(0.238)	(0.235)
Implied income elasticity	5.379***	5.145***	5.148***	5.212***	5.045***
	(1.023)	(1.021)	(1.023)	(1.024)	(1.005)
Individual FE	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Age	N	Y	Y	Y	Y
Year × Education	N	N	Y	Y	Y
Year × Gender	N	N	N	Y	Y
Year × Resident Area	N	N	N	N	Y
N	53269	53269	53267	53267	53267
Adjusted R-squared	0.458	0.458	0.458	0.458	0.462

Robustness Check

First potential concern: last price elasticity

▶ Our baseline results show the **first** price elasticity to avoid the endogeneity of giving price.

▶ We estimated the **last** price elasticity, using the Panel IV method.

    ▶ The instrument is the first giving price.

    ▶ Note that the last giving price is equal to the first giving price under the tax credit system.

Robustness Check 1: Result

Overall last price elasticity increases twofold.

Table 6: Overall Elasticity of Last Price

	(1)	(2)	(3)	(4)	(5)
ln(last giving price)	-2.421***	-2.536***	-2.750***	-2.529***	-2.650***
	(0.204)	(0.216)	(0.233)	(0.231)	(0.229)
ln(annual taxable income)	5.258***	5.072***	4.981***	5.058***	4.910***
	(0.961)	(0.961)	(0.959)	(0.961)	(0.948)
Individual FE	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Age	N	Y	Y	Y	Y
Year x Education	N	N	Y	Y	Y
Year x Gender	N	N	N	Y	Y
Year x Resident Area	N	N	N	N	Y
N	52304	52304	52302	52302	52302
Adjusted R-squared	0.529	0.529	0.529	0.530	0.533

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at individual level. The instumental variable is the first giving price in year t. When controlling age, we alson include its squared term.

Robustness Check 1: Intensive Margin

The intensive-margin last price elasticity lies within the range of the first price elasticity.

Table 7: Intensive-Margin Elasticity of Last Price

	(1)	(2)	(3)	(4)	(5)
ln(last giving price)	-0.898***	-0.961***	-1.197***	-0.998***	-1.074***
	(0.271)	(0.271)	(0.307)	(0.325)	(0.332)
ln(annual taxable income)	2.024***	1.638**	1.460**	1.530**	1.572**
	(0.694)	(0.678)	(0.667)	(0.670)	(0.667)
Individual FE	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Age	N	Y	Y	Y	Y
Year × Education	N	N	Y	Y	Y
Year × Gender	N	N	N	Y	Y
Year × Resident Area	N	N	N	N	Y
N	10672	10672	10672	10672	10672
Adjusted R-squared	0.671	0.671	0.672	0.672	0.674

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at individual level. The instumental variable is the first giving price in year t. When controlling age, we alson include its squared term.

Robustness Check 1: Extensive Margin

The extensive-margin last price elasticity at sample mean is roughly -3%.

Table 8: Extensive-Margin Elasticity of Last Price

	(1)	(2)	(3)	(4)	(5)
ln(last giving price)	-0.623***	-0.630***	-0.644***	-0.593***	-0.619***
	(0.046)	(0.049)	(0.053)	(0.052)	(0.052)
ln(annual taxable income)	1.125***	1.113***	1.103***	1.121***	1.090***
	(0.221)	(0.223)	(0.223)	(0.223)	(0.220)
Implied price elasticity	-3.052***	-3.090***	-3.156***	-2.907***	-3.035***
	(0.227)	(0.239)	(0.258)	(0.257)	(0.254)
Implied income elasticity	5.514***	5.453***	5.407***	5.494***	5.343***
	(1.084)	(1.092)	(1.092)	(1.095)	(1.078)
Individual FE	Y	Y	Y	Y	Y
Time FE	Y	Y	Y	Y	Y
Age	N	Y	Y	Y	Y
Year × Education	N	N	Y	Y	Y
Year × Gender	N	N	N	Y	Y
Year × Resident Area	N	N	N	N	Y
N	52304	52304	52302	52302	52302
Adjusted R-squared	0.464	0.464	0.464	0.465	0.469

Robust Check 2

Second potential concern: Price change due to the change of income

▶ Since the giving price under the tax deduction depends on the change of income, the *within* variation of giving price may be endogenous.

▶ To resolve this concern, we used the data (i) from 2013 to 2018 or (ii) from 2013 to 2014, and estimated the fixed effect model.

  ▶ By this restriction, the *within* price variation of giving price is completely exgonenous.

Robustness Check 2: Result

Overall price elasticity is -1 ~ -1.7%.

Table 9: Overall Elasticity with Short-Period Panel

	After 2012		2013 and 2014	
	(1)	(2)	(3)	(4)
ln(giving price)	-1.014***	-1.286***	-1.398***	-1.686***
	(0.255)	(0.290)	(0.289)	(0.338)
ln(annual taxable income)	5.108***	4.743***	4.013**	3.035
	(1.009)	(0.990)	(1.948)	(1.992)
Individual FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Other Controls	N	Y	N	Y
N	45994	45992	14893	14893
Adjusted R-squared	0.535	0.538	0.590	0.592

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at individual level. Other controls are age (its squared value), the interaction between year dummies and education dummies, the interaction between year dummies and gender dummies, and the interaction between year dummies and resident area.

Robustness Check 2: Intensive Margin

The intensive-margin price elasticity is -0.6 ~ -1%. In column (3), the price elasticity is statistically insignificant.

Table 10: Intensive-Margin Elasticity with Short-Period Panel

	After 2012		2013 and 2014	
	(1)	(2)	(3)	(4)
ln(giving price)	-0.647***	-1.129***	-0.394	-0.712**
	(0.236)	(0.291)	(0.310)	(0.363)
ln(annual taxable income)	1.943***	1.714***	1.440	1.047
	(0.662)	(0.649)	(2.975)	(3.072)
Individual FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Other Controls	N	Y	N	Y
N	10158	10158	2922	2922
Adjusted R-squared	0.684	0.687	0.735	0.737

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at individual level. Other controls are age (its squared value), the interaction between year dummies and education dummies, the interaction between year dummies and gender dummies, and the interaction between year dummies and resident area.

Robustness Check 2: Extensive Margin

The extensive-margin price elasticity at sample mean is $-1 \sim -2\%$.

Table 11: Extensive-Margin Elasticity with Short-Period Panel

	After 2012		2013 and 2014	
	(1)	(2)	(3)	(4)
ln(giving price)	-0.235***	-0.269***	-0.331***	-0.383***
	(0.058)	(0.065)	(0.065)	(0.076)
ln(annual taxable income)	1.093***	1.024***	0.801*	0.574
	(0.230)	(0.226)	(0.428)	(0.447)
Implied price elasticity	-1.064***	-1.217***	-1.689***	-1.951***
	(0.262)	(0.294)	(0.333)	(0.387)
Implied income elasticity	4.951***	4.638***	4.082*	2.926
	(1.043)	(1.024)	(2.181)	(2.279)
Individual FE	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Other Controls	N	Y	N	Y
N	45994	45992	14893	14893
Adjusted R-squared	0.465	0.469	0.524	0.525

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at individual level. Other controls are age (its squared value), the interaction between

Robustness Check 3

Second potential concerns: the change of price due to the change of income

▶ To exclude this potential concerns, previous identification strategy uses the 2014 tax reform.

▶ We can also rule out this problem, using the change in the first giving price.

    ▶ The change in the first giving price is $\ln(p_{it}(y_{it-k} - g_{it-k})/p_{it-k}(y_{it-k} - g_{it-k}))$ where $g_{it-k} = 0$.

    ▶ Since we fix the income y_{it-k}, this variation comes from the tax reform.

Robustness Check 3 (Cont'd)

Our estimation equation is

$$\Delta^k \ln g_{it} = \delta \Delta^k \ln p_{it} + \gamma \Delta^k \ln y_{it} + \Delta^k X_{it} \beta + \mu_i + \iota_t + v_{it},$$

where $\Delta^k Y_{it} = Y_{it} - Y_{it-k}$.

▶ Note that we cannot estimation the extensive-margin elasticity since it is hard to interapt this estimation equation when we use $\Delta^k D_{it}$ as an outcome.

▶ We estimate this model for $k = 1, 2, 3$.

Robustness Check 3: Overall Elasticity

Overall price elasticity is roughly -2%.

Table 12: Estimation of Overall Elasticity with k-th Difference Model

	(1)	(2)	(3)
1-year lagged difference of first price (log)	-1.894***		
	(0.389)		
1-year lagged difference of annual income (log)	2.737***		
	(1.042)		
2-year lagged difference of first price (log)		-2.158***	
		(0.355)	
2-year lagged difference of annual income (log)		4.661***	
		(1.139)	
3-year lagged difference of first price (log)			-1.805***
			(0.345)
3-year lagged difference of annual income (log)			5.422***
			(1.181)
Individual FE	Y	Y	Y
Time FE	Y	Y	Y
Other controls	Y	Y	Y
N	49014	46587	44142
Adjusted R-squared	-0.153	-0.082	-0.024

Robustness Check 3: Intensive-Margin Elasticity

The intensive-margin price elasticity is roughly -2%.

Table 13: Estimation of Intensitve-Margin Elasticity with kth Difference Model

	(1)	(2)	(3)
1-year lagged difference of first price (log)	-1.852**		
	(0.763)		
1-year lagged difference of annual income (log)	2.222		
	(1.715)		
2-year lagged difference of first price (log)		-2.274***	
		(0.621)	
2-year lagged difference of annual income (log)		4.601**	
		(1.789)	
3-year lagged difference of first price (log)			-2.243***
			(0.550)
3-year lagged difference of annual income (log)			5.826***
			(2.166)
Individual FE	Y	Y	Y
Time FE	Y	Y	Y
Other controls	Y	Y	Y
N	10939	10505	10040
Adjusted R-squared	0.137	0.191	0.220

References

References I

Almunia, M., Guceri, I., Lockwood, B., Scharf, K., 2020. More giving or more givers? The effects of tax incentives on charitable donations in the UK. Journal of Public Economics 183. doi:10.1016/j.jpubeco.2019.104114

Auten, G.E., Sieg, H., Clotfelter, C.T., 2002. Charitable giving, income, and taxes: An analysis of panel data. American Economic Review 92, 371–382.

Bakija, J., Heim, B.T., 2011. How does charitable giving respond to incentives and income? New estimates from panel data. National Tax Journal 64, 615–650. doi:10.17310/ntj.2011.2S.08

Fack, G., Landais, C., 2010. Are tax incentives for charitable giving efficient? Evidence from france. American Economic Journal - Economic Policy 2, 117–141. doi:10.1257/pol.2.2.117

Randolph, W.C., 1995. Dynamic income, progressive taxes, and the timing of charitable contributions. Journal of Political Economy 103, 709–738. doi:10.1086/262000

References II

Zeldow, B., Hatfield, L.A., 2019. Confounding and regression adjustment in difference-in-differences. arXiv Preprint.