

# Estimating Effect of Tax Incentives on Charitable Giving Considering Self-Selection of Tax Relief in South Korea

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## 社会にとって寄付の税インセンティブを与えることは望ましいか？

- 多くの国の税制は、所得控除や税額控除を通して、寄付に金銭的インセンティブを設けている
  - 利点：公共財の私的供給を促進する
  - 欠点：税収を減らしてしまう
- 税収の減少分を十分に上回るだけの寄付を増やせば、税インセンティブは社会的に望ましい
  - 厚生評価の重要なパラメータ：寄付の（税）価格弾力性
  - この絶対値が 1 を超えれば、税インセンティブは社会的に望ましい (Saez, 2004)
- 韓国の税制改革を用いて、寄付の価格弾力性を推定することを目的とする

# 税インセンティブの自己選択の問題

税インセンティブと申告コストに基づいて、納税者は控除を受けるかどうかを意思決定する

- 申告コストが大きいことを指摘している研究がいくつかある
  - アメリカの個人所得税の確定申告: 申告準備 (Record keeping) のコスト > 申告自体 (Tax filing) のコスト (Benzarti, 2020)
  - イギリスの寄付控除の固定費用: 申告された寄付額の 10% に相当 (Almunia et al., 2020)
  - デンマークの寄付控除でも、record keeping のコストを含めた様々な optimization friction がある (Gillitzer and Skov, 2018)
- 韓国においても、寄付控除を受けるためのコストは大きいと考えられる
  - 控除を受けた寄付者の割合は 42% (from our data)
  - 控除を受けた寄付者の平均寄付額は 174 万ウォンである一方、控除を受けていない寄付者の平均寄付額は 133 万ウォン (from our data)

# 本研究の概要 (1)

韓国における 2014 年の税制改革を用いて、税インセンティブの自己選択を考慮した寄付の価格弾力性を推定する

- 韓国のパネルデータ (National Survey of Tax and Benefit) を使用する
  - サーベイデータの利点 → 申告された寄付額は実際の寄付額と異なる測定誤差 (Fack and Landaï, 2016; Gillitzer and Skov, 2018) を回避できる
- 2014 年の税制改革 (所得控除 → 税額控除) を税インセンティブの外生変動として利用した DID で推定する
  - 所得税率に依存したインセンティブ (所得控除) から納税者に一律のインセンティブ (税額控除) に変更
- 申告コストの外生要因として、給与所得者かどうかを用いる
  - 給与所得者はそれ以外よりも申告コストが低いと予想される

## 本研究の概要 (2)

### Result

1. Baseline results show that the giving price elasticity is less than -1.4 in terms of intensive margins and less than -1.7 in terms of extensive margins in Korea.
2. The estimated giving price elasticity for those who declare charitable giving is around -1.2 -1.6.
  - These estimates are more elastic than the estimates in the extant research, many of which show around -1.
3. By reducing application cost, we can increase charitable giving.
4. Given our estimates, increasing the subsidy on charitable giving will be desirable in Korea.

## 韓国の寄付控除制度

## 寄付控除のモデル

$$x_{it} + g_{it} = y_{it} - R_{it}T_t(y_{it}, g_{it}) - (1 - R_{it})T_t(y_{it}) \quad (1)$$

- $x_{it}$  は私的消費財、 $g_{it}$  は寄付額
- $y_{it}$  は課税前所得、 $R_{it}$  は寄付を申告するかどうかのダミー変数
- $T_t(y_{it})$  と  $T_t(y_{it}, g_{it})$  は寄付申告をしなかったときの課税額と申告したときの課税額
- 寄付の税インセンティブは  $s_{it} = \partial T_t(y_{it}, g_{it}) / \partial g_{it}$  であり、寄付の相対価格は  $1 - s_{it}$

$(g_{it}, y_{it})$  を所与として、寄付控除の節税額が申告コスト ( $K_{it}$ ) を上回るとき、寄付控除を受ける

$$R_{it} = 1[T_t(y_{it}) - T_t(y_{it}, g_{it}) > K_{it}] \quad (2)$$

## 2014 年の税制改革: 所得控除から税額控除へ

所得控除 (income deduction)

$$T_t(y_{it}, g_{it}) = T_t(y_{it} - g_{it}) \quad (3)$$

- 税インセンティブは  $s_{it} = T'_t(y_{it} - g_{it})$
- 高所得であるほど税負担が軽減される（限界税率が高い）ので、低所得より高所得の方が有利な制度

税額控除 (tax credit)

$$T_t(y_{it}, g_{it}) = T_t(y_{it}) - mg_{it} \quad (4)$$

- $m$  は税額控除率であり、 $m = 0.15 \rightarrow$  税インセンティブは  $s_{it} = m$
- 2014 年の税制改革は税の逆進性を緩和し、税負担の公平性を改善することを目的として、所得に依存しない均一なインセンティブを導入した (Fig. 1)



# 韓国における寄付申告の手続き

韓国では所得税納税者は寄付に対して税制上の優遇を受けることができる

- 優遇を受けるためには、1年間の寄付の証明書を提出して寄付申告する必要がある
  - 給与所得者と非給与所得者で手続きが大きく異なる
- 給与所得者
  - 所得税を源泉徴収で納税し、寄付申告は会社で行う
  - 給与所得者は証明書の提出は随時行うことができる
  - 控除制度の正しい理解や書類作成の必要は特にない
- 非給与所得者
  - 所得納税を確定申告で行い、寄付申告は確定申告時に国税庁で行う
  - 確定申告は翌年の5月に実施
  - 確定申告時まで証明書を保存しておく必要がある → 寄付証明書の発行をめぐり、寄付団体に5月頃問い合わせが殺到
  - 確定申告時には寄付金控除を受けるための申請書類を作成する必要がある
- 給与所得者のほうが寄付の申告コスト ( $K_{it}$ ) が低いと考えられる (Fig. 6)

データ

# National Survey of Tax and Benefit (NaSTaB)

- 2008 年から Korea Institute of Taxation and Finance が実施
- NaSTaB は家計の税負担や公的扶助などに関する年次パネルデータ
- 全国から 5,634 世帯を調査対象とする
  - 5,634 人の世帯主と 15 歳以上で経済活動をしている世帯員が調査に回答する
- 我々の研究では (1)2013 年から 2018 年かつ、(2)23 歳以下の回答者を除いたデータを使用する
  - 2012 年と 2013 年の所得税率は変化していないが、2011 年以前に所得税率の改正が何度行われた (Table 3)
  - 2014 年の制度改革に着目するために、2013 年から 2018 年に限定する
  - 23 歳以下の回答者は所得や資産を十分に持っていない可能性が高いので、データから除外する

# Descriptive Statistics

Table 1: Descriptive Statistics

	N	Mean	Std.Dev.	Min	Median	Max
<b>Income and giving price</b>						
Annual taxable labor income (unit: 10,000KRW)	36189	1747.26	2696.77	0.00	0.00	50000.00
First giving relative price	36198	0.86	0.04	0.62	0.85	0.94
<b>Charitable giving</b>						
Annual charitable giving (unit: 10,000KRW)	36199	35.64	153.20	0.00	0.00	10000.00
Dummy of donation > 0	36199	0.24	0.42	0.00	0.00	1.00
Dummy of declaration of a tax relief	36199	0.10	0.30	0.00	0.00	1.00
<b>Individual Characteristics</b>						
Age	36199	53.45	16.22	24.00	51.00	103.00
Female dummy	36199	0.43	0.50	0.00	0.00	1.00
University graduate	36198	0.42	0.49	0.00	0.00	1.00
High school graduate dummy	36198	0.31	0.46	0.00	0.00	1.00
Junior high school graduate dummy	36198	0.27	0.44	0.00	0.00	1.00
Wage earner dummy	27394	0.56	0.50	0.00	1.00	1.00
#.Tax accountant / population	36199	1.04	0.51	0.32	0.92	2.24

## 右歪曲の所得分布と寄付価格の変動

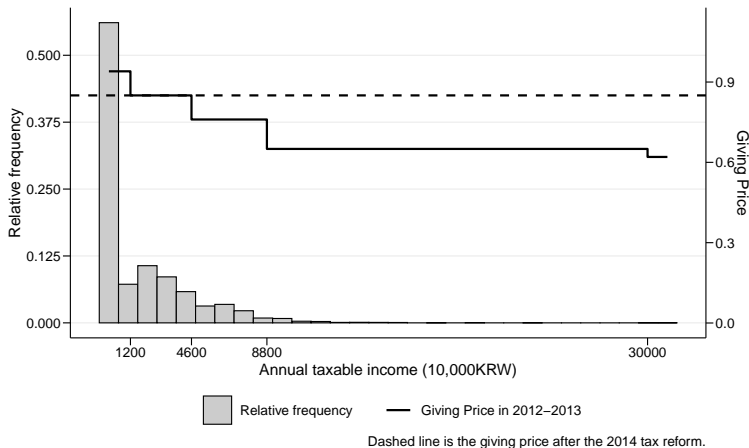


Figure 1: Income Distribution in 2013 and Relative Giving Price. Notes: The left and right axis measure the relative frequency of respondents (grey bars) and the relative giving price (solid step line and dashed line), respectively. A solid step line and a dashed horizontal line represents the giving price in 2013 and 2014, respectively.

## 2014 年税制改革直後、寄付者比率が減少

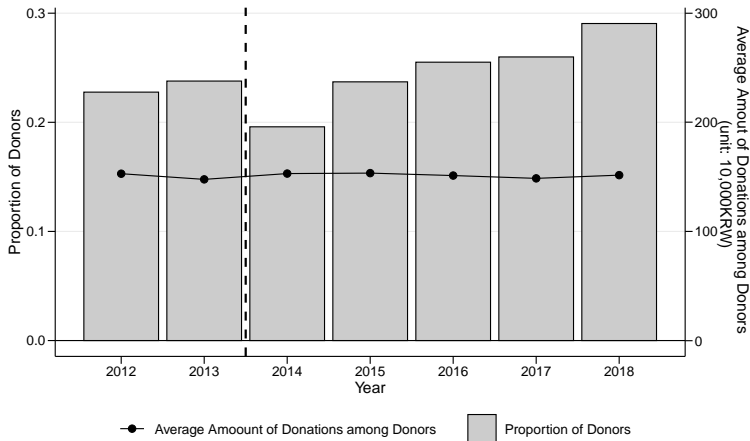


Figure 2: Proportion of Donors and Average Donations among Donors. Notes: The left and right axes measure proportion of donors (grey bars) and the average amount of donations among donors (solid line), respectively.

## 税インセンティブは寄付額を増やした

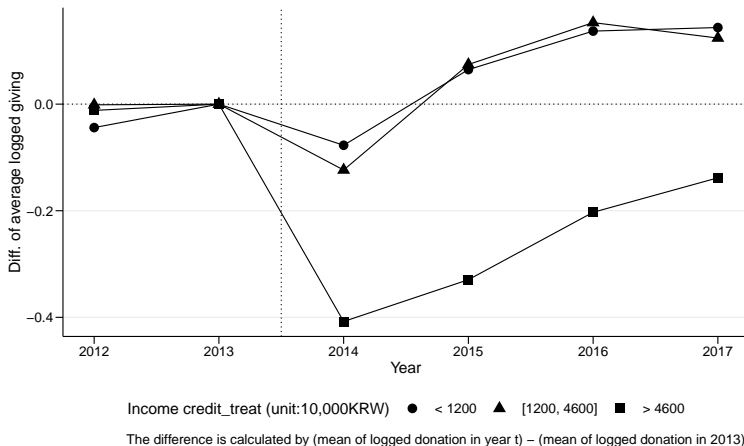


Figure 3: Average Logged Giving by Three Income Groups. Notes: We created three income groups, with the relative price of giving rising (circle), unchanged (triangle), and falling (square) between 2013 and 2014. The group averages are normalized to be zero in 2013.

## 寄付者に限定すると、寄付額に対する価格効果ははっきりとしない

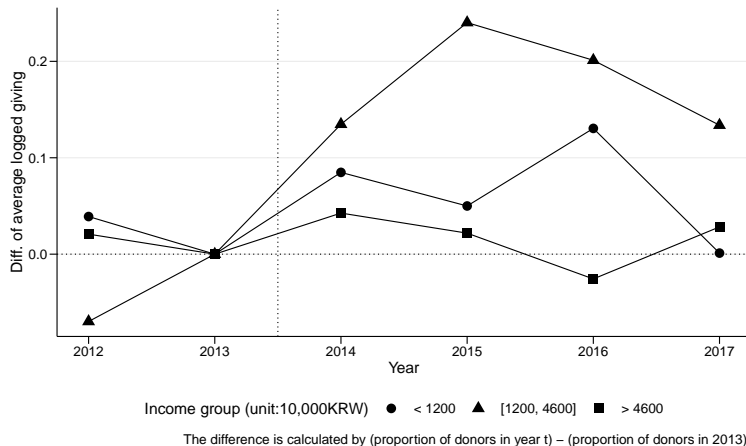


Figure 4: Average Logged Giving by Three Income Groups Conditional on Donors. Notes: We created three income groups, with the relative price of giving rising (circle), unchanged (triangle), and falling (square) between 2013 and 2014. The group averages are normalized to be zero in 2013.



## 税インセンティブは寄付者を増やした

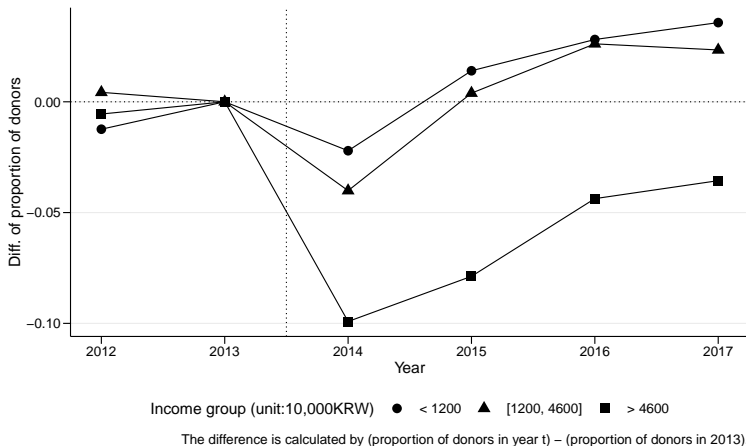


Figure 5: Proportion of Donors by Three Income Groups. Notes: We created three income groups, with the relative price of giving rising (circle), unchanged (triangle), and falling (square) between 2013 and 2014. The group averages are normalized to be zero in 2013.

## 制度改革に関わらず、給与所得者は寄付申告をしやすい

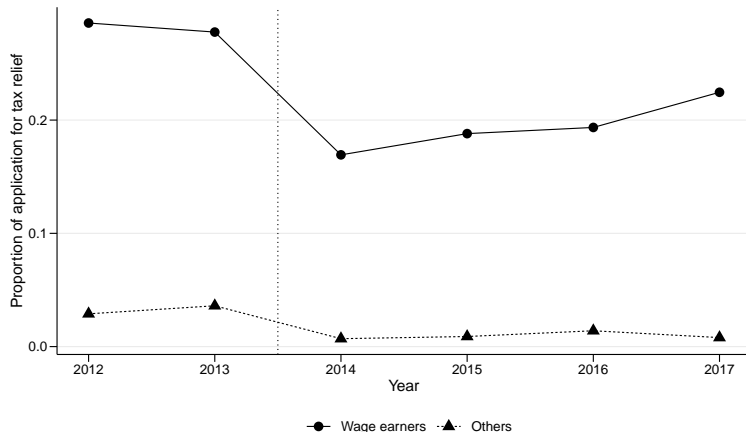


Figure 6: Share of Tax Relief by Wage Earners. Notes: A solid line is the share of applying for tax relief among wage earners. A dashed line is the share of applying for tax relief other than wage earners.

## 寄付の価格弾力性の推定

## 2 種類の寄付の価格弾力性

Almunia et al. (2020) に従い、2 種類の価格弾力性を推定する

1. Intensive-margin tax-price elasticity: 1% の価格上昇で寄付者の寄付額が何% 増えるか？
2. Extensive-margin tax-price elasticity: 1% の価格上昇で寄付確率が何% 増えるか？

## Intensive-Margin Tax-Price Elasticity の推定方法

$$\ln g_{it} = \theta_i + \gamma(R_{it} \times \ln(1 - s_{it})) + \beta X_{it} + \lambda_t + u_{it}, \quad (5)$$

- $X_{it}$  は課税前所得 ( $y_{it}$ ) を含んだ共変量ベクトル
- $\theta_i$  は個人固定効果、 $\lambda_t$  は時間固定効果
- $u_{it}$  は idiosyncratic error
- 関心のあるパラメータは  $\gamma$  で、intensive-margin tax-price elasticity を示す

## Extensive-Margin Tax-Price Elasticity の推定方法

$$D_{it} = \theta_i + \delta(R_{it} \times \ln(1 - s_{it})) + \beta X_{it} + \lambda_t + u_{it}, \quad (6)$$

- $D_{it}$  は正の寄付額 ( $g_{it} > 0$ ) が観測されたら 1 を取るダミー変数
- 関心のあるパラメータは  $\delta$ 
  - 二値のアウトカム変数なので、 $\delta$  は直接、価格弾力性として解釈できない
  - Extensive-Margin Tax-Price Elasticity は  $\hat{\delta}/\bar{D}$  で得られる ( $\bar{D}$  は  $D_{it}$  の標本平均)

## 寄付の相対価格の内生性

$$1 - s_{it} = \begin{cases} 1 - T'_t(y_{it} - g_{it}) & \text{if } t < 2014 \\ 1 - m & \text{if } t \geq 2014 \end{cases}, \quad (7)$$

- $T'_t(\cdot)$  は  $t$  年の限界所得税率、 $m$  は税額控除率 ( $m = 0.15$ )
- 所得控除のとき、寄付価格は寄付額 ( $g_{it}$ ) に依存する
- この価格は *Last-unit price* と呼ばれる

過去の研究にならい、本研究は以下の *first-unit price* を *last-unit price* の代わり（もしくはその操作変数）として用いる

$$1 - s_{it}^f = \begin{cases} 1 - T'_t(y_{it} - 0) & \text{if } t < 2014 \\ 1 - m & \text{if } t \geq 2014 \end{cases}, \quad (8)$$

## 寄付申告の内生性

給与所得者ダミーを exclusion として用いる

- 所得や業種をコントロールすれば、給与所得者であるかどうかは直接寄付額に影響しない
- 給与所得者のほうが非給与所得者より寄付申告コストが安いと考えられる

Wooldridge (2010) より、以下の二つの方法で推定する

1. 給与所得者ダミー ( $Z_{it}$ ) と first-unit price の交差項を  $R_{it} \times \ln(1 - s_{it}^f)$  の操作変数として用いる
2. 寄付申告の傾向スコア  $P_{it}$  と first-unit price の交差項を操作変数として用いる
  - 傾向スコア  $P_{it}$  は  $R_{it} = 1[\alpha_0 + \alpha_1 Z_{it} + \alpha_2 \ln(1 - s_{it}^f) + \alpha_3 X_{it} + u_{it0} > 0]$  をプロビット推定し、その予測確率で得る
  - プロビット推定は係数が時間に対して一定と仮定した Pooled モデルと係数が時間に対して異なると仮定した Separated モデルで推定



# Estimation Results

Table 2: Estimation of Last-Unit Price Elasticities

	Overall		Intensive margin		Extensive margin	
	FE	FE-2SLS	FE	FE-2SLS	FE	FE-2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
log(last price)	-10.856*** (0.300)	-6.361*** (0.579)	-0.634*** (0.231)	-1.907*** (0.451)	-2.945*** (0.071)	-1.570*** (0.127)
Implied price elasticity					-11.684*** (0.281)	-6.227*** (0.502)
First-stage: log(first price)		0.353 [407.8]		0.726 [442.4]		0.353 [407.8]
Num.Obs.	28696	28696	7234	7234	28696	28696
FE: area	X	X	X	X	X	X
FE: indust	X	X	X	X	X	X
FE: pid	X	X	X	X	X	X
FE: year	X	X	X	X	X	X
Square of age	X	X	X	X	X	X

Notes: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors are clustered at individual level. A square bracket is wald statistics of instrument.

## Message from Table 2

- Column 3 and 4: we estimate the equation (5), using the NaSTaB data consisting of donors only.
  - When we do not take endogenous nature of giving price into account, the intensive-margin price elasticity has upward-bias
  - The intensive-margin price elasticity is about -2% (column 4)
- Column 5 and 6 estimate the equation (6)
  - When we do not take endogenous nature of giving price into account, the extensive-margin price elasticity has downward-bias
  - The estimated coefficient of logged value of last-unit price is -1.5 (column 6).
  - The extensive-margin price elasticity is -5.8.

# Robustness Analysis

1. Price elasticity excluding 2013 and 2014 data (Table 4)
  - to eliminate the effect of tax reform announcement.
  - estimated last-unit price elasticity is robust against the announcement effect of 2014 tax reform.
2. Price elasticity with a sample limited to those who applied for tax relief (Table 5)
  - the first-unit price elasticity is -1.2, and the last-unit price elasticity is -1.3
  - To directly control the dynamic effects, we add lagged and future changes of these variables
  - When controlling this effect, the price elasticity is statistically insignificant.
3. Price elasticity to deal with endogenous nature of income (Table 6)
  - we estimate the  $k$ -th order difference model.
  - estimated intensive-margin price elasticity is between -1.8 and -4.1, which is statistically significant

# Heterogenous Price Elasticity (1)

We estimate heterogeneity of the last-unit price elasticity in terms of individual characteristics (Table 7)

1. intensive-margin price elasticity for males is higher than for females, while the extensive-margin price elasticity for males is lower than for females
2. the higher the education level, the higher the intensive-margin price elasticity, but the lower the extensive-margin price elasticity
3. individuals in 40s are sensitive to tax incentives in both intensive-margin and extensive-margin.
4. wage earners are sensitive to tax incentive, while non wage earners are insensitive to tax incentive.

## Heterogenous Price Elasticity (2)

We estimate the last-unit price elasticity for each organization to which the donation is made (Table 8)

1. charitable giving for social welfare organization and religious institution is sensitive to tax incentive in terms of both intensive margin and extensive margin
2. tax incentive negatively affects decision of donation for educational organization and political parties

## Conclusion

## Appendix

Table 3: 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%
(E) 15000 ~ 30000				35%		35%	38%
(F) 30000 ~ 50000	35%	35%	35%		38%	38%	40%
(G) 50000 ~				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.



# Distribution of Donations Conditional on Donors

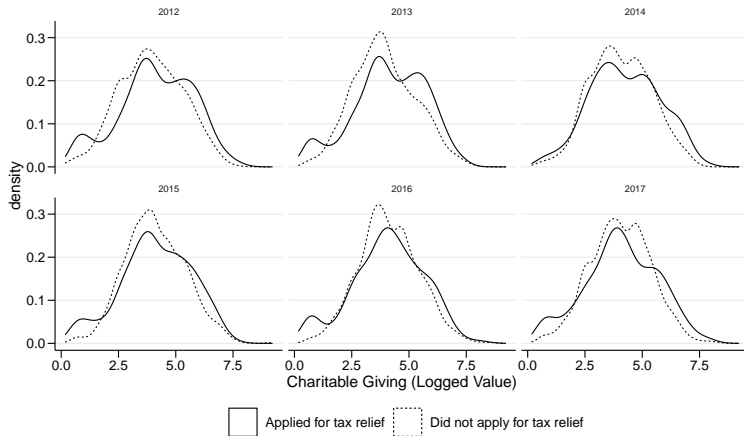


Figure 7: Distribution of Charitable Giving among Those Who Donated

## Share of Application Conditional on Donors by Wage Earners

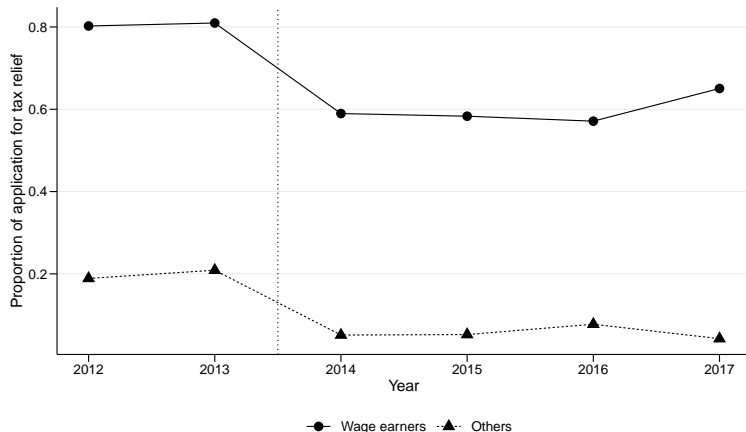


Figure 8: Share of Tax Relief by Wage Earners Conditional on Donors. Notes: A solid line is the share of applying for tax relief among wage earners. A dashed line is the share of applying for tax relief other than wage earners.

# Price Elasticity Excluding Announcement Effect

Table 4: Estimation of Last-Unit Price Elasticities Excluding 2013 and 2014 data

	Overall		Intensive margin		Extensive margin	
	FE	FE-2SLS	FE	FE-2SLS	FE	FE-2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
log(last price)	-11.309*** (0.372)	-6.331*** (0.798)	-0.679** (0.333)	-2.088*** (0.600)	-3.097*** (0.086)	-1.560*** (0.170)
Implied price elasticity					-11.574*** (0.320)	-5.830*** (0.634)
First-stage: log(first price)		0.363 [244.3]		0.796 [270.6]		0.363 [244.3]
Num.Obs.	20198	20198	5405	5405	20198	20198
FE: area	X	X	X	X	X	X
FE: indust	X	X	X	X	X	X
FE: pid	X	X	X	X	X	X
FE: year	X	X	X	X	X	X
Square of age	X	X	X	X	X	X

Notes: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors are clustered at individual level. A square bracket is wald statistics of instrument.

# Subsample Analysis for Those Who Applied for Tax Relief

Table 5: Estimating Intensive-Margin Price Elasticities for Those Who Applied for Tax Relief

	(1)	(2)	(3)	(4)
log(first price)	-1.203*** (0.390)	-0.506 (0.847)		
log(last price)			-1.330*** (0.452)	-0.254 (0.903)
log(income)	0.525 (0.776)	6.126 (5.365)	0.532 (0.785)	6.093 (5.503)
1-year lag of price		0.369 (0.884)		0.487 (0.911)
1-year lag of income		1.040 (4.777)		1.129 (5.030)
1-year lead of income		-0.821 (0.907)		-0.826 (0.904)
Instrument: log(first price)			0.942 [3083.6]	-0.000 [0.0]
Num.Obs.	4079	1029	3972	1024
FE: area	X	X	X	X
FE: indust	X	X	X	X
FE: pid	X	X	X	X
FE: year	X	X	X	X
Square of age	X	X	X	X

Notes: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors are clustered at individual level. 1-year lead of price cannot be estimated because of collinearity.

## $k$ -th Difference Model

Table 6:  $k$ -th Difference Model Using Those Who Applied for Tax Relief

	1-year lag	2-year lag	3-year lag
	(1)	(2)	(3)
Difference of logged first price	-1.890* (1.107)	-2.530*** (0.895)	-4.057*** (0.720)
First-stage: Instrument	0.995 [34401.5]	0.991 [31041.1]	0.984 [17987.3]
Num.Obs.	4014	3903	3765
FE: area	X	X	X
FE: indust	X	X	X
FE: year	X	X	X
Difference of square age	X	X	X

Notes: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors are clustered at individual level. Instrument is difference between lagged first price in year  $t$  and in year  $t - k$  fixing income in year  $t - k$ .

# Heterogenous Price Elasticity in terms of Covariates

Table 7: Heterogenous Last-Unit Price Elasticities in terms of Individual Characteristics

Covariate	Intensive margin			Extensive margin		
	Estimate	S.E.	N	Estimate	S.E.	N
Female	-0.551	(1.120)	2921	-9.786***	(1.440)	10674
Male	-1.919***	(0.523)	4313	-5.126***	(0.554)	18022
University graduate	-2.048***	(0.572)	4723	-4.494***	(0.488)	14778
High school graduate	-1.611	(1.066)	1977	-10.300***	(1.483)	9803
Less than junior high school graduate	1.012	(1.467)	534	-23.121***	(7.031)	4115
Age < 40	-1.538	(1.459)	1889	-1.870	(2.211)	7800
40 ≤ Age ≤ 50	-2.293***	(0.781)	2823	-5.332***	(0.627)	9530
50 < Age	-0.714	(0.718)	2522	-8.170***	(1.214)	11366
Wage earner	-1.966***	(0.486)	5517	-2.009***	(0.451)	15596
Non wage earner	-11.226	(11.177)	1690	-21.142	(33.822)	12934

Notes: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors are clustered at individual level.

# Heterogenous Price Elasticity in terms of Organization Type

Table 8: Estimating Last-Unit Price Elasticities for Each Organization Type

Type	Intensive margin			Extensive margin		
	Estimate	S.E.	N	Estimate	S.E.	N
Social welfare	-1.814**	(0.867)	2990	-5.514***	(1.394)	28696
Education	1.805	(4.507)	178	14.633*	(7.644)	28696
Political party	17.955	(47.747)	258	20.448***	(7.071)	28696
Religious institution	-1.300**	(0.619)	3867	-4.436***	(1.040)	28696
Relief activities by religious institution	-4.985	(3.092)	532	-2.378	(4.125)	28696
Others	-3.847	(3.780)	422	2.706	(4.644)	28696
Culture				15.386	(10.951)	28696

Notes: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Standard errors are clustered at individual level. We cannot the intensive-margin price elasticity for donations for culture due to small sample.

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