

Additional Analysis

Last updated on 2023/09/11

Estimate Elasticities among Claimants

Results: First-Price Elasticity

Table 1: Intensive-Margin Price Elasticity among Claimants

	Log donation
	FE
	(1)
Applicable price (β_a)	-1.147** (0.506)
Log income	-1.221 (2.213)
Num.Obs.	4171

Results: Last-Price Elasticity

Table 2: Intensive-Margin Last-Price Elasticity among Claimants

	Log donation	
	FE	FE-2SLS
	(1)	(2)
Applicable last-price	-0.961* (0.517)	-1.197** (0.531)
Log income	-1.108 (2.213)	-1.269 (2.214)
<i>1st stage information (Excluded instrument: Applicable price)</i>		
F-statistics of instrument		40 585.827
Wu-Hausman test, p-value		0.019
Num.Obs.	4171	4171

Two Period Estimation: Removing Bracket-Shifting Effect

Use 2012 and 2015 data: First-Stage

Table 3: First-Stage Models

	Effective price	
	Donors (Intensive-margin)	Donors and Non-donors (Extensive-margin)
	(1)	(2)
<i>Excluded instruments</i>		
Applicable price	0.739*** (0.110)	0.301*** (0.052)
<i>Covariates</i>		
Log income	-0.229 (0.529)	-0.026 (0.190)
Num.Obs.	2004	7671
RMSE	0.02	0.03

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at household level are in parentheses. An outcome variable is logged value of the effective price. For estimation, model (1) use donors only (intensive-margin sample), and model (2) use not only donors but also non-donors (extensive-margin sample). In addition to logged income and wage earner dummy shown in table, covariates consist of squared age (divided by 100), number of household members, a dummy that indicates having dependents, a set of dummies of industry a set of dummies of residential area, and individual and time fixed effects. Excluded instrument is a logged applicable price.

Use 2012 and 2015 data: Second-Stage

Table 4: Estimation Results of Price Elasticities

	Log donation			Dummy of donor		
	FE		FE-2SLS	FE		FE-2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
Applicable price (β_a)	-1.275 (1.276)			-0.326* (0.190)		
Effective price (β_e^{FE})		-1.129 (1.601)			-2.757*** (0.225)	
Effective price (β_e^{IV})			-1.725 (1.754)			-1.084* (0.574)
Log income	-3.555 (10.491)	-3.777 (10.312)	-3.951 (10.299)	2.062** (0.838)	1.550** (0.725)	2.034*** (0.761)
<i>Implied price elasticity</i>						
Estimate				-1.388* (0.808)	-11.734*** (0.958)	-4.612* (2.443)
<i>1st stage information (Excluded instrument: Applicable price)</i>						
F-statistics of instrument			288.802			282.264
Wu-Hausman test, p-value						
Num.Obs.	2004	2004	2004	7671	7671	7671

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at household level are in parentheses. An outcome variable is logged value of the effective price. For estimation, model (1) use donors only (intensive-margin sample), and model

One-Year Bracket-Shifting

Take an one-year lag of applicable price

```
## # A tibble: 4 x 4
##   year      mu      var shift
##   <dbl>    <dbl>    <dbl> <int>
## 1  2010  NaN      NA      0
## 2  2011 -0.00197  0.00195  573
## 3  2012 -0.00237  0.00207  644
## 4  2013 -0.000662 0.00202  642
```


Two-Year Bracket Shifting

Take a two-year lag of applicable price

```
## # A tibble: 4 x 4
##   year      mu      var shift
##   <dbl>  <dbl>  <dbl> <int>
## 1  2010  NaN      NA      0
## 2  2011  NaN      NA      0
## 3  2012 -0.00304  0.00233  559
## 4  2013 -0.00403  0.00247  755
```

Three-Year Bracket Shifting

```
## # A tibble: 4 x 4
##   year      mu      var shift
##   <dbl>  <dbl>  <dbl> <int>
## 1  2010  NaN      NA         0
## 2  2011  NaN      NA         0
## 3  2012  NaN      NA         0
## 4  2013 -0.00414  0.00238    492
```

How to Remove Bracket-Shifting

We remove tax-payers whose income bracket has been shifted in 2011–2013 (1477 people)

Take an one-year lag of applicable price

```
## # A tibble: 8 x 4
##   year      mu      var shift
##   <dbl>   <dbl>   <dbl> <int>
## 1  2010  NaN      NA      0
## 2  2011    0      0      0
## 3  2012    0      0      0
## 4  2013    0      0      0
## 5  2014 -0.00761  0.00414  1128
## 6  2015    0      0      0
## 7  2016    0      0      0
## 8  2017    0      0      0
```

Remove Bracket-Shifting Sample in 2011–2013

Table 5: First-Stage Models

	Effective price	
	Donors (Intensive-margin)	Donors and Non-donors (Extensive-margin)
	(1)	(2)
<i>Excluded instruments</i>		
Applicable price	0.750*** (0.047)	0.410*** (0.031)
<i>Covariates</i>		
Log income	−0.312* (0.172)	−0.279*** (0.069)
Num.Obs.	5825	21 962
RMSE	0.04	0.04

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at household level are in parentheses. An outcome variable is logged value of the effective price. For estimation, model (1) use donors only (intensive-margin sample), and model (2) use not only donors but also non-donors (extensive-margin sample). In addition to logged income and wage earner dummy shown in table, covariates consist of squared age (divided by 100), number of household members, a dummy that indicates having dependents, a set of dummies of industry a set of dummies of residential area, and individual and time fixed effects. Excluded instrument is a logged applicable price.

Remove Bracket-Shifting Sample in 2011–2013

Table 6: Estimation Results of Price Elasticities

	Log donation			Dummy of donor		
	FE		FE-2SLS	FE		FE-2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
Applicable price (β_a)	-1.172*** (0.436)			-0.276*** (0.090)		
Effective price (β_e^{FE})		-0.670** (0.320)			-2.878*** (0.094)	
Effective price (β_e^{IV})			-1.563*** (0.589)			-0.673*** (0.203)
Log income	2.496 (1.666)	2.258 (1.674)	2.007 (1.692)	2.046*** (0.300)	1.090*** (0.304)	1.859*** (0.286)
<i>Implied price elasticity</i>						
Estimate				-1.176*** (0.385)	-12.270*** (0.400)	-2.869*** (0.866)
<i>1st stage information (Excluded instrument: Applicable price)</i>						
F-statistics of instrument			1068.639			1770.695
Wu-Hausman test, p-value			0.021			< 0.001
Num.Obs.	5825	5825	5825	21 962	21 962	21 962

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at household level are in parentheses. An outcome variable is logged value of the effective price. For estimation, model (1) use donors only (intensive-margin sample), and model

Heterogeneous Elasticities

First-Stage Results

Table 7: Heterogeneity of Price Elasticity: First-Stage Result

Total income	Effective price			
	Donors (Intensive-margin)		Donors and Non-donors (Extensive-margin)	
	$\leq 4,600$	$1,200 \leq$	$\leq 4,600$	$1,200 \leq$
	(1)	(2)	(3)	(4)
<i>Excluded instruments</i>				
Applicable price	0.190*** (0.072)	0.821*** (0.057)	0.049*** (0.013)	0.527*** (0.042)
<i>Covariates</i>				
Log income	-1.165*** (0.366)	-0.261 (0.179)	-0.541*** (0.069)	-0.293*** (0.076)
Num.Obs.	3332	5349	17 047	19 157

Second-Stage Results

Table 8: Heterogeneity of Price Elasticity

Total income	FE-2SLS			
	Log donation		1 = Donor	
	$\leq 4,600$	$1,200 \leq$	$\leq 4,600$	$1,200 \leq$
	(1)	(2)	(3)	(4)
Effective price (β_e^{IV})	-2.863 (9.526)	-1.515** (0.622)	-3.332 (3.919)	-0.493** (0.197)
Log income	0.935 (13.447)	1.808 (1.709)	1.501 (2.225)	1.957*** (0.315)
Estimate			-18.818 (22.136)	-1.772** (0.709)
F-statistics of instrument	6.302	920.612	9.777	1680.669
Wu-Hausman test, p-value	0.568	0.044	0.696	< 0.001
Num.Obs.	3332	5349	17 047	19 157

Price Elasticity of Claiming

Price Elasticity of Claiming

	1 = Claiming	
	FE	FE-2SLS
	(1)	(2)
Applicable first-price	−0.220*** (0.050)	
Applicable last-price		−0.223*** (0.051)
Log income	1.380*** (0.177)	1.377*** (0.177)
<i>Implied price elasticity</i>		
Estimate	−1.982*** (0.452)	−2.008*** (0.458)
<i>1st stage information (Excluded instrument: Applicable first-price)</i>		
F-statistics of instrument		1 481 835.010
Wu-Hausman test, p-value		0.102
Num.Obs.	30 252	30 252

Heterogeneity: Price Elasticity of Claiming

Total income	1 = Claiming	
	$\leq 4,600$	$1,200 \leq$
	(1)	(2)
Applicable first-price	-0.206** (0.098)	-0.297** (0.116)
Log income	3.360*** (0.424)	2.039*** (0.304)
<i>Implied price elasticity</i>		
Estimate	-3.688** (1.765)	-1.851** (0.723)
Num.Obs.	17 047	19 157

Policy Effect of 2014 Tax Reform

Using Applicable Price Elasticities

Income bracket	N	Price		Intensive-margin		Extensive-margin	
		2013 average	Change (%)	2013 average	Change (%)	2013 average	Change (%)
(A) -1200	1233	0.94	-9.57	7.72	10.36	0.12	7.57
(B) 1200-4600	2387	0.85	0.00	18.65	0.00	0.20	0.00
(C) 4600-8800	868	0.76	11.84	66.51	-12.81	0.45	-9.37
(D) & (E) 8800-30000	184	0.65	30.77	149.58	-33.29	0.49	-24.34
Weighted average			0.89		-0.96		-0.70

Claiming Status and Effective Price Change

Income bracket	N	Claiming (%)		Price		
		2013	2014	2013	2014	Change (%)
(A) -1200	1084	0.738	1.015	1.000	0.998	-0.107
(B) 1200-4600	2222	11.116	5.986	0.983	0.991	0.952
(C) 4600-8800	823	38.275	28.311	0.908	0.958	6.666
(D) & (E) 8800-30000	174	36.782	31.034	0.871	0.953	12.969
Weighted average						2.264

Using Effective Price Elasticities

Income bracket	N	Intensive-margin		Extensive-margin	
		2013 average	Change (%)	2013 average	Change (%)
(A) -1200	1084	8.07	0.17	0.12	0.28
(B) 1200-4600	2222	18.32	-1.48	0.20	-2.52
(C) 4600-8800	823	65.65	-10.40	0.45	-17.64
(D) & (E) 8800-30000	174	146.21	-20.23	0.49	-34.33
Weighted average			-3.53		-5.99

Appendix

Full-sample analysis: Stage 1

Table 9: First-Stage Models

	Effective price	
	Donors (Intensive-margin)	Donors and Non-donors (Extensive-margin)
	(1)	(2)
<i>Excluded instruments</i>		
Applicable price	0.694*** (0.038)	0.299*** (0.019)
<i>Covariates</i>		
Log income	-0.225 (0.147)	-0.071 (0.047)
Num.Obs.	7776	30 252
RMSE	0.05	0.04

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at household level are in parentheses. An outcome variable is logged value of the effective price. For estimation, model (1) use donors only (intensive-margin sample), and model (2) use not only donors but also non-donors (extensive-margin sample). In addition to logged income and wage earner dummy shown in table, covariates consist of squared age (divided by 100), number of household members, a dummy that indicates having dependents, a set of dummies of industry a set of dummies of residential area, and individual and time fixed effects. Excluded instrument is a logged applicable price.

Full-sample analysis: Stage 2

Table 10: Estimation Results of Price Elasticities

	Log donation			Dummy of donor		
	FE		FE-2SLS	FE		FE-2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
Applicable price (β_a)	-1.082*** (0.332)			-0.184*** (0.058)		
Effective price (β_e^{FE})		-0.641** (0.255)			-2.729*** (0.073)	
Effective price (β_e^{IV})			-1.560*** (0.486)			-0.617*** (0.182)
Log income	1.629 (1.347)	1.862 (1.334)	1.277 (1.348)	1.464*** (0.209)	0.675*** (0.190)	1.420*** (0.202)
<i>Implied price elasticity</i>						
Estimate				-0.791*** (0.250)	-11.717*** (0.314)	-2.647*** (0.782)
<i>1st stage information (Excluded instrument: Applicable price)</i>						
F-statistics of instrument			1401.509			1812.348
Wu-Hausman test, p-value			0.004			< 0.001
Num.Obs.	7776	7776	7776	30 252	30 252	30 252

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors clustered at household level are in parentheses. An outcome variable is logged value of the effective price. For estimation, model (1) use donors only (intensive-margin sample), and model