Bunching of closely held corporations

Targeted tax incentives, persistence and firms' heterogeneity

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Motivation

In many countries corporations are mostly private **closely held firms**

- At least one major shareholder, often acting as director
- Director-owners of these firms are subject both to labor and capital taxes
- Play an important role in evolution of top incomes (Smith et al., 2019)

.. Yet scarce evidence on **effect of tax incentives on closely held corporations' behavior**, partly due to data availability

This paper

Focus on Dutch **closely held corporations** and exploit kinked corporate income tax schedule by applying **bunching** methods and **probit analysis**

- Magnitude of the response (E-CIT)
- Role of targeted tax incentives + individuals' & firms' characteristics

Research questions

- *Who* reacts to the tax system and *how*?
- Persistence in behavioral response?

▸ Contributions

Dutch institutional setting

- Most closely held firms are private corporations managed by director-owners
  - Own at least 5% of shares in the corporation and work for the firm
- Director-owner is subject to **personal income taxes** (PIT)
  - Progressive rates on wage (top rate 52%)
  - Director-owner has to pay herself reference wage (or prove she cannot)
- Companies are liable to the **corporate income tax** (CIT)
  - 20% tax rate up to €200,000, 25% above that over 2009-2018
  - Corporate taxable income = corporate profits − deductions
  - Today: deductions for energy and environment investments (EEI)

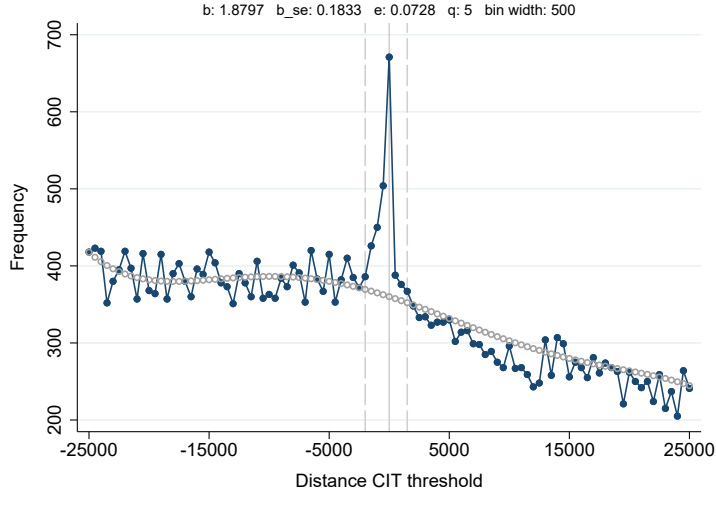
▸ Figure

Data

- **Sample**
  - Dutch companies with at least one director-owner over 2009-2018
  - Director-owner holds $\geq$5% of shares and is employed in the company
- **Sources**
  - Administrative and tax return data on firms and their owners
  - Corporate taxable income, deductions and firms' characteristics
  - Director-owner's personal tax return items and characteristics
- **Sample adjustments**
  - Only companies with a single owner
  - Only owners of a single company

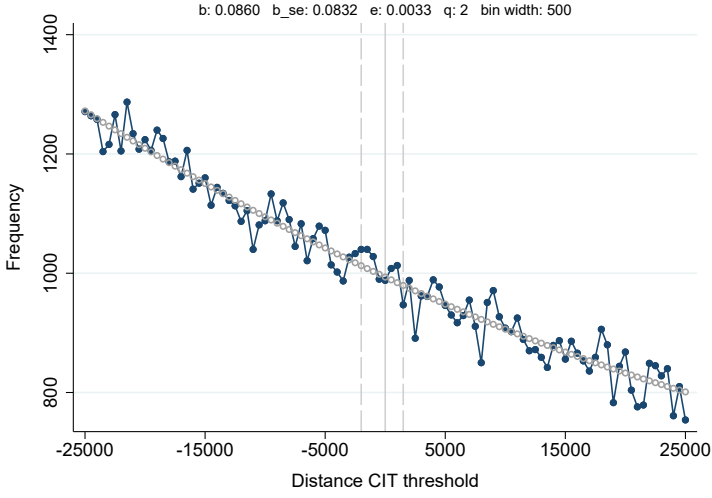
▸ Summary statistics ▸ Sample selection

Bunching at the 200,000 euros threshold



▸ Method ▸ Robustness ▸ Robust counterfactual ▸ Comparison to the literature ▸ Summary statistics

Is it a real response? Bunching in net profits + owner wage



Net profits = (operating income − operating expenses) + (financial income − financial expenses) + results from participation + extraordinary results

Probit analysis: Correlates in bunching

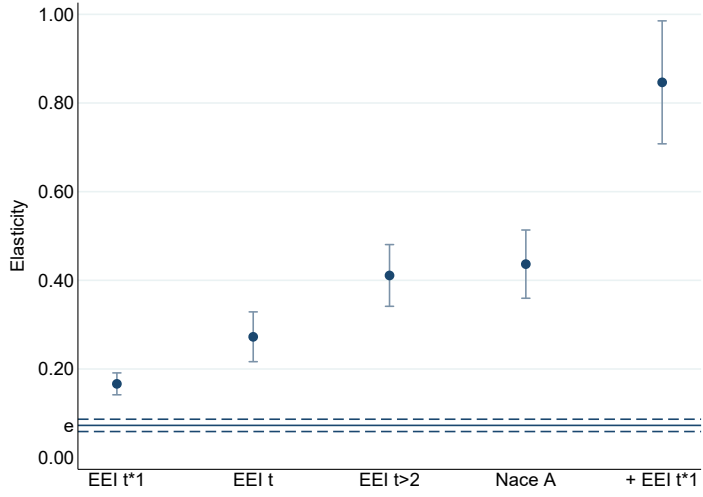
▸ Assumptions ▸ Firm heterogeneity

$d_{it} = 1$ if taxable income within [−€500,€500] of kink

	Range ±10,000	Range ±5,000
EEI t	0.034***	0.047**
	(0.010)	(0.019)
EEI t*2	0.038***	0.060***
	(0.009)	(0.016)
Agriculture, forestry and fishing	0.087***	0.137***
	(0.013)	(0.023)
Assets 1M-3M	0.000	-0.000
	(0.006)	(0.010)
Assets 3M-5M	0.002	0.007
	(0.008)	(0.015)
Assets 5M-7M	0.016	0.022
	(0.010)	(0.018)
Assets $\geq$ 7M	0.024**	0.042**
	(0.010)	(0.018)
10-19 employees	0.018*	0.027
	(0.010)	(0.018)
20-49 employees	0.020*	0.027
	(0.012)	(0.020)
$\geq$ 50 employees	0.054***	0.087***
	(0.016)	(0.029)
[−€500,€500] PIT threshold t	0.004	0.006
	(0.010)	(0.019)
[−€500,€500] PIT threshold t*3	0.014	0.005
	(0.017)	(0.029)
Observations	14,414	7,760
Year and industry dummies	yes	yes
Clustering at taxpayer level	yes	yes
Additional control variables	yes	yes

EEI deductions

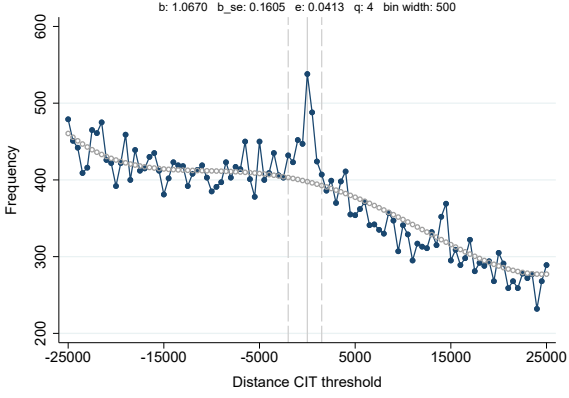
▸ Table ▸ Growth? ▸ Mean EEI & mean EEI use ▸ Other deductions ▸ Industry



EEI t*1: firm has used EEI deductions at least one year over the sample period. EEI t: firm uses EEI deductions in year t. EEI t>2: dummy is one if firm has used deductions at least twice by year t. + EEI t*1: firm operates in nace A and has used EEI deductions at least once. 2009-2018, bin width: 500, 1000 for + EEI t*1.

Bunching after accounting for observed deductions

Taxable income + deductions



Tax savings

	Mean	p99
Range around the kink	[2000, 1500[	
TI + deductions	211,838	368,041
Tax savings	3,282	44,128
Range around the kink	[500, 500[	
TI + deductions	223,065	594,710
Tax savings	6,058	98,621

- Taxable income + investment deductions, LCF, R&D incentives
- Observed deductions explain 40% of the baseline elasticity
- Lead to substantial tax savings for some firms

Probit analysis: Persistence in bunching

▸ Assumptions ▸ Individual heterogeneity

$d_{it} = 1$ if taxable income within [−€500,€500] of kink in more than one year

	Range ±10,000	Range ±5,000
EEI t	0.007*	0.010
	(0.004)	(0.007)
EEI t*2	0.021***	0.034***
	(0.005)	(0.009)
Agriculture, forestry and fishing	0.034***	0.055***
	(0.011)	(0.017)
Assets 1M-3M	0.012***	0.019**
	(0.005)	(0.008)
Assets 3M-5M	0.021***	0.033***
	(0.006)	(0.010)
Assets 5M-7M	0.017**	0.025**
	(0.007)	(0.011)
Assets ≥ 7M	0.029***	0.046***
	(0.006)	(0.010)
10-19 employees	-0.001	0.002
	(0.006)	(0.010)
20-49 employees	0.007	0.016
	(0.006)	(0.011)
≥ 50 employees	0.013	0.022
	(0.009)	(0.015)
[-€500,€500] PIT threshold t	0.012**	0.021***
	(0.005)	(0.008)
[-€500,€500] PIT threshold t*3	0.019*	0.029*
	(0.011)	(0.017)
Observations	13,911	7,491
Year dummies	yes	yes
Clustering at taxpayer level	yes	yes
Additional control variables	yes	yes

Conclusions

E-CIT=0.07 at €200,000 kink, but **large heterogeneity** in the response

- E-CIT larger for large firms, firms using repeatedly EEI deductions, and operating in agriculture, forestry and fishing

Persistence of firms **bunching** at the kink

- Owned by individuals who bunch (persistently) in the personal tax schedule
- Large, operating in agriculture, forestry and fishing, using repeatedly EEI deductions

Implications

- Government policy decisions can significantly affect the size of the E-CIT
- Information frictions may play an important role

Thank you!

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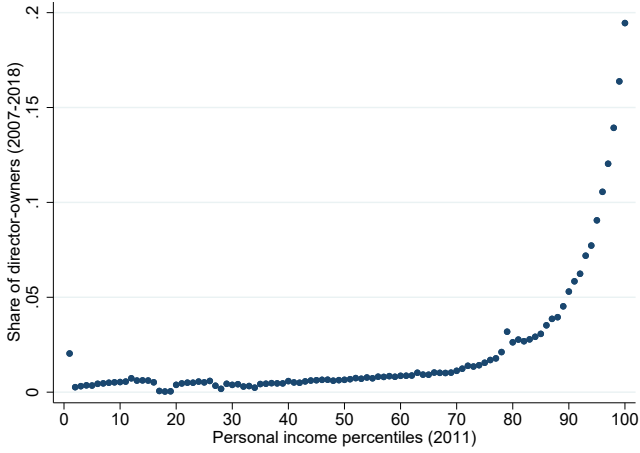
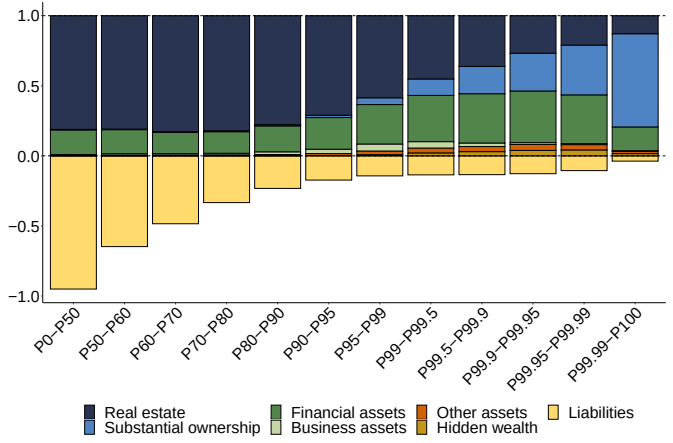
Owners of closely held corporations in the income distribution



Share of individuals who at any time over 2008-2018 have been director-owners of closely held corporations by 2011 personal income percentiles.

◂ Back

Owners of closely held corporations in the wealth distribution



Structure of wealth in the Netherlands in 2007. Source: Leenders et al. (2020)

◂ Back

Contribution

1. **Role of persistence in firms' behavioral response**
   - Persistence of firms at kinks has not been systematically studied
   - Persistence of behaviors that make firms bunch not documented so far

2. **Literature on closely-held businesses and their owners**
   - Link between personal and corporate income tax schedule optimization
   - Scarce evidence mostly due to data limitations

3. **Role of tax incentives + firms' & individuals' characteristics**
   - Show adjustment channels underlying E-CIT
   - Show main predictors of responsiveness ("anatomy of the tax system")

◂ Back

Bunching method: Standard model

Back

Saez (2010); Chetty et al. (2011): E-CIT wrt net-of-tax rate

$$e = \frac{b}{z^* \cdot log(\frac{1-\tau_0}{1-\tau_1})} \tag{1}$$

b	fraction of firms bunching around the kink relative to the counterfactual density
z^*	corporate taxable income threshold
τ_0, τ_1	marginal tax rate below and above z^*

$$\hat{N}_j = \sum_{i=0}^{q} \beta_i \cdot Z_j^i + \sum_{s=l}^{u} \gamma_i \cdot \mathbb{I}[Z_j = s] + \varepsilon_j \tag{2}$$

$\hat{N}_j$	counterfactual number of firms within income bin j
Z_j	midpoint of income bin j
$[l, u]$	bunching window, defined between lower and upper bound

Bunching method: Relationship between ETI and excess mass

Mass of firms bunching at taxable income $z = z^*$ is

$$B = \int_{z^*}^{z^*+\Delta z^*} h_0(z)dz \approx h_0(z^*)\Delta z^* \tag{3}$$

Assuming constant baseline counterfactual density $h_0(z)$ on bunching segment $[z^*, z^* + \Delta z^*]$. Then we can write:

$$\Delta z^* = B/h_0(z) = b \tag{4}$$

Therefore:

$$e = \frac{\Delta z^*/z^*}{\Delta\tau/(1-\tau)} = \frac{b}{z^* \cdot log(\frac{1-\tau_0}{1-\tau_1})} \tag{5}$$

$h_0(z)$	(smooth) density distribution when τ_0 is constant throughout the distribution
$z^* + \Delta z^*$	firms with highest level of pre-reform income that now bunch at the kink

Back

Bunching method: Estimation of relative excess mass b

$$\hat{b} = \frac{\hat{B}}{\frac{\sum_l^u \hat{N}_j}{u-l+1}} \tag{6}$$

$$\hat{B} = \sum_{l}^{u} N_j - \hat{N}_j \tag{7}$$

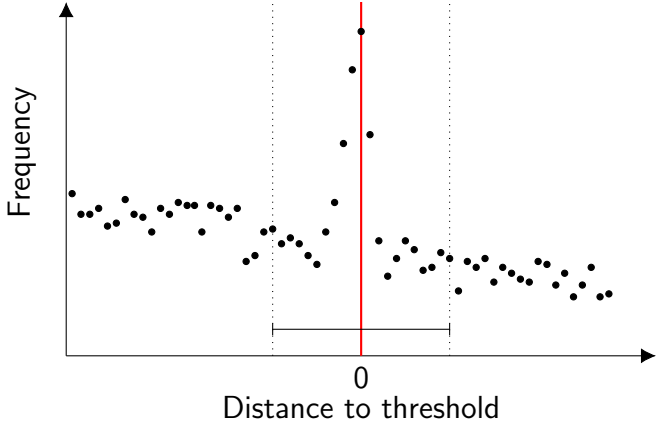
$$N_j = \sum_{i=0}^{q} \beta_i \cdot Z_j^i + \sum_{s=l}^{u} \gamma_i \cdot \mathbb{I}[Z_j = s] + \varepsilon_j \tag{8}$$

$\hat{B}$	number of firms bunching in the bunching window
$[l, u]$	lower and upper bound of bunching window defined using data-driven procedure
N_j	number of firms within income bin j
$\hat{N}_j$	counterfactual number of firms within income bin j
Z_j	midpoint of income bin j

Back

Optimal bunching window - Bosch et al. (2020)

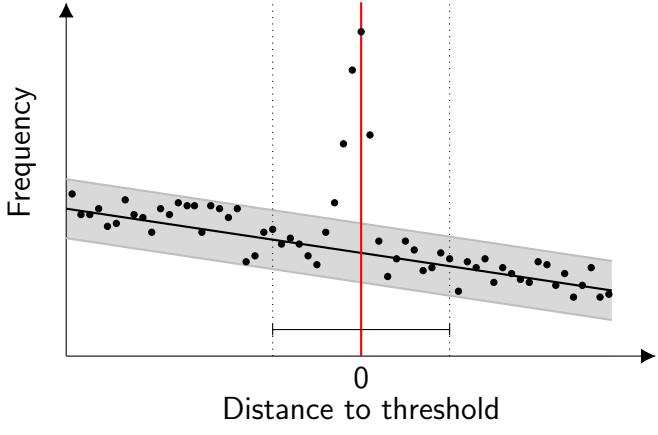
Step 1 - Set an excluded region around the threshold



Data-driven bunching window - Bosch et al. (2020)

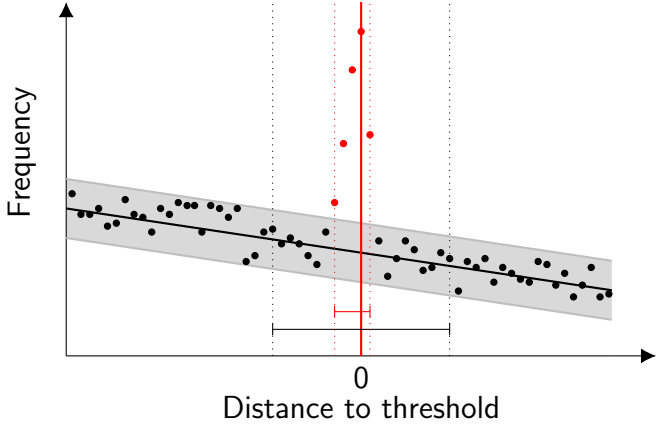
Step 2 - Local linear regression outside excluded region and CI

$$\hat{N}_j^{BW} = \sum_{i=0}^{q} \hat{\beta}_i Z_j^i \qquad \forall\ j$$



Data-driven bunching window - Bosch et al. (2020)

Step 3 - Retrieve the bunching window: $E_j = N_j - CI_j^+ > 0$



Step 4 - Reiterate through all possible excluded regions to obtain a distribution of lower and upper bounds of the bunching window. The optimal bunching window is the mode of this distribution

◂ Back

Probit analysis

Joint correlation of characteristics and deductions with reporting income near kink

- $d_{it} = 1$ if taxable income within $[-1000, 300]$ euros of kink
- X_{it} = dummies for characteristics and targeted tax incentives
- Sample: kink $\pm$ 5,000 or 10,000 euros over 2009-2018
- Clustering at firm-owner level and include year dummies

Coefficients = correlation with likelihood of reporting income near kink, interpreted as average marginal effects

Assumption: characteristics and deductions are orthogonal to likelihood of unintentionally locating near kink, conditional on being inside the regression window (Mortenson and Whitten, 2020)

◂ Probit ◂ Persistence

Summary statistics (selected variables)

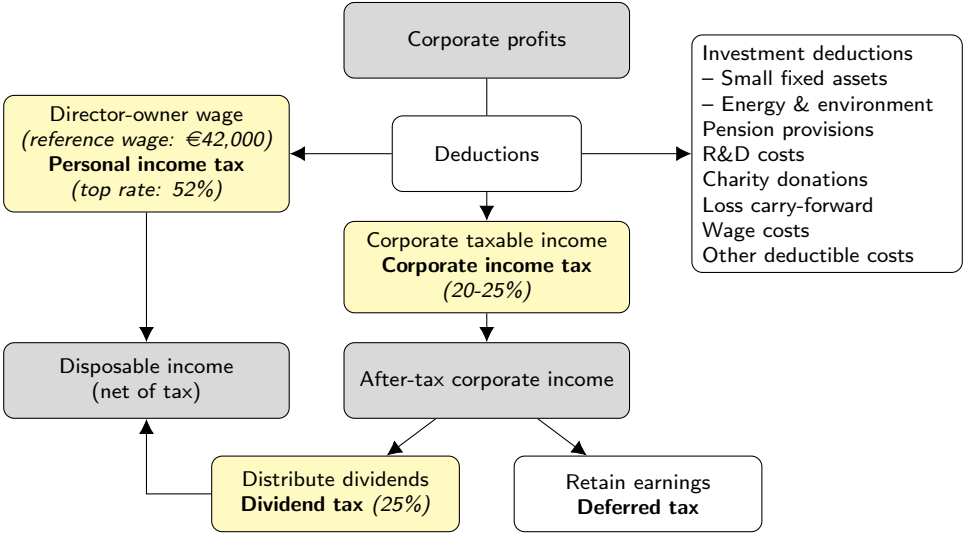
	N	mean	sd	p10	p50	p90
Corporate taxable income	1,651,000	42,072	425,584	-27,667	6,457	126,483
Losses	498,515	-50,446	403,991	-90,943	-14,534	-1,414
Loss carry-forward	266,489	42,101	538,776	1,003	11,063	77,348
Firm age	1,738,000	14.95	16.32	2	11	30
Assets	1,766,000	1,361,000	52,500,000	23,542	343,119	2,276,000
Investment deductions	338,770	7,707	135,834	804	3,430	15,211
Small investment deductions	324,086	5,264	4,906	794	3,136	14,339
EEI deductions	22,730	28,415	508,175	1,688	14,115	34,264
Pension provisions	765,896	219,603	286,938	24,586	130,301	509,277
Charity donations	133,673	10,081	826,605	157	1,075	6,000
R&D deductions	12,334	15,988	130,616	1,800	6,480	18,150
Director-owner age	1,719,000	50.31	11.09	36	50	65
Box 1 taxable income	1,756,000	61,129	70,466	20,500	53,039	102,368
Box 2 taxable income	233,254	124,403	395,151	8,991	57,224	250,000
Box 3 taxable income	709,970	16,211	61,268	334	4,204	35,939

Sample selection

	Share of initial sample
All director-owners, all corporations	1
All director-owners, single corporation	0.96
Max. 2 director-owners, all corporations	0.97
Max. 2 director-owners, single corporation	0.94
Single director-owner, all corporations	0.72
Single director-owner, single corporation	**0.69**

◂ Back

Taxation of closely held corporations and their owners [Data as of 2012]



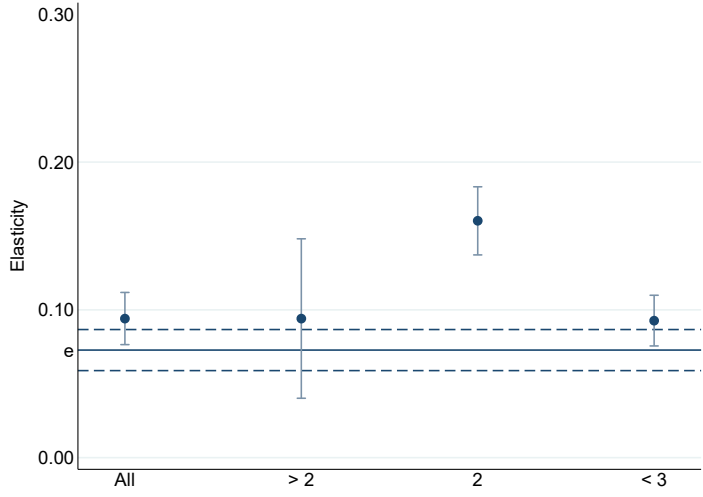
Robustness to alternative specifications

	b	se	N	Elasticity	CI^-	CI^+
Baseline	1.84	0.176	3643	0.07	0.06	0.08
Binwidth						
200	3.81	0.313	2058	0.06	0.05	0.07
300	2.98	0.268	3311	0.07	0.06	0.08
1000	1.45	0.118	8231	0.11	0.09	0.13
Polynomial						
1	2.51	0.190	3568	0.10	0.08	0.11
3	2.12	0.187	3568	0.08	0.07	0.10
7	1.78	0.182	3568	0.07	0.06	0.08
Firm is in sample						
$\geq$ 3 years	1.99	0.241	4874	0.08	0.06	0.10
$\geq$ 4 years	1.76	0.171	2410	0.07	0.06	0.08

Notes: Pooled sample 2009-2018, binwidth=500.

▸ Figure ◂ Back

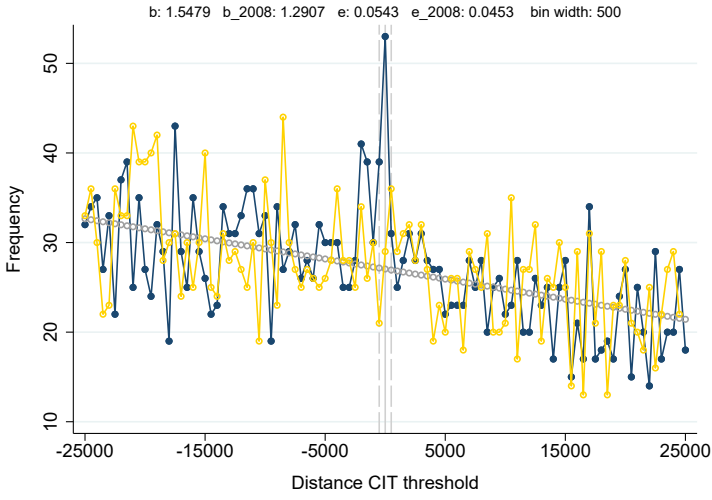
Robustness to alternative samples: Number of owners



Pooled sample 2009-2018, bin width: 500. Results show firms whose owners own at most one company. Results are reported for companies regardless of the number of owners (All), companies with more than 2 owners, companies with two owners only and companies with at most two owners.

◂ Back

Robustness: 2010 E-CIT estimate using 2008 distribution



Results obtained for 2010 sample using 2008 distribution (adjusted for inflation) as counterfactual (yellow line). b and e are the excess mass and elasticity calculated by predicting the counterfactual density with polynomial regression. b_2008 and e_2008 are the results obtained using the 2008 distribution.

◂ Back

Comparison with E-CIT estimates in the literature

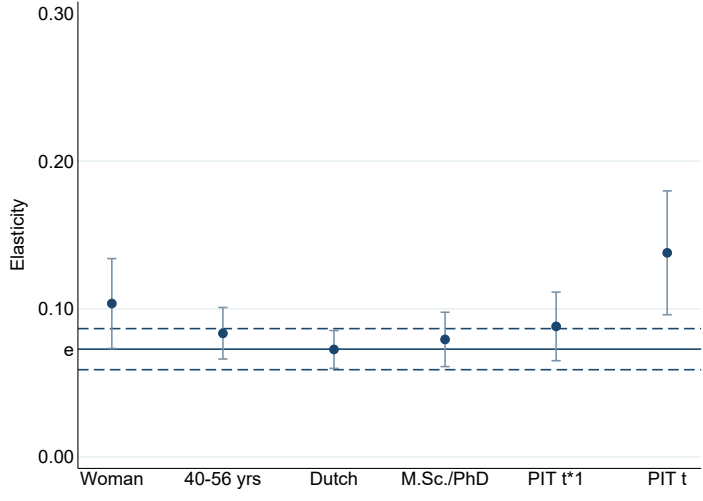
E-CIT depends on the institutional context

	Low kink	High kink	Country
Devereux et al. (2014)	0.37-0.57	0.13-0.17	UK
Coles et al. (2019)	0.55-0.98	-	US
Lediga et al. (2019)	0.79-1.33	0.08-0.14	SA
Turnover	<€500K	>€500K	
Bukovina et al. (2020)	0.75-1.43	0.12	SK

◂ Back

Individual heterogeneity

▸ Table



PIT t: director owner reported personal taxable income within [– €1000,€300] of the kink in year t; $t*1$ ($t*3$): in at least 1 (3) year(s). Pooled sample 2009-2018, bin width: 500. ◂ Back

Individual heterogeneity

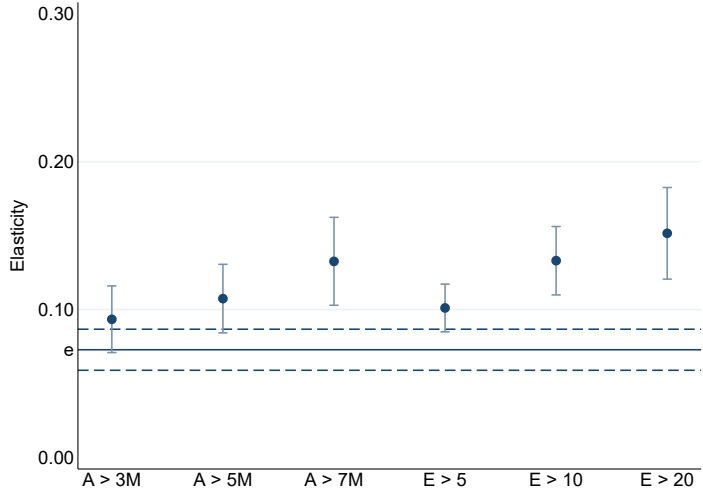
	b	se	N	Elasticity	CI^-	CI^+	Δ TI, %
Baseline	1.84	0.176	3643	0.07	0.06	0.08	0.46
Woman	2.68	0.401	305	0.10	0.07	0.13	0.67
40-56 yrs	2.16	0.230	2400	0.08	0.07	0.10	0.54
Dutch	1.87	0.169	1852	0.07	0.06	0.09	0.47
M.Sc./PhD	2.05	0.243	3752	0.08	0.06	0.10	0.51
PIT t*1	2.28	0.306	587	0.09	0.07	0.11	0.57
PIT t	3.56	0.552	73	0.14	0.10	0.18	0.89

Pooled sample 2009-2018, binwidth=500

◂ Back

Firm heterogeneity

▸ Table



A>3M: firm has assets of at least €3 million in a given year. E>5: Firm has at least 5 employees in a given year.

Pooled sample 2009-2018, bin width: 500.

◂ Back

Firm heterogeneity

	b	se	N	Elasticity	CI^-	CI^+	Δ TI, %
Baseline	1.84	0.176	3643	0.07	0.06	0.08	0.46
Firm age $\geq$ 20	2.18	0.261	957	0.08	0.06	0.10	0.54
Consolidated	2.10	0.161	1442	0.08	0.07	0.09	0.52
Assets $\geq$ 1M	2.13	0.214	2456	0.08	0.07	0.10	0.53
Assets $\geq$ 3M	2.41	0.297	675	0.09	0.07	0.12	0.60
Assets $\geq$ 5M	2.77	0.305	317	0.11	0.08	0.13	0.69
Assets $\geq$ 7M	3.42	0.392	146	0.13	0.10	0.16	0.86
Employees $\geq$ 5	2.61	0.213	1047	0.10	0.08	0.12	0.65
Employees $\geq$ 10	3.44	0.305	674	0.13	0.11	0.16	0.86
Employees $\geq$ 20	3.91	0.408	296	0.15	0.12	0.18	0.98

Pooled sample 2009-2018, binwidth=500

◂ Back

Other targeted tax incentives

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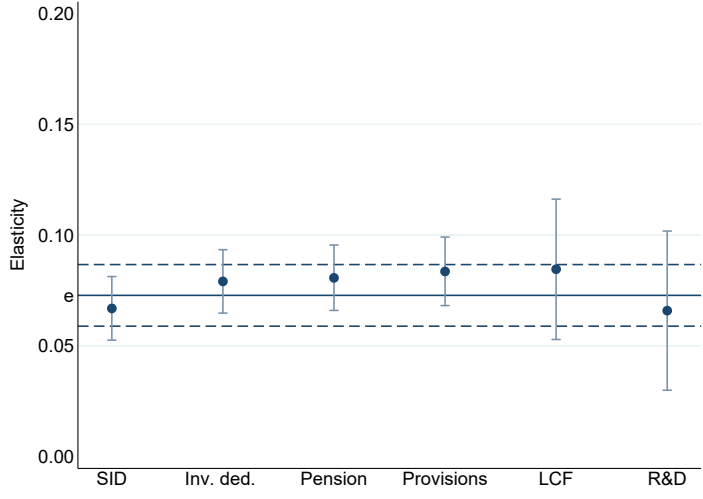
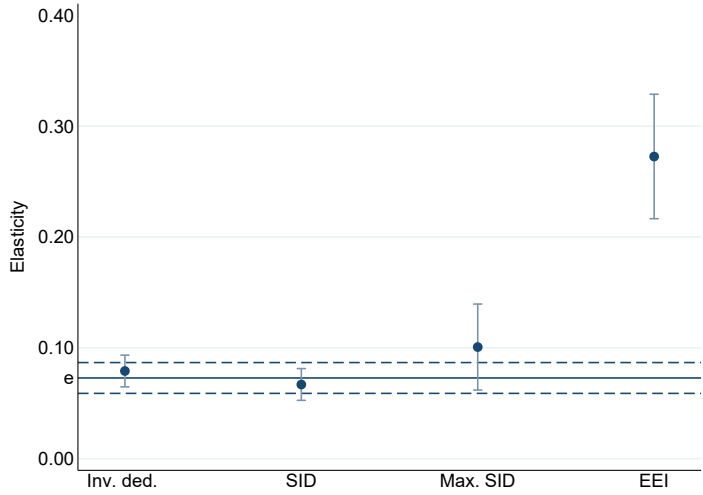


LCF: firms that in year t use loss carry-forward. Similarly for pension provisions, R&D incentives and small investment deductions (SID). Pooled sample 2009-2018, bin width: 500.

◂ Back

Investment deductions

▸ Table

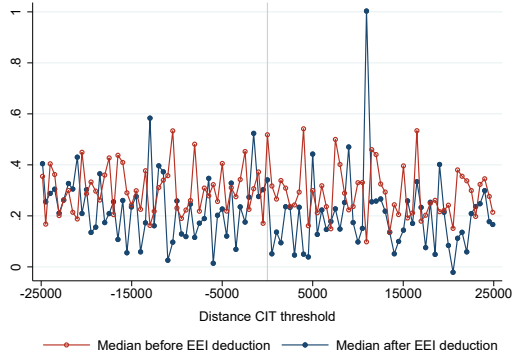


Inv. ded.: firm has used investment deductions in year t. SID (EEI): firm has used small deductions for fixed assets investments (energy and environment investments) in year t. Max. SID: firm has used the maximum amount of SID in year t. Pooled sample 2009-2018, bin width: 500. ▸ SID

Do firms using EEI deductions grow more?

Back

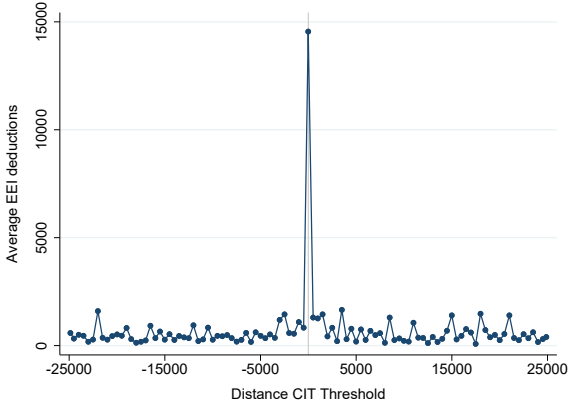
Net profit growth, firms using EEI deductions



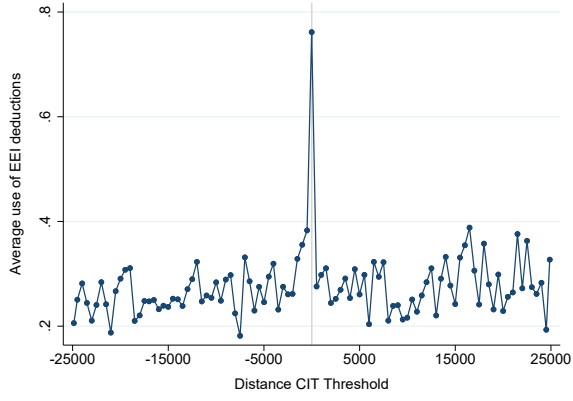
- Phantom investments?
- Automatic and random checks carried out by the Enterprise Agency
- EEI may produce other positive externalities (e.g. green economy)

EEI deductions

Mean EEI deduction



Mean use of EEI deductions per firm



Pooled sample 2009-2018, bin width: 500.

Back

Targeted tax incentives

	b	se	N	Elasticity	CI^-	CI^+	Δ TI, %
Baseline	1.84	0.176	3643	0.07	0.06	0.08	0.46
R&D	1.70	0.472	54	0.07	0.03	0.10	0.43
LCF	2.18	0.417	80	0.08	0.05	0.12	0.55
Change in pension provisions	2.08	0.194	1167	0.08	0.07	0.10	0.52
Change in total provisions	2.16	0.204	1372	0.08	0.07	0.10	0.54
Investment deductions	2.04	0.188	1205	0.08	0.06	0.09	0.51
– SID	1.73	0.189	1120	0.07	0.05	0.08	0.43
– Max SID	2.60	0.511	68	0.10	0.06	0.14	0.65
– EEI	7.04	0.740	124	0.27	0.22	0.33	1.76

Pooled sample 2009-2018, binwidth=500

◂ Back ▸ Inv. deductions ▸ SID

Persistent use of EEI deductions

	b	se	N	Elasticity	CI^-	CI^+	Δ TI, %
Baseline	1.84	0.176	3643	0.07	0.06	0.08	0.46
EEI t	7.04	0.740	124	0.27	0.22	0.33	1.76
EEI t*1	4.30	0.325	643	0.17	0.14	0.19	1.07
EEI t*2	7.27	0.651	258	0.28	0.23	0.33	1.82
EEI t*3	8.85	1.441	112	0.34	0.23	0.45	2.21
EEI t$\geq$1	5.67	0.479	429	0.22	0.18	0.26	1.42
EEI t$\geq$2	10.61	0.917	154	0.41	0.34	0.48	2.65

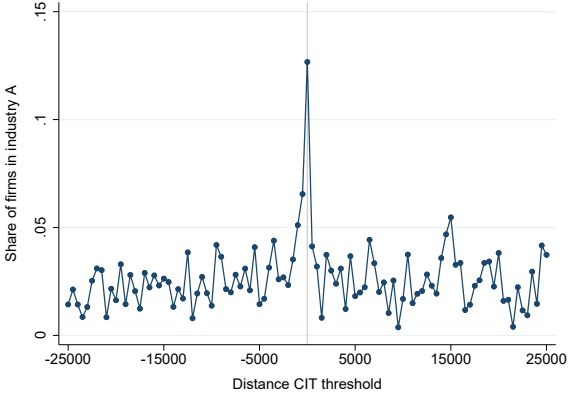
t*1: EEI used at least one year over the time period the firm is observed.
t$\geq$1: by year t the firm has used EEI deductions at least once.
Pooled sample 2009-2018, bin width 500.

◂ Back

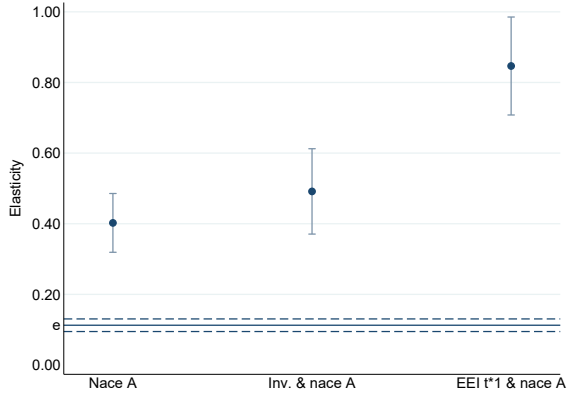
Firms in agriculture, forestry and fishing

Table

Share of firms



Elasticity estimates



Back

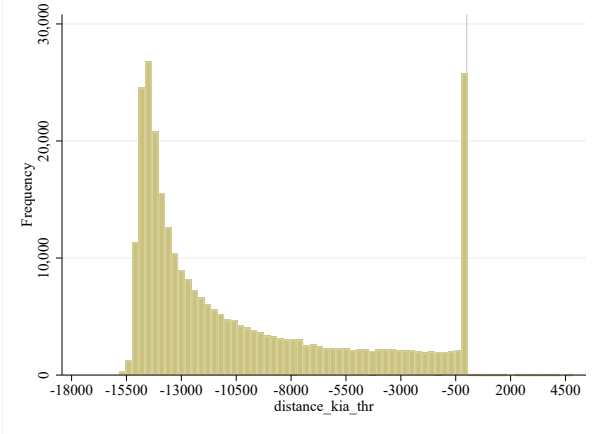
Firms in agriculture, forestry and fishing

	b	se	N	Elasticity	CI^-	CI^+	Δ TI, %
Baseline	1.45	0.118	8231	0.11	0.09	0.13	0.73
Nace A	5.19	0.548	175	0.40	0.32	0.49	2.60
Nace A and inv. ded. t	6.34	0.796	126	0.49	0.37	0.61	3.17
Nace A and EEI t*1	10.93	0.914	141	0.85	0.71	0.99	5.46

Pooled sample 2009-2018, binwidth=1000

◂ Back

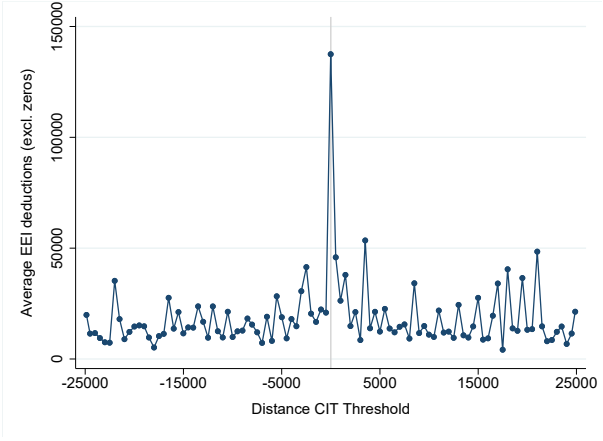
Distribution of small investment deductions



Distance from maximum SID amount

◂ Figure ◂ Table

Average non-zero EEI deduction



Mean non-zero EEI deduction, pooled sample 2009-2018, binwidth=500

▸ Back