The Indirect Effect of Import Competition on Corporate Tax Avoidance

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Motivation

- Profits are subject to **taxation**.
- To lighten this **burden**, firms adapt how they operate and invest.
- Some **avoid taxes**, i.e., exploit legal technicalities to reduce their tax liability (e.g., loopholes and mismatches).
- Corporate tax avoidance has now become a **major policy concern**.
  - Context: tax scandals, budget deficits, rise of inequalities, covid-19.
  - Profit shifting of multinational corporations $\approx$ \$100b annual loss in tax revenues for the US (Clausing, 2016).

What I do in this paper

- The role played by **competition** is theoretically unclear in the literature (Marrelli and Martina, 1988; Goerke and Runkel, 2011).

- To shed more light on this, I build on 2 distinct strands of research.
  - **Economics**: impact of the China shock $\rightarrow$ massive shock + quasi-natural experiment (e.g., Autor et al., 2013; Pierce and Schott, 2016).
  - **Accounting**: measurement of corporate tax avoidance (e.g., Hanlon and Heitzman, 2010; De Simone et al., 2019).

- I study the effect of **Chinese import competition** on tax avoidance of **US-listed firms** using their financial statements.

Preview of the results

- The paper documents a **positive** and **causal** effect of import competition on corporate tax avoidance.
- This effect is specific to **multinational enterprises** (MNEs) and passes through **intangible assets**.

  $\uparrow$ import competition $\Rightarrow \uparrow$ intangible assets $\Rightarrow \uparrow$ profit shifting
- Plus, the increase in tax avoidance is **a side effect**: it seems that MNEs invested in intangibles to escape competition in the first place.
- The findings carry **policy implications**.
  - The China shock contributed to the recent decline in the average effective tax rate of US-listed firms (Dyreng et al., 2017).
  - The results help understand the recent backlash against large firms and globalization (Helpman, 2017; Rodrik, 2018; Walter, 2021).

Related literature

Corporate tax avoidance

- Growing evidence of profit shifting activities (Beer et al., 2020)
  - Channels: e.g., Egger et al. (2010), Griffith et al. (2014), Alstadsaeter et al. (2018), Davies et al. (2018), Laffitte and Toubal (2019).
  - Macro estimates: e.g., Crivelli et al. (2016), Clausing (2016), Cobham and Jansky (2018), Tørsløv et al. (2018), Laffitte et al. (2020).
- Determinants of tax dodging (Alm et al., 2019; Wang et al., 2020)
  - Internal drivers: e.g., Desai and Dharmapala (2009), McGuire et al. (2014), Higgins et al. (2015), Khan et al. (2017), Souillard (2020).
  - External factors: e.g., Marrelli and Martina (1988), Goerke and Runkel (2011), Hoopes et al. (2012), Dyreng et al. (2016), Edwards et al. (2016), Tian et al. (2016), Cen et al. (2017).

China shock

- Labor markets: e.g., Autor et al. (2013), Mion and Zhu (2013), Utar and Ruiz (2013), Utar (2014), Acemoglu et al. (2016), Pierce and Schott (2016).
- Firm behavior: e.g., Iacovone et al. (2013), Bloom et al. (2016), Hombert and Matray (2018), Chakraborty and Henry (2019), Amiti et al. (2020).

Outline of the talk

1. Introduction
2. Data
3. Causal effect
4. Mechanism
5. Conclusion

Outline of the talk

Sources and key variables

Firm-level data and tax avoidance variables

The **firm-level** data come from Compustat.

- It consists of balance sheets, income statements, and cash flows of publicly listed firms in North America since 1950.
- I construct 4 firm-year indicators of corporate tax avoidance:
  - ratio of income taxes to pre-tax income (ETR),
  - ratio of non-deferred income taxes to pre-tax income (ETR2),
  - ratio of cash income taxes paid to pre-tax income (CASHETR),
  - ratio of cash income taxes paid to operating cash flows (CFM).
- They are complementary and the most prevalent in the literature. ▸ Table

Sources and key variables

Industry-level data and import competition variable

I supplement Compustat data with **industry-level data** at the 4-digit SIC level from the NBER-CES Manufacturing Industry Database and Schott (2008).

- NBER-CES $\rightarrow$ annual output, employment, etc from 1958 to 2011.
- Schott (2008) $\rightarrow$ US bilateral trade flows from 1972 to 2005.
- The competition variable is the penetration ratio of US imports from China:

$$IMP_{ijt} = IMP_{jt} = \frac{Imports_{jt}^{China,US}}{Output_{jt}^{US} + Imports_{jt}^{World,US} - Exports_{jt}^{US,World}}$$

  Firm i mostly active in sector j in year t.
- This ratio varies both over time and across sectors. ▸ Example

Sample

Focus on US-listed manufacturing firms between 1990 and 2005

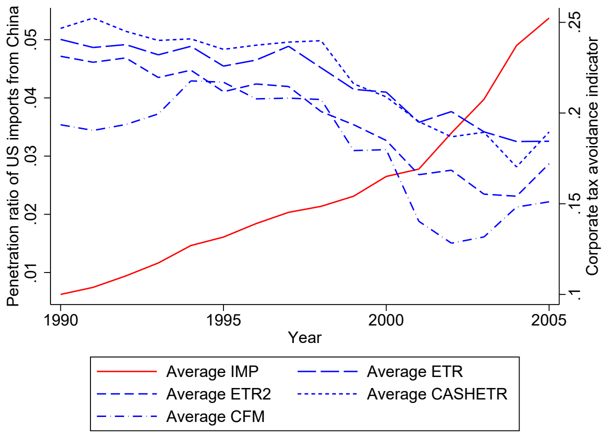
I use a subsample containing only **US-headquartered** firms operating **between 1990 and 2005** in **manufacturing**.

- Headquartered in the US for comparability.
- 1990s: start of the boom of China’s exports. ▸ Graph
- 90 percent of China’s exports were manufacturing products.

The unbalanced sample includes 5,739 firms operating in 218 industries.

First evidence

Figure 1 – Import competition and corporate tax avoidance: macro-level evidence ▸ Table



- The positive correlation also holds at the industry-level. ▸ Graph ▸ Table

Outline of the talk

Econometric model

Benchmark specification

I assess the effect of import competition on corporate tax avoidance by regressing:

$$CTA_{ijt} = \beta_0 + \beta_1 IMP_{jt} + \beta_2 X_{ijt} + \alpha_i + \delta_t + \epsilon_{ijt}$$

- CTA: corporate tax avoidance variable.
- IMP: penetration ratio of US imports from China.
- X: vector of control variables (e.g., sales, pre-tax income, tax loss carry forward, assets, profitability, leverage, foreign operations).
- α: firm-level fixed effects.
- δ: year-level fixed effects.

Baseline results

A positive effect of competition on corporate tax avoidance

Table 1 – Effect of import competition on corporate tax avoidance: baseline equation

	(1) ETR_{ijt}	(2) $ETR2_{ijt}$	(3) $CASHETR_{ijt}$	(4) CFM_{ijt}
IMP_{jt}	-0.20[a]	-0.18[b]	-0.18[a]	-0.26[a]
	(0.03)	(0.07)	(0.04)	(0.06)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
R^2	0.20	0.21	0.13	0.12
Nb. of obs.	23,097	22,286	16,688	16,584

Notes. Standard errors, in parentheses, are clustered at the 4-digit 1987 SIC industry. $^{d}p < 0.15$, $^{c}p < 0.10$, $^{b}p < 0.05$, $^{a}p < 0.01$.

▸ Counterfactual exercise

Sensitivity tests

Exclusion of outliers, more controls, model specification, and falsification tests

The effect is

- robust to removing different types of **outliers**: extreme values of the right-hand side variables, firms with negative profits, entries and exits, firms involved in a merger/acquisition operation.
- robust to extending the set of **covariates**: more globalization-related variables, finer sets of fixed effects.
- consistent across **specifications**: 3-digit industry level, 4-year averages, 16-year differences.
- corroborated by **falsification tests**: random industry, pre-period data.

▸ Table

Endogeneity

Lagged independent variables and IV strategy

- The control variables raise concerns about **reverse causality** and may lead to the **“bad controls”** problem (Angrist and Pischke, 2009).
  - → Use lagged right-hand side variables to mitigate these issues. ▸ Table
- Changes in import competition come from both **supply-** and **demand-**side shocks.
  - → Need to isolate changes coming from the supply-side.
  - → Use the share of imports from China in 8 other high-income countries as an instrument (Autor et al, 2013; Iacovone et al., 2013; Chakraborty and Henry, 2019). ▸ Table
  - → The identification relies on 3 (too strong?) assumptions.

Endogeneity

Difference-in-differences approach

- Alternative: exploit the **granting of the PNTR status** to China in 2000.
  - $\rightarrow$ This event is responsible for 1/3 of the growth of US expenditures in Chinese goods between 2000 and 2005 (Handley and Limao, 2017).
  - $\rightarrow$ Treatment: difference between NNTR and NTR tariff rates (sector-specific).
  - $\rightarrow$ The variation mostly comes from NNTR tariff rates (established in 1930).
  - $\rightarrow$ The equation becomes:

$$CTA_{ijt} = \beta_0 + \beta_1 PNTR_{jt} + \beta_2 X_{ijt} + \alpha_i + \delta_t + \epsilon_{ijt}$$

    with $PNTR_{jt} = 1_{t \geq 2001} \left(NNTR_{j1999} - NTR_{j1999} \right)$. ▸ Table ▸ Parallel trends + placebo
  - $\rightarrow$ Robust to the issue raised by de Chaisemartin and D'Haultfoeuille (2020).

Outline of the talk

What is behind this average effect?

Profit shifting of multinational firms via intangible assets

- **MNEs** can a priori avoid taxes more easily than domestic firms: they can artifically **shift profits** towards low-tax countries.
  - → Is the average effect driven by MNEs?
  - → Yes! ▸ Figure
  - → Robust to the definition of an MNE (financial statements vs Exhibit 21 files).

- The use of **intra-firm royalty payments** constitute one of the dominant profit shifting channels (Heckemeyer and Overesch, 2017) + the China shock pushed firms to **innovate** (e.g., Bloom et al., 2016).
  - → Indirect effect of competition through intangible assets?
  - → Yes! ▸ Table
  - → Robust to the definition of an intangible (broad definition or patents).

China shock ⇒ MNEs invested in intangibles ⇒ MNEs shifted more profits

Did MNEs invest in intangibles just to shift more profits?

No, they did it to escape competition in the first place

- If MNEs invested in intangibles principally to shift more profits and save taxes, we would note more **FDIs of MNEs in tax havens** after the shock.
  - $\Rightarrow$ Did MNEs intensify their network of subsidiaries in tax havens?
  - $\Rightarrow$ No! ▸ Table
- Besides, investments in intangibles could help firms upgrade and thereby **escape competition**.
  - $\Rightarrow$ Is the negative impact of the China shock on sales mitigated by intangibles?
  - $\Rightarrow$ Yes! ▸ Table

$\Rightarrow$ The increase in corporate tax avoidance is a **side effect** of import competition.

Outline of the talk

Summary of the paper

- The effect of competition on corporate tax avoidance is an unresolved question in the existing literature.
- This paper attempts to provide answers by investigating the effect of rising Chinese import competition on tax avoidance of US-listed firms.
- The paper documents a **positive**, **causal**, and **statistically robust** effect of trade-induced competition on corporate tax avoidance.
- The China shock prompted **MNEs** to invest in **intangibles** and these assets facilitated their **profit shifting** activities.
- Nonetheless, this effect is **indirect**: these intangibles primarily aimed at alleviating losses, not saving taxes.

Thank you for your attention!

Questions, comments, and suggestions are welcome:
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Full paper:
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Appendix

Corporate tax avoidance variables

Table 2 – Correlation between tax avoidance variables (within firms)

	ETR	*ETR*2	*CASHETR*	*CFM*
ETR	1.00			
*ETR*2	0.53	1.00		
CASHETR	0.26	0.41	1.00	
CFM	0.20	0.27	0.64	1.00

Notes. This table reports the average Pearson's correlation coefficients between the four tax avoidance variables (within firms). For a firm-year observation to be included in the computation of a correlation coefficient, the two tax avoidance variables must lie in the [0,1] interval.

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Import penetration ratio across sectors

- The penetration ratio of Chinese exports to the US of *hardwood* veneer and plywood products (SIC 2435) was 12 percent in 2005, i.e., about twice the average.
- For *softwood* veneer and plywood products (SIC 2436), the import penetration ratio was **40 times smaller** in the same year (0.3 percent).

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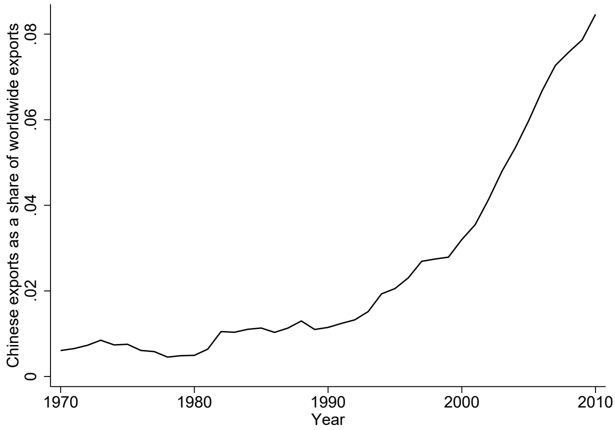
China’s exports

Figure 2 – Exports from China between 1970 and 2010



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Correlation (1)

Table 3 – Import competition and corporate tax avoidance: macro-level regressions

	(1)	(2)	(3)	(4)
	$\overline{ETR}_t$	$\overline{ETR2}_t$	$\overline{CASHETR}_t$	$\overline{CFM}_t$
$\overline{IMP}_t$	-1.36^a	-1.76^a	-1.73^a	-1.62^a
	(0.13)	(0.22)	(0.20)	(0.39)
Controls	No	No	No	No
Nb. of obs.	16	16	16	16

Notes. Standard errors are in parentheses. $^d p < 0.15$, $^c p < 0.10$, $^b p < 0.05$, $^a p < 0.01$.

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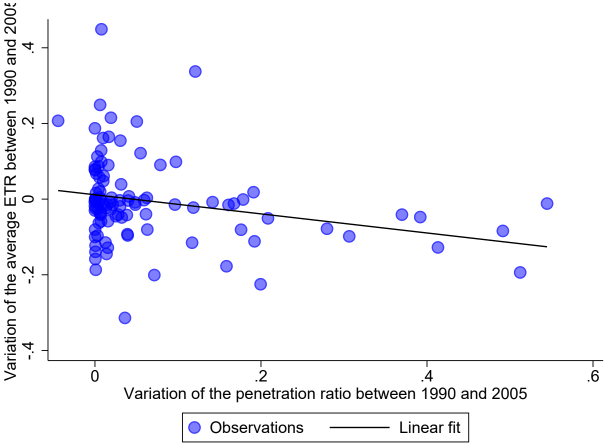
Correlation (2)

Figure 3 – Import competition and corporate tax avoidance: industry-level evidence



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Correlation (3)

Table 4 – Import competition and corporate tax avoidance: industry-level regressions

	(1)	(2)	(3)	(4)
	ETR_{jt}	$ETR2_{jt}$	$CASHETR_{jt}$	CFM_{jt}
IMP_{jt}	-0.11^{d}	-0.11^{c}	-0.06	-0.12^{d}
	(0.07)	(0.06)	(0.06)	(0.08)
Year FEs	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes
Nb. of obs.	1,785	1,771	1,783	1,783

Notes. Standard errors, in parentheses, are clustered at the 4-digit 1987 SIC industry. $^{d}p < 0.15$, $^{c}p < 0.10$, $^{b}p < 0.05$, $^{a}p < 0.01$.

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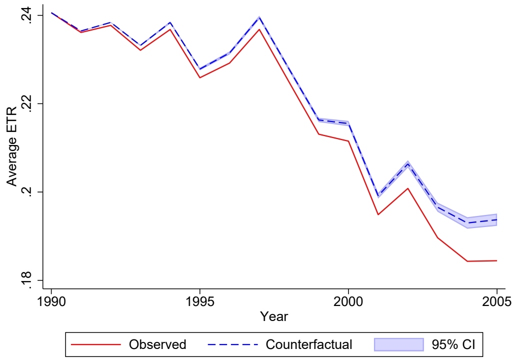
Baseline results

Figure 4 – Counterfactual analysis with back-of-the-envelope computations



- The average ETR would have been **0.93 percentage point** higher in 2005 if the penetration ratio of US imports from China stayed constant.
- The China shock contributed **17 percent** to the decline in the average ETR observed between 1990 and 2005. Back

Robustness tests

Table 5 – Effect of import competition on corporate tax avoidance: robustness checks

	(1) *ETR*	(2) *ETR2*	(3) *CASHETR*	(4) *CFM*
Baseline estimates	-0.20[a]	-0.18[b]	-0.18[a]	-0.26[a]
Panel A: exclusion of outliers				
A1. Extreme values	-0.36[a]	-0.30[a]	-0.33[a]	-0.43[a]
A2. Negative profits	-0.15[a]	-0.11[c]	-0.17[a]	-0.22[a]
A3. Entries and exits	-0.22[a]	-0.23[a]	-0.17[a]	-0.22[a]
A4. Involved in M&A	-0.23[a]	-0.19[a]	-0.18[a]	-0.27[a]
Panel B: more controls				
B1. Trends in globalization	-0.17[a]	-0.15[b]	-0.19[a]	-0.21[a]
B2. Trends in globalization (USDIA included)	-0.20[a]	-0.15[c]	-0.18[b]	-0.14[b]
B3. State-year FEs	-0.20[a]	-0.19[a]	-0.16[a]	-0.26[a]
B4. State-year-MNE status FEs	-0.21[a]	-0.18[a]	-0.15[a]	-0.27[a]
Panel C: alternative specifications				
C1. SIC 3-digit industry	-0.15[a]	-0.16[a]	-0.10[b]	-0.18[a]
C2. 4-year periods	-0.30[a]	-0.11	-0.17[c]	-0.23[a]
C3. 16-year differences	-0.18[c]	-0.36[a]	-0.16[c]	-0.32[b]
Panel D: falsification tests				
D1. Random industry	0.01	-0.02	-0.01	0.05
D2. Pre-period data	-0.11	-0.06	0.35	0.36

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Endogeneity (1)

Table 6 – Effect of import competition on corporate tax avoidance: endogeneity

	(1) *ETR*	(2) *ETR2*	(3) *CASHETR*	(4) *CFM*
Panel A: lagged controls				
A1. One-year lags	-0.21[a]	-0.16[b]	-0.19[a]	-0.30[a]
A2. Two-year lags	-0.21[a]	-0.14[d]	-0.19[a]	-0.27[a]
Panel B: 2SLS à la Autor et al. (2013)				
B1. First-stage results: IMP_{jt} on instrument				
Point estimate				
F-statistic				
B2. Second-stage results: CTA_{ijt} on $\widehat{IMP}_{jt}$				
Point estimate				
Panel C: PNTR as a quasi-natural experiment				
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes

Notes. Standard errors are clustered at the 4-digit 1987 SIC industry and not reported for space. ${}^{d}p < 0.15$, ${}^{c}p < 0.10$, ${}^{b}p < 0.05$, ${}^{a}p < 0.01$.

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Endogeneity (2)

Table 7 – Effect of import competition on corporate tax avoidance: endogeneity

	(1) *ETR*	(2) *ETR2*	(3) *CASHETR*	(4) *CFM*
Panel A: lagged controls				
A1. One-year lags	-0.21[a]	-0.16[b]	-0.19[a]	-0.30[a]
A2. Two-year lags	-0.21[a]	-0.14[d]	-0.19[a]	-0.27[a]
Panel B: 2SLS à la Autor et al. (2013)				
B1. First-stage results: IMP_{jt} on instrument				
Point estimate	0.63[a]	0.63[a]	0.62[a]	0.63[a]
F-statistic	32.65	33.16	29.12	30.23
B2. Second-stage results: CTA_{ijt} on $\widehat{IMP}_{jt}$				
Point estimate	-0.31[a]	-0.28[b]	-0.28[a]	-0.37[a]
Panel C: PNTR as a quasi-natural experiment				
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes

Notes. Standard errors are clustered at the 4-digit 1987 SIC industry and not reported for space. $^d p < 0.15$, $^c p < 0.10$, $^b p < 0.05$, $^a p < 0.01$.

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Endogeneity (3)

Table 8 – Effect of import competition on corporate tax avoidance: endogeneity

	(1) ETR	(2) $ETR2$	(3) $CASHETR$	(4) CFM
Panel A: lagged controls				
A1. One-year lags	-0.21[a]	-0.16[b]	-0.19[a]	-0.30[a]
A2. Two-year lags	-0.21[a]	-0.14[d]	-0.19[a]	-0.27[a]
Panel B: 2SLS à la Autor et al. (2013)				
B1. First-stage results: IMP_{jt} on instrument				
Point estimate	0.64[a]	0.63[a]	0.62[a]	0.63[a]
F-statistic	32.65	33.16	29.12	30.23
B2. Second-stage results: CTA_{ijt} on $\widehat{IMP}_{jt}$				
Point estimate	-0.30[a]	-0.28[b]	-0.28[a]	-0.37[a]
Panel C: PNTR as a quasi-natural experiment	-0.06[b]	-0.08[c]	-0.01	-0.07[d]
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes

Notes. Standard errors are clustered at the 4-digit 1987 SIC industry and not reported for space. [d] $p < 0.15$, [c] $p < 0.10$, [b] $p < 0.05$, [a] $p < 0.01$.

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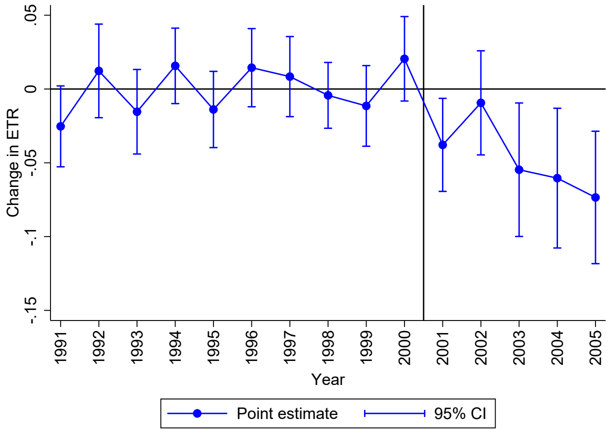
Endogeneity (4)

Figure 5 – Pre-trends in *ETR* and dynamics of the effect



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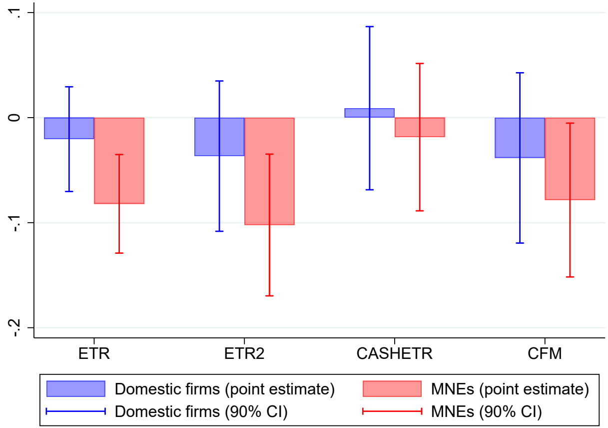
Mechanism (1)

Figure 6 – Domestic firms vs MNE



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Mechanism (2)

Table 9 – Effect of import competition on corporate tax avoidance: mechanism

	(1) ETR_{ijt}	(2) ETR_{ijt}	(3) ETR_{ijt}	(4) ETR_{ijt}	(5) $intangibles_{ijt}$
$PNTR_{jt}$	-0.06^b	-0.02	-0.03	-0.03	0.02
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
$PNTR_{jt} \times MNE_{ijt}$		-0.06^a			0.04^c
		(0.02)			(0.02)
$intangibles_{ijt}$			0.02	0.04^a	
			(0.01)	(0.02)	
$intangibles_{ijt} \times MNE_{ijt}$				-0.06^b	
				(0.03)	
Controls	Yes	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes

Notes. Standard errors are clustered at the 4-digit 1987 SIC industry. $^d p < 0.15$, $^c p < 0.10$, $^b p < 0.05$, $^a p < 0.01$.

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Mechanism (3)

Table 10 – Effect of import competition on corporate tax avoidance: a side one?

	(1) $TAXHAVEN^{ext}_{ijt}$	(2) $TAXHAVEN^{int}_{ijt}$
$PNTR_{jt}$	0.04	3.15
	(0.07)	(4.50)
$PNTR_{jt} \times intangibles_{ijt}$		
Controls	Yes	Yes
Firm FEs	Yes	Yes
Year FEs	Yes	Yes
Nb. of obs.	28,443	4,641

Notes. Standard errors, in parentheses, are clustered at the 4-digit 1987 SIC industry. $^d p < 0.15$, $^c p < 0.10$, $^b p < 0.05$, $^a p < 0.01$.

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Mechanism (4)

Table 11 – Effect of import competition on corporate tax avoidance: a side one?

	(1) $TAXHAVEN^{ext}_{ijt}$	(2) $TAXHAVEN^{int}_{ijt}$	(3) $sales_{ijt}$
$PNTR_{jt}$	0.04	3.15	-2,740.44^{b}
	(0.07)	(4.50)	(1,226.00)
$PNTR_{jt} \times intangibles_{ijt}$			1.44^{b}
			(0.70)
Controls	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes
Nb. of obs.	28,443	4,641	30,141

Notes. Standard errors, in parentheses, are clustered at the 4-digit 1987 SIC industry. $^{d}p < 0.15$, $^{c}p < 0.10$, $^{b}p < 0.05$, $^{a}p < 0.01$.

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