

The Indirect Effect of Import Competition on Corporate Tax Avoidance

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Motivation



- Profits are subject to **taxation**.
- To lighten this financial **burden**, firms adapt how they operate and invest.
- Some firms **avoid taxes**, i.e., some firms 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 multinationals \approx \$100b annual loss in tax revenues in 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 conduct an **empirical analysis** and build on 2 distinct strands of research.
 - **Economics**: impact of the China shock → 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 rich data on their financial statements.

Preview of the results

- The paper documents a **positive** effect of import competition on corporate tax avoidance.
- The average effect is driven by **multinational enterprises** (MNEs), especially those implanted in tax havens, and passes through **intangible assets**.

↑ import competition → ↑ intangible assets → ↑ profit shifting

- Plus, the increase in tax avoidance is a **side effect** of import competition: 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 backlash against large firms and globalization (Helpman, 2017; Rodrik, 2018; Walter, 2021).
 - The conclusions support the calls for reform of the (outdated) international tax system.

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

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1 Introduction

2 Data

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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 → annual output, employment, etc from 1958 to 2011.
- Schott (2008) → 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

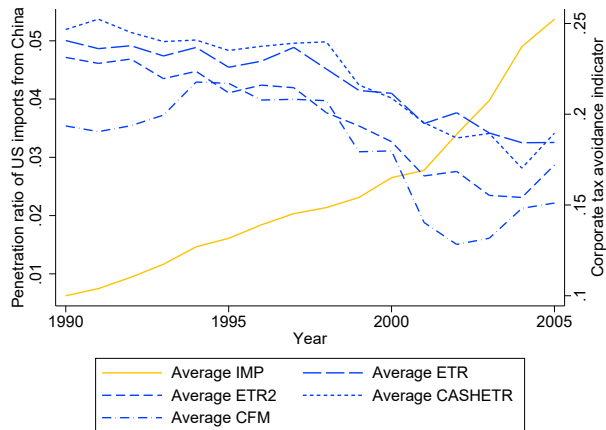
I use a subsample containing only **US-headquartered** firms operating **between 1990 and 2005** in **manufacturing**.

- 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. [► Table](#)

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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 (0.03)	-0.18 ^b (0.07)	-0.18 ^a (0.04)	-0.26 ^a (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

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

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

with $PNTR_{jt} = 1_{t \geq 2001} (NNTR_{j1999} - NTR_{j1999})$.

► Table

► Parallel trends + placebo

- Robust to the issue raised by de Chaisemartin and D'Haultfoeuille (2020).

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What is behind this average effect?

Profit shifting of multinational firms via intangible assets

- **MNEs** have greater possibilities for dodging taxes: They can artificially **shift profits** toward their subsidiaries located in no- or low-tax countries.
 - Is the average effect driven by MNEs?
 - Yes, particularly by those present in tax havens! [► Figures](#)
 - Robust to the definition of an MNE (financial statements vs Exhibit 21 files).
- The strategic use of **intra-firm royalty payments** constitutes 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 potentially note more **FDIs of MNEs in tax havens** after the shock.
 - Did MNEs intensify their network of subsidiaries in tax havens?
 - No! ▶ Table
 - Another story is that investments in intangibles aimed at upgrading and thereby **escaping competition** in the first place.
 - Is the negative impact of the China shock on sales mitigated by intangibles?
 - Yes! ▶ Table
- The increase in corporate tax avoidance is a **side effect** of import competition.

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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.
- 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

	<i>ETR</i>	<i>ETR2</i>	<i>CASHETR</i>	<i>CFM</i>
<i>ETR</i>	1.00			
<i>ETR2</i>	0.53	1.00		
<i>CASHETR</i>	0.26	0.41	1.00	
<i>CFM</i>	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.

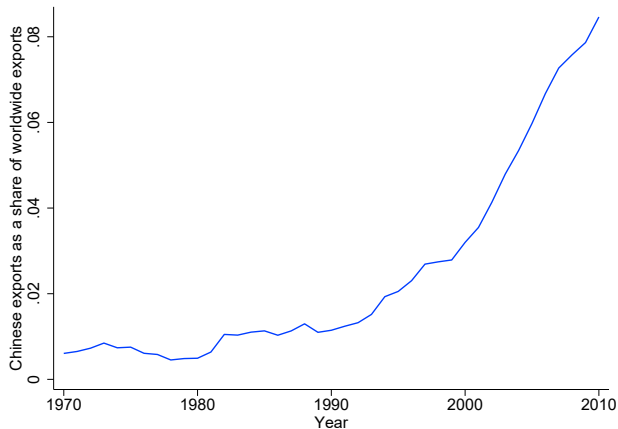
Import penetration ratio across sectors

- 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).

► Back

China's exports

Figure 2 – Exports from China between 1970 and 2010



► Back

Correlation (1)

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

	(1) \overline{ETR}_t	(2) $\overline{ETR2}_t$	(3) $\overline{CASHETR}_t$	(4) \overline{CFM}_t
\overline{IMP}_t	-1.36 ^a (0.13)	-1.76 ^a (0.22)	-1.73 ^a (0.20)	-1.62 ^a (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 $p < 0.01$.

► Back

Correlation (2)

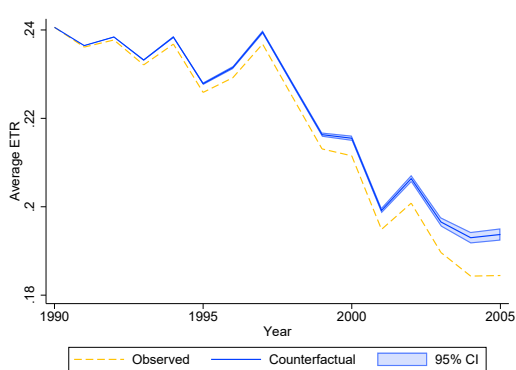
Table 4 – Import competition and corporate tax avoidance:
industry-level regressions

	(1) \overline{ETR}_{jt}	(2) $\overline{ETR2}_{jt}$	(3) $\overline{CASHETR}_{jt}$	(4) \overline{CFM}_{jt}
IMP_{jt}	-0.11 ^d (0.07)	-0.11 ^c (0.06)	-0.06 (0.06)	-0.12 ^d (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 $p < 0.01$.

Baseline results

Figure 3 – Counterfactual analysis with back-of-the-envelope computations



- The average ETR would have been **0.93 percentage point** higher in 2005 had 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) <i>ETR</i>	(2) <i>ETR2</i>	(3) <i>CASHETR</i>	(4) <i>CFM</i>
<i>Baseline estimates</i>	-0.20 ^a	-0.18 ^b	-0.18 ^a	-0.26 ^a
<i>Panel A: exclusion of outliers</i>				
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
<i>Panel B: more controls</i>				
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
<i>Panel C: alternative specifications</i>				
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
<i>Panel D: falsification tests</i>				
D1. Random industry	0.01	-0.02	-0.01	0.05
D2. Pre-period data	-0.11	-0.06	0.35	0.36

Endogeneity (1)

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

	(1) <i>ETR</i>	(2) <i>ETR2</i>	(3) <i>CASHETR</i>	(4) <i>CFM</i>
<i>Panel A: lagged controls</i>				
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
<i>Panel B: 2SLS à la Autor et al. (2013)</i>				
B1. First-stage results: IMP_{jt} on instrument				
Point estimate				
F-statistic				
B2. Second-stage results: CTA_{ijt} on \widehat{IMP}_{jt}				
Point estimate				
<i>Panel C: PNTR as a quasi-natural experiment</i>				
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 are not reported for space. ^d $p < 0.15$, ^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$.

Endogeneity (2)

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

	(1) <i>ETR</i>	(2) <i>ETR2</i>	(3) <i>CASHETR</i>	(4) <i>CFM</i>
<i>Panel A: lagged controls</i>				
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
<i>Panel B: 2SLS à la Autor et al. (2013)</i>				
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
<i>Panel C: PNTR as a quasi-natural experiment</i>				
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 are not reported for space. ^d $p < 0.15$, ^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$.

Endogeneity (3)

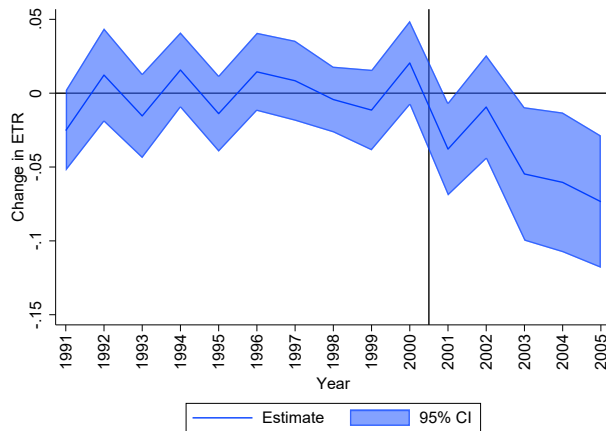
Table 8 – Effect of import competition on corporate tax avoidance: endogeneity

	(1) <i>ETR</i>	(2) <i>ETR2</i>	(3) <i>CASHETR</i>	(4) <i>CFM</i>
<i>Panel A: lagged controls</i>				
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
<i>Panel B: 2SLS à la Autor et al. (2013)</i>				
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
<i>Panel C: PNTR as a quasi-natural experiment</i>				
	-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 are not reported for space. ^d $p < 0.15$, ^c $p < 0.10$, ^b $p < 0.05$, ^a $p < 0.01$.

Endogeneity (4)

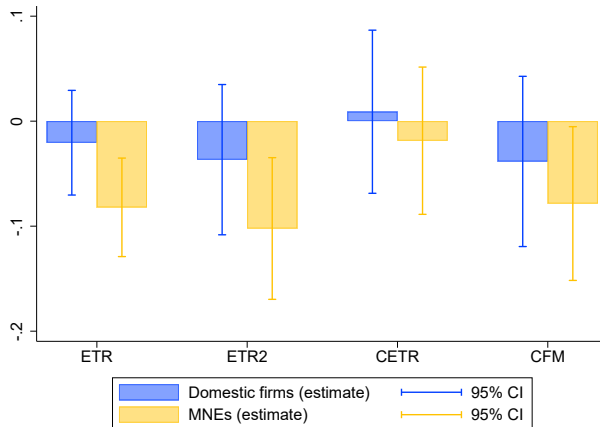
Figure 4 – Pre-trends in *ETR* and dynamics of the effect



► Back

Mechanism (1)

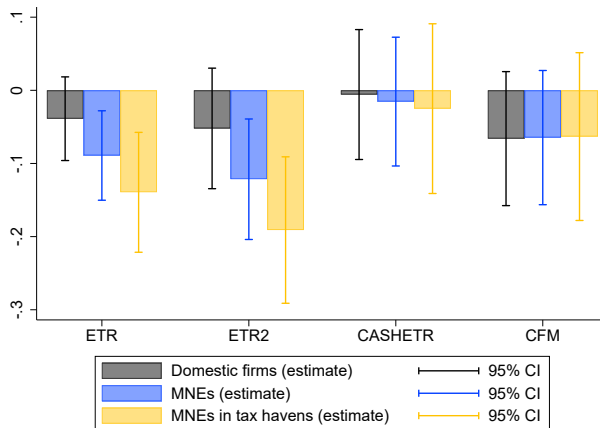
Figure 5 – Domestic firms vs MNEs



► Back

Mechanism (2)

Figure 6 – Domestic firms vs MNEs



► Back

Mechanism (3)

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

	(1) <i>ETR_{ijt}</i>	(2) <i>ETR_{ijt}</i>	(3) <i>ETR_{ijt}</i>	(4) <i>ETR_{ijt}</i>	(5) <i>intangibles_{ijt}</i>
<i>PNTR_{jt}</i>	-0.06 ^b (0.03)	-0.02 (0.03)	-0.03 (0.03)	-0.03 (0.03)	0.02 (0.03)
<i>PNTR_{jt} × MNE_{ijt}</i>		-0.06 ^a (0.02)			0.04 ^c (0.02)
<i>intangibles_{ijt}</i>			0.02 (0.01)	0.04 ^a (0.02)	
<i>intangibles_{ijt} × MNE_{ijt}</i>				-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 $p < 0.01$.

► Back

Mechanism (4)

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

	(1) $TAXHAVEN_{ijt}^{ext}$	(2) $TAXHAVEN_{ijt}^{int}$
$PNTR_{jt}$	0.04 (0.07)	3.15 (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 $p < 0.01$.

Mechanism (5)

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

	(1) $TAXHAVEN_{ijt}^{ext}$	(2) $TAXHAVEN_{ijt}^{int}$	(3) $sales_{ijt}$
$PNTR_{jt}$	0.04 (0.07)	3.15 (4.50)	-2,740.44 ^b (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 $p < 0.01$.