The Indirect Effect of Import Competition on Corporate Tax Avoidance

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MaCCI Annual Conference
ZEW – Leibniz Centre for European Economic Research
March 12, 2020







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., lacovone 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
- **6** Conclusion

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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.

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.

Sample

Focus on US-listed manufacturing firms between 1990 and 2005

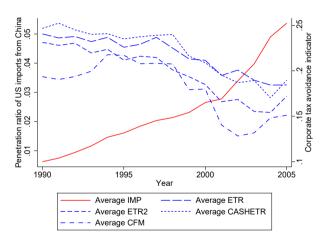
I use a subsample containing only **US-headquartered** firms operating **between 1990 and 2005** in **manufacturing**.

- 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

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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° (0.03)	-0.18 ^b (0.07)	-0.18 ^a (0.04)	-0.26 ^a (0.06)
Controls Firm FEs Year FEs R ²	Yes Yes Yes 0.20	Yes Yes Yes 0.21	Yes Yes Yes 0.13	Yes Yes Yes 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. $^dp < 0.15$, $^cp < 0.10$, $^bp < 0.05$, $^ap < 0.01$.

[►] 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.



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.

 - \rightarrow 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.
 - → 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).
 - ightarrow 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
$$PNTR_{jt}=1_{t\geq 2001}$$
 ($NNTR_{j1999}-NTR_{j1999}$). $ightharpoonup$ Table $ightharpoonup$ Parallel trends + placebo

 \rightarrow 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 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 \Rightarrow MNEs invested in intangibles \Rightarrow 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.
 - ⇒ Did MNEs intensify their network of subsidiaries in tax havens?
 - No! ► Table
- Besides, investments in intangibles could help firms upgrade and thereby **escape competition**.
 - ⇒ 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.
- 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: baptiste.souillard@ulb.be

Full paper: www.baptistesouillard.com

Appendix

Corporate tax avoidance variables

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

	ETR	ETR2	CASHET	R CFM
ETR	1.00			
ETR2	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.



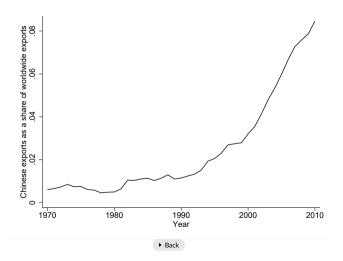
Import penetration ratio across sectors

- 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).



China's exports

Figure 2 – Exports from China between 1970 and 2010



Correlation (1)

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

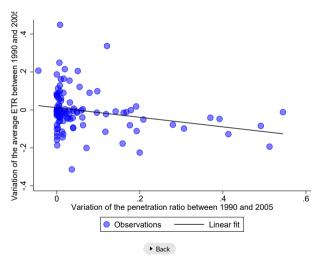
	$\frac{(1)}{ETR_t}$	$\frac{(2)}{ETR2_t}$	$\frac{(3)}{CASHETR_t}$	$\frac{(4)}{CFM_t}$
$\overline{\mathit{IMP}}_t$	-1.36 ^a (0.13)	-1.76 ^a (0.22)	-1.73° (0.20)	-1.62 ^a (0.39)
Controls Nb. of obs.	No 16	No 16	No 16	No 16

Notes. Standard errors are in parentheses. $^dp <$ 0.15, $^cp <$ 0.10, $^bp <$ 0.05, $^ap <$ 0.01.



Correlation (2)

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



Correlation (3)

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

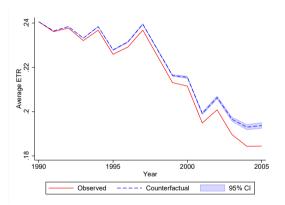
	$\frac{(1)}{ETR_{jt}}$	$\frac{(2)}{ETR2_{jt}}$	$\frac{(3)}{CASHETR_{jt}}$	$\frac{(4)}{CFM_{jt}}$
IMP_{jt}	-0.11 ^d (0.07)	-0.11 ^c (0.06)	-0.06 (0.06)	-0.12 ^d (0.08)
Year FEs Industry FEs Nb. of obs.	Yes Yes 1,785	Yes Yes 1,771	Yes Yes 1,783	Yes Yes 1,783

Notes. Standard errors, in parentheses, are clustered at the 4-digit 1987 SIC industry. $^dp<0.15, ^cp<0.10, ^bp<0.05, ^ap<0.01.$



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.

Robustness tests

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

	(1) ETR	(2) ETR2	(3) CASHETR	(4) <i>CFM</i>
Baseline estimates	-0.20 ^a	-0.18 ^b	-0.18 ^a	-0.26ª
Panel A: exclusion of outliers				
A1. Extreme values	-0.36 ^a	-0.30°	-0.33 ^a	-0.43ª
A2. Negative profits	-0.15 ^a	-0.11 ^c	-0.17 ^a	-0.22ª
A3. Entries and exits	-0.22 ^a	-0.23 ^a	-0.17 ^a	-0.22ª
A4. Involved in M&A	-0.23 ^a	-0.19 ^a	-0.18 ^a	-0.27ª
Panel B: more controls				
B1. Trends in globalization	-0.17 ^a	-0.15 ^b	-0.19°	-0.21 ^e
B2. Trends in globalization (USDIA included)	-0.20°	-0.15 ^c	-0.18 ^b	-0.14 ^b
B3. State-year FEs	-0.20°	-0.19°	-0.16 ^a	-0.26
B4. State-year-MNE status FEs	-0.21	-0.18 ^a	-0.15	-0.27
Panel C: alternative specifications				
C1. SIC 3-digit industry	-0.15 ^a	-0.16 ^a	-0.10^{b}	-0.18 ⁶
C2. 4-year periods	-0.30°	-0.11	-0.17 ^c	-0.23
C3. 16-year differences	-0.18 ^c	-0.36 ^a	-0.16 ^c	-0.32 ^k
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

Endogeneity (1)

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

	(1) ETR	(2) ETR2	(3) CASHETR	(4) <i>CFM</i>
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: IMPit on instrument

Point estimate

F-statistic

B2. Second-stage results: CTA_{iit} on \widehat{IMP}_{it}

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. $^dp < 0.15$, $^cp < 0.10$, $^bp < 0.05$, $^ap < 0.01$.

Endogeneity (2)

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

	(1) ETR	(2) <i>ETR</i> 2	(3) CASHETR	(4) <i>CFM</i>
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. $^dp < 0.15$, $^cp < 0.10$, $^bp < 0.05$, $^ap < 0.01$.

Endogeneity (3)

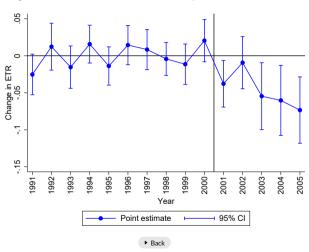
Table 8 - Effect of import competition on corporate tax avoidance: endogeneity

	(1)	(2)	(3)	(4)
	ETR	ETR2	CASHETR	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: <i>IMP</i> _{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. $^dp < 0.15$, $^cp < 0.10$, $^bp < 0.05$, $^ap < 0.01$.

Endogeneity (4)

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



Mechanism (1)

0 7 ETR2 CASHETR ETR СĖМ Domestic firms (point estimate) MNEs (point estimate) Domestic firms (90% CI) MNEs (90% CI) ▶ Back

Figure 6 - Domestic firms vs MNE

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 (0.03)	-0.02 (0.03)	-0.03 (0.03)	-0.03 (0.03)	0.02 (0.03)
$PNTR_{jt} imes MNE_{ijt}$		-0.06 ^a (0.02)			0.04 ^c (0.02)
intangibles _{ijt}			0.02 (0.01)	0.04 ^a (0.02)	
$intangibles_{ijt} imes MNE_{ijt}$				-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. $^dp < 0.15$, $^cp < 0.10$, $^bp < 0.05$, $^ap < 0.01$.



Mechanism (3)

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

	(1) TAXHAVEN _{ijt}	(2) TAXHAVENijt	
$PNTR_{jt}$	0.04	3.15	
$PNTR_{jt} \times intangibles_{ijt}$	(0.07)	(4.50)	
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. $^dp < 0.15$, $^cp < 0.10$, $^bp < 0.05$, $^ap < 0.01$.

▶ Back

Mechanism (4)

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

	(1) TAXHAVEN _{ijt}	(2) TAXHAVEN ^{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. $^dp < 0.15$, $^cp < 0.10$, $^bp < 0.05$, $^ap < 0.01$.