Trade in services, intangible capital, and the profit-shifting hypothesis

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Introduction

- Intangible capital and intellectual property products (IPP) are immaterial and exchangeable goods or assets: patents, trademarks, copyrights, software, managerial expertise, algorithms, databases, the results of R&D, artistic originals, . . . (SNA 2008)
- Payment flows remunerating these intangible assets and related transactions (e.g. R&D expenditure) qualify as **trade in services** and enter balance of payments statistics.
- To give an idea of their size: they account on average for about $1/5$ of total EU services trade.
- IPP play a growing role in the balance-sheet of MNEs (Haskel and Westlake, 2018)
- IPP are easily and cheaply transferable, between firms and across countries (Griffith et al., 2014).

MNE + IPP $\rightarrow$ new avenues for profit-shifting strategies.

Research question(s)

- Our paper aims at shedding light on the use of IPP transactions for profit shifting, using Italian firm-level data on trade in services.
  We do so in three steps:

1. we analyse the geographical and sectoral structure of Italy's IPP services trade, pointing to patterns that are compatible with the hypothesis of such services being used as a profit-shifting tool.

2. we apply to Italian firm-level data the methodology put forward by Tørsløv et al. (2018) for the quantification of profit shifting (with some caveats).

3. we verify if profit shifting estimates and imports of IPP services are correlated at firm level.

Our paper **relates** to two vast strands of literature:

- The rising role of intangible capital in the economic activity of firms: Corrado et al. (2009); Jona Lasinio and Manzocchi (2012); Haskel and Westlake (2018); Jenniges et al. (2019)
- Profit shifting of MNES to tax havens and its measurement: Dharmapala (2014); Clausing (2016); Riedel (2018); Barrios and D'Andria (2020); Bruner et al. (2018); Davies et al. (2018); Tørsløv et al. (2018); Bilicka (2019); Sallusti (2019)
- Our paper **contributes** to the work-stream that stems at their intersection, focusing on the role of intangible capital in profit shifting: Dischinger and Riedel (2011); Griffith et al. (2014); Beer and Loeprick (2015); Alstadsæter et al. (2018); Barrios and D'Andria (2020).

Microdata evidence on IPP services trade

- Our analysis: sample of 2,600 Italian firms, over 2013–2017.
  Services trade transactions are from the International Trade in Services survey of the Bank of Italy, and merged with balance sheet data.
- We aggregated more than 30 types of services (EBOPS classification) into **three categories** relevant for our analysis:
  - **IPP services**: they include:
    - ★ royalties and users' fees to intellectual prop. rights
    - ★ software and computer services
    - ★ research & development
  - **HQ services**: headquarter services; they include:
    - ★ accounting, auditing & tax advisory services
    - ★ managerial and entrepreneurial consultancy
    - ★ other services between associated companies n.i.e.
  - **Other services**: residual category including all other services in the dataset n.i.e. (e.g. advertising, maintenance & repair . . .)

Note: Travel, transportation, and banking services are not included in our dataset.

Counterpart countries of firms trading in IPP services

Based on Hines and Rice (1994) and Tørsløv et al. (2018), we divide counterpart countries in **Tax havens** and **Non havens** and note that:

- IPP services imports come from tax havens in a higher proportion with respect to other services

Figure 1: Distribution of trade in services by counterpart area

	Export				Import			
Counterpart Area	IPP	HQ	Other	Total	IPP	HQ	Other	Total
World	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Non-havens	68.1	56.1	68.6	66.6	57.0	66.4	77.4	71.5
Tax-havens	31.9	43.9	31.4	33.4	43.0	33.6	22.6	28.5
of which:								
Asian Tax-havens	1.3	2.4	1.2	1.4	0.1	1.8	2.5	1.9
EU Tax-havens*	13.3	19.0	16.5	16.0	36.8	22.6	13.1	19.6
European non-EU Tax-havens	17.1	22.2	13.1	15.5	6.1	9.2	6.3	6.6
Other tax-havens	0.3	0.3	0.5	0.4	0.0	0.1	0.7	0.4
% on total services	26.6	15.3	58.1	100.0	22.1	12.9	65.0	100.0

All values are in percentage terms, calculated as average on the 2013–2017 interval.

tax havens list

What kind of firms trade in IPP services? (1)

- Manufacturing firms play a very important role in international trade in services (Federico and Tosti, 2017): in the case of IPP, they account for $^2/_3$ of exports and about 40% of imports.

Firms' economic activity	IPP export	IPP import
Manufacturing	67.4	38.8
Information & computer serv.	15.6	28.9
Telecommunications & media	0.5	12.1
Wholesale & retail trade	4.7	8.3
Business services	9.3	7.3
Residual activities	2.5	4.6
Total economy	100.0	100.0

All values are shares, averaged over the 2013–2017 interval

- There is an important difference between imports and exports: while exports are more concentrated, IPP services imports are due to a **wider sectoral variety of importing firms**. table

What kind of firms trade in IPP services? (2)

- IPP services are traded overwhelmingly by **very large firms**:

	Export				Import			
Firms' employees	IPP	HQ	Other	Total	IPP	HQ	Other	Total
1–99	4.4	2.7	11.8	8.5	2.3	4.6	6.7	5.5
100–499	10.2	22.7	27.1	21.9	20.1	24.7	25.8	24.4
500–999	14.8	23.9	22.4	20.6	14.8	25.7	20.1	19.7
1000 and above	70.7	50.6	38.7	49.0	62.8	45.0	47.4	50.5
All firms	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

All values are shares, averaged on the 2013–2017 interval

What kind of firms trade in IPP services? (3)

We get additional insights considering the **ownership status** of trading firms. We divided them into two sets:

- **Foreign-owned firms**, i.e. firms whose parent companies are located abroad
- **Local firms**, i.e. firms whose parent companies are located in Italy or firms that are not part of a group

	Exports				Imports			
	IPP	HQ	Other	Total	IPP	HQ	Other	Total
Foreign firms	51.5	68.5	40.2	47.5	59.2	71.6	37.0	46.4
Local firms	48.6	31.5	59.8	52.5	40.8	28.4	63.0	53.6
All firms	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

All values are shares, averaged on the 2013–2017 interval

- About 60% of IPP service imports are made by foreign firms
- The status of being "foreign owned" is always positively associated with IPP trade activity, after controlling for size, sector, and year fixed effects. table

Profit shifting estimation methodology

- The approach developed by Tørsløv et al. (2018) is based on the comparison of **profitability rates** between foreign and local firms.
- Profitability index is defined as:

$$z = \pi / w$$

where π = pre-tax corporate profits and w = compensation of employees

- Denoting with subscripts f and l variables related to foreign and local firms respectively, and with superscripts h and n variables referred to tax havens and non-haven countries, Tørsløv et al. (2018) found that:

$$z_f^h > z_l^h \quad ; \quad z_f^n < z_l^n$$

- In tax havens foreign firms profitability is on average higher than local firms, while in non-havens it is the other way round.

- Assuming that all firms have Cobb-Douglas production function ($\sigma = 1$), then a non zero difference $z_l - z_f$ must be due to profit shifting.

- On this reasoning, they quantify shifted profits as the difference between "hypothetical" profits of foreign firms *(if they had the same profitability of local firms)* and their actual profits:

$$\text{Shifted profits} = \pi_f^* - \pi_f = z_l w_f - z_f w_f = (z_l - z_f) w_f$$

- Tørsløv et al. (2018) apply this methodology to aggregate data, taken from macroeconomic statistics, using a combination of NA, FATS, and FDI statistics.

Methodological caveats

There are four potential weaknesses of this methodology, all reflecting limitations of available data:

1. Implicit assumption that local firms show their "true" profitability holds only to the extent that they do not have access to other profit shifting channels
2. Assumption of Cobb-Douglas (or, alternatively, of equal capital intensities between foreign and local firms) may not hold empirically
3. Definition of "foreign firm" does not coincide in FATS (ultimate owner) and in FDI (immediate counterpart).
4. Foreign firm depreciation obtained as a residual may lead to implausible estimates for some countries. more

Applying the methodology to microdata, we overcome issues 3 and 4.

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Application to our sample of Italian firms

- Before applying the previous approach to Italian data, we verified if the inequality $z_f < z_I$ holds also for Italy

Table 1: Profitability and foreign control

	(1)	(2)	(3)	(4)
	y = profitability index z			
Foreign control	-0.218***	-0.360***	-0.301***	-0.213***
	(-4.58)	(-7.78)	(-6.59)	(-4.79)
Log employees			-0.190***	-0.584***
			(-8.77)	(-14.16)
Log assets				0.513***
				(13.47)
Year FE	yes	yes	yes	yes
Sector FE	no	yes	yes	yes
Observations	8525	8525	8511	8475
Adjusted R^2	0.070	0.158	0.173	0.231

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In order to compute $(z_l - z_f)w_f$ for Italy, we aggregated micro-level data in three different ways:

- Across the entire sample of firms (direct approach), à la Tørsløv et al. (2018)
- On a sector-by-sector basis, and then summed up (sum across sectors approach)
- On a firm-by-firm basis: each foreign firm is compared with the average of local firms in the same sector. Firm level results are then summed up (granular approach)

Results from 2nd and 3rd approach deal similar results. We report here results from the first two approaches, the 3rd approach will be used in the last section.

Profit shifting estimates (1)

Sector	Local π_l	Local w_l	Foreign π_f	Foreign w_f	Shifted profits amount	Shifted profits as % of π_f^*
Total (direct estimate)	47,974	62,481	10,383	19,869	**4,873**	**0.32**
Total (sum across sectors)					**1,813**	**0.15**
Data for some relevant sectors:						
Beverages	377	226	346	301	157	0.31
Leather	538	345	58	157	187	0.76
Pharmaceuticals	1438	1120	921	1379	849	0.48
Basic metals	706	916	50	452	299	0.86
Metal products	540	726	55	306	173	0.76
Electrical equipment	584	869	436	1031	257	0.37
Machinery	1645	2715	546	1677	470	0.46
Wholesale & retail trade	2666	6982	1175	4201	429	0.27
Transportation & storage	7490	12044	-34	569	388	1.10

Methodology of Tørsløv et al. (2018) and authors' calculations on Italian data.

All values are in millions of euros and relative to year 2015.

more

Profit shifting estimates (2)

- The 1st approach (direct) quantifies the size of shifted profits as **32%** of adjusted profits, while the 2nd approach (sum across sectors) points to a lower amount: **15%**.
- The discrepancy between the two approaches is relatively large, suggesting that **sectoral composition matters**, and that macro approach like Tørsløv et al. (2018) may cast a non-negligible bias on estimates (Barrios and D'Andria, 2020).
- Releasing Cobb-Douglas assumption, considering tangible capital intensities from balance sheet data, and assuming σ to be in the range 0.7–1.3, our **estimates vary between 4% and 42% of adjusted profits**.
- Our "macro" estimate (32%) is lower than what Tørsløv et al. (2018) (however, close to their estimate with adjusted depreciation), while our "micro" estimate (15%) is very close to that of Sallusti (2019) (13%), who estimates profit shifting through a granular approach on Italian firm-level data.

Shifted profits and imports of IPP services

- As a final step we compared our estimates of **profits shifted abroad** by foreign firms with the value of **IPP (and HQ) services imported** *by the same group of firms*, in order to verify if the latter can accommodate the former in size.
- This verification is divided in two stages:
  - Macro: are IPP (and HQ) flows large enough on aggregate to accommodate PS estimates?
  - Micro: are profit-shifting firms the *same firms* that actually import IPP (and HQ) services?

Services imports and shifted profits

Estimation approach	shifted profits	IPP from RoW	IPP + HQ from RoW	*IPP + HQ : from Tax havens*
I. Direct estimate	4,873	2,405	4,553	1,581
II. Sum of sectors	1,813	2,405	4,553	1,581

Values in millions of euro. Estimates and imports referred to sample data in 2015.

- Direct estimates of profit shifting from 1st approach are too large to be associated only with imports of IPP & HQ services from tax havens.
- Our more conservative estimates (2nd approach) can be accommodated to a large extent into imports of IPP & HQ services from tax havens, however this would imply *all* such imports being made for tax planning purposes, a rather extreme claim. more

Correlation between service imports & shifted profits

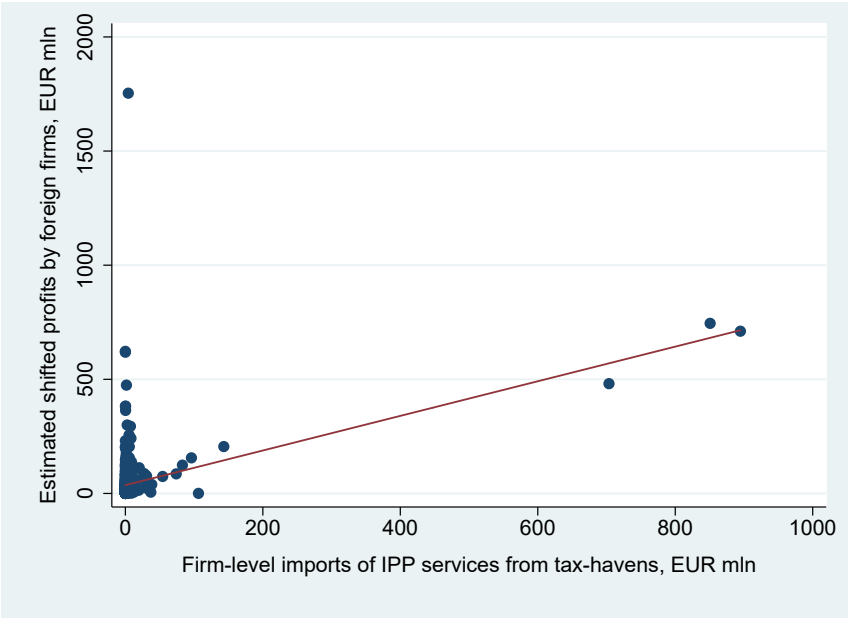
- To check if profit-shifting firms and IPP importing firms are actually the same, we take firm-level estimates of shifted profits (3rd approach) and correlate them with firm-level flows of imported services
- Remarkably, shifted profits at firm-level are correlated only with imports of IPP from tax havens, and the correlation gets stronger if we consider only large importers:

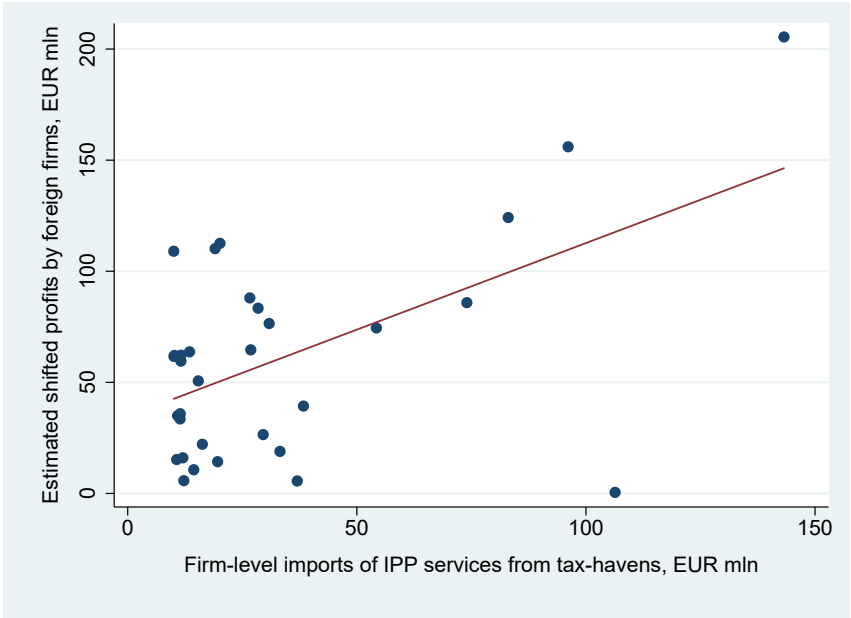
	Imports of IPP services			
	From Non-havens	From Tax havens	From Tax havens > 0	From Tax havens > 10
Profit-shifting	0.03	0.24	0.29	0.87
Profit-shifting > 0	0.18	0.38	0.43	0.97
	Imports of HQ services			
	From Non-havens	From Tax havens	From Tax havens > 0	From Tax havens > 10
Profit-shifting	0.07	0.04	0.05	0.07
Profit-shifting > 0	0.13	0.07	0.07	0.00

The table reports correlation coefficients between firm-level shifted profits and imports of IPP services (upper panel) or imports of HQ services (lower panel), from non-havens and tax-havens countries, in the latter case excluding firms with zero imports (3rd column) or firms with imports less than EUR 10 millions (4th column).

Imports of IPP services and shifted profits

- While a large majority of firms import low or null amount of IPP services from tax havens, there is a small subset of firms which display a significant correlation between the two variables: high imports of IPP services from tax havens and large alleged shifted profits.





Both graphs exclude foreign firms associated with negative profit shifting estimates. The left-hand side graph reports 897 firm-year observations. The graph in the right-hand panel contains only 63 firm-year observations because it excludes firms with IPP imports less than 10 million and it does not display firms with imports of IPP services larger than 150 EUR million. Memo: firms in the second panel account on average for about 40% of IPP services imports from tax havens.

Conclusions

- Our paper connects estimates of profit shifting with imports of IPP services, both at macro and at micro level.
- We find that Italian imports of IPP services have features that are compatible with the hypothesis of such flows being used as profit shifting tool:
  - 40% of imports of IPP services come from tax havens (30% for other services)
  - Large foreign firms account for almost $^2/_3$ of it
- Our baseline estimates vary between 15% and 30% of adjusted profits, but they are conditional to crucial assumptions that may cast some uncertainty upon results.
- Positive correlation between profit-shifting & IPP imports from tax havens at firm level, although at aggregate level other channels are likely to play a role.

Thank you for your attention

This paper is work in progress:
comments and suggestions welcome

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List of tax havens

We use the tax haven list provided by Tørsløv et al. (2018), which is in turn based on the list from Hines and Rice (1994), plus Netherlands and Belgium:

The list contains 40 jurisdictions (bold type for EU members):

Andorra, Anguilla, Antigua and Barbuda, Aruba, Bahamas,
Bahrain, Barbados, **Belgium**, Belize, Bermuda,
Bonaire, British Virgin Islands, Cayman Islands, Curaçao, **Cyprus**,
Gibraltar, Grenada, Guernsey, Hong-Kong, **Ireland**,
Isle of Man, Jersey, Lebanon, Liechtenstein, **Luxembourg**,
Macao, **Malta**, Marshall Islands, Mauritius, Monaco,
Netherlands, Panama, Puerto Rico, Seychelles, Singapore,
Sint Maarten, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Switzerland.

Italian IPP service imports from tax havens are very concentrated: IE, NL and CH account for 85% of the list total. back

Distribution of trade in services by firms sector

		Export				Import			
Economic activity	NACE code	IPP	HQ	Other	Total	IPP	HQ	Other	Total
Food	[10]	3.4	3.1	1.8	2.4	2.3	3.5	1.3	1.8
Beverages	[11]	0.2	0.3	0.5	0.4	0.7	0.9	0.5	0.6
Textiles	[13]	0.0	0.2	0.0	0.0	0.0	0.2	0.3	0.2
Wearing apparel	[14]	2.1	0.1	0.1	0.6	0.7	1.8	1.8	1.5
Leather	[15]	3.8	7.7	0.4	2.4	2.0	4.9	1.5	2.0
Paper & print	[17 + 18]	0.3	0.2	2.0	1.3	0.5	0.9	0.3	0.4
Coke & ref. petroleum	[19]	0.3	0.1	0.7	0.5	1.9	1.1	2.8	2.4
Chemicals	[20]	2.7	4.6	1.8	2.5	5.1	4.3	1.7	2.8
Pharmaceuticals	[21]	6.7	5.7	2.3	4.0	5.3	7.5	1.6	3.1
Plastics & rubber	[22]	3.2	2.5	0.7	1.6	1.6	3.1	1.1	1.5
Non-metallic mineral prod.	[23]	0.6	4.3	1.6	1.7	0.5	0.6	0.8	0.7
Basic metals	[24]	0.0	0.5	0.7	0.5	0.3	0.9	0.7	0.7
Metal products	[25]	0.1	1.7	5.6	3.6	0.5	1.1	0.8	0.8
Electronics	[26]	17.4	6.5	7.1	9.7	1.9	1.9	3.7	3.1
Electrical equipment	[27]	5.3	3.7	0.6	2.3	3.3	2.5	3.3	3.2
Machinery	[28]	3.7	5.5	4.8	4.6	3.2	5.9	4.7	4.5
Transport equipment	[29 + 30]	16.5	9.1	9.3	11.1	8.0	8.4	6.3	6.9
Other manuf. products	[32]	0.2	0.2	0.1	0.1	0.8	0.4	0.2	0.3
Energy & gas	[D]	0.1	2.9	2.9	2.2	0.8	0.8	2.7	2.0
Construction	[F]	0.3	2.6	1.3	1.2	0.3	1.4	1.0	0.9
Wholesale & retail trade	[G]	4.7	11.6	12.4	10.2	8.3	13.8	12.5	11.8
Transportation services & storage	[H]	0.1	1.5	9.9	6.1	1.4	1.9	21.8	14.8
Accommodation & catering	[I]	0.1	0.1	0.1	0.1	0.3	0.5	0.1	0.2
Telecommunications & media	[J58 ...J61]	0.5	2.2	20.5	12.5	12.1	8.0	18.1	15.5
Information & computer serv.	[J62 + J63]	15.6	11.4	0.4	6.1	28.9	10.9	0.8	8.2
Finance & insurance	[K]	0.8	0.7	2.0	1.5	1.2	1.6	0.8	1.0
Business services	[M + N]	9.3	10.5	8.0	8.8	7.3	8.3	4.2	5.4
Residual activities	(*)	1.9	0.4	2.6	2.1	0.8	2.7	4.7	3.6
Total economy		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Memo item: Manufacturing	[C]	67.4	56.3	41.1	50.3	38.8	51.6	35.8	38.5

All values are in percentage terms, calculated as average on the 2013–2017 interval.
In squared brackets the NACE (Rev.2) code of the economic sector of the trading firms.
(*) Includes activities with the following NACE codes: A, B, E, L, P, Q, R, S, U, 12, 16, and 33.

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Estimates of profit shifting by Tørsløv et al. (2018)

- With respect to the last point, we recalculated profit shifting estimate for Italy taking a value for depreciation in line with OECD average, (i.e. 48% instead of 73%).
- Estimated shifted profits for Italy go down from 24 to 9 EUR billion (-60%), meaning a share of shifted profits equal to 28% of adjusted profits.

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Country	π_f	w_f	π_l	w_l	z_f	z_l	$z_l - z_f$	Shifted profits	As % of adj. profits
Estimates by Tørsløv et al. (2018)									
Italy	12	73	180	371	0.2	0.5	0.3	24	67%
Germany	39	212	462	895	0.2	0.5	0.3	71	64%
France	29	139	141	650	0.2	0.2	0.0	1	3%
Netherlands	81	71	76	185	1.1	0.4	-0.7	-52	n.a.
Ireland	105	14	29	43	8.0	0.7	-7.3	-96	n.a.
Luxembourg	46	10	4	9	4.6	0.4	-4.2	-43	n.a.
Estimates based on an alternative depreciation rate (our estimates)									
Italy	24	73	168	371	0.3	0.5	0.1	9	28%

The table reports the estimates of shifted profits in selected European countries according to Tørsløv et al. (2018). All values are in EUR billion (converted from USD dollars at the average exchange rate). Year 2015.

Trade in services and firms' characteristics (1)

	(1)	(2)	(3)	(4)	(5)	(6)
		Exports			Imports	
	IPP	HQ	Other	IPP	HQ	Other
Foreign control	0.259***	0.854***	0.684***	0.739***	1.112***	0.445***
	(0.0664)	(0.0850)	(0.130)	(0.0849)	(0.0817)	(0.117)
Log employees	0.0502	0.0581*	-0.0207	-0.00654	0.0854*	-0.230***
	(0.0281)	(0.0269)	(0.0448)	(0.0392)	(0.0375)	(0.0546)
Log assets	0.101***	-0.0354	-0.109*	0.0584	-0.146**	0.160*
	(0.0225)	(0.0421)	(0.0504)	(0.0446)	(0.0474)	(0.0697)
Constant	-1.184***	0.214	2.333***	-0.260	1.422***	0.747
	(0.201)	(0.381)	(0.473)	(0.356)	(0.394)	(0.613)
Year FE	yes	yes	yes	yes	yes	yes
Sector FE	yes	yes	yes	yes	yes	yes
adj. R^2	0.062	0.045	0.066	0.101	0.072	0.085
N	8557	8544	8422	8572	8570	8501

Regression of log exports (or imports) of a given service type by firm i in year t on foreign control dummy, log employees, log assets, year and sector FE.
Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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Trade in services and firms' characteristics (2)

	(1)	(2)	(3)	(4)	(5)	(6)
	Imports from non-havens			Imports from tax-havens		
	IPP	HQ	Other	IPP	HQ	Other
Foreign control	0.590***	0.797***	0.300**	0.173***	0.315***	0.285***
	(0.0710)	(0.0640)	(0.0994)	(0.0482)	(0.0460)	(0.0714)
Log employees	0.00956	0.0440	-0.144**	-0.0253	0.0411	-0.172***
	(0.0258)	(0.0259)	(0.0465)	(0.0266)	(0.0216)	(0.0315)
Log assets	-0.0286	-0.0896**	0.111	0.0948***	-0.0559	0.0679*
	(0.0294)	(0.0302)	(0.0606)	(0.0274)	(0.0311)	(0.0314)
Constant	0.565*	0.935***	0.530	-0.872***	0.484	0.555
	(0.243)	(0.255)	(0.518)	(0.211)	(0.265)	(0.321)
Year FE	yes	yes	yes	yes	yes	yes
Sector FE	yes	yes	yes	yes	yes	yes
adj. R^2	0.086	0.062	0.080	0.040	0.027	0.054
N	8574	8571	8523	8579	8577	8554

Regression of log imports of a given service type from non-havens or tax-havens by firm i in year t on foreign control dummy, log employees, log assets, year and sector FE.
Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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Profit shifting estimates by sector

Sector	Local		Foreign		Profitability		Shifted profits	
	π_l	w_l	π_f	w_f	z_l	z_f	$(z_l - z_f)w_f$	% of π_f^*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Food	1272	1867	421	729	0.68	0.58	76	0.15
Beverages	377	226	346	301	1.67	1.15	157	0.31
Textiles	148	283	1	15	0.52	0.07	7	0.87
Wearing apparel	743	858	-20	57	0.87	-0.36	69	1.41
Leather	538	345	58	157	1.56	0.37	187	0.76
Paper & print	286	714	68	201	0.40	0.34	13	0.16
Coke and refined petroleum	313	1350	175	370	0.23	0.47	-89	-1.03
Chemicals	766	1046	1045	959	0.73	1.09	-343	-0.49
Pharmaceuticals	1438	1120	921	1379	1.28	0.67	849	0.48
Plastics & rubber	501	635	265	514	0.79	0.52	141	0.35
Non-metallic mineral products	436	1118	98	253	0.39	0.39	1	0.01
Basic metals	706	916	50	452	0.77	0.11	299	0.86
Metal products	540	726	55	306	0.74	0.18	173	0.76
Electronics	374	1206	332	1241	0.31	0.27	53	0.14
Electrical equipment	584	869	436	1031	0.67	0.42	257	0.37
Machinery	1645	2715	546	1677	0.61	0.33	470	0.46
Transport equipment	1109	4939	694	2148	0.22	0.32	-212	-0.44
Other manuf. products	189	521	24	26	0.36	0.92	-14	-1.53
Energy & gas	11531	3095	-374	71	3.73	-5.28	639	2.42
Construction	660	2451	50	222	0.27	0.23	10	0.16
Wholesale & retail trade	2666	6982	1175	4201	0.38	0.28	429	0.27
Transportation & storage	7490	12044	-34	569	0.62	-0.06	388	1.10
Accommodation & catering	165	650	12	67	0.25	0.17	5	0.31
Telecommunications & media	8337	5037	2407	694	1.66	3.47	-1259	-1.10
Information & computer serv.	1322	3157	85	369	0.42	0.23	70	0.45
Finance & insurance	351	148	130	62	2.37	2.07	19	0.13
Business services	3485	7464	1421	1799	0.47	0.79	-581	-0.69
Total economy (sum across sectors)							1,813	0.15
Total economy (direct estimate)	47,974	62,481	10,383	19,869	0.77	0.52	4,873	0.32

Methodology of Tørsløv et al. (2018) and authors' calculations on Italian data.
All values are in millions of euros and relative to year 2015. A negative sign in column (7) means inward profit-shifting.

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Services imports and shifted profits

Sector	shifted profits	IPP	HQ	IPP + HQ	of which: tax havens
Food	76	105	67	172	111
Beverages	157	35	38	73	35
Textiles	7	0	3	3	2
Wearing apparel	69	1	11	12	2
Leather	187	0	201	201	178
Paper & print	13	5	28	34	4
Coke & ref. petroleum	-89	49	32	81	24
Chemicals	-343	215	111	327	78
Pharmaceuticals	849	68	118	186	44
Plastics & rubber	141	53	36	89	41
Non-metallic mineral prod.	1	23	4	27	4
Basic metals	299	15	36	51	16
Metal products	173	19	26	45	13
Electronics	53	14	61	75	50
Electrical equipment	257	150	33	183	102
Machinery	470	111	136	247	70
Transport equipment	-212	250	132	382	65
Other manuf. products	-14	0	6	7	0
Energy & gas	639	23	20	43	25
Construction	10	1	18	19	0
Wholesale & retail trade	429	288	323	611	266
Transportation & storage	388	47	46	93	54
Accommodation & catering	5	14	14	28	6
Telecommunications & media	-1259	358	137	495	1
Information & computer services	70	393	304	696	336
Finance & insurance	19	41	28	69	5
Business services	-581	125	179	304	49
Total economy (sum of sectors)	1,813	2,405	2,148	4,553	1,581
Total economy (direct estim.)	4,873	2,405	2,148	4,553	1,581

All values are in millions of euros and relative to year 2015.

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