EU Tax Observatory Working Paper No. 43

The instruments of profit shifting

January 2026

Kevin Parra Ramirez
Sciences-Po, Banque de France

Vincent Vicard
CEPII

The instruments of profit shifting *

Kevin Parra Ramirez† Vincent Vicard‡

September 2025

Abstract

While multinational enterprises (MNEs) shift hundreds of billions in profits to low-tax jurisdictions annually, *how* they do remains disputed. Using firm-level data for France in 2018, we provide the first joint quantification of the three main profit-shifting channels: transfer mispricing in goods trade, intangible assets and services traded with tax havens, and intra-firm debt. We find empirical evidence for all three instruments, but transfer mispricing dominates quantitatively (€ 10 billion, 0.4% of GDP), followed by services (up to € 6 billion) and debt (€ 2 billion). Although significant, these direct estimates account for half of total missing profits in France, as estimated indirectly from the location of MNE profits. We document two key blind spots likely to close this gap: cross-border digital payments by households and understudied debt instruments (e.g., securities).

Keywords: Tax avoidance, Multinational firms, Profit shifting, FDI, Trade.
JEL Classification: H26, H25, H32, F14, F23.

*We thank Katarzyna Bilicka, Ron Davies, Ségal Le Guern Herry, Niels Johannesen, Philippe Martin, Thierry Mayer, Jakob Miethe, Tatiana Mosquera Yon, Emmanuel Saez and Gabriel Zucman for their useful comments, as well as participants to seminars and conferences at CEPII, CEPR Paris Symposium 2024, EU Tax Observatory, Mannheim Taxation Conference 2024, OECD, OFCE, Sciences-Po and UC Berkeley IRLE seminar.

†Sciences-Po, Banque de France, e-mail: kevin.parraramirez@sciencespo.fr
‡CEPII, e-mail: vincent.vicard@cepii.fr

1 Introduction

Multinational enterprises (MNEs) shift hundreds of billions in profits to low-tax jurisdictions each year, eroding corporate tax bases worldwide and prompting a global policy response with the 2021 OECD tax deal endorsed by over 130 countries.[1] However, while macro-level studies have established the scale of profit shifting, the micro-level mechanisms through which MNEs shift profits remain disputed. This ambiguity undermines the design of targeted anti-avoidance policies, as optimal responses depend critically on the dominant channels in a given economy.

MNEs engage in profit shifting through three main strategies, each relying on cross-border transactions within corporate groups. First, they may manipulate transfer prices in goods trade, under-invoicing exports or over-invoicing imports to allocate profits to low-tax affiliates. Second, they can locate intangible assets such as patents or trademarks in tax havens, then charge affiliates in high-tax jurisdictions for their use through exports of services. Third, MNEs may load subsidiaries in high-tax countries with intra-firm debt, exploiting the tax deductibility of interest payments to reduce taxable income. Each instrument shifts profits from high-tax to low-tax jurisdictions, thereby reducing MNE consolidated tax liabilities.

Although each of these instruments – transfer mispricing, imports of services from tax havens, and debt shifting – has been documented in isolation, their relative importance remains unclear. Existing studies typically focus on only one instrument at a time, making it impossible to compare their quantitative importance within the same economic context. Moreover, cross-country comparisons are complicated by differences in tax systems and economic structures, including the relative prevalence of tech, finance or manufacturing sectors. Finally, the literature spans different time periods, masking trends like the growing international footprint of MNEs or the digitization of the economy.[2] By focusing on France in 2018 and leveraging firm-level data, this paper provides the first joint quantification of all three channels while also identifying previously overlooked sources of profit shifting that contribute to the discrepancy between micro and macro estimates.

Understanding how MNEs shift profits has direct implications for anti-avoidance

[1] See in particular Clausing (2016), Cobham and Jansky (2017), Torslov et al. (2023), Blouin and Robinson (2019) and Hugger et al. (2023).

[2] Wier and Zucman (2022) show that profits shifted globally have risen sharply over the last two decades.

policies and international tax reforms. For tax authorities, knowing which channel of profit shifting dominates allows for more targeted audits, concentrating resources for tax policy enforcement on transactions generating the largest revenue losses among the thousands of intra-firm transactions. Our analysis also reveals a geography of profit shifting by origin and destination that complement evidence based on the location of profits in low-tax countries or tax havens.[3] Additionally, by quantifying distortions in balance of payments data caused by profit shifting, this work informs efforts to improve national accounting statistics in a changing globalization context.[4]

We assemble confidential firm-level information on trade in goods, trade in services and debt stocks to provide direct evidence of each channel of profit shifting for France in 2018. We apply established identification strategies and derive semi-elasticities from French micro-data to compare the relative magnitudes of the three instruments. These direct, micro-based, estimates are benchmarked against indirect measures of total profit shifting derived from foreign direct investment income data. Finally, we leverage new data on cross-border digital payments and debt positions to highlight blind spots in the literature.

We find empirical evidence for the three channels of profit shifting. MNEs located in France use transfer pricing in trade in goods, intra-firm service imports from tax havens and debt to shift profit to low-tax jurisdictions. Regarding the latter, our results show that both non-financial corporations and banks strategically locate intra-firm debt in tax havens.

Interestingly, the channels of profit shifting differ between French and foreign MNEs. In particular, foreign MNEs primarily use Intellectual property, Information and communication services, and Transport services for service-based profit shifting, whereas French MNEs use Other business services (including Headquarter services) and Financial services. Similarly, all banks engage in debt shifting but only foreign non-financial corporations strategically locate intra-firm debt in tax havens. In addition, the geographic pattern of profit shifting depends on the instruments considered: transfer mispricing occurs across all low-tax countries while imports of services and debt shifting are concentrated in tax havens.

[3] Assumptions on the channels of profit shifting are instrumental to the allocation of profits located in tax havens to source countries; e.g., Torslov et al. (2023) assumes that the strategic location of intangibles is the main channel of profit shifting in allocating profits shifted to tax havens.

[4] Klemm et al. (2021) detail how profit shifting affects the balance of payments and provide some aggregate cross-country evidence. See also Guvenen et al. (2022).

Our micro-based quantifications reveal that transfer mispricing on trade in goods dominates profit shifting, accounting for €10 billion of missing profits in France in 2018, followed by trade in services (up to €6 billion) and debt shifting (€2 billion). These findings call into question the prevailing view that intangibles drive profit shifting, in line with the predominance of digital companies in global profits and tax scandals. They however align with prior studies showing limited evidence of tax avoidance through trade in services (Hebous and Johannesen, 2021; Garcia, 2022).[5] This discrepancy may reflect structural differences between the United States and a continental European country like France, where technology companies are less prominent.

The direct quantifications show significant profit shifting, totalling €18 billion or 0.7% of French GDP in 2018 across the three channels. In this respect, our paper challenges the micro-to-macro puzzle which emphasizes that estimated profit-shifting based on transaction data are limited (Wier, 2020; Hebous and Johannesen, 2021; Crivelli et al., 2021). In comparison to indirect estimates derived from FDI income data, direct estimates however account for only half of the total missing profits in France. This discrepancy underscores unexplored blind spots in the literature on profit shifting.

We discuss potential sources of discrepancies and identify two missing information in existing direct estimates of profit shifted that could account for significant profit shifting. First, household imports of digital services are not registered in trade in services data used in prior studies. Using newly available data on cross-border credit card payments, we show that these payments are large (over €50 billion for France in 2022) and disproportionately concentrated on tax havens. Second, the literature on debt shifting focuses on bank-to-bank loans and intra-firm loans to non-financial corporations, overlooking other debt instruments and counterparties – such as debt securities and bank loans to related non-financial corporations – that exhibit significant liabilities toward tax havens. Incorporating these additional channels could partially reconcile direct and indirect estimates of profit shifting. Our results highlight the need to broaden the scope of transaction-level data analyzed to address this gap.

The paper is organized as follows. Section 2 reviews the takeaways from the literature on direct evidence of profit shifting. Sections 3, 4 and 5 present the empirical methodology, data, empirical evidence and quantification for the three main instruments of profit shifting: transfer prices in trade in goods, the location of intangibles and imports of

[5]See Section 2 for more details.

services from tax havens, and debt shifting respectively. Section 6 provides an indirect quantification of total profit shifted based on FDI income and stock data. Section 7 discusses potential blind spots of the literature and Section 8 concludes.

2 Literature review: direct evidence on instruments of profit shifting

Prior studies provide evidence for all three instruments of profit shifting – transfer mispricing in trade in goods, the location of intangible assets and related trade in services, and debt shifting –, but estimated magnitudes vary widely across countries and instruments. This section reviews direct empirical evidence on these three profit-shifting channels. For broader surveys, see Riedel (2018), Beer et al. (2020) or Dharmapala (2014).

The manipulation of transfer prices in intra-firm trade in goods has attracted the most attention. Table 1 lists existing papers and their main results. It shows significant variation in estimated profit shifting across countries. These disparities do not stem from differences in estimated semi-elasticities: these range from 0.22 and 0.65, with the exception of Liu et al. (2017), and are not correlated with the estimated tax losses. They rather arise from country-specific characteristics.[6]

Table 1: Literature on transfer pricing in trade in goods

	Country	Year	Flow	Semi-elasticity	Estimated tax loss (% CIT)	Tax differential (pp)	Exports/GDP
Bernard and Jensen (2004)	USA	2004	Exports	0.65	0.3%	8.1	7.3%
Liu et al. (2017)	UK	2010	Exports	2.7	0.4%	-0.8	16.6%
Cristea and Nguyen (2015)	Denmark	2006	Exports	0.57	0.5%	-3.2	30.8%
Wier (2020)	South Africa	2014	Imports	0.51	0.5%	-5.0	39.2%
Davies et al. (2018)	France	1999	Exports	0.26	0.9%	2.4	19.4%
Vicard (2015)	France	2008	Exports	0.22	2.7%	5.3	20.5%
			Imports	0.24	2.2%		

Source: Wier (2020) and reference cited. Semi-elasticities are authors' preferred) semi-elasticities. Corporate tax differential vis-a-vis trading partners, weighted by exports. CIT: corporate income tax.

All existing studies are single-country analyses using data for different countries at different periods. The major difference relates to the level of corporate tax rate: all countries but the US (Bernard and Jensen, 2004) and France (Davies et al., 2018; Vicard, 2015) are average tax countries. The export-weighted corporate tax differential

[6] All but Davies et al. (2018) also find that all destinations are affected by transfer pricing and not only tax havens.

is negative for South Africa in 2014 (-5.0 percentage points) and Denmark in 2006 (-3.2 pp), and close to zero for the UK in 2010 (-0.8 pp). These limited tax differentials constrain profit shifting through transfer pricing, resulting in lower estimated tax losses. The US is specific: despite its high corporate tax rate, Bernard and Jensen (2004) find limited profit shifting through the manipulation of transfer prices, partly due to its low trade openness compared to other economies.

The French case is particularly informative and underlines the importance of jointly estimating different dimensions of profit shifting for a single country and at a specific point in time. Two papers estimate tax losses from transfer pricing at different points in time: Davies et al. (2018) find moderate losses as a percentage of total corporate income tax (CIT) in 1999, while Vicard (2015) finds substantially larger tax losses in 2008. To assess the contribution of transfer pricing to total profit shifting, these estimates must be considered in relation to total profits shifted over time. Wier and Zucman (2022) indeed underline that both global foreign MNE profits and profit shifted to tax havens have increased sharply since the late 1990s. For France, Vicard (2023) estimates that total profit shifted increased from €1 billion early 2000s to €36 billion in 2015. Consequently, the moderate tax losses in euro estimated by Davies et al. (2018) represent a large share of total profit shifted in 1999.

Topical evidence further underscores the role of transfer pricing as an instrument of tax avoidance. Choi et al. (2020) report that "inspections by the Vietnamese tax authorities have found that 'the most common trick played by FDI enterprises to evade taxes was hiking up prices of input materials and lowering export prices to make losses or reduce profits in books'." In France, Cariou and Cordier (2019, p.70) document tax adjustments of more than €3 billion in 2017 under Article 57 of the General Tax Code related to transfer pricing (out of €6 billion of total adjustments that year).

The strategic location of intangibles in tax havens and the associated exports of services to affiliates in high tax countries have received less attention. Dischinger and Riedel (2011) show that MNEs disproportionately locate intangibles in lower-tax EU subsidiaries over the period 1995-2005, a pattern consistent with service-based profit shifting. The tax response of intangible asset location varies across countries (Griffith et al., 2014) and types of intangibles (Dudar and Voget, 2016).

More recently, Hebous and Johannesen (2021) use firm-level trade in services data for

Germany in 2011 and show that firms are more likely to import intra-firm services from tax havens in several categories (Intellectual property, Headquarter services, Information services and Financial services). The associated tax revenue losses are however limited, on the order of 1 billion per year. Applying the same methodology to Portugal, Garcia (2022) finds no evidence of profit shifting through trade in services by multinationals located in Portugal. She explains this finding through the extensive anti-avoidance policies enacted by the Portuguese tax authorities.

The existing literature therefore provides limited direct evidence of substantial profit shifting through the location of intangibles in tax havens and associated exports of services to other affiliates of the MNE. This conclusion contrasts with the numerous high-profile media reports on tax avoidance schemes involving royalty payments for intellectual property.[7]

A substantial body of literature has investigated debt shifting, showing that internal debt varies systematically with the host-country tax rate or tax differential (e.g., Overesch and Wamser (2010), Buettner and Wamser (2013) and Egger et al. (2014) on German data, Altshuler and Grubert (2003); Desai et al. (2004) on US data and (Huizinga et al., 2008) on European firms). Estimated elasticities are however heterogeneous across papers (Egger et al., 2014). In a meta-analysis, Feld et al. (2011) find a semi-elasticity of the total debt ratio to corporate tax rate of 0.31. Beer et al. (2020) however point out that the significant tax responsiveness found in studies investigating directly debt shifting does not translate into larger indirect estimates of profit shifted when comparing profit measures that include interest expenses to those that exclude them, as would be expected. Additionally, these studies do not quantify the magnitude of profit shifted through the debt shifting channel.

Most of the literature has focused on non-financial corporations and on loans as the debt instrument. Reiter et al. (2021), however, investigates debt shifting in the banking sector and provides evidence of profit shifting through intragroup loans. Cagala and Wabitsch (2023) focus on securities portfolios, showing that banks supply capital to their low-tax subsidiaries at below-market rates, thereby reducing their overall tax liabilities.

Finally, several papers assess the role of debt shifting through indirect evidence based on the location of MNE profits, comparing results based on earnings before interests

[7]See e.g., Samarakoon (2023) on the importance of the Double Irish in U.S. multinational companies' tax strategies.

and taxation (EBIT) with profit before taxation (which includes in particular interest expenses). Heckemeyer and Overesch (2013) estimate that debt shifting accounts for one third of total profit shifting in a meta-analysis. In a more recent meta-analysis, Beer et al. (2020) find mixed results regarding the relevance of debt shifting, with estimates ranging from 0% to a quarter of the total profit shifting response. Using British multinationals tax return data, Bilicka (2019) finds that differences in leverage can explain 40% of the profit ratio gap.

This paper contributes to the literature by providing a comprehensive, direct-evidence-based analysis of profit shifting instruments. Using firm-level data, we jointly investigate all three main instruments of profit shifting emphasized in the literature and quantify their relative magnitudes. We also leverage data on the location of MNE profits to compare estimated profit shifted through direct and indirect evidence and discuss previously overlooked blind spots of the literature that could reconcile these estimates.

3 Manipulation of transfer pricing in intra-firm trade in goods

This section focuses on trade in goods and investigates how prices in intra-firm trade vary systematically depending on the difference in corporate tax between the exporting and importing countries as evidence of tax-motivated mis-pricing in related party trade.

3.1 Methodology

Our methodology follows Cristea and Nguyen (2015), Vicard (2015) and Liu et al. (2017) in using detailed transaction-level data on firm/product/destination exports together with information on the network of affiliates to identify intra-firm trade. Our identification strategy does not rely on the price level but on the price wedge between related party and arm's length exports within destination-product market and its correlation with the corporate income tax rate of each partner country relative to France.

For a firm i exporting good k to destination country j at time t, we estimate the

following equation:

$$\ln UV_{ijkt} = \beta_1 Intra_{ij} + \beta_2 Intra_{ij} \times TaxPos_{jt} + \beta_3 Intra_{ij} \times TaxNeg_{jt} + \theta_{ikt} + \theta_{jkt} + \epsilon_{ijkt}, \tag{1}$$

where UV_{ijkt} is the unit value as a measure of export prices, $Intra_{ij}$ is a dummy variable equal to one when trade is intra-firm. $TaxNeg_{jt}$ and $TaxPos_{jt}$ are the absolute values of the corporate tax rate differential between France and destination country j for negative and positive tax differentials respectively. We include fixed effects in two dimensions: firm×product×year fixed effects control for all firm/product specific determinants of exports such as product-specific productivity; and the destination×product×year fixed effects account for all characteristics of the destination market likely to affect the price wedge between intra-firm and arm's length trade.

β_2 and β_3 are our coefficients of interest. The coefficient β_2 captures transfer mispricing for exports to lower-tax countries and is expected to be negative. β_3 captures the opposite case – exports towards higher-tax countries – and is expected to be small or close to zero, given that France ranks among the highest-tax countries (first to second among OECD countries over the period).

We restrict the sample to trade by affiliates and parents of multinationals because independent firms are a poor control group for multinational firms, which are on average larger, more productive and more export oriented than other firms. Since we aim at quantifying aggregate impacts of profit shifting through transfer prices, we estimate Equation 1 using weighted OLS. Standard errors are clustered at the country-year level.

3.2 Data

We use detailed (administrative) firm-level trade data from French Customs matched with information on ownership of firms from Orbis and LiFi (see Appendix A for more details). The trade dataset produced by French Customs (*Direction Générale des Douanes et des Droits Indirects*, DGDDI) provides information on export and import flows by destination at the 8-digit Combined Nomenclature (CN8) level for all firms located on the French territory.[8] For each flow, we have information on the annual value and quantities, which allows us to compute unit values at the detailed product level. Quantities

[8]Reporting thresholds differ for intra and extra EU origin / destination (see Bergounhon et al. (2018)).

are reported in kilograms, but some products have additional measures of quantities (pairs, dozens, etc.) that we use when available.

3.3 Empirical results

Results are reported in Table 2. Column (1) does not distinguish between positive and negative tax differentials and finds a semi-elasticity of 0.24, meaning that a 10 percentage point lower tax rate at destination relative to France reduces export prices in intra-firm trade compared to arm's length trade of similar products by 2.4%. Distinguishing positive and negative tax differentials, column (2) shows that transfer mispricing occurs only to destination countries with lower corporate tax rates than France, with a semi-elasticity of 0.32.

Column (3) shows that the results hold when excluding tax havens from the sample, confirming that transfer mispricing is not specific to tax havens. Column (4) introduces an interaction term between the intra-firm indicator variable, $Intra_{ij}$ and a tax haven dummy for the country of destination and finds no transfer-pricing specificity in export to tax havens compared to other countries.

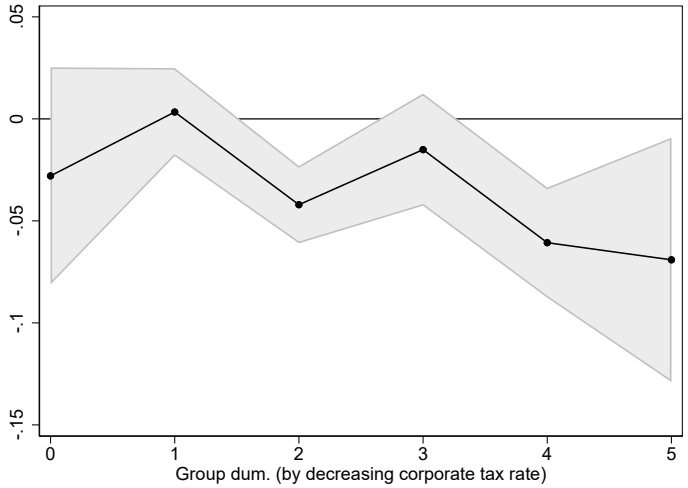
In column (5), we additionally control for log GDP per capita interacted, that may affect differently the pricing behavior in intra-firm and arm's length trade. Its interaction with the intra-firm indicator variable shows a positive coefficient in line with Davies et al. (2018). Our baseline results remain similar in this specification.

Finally, we introduce tax differentials non-linearly using 6 groups: a group of negative tax differentials (i.e., destination countries with higher tax rates than France)[9] and 5 groups by quintile of positive tax differential. The results reported in Figure 1 show that transfer prices are significantly lower than arm's length prices for similar products vis-à-vis countries with lower corporate tax rate (starting from quintile 2) and the price wedge is increasing for countries with large tax differentials (quintiles 4 and 5).

Appendix Table 20 provides results differentiating French and foreign multinationals, defined by ultimate-owner location (column (2)). We add interaction terms between an indicator variable equal to one for French MNEs and the intra-firm indicator variable and its interactions with positive and negative tax differentials. The results show no differentiated behaviors in terms of transfer pricing for French MNEs: while intra-firm

[9]Note that given the high level of corporate tax rate in France compared to OECD countries, most French exports are to lower-tax countries.

Figure 1: Transfer mispricing on trade in goods by quintile



Note: by quintile of statutory tax differential (1 = lowest, i.e higher statutory tax rates). Group 0 stands for negative tax differentials (i.e., countries with higher tax rates than France). Coefficients are reported in column (1) of Table 20.

French prices are larger on average, the interaction term with the positive tax differential is close to zero and insignificant. Regarding negative tax differentials, note that the sum of the coefficients on $Intra_{ij} \times TaxPos_{jt}$ and its interaction with the French dummy is not statistically different from zero. Our results therefore do not support the existence of differences in transfer pricing between French and foreign MNEs.

3.4 Quantification

The quantification uses the estimates from column (2) in Table 2 for both exports and imports. It assumes that quantities traded are held fixed and only import and export prices respond to changes in tax differentials. We compute shifted profits from the difference in predicted exports with and without tax differentials. The concentration of firm-level imports on a single source for a given product prevents estimating Equation 1, whose identification requires observing a firm trading the same product with multiple countries, on import flows. We therefore use the coefficient estimated on exports and apply them to observed import flows by firm/product/destination/mode.

Results are reported in Table 3. It shows that transfer mispricing reduces the value of total exports by 2.3% in 2018 and increases the value of total imports by 2.2%. Taken together, these quantifications suggest that €10 billion of profits are shifted out of France to lower-tax countries through transfer mispricing on trade in goods.

Table 2: Transfer mispricing on trade in goods

	(1)	(2)	(3)	(4)	(5)
Intra-firm	-0.010	-0.001	0.008	-0.035***	-0.229**
	(0.010)	(0.011)	(0.012)	(0.007)	(0.097)
Intra-firm × tax rate diff. < 0		-0.052	-0.010		-0.023
		(0.263)	(0.271)		(0.269)
Intra-firm × tax rate diff. > 0		-0.316***	-0.392***		-0.299***
		(0.099)	(0.116)		(0.094)
Intra-firm × tax rate diff.	0.242***				
	(0.086)				
Intra-firm × TH dum.				0.010	
				(0.016)	
Intra-firm × log GDP per capita					0.021**
					(0.009)
Intra-firm × EU dummy					0.024
					(0.017)
Sample	All	All	No tax havens	All	All
Observations	5,519,952	5,519,952	4,827,063	5,519,952	5,454,889
R-squared	0.997	0.997	0.997	0.997	0.997
FE Country*Product*Year	Yes	Yes	Yes	Yes	Yes
FE Firm*Product*Year	Yes	Yes	Yes	Yes	Yes

Note: Standard errors clustered for intra-group correlation at the country-year level in parentheses, with significance levels indicated with * for 10%, ** for 5%, *** for 1%.

Table 3: Quantification: trade in goods

	Exports		Imports		Total
	value billion €	% of exports	value billion €	% of imports	value billion €
2018	-4.8	-2.3%	5.6	2.2%	-10.3

Note: Quantification based on column (2) in Table 2.

4 Trade in services with tax havens

We now turn to trade in services to identify and measure the amount of profit shifted through the location of intangibles in tax havens and their associated cross-border transactions with affiliates. We assess at the firm-level the extent to which intra-firm imports from tax havens, relative to arm's length trade, are disproportionately large in comparison to imports from other countries. Two differences stand out compared to trade in goods. First, trade in services does not entail transport costs as the actual transport of goods does. Profit shifting through the location of intangibles in tax havens and charging affiliates for their services may therefore generate flows with no real substance or fictitious flows. Second, we cannot use unit values as a proxy of the unit price because services are by their very nature uncountable so that meaningful quantities cannot be collected. Following Hebous and Johannesen (2021), our empirical strategy therefore focuses on the propensity of French firms to import services from affiliates located in tax havens, compared to trade with non-related parties, and identifies which categories of service are 'at risk' of tax avoidance. Equipped with those firm-level estimations, we then quantify the aggregate profit shifted through trade in services.[10]

4.1 Methodology

We apply the framework developed by Hebous and Johannesen (2021) and estimate the following equation for a firm i importing from country j in year t:

$$T_{ijt} = \beta_0 + \beta_1 Intra_{ijt} + \beta_2 Intra_{ijt} \times TH_j + \gamma GDP_{jt} + \theta_i + \theta_j + \theta_t + \epsilon_{ijt} \ , \qquad (2)$$

where T_{ijt} is an indicator variable measuring either export or imports of services of firm i to/from country j. $Intra_{ijt}$ is a dummy variable indicating intra-firm trade at the firm-destination level. TH_j is a tax haven dummy. θ_i are fixed effects by firm, controlling for any firm specific determinants of trade, such as productivity. θ_j are fixed effects by partner country j that account for basic gravity-type determinants of trade (distance, common language, regional trade agreement membership). And θ_t are year fixed effects. We additionally control for the GDP of the partner country j.

[10] We focus here on the standard form of profit shifting investigated in the literature involving intra-firm trade in services. Other business organizations, such as those that avoid permanent establishment status but sell services directly to firms or individuals in France from a subsidiary located in a tax haven, would not enter our estimates. We come back to this issue in section 7.

Our empirical strategy compares intra-firm trade and arm's length trade with tax havens and other countries, respectively, to identify tax-induced trade in services. We control for the average propensity to trade intra-firm (via $Intra_{ijt}$) as well as the average propensity to trade with tax havens (through country fixed effects), and focus on the interaction between $Intra_{ijt}$ and TH_j. In case of profit shifting through the location of intangibles in tax havens, we expect a larger propensity to import intra-firm from affiliates located in tax haven countries, hence positive β_2.

We estimate Equation 2 separately for each category of services to identify 'at risk' services used in profit shifting schemes.

4.2 Data

We use micro-data from a survey conducted by Banque de France (*Enquête Complémentaire sur les Échanges Internationaux de Services*, ECEIS). The survey includes all '*Déclarants directs généraux*' (DDG) defined as firms exporting or importing more than €30 million in a given year in a broad service category. When crossing this threshold, firms are required to report all their export and import flows of services with no minimum threshold of declaration. The data cover 2013–2018.[11]

We merge information on service trade flows with information on trade-credit provided by a dedicated survey, *Enquête sur l'état des créances et des dettes FInancières vis-à-vis des non-résidents* (EFI). This survey reports all trade credit stocks at the quarterly level for firms included in the DDG, distinguishing between related party and arm's length counterparties. Almost all trade transactions generate trade-finance operations between importers and exporters, either through open account, cash in advance or letter of credit.[12] In the case of intra-firm trade, open account transactions are more likely and should appear in the EFI survey as trade receivables and payables vis-à-vis related parties. We therefore use instances of trade credit with related parties in a given country a given year as our indicator of intra-firm trade.

Table 4 reports descriptive statistics on trade in services, distinguishing tax havens from other destination countries and intra-firm from arm's length trade. We consider 7

[11] Note that imports and exports of services by individuals are not included in trade in services data. Any tax avoidance scheme involving direct cross-border payments for services by consumers is therefore not included in our estimates (we come back to this issue in Section 7).

[12] Antràs and Foley (2015) documents that the most common financing terms are cash in advance and open account, letter of credit accounting for 10% of transactions.

categories of services: Intellectual property, R&D and IT, Information and Communication, Technical services, Other business services (including headquarter services), Financial services and Transport services. Total imports of services in our sample amount to €58 billion. Tax havens account for a disproportionately large share of French imports of services relative to their economic size: on average they account for 17% of imports, ranging from 14% in transport to 24% in information and telecommunication. Nearly two-thirds of these imports are with a related party according to our measure of intra-firm trade, and particularly in R&D and IT services (82%), Other business services (81%) and Intellectual property services (71%).

4.3 Empirical results

The results of the estimation of Equation 2, reported in Table 5, show an excess propensity to import intra-firm from tax havens in four of the seven service categories analyzed, namely Intellectual Property, Information and Communication, Financial services and Other business services. Our results therefore yield support for a number of service flows serving tax avoidance schemes. Note that the set of 'at risk' services identified on French data is similar to that identified by Hebous and Johannesen (2021) on German data, except for transport services for which they find significant excess imports in maritime and road transport services.

The generous tax credit on R&D spending in France ('Crédit d'Impôt Recherche', CIR) may explain the limited incentive for French firms to locate their research activities abroad and import R&D services. Under the CIR, French firms are entitled to a 30% tax credit on their R&D spending, up to €100 million (at the firm-level), and 5% above. In 2020, France had the second-most generous tax support for business R&D as a share of GDP across OECD countries.[13]

Comparing the coefficients on $Intra_{ijt} \times TH_j$ to those on $Intra_{ijt}$ shows a significant excess propensity to import intra-firm from tax havens. The implied excess import ranges from 17% of the baseline in Other business services to 50% in Intellectual Property, 75% in Information and Communication, and 173% in Financial services.

We do not find similar results for exports (see Table 17 in Appendix B), except for

[13]OECD R&D Tax Incentives database, April 2023. France also offers a patent box regime that provides a lower 15% corporate tax rate on income from IP assets (for firms conducting R&D activities in France), instead of the 33.3% statutory tax rate prevailing in 2018.

Table 4: Import of services by category and origin (2018)

		Intellectual property	R&D and IT	Information Communication	Technical services	Other business services	Financial services	Transport
Tax Havens	Total	1 212	2 012	646	2 270	822	697	2 397
Tax Havens	of which intragroup	863	1 629	343	1 205	666	561	1 249
Tax Havens	of which with third party	349	383	302	1 065	156	136	1 148
Others	Total	4 836	8 178	2 147	11 889	3 110	2 883	14 838
Others	of which intragroup	4 353	7 342	1 502	8 651	2 403	2 612	5 419
Others	of which with third party	483	835	645	3 238	707	272	9 418
Total (sample)		6 048	10 190	2 793	14 160	3 932	3 580	17 234
Total (BoP)		12 142	27 629	7 255	43 262	15 897	6 376	45 743

Table 5: Regression results on imports of services

	IP	R&D and IT	Info. & Com.	Technical Serv.	Other business	Financial Serv.	Transport
Intragroup	0.064***	0.163***	0.036***	0.233***	0.206***	0.049***	0.185***
	(0.014)	(0.017)	(0.011)	(0.022)	(0.019)	(0.015)	(0.023)
Intragroup × TH	0.032*	0.018	0.027**	−0.029**	0.035*	0.085***	0.012
	(0.018)	(0.016)	(0.012)	(0.014)	(0.018)	(0.021)	(0.019)
GDP	−0.002	0.002	0.003	0.003	0.003	0.004*	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Num.Obs.	177 406	317 001	191 080	464 329	297 888	149 548	319 288
R2	0.204	0.303	0.315	0.321	0.283	0.378	0.322
FE country	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE time	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note : Standard errors clustered for intra-group correlation at the firm level in parentheses, with significance levels indicated with * for 10%, ** for 5%, *** for 1%.

financial services, for which we find a positive and significant coefficient but of lower magnitude than for imports. The absence of significant excess exports of services to affiliates in tax havens supports the profit shifting interpretation of excess imports from affiliates in tax havens.

Table 21 in Appendix C underlines that French and foreign MNEs differ in the service categories through which they appear to shift profits. French MNEs exhibit a significant excess propensity to import from tax haven affiliates only in Other business services and in Financial services. By contrast, for foreign MNEs the interaction between intra-firm trade and the tax-haven indicator is positive in Intellectual property, Information and communication services, and Transport services.

4.4 Quantification

The quantification of the aggregate impact of profit shifting through trade in services draws on the at-risk services identified in Table 5. We take an upper bound and consider all intra-firm imports in at-risk-services from tax havens as profit shifting. Since our firm-level dataset covers 40% of total French imports in these service categories (Table 4), we also compute an out-of-sample prediction by adjusting each service import flow by the share of the survey sample in total French imports. Since the survey covers the largest service traders, multinational firms are more likely to be included; as a result, profit shifting is likely over-represented in our firm-level sample relative to total French imports, and we therefore consider this an upper bound. The results are reported in Table 6.

On our sample, profit shifted through imports of services from tax haven affiliates is estimated at €2.4 billion. This quantification underlines that only up to a limited share of imports of services from tax havens (24%) can be attributed to profit shifting. Finally, when applying the out-of-sample adjustment, we find that profit shifting through intra-firm trade in services is estimated to up to €6.3 billion.

Table 6: Quantification: total at risk service imports from tax havens

	(1)	(2)	(3)
Sample:	In-sample:	DDG	Total
	% of trade	billion €	billion €
2018	4.1%	2.4	6.3

Note: Out-of-sample adjustment based on the sample by service category (as reported in last rows of Table 4). At risk services include all intra-firm imports from tax havens identified in Table 5.

5 Debt shifting

The third main instrument of profit shifting is debt shifting and the associated interest payments to related party. Since interest is generally tax-deductible, the strategic location of intra-firm debt may therefore be used to reduce the tax load at the MNE level.[14] We focus in this section on intra-firm loans within MNEs and compare the debt position of French affiliates with respect to affiliates located in tax havens. We then use interest rates to convert excess debt position to related parties in tax haven into shifted profit.

5.1 Methodology

Our identification strategy exploits the bilateral dimension of debt positions between affiliates within MNEs to identify excess borrowing from affiliates located in tax havens.[15] More specifically, we follow Reiter et al. (2021) and estimate the following equation for any MNE affiliate i and foreign country j in year t:

[14]Thin-capitalization rules cap the amount of debt for which the interest remains tax deductible. France was an early adopter of thin-capitalization rule in 1979 (Blouin et al., 2014). In many countries including France these constraints are not applied to banks or are relaxed. Even where they apply, thin-capitalization rules (and interest-limitation regimes such as the EU Anti-Tax Avoidance Directive (Council Directive (EU) 2016/1164)) focus on net interest, so they are often not binding for banks, whose business model generates high interest income (Reiter et al., 2021; Garlanda-Longueville et al., 2025).

[15]Following Huizinga et al. (2008), several papers rely on affiliate-level data that do not feature the bilateral dimension of debt shifting. Overesch and Wamser (2014), Egger et al. (2014) and Reiter et al. (2021) exploit the bilateral information on internal debt of the German data.

$$\frac{IntNetDebt_{ijt}}{TA_{it}} = \beta_0 + \beta_1 TH_j + \beta_2 X_{jt} + \theta_i + \theta_t + \epsilon_{ijt}. \quad (3)$$

TH_j is a tax haven dummy for counterparty affiliates located in a tax haven. We alternatively use the corporate tax rate of country j as a measure of the tax incentives to shift profits to country j. X_{jt} are a set of country-specific and bilateral determinants of cross-border borrowing, including domestic credit as a share of GDP, as a proxy for the development of the credit market in country j, and an indicator of rule-of-law measuring the quality of domestic institutions. (Log) GDP and (log) distance are standard gravity variables which have been shown to affect international banking finance (Brei and von Peter, 2018). Year fixed effects, θ_t, control for all common national and international shocks affecting economic and borrowing conditions. Finally, firm fixed effects, θ_i, control for all firm and group characteristics.

The internal debt position is measured as intra-firm liabilities net of intra-firm claims borrowed by affiliate i from related affiliates in country j, to take into account the role of conduit entities within MNEs that solely pass-through intra-firm debt between affiliates located in different countries (Reiter et al., 2021). When internal net claims are larger than internal net liabilities, no profit can be shifted for a given interest rate so that we define internal net debt as: $IntNetDebt_{ijt} = max(InternalLiabilities_{ijt} - InternalClaims_{ijt}; 0)$. Bilateral net debt is divided by total assets to account for firm size.

We therefore compare bilateral internal net borrowing from affiliates in tax havens to internal net orrowing from affiliates located in other countries for a given French affiliate i. In case of profit shifting to low-tax affiliates through debt shifting, we expect a positive estimate of β_1, i.e., excess borrowing from tax-haven affiliates. Given structural differences in the role of debt in the banking sector and the rest of the economy, we estimate Equation 3 separately for non-financial corporations and banks. Standard errors are clustered at the firm-level.

5.2 Data

We use two distinct data sources collected by Banque de France to investigate debt shifting: one for non-financial corporations and another for credit institutions and investment

firms, which we will refer to as banks for convenience.

For banks, we use microdata constructed from the Devi-Situ and Situation collections in a format consistent with the Locational Banking Statistics (LBS) of the Bank for International Settlements (BIS). For each bank in our sample, we can track its domestic and cross-border lending and borrowing activities on a quarterly basis.[16] The dataset reports outstanding debt stocks and provides information on the counterparties' countries in cross-border activities. For bank-to-bank cross-border lending and borrowing, we can distinguish intra-firm activities from arm's length activities.[17] Accordingly, our banking analysis restricts to cross-border bank-to-bank positions for which the intra-firm flag is observed. We focus on intra-firm information and use data at the bank×country level for the period 2014-2018.

For non-financial corporations, we use data from the EFI survey, which reports financial positions with foreign counterparties. The structure and composition of the EFI data are similar to the banking data, with two key differences. First, EFI applies a reporting threshold, and includes all firms with total foreign positions – both assets and liabilities combined – exceeding €10 million. Second, EFI data combine quarterly reports from large firms (*Déclarants Direct Généraux*) and annual reports from smaller firms obtained through surveys. However, the annual survey design provides limited information on counterparty countries - firms report only their top three counterparties - and is insufficiently detailed for our identification strategy. We therefore disregard the survey-based component; our final dataset includes 84% to 91% of the total foreign financial positions recorded in the EFI database.

For non-financial firms, we additionnally use information on total assets from the FARE database produced by INSEE and the French Ministry of Finance (DGFiP) that provides financial information from tax reports. This information is not available for banks; we use as proxy for total assets the sum of their outstanding loans,[18] as recorded in the LBS.

[16]The data exclude securities and derivative activities; we discuss this in greater detail in Section 7.

[17]This information is not available for non-banking counterparties

[18]This proxy creates a small number of outliers when small institutions report low assets. To avoid such outliers, we retain ratios below 100%.

5.3 Empirical results

Results are reported in Table 7. Columns (1)-(3) report results for non-financial corporations and columns (4)-(6) for banks. Our results show significant debt shifting to affiliates located in tax havens for both sectors of the economy.

Comparing alternative measures of incentives to shift profit, only the tax haven dummy is significant and positive as expected (column (1)) while the tax differential is not significant (column (2)). This suggests that debt shifting occurs mainly to tax havens and not other lower-tax countries. We then differentiate large European tax havens (Ireland, Luxembourg and Switzerland) and other tax havens, and find only the coefficient on European tax havens to be significant for non-financial corporations (column (3)).

Results for banks show similarly significant debt shifting to tax havens (column (4)).[19] While the coefficient on European tax havens is larger than for other tax havens, we still find significant debt shifting to other tax havens in contrast to non-financial corporations.

The semi-elasticity on the tax haven dummy estimated in column (1) of Table 7 for non-financial corporations implies that intra-firm net debt is 0.002 percentage points higher vis-à-vis subsidiaries located in tax havens than those located in other countries. Given the mean net debt ratio of 0.004, it corresponds to a 50% higher intra-firm net debt with tax haven subsidiaries. For banks, the corresponding effect is 0.67 percentage points (column 4 of Table 7), with a mean net-debt ratio of 0.57 pp, corresponding to a 117% increase.

In Appendix Section B, we provide robustness analysis using the intra-firm liabilities instead of intra-firm net liabilities as the dependent variable (columns (1)-(6) of Table 18). For banks, we additionally include bank×year fixed effects to control for all time-varying characteristics of bank i, and in particular total assets that we cannot control as we do for non-financial corporations (columns (7)-(9) of Table 18). Our results remain qualitatively and quantitatively similar, except for the coefficient on corporate tax rate for banks, which is no longer significant when including bank×year fixed effects.

We also test for different behavior by French and foreign MNEs regarding their use of debt shifting. Results are provided in Table 22 in Appendix Section C. We

[19] Note that the significant coefficient on tax differential in column (5) is no longer significant when controlling for bank×year fixed effects; see below and Table 18 .

Table 7: Regression results on debt shifting

	(1)	(2)	(3)	(4)	(5)	(6)
Corporate Tax Rate		0.000			0.011***	
		(0.000)			(0.003)	
TH dummy	0.002**		0.000	0.671***		0.535***
	(0.001)		(0.000)	(0.105)		(0.091)
TH Europe			0.004**			0.505**
			(0.002)			(0.238)
Domestic credit	0.000	0.000	0.000	0.000	0.002***	0.000
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
Rule of Law	0.001***	0.001***	0.001***	0.057***	0.119***	0.053***
	(0.000)	(0.000)	(0.000)	(0.020)	(0.028)	(0.019)
Log GDP	0.000	0.000**	0.000	0.213***	0.133***	0.204***
	(0.000)	(0.000)	(0.000)	(0.033)	(0.022)	(0.032)
Log distance	0.000	0.000	0.000	−0.564***	−0.558***	−0.531***
	(0.000)	(0.000)	(0.000)	(0.077)	(0.077)	(0.075)
Num.Obs.	144 504	144 504	144 504	258 636	258 636	258 636
R2	0.914	0.914	0.914	0.153	0.151	0.153
FE time	Yes	Yes	Yes	Yes	Yes	Yes
FE firm/bank	Yes	Yes	Yes	Yes	Yes	Yes
Clustered Errors	Firm	Firm	Firm	Bank	Bank	Bank

Note : Standard errors clustered for intra-group correlation at the firm level in parentheses, with significance levels indicated with * for 10%, ** for 5%, *** for 1%.

find in particular that, unlike foreign non-financial corporations, French non-financial corporations do not use the location of intra-firm debt in tax haven as an instrument of profit shifting. The tax haven coefficient is however positive and significant for both French and foreign banks, the latter using more intensively the large European tax havens as debt location (column (4)).

5.4 Quantification

The quantification of profit shifted through debt shifting follows two steps. First, we quantify excess intra-firm debt stocks in tax haven from specifications (1) and (4) of Table 7 for non-financial corporations and banks, respectively. Second, we convert excess intra-firm debt stocks into interest payments to assess their impact on profits declared by French affiliates. We use as interest rates the average effective rate on new cash loans granted to NFCs (Banque de France) and the average interbank rate for banks.

The results reported in Table 8 show a limited amount of profit shifted to tax havens by non-financial corporations due to both modest estimated excess debt and low interest rates. For banks, our quantification shows estimated profit shifted at €1.4 billion in line with the larger estimated excess intra-firm debt in tax havens. Our estimate of excess intra-group debt in tax havens for banks is consistent with Garlanda-Longueville et al. (2025), whose scope spans international banks worldwide.

Table 8: Debt shifting: quantification

	Non financial corporations			Financial corporations		
	Excess debt in tax havens (billion €)	Interest rate %	Profit shifted (billion €)	Excess debt in tax havens (billion €)	Interest rate %	Profit shifted (billion €)
2018	11.1	1.7	0.2	114.9	1.2	1.4

Note: Quantification based on columns (1) and (4) in Table 7.

6 FDI income: estimated profit shifted based on indirect evidence

This section estimates the total amount of profits shifted out of France using indirect evidence from the location of profits of MNEs located in France and their affiliates to benchmark our direct estimates from channels of profit shifting to total profit shifted.

6.1 Methodology

We follow Vicard (2023) and estimate how the return on assets of affiliates within an MNE varies systematically with the corporate tax rate of their host country. In a global capital market equilibrium, returns on assets across affiliates of a given multinational company are expected to be equalized since the multinational arbitrages across different FDI locations based on their expected after-tax return. In this framework, systematic higher after-tax return on FDI in affiliates located in low tax countries can be interpreted as evidence of profit shifting. Total profit shifted can then be recovered from micro-data on FDI yields and stocks for MNE's parents and affilates located in France.

More specifically, we estimate the following equation for parent j holding affiliates in country i in year t:

$$i_{ijt} = \beta_0 + \beta_1 TaxDiff_{it} + FE_{jt} + \epsilon_{ijt}. \tag{4}$$

i_{ijt} is the yield of affiliates located in country i held by parent j. It is computed as the ratio of FDI income from affiliates located in country i in year t (which includes both dividends and reinvested earnings) to the stock of FDI in year $t-1$.

$TaxDiff_{it}$ is the difference between the corporate tax rate in France and in country i. Alternatively, tax incentives to locate profits in affiliates located in i are measured using a variable equal to one when country i is a tax haven (TH_i). FE_{jt} are fixed effects in the parent×year dimension that control for the average level of profitability at the multinational firm-level (productivity, mark-up, intangible assets, etc.). Standard errors are clustered at the country level.

Tax-motivated profit shifting would generate deviations in after-tax yields related to tax differentials between France and the country where subsidiaries are located, while arbitrage opportunities in international investments equalize after-tax yields on investments across locations for a given MNE. We expect $\beta_1 > 0$ in the case of profit shifting by parent firms located in France.

6.2 Data

Data are from confidential firm-level data on FDI stocks and FDI income from foreign affiliates compiled by Banque de France for the balance of payment statistics. The dataset

used merges information from three sources: the survey of direct investment abroad, which collects information on resident multinational firms and their investments abroad, the FIBEN database (*FIchier Bancaire des ENtreprises*) and balance-sheet data from ESANE provided by INSEE, the French statistical institute. Data are supplemented by information from the ACPR on the banking sector. The dataset includes information on foreign affiliates directly held by the parent company located in France. Information on affiliates indirectly held through other foreign affiliates is not reported but the chain of direct investment relationships shall appear in FDI flows and stocks of the first affiliate.

The dataset includes detailed information on a yearly basis on the stock of FDI assets and liabilities and the associated flows of FDI income at the parent-affiliate level for all parents or affiliates resident in France. Information is aggregated at the parent-country-year level because no identifier enables matching stock and income flow data of affiliates from the same parent located in the same country. We use data for the period 2012-2018. Under the balance-of-payment definition, FDI income is after-tax and includes both dividends distributed to the parent company and reinvested earnings, defined as undistributed after-tax operating income of the foreign subsidiaries and equity interests attributable to the parent company (i.e., proportional to the parent ownership share).

6.3 Empirical results

Table 9 reports the results from estimating Equation 4. It shows a positive and significant coefficient on the tax differential. A 1 percentage point larger tax differential is associated with a 0.27 pp (column (1)) increase in the return on FDI for affiliates located in that country. Results in columns (2) and (3) do not show any additional impact of tax haven status above and beyond tax differentials. The rest of Table 9 confirms that the positive and significant coefficient on tax differential is robust to controlling for gravity determinants (column (4)), country fixed effects (column (5)) and country risk (column (6)).

Figure 2 additionally allows for nonlinear effect of taxes on FDI returns. It presents tax differential depending on the decile of statutory corporate tax rate. Return on assets increases when affiliates are located in countries in bins with lower corporate tax rate (right of the horizontal axis). The 95% confidence interval includes 0 up to the fifth decile, suggesting that multinationals shift profits to countries with sufficiently large

Table 9: Tax differential and return on FDI

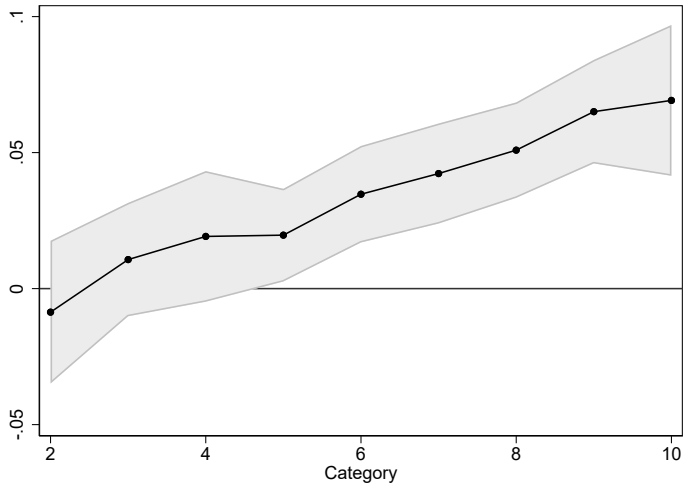
	(1)	(2)	(3)	(4)	(5)	(6)
Tax rate diff.	0.27^a	0.27^a	0.25^a	0.24^a	0.24^c	0.25^c
	(0.04)	(0.04)	(0.04)	(0.06)	(0.13)	(0.13)
Tax haven dummy		0.03	0.01	0.00		
		(0.02)	(0.01)	(0.01)		
Tax rate diff. × Tax haven dum.		-0.13				
		(0.09)				
(log) distance				-0.02^b		
				(0.01)		
Contiguity dummy				-0.01		
				(0.01)		
Common language dummy				0.01		
				(0.01)		
Time difference dummy				0.00		
				(0.00)		
EU dummy				-0.02^c		
				(0.01)		
RTA dummy				-0.01		
				(0.01)		
(log) country risk						0.01
						(0.02)
Observations	24,718	24,718	24,718	17,161	24,709	24,550
R-squared	0.31	0.31	0.31	0.31	0.33	0.33
FE MNE × year	Yes	Yes	Yes	Yes	Yes	Yes
FE country	-	-	-	-	Yes	Yes

Note: Standard errors clustered for intra-group correlation at the country level in parentheses, with significance levels indicated with ^{c} for 10%, ^{b} for 5%, ^{a} for 1%.

differentials only. FDI returns then increase by up to 6 percentage points for affiliates located in the lowest-tax decile.

Finally, columns (2) and (3) in Table 19 in Appendix C differentiate French and foreign MNEs and find no significant differences in the geography of their FDI returns.

Figure 2: Tax differential and return on FDI: by decile of statutory tax rate



Note: by decile of tax differential relative to France (1 = lowest, i.e, larger statutory tax rates). Coefficients reported in column (4) of Appendix C Table 19.

6.4 Quantification

Total missing profits in France are quantified using the results from column (1) in Table 9. We compute the aggregate FDI income with and without profit shifting by predicting FDI yieds from Equation 4 with and without tax differential and multiplying by the observed FDI stock in $t-1$. The difference in aggregate flows from the two predictions gives the amount of missing after-tax profits in France due to profit shifting. To obtain missing before-tax profits, we need to add corporate taxes paid abroad on those profits (and not paid in France on the liability side). Missing (before-tax) profits are an indirect estimation of profit shifting that can be compared to direct evidence on specific instruments.

Table 10 reports the results separately for the asset and liability sides. For 2018, total missing profit amounts to €40.6 billion. Consistent with France's positive net FDI asset position, the majority of estimated shifted profits arises on the asset side, i.e., foreign subsidiaries of French parents located in lower tax countries. Table 10

Table 10: Profit shifting and missing profits in France (€ billion)

	Missing profits		
	Assets	Liabilities	Total
Benchmark	26.0	-14.6	40.6
Fixed effects	22.8	-12.8	35.5
Non linear	31.5	-17.5	49.0

Note: Quantification based on column (1) in Table 9.

also reports estimated missing profits in France using two alternative specifications for quantification. Using the country fixed-effects specification of column (5) in Table 9 yields lower estimated missing profits at €35 billion. Using the nonlinear specification in column (4) of Appendix C Table 19 yields estimated missing profits of €49 billion.

Our €35-49 billion estimation range for missing profits in France in 2018 is close to macro based estimates. Torslov et al. (2023) estimate missing profits worldwide and their distribution by country using national accounts for tax havens. For France, they find missing profits of €41 billion in 2018 (Torslov et al., 2021), in line with our firm-level-based estimates in Table 10.

7 Discussion and limitations: blind spots

The direct estimates of profit shifting for the three channels are significant (€17.9 billion in total or 0.7% of French GDP). As such, they challenge the conclusion of limited estimated profit shifted based on direct evidence. Transfer mispricing in goods trade (€10 billion) is the dominant channel, followed by services (€6.3 billion) and debt (€1.6 billion). These three channels however account for only half of the indirect estimates from Section 6. This section discusses the sensitivity of these estimates to alternative specifications and explores potential blind spots in the literature likely to close the gap between direct and indirect estimates of profit shifting.

7.1 Alternative quantifications

We present sensitivity analysis of our quantifications along two dimensions: (i) using specifications differentiating French and foreign MNEs when their use of specific instruments diverges; and (ii) using alternative tax havens definition. Empirical results for each instrument are reported in Appendix C and D, and quantification results are shown

in Table 11.

When differentiating French and foreign MNEs in their use of different instruments of profit shifting, we find no difference in their use of transfer pricing in trade in goods (column (2) of Table 20). However, they differ in their use of service imports from tax havens and debt shifting. Table 21 shows that French MNEs have excess intra-firm imports of Other business services and Financial services from tax havens, while foreign MNEs use import transaction on Intellectual property, Information and Communication and Transport. Regarding debt, we find that both French and foreign banks are disproportionately indebted to their tax haven affiliates, but to a larger extent for foreign banks. By contrast, only foreign non-financial corporations are found to use intra-firm debt as an instrument of profit shifting (Table 22).

Table 11 reports the quantification of profits shifted through each instrument based on specifications differentiating French and foreign MNEs. Compared to the baseline estimates (first row), estimates do not change for transfer mispricing but are lower for both imports of services and intra-firm indebtedness to affiliates in tax havens. Total profits shifted are 21% lower in this alternative specification but remain significant at €14 billion or 0.6% of GDP.

Second, we test the sensitivity of our results to the definition of tax havens. We use an alternative list of tax havens proposed by Torslov et al. (2023), including in particular Belgium and the Netherlands which were not listed in Hines (2010). Results are reported in Table 23 and 24 of Appendix D. Transfer mispricing remains driven by tax differential instead of tax haven status when controlling for additional variables as in our main regressions (columns (3)-(5) in Table 20). For trade in services, we find a reduced number of categories "at risk" of profit shifting, namely Intellectual property and Financial services. On the contrary, we find more widespread debt shifting for non-financial corporation and qualitatively similar effect on banks.

Turning to quantifications presented in the third row of Table 11, we find similar amounts for transfer pricing in trade in goods and smaller amounts shifted through imports of services from tax haven affiliates. The estimated amount of profit shifted through the location of intra-firm debt in tax havens is however slightly larger than in the benchmark case but still ranks third behind other channels of profit shifting. Total profits shifted lie between the benchmark case and the case differentiating French and

foreign MNES.

This sensitivity analysis shows that, if anything, alternative quantifications reinforce the dominant role of transfer mispricing in total profit shifted identified through indirect evidence. The total amount of profit shifted is slightly lower in the two sensitivity analyses presented in Table 11, but remains significant overall at €14-15 billion.

Table 11: Alternative quantifications (€ billion)

	Goods	Services		Debt			Total
		In-sample	Total	Banks	NFCs	Total	
Baseline	10.0	2.4	6.3	1.4	0.2	1.6	17.9
French / foreign MNEs	10.0	1.3	3.2	1.0	0.0	1.0	14.2
Alternative TH list	10.0	2.0	3.9	1.5	0.3	1.8	15.7

Note: Quantifications are based on column (1) of Table 2 for trade in goods, Tables 21 and 23 for imports of services respectively, and columns (1) and (3) in Tables 22 and 24 for debt.

7.2 Blind spots

Several blind spots in the literature could help close the gap between direct and indirect estimates of profit shifting. We discuss two of them and provide descriptive evidence showing that they are likely to be quantitatively relevant: households imports of services and other debt instruments not usually included in previous work.[20]

Digital imports of services from tax havens: The digitization of the economy has enabled increasing digital trade, particularly by households, which in not captured in trade in services import statistics collected by central banks nor in trade in goods data collected by customs due to reporting thresholds. Such trade flows may be substantial, and give rise to profit shifting by locating sales in a tax haven or a low-tax country and avoiding the creation of a permanent establishment and taxation by the source-country (Laffitte and Toubal, 2022). By focusing on intra-firm imports of services from tax havens, following Hebous and Johannesen (2021), Section 4 does not cover this channel of profit shifting through digital imports from tax havens.

We use credit card payments to provide an order of magnitude of digital imports for France in 2022, and their potential for profit shifting to tax havens. Data are from

[20]The literature points to other channels of tax avoidance by MNEs, including the use of hybrid financial instruments (Johannesen, 2014; Hardeck and Wittenstein, 2018) and treaty shopping (Van't Riet and Lejour, 2018; Hong, 2021), for which empirical evidence remains scarce.

the PID database compiled by Banque de France from bank reportings, for all origin countries (see Appendix A.2 for more details on the database). The data are broken down by merchant category code (MCC), describing the primary business of the merchant involved in the transaction. They show that services account for nearly three quarter of the value of cross-border digital transactions (Gigout and Lavenant, 2025). The database includes all cross-border transactions made online by French credit cards holders, including professional cards, but the sectoral composition largely corresponds to household consumption. For digital platforms, the recorded payment includes the full amount, not only the platform's commission (e.g., the full flat rental amount later transferred to the owner on a rental platform).

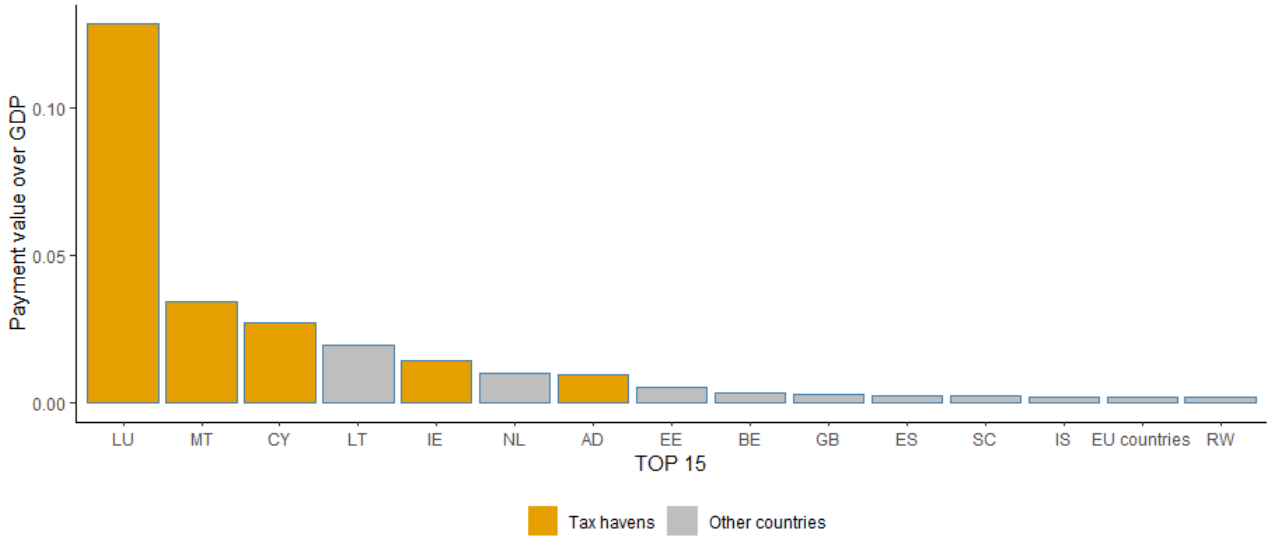
Figure 3 plots total payments by French credit card holders divided by the GDP of the counterparty country for the top 15 recipient countries. It shows that the geography of French digital payments is biased towards tax havens, in particular Luxembourg, Malta, Cyprus and Ireland. Payments to tax havens amount to €20.5 billion, against €36 billion for the rest of the world (of which €9.8 billion to the Netherlands).

For the sake of comparison, we compute a raw measure of 'excess' payments to tax havens, defined as the excess digital payments compared to a 'standard' country as measured by the ratio of the value of digital transactions by French credit card holders divided by GDP. Note that excess payments here correspond to gross turnover, not profits. Excess payments to tax havens amount to €18.9 billion when using as benchmark the average over all countries worldwide excluding tax havens, and €16.1 billion when using the average across EU countries excluding tax havens.

Restricted information on debt: A second source of discrepancy between direct and indirect evidence of profit shifted relates to the scope of analysis on debt shifting. Most of the literature (and the analysis presented in Section 5) focuses on loans of non-financial corporations and within the banking sector. This restricts both the set of counterparties and the asset classes considered. Such a restricted focus largely reflects the availability of information on whether international debt instruments are intra-firm or arm's length.

Table 12 lists the counterparty and asset types missing from our quantifications presented in Section 5 and in the literature in general. It also presents the corresponding liability stocks abroad and in tax havens to gauge the potential magnitude of profit shifting through each debt instrument and counterparty.

Figure 3: The geography of digital imports: top 15 countries of origin



Note: cross-border digital payments by French credit card holders by country of counterparty divided by GDP. Data are from the PID database for year 2022.

Starting with the banking sector, the first row of Table 12 provides the corresponding figures for bank-to-bank loans investigated in Section 5 for comparison. Loans by banks to non-bank counterparties (row 2) are also large and the stock borrowed from tax havens is of similar magnitude as bank-to-bank loans (€131 billon vs. €166 billion). For these transactions, we can recover information to allocate liabilities to intra-firm and arm's length stocks from the Devi-Situ database (used in Section 5) but only from 2023 onward, i.e., outside of our study period. We report in the last column of Table 12 the share of intra-firm liabilities from banks to non-banks in tax havens, computed using the corresponding share of intra-firm loan stocks in 2022. It shows a larger share of intra-firm liabilities in tax havens for bank loans to non-banks (81%) than to banks (72%).

Debt securities are also an important financing vehicle for banks, including intra-firm issuances, which can be used to shift profits to low-tax countries (Cagala and Wabitsch, 2023). The stock of debt-securities liabilities with respect to tax havens stands at €139 billion for banks, an amount similar to bank-to-bank loans, which represents 23% of the total debt securities liabilities of French banks. The intra-firm or arm's length nature of debt securities is however not available. Including additional counterparties and asset classes could therefore more than double the estimated profit shifted by banks through debt shifting compared to Section 5.

For non-financial corporations, estimated profit shifted through debt in Section 5 is

limited despite a large share of intra-firm loans from affiliates in tax havens (row 4). Debt securities, however, appear as an important financing tool for them: outstanding debt securities liabilities are larger than their total loans (€ 573 vs. € 304 billion), but the French data do not provide information on their nature or counterparty countries.

Finally, non-bank financial corporations (row 6) also issue large amounts of debt securities that could increase estimated profit shifted through the location of intra-firm debt in tax havens.

Table 12: Blind spots: debt assets

	Counterparty	**Instrument**	**Liabilities**		
			Total	**TH**	**TH Intra-group**
			€ billion		
Banks	Banks	loans	786	166	72%
Banks	Non banks	loans	456	131	81%*
Banks	All	debt securities	612	139	-
NFC	All	loans	304	86	91%
NFC	All	debt securities	573	-	-
Non-bank financial	All	debt securities	259	-	-

* allocation based on 2023 data featuring intra-group and arm's length information.
Source: Devi-Situ database.

8 Conclusion

This paper addressed three questions: (i) the relative importance of the main profit-shifting channels, (ii) whether direct micro-level estimates align with indirect evidence, and (iii) the potential blind spots in the literature.

We find econometric evidence in favor of all three instruments of profit shifting using micro-data on cross-border transactions for France. Quantitatively, transfer mispricing in trade in goods with related parties emerges as the dominant channel of profit shifting in the case of France in 2018, followed by imports of services from tax havens and debt shifting.

Quantifications based on direct evidence from micro-data yield a significant amount of profit shifted but fall short of estimated profit shifted from indirect evidence based on MNE profits. We identify two blind spots of the literature – digital imports from tax havens and other debt instruments and counterparties not considered in the literature

– that are likely to broaden the coverage of profit shifting and could partly bridge the gap between direct and indirect estimates.

Our work underlines the importance of providing a broad assessment of profit shifting. While the instruments investigated in the literature already provide evidence of sizeable amounts of tax avoidance by MNEs, other types of cross-border transactions may also contribute significantly. We provide descriptive evidence for some transactions likely to serve profit shifting, but leave the study of these alternative channels for future work. Our results also underline the importance of comparing results across countries: different tax systems and economic structures may give rise to different channels of profit shifting in different countries.

References

Altshuler, R. and Grubert, H. (2003). Repatriation taxes, repatriation strategies and multinational financial policy. *Journal of Public Economics*, 87(1):73–107.

Antràs, P. and Foley, C. F. (2015). Poultry in motion: A study of international trade finance practices. *Journal of Political Economy*, 123(4):809–852. From November 2011.

Beer, S., de Mooij, R., and Liu, L. (2020). International corporate tax avoidance: A review of the channels, magnitudes, and blind spots. *Journal of Economic Surveys*, 34(3):660–688.

Bergounhon, F., Lenoir, C., and Mejean, I. (2018). A guideline to French firm-level trade data. Technical report.

Bernard, A. B. and Jensen, J. B. (2004). Entry, expansion, and intensity in the US export boom, 1987-1992. *Review of International Economics*, 12(4):662–675.

Bilicka, K. A. (2019). Comparing UK Tax Returns of Foreign Multinationals to Matched Domestic Firms. *American Economic Review*, 109(8):2921–2953.

Blouin, J., Huizinga, H., Laeven, L., and NicodÃ¨me, G. (2014). Thin Capitalization Rules and Multinational Firm Capital Structure. Taxation Papers 42, Directorate General Taxation and Customs Union, European Commission.

Blouin, J. and Robinson, L. (2019). Double counting accounting: How much profit of multinational enterprises is really in tax havens? *mimeo*.

Brei, M. and von Peter, G. (2018). The distance effect in banking and trade. *Journal of International Money and Finance*, 81:116–137.

Buettner, T. and Wamser, G. (2013). Internal debt and multinational profit shifting: Empirical evidence from firm-level panel data. *National Tax Journal*, 66(1):63–95.

Cagala, T. and Wabitsch, A. (2023). Banks, Bonds and Tax Avoidance. mimeo.

Cariou, E. and Cordier, P. (2019). Rapport d'information sur le bilan de la lutte contre les montages transfrontaliers. Rapport d'information 2252, AssemblÃ©e Nationale.

Choi, J. P., Furusawa, T., and Ishikawa, J. (2020). Transfer pricing regulation and tax competition. *Journal of International Economics*, 127:103367.

Clausing, K. A. (2016). The Effect of Profit Shifting on the Corporate Tax Base in the United States and Beyond. *National Tax Journal*, 69(4):905–934.

Cobham, A. and Jansky, P. (2017). Global distribution of revenue loss from tax avoidance: Re-estimation and country results. Technical report.

Conte, M., Cotterlaz, P., and Mayer, T. (2022). The CEPII Gravity database. Technical Report 05, CEPII Working Paper.

Cristea, A. D. and Nguyen, D. X. (2015). Transfer pricing by multinational firms: New evidence from foreign firm ownerships. *American Economic Journal: Economic Policy*, forthcoming.

Crivelli, E., de Mooij, R. A., De Vrijer, J., Hebous, M. S., and Klemm, A. (2021). *Taxing multinationals in Europe*. Number 12. International Monetary Fund.

Davies, R. B., Martin, J., Parenti, M., and Toubal, F. (2018). Knocking on Tax Haven's Door: Multinational Firms and Transfer Pricing. *The Review of Economics and Statistics*, 100(1):120–134.

Desai, M. A., Foley, C. F., and Hines, J. R. (2004). A multinational perspective on capital structure choice and internal capital markets. *Journal of Finance*, 59(6):2451–2487.

Dharmapala, D. (2014). What Do We Know About Base Erosion and Profit Shifting? A Review of the Empirical Literature. Technical report.

Dischinger, M. and Riedel, N. (2011). Corporate taxes and the location of intangible assets within multinational firms. *Journal of Public Economics*, 95(7):691–707.

Dudar, O. and Voget, J. (2016). Corporate taxation and location of intangible assets: Patents vs. trademarks. Technical report.

Egger, P., Keuschnigg, C., Merlo, V., and Wamser, G. (2014). Corporate Taxes and Internal Borrowing within Multinational Firms. *American Economic Journal: Economic Policy*, 6(2):54–93.

Feld, L. P., Heckemeyer, J. H., and Overesch, M. (2011). Capital Structure Choice and Company Taxation: A Meta-Study. Technical report.

Garcia, J. (2022). Multinationals and services imports from havens: when policies stand in the way of tax planning. Technical report.

Garlanda-Longueville, L., Lé, M., and Parra Ramirez, K. (2025). Why Do Banks Have So Much Debt in Tax Havens? Discussion Paper 2025-13, Sciences Po Department of Economics.

Gigout, T. and Lavenant, E. (2025). Le commerce numÃ©rique et les consommateurs franÃ§ais dans la mondialisation. Technical report.

Griffith, R., Miller, H., and O'Connell, M. (2014). Ownership of intellectual property and corporate taxation. *Journal of Public Economics*, 112:12–23.

Guvenen, F., Mataloni, Raymond J., J., Rassier, D. G., and Ruhl, K. J. (2022). Offshore profit shifting and aggregate measurement: Balance of payments, foreign investment, productivity, and the labor share. *American Economic Review*, 112(6):1848–84.

Hardeck, I. and Wittenstein, P. U. (2018). Assessing the Tax Benefits of Hybrid Arrangements - Evidence from the Luxembourg Leaks. *National Tax Journal*, 71(2):295–334.

Hebous, S. and Johannesen, N. (2021). At your service! The role of tax havens in international trade with services. *European Economic Review*, 135(C).

Heckemeyer, J. H. and Overesch, M. (2013). Multinationals' Profit Response to Tax Differentials: Effect Size and Shifting Channels. discussion paper 13-045, ZEW.

Hines, James R., J. (2010). Treasure islands. *Journal of Economic Perspectives*, 24(4):1103–126.

Hong, S. (2021). Tax treaties and foreign equity holding companies of multinational corporations. *Review of Managerial Science*, pages 1–38.

Hugger, F., Cabral, A. C. G., and O'Reilly, P. (2023). Effective tax rates of MNEs: New evidence on global low-taxed profit. OECD Taxation Working Papers 67, OECD Publishing.

Huizinga, H., Laeven, L., and Nicodeme, G. (2008). Capital structure and international debt shifting. *Journal of Financial Economics*, 88(1):80–118.

Johannesen, N. (2014). Tax avoidance with cross-border hybrid instruments. *Journal of Public Economics*, 112(C):40–52.

Johannesen, N., Tï¿½rslï¿½v, T., and Wier, L. (2016). Are less developed countries more exposed to multinational tax avoidance? Method and evidence from micro-data. Technical report.

Johansson, A., Skeie, O. B., Sorbe, S., and Menon, C. (2017). Tax planning by multinational firms: Firm-level evidence from a cross-country database. OECD Economics Department Working Papers 1355, OECD Publishing.

Klemm, A. D., Hebous, S., and Wu, Y. (2021). How Does Profit Shifting Affect the Balance of Payments? IMF Working Papers 2021/041, International Monetary Fund.

Laffitte, S. and Toubal, F. (2022). Multinationals' Sales and Profit Shifting in Tax Havens. *American Economic Journal: Economic Policy*, 14(4):371–396.

Liu, L., Schmidt-Eisenlohr, T., , and Guo, D. (2017). International Transfer Pricing and Tax Avoidance : Evidence from Linked Trade-Tax Statistics in the UK. International Finance Discussion Papers 1214, Board of Governors of the Federal Reserve System (U.S.).

Overesch, M. and Wamser, G. (2010). Corporate tax planning and thin-capitalization rules: evidence from a quasi-experiment. *Applied Economics*, 42(5):563–573.

Overesch, M. and Wamser, G. (2014). Bilateral internal debt financing and tax planning of multinational firms. *Review of Quantitative Finance and Accounting*, 42(2):191–209.

Reiter, F., Langenmayr, D., and Holtmann, S. (2021). Avoiding taxes: banks' use of internal debt. *International Tax Public Finance*, 28:717–745.

Riedel, N. (2018). Quantifying international tax avoidance: A review of the academic literature. *Review of Economics*, 69(2):169–181.

Samarakoon, N. (2023). The Effect of the Closure of the Double Irish Arrangement on the Location of U.S. Multinational Companies' Profits. Technical report.

Torslov, T., Wier, L., and Zucman, G. (2023). The Missing Profits of Nations. *The Review of Economic Studies*, 90(3):1499–1534.

Torslov, T. R., Wier, L. S., and Zucman, G. (2021). The Missing Profits of Nations: 2018 figures. Technical report.

Van't Riet, M. and Lejour, A. (2018). Optimal tax routing: network analysis of FDI diversion. *International Tax and Public Finance*, 25(5):1321–1371.

Vicard, V. (2015). Profit shifting through transfer pricing: evidence from French firm level trade data. Working papers 555, Banque de France.

Vicard, V. (2023). Profit Shifting, Returns on Foreign Direct Investments and Investment Income Imbalances. *IMF Economic Review*.

Wier, L. (2020). Tax-motivated transfer mispricing in south africa: Direct evidence using transaction data. *Journal of Public Economics*, 184:104153.

Wier, L. S. and Zucman, G. (2022). Global Profit Shifting, 1975-2019. NBER Working Papers 30673, National Bureau of Economic Research, Inc.

A Data

A.1 Ownership data

Ownership information comes from Liaison Financière (LiFi), a database maintained by the French statistical institute (INSEE) combining information from Banque de France, the French tax administration (DGFIP) and additional institutional sources, and Orbis, a private database produced by Moody's. LiFi is used to identify affiliates and parents in the population of French firms and their ultimate parent in France or abroad. We complement these data using Orbis to link ultimate parents to their network of affiliates worldwide. Orbis provides information on corporate ownership links at the global level enabling the identification of the network of subsidiaries of MNEs identified by their ultimate owner. We use a cross-section for 2019 (similarly to Liu et al. (2017) or Johannesen et al. (2016)). Orbis may miss affiliates in tax havens: Johansson et al. (2017) report that 184 out of a sample of 266 US multinationals with tax haven affiliates are identified over the 2000-2010 period; the coverage of the ownership data has however improved.

Our matching algorithm traces the ultimate parent of French affiliates and link it to the intra-firm network of affiliates worldwide. We start from the information on affiliate status and ultimate owner reported in LIFI (deemed more reliable since it is constructed from various sources, including administrative data). The matching algorithm proceeds in three steps.

First, we match LiFi parent companies to Orbis global ultimate owners and retain parent-affiliate links observed in both sources. We then complete each matched group using LiFi's data on subsidiaries. When the sources assign different parents to the same unit, we apply a country-of-headquarters rule: if Orbis points to a French ultimate owner, we keep the LiFi assignment; if it points to a foreign ultimate owner, we take Orbis assignment.

Second, when a LiFi parent company appears in Orbis as a subsidiary - indicating that LiFi may not fully reconstruct cross-border ownership chains, where Orbis is typically more informative - we implement a look-through test: for that group, we examine its subsidiaries and assess whether a single Orbis ultimate owner accounts for a strict majority of their Orbis assignments. If so, we elevate the group to that owner; otherwise we keep the LiFi parent company.

Third, for LiFi groups not yet linked to an Orbis ultimate owner, we map their subsidiaries in Orbis and re-apply the same majority test. Groups with a dominant non-French ultimate owner are linked to that form Orbis; the rest remain under LiFi information.

Our analysis in Section 3 is restricted to MNE affiliates so that any affiliates for which we do cannot trace the ultimate owner is dropped.

A.2 Digital Payments data: Paiements Internationaux à Distance

The data comes from the PID database (Paiements Internationaux à Distance), compiled by the Banque de France using information reported by commercial banks operating in France. It covers all transactions – both online and in-person – made by French cardholders (including professional cards) worldwide, including within France. While all card types are included, most transactions originate from households, according to the sectors of transactions.

In 2022, the PID database recorded 2.2 million observations, representing 3.24 billion unique transactions conducted with cards issued by French banks, regardless of destination (Gigout and Lavenant, 2025). These transactions are categorized into 308 sectors using Merchant Category Codes (MCCs, standardized under ISO 18245). The assigned MCC must reflect the merchant?s primary good or service sold. Additionally, payment network rules (Visa, Mastercard, etc.) require that the country of the payment terminal match the country where the business primarily operates.

A.3 Other data

The lists of tax havens are taken from Hines (2010) and Torslov et al. (2023). Gravity variables are from the CEPII gravity dataset Conte et al. (2022). Country risk is computed from the OECD Country Risk Classification, which allocates countries in 8 categories depending on their credit risk and likelihood of servicing their external debt. Our country risk variable is the logarithm of one plus the country risk category.

A.4 Descriptive statistics

This section presents descriptive statistics of our estimation samples for trade in goods (Table 13), trade in services (Table 14), intra-firm debt (Table 15) and FDI income ((Table 16).

Table 13: Descriptive statistics: trade in goods

	Observations	mean	SD	p10	median	p90
Log unit value	5,519,952	3.161	1.951	0.995	2.944	5.680
Intra-firm	5,519,952	0.517	0.500	0	1	1
Intra-firm × tax rate diff.	5,519,952	-0.049	0.067	-0.154	0	0
Intra-firm × tax rate diff. < 0	5,519,952	0.001	0.012	0	0	0
Intra-firm × tax rate diff. > 0	5,519,952	0.050	0.065	0	0	.1543
Intra-firm × TH dum.	5,519,952	0.047	0.211	0	0	0
Intra-firm × log GDP per capita	5,461,513	5.366	5.175	0	8.257	10.821
Intra-firm × EU dummy	5,519,952	0.382	0.486	0	0	1

Table 14: Descriptive statistics: trade in services

	Observations	mean	SD	p10	median	p90
Import of services	1,916,540	0.05	0.22	0.00	0.00	0.00
Intra-group	1,916,540	0.07	0.25	0.00	0.00	0.00
Intra-group × Tax haven	1,916,540	0.01	0.09	0.00	0.00	0.00
GDP (bn USD)	1,916,540	357	1580	1	23	538

Table 15: Descriptive statistics: intra-firm debt

	Observations	mean	sd	p10	median	p90
Banks						
Internal Net Debt (% of banking assets)	258636	0.57	4.54	0.00	0.00	0.13
Tax Haven	258,636	0.16	0.36	0.00	0.00	1.00
Domestic credit (% of GDP)	258,636	70	50	14	58	143
Rule of Law (index)	258,636	0.27	1.02	-0.98	0.07	1.81
GDP (bn USD)	258,636	859	2,597	11	160	1,830
Distance (km)	258,636	5,005	3,803	881	4,448	9,705
Non-financial corporations						
Internal Net Debt (% of total assets)	144504	0.004	0.203	0	0	0.002
Tax Haven	144,504	0.15	0.36	0.00	0.00	1.00
Domestic credit (% of GDP)	144,504	96	48	34	91	163
Rule of Law (index)	144,504	1.00	0.93	-0.47	1.42	1.88
GDP (bn USD)	144,504	2,168	4,366	57	555	3,890
Distance (km)	144,504	3,186	3,840	287	1,106	9,190

Table 16: Descriptive statistics: FDI income

	Observations	mean	sd	p10	median	p90
Yield	17161	0.12	0.25	-0.10	0.08	0.42
Corporate tax rate differential	17161	0.10	0.07	0.02	0.09	0.19
Tax haven dummy	17161	0.11	0.32	0	0	1
EU membership	17161	0.52	0.50	0	1	1
Distance	17161	3852	4042	526	1352	9710
Common border	17161	0.30	0.46	0	0	1
Common language	17161	0.19	0.39	0	0	1
Time zone distance	17161	2.15	2.87	0	0	7
Common RTA membership	17161	0.67	0.47	0	1	1

B Additional results: robustness

This section provides additional results on the manipulation of transfer prices in trade in goods (Table 20), trade in services (Table 17), debt shifting (Table 18) and FDI income (Table 19).

Table 17: Regression results on exports of services

	IP	R&D and IT	Info. & Com.	Technical Serv.	Other business	Financial Serv.	Transport
Intragroup	0.122***	0.157***	0.042**	0.209***	0.227***	0.047***	0.113***
	(0.023)	(0.019)	(0.016)	(0.018)	(0.022)	(0.017)	(0.020)
Intragroup × TH	−0.003	0.009	0.004	−0.013	0.017	0.069***	−0.018
	(0.017)	(0.012)	(0.009)	(0.012)	(0.018)	(0.019)	(0.014)
GDP	−0.002	0.001	0.001	0.000	0.003*	0.002	0.005***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Num.Obs.	177 406	317 001	191 080	464 329	297 888	149 548	319 288
R2	0.222	0.249	0.299	0.271	0.268	0.458	0.287
FE country	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE time	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note : Standard errors clustered for intra-group correlation at the firm level in parentheses, with significance levels indicated with * for 10%, ** for 5%, *** for 1%.

Table 18: Regression results on debt shifting: robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Corporate Tax Rate		0.000			0.015***			−0.002	
		(0.000)			(0.004)			(0.002)	
TH dummy	0.002**		0.000	0.794***		0.673***	0.734***		0.665***
	(0.001)		(0.000)	(0.114)		(0.095)	(0.059)		(0.055)
TH Europe			0.004**			0.451			0.255***
			(0.002)			(0.283)			(0.094)
Domestic credit	0.000	0.000	0.000	0.001	0.003***	0.001	0.002***	0.004***	0.002***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Rule of Law	0.001***	0.001***	0.001***	0.049*	0.124***	0.046*	−0.027	0.033	−0.029
	(0.000)	(0.000)	(0.000)	(0.025)	(0.033)	(0.025)	(0.020)	(0.021)	(0.020)
Log GDP	0.000	0.000	0.000	0.272***	0.176***	0.264***	0.190***	0.119***	0.186***
	(0.000)	(0.000)	(0.000)	(0.034)	(0.023)	(0.034)	(0.020)	(0.016)	(0.020)
Log distance	0.000*	0.000*	0.000	−0.726***	−0.720***	−0.697***	−0.538***	−0.516***	−0.521***
	(0.000)	(0.000)	(0.000)	(0.083)	(0.083)	(0.082)	(0.039)	(0.038)	(0.038)
Num.Obs.	144 501	144 501	144 501	258 619	258 619	258 619	266 735	266 735	266 735
R2	0.912	0.912	0.912	0.153	0.151	0.153	0.507	0.500	0.507
FE time	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
FE firm/bank	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
FE time*bank	No	No	No	No	No	No	Yes	Yes	Yes
Clustered Errors	Firm	Firm	Firm	Bank	Bank	Bank	Bank	Bank	Bank

Note : Standard errors clustered for intra-group correlation at the firm level in parentheses, with significance levels indicated with * for 10%, ** for 5%, *** for 1%. The dependent variable is intra-firm liabilities in columns (1)-(6) and intra-firm net liabilities in columns (7)-(9).

Table 19: Tax differential and return on FDI: robustness

	(1)	(2)	(3)	(4)
Tax rate diff.	0.41^a	0.28^a	0.21^a	
	(0.08)	(0.04)	(0.05)	
Tax rate diff. × French MNE dum.			0.06	
			(0.05)	
Tax rate decile 2				-0.01
				(0.01)
Tax rate decile 3				0.01
				(0.01)
Tax rate decile 4				0.02
				(0.01)
Tax rate decile 5				0.02^b
				(0.01)
Tax rate decile 6				0.03^a
				(0.01)
Tax rate decile 7				0.04^a
				(0.01)
Tax rate decile 8				0.05^a
				(0.01)
Tax rate decile 9				0.06^a
				(0.01)
Tax rate decile 10				0.07^a
				(0.01)
Observations	24,475	18,970	24,718	24,718
R-squared	0.56	0.30	0.31	0.31
FE MNE × year	Yes	Yes	Yes	Yes

Note: Standard errors clustered for intra-group correlation at the country level in parentheses, with significance levels indicated with ^{c} for 10%, ^{b} for 5%, ^{a} for 1%.

C Additional results: French vs foreign MNEs

This section reports results for each instrument of profit shifting when differential French and foreign MNEs. Results for trade in goods are reported in column (2) of Table 20. Table 21 presents results for imports of services and Table 22 for intra-firm debt.

Table 20: Transfer mispricing on trade in goods

	(1) non linear	(2) MNE FR	(3) No TH	(4)	(5)
Dum 0 - Intra-firm × tax rate diff.	-0.028				
	(0.027)				
Dum 1 - Intra-firm × tax rate diff.	0.003				
	(0.011)				
Dum 2 - Intra-firm × tax rate diff.	-0.042***				
	(0.010)				
Dum 3 - Intra-firm × tax rate diff.	-0.015				
	(0.014)				
Dum 4 - Intra-firm × tax rate diff.	-0.061***				
	(0.014)				
Dum 5 - Intra-firm × tax rate diff.	-0.069**				
	(0.031)				
Intra-firm		-0.058***	0.003	-0.039***	-0.202*
		(0.016)	(0.015)	(0.008)	(0.104)
Intra-firm × tax rate diff. < 0		-0.649	0.038		0.016
		(0.422)	(0.283)		(0.272)
Intra-firm × tax rate diff. > 0		-0.319**	-0.331***		-0.305***
		(0.136)	(0.127)		(0.093)
Intra-firm × tax rate diff. < 0 × French		0.989**			
		(0.401)			
Intra-firm × tax rate diff. > 0 × French		-0.001			
		(0.158)			
Intra-firm × French		0.088***			
		(0.020)			
Intra-firm × TH dum. (Torslov et al., 2023)				0.027***	0.015
				(0.011)	(0.010)
Intra-firm × log GDP per capita					0.018*
					(0.010)
Intra-firm × EU dummy					0.026
					(0.017)
Constant	4.768***	4.781***	5.093***	4.772***	4.762***
	(0.005)	(0.005)	(0.007)	(0.006)	(0.005)
Sample	All	All	No tax havens	All	All
Observations	5,519,952	5,519,952	4,117,297	5,519,952	5,454,889
R-squared	0.997	0.997	0.997	0.997	0.997
FE Country*Product*Year	Yes	Yes	Yes	Yes	Yes
FE Firm*Product*Year	Yes	Yes	Yes	Yes	Yes

Note: Standard errors clustered for intra-group correlation at the country-year level in parentheses, with significance levels indicated with * for 10%, ** for 5%, *** for 1%.

Table 21: Regression results on imports of services: French vs. foreign MNEs

	IP	R&D and IT	Info. & Com.	Technical Serv.	Other business	Financial Serv.	Transport
Intragroup × French Firm	0.109***	0.179***	0.046***	0.258***	0.218***	0.067***	0.166***
	(0.020)	(0.022)	(0.014)	(0.030)	(0.022)	(0.020)	(0.027)
Intragroup × Foreign Firm	−0.005	0.132***	0.012	0.193***	0.187***	0.000	0.213***
	(0.014)	(0.027)	(0.013)	(0.028)	(0.034)	(0.017)	(0.039)
Intragroup × TH × French Firm	−0.005	0.028	0.018	−0.033*	0.058**	0.114***	−0.015
	(0.022)	(0.018)	(0.013)	(0.017)	(0.023)	(0.023)	(0.026)
Intragroup × TH × Foreign Firm	0.084***	−0.009	0.050*	−0.022	−0.004	0.006	0.053***
	(0.028)	(0.028)	(0.027)	(0.018)	(0.024)	(0.019)	(0.020)
GDP	−0.006*	−0.001	0.006**	0.001	−0.001	0.008*	0.000
	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)
Num.Obs.	177 406	317 001	191 080	464 329	297 888	149 548	319 288
R2	0.210	0.304	0.315	0.321	0.284	0.381	0.322
FE country	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note : Standard errors clustered for intra-group correlation at the firm level in parentheses, with significance levels indicated with * for 10%, ** for 5%, *** for 1%.

Table 22: Regression results on debt shifting: French vs. foreign MNEs

	(1)	(2)	(3)	(4)
TH × French firm	0.001	0.000	0.475***	0.642***
	(0.001)	(0.000)	(0.108)	(0.119)
TH × foreign firm	0.004**	0.000	0.808***	0.458***
	(0.002)	(0.001)	(0.126)	(0.085)
European TH × French firm		0.002		−0.755**
		(0.002)		(0.328)
European TH × foreign firm		0.006**		1.664***
		(0.002)		(0.469)
Domestic credit	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.001)
Rule of Law	0.001***	0.001***	0.056***	0.052***
	(0.000)	(0.000)	(0.020)	(0.019)
Log GDP	0.000	0.000	0.213***	0.201***
	(0.000)	(0.000)	(0.033)	(0.032)
Log distance	0.000	0.000	−0.565***	−0.529***
	(0.000)	(0.000)	(0.077)	(0.075)
Num.Obs.	144 504	144 504	258 636	258 636
R2	0.914	0.914	0.153	0.155
FE time	Yes	Yes	Yes	Yes
FE firm/bank	Yes	Yes	Yes	Yes
Clustered Errors	Firm	Firm	Bank	Bank

Note : Standard errors clustered for intra-group correlation at the firm level in parentheses, with significance levels indicated with * for 10%, ** for 5%, *** for 1%.

D Additional results: alternative tax haven list

This section reports sensitivity analysis to an alternative definition of tax havens, using that tax haven list of Torslov et al. (2023): Table 21 for imports of services and Table 22 for debt. Results for trade in goods are reported in columns (3)-(4) of Table 20.

Table 23: Regression results on imports of services: alternative Tax Haven list

	IP	R&D and IT	Info. & Com.	Technical Serv.	Other business	Financial Serv.	Transport
Intragroup	0.062***	0.162***	0.037***	0.229***	0.207***	0.046***	0.184***
	(0.014)	(0.017)	(0.012)	(0.023)	(0.020)	(0.014)	(0.024)
Intragroup × TH	0.034**	0.018	0.016	−0.001	0.017	0.089***	0.019
	(0.017)	(0.017)	(0.014)	(0.012)	(0.018)	(0.022)	(0.018)
GDP	−0.005*	0.000	0.006**	0.001	0.000	0.008*	0.000
	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)
Num.Obs.	177 406	317 001	191 080	464 329	297 888	149 548	319 288
R2	0.204	0.303	0.315	0.321	0.283	0.378	0.322
FE country	Yes	Yes	Yes	Yes	Yes	Yes	Yes
FE firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note : Standard errors clustered for intra-group correlation at the firm level in parentheses, with significance levels indicated with * for 10%, ** for 5%, *** for 1%.

Table 24: Regression results on debt shifting: alternative Tax Haven list

	(1)	(2)	(3)	(4)
TH dummy	0.003***	0.002***	0.495***	0.347***
	(0.001)	(0.000)	(0.117)	(0.109)
TH Europe		0.003*		0.732***
		(0.001)		(0.231)
Domestic credit	0.000	0.000	0.001	0.001*
	(0.000)	(0.000)	(0.001)	(0.001)
Rule of Law	0.000*	0.000*	0.065***	0.057***
	(0.000)	(0.000)	(0.019)	(0.018)
Log GDP	0.000	0.000	0.186***	0.180***
	(0.000)	(0.000)	(0.032)	(0.031)
Log distance	0.000	0.000	−0.532***	−0.494***
	(0.000)	(0.000)	(0.072)	(0.070)
Num.Obs.	144 504	144 504	258 636	258 636
R2	0.914	0.914	0.152	0.153
FE time	Yes	Yes	Yes	Yes
FE firm/bank	Yes	Yes	Yes	Yes
Clustered Errors	Firm	Firm	Bank	Bank

Note : Standard errors clustered for intra-group correlation at the firm level in parentheses, with significance levels indicated with * for 10%, ** for 5%, *** for 1%.