Framing Multinational Companies' Sales Shifting: Concept, Magnitude and Policy Implications

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July 8th 2022

Outline

A conceptual shift? The introduction of "sales shifting"

- Laffitte and Toubal (2022) argue that multinational companies' profit shifting results from two dynamics: the relocation of revenues into low-tax jurisdictions and / or the relocation of expenses into high-tax jurisdictions. They focus on the former, which they designate as "sales shifting".
- Using statistics from the BEA on the activities of US multinationals, they measure their "foreign sales ratio" in each partner country:

$$\text{Foreign sales ratio}_i = \frac{\text{Sales of goods and services generated outside of } i}{\text{Total sales booked in } i}$$

- They find that the foreign sales ratio is not only determined by partner countries' foreign market access, but also by their tax environment. This corroborates the existence of sales shifting practices.

In close connection with proposed reforms

- On the policy side, several reform proposals aim at reconnecting taxation and multinationals' revenue-generating activities or value creation.
- E.g., the OECD's "two-pillar solution to address the tax challenges arising from the digitalisation of the economy" (July and October 2021).
- Other proposals exist, among which the Minimum Effective Tax Rate (METR) of Kadet et al. (2021) or formulary apportionment approaches.

Pure shifting or real responses?

- Policy makers pay strong attention to multinational companies' real responses to corporate taxation, especially in the context of these global reforms.
- But little is known about their implications for investment, employment, etc.
  - Several theoretical models, such as Johannesen (2022) or Hebous and Keen (2022), typically focus on profit shifting practices;[1]
  - The empirical literature has also shifted focus over the 2000s, from the study of real responses to taxation towards profit shifting.

1. Janeba and Schjelderup (2022) add a form of real response to taxation by introducing a location decision and Casella and Souillard (2022) propose a framework to study the impact of the global minimum tax on Foreign Direct Investment (FDI).

Contribution

- First, taking up Laffitte and Toubal (2022)'s concept, we introduce an important dichotomy between "paper" and real sales shifting.
- We illustrate this distinction in a new framework (3), in which "normal" profits may be endogenous to taxation and that provides our identification strategy.
- Second, our empirical analysis (4) based on country-by-country report statistics confirms the relevance of this distinction. We document Laffitte and Toubal (2022)'s sales shifting concept using alternative data sources.
- Third, we stress the implications of this dichotomy for policy makers (5) and to foster further work on these issues, we compile an adjusted, destination-based mapping of country-by-country revenue variables.

Outline

Generalities

- Builds upon Melitz (2003) and Chaney (2005). N potentially asymmetric countries, each with a population of L_i individuals / entrepreneurs. Individuals share identical preferences and are immobile across countries.
- Two sectors. A homogeneous good used as numeraire and produced in all countries with constant returns to scale.[2] A differentiated good with a continuum of varieties.
- Preferences based on Krautheim and Schmidt-Eisenlohr (2011):

$$U_i = \alpha \ln(X_i) + q_i + \frac{G_i}{L_i}$$

  - Two-stage utility with CES preferences over the varieties of the differentiated good (aggregator X_i) and quasi-linear preferences over the two sectors.
  - G_i is the total purchase of the numeraire good by country i's government, financed via a tax levied on corporate profits. Each individual thus benefits from a share $\frac{1}{L_i}$ of this public expenditure.

2. This implies that wages are the same in all countries and are constant, equal to 1.

Benchmark case (1/2)

- In our benchmark, a firm from i can sell in country j iff. it has set up a subsidiary there (incuring fixed cost $f_{i,j}$) and output is produced locally.
- Taxation does not affect the pricing decision. This relies (i) on the assumption that the government spends its tax revenues solely on the numeraire good and (ii) on the quasi-linear utility assumption.
- Potential after-tax profits are given by:

$$\pi_j(\varphi) = \frac{1}{\sigma}(1 - tax_j)[\frac{\sigma}{(\sigma - 1)\varphi P_j}]^{1-\sigma}\alpha L_j$$

- Which must be compared with $f_{i,j}$. This defines a unique cut-off productivity level, $\bar{\varphi}_{i,j}$, above which the firm enters country j.
- We solve for the equilibrium productivity cut-off and price index P_j. We can then write the equilibrium sales, costs and profits of each firm.

Benchmark case (2/2)

- Aggregate sales recorded in j by the multinationals from i write as:

$$X_{i,j} = \lambda \frac{L_i L_j}{L} f_{i,j}^{-(\frac{\gamma}{\sigma-1}-1)} \theta_j^{\gamma}$$

Where λ is a constant and θ_j measures the "remoteness" of market j.

- Increase in parent and partner country sizes. Decrease in the bilateral fixed cost of setting up a foreign affiliate (negative extensive margin).
- Increase in the remoteness of the partner country. The more remote country j, the less foreign multinationals enter this market and the higher the market share for each variety being sold (positive intensive margin effect).
- Remain unaffected by taxation. The extensive margin (less multinationals enter high-tax countries) and the intensive margin (this barrier to entry provides entrants with larger market shares) perfectly offset each other.

Introducing tax planning margins: Profit shifting

- We now allow firms to shift a part of their pre-tax profits to a jurisdiction h, where it will not be taxed. E.g., the branch in the tax haven charges $\Psi_j(\varphi)$ to the country j affiliate for the use of intangible assets.
- We model profit shifting similarly to Laffitte and Toubal (2022), with quadratic variable costs and without the fixed costs added in some models.
- Profit shifting affects neither the pricing decision, nor the pre-tax profits ex ante the transaction. Denoting these $\pi_j^{PT,0}$, after-tax profits write as:

$$\pi_j^{PS}(\varphi) = \pi_j^{PT,0}(\varphi)(1 - ETR_j), \text{ where } ETR_j = tax_j - \frac{tax_j^2}{2a^{\frac{1}{\varepsilon_j}}(1 - tax_j)} < tax_j$$

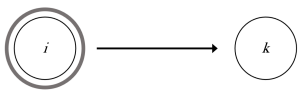
- The expression for aggregate extra-group sales remains unchanged with profit shifting practices. The same dynamics drive this result, the rate at which profits generated in j are effectively taxed (ETR_j) replacing tax_j.

Introducing tax planning margins: Location decisions

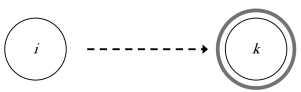
- Shutting off profit shifting, we now allow firms to export either from their headquarter or from foreign affiliates, with bilateral iceberg trade costs.
- Introduces a trade-off between the tax rate and trade costs. The firm might decide to operate in country k from a relatively distant country j if its tax rate is sufficiently low.
- We cannot solve the full problem but if taxes affect extra-group sales, based on our model, we would attribute this effect to this second tax planning margin.

Figure: Serving market k for a country i firm

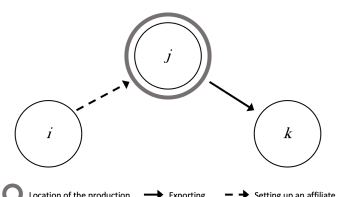
(a) Exporting from the headquarter country



(b) Setting up a local affiliate



(c) Exporting from a foreign affiliate



Outline

The striking importance of small low-tax jurisdictions

- We show the 15 largest foreign partners in terms of unrelated party revenues in the US 2017 country-by-country report statistics:

Table: Top 15 largest partner jurisdictions of US multinational companies

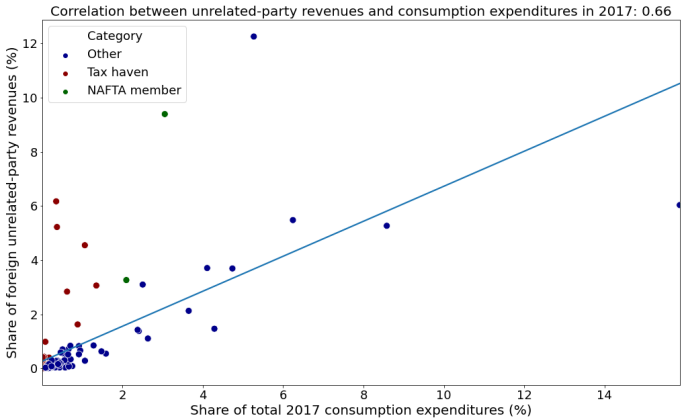
Partner jurisdiction	UPR (USD billion)	Share of foreign UPR (%)
United Kingdom	486.7	12.2
Canada	372.9	9.4
Ireland	245.0	6.1
China	239.5	6.0
Germany	217.5	5.5
Japan	209.1	5.2
Singapore	207.3	5.2
Switzerland	180.6	4.5
Brazil	147.1	3.7
France	146.5	3.7
Mexico	129.5	3.3
Australia	122.9	3.1
Netherlands	121.5	3.0
Hong Kong	112.6	2.8
Italy	84.4	2.1

- Tax havens account for 27% of foreign unrelated-party revenues; 21% when including non-US multinationals.[3]

3. Considering the classification of Tørsløv, Wier, and Zucman (2018)

In disproportion with local market size

- We plot partner jurisdictions' share of unrelated-party revenues and their share of final consumption expenditures:



- Positive but limited correlation between indicators (0.66). Some countries clearly stand out from the "normal" relationship: close commercial partners (NAFTA members in green and the UK at the top) and tax havens (in red).

Econometric modelling

- We now control for partners' foreign market access, as Laffitte and Toubal (2022) do.
- Benchmark specification yields a semi-elasticity of unrelated party revenues to the statutory corporate income tax rate of -2.
- Relatively robust to the use of other measures of the tax rate ("EATR" stands for Effective Average Tax Rate; "EMTR" for Effective Marginal Tax Rate).

▸ Additional results

	(1) ln(UPR)	(2) ln(UPR)	(3) ln(UPR)
Statutory tax rate	-0.0203***		
	(0.005)		
EATR		-0.0163**	
		(0.023)	
EMTR			-0.00978**
			(0.028)
ln(GDP) - WOE	1.207***	1.204***	1.186***
	(0.000)	(0.000)	(0.000)
ln(Foreign Market Access)	0.346***	0.357***	0.386***
	(0.000)	(0.000)	(0.000)
ln(Distance)	-0.536***	-0.518***	-0.502***
	(0.000)	(0.000)	(0.000)
Constant	-2.575*	-2.706**	-2.498*
	(0.056)	(0.047)	(0.063)
Gravity control variables	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	508	508	508
R-squared	0.837	0.836	0.836
Adj. R-squared	0.833	0.832	0.831

p-values in parentheses

Using robust standard errors.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Outline

Two main consequences for policy makers

- Acceptability. The second type of sales shifting does not necessarily disconnect corporate income and real economic activity, which is often pointed at as an "abnormal" phenomenon.
- Effectiveness of the proposed reforms. Example of the two-pillar process:
  - If there is no disconnection between corporate income and productive activities, Pillar Two's substance-based income exclusion may shield undertaxed profits from the 15% minimum rate.
  - Pillar One-like reforms instead anchor the taxing rights to the location of customers or revenue-generating activities. This may drive efficiency gains, but redistributive effects are questionable and the political momentum is limited.

Key data need

- Country-by-country data cannot be used as such to analyse this issue and run simulations of the proposed reforms.
- Revenue variables reflect the tax residence of the affiliates that register the transactions in their financial accounts and not the final destination of the sales. Example with a cloud service multinational company:

The group is headquartered in the US, where the data centres backing its cloud services are located.

Sales teams for the EU are in Ireland. They are the ones selling the services and registering the transactions.

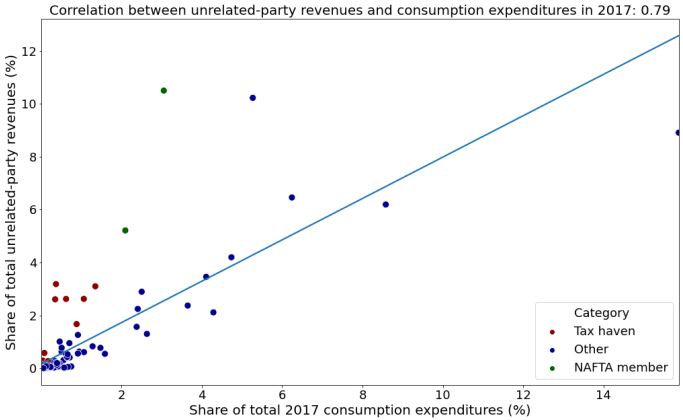
Ultimate users of the services are in France. They receive bills from the Irish subsidiary. *[Not visible in the data]*

- We thus propose a destination-based adjustment of country-by-country revenue variables, based on the BEA's data on the activities of US multinational enterprises and trade statistics.

▸ Overview of the methodology

Assessing its performance (1/2)

- The adjustment recomposes the ranking of Table 1, in favor of NAFTA members (e.g., Mexico moving from 11th to 6th), China or France. Ireland tumbles from 3rd to 14th, while Switzerland and Singapore also lose their positions.
- Consistency with final consumption expenditures is improved:



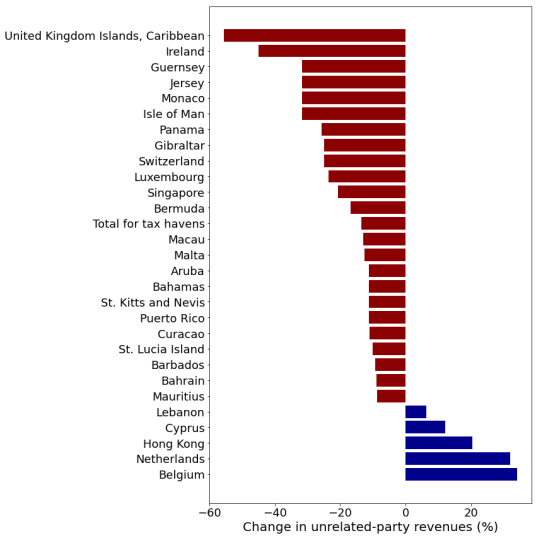
- We draw similar conclusions when including non-US firms.

Assessing its performance (2/2)

- 9 of the 10 largest losers from the adjustment are listed as tax havens.
- Tax havens then account for 18% of US multinationals' adjusted foreign unrelated party revenues (from 21% to 16% when including non-US firms).
- The specific trajectory of a few tax havens (e.g., Belgium, the Netherlands, Hong Kong) may underline some potential limitations of the adjustment.

▸ Focus on the Netherlands

Figure: Change in tax havens' unrelated-party revenues



Note: Focusing on US multinationals.

Outline

Key findings

- In our model, multinationals' extra-group sales remain unaffected by shifting practices. A response of unaffiliated transactions to taxation would thus indicate that a real sales shifting margin exists.
- We highlight the weight of small low-tax jurisdictions in the distribution of multinationals' unrelated party revenues. Tax havens account for 27% of the foreign total in the IRS' data, versus 6% of final consumption expenditures.
- We further estimate a semi-elasticity of unrelated party revenues to the statutory CIT rate of -2 (i.e., a one percentage point increase in the tax rate is associated with a 2% reduction in extra-group sales).
- Multinationals indeed locate their activities and their extra-group sales in reaction to corporate income taxes: they find by doing so another tax planning margin, that corresponds to the second type of sales shifting practices.
- Our proposed adjustment corrects at least partly for this distortion: the weight of tax havens in the IRS' data is reduced to 18% and the "corrected" mapping of sales is significantly more in line with proxies for market size.

Perspectives for improvement

- Theoretical framework. Improvements could come from the junction with the export platform literature, that may allow to model multinationals' location decisions more accurately while preserving tractability.
- Empirical results. Accounting for the sample selection involved in the aggregation of country-by-country reports. Studies estimating gravity equations have dealt with similar limitations of the trade matrices.
- Adjustment of country-by-country revenue variables. Potential limitations are essentially related to the use of trade statistics to distribute the sales directed to third countries (cf. focus on the Netherlands). Further work remains to document the code and the dedicated API.

Acknowledgements and thanks

- I am deeply thankful to Prof. Emmanuelle Taugourdeau and Prof. Gabriel Zucman for their supervision, comments and advice during the preparation of this master thesis. I am also thankful to Prof. Bertrand Garbinti for his attention in the evaluation of my work.
- This research started in the wake of an internship at the EU Tax Observatory and I am also grateful to all the members of the team who have helped me in this exploration of multinational companies' global sales networks.
- Eventually, I have received precious explanations about different data sources from Mark Goddard (BEA), Antonella Liberatore (OECD Statistics and Data Directorate), Katia Sarrazin (OECD Statistics and Data Directorate), Jing Zhang (UN Statistics Division) and the Statistics Department of the IMF.

Outline

Glossary

Abbreviation	Meaning
BEA	Bureau of Economic Analysis
CES	Constant Elasticity of Substitution
CIT	Corporate Income Tax
GE	General Equilibrium
IMF	International Monetary Fund
IRS	Internal Revenue Service
OECD	Organisation for Economic Co-operation and Development
MNC	Multinational company
NAFTA	North America Free Trade Agreement
UN	United Nations
UPR	Unrelated party revenues

Outline

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Outline

Econometric modelling - Additional results

- The tax environment of the partner country is associated with significant effects on unrelated party revenues. On average, holding all controls constant, those are more than 4 times larger in a tax haven.
- Evidence of a non-linear relationship between the tax rate and extra-group sales, the semi-elasticity being larger at low rates. This echoes Dowd, Landefeld, and Moore (2017) or Bratta, Santomartino, and Acciari (2021).
- This non-linear relationship is also observed in the split of US data by industry group. It is strongly statistically significant in three sectors: "Information", "Technical services" and "Manufacturing".
- However, a similar analysis on the OECD's country-by-country report statistics does not allow to conclude, possibly due to the limited time coverage (two income years only, 2016 and 2017).

Back to the presentation

Adjustment of revenue variables - Overview of the methodology

- 1st step: Starting from the IRS' country-by-country report statistics, we use the BEA's data on US multinationals sales of goods and services to split the revenue variables into three types of ultimate destinations (local sales, sales to the headquarter and sales to any third country).
- 2nd step: The first two types are already attributed to their final destination; we distribute the sales to any third country based on the distribution of the partner country's exports of merchandise and services.
- We extrapolate the BEA's statistics to extend the adjustment to 14 non-US headquarter countries. We split the domestic revenues of these multinationals based on the Analytical AMNE database of the OECD.

Back to the presentation

Adjustment of revenue variables - Focus on the Netherlands

- US multinational companies' sales in the Netherlands increase by 32%.
- In 2017, local sales accounted for 65% of the sales of goods and services of US multinationals in the Netherlands. This implies a 35% reduction in unrelated party revenues, more than offset by the sales reallocated from other partners.

Table: Where do the sales attributed to the Netherlands in the adjustment come from?

Affiliate country	UPR (million USD)	Share of the Neth. in exports (%)
Netherlands	78,916.3	..
United States	37,761.8	2.90
Ireland	10,855.2	4.69
UK	7,431.6	6.99
Belgium	4,598.6	16.29
Switzerland	3,508.4	3.02
Germany	3,117.5	6.96
UK Caribbean Islands	2,650.0	31.64
Singapore	2,001.7	1.85
Bermuda	1,474.2	35.94

- Slightly sensitive to the exclusion of certain flows of services from trade statistics, in which case increase is reduced to $+28\%$.

Back to the presentation