

# Do multinationals' unrelated party revenues respond to corporate income taxation? Evidence and implications for policy simulations

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# Outline

## Introduction

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## Motivation (1/2)

- ▶ Over the 2000s, from investment and location decisions, the empirical literature on multinational companies (MNCs)'s tax planning has widely shifted focus onto the elasticity of pre-tax profits to corporate income taxation (CIT) and profit shifting mechanisms.
- ▶ Laffitte and Toubal (2022) have brought revenues under the spotlight again, highlighting the role of low-tax sales platforms in US MNCs' tax planning strategies. They include intra-group transactions in their analysis and thus account for traditional profit shifting mechanisms.
- ▶ What about other responses to taxation? Beer, Mooij, and Liu (2020) underline "little attention in the literature on the interaction between profit shifting and the reallocation of real activities by MNCs".

## Motivation (2/2)

- ▶ In response to MNCs' tax planning practices, several reform proposals aim at reconnecting taxation and value creation.
  - ▶ In the OECD / G20 "two-pillar solution", Pillar One anchors a share of multinationals' tax payments to their revenue-generating activities;
  - ▶ Cobham et al. (2022)'s Minimum Effective Tax Rate (METR) identifies MNCs' non-effectively-taxed profits, aggregates them at the group level and allocates them across tax jurisdictions based on sales, payroll and assets;
  - ▶ Other proposals exist, such as the European Commission's CCCTB (2016)<sup>1</sup> or more generally formulary apportionment approaches.
- ▶ Simulating such reforms requires a distribution of sales based on their final destination. This raises the question of the economic determinants that may drive a wedge between the accounting treatment of extra-group transactions and the actual location of customers.

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1. CCCTB: Common Consolidated Corporate Tax Base.

## Research question

- ▶ Consider a manufacturing firm, willing to locate the plant that will serve EU customers. Among other factors, CIT may make countries more or less attractive. This tax planning margin affects payroll, assets, etc.
  - ▶ **NB:** Interestingly, in such cases, profit margin or profit-to-employee ratios often used to identify shifting may not display any abnormal pattern.
- ▶ Consider a cloud service firm, setting up the entity that will bill its European (extra-group) sales. For such a fully digital activity, the decision may have no impact on employment, nor on investment.
- ▶ But in both cases, the distribution of unaffiliated revenues is affected.

**Question:** Do multinationals' extra-group transactions respond to corporate income taxation? What are the implications for policy simulations?

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## Leveraging country-by-country report statistics

- ▶ We rely on the OECD & IRS country-by-country report (CbCR) statistics, as revenue variables (i) encompass a broad range of transactions and (ii) allow to isolate “unrelated party revenues” (transactions with unaffiliated entities).
- ▶ Importantly, revenues are based on the tax residence of the affiliates that register transactions in their financial accounts, rather than customers' location. Example with a cloud service firm:



Headquarter in the US, with the data centres backing its cloud services.



EU sales teams in Ireland. Selling the services and registering transactions.



Users in France. Receiving bills from the Irish affiliate.  
*[Not visible in the data]*

- ▶ Revenue variables thus reflect MNCs' potential tax planning margins.

## The striking importance of small low-tax jurisdictions

- We show the largest foreign affiliate countries in the US 2017 CbCR statistics:

**Table:** Top 15 unrelated party revenues booked by US MNCs

| Affiliate country | 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                      |

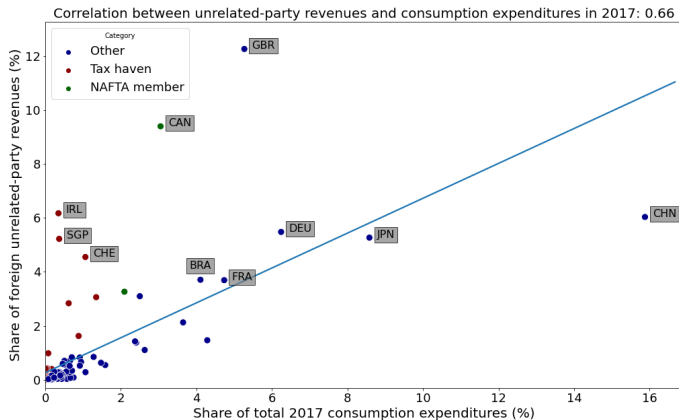
- In 2017, tax havens account for 27% of foreign unrelated party revenues; for 21% when including non-US MNCs.<sup>2</sup>

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



## In disproportion with local demand

- We plot affiliate countries' share of US foreign unrelated-party revenues and their share of final consumption expenditures:



- Positive but limited correlation (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).

## Intermediary remarks

- ▶ Without any disconnection between the accounting treatment of unrelated party revenues and their final destination, differences in affiliate set-up costs may rationalize the table above.
  - ▶ E.g., entering the Irish market could be particularly easy for US MNCs.
- ▶ The graph instead suggests that remote sales are at play, considering the limited consistency with local demand. Small jurisdictions may attract large extra-group sales due to the access they provide to neighbouring markets.
- ▶ But the presence of certain tax havens well above the regression line points to an effect of countries' tax environment. Is it driven by CIT specifically or by other factors?

Our econometric analysis aims at **disentangling potential interpretations**.

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## Model

- ▶ Econometric model builds upon a theoretical framework in which firms must produce and register extra-group sales locally to serve a given market, thus shutting off disconnection channels.
- ▶ In the bilateral equation for sales, partner's attractiveness as an export platform ("foreign market access", FMA) and taxation thus play no role.
- ▶ We add them to the model and test their effects, which yields:

$$\ln(X_{i,j,t}) = \beta_0 + \beta_1 Tax_{j,t} + \beta_2 \ln(GDP_{i,t}) + \beta_3 \ln(GDP_{j,t}) \\ + \beta_4 \ln(FMA_{j,t}) + \beta_5 \ln(Dist_{i,j}) + G_{i,j,t} \gamma + FE_{i,t} + \varepsilon_{i,j,t}$$

- ▶  $FMA_{j,t}$  is estimated as in Laffitte and Toubal (2022);
- ▶  $G_{i,j,t}$  stands for gravity variables, including country  $j$ 's remoteness;
- ▶  $FE_{i,t}$  is a set of headquarter country and time fixed effects.

## Benchmark results

- ▶ Estimating the model with various tax rate measures.
- ▶ -1.85 semi-elasticity of unrelated party revenues to the statutory tax rate.
- ▶ Relatively robust to other measures of the tax rate.
- ▶ Main controls generally significant, with consistent signs and magnitudes.

|                           | (1)<br>ln(UPR)       | (2)<br>ln(UPR)       | (3)<br>ln(UPR)        |
|---------------------------|----------------------|----------------------|-----------------------|
| Statutory tax rate        | -0.0185**<br>(0.011) |                      |                       |
| Lagged statutory tax rate |                      | -0.0156**<br>(0.033) |                       |
| Lagged CbCR ETR (cash)    |                      |                      | -0.0188***<br>(0.002) |
| ln(GDP) - WOE             | 1.196***<br>(0.000)  | 1.191***<br>(0.000)  | 1.226***<br>(0.000)   |
| ln(Foreign Market Access) | 0.292***<br>(0.004)  | 0.291***<br>(0.004)  | 0.237<br>(0.107)      |
| ln(Distance)              | -0.489***<br>(0.002) | -0.483***<br>(0.002) | -0.137<br>(0.501)     |
| Gravity control variables | Yes                  | Yes                  | Yes                   |
| Year fixed effects        | Yes                  | Yes                  | Yes                   |
| Observations              | 508                  | 508                  | 256                   |
| R-squared                 | 0.837                | 0.837                | 0.846                 |
| Adj. R-squared            | 0.832                | 0.832                | 0.837                 |

*p*-values in parentheses

Using robust standard errors.

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

## Influence of the broader tax environment

- ▶ Enriching controls with other tax environment characteristics.
- ▶ Reduces magnitude and significance of the statutory tax rate effect. Benchmark semi-elasticity inflated by an omitted variable bias?
- ▶ Holding controls constant, revenues are up to 4 times larger in a tax haven!
- ▶ Consumption taxes seem to matter more than CIT.

|                              | (1)                  | (2)                  | (3)                  |
|------------------------------|----------------------|----------------------|----------------------|
|                              | ln(UPR)              | ln(UPR)              | ln(UPR)              |
| Statutory tax rate           | -0.0171**<br>(0.016) | -0.0143**<br>(0.037) | -0.0121*<br>(0.080)  |
| Consumption tax rate         |                      | -0.0243**<br>(0.031) | -0.0257**<br>(0.030) |
| TWZ tax haven classification |                      | 1.409***<br>(0.000)  |                      |
| H&R tax haven classification |                      |                      | 1.321***<br>(0.000)  |
| ln(GDP) - WOE                | 1.148***<br>(0.000)  | 1.278***<br>(0.000)  | 1.269***<br>(0.000)  |
| ln(Foreign Market Access)    | 0.349***<br>(0.000)  | 0.188**<br>(0.033)   | 0.242***<br>(0.006)  |
| Tax environment controls     | Yes                  | Yes                  | Yes                  |
| Gravity control variables    | Yes                  | Yes                  | Yes                  |
| Year fixed effects           | Yes                  | Yes                  | Yes                  |
| Observations                 | 508                  | 474                  | 474                  |
| R-squared                    | 0.852                | 0.889                | 0.886                |
| Adj. R-squared               | 0.847                | 0.884                | 0.881                |

*p*-values in parentheses

Using robust standard errors.

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

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## The need for an adjustment of revenue variables

- ▶ Unrelated party revenues do not reflect customers' location, as required for instance in the draft Pillar One revenue sourcing rules (see OECD (2022)).
- ▶ As we have seen, because they rely on the accounting treatment of transactions, revenues are biased towards - possibly low-tax - sales platforms.
- ▶ This distorts simulations of the revenue effects of sales-based proposals. Naively allocating Baraké et al. (2021)'s tax deficit estimates based on unrelated party revenues, tax havens gather around 20% of the gains from foreign MNCs.<sup>3</sup>
- ▶ We propose an adjustment of revenue variables, based on BEA data and trade statistics. It aims at approximating **a destination-based mapping of sales**.

▶ Overview of the methodology

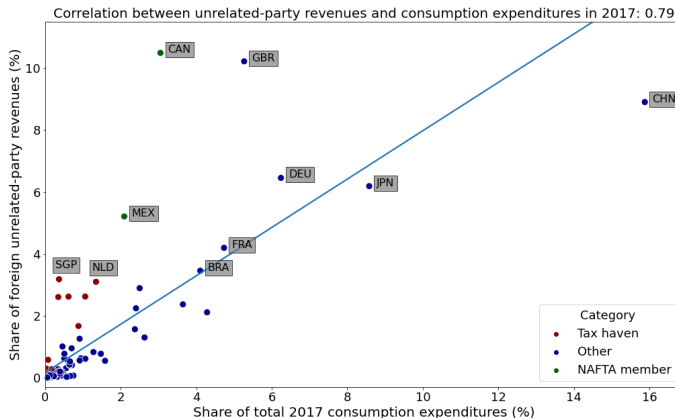
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3. With methodological cave-ats regarding the MNCs and taxing countries considered, more details in the paper.



## Assessing the adjustment performance (1/2)

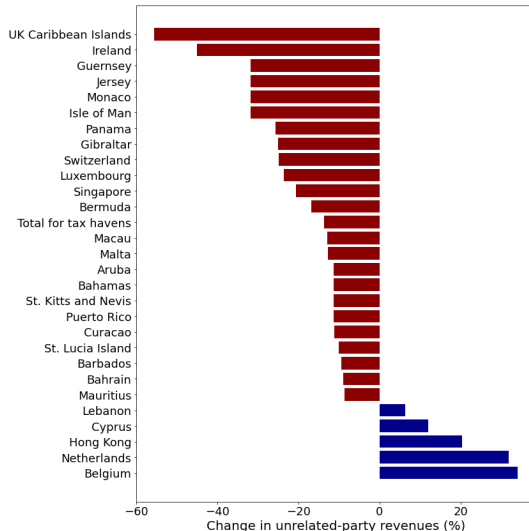
- ▶ The adjustment recomposes the previous ranking, in favor of NAFTA members (e.g., Mexico moving from 11<sup>th</sup> to 6<sup>th</sup>), China or France. Ireland tumbles from 3<sup>rd</sup> to 14<sup>th</sup>, while Switzerland and Singapore also lose their positions.
- ▶ Improved consistency with final consumption expenditures (0.79 correlation):



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

## Assessing the adjustment performance (2/2)

- ▶ 9 of the 10 largest losers are listed as tax havens.
- ▶ Tax havens gather 18% of US MNCs' *adjusted* foreign unrelated party revenues (vs. 27% ex ante).
- ▶ In the simulation, with the adjusted sales, tax havens collect 13% of the gains from foreign MNCs (vs. 20% ex ante).
- ▶ The specific trajectory of a few havens (e.g., Netherlands) may underline limitations of the adjustment.



Note: Focusing on US multinationals.

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## Conclusion

- ▶ We use CbCR statistics to assess whether extra-group transactions respond to corporate income taxation, as suggested by simple descriptive evidence.
- ▶ Benchmark econometric analysis yields a semi-elasticity of -1.85 to the statutory tax rate. But the effect of CIT may in fact relate to other tax environment characteristics and its robustness is limited.
  - ▶ Some evidence that location decisions and the organisation extra-group sales provide MNCs with a tax planning margin adding to profit shifting schemes.
- ▶ Since directly using unrelated party revenues biases sales apportionment simulations towards MNCs' sales platforms, we propose an adjustment mechanism, the resulting mapping being more in line with aggregate demand proxies.
  - ▶ Database available for future research, as well as a flexible Python package.

## 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 my master thesis and the ongoing “extraction” of this paper. I am grateful to Prof. Bertrand Garbinti for his feedback when assessing 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.

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## Appendix A - Glossary

| Abbreviation | Meaning  |
|--------------|--|
| BEA          | Bureau of Economic Analysis                            |
| CbCR         | Country-by-country report                              |
| CIT          | Corporate income taxation                              |
| 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                               |

## Appendix B.1 - Estimation of foreign market access

- ▶ In our benchmark specifications, we control for foreign market access (FMA) as estimated by Laffitte and Toubal (2022) based on Head and Mayer (2013). We draw these explanations from their Online Appendix (link).
- ▶ Consider the following model of log bilateral trade flows:

$$\ln(\text{Trade}_{i,j,t}) = \alpha + \beta_1 \ln(\text{Distance}_{i,j}) + \beta_2 \text{Contig}_{i,j} + \beta_3 \text{Colony}_{i,j} + \beta_4 \text{ComLang}_{i,j,t} + \beta_5 \text{RTA}_{i,j,t} + \mu_{i,t} + \mu_{j,t} + \epsilon_{i,j,t}$$

Where fixed effects  $\mu_{i,t}$  and  $\mu_{j,t}$  stand for multilateral resistance terms specific to the origin and the partner country (e.g.,  $\mu_{j,t}$  covers country  $j$  market size).

- ▶ Bilateral terms give a measure of the ease of access to  $j$  for exporters in  $i$ .<sup>4</sup>
    - ▶ E.g.,  $\hat{\beta}_2$  is positive and ease of access measure thus increases with contiguity.
- $$\phi_{i,j,t}^{\hat{\beta}_1} = \text{Dist}_{i,j}^{\hat{\beta}_1} * \exp(\hat{\beta}_2 \text{Contig}_{i,j} + \hat{\beta}_3 \text{Colony}_{i,j} + \hat{\beta}_4 \text{ComLang}_{i,j,t} + \hat{\beta}_5 \text{RTA}_{i,j,t})$$
- ▶ Foreign market access then defined by  $\text{FMA}_{i,t} = \sum_j \exp(\mu_{j,t}) * \phi_{i,j,t}^{\hat{\beta}_1}$ . It is high for countries with easy access (high  $\phi_{i,j,t}^{\hat{\beta}_1}$ ) to large partners (large  $\mu_{j,t}$ ).

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4. We estimate the model upon the BACI database (Gaulier and Zignago (2010)).



## Appendix B.2 - Further results and cave-ats

- ▶ The effect of CIT is of much lesser magnitude than for related party revenues or profits before tax (around -4.3 for these two outcomes).<sup>5</sup> This result may suggest that the organisation of extra-group sales only constitutes a secondary tax planning margin for MNC, vs. intra-group profit shifting schemes.
- ▶ Other estimates show that, as CIT affects MNCs' location choices, it has an impact on the number of firms active in a given affiliate country. Because of the way CbCR statistics are aggregated to preserve taxpayers' confidentiality, this may give rise to endogenous sample selection.
- ▶ Except for the ETRs estimated directly from CbCR statistics, robustness to another measure of foreign market access (World Bank (2018)'s Logistics Performance Index), to wages or to affiliate country fixed effects is very limited.

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5. As discussed in the paper, this estimate cannot be directly compared with the benchmark -0.8 or -1 semi-elasticity of pre-tax profits to CIT rate differentials identified so far in the literature.

## Appendix B.3 - What to think of CbCR-estimated ETRs?

- ▶ As they reflect the taxes actually paid or accrued by large multinational companies, they may be closer to perceived tax burdens and may thus be our ideal tax measures. E.g., they discriminate tax havens particularly well, compared with the statutory rate or the Effective Average Tax Rate (EATR).
- ▶ But they are essentially endogenous to MNCs' tax planning strategies, which may raise issues for the estimation even with a one-year lag. Cf. loss of significance for key control variables like foreign market access or distance.
- ▶ And they may be distorted downwards by the inclusion of intra-group dividends in the profits before tax variable. Questions the “discrimination result” if tax haven affiliates receive more dividend payments than non-haven affiliates.

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## Appendix C.1 - Adjusting revenues: Brief methodology

- ▶ 1<sup>st</sup> 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 revenue variables into three types of final destinations (local sales, sales to the headquarter and sales to any third country).
- ▶ 2<sup>nd</sup> 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 affiliate country's exports of merchandise and services.
- ▶ 3<sup>rd</sup> step: 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.

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## Appendix C.2 - Adjusting revenues: Focus on the Netherlands

- ▶ US MNCs' 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 Netherlands in exports (%) |
|-------------------|-------------------|---|
| NLD               | 78,916.3          | ..                                      |
| USA               | 37,761.8          | 2.9                                     |
| IRL               | 10,855.2          | 4.7                                     |
| GBR               | 7,431.6           | 7.0                                     |
| BEL               | 4,598.6           | 16.3                                    |
| CHE               | 3,508.4           | 3.0                                     |
| DEU               | 3,117.5           | 7.0                                     |
| UKI               | 2,650.0           | 31.6                                    |
| SGP               | 2,001.7           | 1.8                                     |
| BMU               | 1,474.2           | 35.9                                    |

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