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Adjusting Country-by-Country Revenue Variables: A Journey into Multinational Companies' Sales Networks

ABSTRACT:

In this study, we explore a key limitation of multinational companies' country-by-country data: as revenue variables reflect the tax jurisdiction of the affiliates that register the transactions and not the ultimate destination of goods or services, they are heavily distorted by the use of platform jurisdictions, from which sales are operated remotely. We first evidence these distortions based on unadjusted country-by-country data and highlight the disproportionate weight of a few small, low-tax countries in the distribution of US multinational firms' unrelated-party revenues. Second, we develop a methodology to adjust these revenue variables and approximate a destination-based mapping of sales. The impact of this adjustment on well-known platform jurisdictions corroborates earlier findings. Eventually, we propose a tentative extension of our methodology to non-US headquarter countries and re-estimate the revenue gains from Baraké et al. (2021)'s minimum tax unilateral implementation scenario.

1. Introduction

Initially released by the OECD in July 2020, the aggregated and anonymized tabulations of multinational companies' country-by-country reports have rapidly become a central data source in the study of the profit shifting and aggressive tax planning behavior of global corporations. They indeed provide rich information on multinational enterprises' revenues, profits or taxes paid, broken down by their headquarter country and the tax residency of their affiliates. These macroeconomic data have been widely used in the related literature, either focusing on the United States like Clausing et al. (2021) or considering all available headquarter countries such as Garcia-Bernardo and Janský (2021). In particular, parallel to the negotiation process orchestrated by the OECD and the G20, country-by-country reporting is key to estimate the revenue effects of imposing a global minimum tax rate on multinational companies' profits (see OECD (2020) or Baraké et al. (2021)).

In this report, we investigate a key limitation of country-by-country data, inherent in revenue variables. Importantly, the micro-level data, to which national tax authorities have access before they are transmitted to the OECD in an aggregated and anonymized form, also feature this shortcoming. Indeed, as defined in the country-by-country reporting standards, revenue variables reflect the tax jurisdiction of the subsidiaries that register the transactions in their financial accounts, instead of the ultimate destination of the sales. For instance, even though the actual customer resides in France or in Germany, the sales of goods and services operated by Apple or Amazon via their Irish affiliates are attributed to Ireland. The distortion is substantial because large multinational companies are known to organize their global sales networks around "platforms", i.e. jurisdictions from which they operate a large share of their sales while final beneficiaries reside abroad. Digitalisation, among other trends, has made it easier for many corporations to serve their customers remotely.

We first evidence the phenomenon and the related distortions based on the US aggregated and anonymized country-by-country data. We find that a few low-tax jurisdictions, in particular Ireland, Singapore and Switzerland, concentrate a disproportionate share of US multinational enterprises' unaffiliated sales relatively to the size of their economies. For instance, while Ireland represents only 0.5% of the total Gross National Income (GNI) observed in our sample, the country accounts for 7.1% of unrelated-party revenues. It is the third largest destination for US multinational companies' sales, ranking ahead of close commercial partners like Western Europe industrialized economies (e.g. Germany or France) or large developing countries (e.g. China or Brazil). Overall, the 41 tax havens listed in Tørsløv et al. (2019) account for 28% of all unrelated-party revenues registered abroad by US multinational enterprises. We show that the disconnection between partner countries' share of unaffiliated sales and their economic weight is most significant for the sectors of activity that involve on intangible transactions, such as information and communication or financial services.

These distortions in country-by-country data and more generally, the absence of a destination-based mapping of multinational companies' sales are especially problematic when estimating the revenue

effects of proposed reforms of the international corporate income tax system. Indeed, these often rely on sales apportionment formulas. For instance, the Pillar One of the agreement reached by 133 members of the G20 / OECD Inclusive Framework on Base Erosion and Profit Shifting (BEPS) in last July[1] aims at re-allocating taxing rights over the "excess profits" of multinational companies to their "market jurisdictions", i.e. to the countries where their ultimate customers are located. Should French users account for 5% of Google's worldwide sales, France would be able to tax 5% of the firm's consolidated profits, in excess of at least 10% of group-level revenues. As another example, several researchers from the Tax Justice Network proposed to attribute revenue gains from the global minimum tax on corporate profits not to headquarter countries (as in the Pillar Two of the agreement mentioned above) but based on multinational companies' destination-based sales[2]. Estimations of the revenue effects of both these proposals can be affected by the use of sales platforms by multinational enterprises: Ireland's gains are particularly likely to be overstated, while the gains for higher-tax countries out of which sales are shifted would rather be underestimated.

Therefore, focusing again on the US case, we propose a methodology to adjust the revenue variables of country-by-country data based on the ultimate destination of multinational companies' sales. Data compiled by the Bureau of Economic Analysis (BEA) indicate, for a number of partner jurisdictions, what shares of these revenues are directed to the host country, to the US or to any other destination. Importantly, these statistics allow to distinguish unrelated-party and related-party revenues. From there, we use the OECD's Balanced Trade Statistics on merchandise and service exports to distribute the latter type of sales to ultimate partner jurisdictions. The data used and our methodology are described in a more detailed fashion in the two following sections of the report. As presented as part of our results, the adjusted revenue variables of US multinational companies further highlight the importance of sales platforms: for the fiscal year 2018, Ireland is the most severely hit partner jurisdiction and sees its unrelated-party revenues cut by 66.6%. More generally, the importance of tax havens is reduced via the adjustment, as they eventually account for 17.2% of unaffiliated sales.

Our contribution adds to the methodology proposed by the OECD (2020), to estimate the revenue effects of Pillar One. The authors rely on the OECD's Analytical AMNE database to approximate the destination-based sales of multinational companies engaged in Consumer-Facing Businesses (CFB) and to distribute their excess profits among market jurisdictions. For each country where subsidiaries of these firms are active, they distinguish the revenues that relate to exports and those that are actually generated in the host country: they subtract the former from the latter to deduce a destination-based distribution of multinational enterprises' sales. The computations that we develop for US multinational companies correct for two key shortcomings of this methodology. It allows to adjust related-party and unrelated-party revenues separately, the two types of transactions being driven by very different logics, and it accounts for "remote sales". Goods and services sold by US

[1] See the related joint statement following this link.
[2] See Cobham et al. (2021) in the bibliography of this report.

multinational enterprises to French customers may not directly stem from their French subsidiaries but can instead be registered by Irish, German or any other affiliates. These sales operated from a foreign country intro France are not captured by the methodology of the OECD (2020).

Eventually, we propose a tentative extension of our destination-based adjustment to other headquarter countries, beyond the US. Similarly to the OECD (2020) in this case, we leverage the Analytical AMNE database to distribute revenues between three types of transactions: those directed to the host country, those directed to the headquarter country and those directed to any other country. The separation between the last two kinds of sales relies, as a simplification, on an extrapolation of the BEA's data on the activities of US multinational companies. Although we cannot distinguish in the datasets that we use sales to affiliated and affiliated partners, we try to capture remote sales thanks to trade statistics, similarly to what is done in the US case. From this approximation of a global destination-based mapping of multinational companies' sales, we re-estimate the corporate income tax revenue gains from the minimum tax unilateral implementation scenario of Baraké et al. (2021).

2. Description of existing data

a. Aggregated and anonymized CbCR data

General presentation

This study first relies on the aggregated and anonymized country-by-country data of the Internal Revenue Service (IRS). Released so far for three financial years (from 2016 to 2018), this dataset provides information on the domestic and foreign activities of US multinational companies. For each tax jurisdiction where they are active, country-by-country data display their aggregated revenues, pre-tax profits, corporate income taxes paid and accrued, among other variables. This reporting has been mandatory for US multinational companies with a consolidated turnover of more than 850 million USD since 2017: reports are transferred to the US tax authority, which compiles these micro-data in an anonymized and aggregated dataset for public release.

In particular, the dataset comprises three revenue variables: "Unrelated party revenues", which correspond to transactions between subsidiaries of the reporting multinational company and unaffiliated partners; "Related party revenues", associated with intra-group transactions; "Total revenues", i.e. the sum of the two other variables. In country-by-country data, the notion of revenues encompasses a wide scope of transactions. The definition provided by the OECD, in charge of supervising the global collection of country-by-country data, is the following: "revenues should include revenues from sales of inventory and properties, services, royalties, interest, premiums and any other amounts". Besides, dividends paid by affiliated corporations are excluded.

Known issues and pre-treatment choices

Several studies have underlined the limitations of country-by-country data. When focusing on revenues, three shortcomings of this dataset should be taken into account:

- **Stateless entities**. The US aggregated and anonymized country-by-country data include "stateless" entities, i.e. affiliates of US multinational companies whose tax jurisdiction could not be properly established for various possible reasons. Importantly, these may lead to double-counting in the revenue variables and therefore, following most of the studies that have resorted to country-by-country data (OECD (2020), Garcia-Bernardo and Janský (2021) or Clausing et al. (2021)), we exclude stateless entities from our analysis.

- **Aggregation levels and taxpayer confidentiality**. For a given pair of headquarter country and market jurisdiction, the number of active multinational companies is so low that aggregated country-by-country reports could breach the taxpayer's confidentiality. The IRS therefore gathers partner countries with a too low number of reporting entities, typically at the

continental level, which introduces rows such as “Other Europe” or “Other Africa”. The methodological section of this report describes in more details how we account for these aggregated partner jurisdictions.

- **Voluntary and mandatory reporting**. For the financial year 2016, the reporting of country-by-country data by in-scope multinational companies was not yet mandatory. As noticed by the OECD (2020), between the 2016 and 2017 US country-by-country data, the number of reporting companies increased by roughly 40%. Our benchmark results are presented for the financial year 2018 and they are therefore preserved from this limitation. The latter might however affect our results for the financial year 2016, presented as robustness checks.

Brief descriptive statistics

For the financial year 2018, the US country-by-country data relied on the reporting of 1,641 multinational companies, which accounted for 197,061 entities globally. Excluding “Stateless entities”, which account for 3.5% of US multinational enterprises’ total revenues worldwide, as well as intermediary totals, the preprocessed dataset provides information for 144 unique partner jurisdictions. This includes the US themselves, the revenues domestically registered by US multinational companies representing 66.1% of the global total. Among the unique partner jurisdictions, there are also 4 continental aggregates (“Other Africa”, “Other Europe”, “Other Americas” and “Other Asia and Oceania”) that together account for less than 0.1% of total foreign revenues (excluding those booked in the US).

b. Data on the activities of US multinational enterprises

Second, we leverage data provided by the Bureau of Economic Analysis (BEA) on the worldwide activities of US multinational companies. These statistics, compiled since 1977, give an annual overview of the finances (balance sheet details, aggregated income statements…) and operations (destination of goods and services supplied, employee compensation, capital expenditures…) of US multinational companies and their foreign affiliates.

In particular, we focus on the BEA’s 2018 preliminary statistics related to the majority-owned affiliates of US multinationals. Tables E1 to E17 provide detailed information on the “goods and services supplied” by US multinationals. These can be assimilated to sales but their scope is narrower than that of revenue variables in country-by-country data. The precise definitions of goods and services supplied can be found in Appendix A of the present report.

For 64 jurisdictions (of which 7 regional aggregates) where they operate, Table E2 allows to split the sales registered by the majority-owned affiliates of US multinational companies based on their ultimate destinations. Total goods and services supplied are first provided in millions of current USD.

These are then split between sales to the US and sales to foreign countries. The latter amount is again distributed between sales to the host country (where the affiliate is active) and sales to any other country. Eventually, all aggregates are split between sales to affiliated companies and sales to unrelated parties. The schema in Appendix B summarizes this series of disaggregations.

These data allow to shed light on the issue mentioned above for country-by-country data. The total goods and services registered by the majority-owned affiliates of US multinational enterprises in a given jurisdiction are not all directed to the host country. On average, 58% of the goods and services supplied are attributed to the host country, with respectively 12% and 30% of sales directed to the US and to any other country. This ratio of goods and services supplied to the host country to total goods and services supplied strongly varies from a partner jurisdiction to another: the minimum is of 2% for Barbados and the maximum of 96% for Venezuela. These differences highlight the use by US multinational companies of certain countries as platforms, where only a limited share of sales operated is actually directed to the local market.

c. Balance Trade Statistics

Third, to distribute the sales that are ultimately directed to any country other than the host jurisdiction and the US, we use the OECD's Balanced Trade Statistics. More precisely, we combine the Balanced International Merchandise Trade Statistics (BIMTS) and the Balanced Trade in Services (BaTIS) datasets. These analytical statistics were designed so as to correct for recurrent asymmetries in international trade data.

On the one hand, BIMTS cover 163 reporting countries. For each of these, the dataset provides its "Balanced Trade Value", i.e. its exports corrected for bilateral asymmetries, to a variety of partner countries in current USD. Data are available for 6 years, from 2013 to 2018, and a wide variety of commodity categories. In 2018, focusing only on the total of all commodities, the dataset covers 162 unique partners and on average, each reporting country is associated with 135 destinations.

On the other hand, BaTIS data cover 206 reporting countries, from 2005 to 2019. For each pair of reporting and partner countries, several information are available. First, one can choose between the exports from the reporting country to the partner jurisdiction and imports by the former from the latter. Second, several values are proposed: the reported amount, additional estimates and a "final balanced value" that aims at correcting for bilateral asymmetries. Last, these data are available for a wide range of service categories. All amounts are presented in current USD. For the year 2018, considering exports, final balanced values and the total of all services, the dataset covers 206 unique partner jurisdictions and on average, each reporting country is associated with 198 destinations.

Regarding the way we combine the two datasets (respectively dedicated to merchandise and services), more details are provided in the following methodological section.

3. Methodology

In this section, we detail the methodology used to adjust the revenue variables of the IRS' country-by-country data based on the ultimate destination of the sales.

a. Splitting revenues intro three types of sales

The first step consists in splitting each of the three revenue variables ("Unrelated party revenues", "Related party revenues" and "Total revenues") in three different amounts: sales directed to the host country, sales directed to the US and sales directed to any other country.

We start by reorganizing the BEA data on the destination of the goods and services supplied by the majority-owned affiliates of US multinational firms. In the original Table E2, sales are split based on their destination and then, unrelated-party revenues are distinguished from intra-group transactions. As presented in the schema of Appendix C, we create new total columns and revert this order.

We add these data to the IRS' country-by-country statistics. For each partner jurisdiction present in both datasets, we then have: the three revenue variables drawn from country-by-country data, the new total columns computed from BEA data (for affiliated, unaffiliated and all partners) and their split based on the final destination of the transaction. However, excluding US-US sales, 86 partner jurisdictions in the preprocessed IRS dataset are absent from BEA data, accounting for 4% of all foreign total revenues. Plus, for some countries, the BEA data are incomplete and do not allow to properly split unaffiliated and affiliated sales based on their destination. For these, we impute the BEA variables summed at the level of the corresponding continent.

This is possible because we do not use the absolute amounts of goods and services supplied that the BEA dataset provides but ultimately focus on the relative share of each type of destination (the US, the host country or any other country) in unaffiliated, affiliated and total sales. We compute these nine percentages for each partner jurisdiction in country-by-country data, including those for which imputations were operated at the continental level. These percentages then allow to distribute the three revenue variables of country-by-country data between the different types of destination.

Appendix D gives a detailed example of these computations for one of the partner jurisdictions that are present in both datasets.

b. Already attributed sales

With the computations detailed above, we obtain a split of unrelated-party revenues, related-party revenues and total revenues in three types of ultimate destination: the US, the host country and any other country. This gives a total of nine variables.

Importantly, from then on, the total revenue columns do not match the sum of the corresponding unrelated-party and related-party revenue columns. It is the case in the original country-by-country data of the IRS, but we have computed from BEA statistics and applied different percentages to distribute each of the three revenue variables.

Additionally, among these nine columns, six of them can already be considered as destination-based sales. Unrelated-party revenues, related-party revenues and total revenues attributed to the US or to the host country, i.e. to the partner jurisdiction in the IRS dataset, are associated with their ultimate destination. We therefore move to the destination-based distribution of the sales that are directed towards any other country.

c. Distributing sales to third countries

Preparing trade data

On the one hand, for merchandise trade statistics, we use the OECD's Balanced International Merchandise Trade Statistics (BIMTS). We focus on the three years of interest (from 2016 to 2018) and on the total of all commodities. We consider all reporting countries and all partner jurisdictions. On the other hand, for service-related trade statistics, we rely on the OECD-WTO's Balanced Trade in Services (BaTIS) dataset. We restrict it to exports from reporting countries to their partners, focusing on the total of all services and the "final balanced value".

At this stage, we ensure the overlap between destination countries in the trade statistics and the 144 unique partner jurisdictions in the IRS' country-by-country data. Countries that appear among destinations in the trade statistics but are absent from the set of affiliate jurisdictions in the IRS dataset are aggregated at the continental level. They thus form aggregate partners such as "Other Europe", "Other Africa", etc. In the BaTIS dataset, for some reporting countries, service exports are not broken down at the destination country level but are presented as directed to the "Rest of the world". We redistribute these amounts to the "Other Europe", "Other Africa", etc. aggregate partners based on the relative importance of these destinations for each reporting country concerned.

Combining merchandise and services statistics

We then merge the two datasets on each reporting country / partner country pair. We retain all the country pairs for which we have either merchandise- or service-related information and we replace the resulting missing values with zeros. This process has two main implications:

- First, it comes down to assuming that the coverage of the two datasets is complete for all the reporting countries that they involve. Let us take the example of France, which is present as

a reporting country in both BIMTS and BaTIS datasets. Among the partner jurisdictions associated with France in the preprocessed BaTIS dataset, the final balanced value of French exports of services to Gabon are of 555.8 million USD. But Gabon does not appear in the pre-treated BIMTS. When merging the two datasets, we keep the France-Gabon row and replace the merchandise exports by zero, considering that the partner being absent from the BIMTS simply means that there are no exports of tangible goods from France to Gabon.

- Second, several reporting countries are only present in the BIMTS (2 countries) or in the BaTIS (40 countries). It is not likely for these countries to exclusively export merchandise or services. Hence, should we be interested in the absolute amounts of exports of these countries, we should find a way to estimate missing data from what is available in the OECD's datasets. In our computations, we solely look for a distribution of these countries' exports, e.g. what percentage of Serbian exports (only in BaTIS) France, the US or Germany represent. In this case, replacing missing values by zeros comes down to assuming that the distribution of observed exports is the same as that of unobserved transactions and thus, as the distribution of these countries' overall exports.

From there, after having combined the two datasets, we obtain data on the exports of merchandise and / or services from 202 unique reporting countries to 135 partner jurisdictions. We sum merchandise and service exports into a single variable covering all kinds of exports.

Distributing the revenue variables

After the destination-based split of the revenue variables of country-by-country data, we use trade statistics to distribute the sales that are not directed towards the US, nor towards the host country (where the affiliate is active).

This requires to expand the combined trade statistics to the 143 unique foreign partner jurisdictions in the IRS' country-by-country data. To do so, we aggregate data on overall merchandise and service exports at the continental level. Said otherwise, for countries that are among partner jurisdictions in the split revenue table but are absent from the OECD's trade statistics, we assume that their distribution of exports is similar to that of their continent. More precisely three cases arise:

- If the partner jurisdiction appears in the OECD's trade statistics, we directly distribute the sales directed towards any other destination based on the observed distribution of the country's exports;

- If the partner jurisdiction is a continental aggregate ("Other Europe", "Other Africa"…) – and is therefore absent from the OECD's trade statistics – we associate it with the exports data aggregated at the continental level;

- If the partner jurisdiction, say a European one, is a well-identified country but is absent from the OECD's trade statistics, we take the corresponding continental aggregate in trade statistics and eliminate the country from destinations.

For each partner jurisdiction in the IRS' country-by-country data, we can thereby deduce a distribution of exports. Two additional remarks are in order. First, in all these cases, we eliminate the US from export destinations: the sales that are ultimately directed to the US have already been attributed using BEA data. Second, for each reporting country, we eliminate from the distribution of exports the destinations that represent less than 0.5% of total transactions. We indeed assume that US multinationals are not likely to operate such niche operations and rather attribute them to domestic multinationals.

We use this distribution to estimate the ultimate destinations of unattributed sales. For instance, for France, unrelated-party sales to other countries amount to 20.3 billion USD; Germany representing 15% of French exports based on the OECD's datasets, we conclude that US multinationals register 3.1 billion USD of sales via their French subsidiaries that are ultimately directed to Germany.

d. The case of US-US sales

So far, we have estimated a destination-based mapping of the sales registered by US multinationals via their affiliates in foreign partner jurisdictions. BEA data allowed to split each of the revenue variables of the IRS' country-by-country data in three categories and unallocated sales were distributed thanks to trade statistics.

However, Table E2 of BEA data on the activities of US multinationals does not allow to distribute the revenues registered by US multinationals directly in the US, that may actually be associated with exports and be ultimately directed to other, foreign countries. Instead, we use Table O1 that describes the sales of US parents based on their destination and type for each sector of activity. Without allowing to distinguish between unrelated-party and related-party revenues ("U.S. persons" are not split between intra- and extra-group transactions), we find that 12% of total US-US sales are in fact directed to another country.

We can therefore split the three US-US revenue variables between local operations and exports. The former are already associated with their ultimate destination and consistently with the methodology detailed above, we use the OECD's data on US merchandise exports to distribute the latter. Indeed, the transactions that involve tangible goods are less likely to be organized by multinationals for tax planning purposes and merchandise trade statistics are more likely to reflect the ultimate destination of associated sales than the service-related ones. For instance, well-known profit shifting destinations account for a disproportionate share of US exports of services relatively to the size of their economy:

Ireland, Switzerland and Luxembourg combined account for 12%. Besides, we exclude destinations that represent less than 0.1% of US exports of services, the absence of such a restriction producing disproportionate adjustments for small economies (such as Lebanon for which unrelated-party sales increase by 677%).

4. Results

a. Before the destination-based adjustment

We first explore the geographical distribution of US multinational companies' sales based on the unadjusted country-by-country data of the IRS. Among the variables provided, we mainly focus on "Unrelated party revenues", which cover sales and transactions operated with unaffiliated entities.

Table 1 first displays the respective weight of the four continental aggregates that we use throughout our computations to impute missing values. We also distinguish domestic operations, i.e. the unrelated-party revenues registered by the US-based entities of in-sample multinational groups.

Table 1: Evolution of the continental distribution of US multinational companies' foreign unrelated-party revenues over the sample period, as in unadjusted country-by-country data.

	2016	2017	2018
Sales to the US (billion USD)	7800	10618	11324
Sales abroad (billion USD)	3026	3984	4397
of which Africa (%)	*1.6*	*1.4*	*1.3*
of which America (%)	*21.1*	*20.7*	*18.9*
of which Asia-Pacific (%)	*31.7*	*32.4*	*33.9*
of which Europe (%)	*45.6*	*45.5*	*46.0*

Note: This table presents the absolute amounts of US multinational companies' unrelated-party revenues in the US and in foreign partner jurisdictions. The latter total is obtained by summing unrelated-party revenues over all non-US partner countries but "Stateless entities" and continental totals. These figures are presented in current billion USD. The distribution of foreign unrelated-party revenues among 4 regional aggregates (Europe, Asia-Pacific, America, Africa) is also presented, continents' respective weights being expressed in percentage. All figures are based on the unadjusted IRS' aggregated and anonymized country-by-country data.

The bulk of sales to unaffiliated companies is directed to Europe (roughly 46%) and Asia-Pacific countries form the second largest continental partner for the US. We also notice the strong time consistency of each continent's share of unrelated-party revenues, including for the year 2016 in which country-by-country reporting was not yet mandatory. These three years of data are naturally insufficient to draw strong conclusions but the weight of Asia-Pacific increases over time, while the American and African continents rather seem to recede.

The continental distribution of unrelated-party revenues however hides noticeable country-level specificities. Table 2.a shows the 20 largest destinations for US multinational companies' sales based on the IRS' 2018 country-by-country data. Sales are expressed in absolute amounts and in shares of total foreign unrelated-party revenues.

Table 2.a: Top 20 largest partner jurisdictions based on the unrelated-party revenues booked by US multinational companies in 2018, as in unadjusted country-by-country data.

Partner jurisdiction	Unrelated-party revenues (USD billion)	Share of total foreign unrelated-party revenues (%)
United Kingdom	556.6	12.7
Canada	363.4	8.3
Ireland	308.6	7.0
Singapore	265.1	6.0
China	259.2	5.9
Germany	236.4	5.4
Japan	230.4	5.2
Switzerland	208.5	4.7
Netherlands	150.0	3.4
Mexico	146.0	3.3
France	142.7	3.2
Australia	139.7	3.2
Brazil	137.5	3.1
Hong Kong	128.4	2.9
Italy	81.8	1.9
India	69.1	1.6
Spain	66.2	1.5
Korea	64.9	1.5
United Arab Emirates	64.7	1.5
Belgium	52.7	1.2

Note: This table presents the 20 most important partner countries for US multinational companies. This ranking is based on the unrelated-party revenues booked by US multinational enterprises in each of these jurisdictions. Revenues are presented in absolute amounts (expressed in 2018 billion USD) and as a share of US multinational companies' total foreign unrelated-party revenues (expressed in percentage). All figures are based on the IRS' 2018 aggregated and anonymized country-by-country data.

Two long-term commercial partners of the US, the United Kingdom and Canada, come respectively first and second. Major industrialized economies (e.g. Germany, Japan, France), the largest emerging countries (China, Brazil, India) or members of the North American Free Trade Agreement (Canada mentioned above and Mexico) appear among this top 20. But the position of smaller economies, such as Ireland, Singapore or Switzerland that respectively rank third, fourth and eighth, may be more surprising.

Table 2.b relates each country's share of US multinationals' unrelated-party revenues with its share of the total Gross National Income (GNI) observed for the year 2018 in the sample. The GNI indicator is drawn from a World Bank database to serve as a proxy of market size[3].

Table 2.b: Relationship between the 20 largest partner jurisdictions' share of US multinational companies' foreign unrelated-party revenues and their share of Gross National Income (GNI).

Partner jurisdiction	Share of total foreign unrelated-party revenues (%)	Share of Gross National Income (%)
United Kingdom	12.8	4.5
Canada	8.4	2.7
Ireland	7.1	0.5
Singapore	6.1	0.5
China	6.0	21.9
Germany	5.5	6.4
Japan	5.3	8.1
Switzerland	4.8	1.1
Netherlands	3.5	1.5
Mexico	3.4	1.9
France	3.3	4.5
Australia	3.2	2.2
Brazil	3.2	2.9
Hong Kong	3.0	0.6
Italy	1.9	3.4
India	1.6	4.3
Spain	1.5	2.3
Korea	1.5	2.7
United Arab Emirates	1.5	0.7
Belgium	1.2	0.9

Note: This table presents the 20 main partner jurisdictions for US multinational companies, based on the unrelated-party revenues booked by the latter. It displays each country's share of the total foreign unrelated-party revenues of US multinational enterprises and its share of the total Gross National Income (GNI) observed in the sample. For instance, the United Kingdom is found to account for 12.8% of US multinational companies' unrelated-party revenues outside of the US and 4.5% of the total GNI of in-sample partner jurisdictions, excluding the US here too. Revenue figures are based on the unadjusted IRS' aggregated and anonymized country-by-country data; GNI data are sourced from the World Bank's databases.

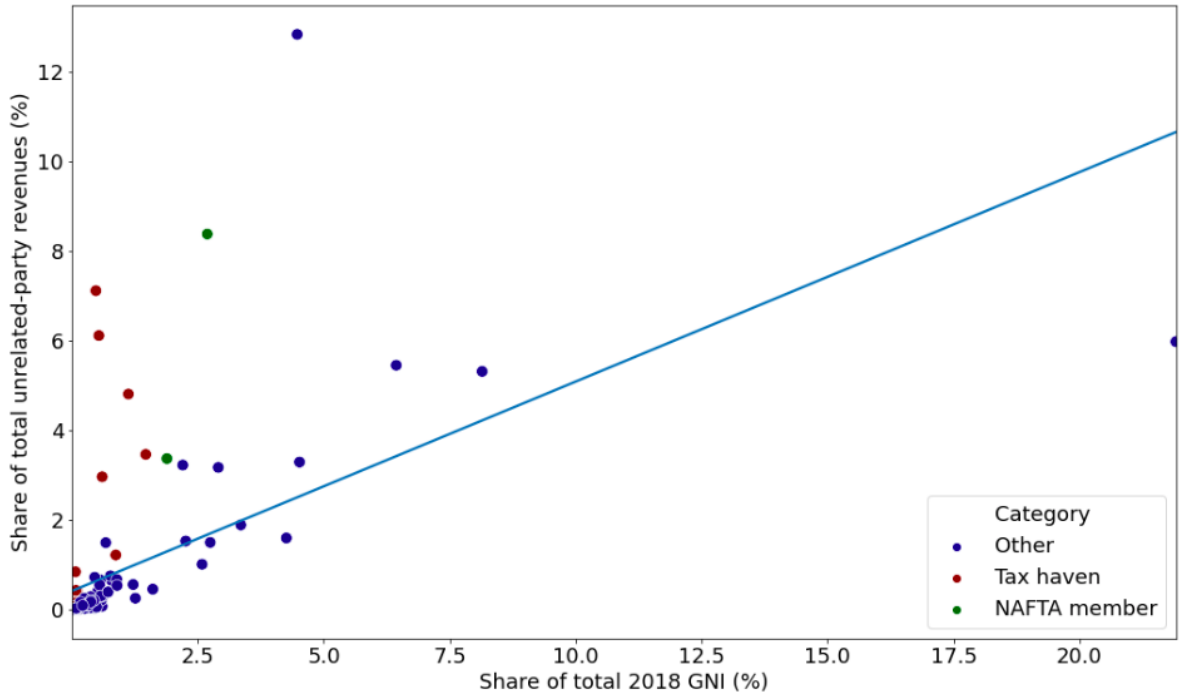
The misbalance between each country's share of total unrelated-party revenues and total GNI is especially striking for the three low-tax jurisdictions mentioned above. While Ireland and Singapore

[3] We exclude 14 countries for which we have no data on 2018 GNI; because these partner jurisdictions account for 1.5% of US multinational companies' total unrelated-party revenues, the "Share of total unrelated-party revenues (%)" column can be marginally different between Table 2.a and Table 2.b.

respectively account for 7.1% and 6.1% of the worldwide unaffiliated sales of US multinational companies based on country-by-country data, both countries only represent 0.5% of the total GNI observed in the sample. Similarly, Switzerland represents 4.8% of total revenues and 1.1% of total GNI. This table therefore underlines the disproportionate weight of a few small economies in the distribution of US multinational enterprises' sales. On the other hand, apart from specific commercial partners (e.g. the United Kingdom, Canada, Mexico or Australia), the main industrialized countries (e.g. Germany, Japan, France or Italy) display a higher share of total GNI than of unrelated-party revenues. So do most emerging economies like China, for which the discrepancy is particularly deep with 21.9% of total GNI for only 6.0% of unaffiliated sales, or India.

Figure 1 facilitates the visualization of these patterns. Countries' position on the x-axis is determined by their share of total GNI, while their position on the y-axis is given by their share of total unrelated-party revenues. Without any attempt at the estimation of a rigorous model, the regression line underlines the expected relationship between both variables. With a correlation of 0.56, a high share of total GNI is generally associated with a high share of US multinational companies' unrelated-party revenues.

Figure 1: Relationship between partner jurisdictions' share of US multinational companies' foreign unrelated-party revenues and their share of Gross National Income (GNI).



Note: This figure presents the relationship between partner jurisdictions' share of US multinational companies' foreign unrelated-party revenues and their share of the Gross National Income (GNI) observed in the sample. The x-axis corresponds to GNI and the y-axis to revenues. Dots, that all stand for a given partner country, are distinguished into three groups: NAFTA members (Canada and Mexico), tax havens as listed by Tørsløv et al. (2019) and other jurisdictions. The indicative trend line is obtained via the ordinary least-squares estimation of

a model regressing the share of unrelated-party revenues over the share of GNI. Revenue figures are drawn from the unadjusted IRS' aggregated and anonymized country-by-country data; GNI data are sourced from the World Bank's databases.

A number of countries, the dots located well above the regression line, display a share of unrelated-party revenues that is disproportionately large relative to their share of total GNI. Highlighted by the color of these dots, two main groups appear: close commercial partners of the US (with NAFTA members in green and the UK at the very top of the graph) and tax havens, based on the classification by Tørsløv et al. (2019). The three low-tax jurisdictions mentioned above (Ireland, Singapore and Switzerland) appear well above the regression line, as well as Hong-Kong and the Netherlands. Importantly, such a discrepancy is not observed for all tax havens: the ones that stand out are the among the largest economies of the list and are geographically close to US multinational enterprises' largest markets.

These constatations highlight a key limitation of country-by-country data when it comes to sales. The three revenue variables are based on the tax jurisdiction of the affiliate that registers the transactions in its income statement, instead of the ultimate destination of the goods or the country of residence of the ultimate service beneficiary. As a consequence, country-by-country data are distorted by the use, by US multinational companies, of some low-tax jurisdictions as platforms. Based in these countries, subsidiaries can operate their sales from a distance, especially in some highly-digitalized industries. Overall, the 41 tax havens listed in Tørsløv et al. (2019) account for 28% of all unrelated-party revenues registered abroad by US multinationals and for less than 6% of GNI.

This explanation of the discrepancy between unrelated-party revenues and GNI observed in tax havens is corroborated by the analysis of the IRS' industry-specific country-by-country data. For each year from 2016 to 2018, the US tax authority indeed provides a split of aggregated and anonymized country-by-country data based on the 7 sectors of activities of US multinational enterprises. Focusing on the distribution of unrelated-party revenues for each of these groups allows to refine the analysis of the phenomenon.

Table 3 below describes the relative importance of each industry group based on the share of total and foreign unrelated-party revenues for which they account in 2016, 2017 and 2018. The initial classification by sector of activity is based upon the North American Industry Classification System (NAICS) but certain groups have been marginally renamed for convenience in this report.

Table 3: Evolution of the distribution of total and foreign unrelated-party revenues by sector of activity, based on the IRS' unadjusted industry-specific country-by-country data.

	Share of total unrelated-party revenues (%)			Share of foreign unrelated-party revenues (%)		
Industry	**2016**	**2017**	**2018**	**2016**	**2017**	**2018**
Manufacturing	34	34	33	46	49	46
Wholesale and retail trade	30	30	31	24	22	22
Finance and insurance	13	13	13	8	9	10
Management (except public administration)	8	8	9	6	8	8
Information	9	8	9	8	7	8
Technical services	3	3	3	5	3	4
Agriculture, extractives and construction	3	3	3	3	3	3

Note: This table presents, for each year in the sample period, the distribution of total and of foreign unrelated-party revenues by sector of activity. Foreign unrelated-party revenues exclude the unaffiliated sales registered by US multinational companies in their headquarter country. "Stateless entities" are also excluded. All figures are based on the IRS' country-by-country data broken down by industry group, without any adjustment.

The distribution of unrelated-party revenues (both total and foreign) being relatively stable over the sample period, we focus on the most recent, 2018 data. For the different industry groups, we compute the correlation between partner countries' share of foreign unrelated-party revenues and of the total GNI observed in the sample. Except for "Agriculture, extractives and constructions" that displays a negative result, this correlation tends to be higher for the sectors of activities that rely on tangible transactions. Typically, "Manufacturing" and "Wholesale and retail trade" come first and second, with correlations of respectively 0.58 and 0.43; on the contrary, the lowest correlations are obtained for "Information" (0.09) and "Finance and Insurance" (0.23).

In Appendix E, we present a Figure 1-like chart for each sector of activity. The largest distortion indeed appears for the "Information" industry, for which Ireland eloquently concentrates 34% of US multinational companies' foreign unrelated-party revenues and only 0.5% of the total GNI observed in the restricted dataset.

The US multinational enterprises whose principal industry essentially rely on intangible transactions therefore show a greater tendency to dissociate the distribution of their revenues in country-by-country data from the distribution of their destination-based sales. This supports the idea that a substantial part of this decorrelation is related to the use, by US multinational companies, of certain (generally low-tax) jurisdictions as sales platforms. Based in these countries, their subsidiaries can operate their sales from a distance, to ultimate users and customers located in another jurisdiction.

b. After the destination-based adjustment

In this section, we replicate the previous results based on the adjusted country-by-country revenue variables. We thereby underline the effect of our destination-based adjustment, that comforts our interpretation of the decorrelation between the distribution of unadjusted revenue variables and the location of US multinational enterprises' final markets.

Before digging deeper in country-level analyses, Table 4 allows to compare domestic and foreign sales after the destination-based adjustment. It also displays the relative weight of each of the 4 continental aggregates (that we use throughout our computations to impute missing values) in foreign sales.

Table 4: Evolution of the continental distribution of US multinational companies' foreign unrelated-party revenues over the sample period, based on adjusted revenue variables.

	2016	2017	2018
Sales to the US (billion USD)	6944	9414	10014
Sales abroad (billion USD)	3882	5188	5707
of which Africa (%)	*1.7*	*1.4*	*1.4*
of which America (%)	*25.1*	*25.2*	*23.8*
of which Asia-Pacific (%)	*35.0*	*36.2*	*37.0*
of which Europe (%)	*38.3*	*37.2*	*37.8*

Note: This table presents the absolute amounts of US multinational companies' unrelated-party revenues in the US and in foreign partner jurisdictions. The latter total is obtained by summing unrelated-party revenues over all non-US partner countries but "Stateless entities" and continental totals. These figures are presented in current billion USD. The distribution of foreign unrelated-party revenues among 4 regional aggregates (Europe, Asia-Pacific, America, Africa) is also presented, continents' respective weights being expressed in percentage. All figures are based on country-by-country data adjusted via the computations presented above.

These results are relatively stable from a year to another, with a substantial increase in the absolute amounts of unrelated-party revenues from 2016 to 2017, explained by country-by-country reporting becoming mandatory for large multinational companies. However, we observe substantial differences with Table 1, built upon unadjusted data.

First, in all three years, sales to the US are reduced by slightly more than 10%. This means that the exports now excluded from the unrelated-party revenues registered domestically by US multinational enterprises are not fully compensated for by the foreign sales that are re-attributed to the headquarter country. Mechanically, since we only redistribute the revenue variables without affecting the total, foreign sales have increased substantially. This represents a jump by roughly 30%.

Second, we observe that the continental distribution of foreign unrelated-party revenues has been recomposed. European countries still display the largest concentration of US multinational companies' sales but they have lost 7 to 8 percentage points through the destination-based adjustments. On the contrary, the weights of Asia-Pacific and America have both increased, the former being closer and closer to Europe over time. This discrepancy underlines the importance of European platform jurisdictions in the global sales network organized by US multinational firms.

Furthermore, with Table 5, we investigate the effect of our destination-based adjustment at the partner country level. Focusing on 2018 adjusted data, we show the 20 largest destinations for US multinational companies' foreign unrelated-party sales. For each of these countries, we display the adjusted revenues in billion USD, the corresponding share of total foreign unrelated-party revenues and the country's share of total GNI.

Table 2.b: Relationship between the 20 largest partner jurisdictions' foreign unrelated-party revenues and their share of Gross National Income (GNI), based on adjusted revenue variables.

Partner jurisdiction	Unrelated-party revenues (USD billion)	Share of total foreign unrelated-party revenues (%)	Share of Gross National Income (%)
Canada	580.0	10.4	2.7
United Kingdom	569.9	10.2	4.5
China	459.0	8.2	21.9
Mexico	354.8	6.3	1.9
Germany	345.3	6.2	6.4
Japan	329.8	5.9	8.1
France	213.7	3.8	4.5
Netherlands	184.0	3.3	1.5
Singapore	183.9	3.3	0.5
Brazil	166.3	3.0	2.9
Hong Kong SAR, China	160.4	2.9	0.6
Australia	157.8	2.8	2.2
Switzerland	139.6	2.5	1.1
Korea, Rep.	126.6	2.3	2.7
India	126.6	2.3	4.3
Italy	123.8	2.2	3.4
Belgium	103.7	1.9	0.9
Ireland	102.9	1.8	0.5
Spain	90.5	1.6	2.3
United Arab Emirates	83.0	1.5	0.7

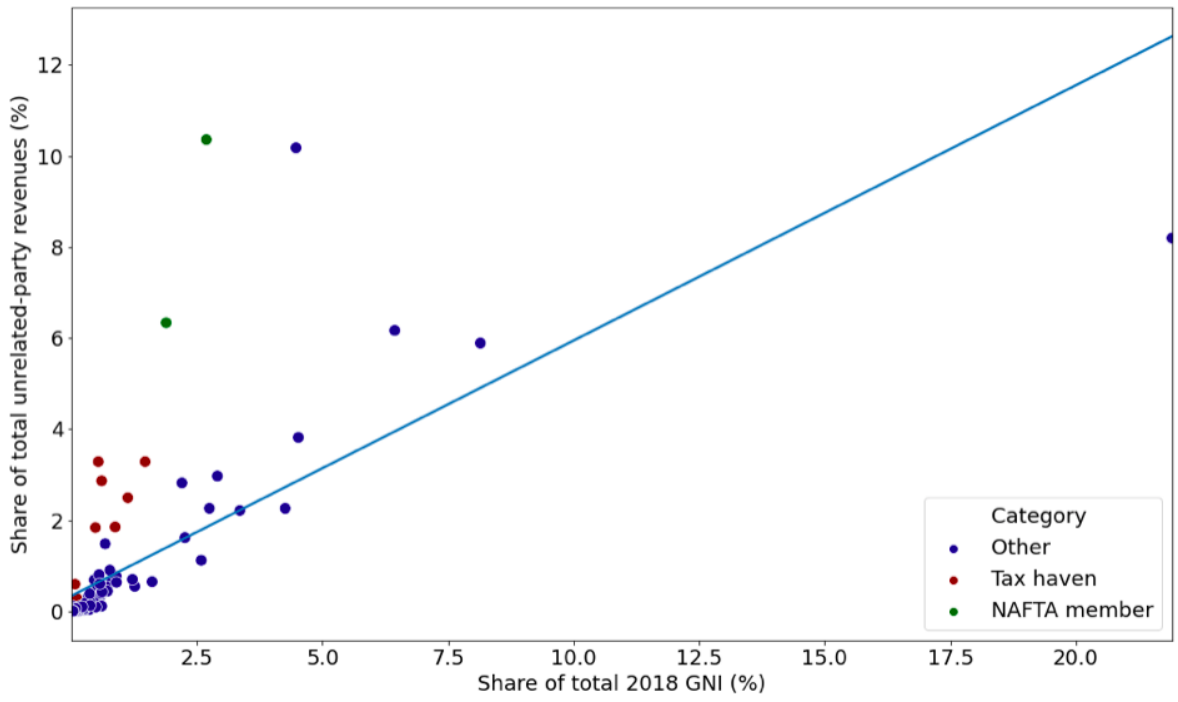
Note: This table presents the 20 main partner jurisdictions for US multinational companies, based on the unrelated-party revenues booked by the latter. It displays each country's absolute amount of foreign unrelated-party revenues, its share of the total and its share of the total Gross National Income (GNI) observed in the

sample. For instance, the United Kingdom is found to account for 10.2% of US multinational companies' unrelated-party revenues outside of the US and 4.5% of the total GNI of in-sample partner jurisdictions, excluding the US here too. Revenue figures are based on 2018 country-by-country data adjusted via the computations presented above; GNI data are sourced from the World Bank's databases.

The highest-ranking countries have been recomposed, especially in favor of NAFTA members (Canada moving from second to first, Mexico from tenth to fourth), of the largest economy of the sample (China moving from fifth to third) and of France (from eleventh to seventh). Oppositely, the most well-known sales platform of US technology multinational companies, Ireland, has tumbled from third to seventeenth: before the adjustment, it represented 7.0% of foreign unrelated-party revenues and only accounts for 1.8% after the destination-based adjustment. In a similar manner, Switzerland has moved from eighth to thirteenth (4.7% of foreign unrelated-party revenues before the adjustment vs. 2.5% after) and Singapore from fourth to ninth (6.0% vs. 3.3%). Importantly, the weight of these three countries in the foreign unaffiliated sales of US multinational enterprises is now more in line with the size of these economies, as indicated by their share of total GNI.

Figure 2 further highlights the relationship between destination countries' share of US multinational enterprises' foreign unrelated-party revenues and of total GNI. The correlation between the two has increased substantially: before the adjustment, it was of 0.56 and now reaches 0.70 after the destination-based adjustment.

Figure 2: Post-adjustment relationship between partner jurisdictions' share of US multinational companies' foreign unrelated-party revenues and their share of Gross National Income (GNI).



<u>Note:</u> This figure presents the relationship between partner jurisdictions' share of US multinational companies' foreign unrelated-party revenues and their share of the Gross National Income (GNI) observed in the sample.

The x-axis corresponds to GNI and the y-axis to revenues. Dots, that all stand for a given partner country, are distinguished into three groups: NAFTA members (Canada and Mexico), tax havens as listed by Tørsløv et al. (2019) and other jurisdictions. The indicative trend line is obtained via the ordinary least-squares estimation of a model regressing the share of unrelated-party revenues over the share of GNI. Revenue figures based on 2018 country-by-country data adjusted via the computations presented above; GNI data are sourced from the World Bank's databases.

Although a number of tax havens still display a disproportionately high share of unrelated-party revenues compared with their weight in total GNI, the corresponding dots are now grouped closer to the indicative regression line. On the contrary, both NAFTA members (Canada and Mexico) have seen their share of unrelated-party revenues increase through the adjustment. We therefore observe a more robust relationship between adjusted unaffiliated sales and our proxy for market size. The United Kingdom, along with major commercial partners of the US, now shows the largest discrepancy between unrelated-party revenues and GNI. Said otherwise, the destination-based adjustment seem to correct for a significant part of US multinational companies' relocation of sales to low-tax, platform jurisdictions.

Based on these observations, we conclude that the adjusted variables are less subject to US multinational enterprises' tax-driven organization of their global sales network and that we have therefore come closer to a destination-based mapping of the transactions of these companies. Thanks to such an adjustment, we can be more confident about estimates of the effects of the international tax reform proposals that are based on sales apportionment formulas. In Section 5, we propose a tentative expansion of our destination-based adjustment to non-US headquarter countries and re-estimate the revenue gains from the unilateral scenario proposed by Baraké et al. (2021).

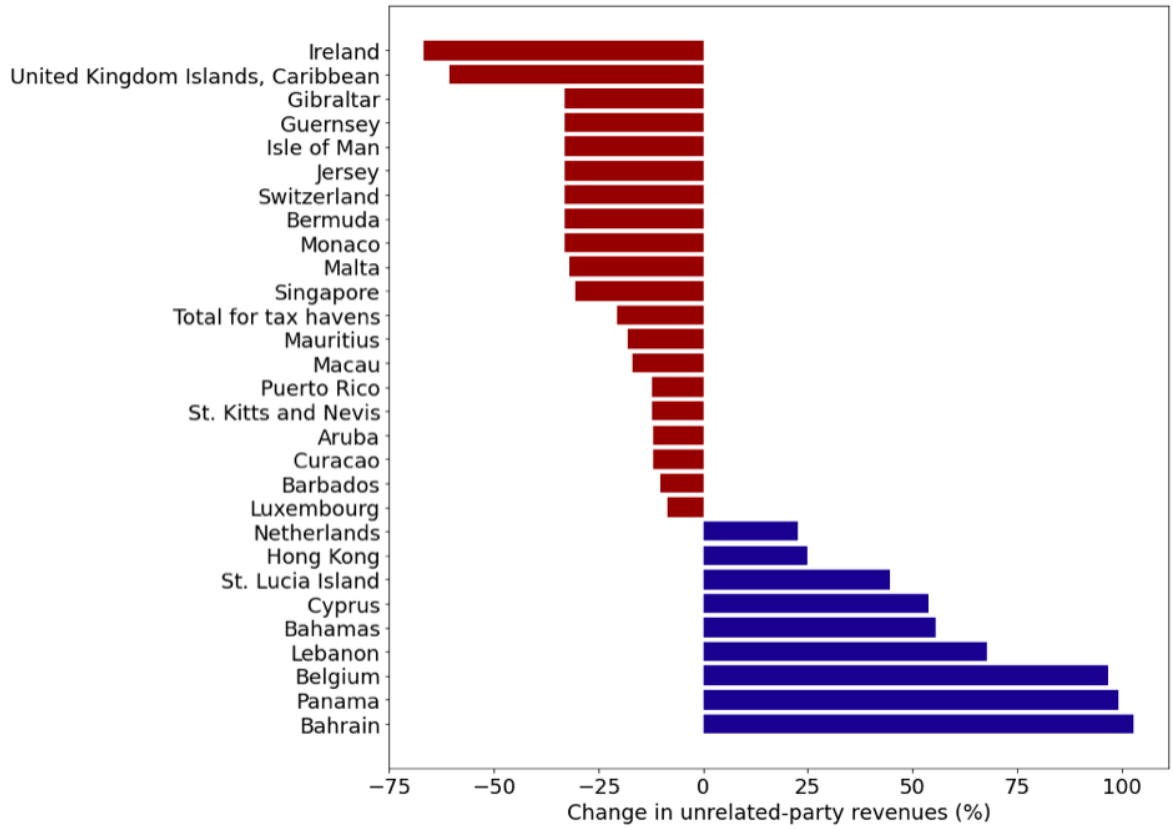
c. Focus on tax havens

Before anything else, we further investigate the effect of the destination-based adjustment on tax havens, as listed by Tørsløv et al. (2019). This focus is justified by the occurrence of many tax havens among the partner countries that display the largest decrease in unrelated-party revenues due to the adjustment. Indeed, all of the 10 partner countries that are the most severely hit are tax havens. While revenues attributed to Ireland and the UK Caribbean Islands decrease by respectively 66.6% and 60.4%, unaffiliated sales to the other jurisdictions (e.g. the Channel Islands, the Isle of Man, Switzerland, Bermuda or Malta) have all been reduced by more than 30%.

On average, the unrelated-party revenues attributed to Tørsløv et al. (2019)'s tax havens are cut by 20.5%: while they accounted for 27.9% of foreign unrelated-party revenues before the adjustment, their weight has gone down to 17.2%. When also considering domestic transactions, their share of total unaffiliated sales went from 7.9% to 6.3%.

This overall lower importance hides different dynamics from a tax haven to another. While 19 of the 28 partners considered have seen their unrelated-party revenues decrease, the adjustment increased the weight of some of the largest economies in the sample (e.g. the Netherlands, Belgium or Hong-Kong). Figure 3 shows the percentage change in unrelated-party revenues for all tax havens.

Figure 3: Variations in tax havens' unrelated-party revenues through the destination-based adjustment of sales variables.



<u>Note:</u> This figure presents the percentage change in unrelated-party revenues implied by our destination-based adjustment for tax havens listed by Tørsløv et al. (2019). The aggregated evolution of all tax haven unrelated-party revenues is also presented as the "Total for tax havens". Red bars indicate a decrease in unrelated-party revenues, while blue bars indicate an increase.

While most tax havens are indeed penalized by the destination-based adjustment, some others display an increase in unaffiliated sales from US multinational companies. Even more surprising is the scale of the upgrade (close to or more than 100%) for Belgium, Panama or again Bahrain. To better understand these results, we more specifically examine the effect of our adjustment on three partner countries: Ireland, the Netherlands and Belgium. This investigation also highlights some of the main areas for improvement of our methodology.

Focus on Ireland

Of all partner jurisdictions, Ireland displays the most severe decrease after the destination-based adjustment. Unrelated-party sales from US multinational enterprises decrease by 66.6%, from 308.6 billion USD down to 102.9 billion USD.

The bulk of this decrease comes from the very large share of unaffiliated sales that is re-attributed to other countries based on the BEA's data. Indeed, according to Table E2, in 2018, only 23.5% of the supply of goods and services registered by US multinational companies in Ireland were actually directed towards the host country. As a consequence, less than a quarter of the unrelated-party revenues booked in Ireland in country-by-country data are ultimately attributed to the partner jurisdiction when applying our destination-based adjustment.

This reduction, combined with the very large amount of unrelated-party revenues booked in Ireland according to the IRS' country-by-country data, is so deep that it cannot be compensated for by the attribution to Ireland of a part of sales registered in other countries. Based on the OECD's trade statistics, Ireland represents a substantial share of the exports of large economies such as the United Kingdom (8.0%), the Netherlands (5.7%) or the US (0.8%). But the sales that are attributed to Ireland from other partner jurisdictions represent no more than 10% of the unrelated-party revenues initially registered there according to country-by-country data.

Focus on the Netherlands and Belgium

Through our destination-based adjustment, both the Netherlands and Belgium, listed as tax havens in Tørsløv et al. (2019), see their unrelated-party revenues increase. We try to explain these results and show how they highlight certain limitations of our methodology.

First of all, the BEA's data attribute to the Netherlands a much larger share of the goods and services supplied by the Dutch subsidiaries of US multinational companies to unaffiliated partners. From there, 63.3% of the unrelated-party revenues in country-by-country data are attributed to the host country; this can be compared with the 76.5% cut applied to Irish unrelated-party revenues.

Second, this reduction is more than compensated for by the sales registered in other partner jurisdictions that are ultimately attributed to the Netherlands using the OECD's trade statistics. In particular, according to the latter, the Netherlands accounts for 2.7% of US exports of merchandise and services. This means that in our destination-based adjustment, this partner jurisdiction captures 2.7% of the 1,428.6 billion USD unrelated-party revenues registered in the US in country-by-country

data but that are actually directed to a foreign partner. This is sufficient to bridge roughly 70% of the decrease implied by the BEA's data.

One may question the weight of the Netherlands in the distribution of US exports. Indeed, the OECD's trade statistics might not necessarily reflect the ultimate destination of the merchandise and services supplied. In that sense, they could be subject to distortions similar the ones mentioned for country-by-country data, the sales platforms chosen by US multinational enterprises accounting for an inflated share of exports. In the case of the Netherlands, the importance of local ports (Rotterdam, Amsterdam, etc.) and airports (e.g. Schiphol) might also distort trade statistics to some extent.

We reach a comparable conclusion for Belgium. Here also, the impact of the first adjustment based on the BEA's data is limited: 56.6% of unrelated-party revenues are attributed to the affiliate country. The reduction is compensated for by the sales re-directed from other partner jurisdictions to Belgium based on the OECD's trade statistics. For instance, Belgium accounts for 1.9% of US exports and thereby gains 26.9 billion USD of unaffiliated sales. Table 6 shows the 10 affiliate countries from which most of the adjusted unrelated-party revenues attributed to Belgium are sourced.

Table 6: Mapping of unrelated-party revenues attributed to Belgium following our destination-based adjustment, per affiliate jurisdiction of origin.

Affiliate jurisdiction	Share of Belgium in exports (%)	Unrelated-party revenues attributed to Belgium (billion USD)
Belgium	..	29.8
United States	1.9	26.9
Ireland	9.4	21.6
Netherlands	13.5	6.9
United Kingdom	4.5	4.7
Switzerland	2.5	2.8
Germany	4.4	2.0
Singapore	1.5	1.9
France	8.7	1.8
Luxembourg	10.8	1.0

Notes: This table indicates the 10 main affiliate jurisdictions from which the post-adjustment unrelated-party revenues of US multinational companies in Belgium are sourced. The "Share of Belgium in exports" column indicates the weight of Belgium in the affiliate country's exports based on the OECD's Balanced Trade Statistics. It is used to determine the unrelated-party revenues eventually allocated to Belgium following the methodology of our destination-based adjustment. The latter are expressed in 2018 billion USD.

The concentration of tax havens in the list is eloquent: 9.4% of the unrelated-party revenues relocated out of Ireland based on the BEA's data are eventually attributed to Belgium. Not only does

this point at distortions in the OECD's trade statistics, but this constatation fundamentally questions the capacity of our methodology to capture the multi-layer sales platform networks organized by US multinational enterprises. If the latter simply used Ireland as a unique intermediary stage before the delivery of the goods and services to the final customer, Irish trade statistics would give more weight to large economies rather than to low-tax jurisdictions and our methodology could efficiently correct for the implied distortion. But in practice, the transactions of large multinationals are organized as complex cross-border schemes that we can only partly unravel via our adjustment.

5. Tentative extension to other headquarter countries

a. Additional data sources

To extend our destination-based adjustment of the revenue variables in country-by-country data beyond the US, to other headquarter countries, we mobilize two additional data sources. First, we source revenue variables from the OECD's aggregated and anonymized country-by-country data. Second, the Analytical AMNE database of the OECD allows us to split these revenues between sales actually directed to the jurisdiction of the affiliate and exports.

The OECD's aggregated and anonymized country-by-country data

We first leverage the OECD's aggregated country-by-country data. The scope of companies covered by the dataset, the reported variables (revenues, pre-tax profits, taxes paid, etc.) and their definition are the same as in the IRS' country-by-country data. They are described in Section 2.a.

We focus on the first release of the dataset, for the financial year 2016, which is used by Baraké et al. (2021) to estimate the potential revenue gains of various global minimum tax implementations. Indeed, we extend our destination-based adjustment of revenue variables to non-US headquarter countries so as to re-estimate the outcome of their unilateral scenario. However, contrarily to Baraké et al. (2021) who focus on the positive-profits sub-sample, we consider the most extensive dataset, including loss-making entities.

The level of disaggregation of country-by-country reports varies from a headquarter jurisdiction to another. On the one hand, in our preprocessed dataset, the country that reports the most detailed breakdown jurisdictions is India, with 132 unique partner jurisdictions. On the other hand, some countries only display two rows, one that corresponds to the domestic activities of their multinational enterprises and another that corresponds to their "Foreign Jurisdictions Total". We eliminate these four headquarter countries (Finland, Ireland, Korea and the Netherlands). Eventually, our dataset provides information on the sales of multinational companies from 23 parent countries and in 203 unique partner jurisdictions. On average, each headquarter country reports data for slightly less than 59 affiliate countries.

The OECD's Analytical AMNE database

The OECD's Analytical AMNE database, compiled by Cadestin et al. (2018), comprises two main files that we use in our analysis. The first one[4] provides information and estimations relative to the activities of foreign-owned and domestically-owned companies in a sample of countries, from 2005

[4] Which can be downloaded as "analytical_amne.xlsx".

to 2016. For each country, the dataset indicates the gross value-added, exports and imports of the foreign subsidiaries of multinational enterprises (foreign-owned companies) and of locally-owned companies. These variables are further broken down by industry. We concentrate on 2016 data to align with country-by-country statistics and only consider the rows corresponding to foreign-owned companies. We further sum the three variables over all sectors of activity.

The dataset also provides a bilateral mapping of gross output between host countries and the jurisdictions where companies are ultimately headquartered. For instance, for a given year and a given sector of activity, the ARG-ARG cell describes the gross output registered in Argentina by Argentina-owned companies and the ARG-FRA cell indicates the gross output registered by French multinational companies in Argentina. Focusing on 2016 data, we sum these results over all sectors of activity and all jurisdictions of ultimate ownership, so as to complement the previous dataset with gross output. As explained below in more details, we also compute the total gross output excluding US-headquartered multinational enterprises.

The database provides an additional file[5], which allows to investigate the activities of domestically-owned companies in a sample of countries from 2005 to 2016. It indeed provides information on and estimations of the gross output, gross value-added, exports and imports of domestically-owned companies. It allows to distinguish between the domestic branches of multinational enterprises and purely local firms. Here also, variables are further broken down by industry. We concentrate on 2016 data and only consider the rows corresponding to the activities of multinational enterprises. We sum the four variables over all sectors of activity.

In both cases, we obtain data for 59 unique host countries.

b. Methodology

Determining a distribution of sales

As for benchmark computations focusing on the US, the first step of our destination-based adjustment consists in distributing the revenue variables of country-by-country data into three categories: sales directed to the partner jurisdiction, those actually directed to the headquarter country and those directed towards any other country. In the absence of data on the activities of non-US multinational enterprises that would be comparable to the statistics compiled by the BEA, we base this split on the Analytical AMNE database of the OECD.

First, we want to split foreign sales, e.g. the unrelated-party, related-party and total revenues registered by French multinational companies in Germany according to the OECD's country-by-

[5] Which can be downloaded as "analytical_amne_domesticMNEs.xlsx".

country data. For this split, we rely on the gross output and exports of foreign-owned companies in Germany based on the first data file of the Analytical AMNE database. Dividing exports by the gross output can indeed be interpreted as a proxy for the share of sales that are directed either to the headquarter of the multinational enterprise or to any other country. Conversely, it indicates the share of sales registered in the affiliate country that are actually directed to local customers and users.

However, we introduce an intermediary manipulation at this stage. The total gross output and exports indicated in the OECD's Analytical AMNE database for each host country include the activities of US multinational companies. In this extension of the destination-based adjustment, we only look for a redistribution of non-US multinational enterprises' revenues. Should US multinational companies be the only ones to use Ireland as a platform to operate their sales in Europe or should they be the only ones to concentrate their sales so intensively in the jurisdiction, they would inflate the weight of exports for Ireland in Analytical AMNE data. As mentioned above, we could obtain, for each host country, a total gross output excluding US multinational companies. We now need to estimate exports that similarly cover non-US multinational enterprises only.

To do so, we again mobilize the BEA's data. Based on Table E2, we compute the share of US sales that correspond to exports (either to the US or to any other country) for each host country. We multiply this share by the gross output of US multinational enterprises in the local jurisdiction and obtain a proxy for their exports. We subtract this proxy from total exports and can then compute the ratio of non-US exports to non-US gross output, which indicates what share of sales will be attributed either to the headquarter country or to any other country. Throughout these computations, if a host country is not present in the BEA's data, we attribute to it the export ratio of US multinational companies computed across all partner jurisdictions in Table E2.

The OECD's Analytical AMNE database does not allow to split exports based on their ultimate destinations, either the headquarter country of multinational companies or any other partner jurisdiction. We apply, for each host country, the ratio of sales that are directed to the US to the goods and services supplied to any country but the host jurisdiction observed for US multinational companies in the BEA's data. We use it to distinguish exports to the country of ultimate ownership of the multinational firm from exports to any third country.

Second, we want to split domestic sales, e.g. the revenues registered by French multinational enterprises in France in country-by-country data. We leverage the second dataset of the OECD's Analytical AMNE database, which indicates the gross output, gross value-added, imports and exports of the domestic branches of locally-owned multinational companies for sample of host countries. Here, the ratio of exports to gross output is used as a proxy for the share of sales registered domestically that are actually directed to any other country.

We extrapolate both sets of results, for foreign sales on the one hand and domestic transactions on the other hand. We have obtained these for 59 host countries and expand them to the 203 unique partner jurisdictions of country-by-country data. To do so, we sum split sales into 4 regional aggregates (Europe, Africa, Asia-Pacific and America) and impute the values for missing countries based on the continent to which they belong. From the absolute amounts of sales directed to the host country, to the headquarter jurisdiction or to any other country, we deduct relative weights.

Splitting revenue variables into a destination-based mapping

From the previous step, we have obtained proxies for the relative weights of each destination type (to the affiliate country, to the headquarter jurisdiction and to any other country) in country-by-country revenue variables. We separate country-by-country data into two sub-samples, with domestic activities on the one hand and foreign operations on the other hand, and split each of the three revenue variables into the three categories. Two of these types of sales are already attributed to their final destination: sales directed to the affiliate country and to the headquarter country.

We further need to distribute the sales directed to any other country based on the location of final customers and users. Similarly to benchmark computations for US multinational companies, these are allocated based on the distribution of each host country's merchandise and services exports. If French multinational companies register "sales to any other country" of 100 USD in Germany and Denmark accounts for 3% of German exports, 3 USD of French multinational companies' revenues are redirected to Denmark. Importantly, since sales to the headquarter country are already attributed, we make sure to exclude the parent jurisdiction (France in this example) from the affiliate country's exports distribution. Said otherwise, Denmark accounts here for 3% of German exports, excluding France.

We thereby obtain a three-dimensional dataset in which an observation is defined by the headquarter country where multinational enterprises are ultimately owned, the affiliate country where revenues are registered in country-by-country data and the ultimate destination of the sales. We eliminate the intermediary dimension of the affiliate country and sum revenue variables over each pair of parent country and ultimate destination. We eventually append the corresponding sales mapping obtained earlier for the US.

Main limitations

In addition to the limitations of benchmark computations underlined in Section 4.c., the tentative expansion of our destination-based adjustment to other headquarter countries beyond the US presents two main shortcomings.

First, the OECD's Analytical AMNE database, on which the split of revenue variables between the three destination types relies, does not allow to distinguish sales to affiliated and unaffiliated partners. The same ratio of exports versus local sales is thus applied to all revenue variables (unrelated-party, related-party and total). This is a substantial limitation because the organization of multinational enterprises' intra-group and extra-group sales networks are based on different logics. Cobham et al. (2021) and the OECD Secretariat (2020) underline the distortions generated by internal transactions, which are part of multinational companies' major aggressive tax planning tools.

Second, the available data do not allow to split exports between sales to the headquarter country and sales to any other country. For this distinction, we apply to each host country the ratio observed for US multinational enterprises in the BEA's data. For example, if in France, 30 USD of US multinational companies' sales are directed to the US and 70 to any country but France and the US, the ratio applied to activities in France would be 30%, this share of exports being attributed to the headquarter country. Nothing guarantees that the global sales networks of non-US multinational companies are organized similarly to that of their US counterparts, hence this computation should be perceived as a tentative and simplified way of circumventing data insufficiencies.

c. Revision of the unilateral scenario of Baraké et al. (2021)

Revised estimates of corporate income tax revenue gains

From our adjusted mapping of country-by-country revenue variables, we revise the corporate income tax revenue gains from the "unilateral scenario" defined by Baraké et al. (2021).

In their report, the authors estimate the effect of a global minimum tax on corporate profits. They envision three scenarios: a multilateral implementation of the reform, similar to the agreement recently reached by 133 members of the Inclusive Framework; a partial cooperation case involving only EU Member States; the unilateral scenario, with one headquarter country independently applying the minimum tax and drawing revenues from the taxation of foreign multinational companies' undertaxed profits. Indeed, the taxing country is assumed to collect a share of foreign firms' tax deficit, based on its weight in their unrelated-party sales.

Said otherwise, if France were to unilaterally implement a minimum tax at an effective rate of 15%, it would not only collect a top-up tax on the profits of French multinational companies that are taxed below the minimum rate. But it would also determine the worldwide tax deficit of, say, Apple and collect part of it, based on the weight of France in the sales of the company. If French customers and users account for 2% of Apple's global unrelated-party revenues, France collects 2% of Apple's tax deficit. In practice however, in the absence of sufficient micro-data, Baraké et al. compute tax deficits at the headquarter country level and these are allocated based on aggregated revenue variables: if

France represents 2% of US multinational companies' unrelated-party revenues in country-by-country data, it collects 2% of the total US tax deficit.

We directly use the tax deficit estimates of Baraké et al. for the fiscal year 2016 and modify the allocation key. We compare each headquarter country's revenue gains based, on the one hand, on the unrelated-party revenues of the OECD's country-by-country data and on adjusted revenues on the other hand. Table 7 presents the outcome of the unilateral scenario for EU Member States and parent countries included in country-by-country data.

Table 7: Revision of the estimated revenue gains from the unilateral scenario of Baraké et al. (2021), based on the destination-based adjustment of country-by-country revenue variables.

Country	Corporate income tax revenue gains (EUR billion)		Change in revenue gains due to the destination-based adjustment
	Unadjusted revenues	Adjusted revenues	
Austria	7.8	8.5	9.2%
Belgium	20.6	23.3	13.0%
Cyprus	1.0	1.0	-5.4%
Czech Republic	1.4	2.5	72.6%
Germany	37.7	44.5	18.0%
Denmark	3.8	4.5	16.4%
Estonia	0.4	0.4	-0.8%
Spain	16.7	18.0	7.6%
Finland	5.1	5.4	5.7%
France	31.3	35.4	13.1%
Greece	1.8	2.1	17.5%
Hungary	2.3	2.7	17.4%
Ireland	16.9	16.4	-2.7%
Italy	14.4	17.8	24.3%
Luxembourg	8.8	9.2	5.3%
Latvia	0.5	0.5	5.4%
Malta	0.3	0.3	9.2%
Netherlands	13.4	16.5	22.5%
Poland	12.4	13.2	6.9%
Portugal	1.2	1.4	22.7%
Sweden	6.3	7.2	14.8%
Slovenia	0.1	0.2	67.2%
Slovakia	0.2	0.6	141.8%
Australia	14.8	16.7	12.5%
Brazil	10.8	14.1	30.8%
Canada	40.3	44.0	9.3%
Chile	2.7	2.7	-1.3%
China	53.3	55.5	4.0%
Indonesia	2.8	4.2	49.9%
India	2.9	5.2	79.3%
Japan	32.6	36.7	12.5%
South Korea	7.0	10.6	52.5%
Mexico	5.1	8.2	60.6%
Norway	3.9	4.6	19.2%
United States	209.8	226.9	8.1%
South Africa	3.9	4.2	6.6%

Note: This table presents the revision of the revenue gain estimates proposed by Baraké et al. (2021) for their unilateral scenario. Revenue gain estimates are presented in 2021 EUR billion and the change due to our destination-based adjustment of country-by-country revenue variables is expressed in percentage. The sample comprises 23 EU Member States and 13 non-EU countries having reported country-by-country data in 2016.

Focus on countries displaying a decrease in unrelated-party revenues

As expected for Ireland, estimated revenue gains move from 16.9 billion EUR to 16.4 billion EUR for Ireland, that is a reduction by 2.7%. More generally, the corporate income tax revenue gains from the unilateral implementation of the minimum tax decrease only for a few countries: two tax havens (Ireland and Cyprus) and two non-havens (Estonia and Chile). Countries in the first group are known to be part of multinational companies' sales and profit networks, designed for aggressive tax planning purposes. The decrease in their revenue gains suggests that country-by-country data, distorted by the use of sales platforms, tend to overestimate their weight in multinational enterprises' revenues. The other cases are more difficult to interpret. Although the Estonian corporate income tax system can be attractive for foreign businesses, nothing indicates that these are used as sales platforms by US multinational companies.

The effect of the destination-based adjustment on corporate income tax revenues collected from foreign multinational enterprises is further decomposed in Appendix G. The dedicated tables show, both before and after the adjustment, the revenues that are collected from US-headquartered multinational companies and those that are drawn from other foreign firms. As explained above, variations in revenues collected from non-US multinationals are subject to more caution, because of the limitations of our methodology expanding the destination-based adjustment beyond the US. For Estonia and Chile, we notice that the bulk of the decrease is related to revenues collected from non-US multinational companies. Thus, we cannot conclude that the reduction observed for the revenue gains of these countries reflects the aggressive tax planning behaviors of multinational firms.

Focus on countries displaying an increase in unrelated-party revenues

We reach a broadly consistent conclusion when considering the headquarter countries whose revenue gains increase through the adjustment. Importantly, most of the largest economies, where the ultimate recipients of artificially relocated transactions are based, see their revenues increase. Among these, India (79.3%), Indonesia (49.9%), Mexico (60.6%) or Brazil (30.8%) display the largest relative upgrades but Italy, Canada, Japan, France or Germany also display substantial increases in absolute amounts. For Mexico, the increase is mainly driven by tax revenues collected from US multinational companies; for the others, variations are more balanced.

More surprisingly however, although it plays a central and widely documented role in the aggressive tax planning schemes of multinational companies, Luxembourg displays a 5.3% increase in revenue gains, driven by the revenues it collects from both US and non-US firms. This constatation can be related to the discussions of Section 4.c. on the specific cases of the Netherlands and Belgium. Overall, the effects of our destination-based adjustment of revenue variables appear as broadly consistent with what is known of tax-motivated global companies' practices but further refinements seem necessary, especially in the distribution of non-US multinational firms' sales.

6. Conclusion and acknowledgements

In this report, we document a fundamental limitation of country-by-country data. We evidence how the use by multinational companies of sales platforms, from which transactions are operated even though their ultimate beneficiary is located abroad, distorts revenue variables and overstates the weight of some small, often low-tax, jurisdictions. We underline the variable intensity of these distortions from a sector of activity to another, information and communication or financial services being more heavily harmed.

We further propose a methodology to estimate a destination-based mapping of US multinational companies' sales. The results of this adjustment corroborate our earlier observations, based on unadjusted data: a few low-tax jurisdictions known to be used as sales platforms come out as the biggest losers from our computations. Ireland, in particular, displays a 66.6% decrease in its unrelated-party revenues. A tentative extension of our methodology to non-US headquarter countries allows us to re-estimate the revenue gains from the minimum tax unilateral implementation scenario proposed by Baraké et al. (2021). Ireland sees its estimated revenues decrease, while that of the largest economies tend to increase.

As discussed in the previous sections, certain results highlight the areas left for improvement in our methodology. In particular, the trade statistics used to distribute certain sales might be themselves subject to heavy distortions. These distortions might be twofold. On the one hand, export data might display a similar issue as the country-by-country revenue variables, overstating the weight of sales platforms. On the other hand, re-exports might also distort trade statistics, giving a disproportionate importance to commercial hubs such as the Netherlands. These distortions may translate, when re-estimating revenue gains from the unilateral scenario of Baraké et al. (2021), into an overestimation of certain countries' corporate income tax increment. So as to assess and correct for the second type of distortions, a potential next step for our study could lie in the exploitation of the UN Comtrade statistics on re-exports and re-imports.

More generally, additional data sources might help understand how the global sales networks of multinational companies are organized and evaluate the importance of platform jurisdictions. For instance, the study of value-added tax returns registered in final destination countries, combined with micro-data on the ownership structures of multinational companies, would allow to precisely size the weight of sales platforms. Certain accounting requirements might also give an indication of the distribution of multinational firms' sales. With all these perspectives ahead, I will continue working on the topic next year, still as part of the EU Tax Observatory. I am thankful to Prof. Gabriel Zucman for his comments during the preparation of this report and for the opportunity to keep investigating the subject. I am also grateful to all members of the EU Tax Observatory team who have helped me in this exploration of multinational companies' global sales networks.

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APPENDIX

A. Definition of "goods and services supplied" in BEA data

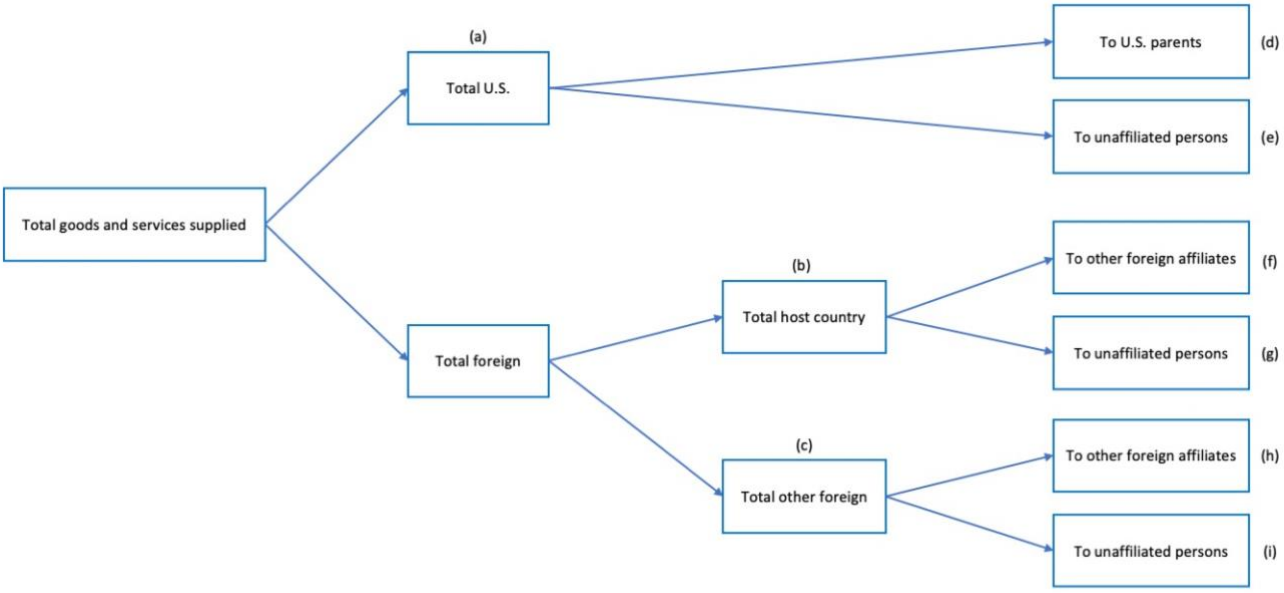
- **Goods supplied**:

"Goods supplied are generally defined as sales of economic outputs that are tangible. For sales in wholesale and retail trade, goods supplied include only the value of goods resold; they consist of reported sales of goods less BEA's estimate of the value of the distributive services provided by selling, or arranging for the sale of, goods (this estimate is added to reported sales of services to calculate services supplied)."

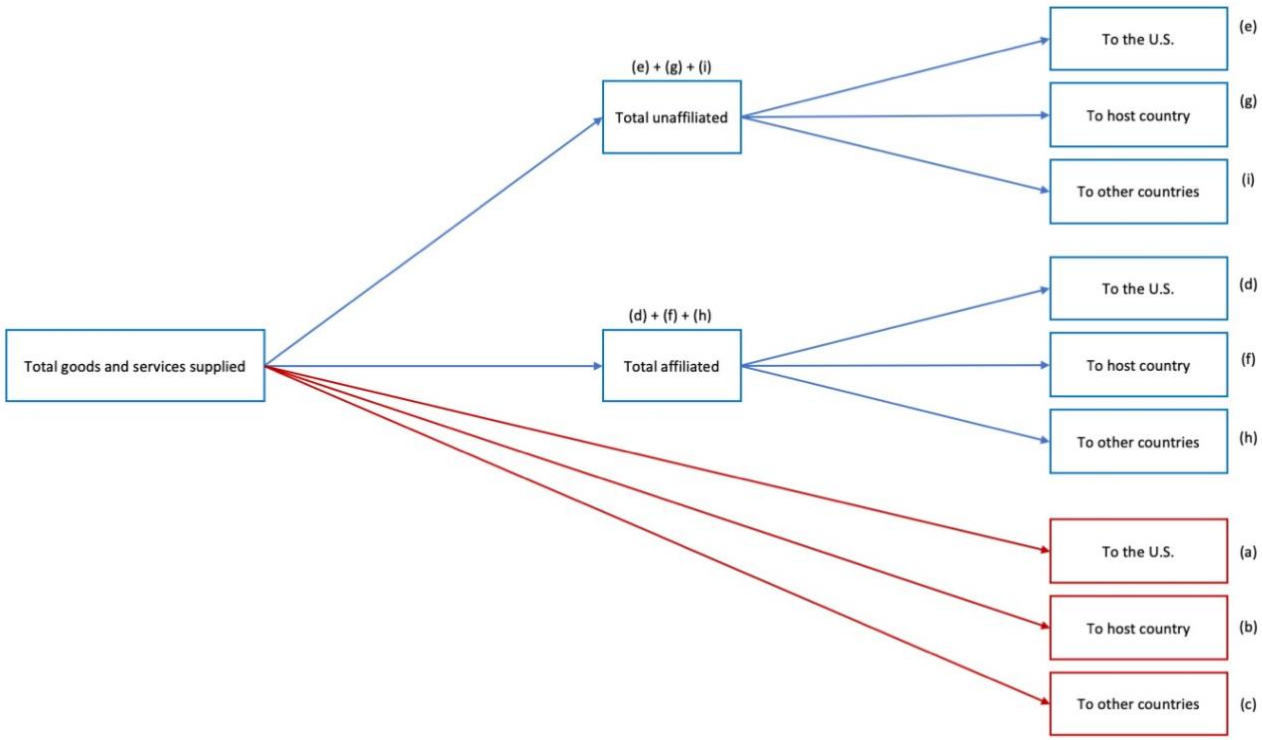
- **Services supplied**:

"Services supplied are generally defined as sales of economic outputs that are intangible. For sales in insurance, services supplied consist of reported premiums less BEA's estimates of the premiums set aside for expected or "normal" losses plus a measure of premium supplements, which represent income earned on funds that insurers hold on policyholders' behalf. For sales in banking, services supplied include not only the explicit fees and commissions reported as sales but also BEA's estimate of the value of implicit services provided by banks. (The values subtracted from and added to sales of services in insurance and banking are added to and subtracted from, respectively, reported values of other income.) For sales in wholesale and retail trade, services supplied include BEA's estimate of the value of the distributive services provided by selling, or arranging for the sales of, goods (this estimate is subtracted from reported sales of goods to calculate goods supplied). For industries other than insurance, banking, and wholesale and retail trade, services supplied consist of reported sales of services."

B. Schema 1 – BEA data



C. Schema 2 – BEA data



D. Example of computations

Step 1

To illustrate the computations described in Section 3.a, let us take the example of France. In the IRS' country-by-country data, this partner jurisdiction is associated with the following values for revenue variables:

- Unrelated party revenues: 142.7 billion USD
- Related party revenues: 60.4 billion USD
- Total revenues: 203.1 billion USD

Step 2

From the Table E2 of BEA data on the activities of US multinationals, we find that:

- Goods and services supplied to unaffiliated parties amount to 167.8 billion USD. These are distributed as follows:
    - 85% (142.1 billion USD) are directed to France;
    - 1% (1.9 billion USD) are directed to the US;
    - 14% (23.8 billion USD) are directed to other countries.
- Goods and services supplied to affiliated parties amount to 43.4 billion USD. These are distributed as follows:
    - 21% (9.1 billion USD) are directed to France;
    - 12% (5.0 billion USD) are directed to the US;
    - 68% (29.2 billion USD) are directed to other countries.
- Total goods and services supplied amount to 221.2 billion USD. These are distributed as follows among ultimate destination types:
    - 72% (151.1 billion USD) are directed to France;
    - 3% (6.9 billion USD) are directed to the US;
    - 25% (53.2 billion USD) are directed to other countries.

Step 3

From there, we deduce the following split for the three revenue variables in the IRS' country-by-country data:

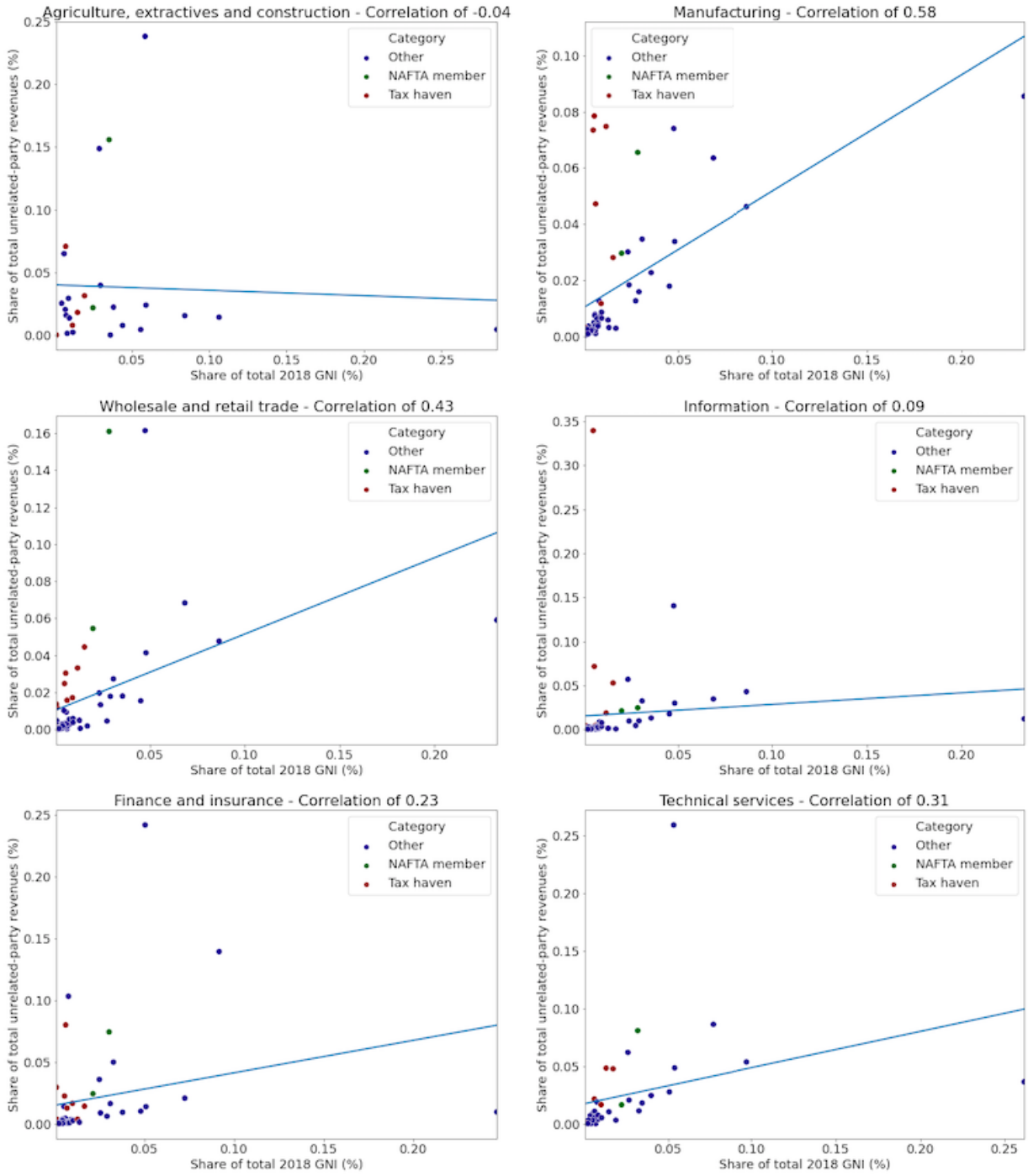
- Unrelated party revenues:
    - 85% * 142.7 = 120.8 billion USD are directed to France;
    - 1% * 142.7 = 1.6 billion USD are directed to the US;
    - 68% * 142.7 = 20.3 billion USD are directed to other countries.
- Related party revenues:
    - 21% * 60.4 = 12.6 billion USD are directed to France;
    - 12% * 60.4 = 7.0 billion USD are directed to the US;
    - 68% * 60.4 = 40.8 billion USD are directed to other countries.
- Total revenues:
    - 72% * 203.1 = 145.3 billion USD are directed to France;
    - 3% * 203.1 = 6.7 billion USD are directed to the US;
    - 25% * 203.1 = 51.1 billion USD are directed to other countries.

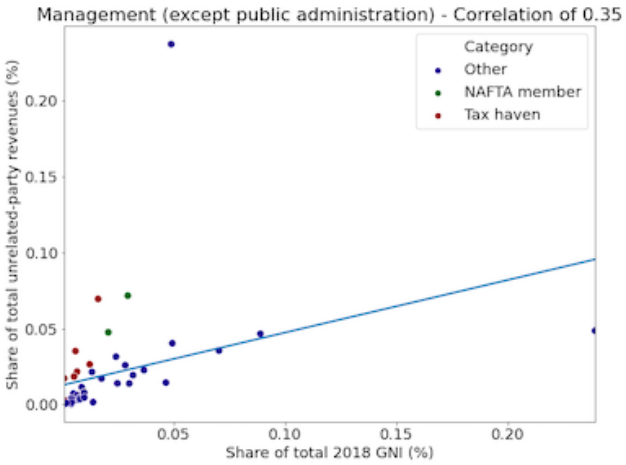
Other cases

Should France be absent from BEA data, in Step 2, we would instead compute the amounts of goods and services supplied to affiliated, unaffiliated and any party at the European level. We would have similarly computed the destination-based distribution of these three amounts at the continental level. From there, the resulting percentages would have been applied similarly as in the Step 3 above, so as to split the three revenue variables of country-by-country data.

E. Industry-specific charts

Figure E.1: : Relationship between partner jurisdictions' share of US multinational companies' foreign unrelated-party revenues and their share of Gross National Income (GNI), broken down by industry group.





<u>Note:</u> This figure presents, for each industry group, the relationship between partner jurisdictions' share of US multinational companies' foreign unrelated-party revenues and their share of the Gross National Income (GNI) observed in the sample. The x-axis corresponds to GNI and the y-axis to revenues. Dots, that all stand for a given partner country, are distinguished into three groups: NAFTA members (Canada and Mexico), tax havens as listed by Tørsløv et al. (2019) and other jurisdictions. The indicative trend line is obtained via the ordinary least-squares estimation of a model regressing the share of unrelated-party revenues over the share of GNI. The correlation between partner jurisdictions' share of foreign unrelated-party revenues and their share of GNI is also indicated. Revenue figures are drawn from the unadjusted aggregated and anonymized country-by-country data of the IRS; GNI data are sourced from the World Bank's databases.

F. Decomposition of variations in the corporate income tax revenue gains from the unilateral implementation of a minimum tax on corporate profits

Table F.1: Change in revenues drawn from US multinational companies implied by the destination-based adjustment.

	Revenues collected from US multinational companies (billion EUR)		
Country	Before the adjustment	After the adjustment	Change in %
Austria	0.2	0.3	70.8%
Belgium	0.8	1.2	47.1%
Cyprus	0.0	0.0	-20.1%
Czech Republic	0.1	0.2	40.6%
Germany	2.6	3.6	39.5%
Denmark	0.1	0.2	57.1%
Estonia	0.0	0.0	NA
Spain	0.7	1.0	36.6%
Finland	0.1	0.1	32.4%
France	1.5	2.5	62.9%
Greece	0.1	0.1	14.0%
Hungary	0.1	0.1	-0.3%
Ireland	2.5	0.8	-68.4%
Italy	1.1	1.4	34.2%
Luxembourg	0.2	0.3	41.4%
Latvia	0.0	0.0	2.1%
Malta	0.0	0.0	NA
Netherlands	1.4	1.8	28.6%
Poland	0.3	0.4	41.1%
Portugal	0.1	0.1	24.1%
Sweden	0.2	0.4	61.8%
Slovenia	0.0	0.0	-9.2%
Slovakia	0.1	0.1	-3.7%
Australia	1.2	1.7	43.2%
Brazil	1.1	2.0	80.6%
Canada	3.9	6.3	62.3%
Chile	0.4	0.4	7.5%
China	2.6	4.5	73.0%
Indonesia	0.1	0.3	147.6%
India	0.6	1.1	71.3%
Japan	2.7	3.6	31.8%
South Korea	0.6	1.1	91.8%
Mexico	1.6	3.6	124.4%
Norway	0.2	0.3	80.8%
United States	NA	NA	NA
South Africa	0.3	0.4	20.2%

Note: This table presents for each in-sample headquarter country the estimated tax revenue gains that it could draw from US multinational companies by unilaterally implementing a minimum tax at Baraké et al. (2021)'s reference effective rate of 25%. In the unilateral scenario, a non-US taxing country would indeed collect part of the US tax deficit based on its weight in the distribution of US multinational companies' global sales. Ex-ante and ex-post revenue gain estimates are presented in 2021 billion EUR; the variation is expressed in percentage. The change in revenues drawn from non-US multinational companies is described in Table F.2 and the change in total revenue gains is described in Table 7.

Table F.2: Change in revenues drawn from non-US multinational companies implied by the destination-based adjustment.

	Revenues collected from non-US multinational companies (billion EUR)		
Country	Before the adjustment	After the adjustment	Change in %
Austria	0.7	1.2	88.5%
Belgium	0.8	3.1	296.4%
Cyprus	0.1	0.0	-60.6%
Czech Republic	0.2	1.2	407.4%
Germany	6.0	11.8	95.5%
Denmark	0.2	0.8	228.5%
Estonia	0.0	0.0	-23.5%
Spain	3.6	4.6	28.0%
Finland	0.3	0.6	83.7%
France	3.7	6.8	86.3%
Greece	0.1	0.4	324.2%
Hungary	0.3	0.7	151.3%
Ireland	0.4	1.6	323.4%
Italy	2.1	5.3	146.2%
Luxembourg	0.7	1.1	53.5%
Latvia	0.0	0.0	204.4%
Malta	0.0	0.0	9021.8%
Netherlands	2.7	5.4	96.2%
Poland	1.1	1.8	68.4%
Portugal	0.5	0.7	48.6%
Sweden	0.8	1.6	98.7%
Slovenia	0.0	0.1	240.1%
Slovakia	0.1	0.5	268.3%
Australia	1.9	3.3	69.9%
Brazil	2.3	4.7	105.3%
Canada	1.7	3.0	79.3%
Chile	1.1	1.1	-5.7%
China	20.5	20.8	1.2%
Indonesia	1.8	3.0	70.2%
India	0.8	2.7	225.9%
Japan	1.2	4.4	274.1%
South Korea	0.2	3.3	1968.2%
Mexico	2.1	3.2	49.4%
Norway	0.4	1.0	158.7%
United States	44.5	61.5	38.3%
South Africa	0.5	0.7	34.9%

Note: This table presents for each in-sample headquarter country the estimated tax revenue gains that it could draw from foreign, non-US multinational companies by unilaterally implementing a minimum tax at Baraké et al. (2021)'s reference effective rate of 25%. In the unilateral scenario, a taxing country would indeed collect part of foreign jurisdictions' tax deficit based on its weight in the distribution of their multinational companies' global sales. Ex-ante and ex-post revenue gain estimates are presented in 2021 billion EUR; the variation is expressed in percentage. The change in revenues drawn from US multinational companies is described in Table F.2 and the change in total revenue gains is described in Table 7.