

# Did the Tax Cuts and Jobs Act Reduce Profit Shifting by US Multinational Companies?\*

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## Abstract

The Tax Cut and Jobs Act of 2017 reduced the US federal corporate tax rate and introduced provisions to limit profit shifting. We combine and reconcile survey data, tax data, and firm financial statements to study the effect of this reform on profit shifting and taxes paid. We find that the share of foreign income booked by US firms in tax havens remained stable at around 50%–60% between 2015 and 2020. The Act did not affect the effective tax rate on foreign profits and caused a 10 percentage point decline in the effective tax rate on domestic profits.

*Keywords* — multinational corporation; corporate taxation; profit shifting; effective tax rate; country-by-country reporting; Tax Cuts and Jobs Act

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# 1 Introduction

A body of work documents profit shifting behavior by multinational corporations. According to recent estimates, close to 40% of multinational profits—profits booked by firms outside of the country of their headquarter—are shifted to tax havens globally each year (Garcia-Bernardo and Janský, 2021; Tørsløv et al., 2020). U.S. multinationals appear to book a particularly large fraction of their income in low-tax places (e.g., Clausing, 2020b; Guvenen et al., 2021). This evolution has been one of the drivers of the decline in the effective tax rate of US corporate profits (Wright and Zucman, 2018).

The Tax Cuts and Jobs Act of 2017 lowered the U.S. federal corporate income tax rate from 35 to 21 percent and switched from a worldwide tax system to a territorial system.<sup>1</sup> To reduce the incentives to shift profits to tax havens, the Act introduced three provisions: a U.S. tax on foreign income subject to low tax rates abroad; a reduced rate on foreign income derived from intangibles booked in the United States; and measures to limit the deductibility of certain payments suspected to shift income out of the United States.

Did the Tax Cuts and Jobs Act affect the amount of profit booked by U.S. multinationals in tax havens? To address this question we combine tax data (published by the Internal Revenue Service), survey data (published by the Bureau of Economic Analysis), and company financial statements (collected in Orbis and Compustat). With the exception of tax data which currently end in 2018, our data sources go up to the year 2020, allowing us to capture three years post-reform and to provide a clear assessment of the impact of this tax change.

Our main findings can be summarized as follows. First, the share of profit booked by U.S. multinationals in tax havens has remained essentially unchanged between 2015 and 2020. Across data sources, U.S. multinationals booked about 50%–60% of their foreign

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<sup>1</sup>The tax base in a territorial system includes domestic profits only. In a worldwide system the tax base includes global profits, and tax credits are generally given for taxes paid abroad. In practice, territorial systems usually have anti-avoidance provisions to prevent firms from shifting domestic profits abroad, and most systems can be better characterized as hybrid.

profits in tax havens over this period of time, with no trend. The similarity of findings across independent sources suggests that the high and stable share of foreign profits booked in tax havens is robust. As close to half of the profits of large U.S. multinational companies are booked abroad (and about half in the United States), the share of total (foreign plus domestic) profits booked in tax havens has remained stable at about 25%, a historically high level.

Second, we observe a large decline in the effective tax rate paid by U.S. firms. For profit-making companies, the effective rate on domestic profits fell more than 10 percentage points after the enactment of Tax Cuts and Jobs Act, while the effective rate on foreign profits barely changed (1 percentage point increase in both tax havens and other countries). As a result, the effective tax rate of US multinationals (on domestic and foreign profits combined) fell by about 5 percentage points, from 19% in 2017 to less than 14% in 2018.

Quantifying these effect of the Tax Cuts and Jobs Act is important because on a priori grounds, it was not clear whether the Act would increase or reduce profit shifting (Auerbach, 2018; Chalk et al., 2018; Hanlon et al., 2019; Slemrod, 2018). The lower U.S. rate—as well as the specific measures introduced to limit profit shifting, in particular the minimum tax on some foreign income known as Global Intangible Low-Taxed Income (GILTI)—reduce the incentives for U.S. firms to book profits in tax havens. However, the move to a territorial system increases the incentives to shift income out of the United States to low-tax countries. Moreover, certain aspects of GILTI provide incentives for U.S. firms to move tangible capital to low-tax countries (Clausing, 2020b). Whether the Tax Cuts and Jobs Act was successful at reducing profit shifting to tax havens is thus an empirical question.

Methodologically, our contribution is to reconcile all the available evidence on the location and effective taxation of the profits of U.S. multinational companies. In particular, we pay special attention to new tax data: tabulations of the country-by-country reports that all large firms headquartered in the United States have to submit to the IRS since

2016. The 2018 tabulations were released in March 2021. These statistics, which are still in their infancy, double-count profits as a number of companies include as profit tax-exempt dividends flowing across subsidiaries (Horst and Curatolo, 2020). We develop a methodology to quantify and eliminate double counting from these data and to reconcile them with other tax data (controlled foreign corporations statistics), Compustat, and the BEA surveys of the activities of US multinational enterprises.

Our findings contribute to a large literature on profit shifting and effective tax rates of multinational enterprises, recently reviewed by Beer et al. (2020) and Janský (2020), respectively. We add to the literature in a number of ways.

First, our study is the first to empirically assess the impact of the Tax Cuts and Jobs Act on profit shifting for US multinationals as a whole. Using a sample of the largest 10 pharmaceutical multinationals, Sullivan (2020) finds no evidence of profit shifted back to the the United States. Our results are consistent with substantial profit shifting by multinationals headquartered in the United States (e.g., Clausing, 2020b; Dowd, Landefeld et al., 2017; Garcia-Bernardo, Janský and Tørsløv, 2021), corresponding to substantial shares of profits reported in tax havens (e.g. Garcia-Bernardo, Janský and Tørsløv, 2021; Tørsløv et al., 2020; Zucman, 2014).

Second, we add to a body of work estimating the decline in effective tax rates caused by the Tax Cuts and Jobs Act (Dowd, Giosa et al., 2020; Dyreng et al., 2020; Sullivan, 2020). Compared to previous work, we provide a more granular picture of the source of this decline. In particular, we can establish that in spite of GILTI, the effective tax rate paid by US multinationals on their foreign income did not increase substantially in 2018. This rate was just 5% in tax havens, a set of countries that includes Bermuda, Singapore, the Netherlands, Switzerland, the Cayman Islands, Ireland, Puerto Rico, Jersey, the Isle of Man, Hong Kong, Gibraltar, Barbados, Luxembourg, Bahamas, British Virgin Islands,

Malta, and Mauritius.<sup>2</sup> This finding suggests that GILTI has not been effective, so far, at increasing the taxation of income shifted to tax havens.

Third, we add to a nascent literature investigating the quality of available data for US multinationals (e.g., Bilicka, 2019; Blouin and Robinson, 2020; Clausing, 2020a; Garcia-Bernardo, Janský and Tørsløv, 2021; Tørsløv et al., 2020). Our contribution here is to provide an attempt at reconciling all available data (BEA surveys, Compustat, Orbis, country-by-country reports, IRS information returns) before and after the Tax Cuts and Jobs Act.

The rest of this paper proceeds as follows. Section 2 presents the data we use. In particular, we explain how existing data sources on the size and location of the foreign profits of US multinationals can be reconciled. Section 3 presents our methodology to track the evolution of profit shifting and effective tax rates. Section 4 presents and discusses our results. We conclude in section 5.

## **2 Data on the Profits of US Multinational Companies**

We combine and reconcile three different data sources to study the evolution of profit shifting by US multinational companies: surveys of the activities of US multinational companies conducted by the Bureau of Economic Analysis; firm financial statement collected in the Compustat and Orbis databases; and tax data collected by the Internal Revenue Service (country-by-country statistics and controlled foreign corporations information returns). In this section we present each of these data sources; we explain how we compute profits in a harmonized way and without double-counting; and we show how these various data can be reconciled.

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<sup>2</sup>The list of tax havens was defined as all countries reporting at least one billion of profits, an effective tax rate below 12% and profit margins over \$100,000 per employee. Only three jurisdictions (Costa Rica, Macao and Panama) are dropped in the last condition, accounting for \$6 billion of profits a year. We also included the Bahamas, since the country has a zero statutory corporate tax rate.

## 2.1 BEA Survey Data

The Bureau of Economic Analysis (BEA) conducts mandatory quarterly, annual, and benchmark surveys of the foreign operations of US multinational companies.

Quarterly surveys (form BE-577) provide data to estimate the US share of profits made by foreign companies (typically affiliates of US multinationals) in which a US investor owns a more than 10% stake. These estimates are published in the US balance of payments as direct investment income received by the United States. These data are available at a high frequency: estimates for the fourth quarter of year  $n$  (and hence for the entire year  $n$ ) are published in March of  $n + 1$ . This allows us to study changes in the size and location of the profits of foreign affiliates of US multinationals up until the end of the year 2020.

Annual (form BE-11) and benchmark (form BE-10) surveys provide more detailed statistics on the activities of US multinational enterprises, and are available with a lag. Tabulations of the annual survey of year  $n$  are published in August of  $n + 2$ . Benchmark surveys are conducted every five years; the most recent benchmark survey is for the year 2019. We use the annual surveys to provide additional details on the activities of US multinational enterprises up until 2018, and plan to use the 2019 benchmark survey upon publication in August 2021.

We compute profits in these data as follows. In the annual and benchmark surveys, we use the variable “profit-type return” (denoted as *BEA* in what follows), following, e.g., Wright and Zucman (2018), Tørsløv et al. (2018), and Garcia-Bernardo, Janský and Tørsløv (2021). This variable does not double-count foreign profits; it is gross of foreign corporate taxes paid, net of interest payments, and net of depreciation.

We compute profits in the quarterly survey as reported in the balance of payments (*BoP*) by adding foreign taxes paid to direct investment income without current cost adjustment. Like profit-type return, this measure of profits does not double-count foreign profits; it is gross of foreign corporate taxes paid, and net of depreciation. In contrast to profit-type return, it does not net out interest payments.

The merits and demerits of these various measures are discussed in, e.g., Wright and Zucman (2018), Clausing (2020b) and Blouin and Robinson (2020). Two points are worth mentioning. First, following internationally-agreed guidelines, the balance of payments measure assigns profits to the countries with which the U.S. parent companies have direct links, which may not be the countries where profits have been made, but countries hosting intermediate holding company. For example, income assigned to Bermuda in the balance of payments may correspond to profits made in Germany and then paid out as dividends to a holding company in Bermuda. By contrast, “profit-type return” assigns profits to the countries where profits have been made, but these countries may not be those where the profits are taxed. For example, profit assigned to Ireland in the annual and benchmark surveys may in fact be taxed in Bermuda (e.g., Coffey, 2021).

Second, both measures exclude profits booked in Puerto Rico, which is not treated as a foreign jurisdiction the BEA surveys. Profits booked in Puerto Rico are not subject to the US federal corporate tax, and Puerto Rico is one of the largest tax havens for US companies (Tørsløv et al., 2020). To correct for this, we impute profits in Puerto Rico based on the information available in the CBCR data (see below).

## **2.2 Corporate Financial Statements**

We use S&P’s Compustat North America data to study the profits of US listed multinational companies. This data source provides financial information extracted from company filings. Unlike Compustat Global or Orbis, Compustat North America provides quasi-comprehensive information on the foreign profits of US multinational companies (i.e., global profits are broken down into US vs. non-US). However, profits are not identified at the country level, making it impossible to estimate the share of profits booked in tax havens.

We complement Compustat with the Bureau van Dijk Orbis database. Orbis relies on administrative information in public business registries to record the profits made by

multinationals in their various subsidiaries. As discussed in Tørsløv et al. (2018), the coverage of Orbis is limited by the fact that in a number of countries, public registries either do not exist (e.g., Bermuda), or contain no income information (e.g., Switzerland). Profits booked by multinationals in these countries are not visible in Orbis.

### **2.3 Controlled Foreign Corporations Information Returns**

Another dataset commonly used to study profit shifting comes from the “U.S. Corporations and Their Controlled Foreign Corporations” information returns collected by the Internal Revenue Service (form 5471). In this dataset, we compute profits (*CFC* in what follows) by subtracting “Dividends received from foreign corporations or partnerships controlled by U.S. corporation filing return” from “Current earnings and profits (less deficit)”. This dataset is only released every two years. The most recent release contains data from 2016.

### **2.4 Country-By-Country Reports**

We use the Country-by-Country dataset (tabulations of IRS form 8975) published by the Internal Revenue Service. These data include aggregate information on all US-headquartered multinationals with annual revenue for the preceding reporting period of over \$850 million. Multinationals report the following information for each tax jurisdiction in which they conduct business: unrelated party revenues, related party revenues, profits, income taxes paid and accrued, stated capital, accumulated earnings, and tangible assets other than cash; see Clausing, 2020b; Garcia-Bernardo, Janský and Tørsløv, 2021) for a detailed presentation of these data.

The main advantage of the CBCR data is its extensive country coverage. The coverage of US multinationals affiliates in both tax havens and low-income countries is much more granular than in other data sources such as the Bureau of Economic Analysis survey data (Garcia-Bernardo, Janský and Tørsløv, 2021).



The data for 2016, 2017 and 2018 were released by the Internal Revenue Services in December 2018, December 2019 and March 2021, respectively. The results below focus on the data for 2017 and 2018, which cover the full population of US multinationals. In contrast, the data for 2016 are estimates based on a sample (Garcia-Bernardo, Janský and Tørsløv, 2021) and is included for illustrative purposes only.

The CBCR provides information independently for “all-subgroups” (both profit-making and loss-making affiliates) and “sub-groups with positive profits” (from now on, profit-making affiliates). The data on all affiliates provides higher granularity—e.g., in the subset of profit-making affiliates, Jersey, Isle of Man and Gibraltar are included in the group “Other Europe” together with small European countries such as Albania, Latvia or Moldova. We use data on all affiliates for most of our analysis (except for the estimation of effective tax rates as discussed in Section 3.2).

## **2.5 Correction of Double-Counting in the CBCR Data**

CBCR data double count foreign profits, since intra-group dividends are sometimes counted as profits both in the origin country and in the destination country. This double-counting has been estimated at around 23% for 2017 data (Horst and Curatolo, 2020) (14.4% if stateless entities are excluded). In this section, we estimate the double counting at 48% in 2017 and 72% in 2018 (33% and 59% if stateless entities are excluded). We show that the majority of this double counting is reported in the United States.

Similarly to (Horst and Curatolo, 2020), we use Compustat data to estimate the theoretical profits that should be reported in the CBCR data. We extract information through WRDS (Wharton Research Data Services) on foreign profits (pifo), foreign taxes (txfo), total profits (pi) and total taxes (txc). We also collect data on total assets (at), intangible assets (intan), employees (emp) and total sales (revt). Our cleaning procedure consists of four steps: First, we kept observations using the industrial reporting format (indfmt=="INDL") when possible. Second, we kept only US-headquartered MNCs (loc=="USA"), which re-

duces the sample to 7871, 7780 and 7774 companies for 2016, 2017 and 2018. Third, we kept companies with revenues over 850 million, which reduces the sample to 1723, 1740 and 1757 companies—for comparison, the CBCR samples are 1,575 and 1,641 for 2017 and 2018 and can be considered to represent a complete coverage for this purpose. Fourth, we dropped companies without information on foreign profits or foreign taxes, which reduces the sample to 1428, 1441 and 1460 companies. Of those, 1,310, 1,323 and 1,340 firms had information on foreign profits, and 1,012, 1,022 and 1,042 reported non-zero values of foreign profits. The total profits in 2017 for the sample of 1,441 companies is 1,342 bn. From those, 550 bn correspond to foreign profits, 499 bn to domestic profits, and 293 bn are unknown (Table 1, columns B–C).

In order to estimate the theoretical total profits, we first estimated the foreign and domestic profits of the approximately 120 companies with missing data—i.e, bringing the sample size from approximately 1,330 companies to 1,450 companies. To do so, we model the logarithm of foreign profits using the logarithm of assets, revenue, intangibles, number of employees and foreign tax accrued using the data (running a regression for the companies with non-missing foreign profits). The model estimates that the companies with missing information in 2017 have 248 bn of domestic profits and 34 bn of foreign profits (total 282 bn, remarkably close to the 293 bn that were unknown) (Table 1, columns G–H). Secondly, we estimated the financial information of companies missing in the sample—i.e, bringing the sample size from approximately 1,450 companies to the approximately 1,600 companies reporting CBCR. Since those companies are private companies, they are expected to be smaller than publicly listed companies. We assign to these missing companies 20% the average profits of non-missing observations. The profits of all companies reporting CBCR are estimated at 1,367 bn in 2017 and 1,514 bn in 2018 (Table 1, column I). Given that 1,818 bn and 2,406 bn were reported to CBCR excluding stateless entities, this imply a double-counting of 33% and 59% respectively (Table 1, column K). Double counting takes places primarily in the United States. Splitting this into domestic and foreign components,

Table 1: Descriptive statistics of CBCR, Compustat, Orbis and estimated double counting in the CBCR data

	Year	Compustat		CBCR		Method 1. Regression to find foreign profits								Other datasets						
		Profits	N	Profit (inc. stateless)	Profit (exc. stateless)	N	Profit	N	Profit	Double count (inc. stateless)	Double count (exc. stateless)	Double count (inc. stateless) USD billion	Double count (exc. stateless) USD billion	Orbis (N = 1,234 and o (N = 1,221)	Horst & Curatolo (N = 1,349)	BOP	BEA	BEA+ capital gains	CFC	
Dom	2017	499	1,323	1,180	1,180	747	1,425	<b>763</b>	55%	55%	417	417								
	2018	595	1,340	1,488	1,488	837	1,445	<b>852</b>	75%	75%	636	636								
For	2016															557	478	472	706	
	2017	550	1,323	842	638.4	584	1,425	<b>596</b>	41%	7%	246	42			659	573	636			
	2018	617	1,340	1,116	917.5	647	1,445	<b>659</b>	69%	39%	457	259			702	608	659			
Total	2017	1,342	1,441	2,022	1,818	1,575	1,342	1,441	<b>1,367</b>	48%	33%	655	451	1,317	1,450					
	2018	1,491	1,460	2,604	2,406	1,641	1,491	1,460	<b>1,514</b>	72%	59%	1,090	891	1,418						
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S

Notes: The table provides basic descriptive statistics for US MNCs on the basis of a variety of data sources and our new estimates correcting for double counting in the CBCR data. We present profits and number of companies, when available, for 2017 and 2018 for their total as well as domestic and foreign activities. The table provides information from Compustat, and the CBCR data as published by the IRS, as corrected for double counting by Horst and Curatolo (2020) and as corrected by us in this paper. We estimate total profits at 1,367 billion and 1,514 billion in 2017 and 2018, which implies a double counting of 33% and 59%. We estimate the double counting in the United States at 55% and 75% (417 and 636 billion), while the double counting in foreign countries is 7% and 39% (42 billion and 259 billion). Including stateless entities increase the double counting in foreign countries by 200 billion in both years. The CBCR data corrected for double counting exhibits total profits similar to the various BoP and BEA series (between 573 and 659 billion in 2017 and between 608 and 702 billion in 2018), which have comprehensive coverage of US MNCs similarly to the CBCR data.

we estimate domestic double counting at 55% and 75% in 2017 and 2018 (417 and 636 bn) and foreign double counting at 7% and 39% (42 and 259 bn) (Table 1, columns K and M). The extent of foreign double counting is higher when including stateless entities (Table 1, columns J and L), which we explore further in section A.1.

In addition, we present three robustness checks. The first excludes the imputation of missing financial. As in our benchmark method, we assume that the foreign profits of all companies that paid zero foreign tax are zero. This increases the sample size from around 1,000 companies to around 1,330 companies. As in our benchmark method, the second step assumes that missing firms have the same average profits as non-missing firms. The second robustness test starts from the sample with non-zero foreign profits and assumes that the average profit of all missing observations is 20% the average profit of non-missing observations. This value was calculated using the information on listed vs non-listed companies in Orbis with revenue over 850 million. The third robustness test adjusts the

information of profits based on the information on employees and sales in CBCR data, which are not subject to double counting. All methods provide similar estimates (total profits of  $1,399 \pm 49$  billion and  $1,587 \pm 74$  billion in 2017 and 2018).

## 2.6 Comparison and Reconciliation of Data Sources

After correcting the double-counting in the CBCR data we find a good agreement between all datasets (Table 1).

In 2017 we estimate foreign profits in CBCR at 596 billion, closely comparable to the 573–659 billion found on the other datasets. In 2018 we estimate foreign profits at 659 billion, comparable to the 608–702 billion found in the other datasets. The change of profits between 2017 and 2018 is also similar to the one found in other datasets, including Compustat and Orbis with a lower sample size.

Next, we move past the aggregate level and correct for double counting in the CBCR data at the country level. We remove double counting proportionally to the profits reported in the CBCR data with profit-making entities, since profits (potentially including dividends) offset by losses will still be reflected in that data. Since it is unlikely that profits are double-counted in countries not used for as conduit or tax havens, we remove all double counting from all tax havens with two exceptions: the United Kingdom and Ireland. While we do not classify the United Kingdom as a tax haven, it is often the location of corporate holdings and serves as a conduit. We do not remove profits from Ireland since the effective tax rate is 12% (similar to the statutory tax rate) and the Irish profits in CBCR data are much lower than those of other sources—which could point to a reporting of the profits attributable to double Irish structures in other jurisdictions (e.g. Bermuda or Stateless entities).

The CBCR data at the country level is highly correlated with the BEA data (Figure A3). Among the countries available in both datasets, CBCR and BEA show a stronger correlation (kendall rank 0.80), although BEA show lower profits in the Netherlands,

Bermuda, Luxembourg and the UK Caribbean. Conversely, BoP show a weaker correlation (kendall rank 0.75–76), especially in countries with less than 20 billion in profits reported. Similarly, Figure A4 shows the comparison between BEA and CFC. Among the countries available in both datasets, CFC and BoP show a strong correlation. CFC and BEA-profit type return show a weaker correlation, especially in relationship to the Netherlands, Bermuda, Luxembourg and the UK Caribbean, where BoP report less profits.

Table 2: Profits by country for all datasets studied, without attributing stateless income

	BoP (2017)	BoP (2018)	BEA (2017)	BEA (2018)	CBCR (2017)	CBCR (2018)	CFC (2016)
Bermuda	49.0	45.0	8.2	9.3	29.5	58.1	84.5
Singapore	33.0	44.9	35.9	66.7	49.9	51.5	23.5
Ireland	66.4	65.6	80.1	104.7	29.5	49.1	162.3
United Kingdom	59.4	58.1	54.1	47.3	11.3	42.1	39.5
Netherlands	84.8	89.0	55.7	19.9	34.2	34.9	84.3
Switzerland	33.3	26.1	36.3	45.4	44.4	31.8	42.7
Cayman Islands					53.3	28.9	31.8
Puerto Rico	31.4	23.5	31.4	23.5	31.4	23.5	9.5
Jersey					10.5	12.5	
Isle of Man					6.8	12.5	
Hong Kong	8.8	12.7	10.0	10.7	11.2	10.3	7.2
Gibraltar					4.6	8.6	
Barbados	1.2	3.2	4.8	5.3	5.7	6.4	0.6
Luxembourg	44.2	43.1	12.4	1.1	19.8	2.6	39.2
British Virgin Islands					2.7	2.2	-0.5
Bahamas					-1.0	2.2	1.3
Malta					-0.3	1.1	
Mauritius					2.9	0.7	
Other Europe (BEA/BoP)	4.5	9.5	-6.9	11.2			
UK Caribbean (BEA/BoP)	32.5	35.2	12.9	12.3			
Other Western (BEA/BoP)	1.5	5.2	12.1	14.2			
TOTAL (exc. UK)	390.6	402.8	293.0	324.2	335.1	336.7	486.3
TOTAL (inc. UK)	450.0	460.9	347.1	371.4	346.3	378.9	525.8
Foreign profits	655.6	696.7	633.2	660.4	596.0	658.8	705.6
TOTAL (exc. UK) % foreign profits	59.6	57.8	46.3	49.1	56.2	51.1	68.9
TOTAL (inc. UK) % foreign profits	68.6	66.2	54.8	56.2	58.1	57.5	74.5

Notes: Profits by country for all tax havens and datasets studied, without attributing stateless income. While we do not classify the United Kingdom as a tax haven, it is often the location of corporate holdings and serves as a conduit and why we include it among tax havens as an alternative.

### 3 Methodology

To reduce the incentives to shift profits to tax havens, the Tax Cuts and Jobs Act introduced three provisions: a U.S. tax on foreign income subject to low tax rates abroad, GILTI (global intangible low-taxed income); a reduced rate on foreign income derived from intangibles booked in the United States, FDII (foreign-derived intangible income); and measures to limit the deductibility of certain payments suspected to shift income out of the United States, BEAT (base erosion and anti-abuse tax).

Our main goal in this paper is to understand the extent to which the Tax Cuts and Jobs Act reduced profit shifting to tax havens. We are also interested in analyzing how the changes in the law affected the taxation of domestic and foreign profits. This section outlines our methodology.

#### 3.1 Profit Shifting

We estimate the profits reported in tax havens as a share of either total or foreign (i.e. non-US) profits. We investigate individual tax havens as well as tax havens as a group. We limit tax havens to jurisdictions where multinationals booked at least \$10 billion in profits, have a profit margin over \$100,000 per employee, and paid an effective tax rate below 12%. The list of tax havens and their effective tax rate is: Bermuda (1.2%), Ireland (11.9%), Netherlands (6.0%), Cayman Islands (0.3%), Singapore (5.2%), Luxembourg (1.4%), Switzerland (7.4%), Puerto Rico (1.7%), Jersey (0.8%), Hong Kong (11.5%), Isle of Man (0.0%), Gibraltar (0.3%), Barbados (0.4%), Mauritius (3.2%), British Virgin Islands (1.0%), Bahamas (44.3%), Malta (8.1%).

To discuss our results below, we group the tax havens in two categories, similarly to Reurink and Garcia-Bernardo (2020): “profit centers” and “coordination centers”. Profit centers include small island states used only for profit booking: Bermuda, the Cayman Islands, Puerto Rico, Jersey, Isle of Man, Gibraltar, Barbados, Mauritius, British Virgin

Islands, Bahamas and Malta. Coordination centers include tax havens that are also used for management and other coordination activities: Singapore, the Netherlands, Switzerland, Ireland, Luxembourg and Hong Kong.

### **3.2 Effective tax rates.**

We estimate ETR as the ratio of cash taxes over profits, using the data on profit-making affiliates. In this way, we avoid offsetting firms with losses and firms with profits and we thus avoid overstating ETRs. For the jurisdiction that are not present in the data containing profit-making affiliates we use the data of containing all affiliates.

## **4 Results**

### **4.1 Profits Remain in Tax Havens**

We find that the share of foreign profits booked in tax havens is similar across years and datasets at around 50–60% (Fig. 1). In CBCR, the equivalent of 51% of foreign profits are reported in tax havens in 2018, decreasing from 56% in 2017 (Fig. 1A and Table 2). This is only the case because losses decreased in the UK (i.e. total profits increased). Including the United Kingdom among tax havens, profits in tax havens remained stable at 58%, or in dollar value, increasing from 346B (58.1% of foreign profits) to 379B (57.5% of foreign profits).

The total profits in tax havens happened to be split evenly between coordination centers and profits centres in 2017. From the 56% of foreign profits in tax havens (excluding the UK) in 2017, 28% correspond to profits booked in coordination centers and 28% to profits booked in profit centers (Fig. 1A). In 2018, 27% of foreign profits are booked in coordination centers and 24% in profit centers. Conversely, profits in the United States remained constant, experiencing a small increase from 56.1% to 56.4% (Fig. 3). This points

to a failure of TCJA in its objective to stop corporate profits from being shifted outside the United States.

The high concentration of profits in tax havens contrasts with the dispersion of employment. Only 5% of foreign employees are present in tax havens (Fig. 1B), the majority of them in coordination centers such as Ireland, Singapore or the Netherlands. This is a decline from the 6% reported in 2017. Similarly to the observed patterns in the location of profits, the share of total employment in the United States decreased from 61.8% in 2017 to 59.3% in 2018 (Figure 3).

The different datasets paint a similar pattern. For both BoP and BEA, we observe no substantial decrease in the total profits in tax havens (Figs. 1 and A6).

The increase of profits in tax havens is not equally distributed for all tax havens (Fig. A5, Table 2). Among profit centers, profits in Bermuda and Ireland increased, while profits in the Cayman Islands decreased from 6% to 4%. Interestingly, Jersey, Isle of Man and Gibraltar attracted a larger share of foreign profits. Among coordination centers, only Ireland and Singapore attracted a larger share of foreign profits, with Netherlands and Switzerland losing part of their share of profits.

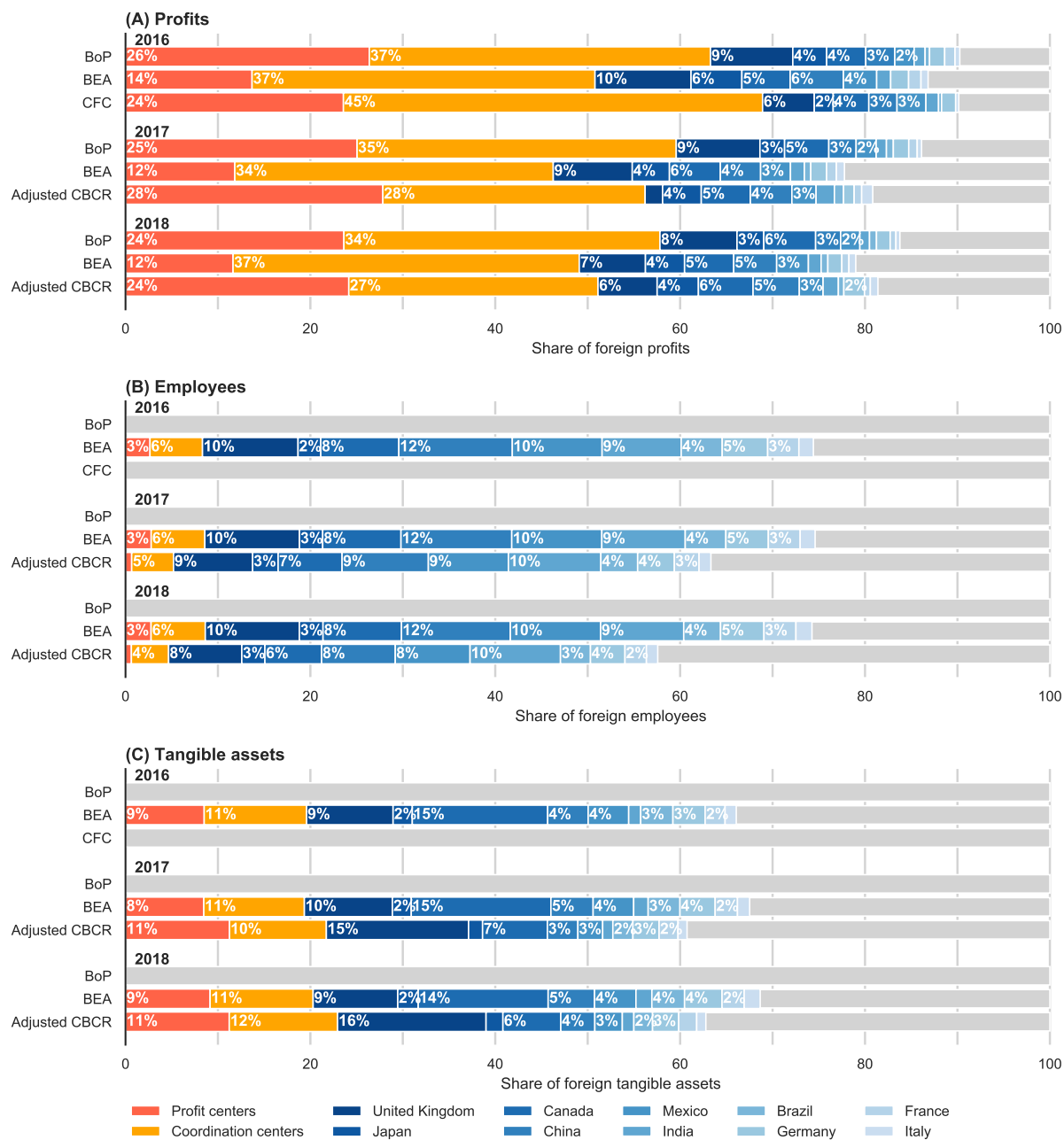
Next, we investigated if the high levels of profits found in tax havens could be tax-motivated. If this is the case, a high profitability (profit per employee) should be correlated with a low effective tax rate.<sup>3</sup> We find this to be the case (Figure 2 for 2018 and Figure ?? for both 2017 and 2018). The top profit centers, accumulating 24.2% of foreign profits, exhibit a profitability of 3 million per employee and an ETR of 1.3%. The top coordination centers, accumulating 27.2% of foreign profits, exhibit a profitability of 430,000 per employee and an ETR of 8.6%.

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<sup>3</sup>This relationship is the basis of the methods calculating the tax semi-elasticity, pioneered by Hines and Rice (1994)

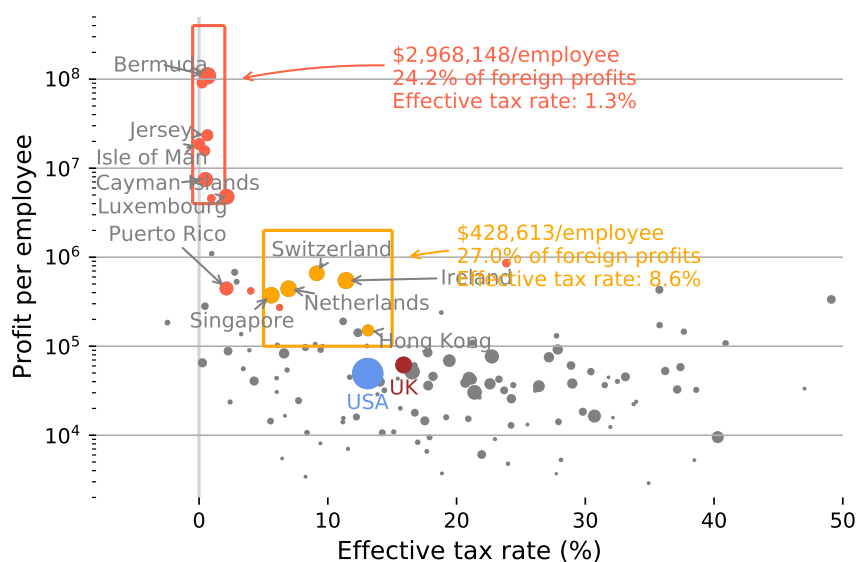


Figure 1: Share of profits in tax havens



Notes: Profit centers include small island states used only for profit booking: Bermuda, the Cayman Islands, Puerto Rico, Jersey, Isle of Man, Gibraltar and Barbados. Coordination centers include tax havens that are also used for management and other coordination activities: Singapore, the Netherlands, Switzerland, Ireland, Luxembourg and Hong Kong.

Figure 2: Extreme profitability in tax havens



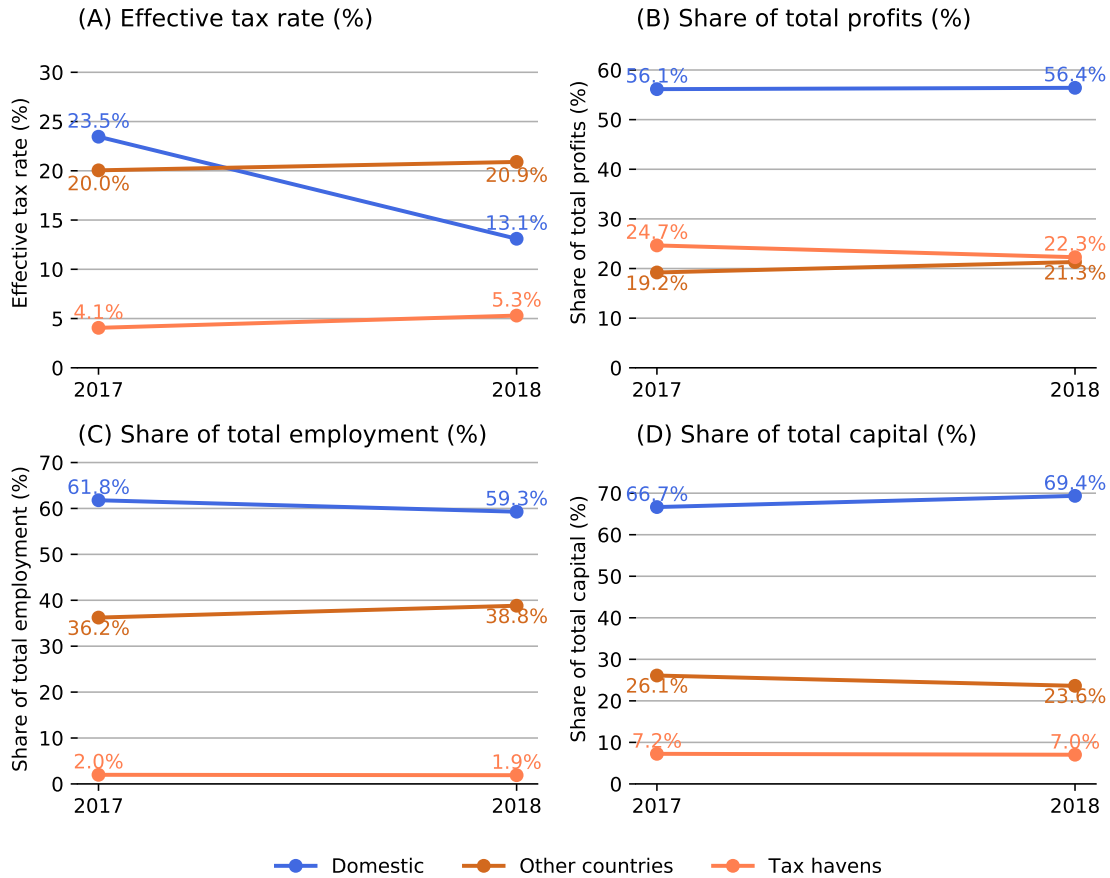
Notes: Profitability of affiliates (estimated as profit per employee) in 2018 as a function of the ETR. The area of the bubble is proportional to the profits booked in the jurisdiction. We use data for profit-making affiliates except for the countries that do not appear in that dataset. For those countries we use the data on all affiliates of US multinationals. Profit centers are marked in red. Coordination centers are marked in orange. The United States is displayed in blue, and the United Kingdom is displayed in dark red. Only tax havens with at least \$10 billion of profits booked are annotated.

## 4.2 Decline in Effective Tax Rates

We observe a large decline in ETRs between 2017 and 2018 for domestic profits (just above 10 percentage points) and a 1 percentage points increase for foreign profits (Fig. 3A). The decline in domestic ETRs is broadly consistent with the decline of federal corporate tax revenue as a share of the GDP from 1.5% in 2017 to 1.0% in 2018 (Congressional Budget Office, 2021). The observed decline for domestic profits is in line with some predictions (e.g. Clausing, 2020b) that the ETR cut would be 10 percentage points, which is, due to base-broadening provisions in the TCJA, lower than the statutory rate cut of 14 percentage points.

The change in foreign ETRs (Fig. 3A) is driven by both tax havens (increase from 4.1% to 5.3%) and other countries (increase from 20.0% to 20.9%). Both the location of profits (Fig. 3B) and real economic activity (Fig. 3C–D) remain constant before and after the TCJA.

Figure 3: A large decline in effective tax rates on domestic profits



Notes: Evolution of the (A) average effective tax rate (B) share of total profits (C) share of total employment, and (D) share of total tangible assets; divided in domestic (blue), tax haven (orange) and other foreign (brown) activities of US multinationals. We observe a large decline in ETRs between 2017 and 2018 for domestic profits (more than 10 percentage points) and a 1 percentage points increase for foreign profits.

## 5 Conclusion

The Tax Cut and Jobs Act (TCJA) was expected to increase the “competitiveness” of the United States, bringing profits and investment back from foreign countries and tax havens. We analyze the country-by-country reporting data of US multinational corporations and show that the reform delivered a large decline in effective tax rates but failed to prevent a continuation in profit shifting to tax havens. Compared with 2017, US multinational corporations in 2018 booked a similar share of their profits in tax havens—56% of their foreign profits—and paid a lower tax rate on their domestic operations (10 percentage

points) and an only slightly higher tax rate on their foreign operations (1 percentage point).

## References

- Auerbach, Alan J. (Nov. 2018). 'Measuring the Effects of Corporate Tax Cuts'. en. *Journal of Economic Perspectives*, 32(4).
- Beer, Sebastian, De Mooij, Ruud and Liu, Li (2020). 'International Corporate Tax Avoidance: A Review of the Channels, Magnitudes, and Blind Spots'. *Journal of Economic Surveys*, 34(3).
- Bilicka, Katarzyna Anna (2019). 'Comparing UK Tax Returns of Foreign Multinationals to Matched Domestic Firms'. en. *American Economic Review*, 109(8).
- Blouin, Jennifer and Robinson, Leslie A. (2020). *Double Counting Accounting: How Much Profit of Multinational Enterprises Is Really in Tax Havens?* en. SSRN Scholarly Paper ID 3491451. Rochester, NY: Social Science Research Network.
- Chalk, Nigel, Keen, Michael and Perry, Victoria (2018). 'The Tax Cuts and Jobs Act: An Appraisal'.
- Clausing, Kimberly (Nov. 2020a). 'Five Lessons on Profit Shifting from the US Country by Country Data'. *Tax Notes Internationala and Tax Notes Federal*.
- (Dec. 2020b). 'Profit Shifting Before and After the Tax Cuts and Jobs Act'. en. *National Tax Journal*.
- Congressional Budget Office (Mar. 2021). *The 2021 Long-Term Budget Outlook*. Tech. rep.
- Dowd, Tim, Giosa, Christopher and Willingham, Thomas (Dec. 2020). 'Corporate Behavioral Responses to the TCJA for Tax Years 2017–2018'. *National Tax Journal*, 73(4).

- Dowd, Tim, Landefeld, Paul and Moore, Anne (2017). 'Profit Shifting of U.S. Multinationals'. *Journal of Public Economics*, 148.
- Dyreng, Scott, Gaertner, Fabio B., Hoopes, Jeffrey L. and Vernon, Mary (June 2020). *The Effect of U.S. Tax Reform on the Tax Burdens of U.S. Domestic and Multinational Corporations*. en. SSRN Scholarly Paper ID 3620102. Rochester, NY: Social Science Research Network.
- Garcia-Bernardo, Javier and Janský, Petr (Mar. 2021). 'Profit Shifting of Multinational Corporations Worldwide'. *ICTD Working Paper*, (119).
- Garcia-Bernardo, Javier, Janský, Petr and Tørsløv, Thomas (2021). 'Multinational Corporations and Tax Havens: Evidence from Country-by-Country Reporting'. en. *International Tax and Public Finance*.
- Guvenen, Fatih, Mataloni Raymond J, Jr., Rassier, Dylan G and Ruhl, Kim J (2021). *Offshore Profit Shifting and Aggregate Measurement: Balance of Payments, Foreign Investment, Productivity, and the Labor Share*. Working Paper 23324. National Bureau of Economic Research.
- Hanlon, Michelle, Hoopes, Jeffrey L. and Slemrod, Joel (June 2019). 'Tax Reform Made Me Do It!' *Tax Policy and the Economy*, 33.
- Hardeck, Inga and Wittenstein, Patrick U. (2018). 'Assessing the Tax Benefits of Hybrid Arrangements - Evidence from the Luxembourg Leaks'. *National Tax Journal*, 71(2).
- Harris, Jeremiah and O'Brien, William (Nov. 2018). 'U.S. Worldwide Taxation and Domestic Mergers and Acquisitions'. en. *Journal of Accounting and Economics*, 66(2).
- Hines, James R. and Rice, Eric M. (1994). 'Fiscal Paradise: Foreign Tax Havens and American Business'. *Quarterly Journal of Economics*, 109(1).
- Horst, Thomas and Curatolo, Alex (2020). 'Assessing the Double Count of Pretax Profit In the IRS Summary Of CbC Data for Fiscal 2017'. *Tax Notes International*, 98(4).

- Janský, Petr (Oct. 2020). 'Corporate Effective Tax Rates for Research and Policy'. en. *IES Working Paper Series*, 2020(41).
- Reurink, Arjan and Garcia-Bernardo, Javier (2020). 'Competing for Capitals: The Great Fragmentation of the Firm and Varieties of FDI Attraction Profiles in the European Union'. *Review of International Political Economy*, 0(0).
- Slemrod, Joel (2018). 'Is This Tax Reform, or Just Confusion?' *Journal of Economic Perspectives*, 32(4).
- Stewart, Jim (May 2021). 'CbC Reporting and Measuring Effective Tax Rates'. en. *Tax Notes Federal*.
- Sullivan, Martin (Nov. 2020). 'TCJA Not Enough to Shift Big Pharma Profits to U.S.' *Tax Notes Federal*, 2020(169).
- Tørsløv, Thomas, Wier, Ludwig and Zucman, Gabriel (2018). 'The Missing Profits of Nations'. *National Bureau of Economic Research Working Paper*, 2018(24071).
- (2020). 'The Missing Profits of Nations'. *National Bureau of Economic Research Working Paper*, 2018, revised April 2020(24071).
- Wright, Thomas and Zucman, Gabriel (2018). 'The Exorbitant Tax Privilege'. *National Bureau of Economic Research Working Paper*, 24983.
- Zucman, Gabriel (2014). 'Taxing across Borders: Tracking Personal Wealth and Corporate Profits'. *Journal of Economic Perspectives*, 28(4).

## A Appendix: Supplementary materials

### A.1 Attributing stateless income

While in our main estimates we do not attribute stateless income, here we discuss the possibility of attributing stateless income. One possibility implicitly assumed above is that stateless income is fully double counting and can be attributed to partnerships in the United States. This reduces foreign profits, and allows to reconcile the global profits in the CBCR data with other data sources. An alternative that we explore here is that at least some of the stateless income is not double counting, but should instead be reported in one of the tax havens. This alternative helps reconcile the country-level profits in the CBCR data with some other data sources, in particular, for some tax havens. For example, the comparison of CBCR and BEA data shows that CBCR may be missing a considerable fraction of profits in Ireland. While BoP and BEA data reports 65–105 billion in Ireland, and CFC reports 162 billion, CBCR reports only 30 billion. This could be caused by stateless entities. Stateless entities are an important part of profit shifting—e.g. profits booked in Ireland through the so called double Irish (Harris and O’Brien, 2018) would be included within the stateless entities—but they also include S-Corps: tax transparent entities taxed at the individual level. Merely removing stateless entities would thus distort the sample. The case of Ireland in the CBCR data has been recently discussed also by Stewart (2021). A similar mismatch of tax residency has also been noted in Luxembourg (Hardeck and Wittenstein, 2018), which can explain why CBCR shows only 5–20 billion of profit in Luxembourg (in contrast with as much as 44 billion in the BoP data or 39 billion in the CFC data).

Therefore, as an alternative, we correct the CBCR data by adding, before removing double counting, 50% of the reported values as stateless entities for Ireland, and an extra 20% to Luxembourg. We then remove double counting to adjust the profits to the correct level. Importantly, since we remove the double counting *only* from tax havens, this does

not change the total profits in tax havens, it only redistribute them more accurately (Table A1). The change in the tax haven share of foreign profits is similar to the one presented in the main body of the paper (Table 2).

Furthermore, we present results for two additional, alternative approaches. In the first one, we remove double counting from all countries and we do not attribute stateless income (Table A2), while in the second one we remove double counting from all countries and we attribute stateless income (Table A3). For both of these we observe increases in the tax haven share of foreign profits (by 5 and 0.9 percentage points, respectively, excluding the United Kingdom).

## A.2 Estimating profit shifting

We proxy profit shifting with a so called profit misalignment method. That method has been shown by Garcia-Bernardo and Janský (2021) to arrive at similar estimates of the scale of profit shifting as the tax semi-elasticity method (Beer et al., 2020). The profit misalignment method calculates the extent of profit misalignment as the difference between the share of profits in the country and the share of economic activity,  $E_i$ .

$$f_i = p_i/P - E_i, \quad (1)$$

where  $p_i$  are the profits booked in the country and  $P$  corresponds to total profits by US multinationals,  $\sum_j (p_j)$ . The share of economic activity,  $E_i$ , is proxied in different ways using unrelated party sales, tangible assets, employment and wages (proxied, as in Garcia-Bernardo and Janský, 2021). In this paper, we use 1/3 unrelated party sales, 1/3 tangible assets, 1/6 employment and 1/6 wages. In the appendix we detail robustness tests.

If the share of economic activity is lower than the share of profits, we assume that profits are shifted into the country. This approach allow us to measure degrees of profit



Table A1: Profits by country for all datasets studied, attributing stateless income

	BoP (2017)	BoP (2018)	BEA (2017)	BEA (2018)	CBCR (2017)	CBCR (2018)	CFC (2016)
Ireland	66.4	65.6	80.1	104.7	93.7	72.9	162.3
Bermuda	49.0	45.0	8.2	9.3	23.1	51.4	84.5
Singapore	33.0	44.9	35.9	66.7	39.6	46.0	23.5
United Kingdom	59.4	58.1	54.1	47.3	-3.5	36.0	39.5
Netherlands	84.8	89.0	55.7	19.9	21.5	29.5	84.3
Switzerland	33.3	26.1	36.3	45.4	33.7	27.5	42.7
Cayman Islands					42.0	25.3	31.8
Puerto Rico	25.0	21.0	25.0	21.0	25.0	21.0	9.5
Luxembourg	44.2	43.1	12.4	1.1	38.2	19.2	39.2
Jersey					7.9	11.3	
Isle of Man					5.4	11.2	
Hong Kong	8.8	12.7	10.0	10.7	8.7	9.2	7.2
Gibraltar					3.7	7.7	
Barbados	1.2	3.2	4.8	5.3	4.5	5.6	0.6
British Virgin Islands					2.1	2.0	-0.5
Bahamas					-1.0	1.9	1.3
Malta					-0.3	1.0	
Mauritius					2.3	0.6	
Other Europe (BEA/BoP)	4.5	9.5	-6.9	11.2			
UK Caribbean (BEA/BoP)	32.5	35.2	12.9	12.3			
Other Western (BEA/BoP)	1.5	5.2	12.1	14.2			
TOTAL (exc. UK)	384.2	400.4	286.6	321.7	350.3	343.2	486.3
TOTAL (inc. UK)	443.6	458.5	340.7	369.0	346.7	379.2	525.8
Foreign profits	649.2	696.7	626.8	660.4	596.0	658.8	705.6
TOTAL (exc. UK) % for- eign profits	59.2	57.5	45.7	48.7	58.8	52.1	68.9
TOTAL (inc. UK) % for- eign profits	68.3	65.8	54.4	55.9	58.2	57.6	74.5

Notes: Profits by country for all tax havens and datasets studied, attributing stateless income (specifically, 50% of the reported values as stateless entities for Ireland, and an extra 20% to Luxembourg). While we do not classify the United Kingdom as a tax haven, it is often the location of corporate holdings and serves as a conduit and why we include it among tax havens as an alternative.

shifting. For example, we estimate that 99% of the profits in the Cayman Islands are artificially shifted there, while only 70% or those in the Netherlands and 30% of those in Ireland are.

Table A2: Profits by country for all datasets studied, removing double counting from all countries and not attributing stateless income

	BoP (2017)	BoP (2018)	BEA (2017)	BEA (2018)	CBCR (2017)	CBCR (2018)	CFC (2016)
Bermuda	49.0	45.0	8.2	9.3	30.7	72.6	84.5
Singapore	33.0	44.9	35.9	66.7	51.8	63.3	23.5
United Kingdom	59.4	58.1	54.1	47.3	14.0	55.4	39.5
Ireland	66.4	65.6	80.1	104.7	29.5	49.1	162.3
Netherlands	84.8	89.0	55.7	19.9	36.5	46.5	84.3
Switzerland	33.3	26.1	36.3	45.4	46.4	41.0	42.7
Cayman Islands					55.5	36.8	31.8
Puerto Rico	32.6	28.8	32.6	28.8	32.6	28.8	9.5
Jersey					11.0	15.3	
Isle of Man					7.0	15.3	
Hong Kong	8.8	12.7	10.0	10.7	11.6	12.9	7.2
Luxembourg	44.2	43.1	12.4	1.1	21.9	12.0	39.2
Gibraltar					4.8	10.4	
Barbados	1.2	3.2	4.8	5.3	5.9	8.1	0.6
British Virgin Islands					2.8	2.7	-0.5
Bahamas					-1.0	2.6	1.3
Malta					-0.3	1.3	
Mauritius					3.0	0.8	
Other Europe (BEA/BoP)	4.5	9.5	-6.9	11.2			
UK Caribbean (BEA/BoP)	32.5	35.2	12.9	12.3			
Other Western (BEA/BoP)	1.5	5.2	12.1	14.2			
TOTAL (exc. UK)	391.8	408.1	294.2	329.5	349.8	419.6	486.3
TOTAL (inc. UK)	451.2	466.2	348.3	376.7	363.9	475.0	525.8
Foreign profits	656.8	696.7	634.4	660.4	596.0	658.8	705.6
TOTAL (exc. UK) % for- eign profits	59.7	58.6	46.4	49.9	58.7	63.7	68.9
TOTAL (inc. UK) % for- eign profits	68.7	66.9	54.9	57.1	61.0	72.1	74.5

Notes: Profits by country for all tax havens and datasets studied, removing double country from all countries and not attributing stateless income. While we do not classify the United Kingdom as a tax haven, it is often the location of corporate holdings and serves as a conduit and why we include it among tax havens as an alternative.

We use two versions of the profit misalignment method. The first (pure) compares the distribution of profits with the distribution of economic activity. The second (redistribution) redistributes part of the profits in tax havens according to the economic activity.

Table A3: Profits by country for all datasets studied, removing double counting from all countries and attributing stateless income

	BoP (2017)	BoP (2018)	BEA (2017)	BEA (2018)	CBCR (2017)	CBCR (2018)	CFC (2016)
Ireland	66.4	65.6	80.1	104.7	106.3	96.3	162.3
Bermuda	49.0	45.0	8.2	9.3	26.2	65.6	84.5
Singapore	33.0	44.9	35.9	66.7	44.7	57.6	23.5
United Kingdom	59.4	58.1	54.1	47.3	3.7	49.0	39.5
Netherlands	84.8	89.0	55.7	19.9	27.7	40.9	84.3
Switzerland	33.3	26.1	36.3	45.4	39.0	36.5	42.7
Luxembourg	44.2	43.1	12.4	1.1	47.4	34.2	39.2
Cayman Islands					47.6	33.0	31.8
Puerto Rico	28.1	26.2	28.1	26.2	28.1	26.2	9.5
Jersey					9.2	13.9	
Isle of Man					6.1	13.9	
Hong Kong	8.8	12.7	10.0	10.7	9.9	11.7	7.2
Gibraltar					4.2	9.5	
Barbados	1.2	3.2	4.8	5.3	5.1	7.3	0.6
British Virgin Islands					2.4	2.4	-0.5
Bahamas					-1.0	2.4	1.3
Malta					-0.3	1.2	
Mauritius					2.6	0.8	
Other Europe (BEA/BoP)	4.5	9.5	-6.9	11.2			
UK Caribbean (BEA/BoP)	32.5	35.2	12.9	12.3			
Other Western (BEA/BoP)	1.5	5.2	12.1	14.2			
TOTAL (exc. UK)	387.4	405.6	289.8	326.9	405.3	453.7	486.3
TOTAL (inc. UK)	446.7	463.7	343.9	374.2	409.0	502.7	525.8
Foreign profits	652.4	696.7	630.0	660.4	596.0	658.8	705.6
TOTAL (exc. UK) % for- eign profits	59.4	58.2	46.0	49.5	68.0	68.9	68.9
TOTAL (inc. UK) % for- eign profits	68.5	66.5	54.6	56.7	68.6	76.3	74.5

Notes: Profits by country for all tax havens and datasets studied, removing double country from all countries and attributing stateless income (specifically, 50% of the reported values as stateless entities for Ireland, and an extra 20% to Luxembourg). While we do not classify the United Kingdom as a tax haven, it is often the location of corporate holdings and serves as a conduit and why we include it among tax havens as an alternative.

In the “pure” profit misalignment method, profit shifting into a country is calculated as

$$S_i = f_i \cdot P. \quad (2)$$

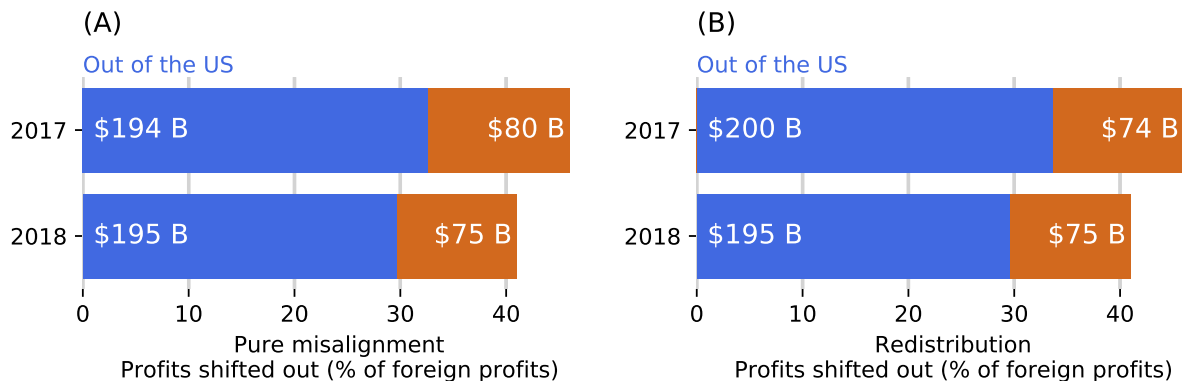
In the “redistribution” profit misalignment method, the sum of profits shifted into countries,  $P \sum_{i:f_i>0} f_i$  is redistributed according to  $E_i$ . Profit shifting into a country is calculated as

$$S_i = \begin{cases} f_i \cdot P - E_i \cdot P \cdot \sum_{i:f_i>0} (f_i), & \text{if } f_i \geq 0 \\ -E_i \cdot P \sum_{i:f_i>0} (f_i), & \text{otherwise} \end{cases} \quad (3)$$

Since the misalignment between the location of real economic activity and profits is often correlated with the effective tax rate, the “pure” profit misalignment method may offer more realistic estimate.

We estimate profit shifting using two profit misalignment methods and we find a slight decrease in profit shifting between 2017 and 2018, from 46% of foreign profits (\$274 billion) to 41% (\$270 billion) (Fig.A1). Profit shifting to individual tax havens is detailed in Table A4. The origin of profit shifting depends on the proxy for economic activity used, as we show in the robustness tests (Fig. A2. In general, we observe that between 40–70% of the profits shifted are shifted out of the United States, while 30–60% are shifted out of third countries. Overall, profit shifting to tax havens remains large.

Figure A1: Profit shifting to tax havens remains large



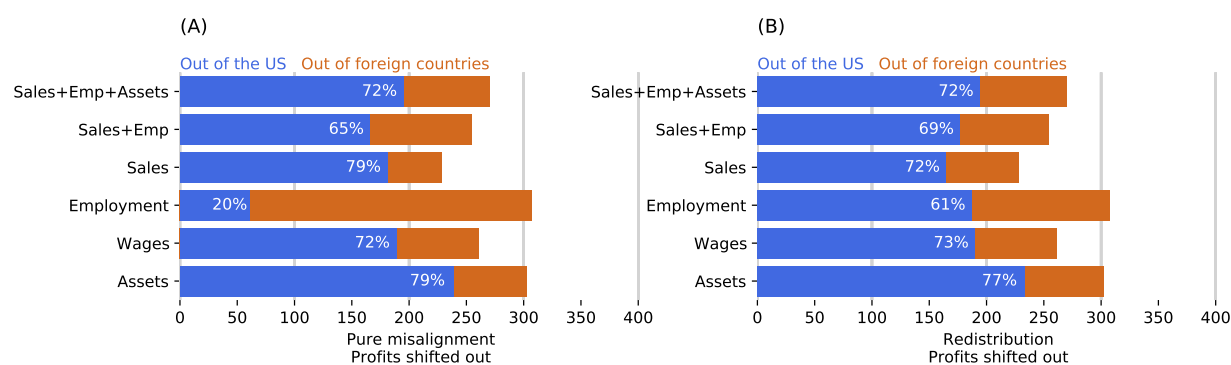
Notes: Profits shifted as a share of total foreign profits for the pure misalignment method and the redistribution method (see Methods, section A.2 for a detailed description of the methods).

Table A4: Profit shifting to tax havens remains large

	2017			2018		
	Profits	Profits shifted	% shifted	Profits	Profits shifted	% shifted
Bermuda	23.1	22.4	96.8	51.4	50.2	97.6
Ireland	93.9	58.6	62.5	73.0	33.4	45.8
Singapore	39.7	27.1	68.2	46.1	31.1	67.4
Cayman Islands	42.1	40.9	97.1	25.3	24.2	95.4
Puerto Rico	25.0	22.7	90.7	21.0	18.2	86.6
Netherlands	21.6	11.6	54.1	29.5	18.0	60.9
Switzerland	33.8	22.2	65.8	27.6	14.4	52.3
Isle of Man	5.4	5.4	98.3	11.3	11.2	99.1
Jersey	7.9	7.7	96.6	11.3	11.0	98.0
Gibraltar	3.7	3.7	99.7	7.7	7.7	99.8
Barbados	4.5	3.5	76.6	5.7	4.7	83.6
Bahamas	-1.0	-0.5	51.4	3.4	3.2	92.7
Luxembourg	38.3	21.7	56.8	19.3	2.2	11.3
Hong Kong	8.7	2.3	26.9	9.2	1.9	21.1
TOTAL	346.8	249.3	71.9	341.7	231.4	67.7

Notes: Profits, and profits shifted in billions and as a share of total foreign profits (see Methods, section A.2 for a detailed description of the methods).

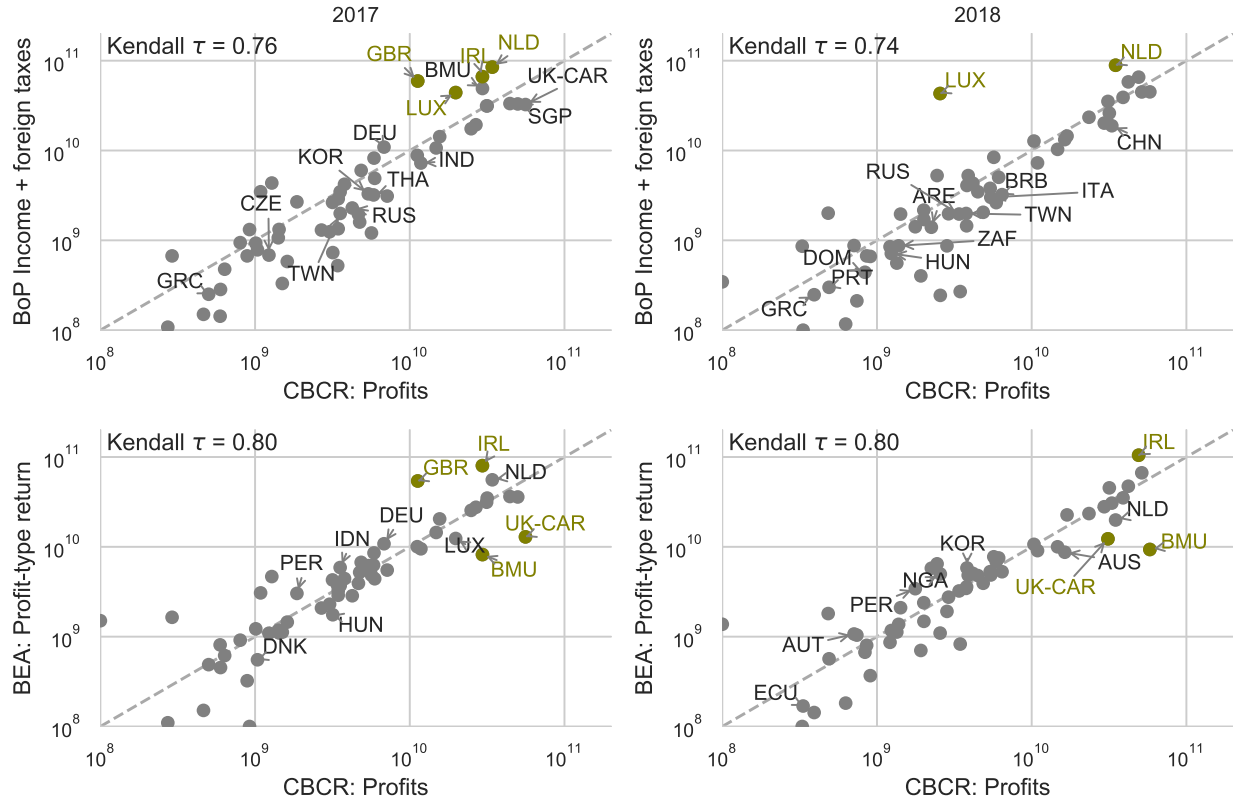
Figure A2: Comparison of different formulas for profit shifting



Notes: Comparison of different formulas for profit shifting using a variety of economic activity indicators. Profits shifted as a share of total foreign profits for the pure misalignment method and the redistribution method (see Methods, section A.2 for a detailed description of the methods).

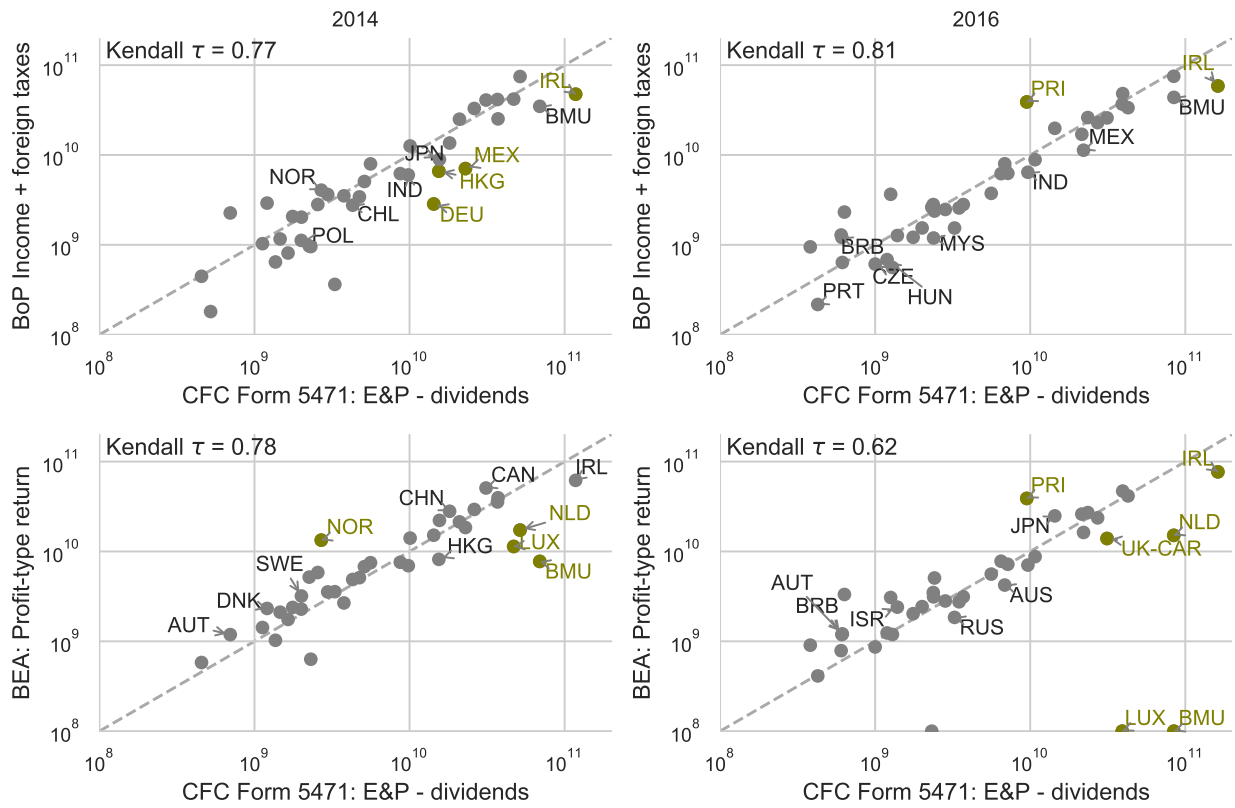
### A.3 Supplementary figures

Figure A3: Comparison of CBCR and BEA



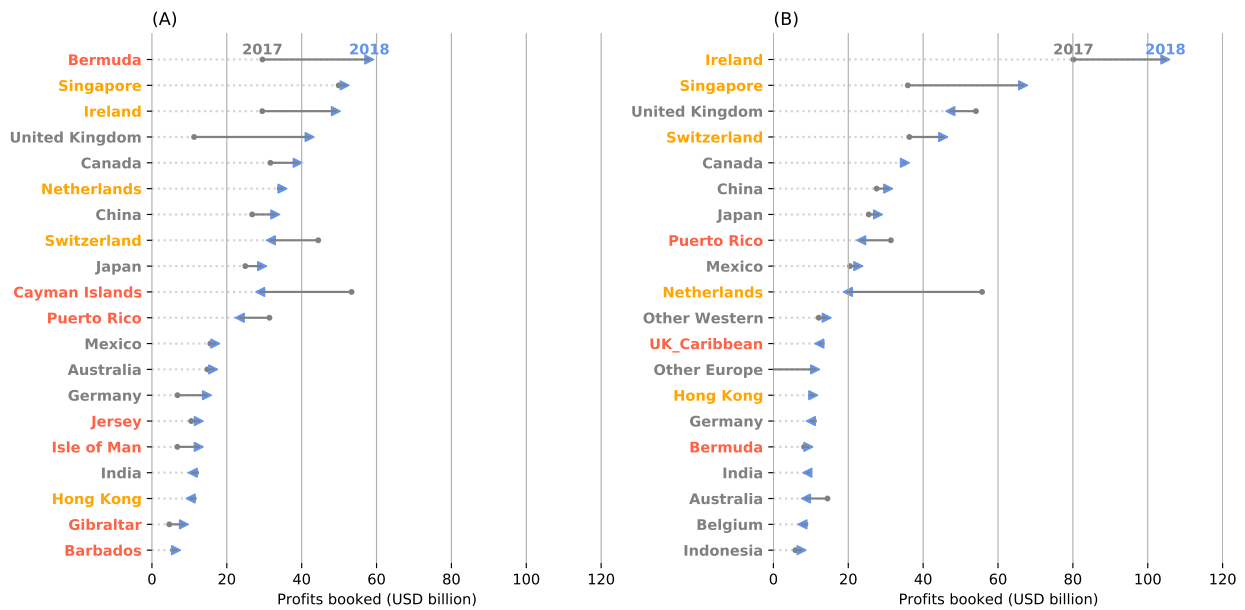
Notes: Countries where the difference between the two sources exceeds 50% of the smaller value are annotated. Countries where the difference exceeds 100% are visualized in olive. Countries with negative profits are moved to the axis (note Bermuda in the bottom left plot). Kendall  $\tau$

Figure A4: Comparison of CFC and BEA



Notes: Countries where the difference between the two sources exceeds 50% of the smaller value are annotated. Countries where the difference exceeds 100% are visualized in olive.

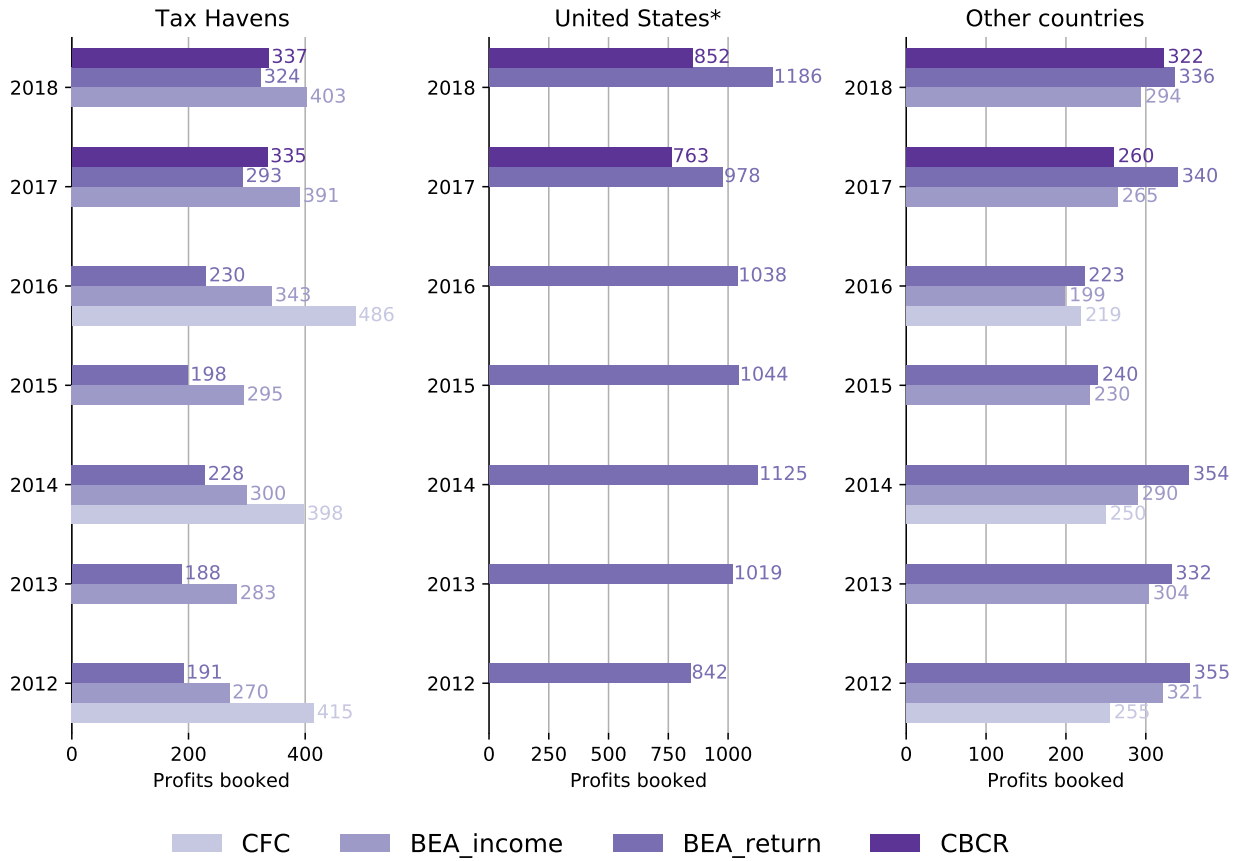
Figure A5: Profits are booked in tax havens



Notes: Location of profits, sorted by the total profits reported. The value from 2017 is displayed as a gray dot, the value from 2018 is displayed with a blue arrow. Panel (A) shows CBCR data, panel (B) shows BEA data (profit-type return + capital gains). Coordination centers are displayed in orange, profit centers are displayed in red.

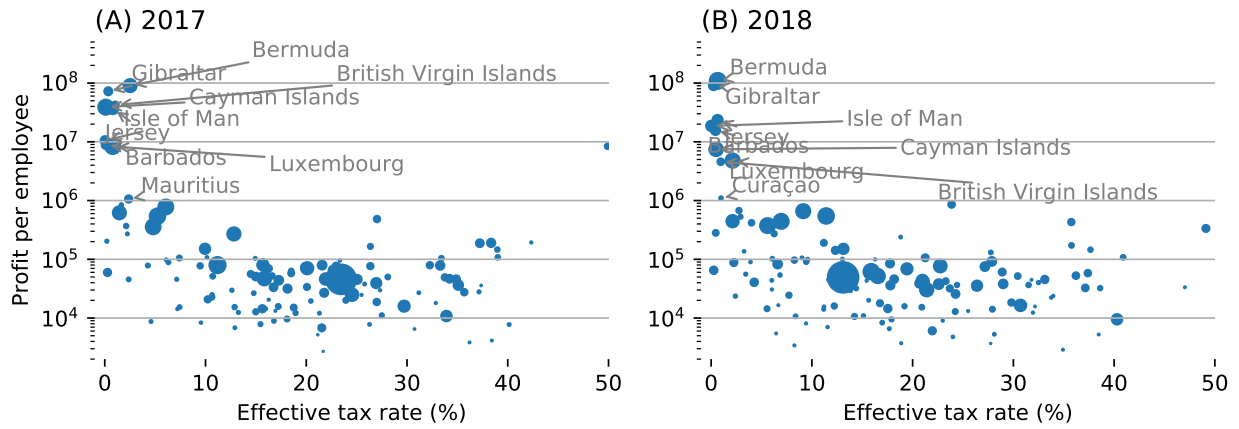


Figure A6: Profits in all sources



Notes: The profits in the United States are not comparable between sources, since BEA data includes many more US entities. CBCR disaggregates into more countries.

Figure A7: Profitability of affiliates as a function of the effective tax rate.



Notes: Profitability of affiliates (estimated as profit per employee) in 2017 and in 2018 as a function of the ETR. The area of the bubble is proportional to the profits booked in the jurisdiction. We use data for profit-making affiliates except for the countries that do not appear in that dataset. For those countries we use the data on all affiliates of US multinationals.