

# State of Tax Justice 2024: Methodological note on estimating the scale of corporate tax abuse

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November 2024

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# 1 Introduction

The purpose of this methodological note is to describe the methodology of new estimates of corporate tax abuse of multinational corporations, as presented in the State of Tax Justice 2024 report published by the Tax Justice Network in November 2024. In mid-2024, the OECD updated their aggregate country by country reporting (CBCR) data, extending the series from 2018 to 2021, allowing the State of Tax Justice 2024 to present for the first time an evolution of corporate tax abuse over a span of six years. The dataset also contains more countries reporting for the three new years, although not all countries report correctly. The methodological note is composed of the following sections. Firstly, we discuss the data; secondly, we describe the misalignment method; and thirdly, we expose the shortcomings of the data and how we deal with them. The code that implements the methodology described in this note is available at [osf.io/zfb2w/](https://osf.io/zfb2w/).

## 2 Data

For the purposes of the State of Tax Justice 2024 report, we analyse aggregate country by country reporting (CBCR) data for the years 2016 to 2021 as published by the OECD in 2024. The dataset contains information on the activities of the multinational corporations (MNCs) headquartered in up to 52 countries in 2021. The dataset has been increasing steadily, from 26 reporting countries in 2016 to 52 in 2021. However, not all countries report data truly country-by-country. Some countries only report variables for themselves and the “rest of the world”, while some other countries only report variables for themselves and aggregated continents. The number of reporting countries with useful data is thus reduced to 39 in 2021, up from 19 in 2016. Table 1 sums up the situation.<sup>1</sup>

This section of the State of Tax Justice Report is largely based on the methodology developed by García Bernardo and Janský (2024). We use the OECD CBCR data to measure misaligned profits. The methodology is designed to identify high profits in jurisdictions with low economic activity, and low profits in jurisdictions with high economic activity and reassign profits to where real economic activity is undertaken. Once that step is done, we estimate the tax loss suffered by countries due to these misaligned multinational profits/shifted profits.

The methodology exploits CBCR data which include information on MNCs’ economic activity in jurisdictions where subsidiaries are located. The dataset was provided thanks to a CBCR regulation which stems from OECD Base Erosion and Profit Shifting (BEPS) Action 13 on CBCR. The regulation requires all large MNCs to report how much economic activity they have, how much profit they generate, and how much tax they pay in every individual country they operate in, including tax havens. The regulation impacts MNCs with consolidated group revenues of at least EUR 750 million, headquartered in any country which has adopted the CBCR regulation. As the main data source for our analysis, we use the CBCR data for large MNCs published by the OECD within the fourth edition of the Corporate Tax Statistics. The data for 2021 contains information for 52 headquarter countries (see Table 2) and was published in 2024 (alongside the years 2016 to 2020).

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<sup>1</sup>The 2016 and 2017 data also contain data on Chinese MNCs. However, they are not part of the 2018 dataset.

**Table 1.** Evolution of the data quality over time and countries that do not truly report country by country

Year	Reporting countries	Reporting countries with useful data	Countries reporting only for themselves and “rest of the world”	Countries reporting only for themselves and aggregated continents
2016	26	19	Finland, Ireland, Korea, Netherlands	Austria, Norway, Sweden
2017	38	28	Finland, Ireland, Korea, Netherlands	Austria, Greece, Isle of Man, Norway, Sweden, UK
2018	46	36	Finland, Hungary, Ireland, Korea, New Zealand	Austria, Greece, Isle of Man, Sweden, UK
2019	50	36	Czechia, Hungary, Ireland, Macau, New Zealand	Austria, Finland, Greece, Korea, Isle of Man, Mauritius, Poland, Sweden, UK
2020	52	39	Czechia, Hungary, Ireland, Macau, New Zealand	Austria, Finland, Korea, Isle of Man, Mauritius, Poland, Sweden, UK
2021	52	39	Czechia, Hungary, Ireland, Macau, Morocco, New Zealand	Austria, Finland, Korea, Mauritius, Poland, Sweden, UK

Sources: Authors using OECD data (2024).

Existing research compared the US CBCR data with other sources (Clausing 2020a; Garcia-Bernardo, Janský, and Tørsløv forthcoming) and established a good correlation between various types of data sources. Moreover, the CBCR data is outstanding in several dimensions.

One of the most obvious advantages of CBCR data over other data sources is its much more substantial country coverage. This is especially relevant for low- and middle-income countries and for selected parts of the world. For example, US CBCR data includes information on taxes and profits for 25 African countries while the frequently used data from the Bureau of Economic Analysis of the United States Department of Commerce only covers three. CBCR data includes data on large MNCs’ profits and tax payments in, for example, up to 169 (Switzerland) and 164 (Germany) jurisdictions in 2018 – 166 and 163 jurisdictions respectively for the data set limited to firms with positive profits. The exceptional data coverage provided by the OECD’s CBCR data thus enables us to collect evidence of profit shifting for many countries with low and middle per capita incomes. The superior coverage is one reason why UNODC and UNCTAD (2020) proposed to use this CBCR data for the Sustainable Development Goals indicator of illicit financial flows, likely in a similar way that we implement the profit misalignment method outlined below (Cobham and Janský 2020).

Notwithstanding the better country coverage compared to other data sources, the OECD’s CBCR data is far from complete. As shown in Table 3, in most reporting countries, the OECD’s CBCR data entails significantly fewer reporting MNCs than expected

**Table 2.** Countries reporting at least some CBCR data in the OECD database

Argentina	Finland	Latvia	Saudi Arabia
Australia	France	Lithuania	Singapore
Austria	Germany	Luxembourg	Slovenia
Belgium	Greece	Malaysia	South Africa
Bermuda	Hong Kong	Mexico	South Korea
Brazil	Hungary	Netherlands	Spain
Canada	India	New Zealand	Sweden
Cayman Islands	Indonesia	Norway	Switzerland
Chile	Ireland	Panama	United Kingdom
China*	Isle of Man	Peru	United States
Czechia	Italy	Poland	
Denmark	Japan	Romania	

Sources: Authors using OECD data (2024).

Notes: China does not have available data in this dataset for 2018 but does for 2016 and 2017..

based on Bureau van Dijk’s Orbis ownership database. Interestingly, however, the number of MNCs in some jurisdictions, notably the Cayman Islands and Ireland, is higher in the CBCR data than in Orbis. This could be due to the lack of transparency of Caymans or Ireland based MNCs, that will be cautious to reveal their existence and are not covered in Orbis, as a consequence. However, these MNCs might still be forced to provide a country by country report and therefore appear in the CBCR data. The imperfect company coverage revealed in Table 3 gives an indication of the level of uncertainty surrounding our estimates. We hope for a steady improvement of the data provided by the OECD to consistently improve our estimates.

A second advantage of CBCR data is that profits and taxes are defined consistently with the concepts of corporate profits and taxes (with some limitations, in particular the potential double counting of dividends, see below). By contrast, this is not the case with e.g. Bureau of Economic Analysis data where profits are imputed from a combination of net profits, intra-group dividends, interest paid, and other variables, as recently discussed by Blouin and Robinson (2020), Garcia-Bernardo, Janský, and Tørsløv (2021), Clausing (2020a), and Clausing (2020b). Since CBCR data offers the best available information on MNCs’ tax payments for many countries, it provides us with the first such dataset suitable for a high-quality cross-country comparison (for example, until now various proxies for profits were used, e.g. by Haberly and Wójcik (2015), Bolwijn, Casella, and Rigo (2018) or Damgaard, Elkjaer, and Johannesen (2019)).

**Table 3.** Number of reporting companies expected (according to Orbis) versus observed in the CBCR data

Country	Expected (Orbis)	Observed (CBCR)	Ratio	Country	Expected (Orbis)	Observed (CBCR)	Ratio
Panama	185	2	92.81	Mexico	310	69	4.50
Hungary	204	5	40.82	Sweden	447	103	4.34
Lithuania	128	4	32.05	Austria	340	82	4.15
Romania	128	4	32.05	Australia	454	132	3.45
Slovenia	161	6	26.96	Spain	441	132	3.35
Saudi Arabia	323	18	17.95	Italy	455	142	3.21
Greece	289	19	15.23	India	476	151	3.16
New Zealand	283	19	14.91	Switzerland	415	138	3.01
Chile	334	32	10.44	Netherlands	451	165	2.74
Argentina	219	21	10.44	Luxembourg	340	147	2.32
Poland	314	31	10.15	Canada	487	220	2.22
Indonesia	252	27	9.36	South Korea	518	245	2.11
Finland	380	52	7.32	France	479	232	2.07
Peru	185	26	7.14	Hong Kong	337	167	2.02
Malaysia	378	60	6.31	United Kingdom	526	387	1.36
Norway	374	61	6.14	Germany	517	387	1.34
Belgium	346	58	5.98	Japan	623	861	0.72
Denmark	401	69	5.82	United States	666	1641	0.41
Bermuda	393	70	5.62	South Africa	394	1136	0.35
Singapore	372	79	4.71	Cayman Islands	473	1535	0.31
Brazil	376	81	4.65	Ireland	378	1505	0.25

Sources: Authors using OECD and Orbis data (2024).

Third, CBCR data are provided in two separate data sets, for all large MNCs (“All Sub-Groups”) as well as for those large MNCs that have reported positive profits and so not losses in a given year (“Sub-Groups with Positive Profit”). The latter dataset is useful to estimate effective tax rates (ETRs). Though ETRs are not central to our analysis (see below), this data structure allows us to calculate them based on the data set for MNCs that have positive profits only, at the expense of a decrease in country coverage. By using the data with positive profits only, we avoid offsetting firms with losses and firms with profits and we can thus estimate ETRs more precisely. By contrast, data sets which include both profits and losses likely understate profits (since losses are included) and overstate ETRs (since taxes are paid by companies earning profits, typically, though losses are also included in the denominator). We use the dataset including all MNCs (both the ones that have reported profits and the ones that have reported losses) for

the misalignment method since for these purposes we prefer to have information on real economic activities of MNCs regardless of whether these MNCs are profit- or loss-making. The dataset including all MNCs is also more suitable for comparison with other datasets (e.g. from the Bureau of Economic Analysis). Unfortunately, both datasets might be affected by a practice where MNCs prefer to report losses in countries with high taxes while locating their profits in countries with low taxes.

While these advantages of CBCR data open new avenues for research, several challenges associated with the data remain. First, unfortunately, the data contain a certain extent of double counting in profit due to intercompany dividends – MNCs are instructed not to double count intercompany dividends in revenue but not so explicitly in profit. This potential double counting has been explored recently for US data by Horst and Curatolo (2020). We correct explicitly for double counting of dividends (see Section 4.1), and exclude stateless income, another potential source of double counting. Second, some countries are aggregated in country groups (like “Other Africa” or “Other Europe”) and these groups are not defined consistently. Section 4.2 explains how we handle this problem.

Further limitations of the CBCR data (e.g. revenues unavailable according to the location of the final customer) are discussed by the OECD, which published the data with an “Important disclaimer regarding the limitations of the country by country report statistics”, and by Garcia-Bernardo, Janský, and Tørsløv (2021) and Clausing (2020a).

### 3 Misalignment method: estimating the corporate tax abuse by multinational corporations

We estimate profit shifting based on profit misalignment. The misalignment method starts from the notion that profits should accrue where the economic activity takes place. Profit misalignment therefore measures shifted profits by the mismatch between reported profit ( $\pi$ ) and theoretical profits ( $p$ ), i.e. profits we would expect given the observed economic activity. We multiply shifted profits by the applicable corporate income tax rates (CITs) to obtain an estimate for tax revenue losses. The following section details our approach.

We start by **calculating theoretical profits**. In principle, a jurisdiction’s theoretical profits can be estimated based on a combination of labour, capital and revenue the MNC has in this jurisdiction. In the State of Tax Justice, we calculate theoretical profits by allocating 50% of the weight to employees (E), and 50% of the weight to wages (W). We base theoretical profits on employment related variables as these are hard to manipulate and data quality is relatively high in the CBCR data. While the number of employees represents an estimate for the workforce located in a given country, the wage component accounts for potential differences in labour productivity. Alternative formulas, e.g., based on sales or assets or a combination of all factors, yield similar results.

Formally, for each country  $i$  in which MNCs from parent jurisdiction  $j$  operate, we calculate the theoretical profits  $j$ ’s MNCs generate in  $i$  as follows. Note that MNCs from parent jurisdiction  $j$  operate in countries  $i = 1, i = 2, \dots, i = I$ .

$$p_{ij} = \sum_{i=1}^I \pi_{ij} \times \left( 0.5 \times \frac{W_{ij}}{\sum_{i=1}^I W_{ij}} + 0.5 \times \frac{E_{ij}}{\sum_{i=1}^I E_{ij}} \right)$$

For instance, if 10% of Indian MNCs' employees were located in Bangladesh and 10% of Indian MNCs' payroll was paid in Bangladesh, theoretical profits in Bangladesh should be 10% of all profits generated by Indian MNCs. Importantly, since MNCs can report zero or negative profits in a country with the goal of avoiding taxes, we use the data on all sub-groups for this calculation.

In a second step, we estimate profit shifting on a bilateral level. Profit shifted into country  $i$  or out of country  $i$  by MNCs from parent jurisdiction  $j$  ( $S_{ij}$ ) is calculated as the difference between profits reported by MNCs from parent jurisdiction  $j$  in country  $i$  ( $\pi_{ij}$ ) and theoretical profits in that country ( $p_{ij}$ ):

$$S_{ij} = \pi_{ij} - p_{ij}$$

$S_{ij}$  is negative if less profits are reported in country  $i$  than we would expect, given the economic activity. A negative  $S_{ij}$  thus indicates that profit is shifted out of jurisdiction  $i$ .  $S_{ij}$  is positive if more profits are reported in country  $i$  than we would expect, given the economic activity. A positive  $S_{ij}$  thus indicates that profit is shifted into jurisdiction  $i$ .

As we only aim to capture misaligned profits which are due to tax considerations, we set  $S_{ij}$  to zero whenever the ETR of the destination country of shifted profits is higher than 15%. We thereby assume that MNCs only involve in tax induced profit shifting if they can realize an ETR below 15% in the destination of profit shifting.

In a third step, we **obtain the total profit shifted into and/or out of a country**. We aggregate all misalignment estimates of country  $i$ , i.e. misalignment generated by MNCs from all parent jurisdictions  $j = 1, j = 2, \dots, j = J$  that report activity in country  $i$ . We do so separately for positive and negative misalignment values to allow for the possibility that a country might suffer from profit shifting but act as a destination for shifted profits at the same time. Total profit shifting estimates for jurisdiction  $i$  are consequently calculated as:

$$\text{Profit shifted out of country}_i = \sum_{j=1}^J S_{ij}^-$$

$$\text{Profit shifted into country}_i = \sum_{j=1}^J S_{ij}^+$$

In a final step, we **translate profits shifted into or out of a country in tax revenue losses**. We calculate tax revenue losses suffered by country  $i$  by multiplying profits shifted out of the country by the country's CIT ( $(CIT)_i$ ).

$$\text{Tax loss incurred}_i = \text{Profit shifted out of country}_i \times \text{CIT}_i$$

Reversely, we calculate tax revenue losses inflicted on other countries by multiplying profits shifted to country  $i$  by the average CIT of those countries that these profits are shifted away from. In particular, we calculate the average  $(CIT)_j$  by taking the weighted average of the CITs of all countries experiencing outward profit shifting by MNCs from parent jurisdiction  $j$ , weighted by their amount of outward shifted profits:

$$\text{Tax loss inflicted}_i = \sum_{j=1}^J S_{ij}^+ \times \text{CIT}_j$$

Unlike in previous versions of the State of Tax Justice, where we used ETRs to calculate these losses, we use statutory rates. We prefer statutory rates as countries have actively decided that corporates should pay these rates, in the best case as a result of a democratic process. As such, these rates that should be applied on profits by MNCs who choose to operate in the country.

## 4 Accounting for shortcomings of the OECD’s CBCR data

As outlined previously, the OECD’s aggregated CBCR data comes with a number of shortcomings. To obtain as trustworthy estimates as possible, we diligently clean the data. In the following section, we first describe our approach to correct for the double counting of dividends. We then explain how we deal with aggregated country groups and missing data.

### 4.1 Correcting for the double counting of dividends

CBCR data double-count profits as several companies include tax-exempt dividends flowing across subsidiaries as profit. We use a highly conservative correction applied independently to the domestic operations and foreign operations of MNCs. The correction is applied to all subgroups (if their total profits are positive) and the subgroup with positive profits. From 2020 on, there are rules in place on how to deal with intra-company dividends. If companies have followed these rules, and countries have enforced these rules, the double counting should not be a problem from 2020 on. The OECD reports that the problem might persist. We assume that the issue is solved for the years 2020 and 2021, as we expect the OECD to adhere to the high standards they set themselves.

We correct the domestic profits of multinational corporations based on reports provided by the governments and – when such reports are unavailable – based on the academic literature. In particular, we remove 60.69 per cent of domestic profits for Sweden and 50% of domestic profits for Italy based on the analyses published by the two countries.<sup>2</sup> For the Netherlands and the United Kingdom, we use the adjusted values that the countries publish.<sup>3</sup> We correct the data for the United States (where 74 per cent of domestic profits are double counted) based on the analysis by Garcia-Bernardo, Janský, and Zucman (2022). For Belgium, Isle of Man and Singapore, countries with very low ETRs, we remove 50 per cent of all domestic profits. For all other countries, we remove 35 per cent of domestic profits, except for Mexico and Slovenia, where double counting does not seem to be an issue since domestic ETRs are higher than foreign ETRs and except for Ireland, the Cayman Islands, and Luxembourg, where total profits are negative in 2018.

We correct the foreign operations of multinational corporations using the analysis by Garcia-Bernardo, Janský, and Zucman (2022) on US multinational corporations, reducing foreign profits by 39%. For tax havens, we remove 10 per cent of foreign profits.

As a result of our correction, the effective tax rates faced by foreign multinational corporations in a country are similar to the effective tax rates faced by domestic multinational corporations. This is not the case in the original data, where domestic ETRs are consistently smaller than foreign ETR, indicating that our correction is useful.

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<sup>2</sup>See [Sweden](#) and [Italy](#).

<sup>3</sup>See [Netherlands](#) and [United Kingdom](#).



## 4.2 Dealing with aggregated country groups

The second important data limitation concerns the combinations of countries in aggregated categories (e.g. “Other Africa” or “Other Europe”). The aggregation criterion is different for different countries. If we decided to ignore these grouped data, we would be missing a significant part of the operations in those countries, leading to an underestimation of the extent of profit shifting. We address these biases we assume that the MNEs of the countries that report aggregated country groups behave like the “average” MNE in the countries that report correctly. To do that, we first aggregate the variables reported by the CBCR by partner countries. For instance, for the year 2016 we see that on aggregate, there are 80 million employees reported in total by the countries that report correctly. Secondly, we look at the share corresponding by partners. For instance, we observe that of those 80 million employees reported by the countries that report correctly, 18 million employees are reported in the USA. In short, roughly 24% of all employees reported in the CBCR in 2016 are in the USA. Thirdly and lastly, we assume that 24% of the total employees reported by the “bad” reporters are assigned to the US. We repeat this with the rest of the economic variables used in the regression. This allows us to assign the aggregate numbers of the countries that report country groups to a country and offer a closer estimate to its real tax abuse.

## 4.3 Estimating a global number accounting for countries that do not report at all

The third limitation of the OECD’s CBCR data concerns the lack of reporting by some countries. There is no way to overcome that limitation that does not include making strong assumptions about the number of MNEs in non-reporting countries. Hence, we decided to just offer a scaled-up estimate of the global corporate tax abuse - without assigning that extra corporate tax abuse to the countries that are losing tax revenues.

Our reasoning is the following: the CBCR data covers a substantial amount of the world’s Multinationals. There are around 10.000 multinationals in 2021, of which CBCR covers around 7600. In short, the CBCR covers 76% of all MNEs, and 24% are not covered in 2021. We assume that the MNEs not covered behave like those covered. Hence, we scale up the aggregate number for 2021 by  $(1+0.24)$  and that gives the scaled-up total estimates for profit shifting. We then work backwards to estimate how many MNEs are uncounted each year. We assume that the number MNEs is growing each year at the same rate of growth that they are growing in the initial reporters. In short, if the countries that started reporting in 2016 see an increase of 3% in the number of MNEs they report, we assume that the world sees a similar increase in the number of MNEs. This allows us to see the number of uncounted MNEs by CBCR, and to scale up the aggregate data.

## 5 Conclusion

This methodological note has outlined the approach used to estimate corporate tax abuse by multinational corporations as presented in the State of Tax Justice 2024. By leveraging the OECD’s aggregate CBCR data, we have provided insights into profit misalignment and the resulting tax revenue losses across countries. While the CBCR dataset offers unprecedented coverage and consistency, we have highlighted key limitations, including issues of data aggregation, double counting, and incomplete reporting. These challenges

necessitate careful adjustments and robustness checks to ensure the reliability of our estimates.

Our methodology—grounded in the allocation of theoretical profits based on real economic activity—enables us to detect profit shifting patterns and quantify tax losses with greater accuracy than previously possible. This evidence is critical for policymakers, particularly in low- and middle-income countries, as they seek to address the economic and social harms caused by corporate tax abuse.

Despite its imperfections, the CBCR dataset remains a vital tool for enhancing transparency and accountability in global taxation. As the quality and scope of this data improve, so too will our ability to refine these estimates. Future work will focus on integrating additional data sources and refining the methodologies to account for new challenges, further supporting the global effort to curb tax avoidance and promote fairer tax systems.